

which operate in producing the various phenomena peculiar to organized or living beings, and which cannot be referred solely to the agency of the physical forces. These phenomena are growth, development, assimilation, sensation, voluntary motion, &c. All organized bodies, no matter how complex soever they may be in their structure, have their origin in nucleated cells. There is no appreciable difference between the germ of the lowest vegetable and that of the highest animal. The simple cell may be regarded as the type of organization; and in the development and multiplication of cells, we have an exhibition of vital action in its simplest and least complicated form. In the development of a cell, the germ, by the exercise of that power to which the term vital has been applied, attracts to itself the nutrient particles of the substances by which it is surrounded, elaborates them into certain proximate principles, by the incorporation of which into its own structure, it increases in size. Shortly, the cell wall, a transparent, homogeneous membrane; and the cavity, containing a fluid either limpid and transparent, or varying in tint as the case may be, become apparent. The process of assimilation goes on—the cell enlarges, and the fluid in its interior, heretofore apparently homogeneous, now exhibits a finely granular appearance. The minute granu aggregate and form molecules of a larger size, which adhere to the side of the cell wall, from which, however, they soon become separated. After a time, rupture of the cell-wall takes place, the numerous molecules are set free, and become in their turn the elaborators of new cells. In some instances, however, complete development of cells occurs within the parent cell.

If we look now to the vegetable germ, we find that, to exhibit the series of phenomena which we have mentioned, certain conditions are absolutely demanded. These are, that the germ be exposed to the influences of Heat, Light and Moisture. The flowerless plants belonging to the fresh water Algæ, being composed of cells which have an independent existence, afford the best study of cell-life, and the effects of extraneous influences in determining and continuing such life. The germ of the *Hæmatococcus binalis*, or any other of the Algæ, when exposed to light, at a certain temperature, manifests vital activity by absorbing from the water in which it is situated carbon, nitrogen, hydrogen and oxygen; and by the arrangement of these constituents into combinations, which it assimilates into its own structure, and which serve, not only for its own sustentation, but also, for the production of new cells. The carbon is obtained from carbonic acid, and the nitrogen from ammonia; which chemical compounds are destroyed by the vital power operating through the material of the germ, and subsequently of