Paleontology

Silurian and Devonian Corals of the Falls of the Ohio. Erwin C. Stumm. Geological Society of America, New York, 1964. x + 184 pp. Plates. $8.50.

In 1810 Jonathan Williams saw what he thought were fossil trees, the remains of an ancient forest, in the rocks at the Falls of the Ohio River opposite present-day Louisville, Kentucky. These were fossil corals occurring in vast numbers in limestones of Middle Silurian and the Middle Devonian age. They appear to have been first recognized as fossil marine organisms by Henry McMurtrie in 1819; a year later several were described by C. S. Rafinesque and his friend Clifford, and since then literally hundreds of "species" of rugose and tabulate corals have been described from the outcrops at the Falls and surrounding regions of Indiana and Kentucky—indeed, so many have been described that for too long there has been confusion as to just what corals were there and in which of the two main horizons, which differ so widely in age, they occur.

The laborious task of analyzing this maze of "species" and locating the hundreds of types and figured specimens was undertaken several years ago by the author, E. C. Stumm, whose results are now presented in a handsome monograph. Aside from a short but clear analysis of the stratigraphy of this classic area, the monograph consists of concise systematic descriptions of 273 recognized species, with extensive synonymies, repositories of types and other specimens, and illustrations of nearly every form. Sixty-seven species representing 33 genera are recorded from the Middle Silurian Louisville limestone, and 206 species (7 new) distributed among 54 genera (1 new) from the Middle Devonian limestones.

The author points out that "more than two thirds of the species names previously proposed are proved to be invalid." "Proved" is a strong word, for in such morphologically plastic organisms as the rugose, scleractinian, and tabulate corals the range of individual variation is generally very great and a coral "species" is a highly subjective matter at present. In the present work there is little or no discussion of variation or critical evaluation of the species, to the extent that even with the very good figures other workers on corals will find the systematics as a whole disappointing and difficult to work with.

The memoir is well produced, but curious is the omission of periods at the end of the last sentences of most paragraphs and the lack of diacritical marks in many of the articles cited in the extensive list of references. Stumm cannot be blamed for these minor oversights, and paleontologists are indebted to him for these fruits of a long study.

J. W. WELLS
Department of Geology, Cornell University

Aspects of Nuclear Physics

A Textbook of Nuclear Physics. C. M. H. Smith. Pergamon, New York, 1965. xvi + 822 pp. Illus. $17.50.

Although the title indicates that this volume is a text on nuclear physics, the first six chapters present outlines of atomic physics, relativity, and quantum mechanics. In addition, chapters on mass spectroscopic techniques, electronics, particle accelerators, elementary particle physics, and thermonuclear reactions in stars provide coverage of topics peripheral to the main topic.

The book is designed for use in an intermediate-level course and is comparable in level to the recent text by W. E. Burcham and the older book by Robley Evans. It contains rather extensive discussions of a historical nature as well as brief résumés of recent results. Rather good bibliographies are provided at the end of each chapter. However, the student who uses this as a textbook will have difficulty following the references. The author begins with kinetic theory and the historical work in the development of the quantum theory, and then treats relativity and x-ray and electron diffraction before giving a brief summary of quantum mechanics. Without some prior knowledge of the topics treated, it will be quite difficult for a student to assimilate the material presented up through quantum mechanics. A treatment of nuclear physics begins in chapter 7. Gross properties of nuclei, radioactive decay, neutron physics, nuclear magnetism, and fission are treated before the topic of nuclear forces is discussed. The presentation is essentially descriptive, with occasional developments of a theoretical nature which are, unfortunately, too brief. Good descriptions of experimental techniques are presented with rather complete references to the original papers. Nuclear forces and models are treated in only two chapters. The presently accepted facts and interpretations of nuclear structure are briefly treated. Many of the most active topics of current research in nuclear structure are dismissed with extremely brief mention. I would prefer to see fewer topics introduced, and a more thorough development given to those treated. I also disagree with the concept that elementary particle physics is an essential component of the study of nuclear physics as the author suggests.

For the purposes of an introductory text this book presents the historical and experimental aspects of the subject quite well. It suffers from the author's attempt to present too much theoretical material that is not really relevant to the apparent aim of his text. Rather few problems or exercises for the student are presented at the end of each chapter.

DAVID A. LIND
Department of Physics and Astrophysics, University of Colorado, Boulder

Two-Body Motion

Elements of Astromechanics. Peter van de Kamp. Freeman, San Francisco, 1964. viii + 147 pp. Illus. Paper, $2; cloth, $4.

The author's stated purpose in this book is to provide a brief introduction to basic concepts in elementary astromechanics. Except for a short chapter on the stationary points in the restricted problem of three bodies, the discussion is limited to two-body motion. What is covered—Kepler's Laws, gravitation, kinematical and dynamical orbit characteristics, and double-star orbits—is well done. In fact, owing to repetition, some of it appears overdone. The exposition is clear, and considerable attention is given to detail, presumably with the novice in mind.

