

CURRENT LITERATURE

BOOK REVIEWS

Physical chemistry and biology

MCCLENDON¹ has performed a valuable service to biologists by organizing the more important facts and principles of physical chemistry that have to do with biological problems. These are stated briefly and concisely, and the usefulness of the book is increased by clearness in definitions. Several passages in the introduction are suggestive of helpful lines of work and interpretation.

The following paragraph from the preface suggests the viewpoint: "The purpose of this book is not to go far into physical chemistry, but to develop a tool for physiological research. Lengthy discussions of debated questions are avoided by tentatively accepting the hypothesis which fits the most facts, until a better one appears. For further discussion of any subject the reader is referred to the literature list and index. For facts, however, he is referred to nature. It is not to be hoped that theories should coincide exactly with data available at present. Even in the most exact branches of chemistry the atomic weight determinations, for instance, do not exactly coincide with the values calculated from the atomic numbers, and there seems to be some doubt as to whether lead is one element or several. How much more uncertainty there should be about physiology, where determinations are vitiated by the great variability of the material and its physiological states."

The book seems to be more from the biological standpoint and much better balanced than some other books on the relation of physical chemistry to biology that have come to the attention of the reviewer. In the introduction the author says, "Though the problems considered in this book are physiological, the methods of attack are chiefly those of the physical chemist." The book should do much toward encouraging the kind of work and thought that is neither distinctly chemical, in the sense of ignoring the structures and physical environment within which the reactions must take place in organisms, nor yet strictly biological, in the sense of ignoring any of the chemistry involved.

When the author states (p. 1) that the methods that may be applied to the interior of living cells are at present very few and concerned chiefly with the inorganic constituents, he is putting entirely too low an estimate on micro-chemistry as a means of investigation. It is true that this is as yet an imperfect tool, but still it is useful in a great many cases in detecting organic compounds as well as inorganic. While his statement that "modern biochemistry is therefore not yet concerned directly with the composition of normal living

¹ MCCLENDON, J. F., *Physical chemistry of vital phenomena*. For students and investigators in the biological and medical sciences. 8vo. pp. vi+240. *figs.* 30. Princeton Univ. Press. 1917.

cells, but with their decomposition products and the exchange between the cell and its surroundings," and that from our knowledge of these "we may speculate on the composition of the cell and the changes that go on in it during functional activity," represents two lines along which productive work is being done and will continue to be done, he is leaving in the background a third line which has also proved helpful and promises still more for the future.

We might wish that the author had given more recognition to the fact that many plant processes are conditioned by the permeability or impermeability of non-living plant membranes. These, however, are very minor criticisms on a book which commends itself strongly by its many excellent features. Among the important topics discussed in the introduction are viscosity as a factor in diffusion, surface phenomena, and the relation of semipermeability to electric phenomena.

His discussion of the plasma membrane (p. 94) as a separate phase which may change with the physiological condition of the cell, and of the protoplasm as sometimes consisting of as many as four phases, in all of which partition solubility must be considered, as well as the molecular condition of each solute in each phase and in the bathing medium, leads him to the conclusion that "all of these factors make the subject of cell permeability a very complex one, no general rules without exception having been found. All we can do at present is to collect data on the permeability of cells to various substances." It is to be hoped that this will commend itself so strongly to biologists that we shall have a larger output of data and a smaller output of theories.

The following shortened chapter headings will suggest the general scope of the book: electrolytic dissociation; osmotic pressure; hydrogen and hydroxyl ion concentration; surface tension and absorption; electrolytes, non-electrolytes, and colloids; enzyme action; permeability and its changes; negative osmosis; anesthesia and narcosis; amoeboid motion, cell division and parthenogenesis; muscular contraction; blood and other cell media.

The "chemical summary" in the appendix will be very useful. The literature list includes over 1500 papers arranged alphabetically according to authors. References in the text to this list facilitate more detailed study of any desired topic. Instead of the conventional index to the text, there is an index to this literature list.—GEORGE B. RIGG.

NOTES FOR STUDENTS

Taxonomic notes.—BLAKE² has described a new *Rudbeckia* (*R. Deamii*) from Indiana, closely allied to *R. speciosa*.

COKER³ has published a detailed and handsomely illustrated monograph of the *Amanita* group as represented in the eastern part of the United States.

² BLAKE, S. F., A new *Rudbeckia* from Indiana. *Rhodora* 19:113-115. 1917.

³ COKER, W. C., The *Amanitas* of the eastern United States. *Jour. Elisha Mitchell Sci. Soc.* 33:1-88. *pls.* 69. 1917.