

mathematical formulæ, and expand their view through applications: the greatest progress in the natural sciences has been made by those who started with a large and comprehensive view of things natural, and gradually descended into detail. Newton, Lagrange, Fresnel, and Helmholtz are good examples of the former; Humboldt, von Baer, Claude Bernard, and Darwin of the latter.

Now, it is a frequent experience that in the study of things natural, through the unavoidable process of dissection and analysis, the subsequent synthesis or summing up has not carried the student back to the real thing from which he started, but to some artificial product differing essentially from the natural object. The real essence of the thing seemed lost when its parts were examined by themselves or in their apparent aggregation. A prominent example of this kind is to be found in the living organism. Theories have accordingly been formulated which looked upon life as a special principle to be superadded to any conceivable aggregation of mechanical processes, in order to raise them from the lifeless into the living order of things. The last chapter dealt with the various biological hypotheses, of which three are conspicuous: the purely mechanical, according to which the living organism is merely a very complicated chemical molecule; the vitalistic, which establishes an essential difference between the action and constitution of a living and a lifeless unit of matter; and an intermediate view, which looks upon organisms as manufactured machines built up according to some plan, design, or idea, the nature of which can be further inquired into, but which does not try to throw any additional