In some places the text is marred by oversimplified, and consequently not wholly correct, discussions of dy-

namical concepts like mass, weightlessness, energy, and work. All in all, the book does not belie the author's stated aim. Contrary to the publisher's claim, however, its utility is restricted to the introductory level. The usefulness of this little book for the uninitiated might have been greatly enhanced if it contained some qualitative or semiquantitative discussion of the interesting perturbations of artificial earth satellite orbits, due principally to earth oblateness and atmospheric drag.

LEON BLITZER
Department of Physics,
University of Arizona

Electrical Engineering

The Nature of Induction Machines. Philip L. Alger. Gordon and Breach, New York, 1965. xiv + 516 pp. Illus. $25.

The first edition (1951) of this important book has been out of print for several years. The importance of this second edition is accentuated by changes that have been made in the education of engineers during the last decade. Students today are acquainted with only the barest outline of the theory of electrical machines. Although only a few people will make direct use of this book in teaching, it will be very useful as a developmental tool and a reference work for engineers who are designing induction motors or incorporating such motors into appliances, drives, and control systems.

The principal merit of the book is its comprehensive coverage of nearly all of the aspects of this most important class of electromechanical energy converters. Alger defines the purpose of his book as follows: "To give its readers an understanding and a visual perception of, and some familiarity with, the behavior and uses of induction machines." The author is uniquely qualified to accomplish this task, because the modern induction machine is largely a product of his pioneering contribution to the design and theory of rotating machines.

The first five chapters cover the basic principles of the induction motor, its similarity to the static transformer, the rotating magnetic field, and methods of performance calculation. The next five chapters are concerned with developments made by the author during the many years he has worked, and with the designing process, reactance calculations, torque-speed characteristics, and the effects of higher harmonic fluxes which are caused by the uneven distribution of the air gap permeance caused by the slotting of the cylindrical members of the machine. Kron's generalized theory is introduced and then used to develop equivalent circuits for single-phase induction motors.

The author's recent contribution to a method of reducing starting currents and increasing starting torques by complementing the usual copper or aluminum bars with alnico bars is described in detail. Extensive consideration is given to a recent development, using silicon controlled-rectifiers in stepless speed control of induction motors, that will extend still further the broad application of these machines.

The style is readable, and the exposition is lucid. Clear pictures of each phenomenon are provided, and equivalent-circuit analogies are generously employed. In subsequent printings, the addition of a table of symbols would aid in reading through this rich profusion of ideas. For the serious student and the specialist who wish to study the subject in depth, there is a comprehensive bibliography at the end of each chapter.

In this book Alger shares with the next generation of engineers his lifetime experiences as a thoughtful, productive engineer. No designer in the field has more to share.

EDWARD A. ERDELYI
Department of Electrical Engineering,
University of Colorado, Boulder

Ribosomes in Protein Synthesis

The Physical and Chemical Properties of Ribosomes. Mary L. Petermann. Elsevier, New York, 1964. xii + 258 pp. Illus. $10.

This monograph (221 pages of text) by Mary Petermann will be a welcome guest not only in the laboratories of those involved in studying the physicochemical properties of ribosomes but also in the laboratories of those who look into protein synthesis. The author really covers the field: a short history of ribosomes, their occurrence, separation, preparation, and purification; and their chemical composition [including studies on the structural protein(s) and RNA(s) of the particles] and physicochemical properties, including the involvement of "messenger" RNA and transfer RNA with ribosomes. In addition, 972 articles (up to May 1964) are cited, with clear-cut summaries as to the nature of these references provided in the text; this will be very helpful to investigators in a field whose growth is quite logarithmic. In some instances, as in the separation and purification of the particles, in their dissociation, in their binding properties, and in the nature of ribosomal RNA, all fields in which the author has been long active, she goes into some detail on the experimental procedures that are involved.

What I particularly liked about the book are the quite numerous critical comments, both on procedures and results, which are dispersed among the allusions to published papers; in other words, the book serves not only as a summary of work already done, but also as a guidepost for future experiments. It thus makes quite clear that, notwithstanding the past decade of work, and notwithstanding the simplified hypotheses which have been put forth, we actually know with assurance very little concerning the role of ribosomes in protein synthesis. For those already in the field, certainly for those going into it, the possession of this book is a necessity; it fills a gap in an important subject. For it is a rather good example of how to condense a subject with clarity, and thus it is not for the dilettante nor for the casual observer of the scene, but for the serious worker in the field.

My one criticism is to note that $10 is a rather steep price to pay for a book which, considering the nature of growth in this field, may well have to be modified in many particulars within its short lifetime. Indeed, between the beginning and the termination of the author's period of writing the book, so many new papers appeared that, in a period of six months, some 200 reference allusions had to be included in an addendum. Nevertheless, at the moment this book is the best extant critical summary and review article on ribosomes.

PHILIP SIEKEVITZ
Rockefeller Institute,
New York, New York