

formation, growth, division, and maintenance of form amidst change of matter and alternation of function—constitutes the “prolegomena” of physiology, and a comparison of Prof. O. Hertwig’s recent publication on the “cell” with the introduction to Johannes Müller’s ‘Physiology’ marks well the change of ideas which half a century has produced. And we must so much the more admire the clear anticipation of Schwann, as he was not in possession of the full conception of energy in its two interchangeable forms of kinetic and potential energy, which was developed in the course of the two decades following his publication. Schwann not only conceived the cell to be the morphological unit of all living matter, but he also saw that “cell formation must be the general principle of organic development, and that there can be only one such principle.” In the third section of his ‘Microscopical Researches’ he founds on this “his theory of organisms, and rejects distinctly therein all teleological explanations based upon a vital force acting according to final purposes.” He thus showed “that the only essential property of all living matter—viz., growth—is not inaccessible to a physical explanation,” and he did this at a time “when Liebig had not yet taught physiologists the chemical changes which take place in living tissues.” These ideas were only partially adopted by Johannes Müller and other leading physiologists of the day. Schwann’s view could only be consistently elaborated in proportion as to the older conception of a “Stoffwechsel” (a chemical process) there was added that of a “Kraft”- or