Modern Biology Series

Hormones and Evolution. E. J. W. Barrington. Van Nostrand, Princeton, N.J., 1964. x + 154 pp. Illus. $3.95.

This volume is one of the Modern Biology Series, a series intended to provide college-preparatory and university students with significant background knowledge, presented by an authority writing about his own field of study, that goes beyond the scope of the general textbook in botany and zoology. This book, which represents the substance of three lectures given by the author at the University of London in the autumn of 1961, is divided into six chapters: (i) "Evolution and the endocrine glands," (ii) "The steroid hormones," (iii) "The hormones of the thyroid gland," (iv) "Protein and polypeptide hormones," (v) "The polypeptide hormones of the hypothalamus," and (vi) "Retrospect." The author discusses the origin and evolution of endocrine systems, and outlines current developments in the biology and chemistry of hormones from vertebrates and invertebrates, with references from the literature up to 1962. The book points up clearly how advances in the growing field of comparative endocrinology are enhancing our understanding of the mechanisms of hormonal action and clarifying our thinking about the molecular basis of evolution and adaptation.

The great interest shown recently in comparative endocrinology was given special expression in 1961 with the appearance of a new journal, *General and Comparative Endocrinology*, dedicated to an exploration of a range of material similar to that treated here. A portion of the editorial statement, written by the coeditors, Aubrey Gorbman and Barrington, for the first edition of the journal, is very applicable to the present volume and may appropriately be quoted in this review:

". . . [R]ecent years have seen a rapidly growing realization that there are major groups of the animal kingdom, invertebrate as well as vertebrate, which have an importance no less significant than that of the classically favored laboratory animals. No doubt this is in part a consequence of the way in which major advances in our understanding of one group have been facilitated by results emerging from the study of another . . . but in part it probably reflects an increasing appreciation that the keys to the understanding of complex systems must often lie in the simpler ones from which these have evolved."

This book has an attractive format and is extremely well written in a style for the general reader, but without oversimplification or loss of technical accuracy.

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Russian Literature on Pedology

Ecology of Soils. V. R. Volobuev. Translated from the Russian edition (1963) by A. Gourevich. Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1964. iv + 260 pp. Illus. $10.25.

For many American soil scientists this work will serve initially as a door opening to the riches of the Russian literature on the factors of soil formation in relation to the geographic distribution of soils. The author says in the foreword that "It does not explain the principles of soil ecology in full, but concentrates chiefly on some of the main problems. . . . The book mainly reflects the author's personal views, and its publication will encourage further debate." In the introduction, by way of definition, he further states that "the ecology of soils must study the regular relations between soil and its formative environment, in their interaction and development."

The first part of the book, "Main Relations Between Soil and Environment," consists of seven chapters which summarize the Russian concepts in relation to the work of a relatively few non-Russian investigators. Here there is presented much interesting detail that those familiar with Jenny's *Factors of Soil Formation* and Joffe's *Pedology* will be able to reconcile fairly easily with their previous knowledge. However, tropical soils fare rather badly.

The second part of the book, "General Differences in Soil Formation in Relation to Environmental Conditions," contains five chapters in which the author's original contributions are set forth. These consist in the development of graphical methods for relating the great soil groups of the world to the major climatic factors. Equations expressing the regularities found are extensively discussed. The treatment of temperature and moisture is carried further than was done by Jenny. Pedologists will find much to interest them in these chapters. The gross chemical compositions of soils are discussed in relation to soil-forming factors, but the processes that lead to the formation of distinct horizons are dealt with only qualitatively. In other words, the viewpoint is geographic rather than chemical. Chapter 12 contains a highly original development of the relation of the energetics of soil formation to environmental factors.

Chapters 13 and 14 constitute the third part of the book, "Seasonal Phases of Soil Formation." Here again there is presented much of the author's own work, applied particularly to the chernozem and the brown forest soils.

The author is to be congratulated on his originality, which will provide pedologists with much material for discussion. The Israel Program for Scientific Translations has rendered a service to soil science by sponsoring this translation.

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Physical Electronics

Semiconductor Controlled Rectifiers: Principles and Applications of P-N-P-N Devices. F. E. Gentry, F. W. Gutzwiller, Nick Holonyak, Jr., and E. E. Von Zastrow. Prentice-Hall, Englewood Cliffs, N.J., 1964. xvi + 383 pp. Illus. $15.

The history of the development of electronic devices shows that a diode device has a limited field of application, but that the introduction of a control electrode expands the area of application enormously. The transistor illustrates this point. The authors of this book show that the four-layer (pnpn) device is a generalized transistor, and that it has expanded the application potential of the power rectifier by introducing control analogous to the gaseous diode-thyratron development.

