are many places in this compendium that appear to have suffered severely because of lack of space—subjects that should be expanded into a second or third volume. This book therefore is at the crossroads. If it is expanded, it will become a two-volume edition. If further revisions are made downward, it will lose its inclusive nature and would then revert to a traditional textbook for medical students. It is felt that the authors should amplify their statements and expand into a second volume, perhaps dividing the book in the middle, with the first volume being devoted largely to principles and the second volume to the expansion of detail on unusual or rare subjects. The book is highly recommended for use by practicing physicians, pathologists, and medical students.

JOHN A. WAGNER
*Department of Pathology, School of Medicine, University of Maryland, Baltimore*

***Progress in Biophysics and Biophysical Chemistry,*** vol. III. J. A. V. Butler and J. T. Randall, Eds. Academic Press, New York, 1953. 386 pp. Illus. + plates. $9.50.

The new volume in this admirable series maintains, with few lapses, the high standards set by its predecessors. Several of the articles are of the nature of decennial reviews. Considering the chapters in order:

Doniach, Howard, and Pelc briefly, but authoritatively, summarize the physical principles, techniques, and principal accomplishments of the autoradiographic method. A set of excellent photographs clearly indicates the scope and power of the modern techniques.

Seeds provides a valuable summary of the rather limited data available upon the dichroism of the ultraviolet and visible absorption bands of oriented biological substances, with reference to the utility of such data in the determination of structure. With the development of microspectrographic methods, the potential range of application of this technique has been greatly expanded.

Fraser is concerned with the infrared spectra of biologically important molecules, particularly proteins, nucleic acids, and polysaccharides, and the assignments that have been made of the various bands. While the uncertainties of interpretation are indicated, the treatment is too brief to serve as much more than a guide to the literature.

Markham contributes a critical and authoritative review of several topics pertaining to viruses, including the use of centrifugal methods for virus purification and molecular weight determination, the study of the structure of virus crystals by electron microscopy and x-ray diffraction, and the investigation of the form of tobacco mosaic virus in solution by viscosimetric, birefringence, and light-scattering techniques. Markham's discussion clearly points out the inadequacies of some of the early work in this field and indicates some still unresolved discrepancies.

"Mechanism of biological action of ultraviolet and visible radiations" by Errera is a wide-ranging and quite complete review that is somewhat marred by an uncritical attitude and an awkward organization of material.

Booth gives a brief, but lucid, summary of the developments in the theory of the ionic double layer during the past decade and of the advances in the applications of this theory to a variety of specific problems, including among others, the stability of colloids, coacervation, and electrophoresis.

Davies and Walker provide a well-balanced and thorough review of the practices, potentialities, and difficulties (intrinsic and technical) of microspectrophotometry. The carefully reasoned discussion of the major contributions in this field is especially noteworthy.

Sadron's chapter is a critical review of the hydrodynamic and optical methods for determination of the size and shape of rigid macromolecules in solution. Particular attention is paid to the assumptions underlying the various methods, the internal consistency of the methods, and the necessity for consideration of the rigidity and degree of polydispersity of the particles. Experimental results upon TMV, serum albumin, and DNA are discussed as examples.

Teorell succinctly summarizes the theory of ionic transport across electrically charged (ionic) membranes. The applications of this theory to the development of membrane potentials, to the electric conductivity and reactance of such membranes, and to the establishment of transient and steady-state ionic distributions are discussed, with special reference to possible biological implications.

A disturbing number of typographical errors and faulty equation references must be noted.

The wide scope of topics in this volume forms an interesting contrast in conception of the nature of biophysics to that of the corresponding American series.

ROBERT L. SINSHEIMER
*Physics Department, Iowa State College*

***Simuliidae of the Ethiopian Region.*** Paul Freeman and Botha de Meillon. British Museum (Natural History), London, 1953. vii + 224 pp. Illus. £2 10s.

The black flies constitute one of the most important families of bloodsucking Diptera, transmitting human onchocerciasis in Africa and Central America. A great annoyance wherever they occur, they often produce fatal toxemia by their mass attacks. The tropical African fauna has been studied in considerable detail, but this is the first revisionary work since the junior author's treatment of 23 species in 1930. This present work reduces the more than 100 described species to 69. This is the result of some complete synonymizing and some reduction of species based on pupal differences only to the status of forms. The authors discuss the species problem in some detail and suggest that these forms may actually be reproductively isolated, sibling species, a theory that seems

to have considerable support. These difficult species problems are found in the family throughout the world and are troublesome to solve because black flies do not lend themselves to laboratory colonization and experimentation.

