

him with many details which further abstraction has proved to be unnecessary. On the other hand, to start with the position attained at the present time, giving definitions and theorems in their most abstract and concise form, with every trace of their origin removed, may cause great difficulty to the beginner. Prof. N. Jacobson has chosen this second method, though he acknowledges that the beginner may at times find it uncomfortably abstract. The present volume is the first of three, and deals with "Basic Concepts". Volume 2 will bear the title "Linear Algebra" and will deal with vector spaces. Volume 3, "The Theory of Fields and Galois Theory", will be concerned with the algebraic structure of fields.

The introduction to the present volume deals with sets and their mappings, and applies these ideas to the natural numbers regarded as an abstract system. Chapter 1 introduces the idea of a group in an unusual manner, defining it in terms of the much newer idea of a semi-group, although, as the author says, the theory of semi-groups cannot be regarded as having reached a definitive stage. Chapter 2 deals with rings, integral domains, and fields, and Chapter 3 with their extensions. Chapter 4 deals with elementary factorization theory. Chapter 5 resumes the study of groups, now considered in association with operators. Chapter 6 introduces the term 'module' as a composite notion based on those of a ring and a group with operators. Finally, Chapter 7 generalizes some of the previous parts of the theory of groups and rings by a brief treatment of lattices.

The volume contains a good many exercises, of varying degrees of difficulty, and the beginner is advised to study these in order to realize more clearly what is involved in the abstract axiomatic development of the text.

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GENERAL PHYSIOLOGY

A Textbook of General Physiology

By Dr. Hugh Davson. Pp. xiii+659+16 plates. (London: J. and A. Churchill, Ltd., 1951.) 45s. net.

THE teaching of physiology to medical students requires that emphasis be placed on mammalian physiology with the human aspect as the final objective. To this end, numbers of text-books of physiology, of recognized excellence, are available to the student and teacher. Where the needs of the medical curriculum do not prevail, however, and the requirement is for a general approach to physiology, embracing all living material, the degree student is not well provided for. In fact, in recent years no up-to-date British text in general physiology has been available. This lack may put the student of general physiology at a disadvantage, and the need for suitable text-books will be generally admitted.

A desire to fill this gap has stimulated Dr. Hugh Davson to produce a new text-book of general physiology. He sets out his aims in his preface: to meet the needs of the degree student in physiology, botany, and zoology; to help the young research worker; to assist the understanding of physiology by workers in the exact sciences who have not been trained in biology; and to provide information on current activities in general physiology. This is a formidable task. To cover fully the whole field would demand a very large volume, and the production of such a volume at present is apparently economically

impracticable. Dr. Davson has met this difficulty by deliberate restriction of the scope of the book, and by economical and direct writing. Even so, the book contains a very large quantity of information, and this is supplemented by a generous bibliography at the end of each chapter.

The book is divided into six sections, as follows: (1) the structural basis of living matter; (2) transformations of energy in living systems; (3) the transport of water and solutes; (4) characteristics of excitable tissue; (5) the mechanism of contraction of muscle; (6) the effect on the organism of light, and biological light emission. Sections (3) and (4) are of comparable length and together make up more than half the total number of pages in the book. Sections (1) and (6) are shorter than (3) and (4), while sections (2) and (5) are approximately one-quarter the extent of the longest sections. The author has deliberately excluded detailed consideration of such subjects as physical chemistry and has very reasonably assumed that the reader has some knowledge of physics and chemistry. He has, however, included some reference to the more complicated techniques which are in use for physiological research.

Despite this arbitrary choice of topics, which the author himself feels is a valid criticism, the book emerges as a well-balanced and representative account of current physiological work and thought. Much vigorous and progressive work is described, and the non-biological reader will be impressed by the very wide range of specialized techniques which are being used in physiological research to-day.

In general, the book is considerably in excess of the needs of the less-advanced student, and the author's hope that it would be capable of keeping the mammalian physiologist in touch with the activities of his general physiologist colleagues is likely to be fully realized.

The type of approach used is perhaps best illustrated by reference to the contents of section (1) of the book, which deals with tissue structure. This is largely concerned with the modern concepts of the cell. The experimental methods for investigation of cell structures are described, ranging from the conventional light microscope, through its ultra-violet and phase-contrast developments, to the principles and use of the electron microscope. Cell structure and mitosis are then dealt with, including the results of high pressures and centrifugal forces on cells. Submicroscopical structure is then considered, with descriptions of polarization microscopy and X-ray diffraction studies as applied to cytoplasmic structure. Finally, nucleoprotein material and the external structures of the cell complete the section. The bibliography for this section gives three hundred titles of papers and monographs, so that the reader need not be in difficulty in the further pursuit of the subject.

The concept of a general physiological approach is fully maintained throughout the book, and the titles of sections in themselves do not, of course, indicate the scope of the work. For example, the section on transport of water and solutes comprises eight chapters, ranging from simple equilibria to kidney function, gastric secretion and bioelectric potentials, among many other topics. The illustrations throughout are numerous and of good quality.

In its aims and in its approach to physiology, this book has a distinct individuality, and there is every reason to expect that it will be warmly received as a worthy addition to British physiological literature.