

zoologist rarely knows enough chemistry, the chemist rarely knows enough zoology, to enable either to contribute much to comparative physiology. And as for the chemical physiologist, expert as to man and mammals, he has too many pressing problems of his own—with attractive practical outcome too—to be readily tempted aside by the digestive cæca of the star-fish or the mid-gut gland of the snail. One zealous worker in the latter part of the Victorian era deserves to be commemorated, C. F. W. Krukenberg. He realized the dignity of the problem to which he set himself, and the results recorded in his *Studien* and *Vorträge* remain a monument to the industry of an unfortunately short life. Particularly notable too has been the work of Verworn on the Protozoa, which form the *Ultima Thule* of the physiologist. Ingenuity of experiment and fertility in suggestion are characteristic of his work, the results of which are summed up in his stimulating *Allgemeine Physiologie* (2nd ed., 1897).

Since the time of Johannes Müller the science of physiology has become highly specialized, and it is necessary to distinguish several separate lines of advance which have the common aim of storming the citadel of life.

Thus there is the study of the chemical aspect of vital phenomena, generally referred to, not very happily, as chemical physiology or physiological chemistry. With the beginning of this we may associate the names of Wöhler and Liebig, and the progress of the study should be connected, on the one hand, with the development of organic chemistry, on the other hand, with the deepening of analysis, which forced the physiologist from the investigation of the functions of organs to an inquiry into the metabolism or *Stoffwechsel* of the living body.

To appreciate the importance of even the early steps we must remember that before Liebig's day the majority of chemists held that their laws did not apply in the world of life, and even the great Liebig himself regarded the chemical processes which occur in organisms as distinctly subsidiary to the operations of the *Lebenskraft* or vital force.