

wonder would be that parthenogenesis did not occur much oftener than it does. On any ordinary theory of reproduction the formation of graft-hybrids, and the action of the male element on the tissues of the mother-plant, as well as on the future progeny of female animals, are great anomalies; but they are intelligible on our hypothesis. The reproductive organs do not actually create the sexual elements; they merely determine the aggregation and perhaps the multiplication of the gemmules in a special manner. These organs, however, together with their accessory parts, have high functions to perform. They adapt one or both elements for independent temporary existence, and for mutual union. The stigmatic secretion acts on the pollen of a plant of the same species in a wholly different manner to what it does on the pollen of one belonging to a distinct genus or family. The spermatophores of the Cephalopoda are wonderfully complex structures, which were formerly mistaken for parasitic worms; and the spermatozoa of some animals possess attributes which, if observed in an independent animal, would be put down to instinct guided by sense-organs,—as when the spermatozoa of an insect find their way into the minute micropyle of the egg.

The antagonism which has long been observed,<sup>55</sup> with certain exceptions, between growth and the power of sexual reproduction<sup>56</sup>—between the repair of injuries and gemmation—and with plants, between rapid increase by buds, rhizomes, &c., and the production of seed, is partly explained by the gemmules not existing in sufficient numbers for these processes to be carried on simultaneously.

<sup>55</sup> Mr. Herbert Spencer ('Principles of Biology,' vol. ii. p. 430) has fully discussed this antagonism.

<sup>56</sup> The male salmon is known to breed at a very early age. The Triton and Siredon, whilst retaining their larval branchiæ, according to Filippi and Duméril ('Annals and Mag. of Nat. Hist.,' 3rd series, 1866, p. 157), are capable of reproduction. Ernst Haeckel has recently ('Monatsbericht Akad. Wiss. Berlin,' Feb. 2nd, 1865) observed the surprising case

of a medusa, with its reproductive organs active, which produces by budding a widely different form of medusa; and this latter also has the power of sexual reproduction. Krohn has shown ('Annals and Mag. of Nat. Hist.,' 3rd series, vol. xix., 1862, p. 6) that certain other medusæ, whilst sexually mature, propagate by gemmæ. See, also, Kolliker, 'Morphologie und Entwicklungsgeschichte des Pennatulidenstammes,' 1872, p. 12.