authors' expectation of producing a "synthetic, personal evaluation of the state of our knowledge."

There is little to temper enthusiasm for the sheer competence that has gone into the preparation of this work. Of course there are a few places where one could wish for a bit more information or explanation. In some respects it is not an "easy reading" book. Sometimes a sentence requires repeated reading before its meaning is clear—for example (from the summary, p. 1434), "The brain is large, but the optic lobes together and sometimes each one of them are even larger; species differences have been correlated with habit of life." Occasionally subordinate clauses get in the way of understanding as in the following example (p. 338), "Mutual exclusion is, of course, a necessary facet of behavior which includes push-button responses, like giant fiber startle reflexes—a necessary facet, that is, if frequent jams and stalls from coincidence of stimuli are to be avoided." But these examples are trivia, and on the whole the quality of writing is high.

The contributions of the publisher should not go unnoted, for no work of this comprehensive nature could be produced without a remarkable degree of understanding between author and publisher. The Freeman Company must share credit for a job well done. To the contributing authors, Howard A. Bern and Irvine A. Hagadorn for their fine treatment of neurosecretion and J. E. Smith for his handling of the Echinodermata, commendation is also due. Their chapters fit nicely into the spirit and philosophy of the entire work, with no jarring divergence in style or approach.

Bullock and Horridge are research scientists of great competence. That they should take time from their own interests and particular areas of investigation to produce these volumes is a special kind of service to science. The cost must have been high. So too, the purchase price may seem extravagant. But no student of nervous systems could, by the expenditure of many times $75, duplicate what is here presented in coherent fashion. For as long as men investigate nervous systems and try to understand their perplexing ways, so long will Bullock and Horridge be remembered with gratitude.

DIXY LEE RAY

Department of Zoology, University of Washington and Pacific Science Center, Seattle

International Series of Monographs on Analytical Chemistry

Nuclear Techniques in Analytical Chemistry. Alfred J. Moses. Pergamon, New York, 1965. viii + 142 pp. Illus. $6.50.

This book will give the analytical chemist a bird's-eye view of the applications of radiochemical methods to a wide variety of problems. It is not really a book that stresses techniques. For detailed discussions of such classical topics as self-absorption, Feather analysis, absolute beta counting, and back-scattered radiation, the reader is referred to other sources. There is no discussion of the chemical niceties of exchange reactions, and the statistical problems encountered as the counting rate approaches background are deemed outside the scope of this monograph. There is, however, an adequate introduction to such topics as instrumentation, the measurement of natural radioactivity, activation analysis by neutrons, positive ions and gamma rays, the application of radiochemistry or tracer methods to the study of surface-exchange reactions, gas adsorption, geo- and cosmochronology, and the detection of tracer impurities in semiconductors.

A section devoted to the analysis of biological materials presents detailed procedures for the determination of phosphorus, cobalt, molybdenum, gold, arsenic, and manganese in beetle wings, tissue, plant material, biological materials, and marine organisms. No consideration is given to the problems that would arise if the chemist were faced with other combinations of these elements and sources. It is this recipe-like quality, admittedly unavoidable in a book this size, that will strike the discerning chemist as a limitation to the book's usefulness.

In the appendix, the General Electric KAPL Chart of the Nuclides is reproduced at less than half the original size, thereby rendering it essentially illegible. Except for this defect, the typography and composition of the book are excellent. I noted only a few trivial errors, and the bibliographies at the end of each chapter provide ample sources to help the reader to extend his knowledge. I feel that perusal of the book by the uninitiated will provoke as many questions as it will answer. But that is all that a bird's-eye view should be asked to do.

ROBERT P. EPPLE

Division of Research, U.S. Atomic Energy Commission

"Loadstones, Onyons and Garlick," and Magnetic Theory

The Theory of Magnetism. An introduction to the study of cooperative phenomena. Daniel C. Mattis. Harper and Row, New York, 1965. xvi + 302 pp. Illus. $11.50.

This thoroughly delightful book is a highly personalized essay, neither pretending completeness nor claiming representation of any but its author's unique and individual interest. Mattis is concerned strictly with fundamental issues, and in discussing the central core of magnetic theory his insight is incisive and his style is lively and lucid.

The first chapter of the book is a charming account of the history of magnetism, written jointly by the author and his wife. This history ranges from Pliny's account of the discovery of the magnet stone by the shepherd Magnes, "the nails of whose shoes and the tip of whose staff stuck fast in the magnetick field while he pastured his flock," through the 16th century account by Porta of his disproof of the popular superstition that "if a loadstone be annointed with garlic, it does not attract iron. . . . but when I tried all these things, I found them to be false: for . . . breathing and belching upon the Loadstone after eating of Garlick, did not stop its virtues. . . . And again, When I enquired of the Mariners, Whether it was so they were forbid to eat onyons and Garlick for that reason; they said, They were old Wives fables and seemed ridiculous; and that Seamen would sooner lose their lives, than abstain from Onyons and Garlick." No professor who teaches a course in magnetism should henceforth venture into class unarmed with this ready supply of anecdotes and vignettes.

