Books

Progress in Biophysics and Biophysical Chemistry. Volume 3. Edited by J. A. V. Butler and J. T. Randall. 386 pp. Academic Press Inc., New York, 1953. $9.50.

The third in the Progress Series, this volume is another welcome addition to the literature on biophysics. The selection of subjects for the volumes of this series has been of especial interest since the editors recognized early the difficulty in specifying the topics which might be called biophysics. In the preface to Volume I, 1950, they said: "Excluding biochemistry on the one hand and physiology on the other, there lies between a vast and rather amorphous field of study of which the frontiers and lines of demarcation are anything but well defined."

The subjects selected for Volume 3 show that the editors, Butler and Randall, have taken a broad and long-range view of biophysics. There is an extension of the subject toward chemistry. In his chapter on Methods of Determining the Form and Dimensions of Particles in Solution: A Critical Survey, C. Sadron refers to "the importance of this new branch of physical chemistry to biologists", and in his concluding paragraph he speaks of "the common efforts of chemists and physical chemists".

The affinity between biophysics and physical chemistry suggested by Sadron's paper is seen in other papers. For example, F. Booth, in the chapter on the theory of the ionic double layer, finds it necessary to explain the connection between his subject and biophysics and adds: "Practically all the questions we shall discuss are ones usually assigned to colloid chemistry rather than biophysics." A similar extension of the domain of biophysics is found in T. Teorell's paper on transport processes in ionic membranes. These vital aspects of tissue structure are fertile fields for the physicist to explore. The editors are to be commended for including these subjects in their progress report. And the contributors have ably pointed up the fundamental physics involved in each subject.

Five of the chapters deal with the applications of physical techniques to biological situations. They are: Autoradiography, Polarized Ultraviolet Microspectrography and Molecular Structure, The Infrared Spectra of Biologically Important Molecules, Some Physicochemical Studies on Viruses, and Microspectrometry of Living and Fixed Cells. These chapters give an appraisal of results as well as a critique of method. The evaluations are excellent and will be of interest to biologists as well as to physicists and chemists. The chapters are not mere descriptions of physical procedure.

The discussion on mechanisms of biological action of ultraviolet and visible radiations by M. Errera is noteworthy in that it deals with ultraviolet and visible radiations only. This seems to be a timely supplement to the current extensive literature on the actions of ionizing or penetrating radiations.

This stimulating volume is an essential part of the biophysicist's library. There are nine chapters along with the author and subject indices. The treatment of each subject is thorough and even gives considerable mathematical analysis where necessary. The photographic plates and illustrations are excellent.

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Electron Optics (Second Edition). By O. Klemperer. 471 pp. Cambridge University Press, 1953. $9.50.

Those who have known and perused the earlier edition of Klemperer's *Electron Optics* (Cambridge University Press, 1939, 107 pages) have a pleasant surprise coming in the second edition of this book. The new version is presented in a volume about 4½ times the size of its predecessor. Little has been conserved from the original. Most of the presentation is new and includes some of the most modern achievements of this rapidly growing field. It speaks fully on geometrical electron optics, but a 4½ fold expansion of the earlier work alone cannot account for the tremendous advances made in the intervening 14 years. It is still a condensation of the subject. Condensation means a very careful selection of what is and what is not important for inclusion in a document of this nature. The author succeeded almost everywhere in choosing what this reviewer considers the essential part of geometrical electron optics. A short review of the chapters illustrates this point best.

After a historical introduction, four chapters are devoted to a discussion of electron lenses. This includes, as in the first edition, the cardinal points of electron lenses (Chapter II), the field plotting and ray tracing (Chapter III), some discussion of electrostatic lenses (Chapter IV) and magnetic lenses (Chapter V). The relative expansion of this material is perhaps less noticeable as the 60 pages of the first edition became only 120 pages in the new book. Much more marked is the increase in space allotted to aberrations. Chapter VI, tracing the geometrical aberrations, and Chapter VII, what the author calls electronic aberrations, total 74 pages instead of 17. Entirely new are the following four chapters: VIII. Electron optics and space charge, IX. Emission systems, X. Electron lenses and emission systems with line, focus, and XI. Deflecting fields.

Some of the material contained in these chapters existed in a very rudimentary form in the first edition, distributed between other chapters and the "Appendix". The last chapter in this volume is devoted to applications in industry and research.