

No theory of the nature and origin of life has gained universal acceptance: the very alphabet of biology, or the science of life, has still to be written. We fancy we possess some knowledge of certain forms or processes which are common to all living matter, but the description of these has to be kept in the most general, not to say the vaguest, terms: quite unlike the rudiments of other scientific theories which deal with mathematically defined conceptions expressed in distinct language and formulæ.

2.  
Vagueness  
of biological  
theories.

For instance, if we take one of the best founded of modern biological theories—the cellular theory<sup>1</sup> of living matter—we notice that the pretty definite description which the early supporters of this theory—Schleiden and Schwann—gave of this morphological unit of vegetable and animal structure has been displaced by much vaguer descriptions. Schleiden and

<sup>1</sup> The history of the cellular theory has been written from various points of view in all the three languages. I give the titles of a few out of the great abundance of excellent treatises. Foremost stands the work of Prof. Oscar Hertwig of Berlin, 'The Cell: Outlines of General Anatomy and Physiology.' English transl. by Campbell (1895). Then there is the more recent book by Prof. Valentin Häcker of Freiburg, 'Praxis und Theorie der Zellen- und Befruchtungslehre' (Jena, 1899). In the French language we have the great compendium of biological theories by M. Yves Delage, 'La Structure du Protoplasma et les Théories sur l'Hérédité,' &c. (Paris, 1895). In English we have the valuable treatise of Prof. E. B. Wilson, 'The Cell

in Development and Inheritance' (1896), and the excellent little work of Prof. James Arthur Thomson, 'The Science of Life' (1899). Of high importance are also the older works of the great master and brilliant expositor in biological science, Claude Bernard, notably his celebrated lectures entitled "Leçons sur les Phénomènes de la vie communs aux animaux et aux végétaux" (1878 and 1879), which every philosophical student of biology should read, as well as his excellent posthumously published little work, 'La science expérimentale,' 1890. Of him M. Dumas says that he has "épuisé ses forces à l'étude du grand mystère de la vie, sans prétendre à pénétrer toutefois son origine et son essence" ('Sci. Exper.,' p. 6).