The author's choice of topics through the remainder of the book is dictated by his formal leanings. Given a physical problem, and a qualitative physical explanation, Mattis much prefers a rigorous solution of a clean model (even though it may be only vaguely related to the physical system) to an

approximate solution of a more realistic one. The distinction between that which is rigorously true and that which is "very probably nearly true" is never left fuzzy. Nevertheless, the book is neither overloaded with calculations nor sterilely formal. The essential pattern of the analysis is described, with the excruciating details omitted, and the results are neatly summarized and placed in a broad and general perspective. The historical introduction precedes reviews of exchange interactions in molecules and in solids, of angular momentum formalism (containing such little-known items as Schwinger's coupled boson representation of spin operators), and of relevant parts of molecular orbital theory. These sections provide a suitable summary of the background material needed by a student interested in magnetism. The portion of the book devoted directly to magnetism theory is less than 150 pages and consists primarily of two topics: an account of spin-wave theory in insulators and a discussion of the present status of the theory of magnetism in metals. These sections are outstanding in their clarity and originality, and I found them both interesting and instructive. The book concludes with a chapter on the simpler aspects of statistical mechanics in magnetic materials, and finally with a somewhat incongruous and lengthy excursion on the detailed solution of the two-dimensional Ising model.

To theoretically oriented students of solid-state physics, or to physicists specifically interested in spin systems, Mattis presents an account of magnetism theory stripped to its essential skeleton and written with authority and insight.

HERBERT CALLEN
Department of Physics,
University of Pennsylvania

Commonwealth and International Library of Science

Floral Biology. Mary Percival. Pergamon, New York, 1965. xvi + 243 pp. Illus. Paper, 20s.

The publisher, on the back cover, says that "This book, written for students, introduces them to the subject of floral biology, and gives them some idea of the scope of the subject rather than presenting them with a compendium of facts. The book is simply written, and contains a minimum of technical terms." The flavor of the book may be most easily conveyed by saying that every statement in this quotation is false. Its pages are filled with facts, and some idea of its simplicity may be gained from the fact that, in the first ten pages, an average of three new terms per page are introduced—for example, the following are introduced on page 2: *monoclinous, diclinous, monoecious, dioecious, gynomonoecious, andromonoecious*, and *trimonoecious*. The facts must run into the thousands, including such topics as ecology of anther dehiscence, composition of nectar, senses of flower-visiting birds, efficiency of birds as pollinators, pollination by bats, insect senses, flower form (in relation to pollination), the significance of phenology, bee flowers, fly flowers, moth flowers, butterfly flowers, isolating mechanisms in flowers, and many others.

The book is a textbook that falls into the error common to texts and to teachers: the persuasion that terminology is knowledge. American students, at least, would be entirely preoccupied by words like those cited above, to the exclusion of any real interest in flowers. But aside from its value to students, the book has a real value as a compendium of information, mainly about pollination. Results of many researches are reported in detail. A few typical examples are the percentage of protein in pollen, the relation of anther dehiscence to desiccation, the types of bills and tongues of flower-visiting birds, and the means by which pollinating insects communicate.

The text is illustrated by numerous photographs, doubtless from good negatives but muddy and unclear as reproduced, and by rather crude diagrams, which add little to one's understanding of floral structure. In figure 33, "right" and "left" seem to be reversed. Figure 45 is (to me) completely unintelligible.

The book ends with 98 references, besides a "bibliography" of 38 book titles, an "animal index," a "plant index," and a "subject index."

H. W. RICKETT
New York Botanical Garden,
Bronx Park

Steroids: Structure and Activity

Methods in Hormone Research. vol. 4, pt. B, *Steroidal Activity in Experimental Animals and Man*. Ralph I. Dorfman, Ed. Academic Press, New York, 1965. xii + 362 pp. Illus. $13.

This book, volume 4 in the series entitled *Methods in Hormone Research,* deals with selected topics concerning steroidal activity in experimental animals and man. It is therefore a continuation of volume 3, which has the same subtitle, and it similarly attempts to summarize and interpret the literature on the subjects under discussion. With few exceptions, no new data are presented.

The primary goals in the preparation of volume 4, as stated by R. A. Huseby, were to summarize the relative potency of various steroids, to correlate biological activities of steroid hormones in experimental animals with those in man, to correlate molecular structure with biological activity, and to summarize, when possible, the mechanism of action of steroid hormones. For the most part, these goals have been achieved.

The chapters on anabolic steroids, by Fred A. Kincl; antiandrogens, by Ralph I. Dorfman; and antiprogestational compounds, by Tomotsu Miyake and R. I. Dorfman, dwell extensively on the correlation between molecular structure and function and potency of many synthetic steroidal compounds. These reviews provide a needed summary of the fairly extensive literature on these subjects. All three chapters make liberal use of tables to present the data. In fact, the long text in Kincl's review adds little to its very complete and self-explanatory tables.

Three other chapters deal with the action of steroids on tumorigenesis and neoplastic growth. H. Brendler's review on steroids in reactivated prostatic cancer refers primarily to clinical studies. R. A. Huseby's chapter on steroids and tumorigenesis in experimental animals deals with spontaneously occurring and hormonally induced tumors in mice and rats. As the author points out, the presence of species and strain differences, as well as environmental and hormonal variables, adds to the difficulty encountered in utilizing animal data for the study of the hormonal regulation of human cancer. I noted a small error on page 151, where Crooke's hyaline changes which appear in the anterior