

in the component cells. Perhaps one might say that the suggestion was, that the cell was in organic processes like the molecule in the inorganic world.

The investigation of the structure of cells soon outran the physiological interpretation of that structure; for it must be universally confessed that a group of cells—in a ganglion, or a digestive gland, or a kidney—performs functions which we are often quite unable to connect in any luminous way with the known facts about their organization or mutual relations. On the one hand, we see complexities of cell-structure whose meaning is unknown or uncertain; on the other hand, we observe functions which we cannot correlate with any known organization.

This double break-down has led many to adhere to Huxley's statement (1853), "The cells are no more the producers of the vital phenomena than the shells scattered along the sea-beach are the instruments by which the gravitative force of the moon acts upon the ocean. Like these, the cells mark only where the vital tides have been, and how they have acted."

On the other hand, if we avoid word-quibbles, and define the cell as a unit area of living matter (cytoplasm and nucleoplasm); if we study the phenomena of cell-life in that natural analysis which is afforded us by the unicellular organisms; if we carefully estimate what is known as to complex internal organization of cells and its changes with change of function and external conditions; we may perhaps advance to a more hopeful position—that cellular physiology is rather beginning than ended.

Although we do not know the whole meaning of the nucleus, we know from the experiments of Balbiani, Gruber, Bruno Hofer, Verworn, and others, that a maintenance of the inter-relations between nucleoplasm and cytoplasm is essential to the continuance of cell-life. We cannot explain the activity of the nerve-cells, but the discovery of their dendritic ramifications and extraordinary complication of inter-relations has *some* meaning to us. Or, again, that an exhausted nerve-cell should show more or less nuclear collapse (Hodge,