

CHAPTER XXIV.

LAWS OF VARIATION—USE AND DISUSE, ETC.

**NISUS FORMATIVUS, OR THE CO-ORDINATING POWER OF THE ORGANISATION—
ON THE EFFECTS OF THE INCREASED USE AND DISUSE OF ORGANS—
CHANGED HABITS OF LIFE—ACCLIMATISATION WITH ANIMALS AND PLANTS
—VARIOUS METHODS BY WHICH THIS CAN BE EFFECTED—ARRESTS OF
DEVELOPMENT—RUDIMENTARY ORGANS.**

IN this and the two following chapters I shall discuss, as well as the difficulty of the subject permits, the several laws which govern Variability. These may be grouped under the effects of use and disuse, including changed habits and acclimatisation—arrest of development—correlated variation—the cohesion of homologous parts—the variability of multiple parts—compensation of growth—the position of buds with respect to the axis of the plant—and lastly, analogous variation. These several subjects so graduate into one another that their distinction is often arbitrary.

It may be convenient first briefly to discuss that co-ordinating and reparative power which is common, in a higher or lower degree, to all organic beings, and which was formerly designated by physiologists as *nisus formativus*.

Blumenbach and others¹ have insisted that the principle which permits a Hydra, when cut into fragments, to develop itself into two or more perfect animals, is the same with that which causes a wound in the higher animals to heal by a cicatrice. Such cases as that of the Hydra are evidently analogous to the spontaneous division or fissiparous generation of the lowest animals, and likewise to the budding of plants. Between these extreme cases and that of a mere cicatrice we have every gradation. Spallanzani,² by cutting off the legs and tail of a Salamander, got in the course of three months six crops of these members; so that 687 perfect bones were reproduced by one animal during one season. At whatever point

¹ 'An Essay on Generation,' Eng. transl., p. 18; Paget, 'Lectures on Surgical Pathology,' 1853, vol. i. p.

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² 'An Essay on Animal Reproduction,' Eng. transl., 1769, p. 79.