

organisms, it is divided into many stages, allocated to special cells or to quite distinct classes of beings, some of which, like plants, take upon themselves the first important steps of the anabolism, so that others—the animals—may carry it a stage higher, preparing a discharge, or catabolism, which becomes more and more effective, till it reaches the unique nervous function which accompanies the highest phenomenon of animal activity—the mental process. Claude Bernard¹ has put into classical words the rationale of this process. “If, in the language of a mechanic, the vital phenomena—namely, the construction and destruction of organic substance—may be compared to the rise and fall of a weight, then we may say that the rise and fall are accomplished in all cells, both plant and animal, but with this difference, that the animal element finds its weight² already raised up to a certain level, and that hence it has to be raised less than it subsequently falls.

¹ ‘Phénomènes de la vie,’ &c., vol. ii. p. 513. It is one of Claude Bernard’s greatest merits to have corrected the earlier formula in which the circulation of matter had been expressed. Dumas and Bous-singault had said: “L’oxygène enlevé par les animaux est restitué par les végétaux. Les premiers consomment de l’oxygène; les seconds produisent de l’oxygène. Les premiers brûlent du carbone; les seconds produisent du carbone. Les premiers exhalent de l’acide carbonique; les seconds fixent de l’acide carbonique.” On this passage Claude Bernard has the following comment: “Cette loi qui sous la forme précédente exprime avec vérité le mécanisme d’une des plus grandes harmonies de la nature est une loi cosmique et non une loi

physiologique. Appliquée en physiologie, elle n’explique pas les phénomènes individuels: elle exprime comment l’ensemble des animaux et l’ensemble des plantes se comportent en définitive par rapport au milieu ambiant. La loi établit la balance entre la somme de tous les phénomènes de la vie animale et de la vie végétale: elle n’est point l’expression de ce qui se passe en particulier dans un animal ou une plante donnés” (p. 512). This false direction, which had been introduced into physiology a generation earlier, Claude Bernard corrected by the view that the circulation of matter takes place not only between the two kingdoms of nature but in every elementary organism.

² Or its potential.