Semiconductor Controlled Rectifiers represents the first comprehensive text devoted to the explanation of the four-layer, semiconductor, controlled recti-

fier (SCR) and to an analysis of its applications. The impressive team of writers who are responsible for the volume have participated in the development of the device from the conception of the basic configuration, and they are familiar with all of the complex electrical characteristics as they bear on practical application.

A key parameter in the operation of the SCR is the variation of the current gain in the device with current. Accordingly, the area of physics concerned with the variation gain is given a very thorough and comprehensive treatment, and another important topic, avalanche breakdown of junctions, has been treated well.

The key points of basic theory are used to explain operation of the device, graphically and then in more analytical detail, a procedure that makes a very lucid presentation. The reader should not neglect this kind of detail to hurry on to the applications, because many pitfalls await the circuit designer who is not fully aware of the electrical characteristics. Misfirings and destructive overloads, for example, penalize misapplication.

On the critical side, I would like to have seen more discussion of the very important "turn-off" type SCR. This device goes beyond the thyratron analogue by providing turn-off of the switch at other than the zeros of anode voltage. Also, there is much more to the subject of inverter circuit design than will be found in this book.

The authors have performed a very valuable service to the solid-state device industry by providing this excellent text.

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Botany: Perceptive and Controversial Observations

Organization and Evolution in Plants. C. W. Wardlaw. Longmans, Green, London, 1965. xiv + 499 pp. Illus. 60s.

Some of biology's elder statesmen seem to favor well-crafted small contributions, while others prefer to integrate their contributions into a grander design, to attempt definitive statements on the state of their science. With this and other books, Wardlaw clearly belongs to the latter group. One may protest that biology is too flagrantly an explosion of ideas and data to foster neatly rounded philosophical summations. Rather, one may prefer the simple guidelines and doctrines with which most biologists seem reasonably well equipped, or else a critical review of progress within particular fields. Moreover, the field with which Wardlaw is most closely associated—morphogenesis—is not easily defined and is still in its infancy. This infancy has been a long one because the problems it proposes to solve are unusually large, difficult, and basic. To subject such a field to summation at this time results in certain ironies.

These ironies are clearly evident in *Organization and Evolution in Plants*. Morphogenesis has yielded some fine studies, among which may be ranked certain of Wardlaw's papers. Beyond experimental studies such as these, morphogenesis is rich in enumeration of baffling or interesting phenomena and prediction of results to be achieved. Morphogenesis has many "accounts receivable," but relatively few "paid-up accounts." Retelling the curiosities of embryology, galling, and so on, which suggest that experimental study may serve a purpose if the retelling is germinal, inspires new and ingenious studies. If this book performs that function, the accomplishment is partly obscured by the welter of diverse information and citation. Items such as the *Oxford Dictionary*, the origin of life, Greek philosophy, and many others are paraded before us bewilderingly. Wardlaw obviously possesses a wide range of interests. Many interesting biological phenomena are cited, and the abundance of illustrative material is admirable. The viewpoints and philosophy which interconnect these into a book, however, will be of interest chiefly to those who value Wardlaw as a scientific personality. Others may wish to create their own syntheses—and may be stimulated to do so by reading this book, in which perceptive observations mingle with those which seem to be restatements of the obvious, or which would seem to be rather controversial.

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Allendoerfer Advanced Series

Measure and Integration. Sterling K. Berberian. Macmillan, New York, 1965. xx + 312 pp. Illus. $9.95.

About 15 years have elapsed since the publication of Paul R. Halmos's important textbook on measure theory. Sterling K. Berberian, the author of the book under review, acknowledges in the preface his indebtedness to Halmos. In many ways *Measure and Integration* does resemble Halmos's book, but, if I may borrow one of the author's phrases, it is certainly not an almost-everywhere copy of it. Berberian's book is an excellent book on measure and integration. It contains many good problems, and even many interesting research problems, which are distinguished by an asterisk.

One of the main novelties of the book is that Berberian breaks with an old tradition, namely, the functions under consideration are the finite real-valued functions rather than functions which may have possibly infinite values. The author is to be congratulated for having made this decision. I fully agree that infinite values for functions indeed do not contribute essentially to the understanding of integration.

Product measures and Fubini's theorem are dealt with in great clarity, and this is the place where the reader may find many interesting open problems among the exercises.

A large portion, approximately, 130 pages, is used for a careful discussion of the theory of integration on locally compact spaces, culminating in the treatment of the Haar integral on locally compact groups. For the proof of the existence of the Haar integral, the author has chosen the simpler road via the Tychonov product theorem rather than showing directly that the Haar integral is the limit of a certain Cauchy net. The main ideas developed here are then applied to the introduction and discussion of the group algebra.

The book finishes with a very useful section entitled "References and Notes," a good bibliography, and an extensive index. All in all, I can recommend this book to everyone who is interested in the modern ideas on the theory of measure and integration.

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