

"Energie-wechsel"<sup>1</sup> (a physical process). Bio-chemistry had to be supplemented by bio-physics. With a clear anticipation of the correcter and fuller view, Schwann introduced the Greek term "metabolê." It is the merit of Prof. Michael Foster to have domiciled this useful and all-comprising technical term in English physiological

<sup>1</sup> Du Bois-Reymond ('Reden,' vol. ii. p. 220) mentions this as the third important gain which physiological science had to register since the appearance of Müller's book; the first and second being the cellular theory and the mechanico-physical method, both largely owing to Schwann. This was written just before the great influence of Darwin began to be felt. In the ideas introduced by Helmholtz, which clarified the conception of force, he sees the "key which opens a comprehension of the 'Stoffwechsel' in plants and animals." The term "Stoffwechsel," also "Stoffumsatz," or simply "Umsatz," has been quite familiar in German physiological literature during the whole of the century. I cannot find any generally accepted term in English literature before the introduction of Schwann's term "metabolic phenomena," which, I believe, was first adopted by Sir M. Foster, and is now quite domiciled in English text-books and translations. The passage in Schwann's 'Microscopical Researches' is as follows ('Sydenham Society's Translation,' p. 193): "The phenomena attending the formation of cells may be arranged in two natural groups: first, those which relate to the combination of the molecules to form a cell, and which may be denominated the *plastic* phenomena of the cell; secondly, those

which result from chemical changes, either in the component particles of the cell itself or in the surrounding cytoplasm, and which may be called *metabolic* phenomena (τὸ μεταβολικόν, implying that which is liable to occasion or to suffer change)." It will be seen later on that the term metabolism is a peculiarly happy one, as it lends itself by a slight change in the prefix to denote the twofold process of building up and of running or falling down, which constitutes the changes peculiar to protoplasm as the constituent element of all organised substance. It is, accordingly, somewhat surprising that the term has found so little favour abroad. In France, where this twofold movement has long ago been recognised as one of the characters of the living process, the terms "composition et décomposition" (de Blainville), "organisation et désorganisation" (Claude Bernard), "assimilation et désassimilation," have been variously adopted (see Claude Bernard, 'Phénomènes de la vie,' vol. i. p. 36, &c.) M. Yves Delage ('L'Hérédité,' p. 53) says: "Les Anglais ont substitué à ces expressions si significatives: *nutrition, assimilation, désassimilation*, une terminologie qui a dû leur paraître bien belle, car ils l'ont tous adoptée avec un empressement remarquable; c'est celle de *métabolisme*," &c.