Books

Biophysics

Progress in Biophysics and Biophysical Chemistry, Volume I. Edited by J. J. Randall and J. A. V. Butler. 279 pp. Academic Press, Inc., New York, 1950. $6.80.

This book might perhaps be characterized as a group of unrelated review articles on certain selected subjects of current interest in biophysics and what the editors call biophysical chemistry. No attempt is made to give a comprehensive coverage of the whole field. Each author has written a critical review of his own field, and has freely presented his own points of view.

The first chapter deals with properties of solutions of large molecules. It considers the experimental methods for studying large molecules, and gives a critical and mathematical evaluation of them. There is also an extensive review of the known molecular constants of proteins.

The second chapter on Fundamental Structures in Biological Systems deals almost exclusively with the results of x-ray diffraction studies of proteins and polysaccharides. It is an excellent review of the work of Astbury and his group.

The section on the scattering of visible light and x-rays by solutions of proteins is short but complete. Scattering measurements have given a good deal of information about the size, shape and behavior of proteins in solution and this is a good account of the accomplishments and limitations of the method, with just enough of the theoretical background to give the necessary cohesion to the account.

The section on bioelectric potentials covers only that part of the subject dealing with steady potentials which have been observed in and around biological systems of various kinds. It is a long and not very critical review of a very controversial subject. However, the reviewer does attempt to give a review of the underlying mechanisms responsible for the production of these potentials.

The next section is a short account of the potentialities of phase-contrast microscopy. The section on local refractometry is a theoretical treatment of certain phases of microscopy, and is of use more to people interested in designing new microscopes than as a guide to the intelligent use of existing ones. There is an excellent chapter on the use of soft x-rays in an assay of biological material. This technique allows the quantitative analysis of very small volumes under special conditions. It is a very interesting application of x-ray absorption methods, but would seem to have a rather limited usefulness in biology.

There is an excellent chapter on the tolerance of man for radioactive isotopes. This is a subject which has been extensively treated in a number of places, but usually with the result that the reader is filled with fear at the thought of working with radioactive isotopes. This treatment gives a sound basis for the currently accepted tolerance values, and tends to dispell fear rather than create it.

The last chapter, on the mechanical properties of fibers and muscles, approaches the subject from a very fundamental point of view. A thorough thermodynamic treatment of elastic strains is followed by a discussion of power cycles and heat engines as applied to elastic bodies. These ideas are then applied to muscle, using such pertinent data as exist on the mechanical and thermal properties of muscle.

The book is written for scientists having a solid grounding in physics and mathematics, as well as an active interest in current biological problems. It is the first of a series in this field, and has set high standards for succeeding volumes.

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Counters

Counting Tubes, Theory and Application. By S. C. Curran and J. D. Craggs. 238 pp. Academic Press, Inc., New York, 1949. $5.50.

Ionization Chambers and Counters. By D. H. Wilkinson. 266 pp. Cambridge University Press, London, 1950. $4.50.

The available literature on the important subject of counters, hitherto quite scanty, has been extended significantly with the publication of these books. Both of English origin, they supplement the previous works of Korff and of Rossi and Staub in this country and provide a fresh perspective with which to view the material.

The approach of the present authors is different in each case, with Wilkinson concentrating exclusively on the theory of the operation of ionization chambers and proportional and Geiger counters while Curran and Craggs give this aspect a more cursory treatment, considering in addition such topics as construction details, associated circuits, and the application of counters to specific uses. The two books thus complement one another in scope, with the former probably being most useful for workers in the field of counter research and the latter for those using counters in their work and hence primarily interested in their practical application.

After a brief introduction, Wilkinson discusses in some detail the ionization produced by the passage of various charged particles through matter. The characteristics of the ions produced and the phenomena of self-quenching action, gas multiplication, and ion recombination are then considered from the point of view of counter action, followed by a description of the mechanism of pulse formation and the theory of pulse differentiation. The ionization chamber, proportional