subjects, not hitherto discussed, must be treated at disproportionate length. In the Second Part the hypothesis will be given; and after considering how far the necessary assumptions are in themselves improbable, we shall see whether it serves to bring under a single point of view the various facts.

PART I.

Reproduction may be divided into two main classes, namely, sexual and asexual. The latter is effected in many ways—by the formation of buds of various kinds, and by fissiparous generation, that is by spontaneous or artificial division. It is notorious that some of the lower animals, when cut into many pieces, reproduce so many perfect individuals: Lyonnet cut a Nais or freshwater worm into nearly forty pieces, and these all reproduced perfect animals.[2] It is probable that segmentation could be carried much further in some of the protozoa; and with some of the lowest plants each cell will reproduce the parent-form. Johannes Müller thought that there was an important distinction between gemmation and fission; for in the latter case the divided portion, however small, is more fully developed than a bud, which also is a younger formation; but most physiologists are now convinced that the two processes are essentially alike.[3] Prof. Huxley remarks, "fission is little "more than a peculiar mode of budding," and Prof. H. J. Clark shows in detail that there is sometimes "a compro- "mise between self-division and budding." When a limb is amputated, or when the whole body is bisected, the cut extremities are said to bud forth;[4] and as the papilla, which is first formed, consists of undeveloped cellular tissue like that forming an ordinary bud, the expression is apparently correct. We see the connection of the two processes in

[2] Quoted by Paget, 'Lectures on Pathology,' 1853, p. 159.

[3] Dr. Lachmann, also, observes ('Annals and Mag. of Nat. History,' 2nd series, vol. xix., 1857, p. 231) with respect to infusoria, that "fissa- "tion and gemmation pass into each "other almost imperceptibly." Again, Mr. W. C. Minor ('Annals and Mag. of Nat. Hist.,' 3rd series, vol. xi. p. 328) shows that with Annelids the distinction that has been made between fission and budding is not a fundamental one. *See*, also, Professor Clark's work, 'Mind in Nature,' New York, 1865, pp. 62, 94.

[4] *See* Bonnet. 'Œuvres d'Hist. Nat.,' tom. v., 1781, p. 339, for remarks on the budding-out of the amputated limbs of Salamanders.