The introductory portion contains good discussions of the life history, adult habits, zoogeography, relation to disease, anatomy of adult, pupa, and larva, and of the collection, preservation, and examination of material. This is followed by a taxonomic treatment of the species, which are arranged in the two genera *Cnephia* and *Simulium*. Characters are given for dividing the latter genus into two divisions, not named as subgenera, and these are again divided into seven species groups. The classification of the Simuliidae is still far from satisfactory, and there is great need for the coordination of the several systems that have been suggested for various faunas. The species are well described, and figures and keys are given to separate the females, males, and pupae. Distribution is given by country and, wherever known, there are notes on the larva and habits. This most welcome addition to our knowledge of the fauna of tropical Africa will be extremely useful in determining the species.

ALAN STONE

*Entomology Research Branch,*
*U.S. Department of Agriculture*

***Biology.*** Paul B. Weisz. McGraw-Hill, New York, 1954. 679 pp. Illus. $6.50.

The first 13 pages of *Biology* present the properties of life in broad outline against a background of the physical environment of the earth that furnishes the conditions where life is possible. Following this, at the "second level," 94 pages are devoted to a more intensive treatment of environmental relationships (soil and carbon and nitrogen cycles), composition of protoplasm (elements, compounds, ions, colloids, membranes, and osmosis), basic metabolic processes (catalysis, enzymes, photosynthesis, energy metabolism, and types of nutrition), and self-perpetuation (cellular and organismic regulation and reproduction, adaptation, sexuality, heredity, and evolution). The remaining 543 pages consider successively cell structure and function, differentiation and specialization, plant structure and function, skeletal and muscular physiology, community and social organization, photosynthesis and transpiration in plants, digestion and circulation in animals, respiration and energy metabolism, synthesis, vitamins, hormones, blood functions, excretion, circulatory mechanisms, nervous system and sense organs, reproduction (mitosis, growth, and gametogenesis), plant life-histories, human reproduction and its hormonal regulation, and genetics and evolution.

In returning to the same principles at successively higher levels of treatment, this book differs somewhat in plan from other biology textbooks. The author consciously tries to avoid methodical, compartmentalized handling of his material by integrating the main ideas of biology around processes rather than taxonomic groups or organ systems. Classification is relegated to six pages in the appendix. Only the briefest treatment is accorded to invertebrates, and even the comparative treatment of the lower vertebrate groups is only moderately developed. The emphasis is predominantly on human functions. The claim is made in the foreword that formal physics and chemistry are not necessary, that such physicochemical concepts as are needed are developed in the textbook itself. It may be questioned, however, whether the student with no previous chemistry can acquire from a few pages of simplified and condensed synopsis the necessary background for an adequate understanding of the role of pyruvic acid, adenosine triphosphate, and so forth, in energy metabolism. Weisz thinks that it is possible and makes a courageous attempt to give the student an insight into the chemical workings of the enzymes in cell metabolism.

LOWELL E. NOLAND

*Department of Zoology, University of Wisconsin*

***Introduction to a Study of Mechanical Vibration.*** G. W. Van Santen. Philip's Technical Library, Eindhoven, Holland; U.S. Dist., Elsevier Press, Houston, Texas, 1953. 296 pp. Illus.

The preface of this book states, "The object . . . is to review the elementary theory of Mechanical Vibrations, as well as some of the more important problems of vibration encountered in practice. . . . Every effort has been made to present each individual subject so as to demonstrate the essentials of the problems and thus provide a jumping off point for a special study of any particular branch of the work. At the same time we have tried in each instance to indicate practical lines for the direct solution of many problems."

To fulfill this object, the author has chapters in the usual order on definitions and free and forced vibrations. These are followed by chapters on electromechanical analogies, coupling between two and three mass systems, and simple isolation. Vibrational waves are studied to introduce the subject of sound isolation and control, and there are brief discussions of associated topics ranging from ultrasonics to seismology. Lateral critical speeds in shafts are briefly covered from the engineering point of view, since only the first critical speed is considered. Tangential effort diagrams and Holzer tables are outlined in the section on torsional vibrations. This is followed by a brief discussion of balancing, damping, self-excited vibrations, fatigue in materials, and human reactions to vibrations.

Three chapters are used to survey the general field of vibration measurement, with emphasis on vibration equipment manufactured by N. V. Philips, Eindhoven, Holland. The last chapter is a short but well-illustrated and interesting discussion of the human ear. Three short appendixes give common trigonometric formulas, complex quantities, and phase deter-