chemist puts together these substances in the laboratory are rarely the methods adopted by nature in the living organism, and in many cases the product itself, though apparently the same, is yet essentially different.[1]

[1] This touches on a very important point, which is much emphasised in all the best modern treatises on the subject. Claude Bernard in all his writings insisted on the fundamental difference between the processes going on in the organism and those that go on in the laboratory of the organic chemist, though the two produce frequently the same apparent result. "Si les forces que l'être vivant met en jeu dans ses manifestations vitales ne lui appartiennent pas et rentrent toutes dans les lois de la physico-chimie générale, les instruments et les procédés à l'aide desquels il les fait apparaître lui sont certainement spéciaux. En effet, l'organisme manifeste ses phénomènes physico-chimiques ou mécaniques à l'aide des éléments histologiques cellulaires, épithéliaux, musculaires, nerveux, &c. Il emploie donc de procédés, c'est-à-dire des outils organiques qui n'appartiennent qu'à lui. C'est pourquoi le chimiste, qui peut refaire, dans son laboratoire, les produits de la nature vivante, ne saurait jamais imiter ses procédés, parce qui il ne peut pas créer les instruments organiques élémentaires qui les exécutent. Cela revient à dire que tous les appareils des êtres organisés ont une morphologie qui leur est propre" ('Rapport,' &c., 1867, p. 135). Quite recently Bunge (*loc. cit.*, p. 313) has said, "All our artificial syntheses can only be achieved by the application of forces and agents which can never play a part in vital processes, such as extreme pressure, high temperature, concentrated mineral acids, free chlorine—factors which are immediately fatal to the living cell. . . . It follows that the animal body has command of ways and means of a totally different character, by which the same object is gained." A very interesting speculation, referring specially to this point, was put forward by the eminent physiologist, Prof. E. Pflüger of Bonn, in the year 1875. It is fully discussed in Verworn's frequently quoted work on General Physiology (pp. 304, 311, 482). The theory is based upon the remarkable part which the compound radicle cyanogen seems to play in the organism. Pflüger starts from the fundamental characteristics of the substance called proteid, with which life is inseparably connected. Proteid is known to exist in a stable form in food-stuffs, for instance in egg albumen. But this is not the same as the proteid contained in living matter. In the latter it is not stable, but is being continually decomposed. The decomposition was found to be due to the oxygen that occurs in the living proteid molecule. This oxygen, which is intramolecular, being continually received from outside by respiration, transforms the more stable molecule into an unstable labile molecule. In further following the clue afforded by this property, and comparing the decomposition products of living proteid with those obtained by artificial oxidation of dead proteid, Pflüger is led to the conclusion that the presence of the radicle cyanogen in the living proteid will explain the difference. "In the formation of cell-substance—*i.e.*, of living proteid—out of food proteid, a change of the latter takes place, the atoms of