before he becomes too enthusiastic in applying the simple methods given in Part 1.

Most of both parts are devoted to approximations based on the molecular orbital approach, although other approaches, particularly the valence bond method, are discussed in some detail. As the authors admit, many of the methods of calculating wave functions and their properties have been omitted, but the extent of the actual coverage is impressive.

All in all, this book certainly represents the most useful and easily assimilated discussion of quantum chemistry and its applications in this field which is available to date. The authors are to be congratulated.

M. B. WALLENSTEIN
National Bureau of Standards, Washington, D.C.

Physics of the Atom. M. Russell Wehr and James A. Richards, Jr. Addison-Wesley, Reading, Mass., 1960. xi + 420 pp. Illus. $8.50.

Elementary Modern Physics. Richard T. Weidner and Robert L. Sells. Allyn and Bacon, Boston, Mass., 1960. xi + 513 pp. Illus. $8.50.

Here are two good, new books on modern physics, a field comprising chiefly relativity, quantum physics, solid-state physics, and atomic and nuclear structure. These books are written at about the same level—namely, to follow a general physics course in which calculus is employed. Both require calculus as a prerequisite; both use the rationalized mks system of units; both are about the proper length for a one-semester course; one contains 11 chapters, and the other, 12.

Both the textbooks have a gratifyingly large number of problems at the end of each chapter, and answers to odd-numbered problems at the back. In layout and typography they leave nothing to be desired; the many line drawings are clear, and a few halftone illustrations are included where most appropriate. Interestingly enough, in both books important equations are boxed for emphasis. In both, references for collateral reading, at a comparable or somewhat higher level, are listed at the ends of the chapters; the Wehr and Richards volume lists journal articles as well as standard reference or textbooks.

Wehr and Richards follow essentially the chronological sequence of the great discoveries in modern physics. The first three chapters give the atomic view of matter, electricity, and radiation; the fourth chapter presents the atomic models of Rutherford and Bohr. Chemical evidence is often quoted; this a useful feature, since most students at this level have studied general college chemistry. Some good experiments, not often seen in textbooks, are mentioned—for example, the experiment of Zartman and Ko, which confirmed the Maxwellian velocity distribution. The chapter on relativity is well done, and so is the one on x-rays. Then follow a chapter on waves and corpuscles, one on solid-state physics, and finally, four chapters on phases of nuclear physics.

The illustrations reveal excellent ingenuity and laudable clarity; the diagram of the x-ray powder-diffraction process is novel and most revealing (page 157). An item that will be found useful by instructors as well as by students is the 20-page appendix, listing in chronological order from 550 B.C. to 1958 the various key experiments and theories bearing on the atomic view of nature (the nationalities of the many persons included are also indicated). Another appendix lists the Nobel prize winners in physics and chemistry, through 1958.

The text by Weidner and Sells covers essentially the same subject matter, but it is organized in a nonchronological manner that is said to be logically coherent and sequential. The first chapter is an excellent review of the appropriate areas of classical physics. Next comes a chapter on relativity, then two on quantum effects, then three on optical and x-ray spectra. In the three chapters on nuclear physics, the subject is introduced by describing accelerating machines and detection devices; this is a rather novel order. The final chapter is devoted to molecular and solid-state physics. An attractive feature of this textbook is the short summary given at the end of each chapter. In fact, the subject matter, content, and level of the book can readily be ascertained by reading the 11 summaries (there is none for the first chapter).

A useful feature is the listing in large type, on the inside front and back covers of the book, of the nine physical constants and the four rest masses and rest energies commonly used in computations. Students working on problem assignments will find this to be a great time saver.

The choice between these textbooks will probably be made on the basis of whether or not the prospective user feels strongly about the chronological order of presentation, and whether his pet topics are emphasized. For example, Weidner and Sells give a more thorough treatment of atomic spectra, whereas Wehr and Richards illustrate the band theory of solids by explaining the operation of a number of semiconductor devices. We feel that each book is an excellent treatment of modern physics on the elementary level and that these textbooks constitute a formidable challenge for subsequent authors and publishers in this field.

S. S. BALLARD
F. E. DUNNAM
Department of Physics, University of Florida

The Ongoing State University. James L. Morrill. University of Minnesota Press, Minneapolis, 1960. 143 pp. $3.50.

Much has been said and written about the American state university, but never more wisely than in this book, *The Ongoing State University*, by James L. Morrill. Published just before the author retired after serving for 15 years as president of the University of Minnesota, it is a skillful adaptation from what must have been a considerable number of speeches made between 1945 and 1960.

The first three chapters—"The land-grant idea," "Knowledge for use," and "Servant of all the people"—highlight service aspects of the state university and set the tone for the volume. Developmental and administrative features of American higher education, which so frequently confuse and confound foreign observers, are dealt with in chapter 4. Five chapters are concerned with such prickly topics as academic freedom and responsibility, religion in the state university, athletics, public relations, and the alumni. Finally, to round out a dozen closely packed chapters, Morrill makes some pointed observations about the responsibility of a state to its university, the relations of higher education and the federal government, and education as an investment in the future.

In his preface, Morrill states: "Like politics, university administration is also the art of the possible, of helping to make possible the aims of both the philosophical and the practical as scholarship and science and society

are able to perceive and conceive these aims." Although some scholars and scientists regard the administrative role as largely supernumerary, I believe that all who have known the distinguished career of "Lew" Morrill will agree that his positive leadership in higher education has meant a great deal, not only to Minnesota but also to the nation as a whole. This book will be of particular interest to them. More than that, however, it is full of insights which will enhance anyone's understanding of an increasingly important American institution, the state university.

LOGAN WILSON

University of Texas, Austin

Introduction to Quantum Field Theory. F. Mandl. Interscience, New York, 1960. vii + 202 pp. Illus. $6.

Two claims are made for this slender volume: first, that it is an introduction to the basic ideas of field quantization and, second, that "it should make the reader expert at handling modern perturbation-theoretic methods in quantum theory." One might be inclined to question the optimism with which the second claim is phrased, but it must be admitted that the author has a knack for exposition that goes far to substantiate the claim.

The weakness of the book is all too obvious, and perhaps even inevitable. Quantum field theory is a subject which is not yet in a definitive form. Therefore one must certainly include a large amount of background material in order to make intelligible the more recent developments which are not included in the present volume. This background material is provided in the book written by Schweber, Bethe, and de Hoffman; and in essence, Mandl has included no more modern material in his volume than is included in the above mentioned text. There is no mention of the recent work of Jost, Lehmann, Symanczik, and others who have explored the results of dispersion theory. This is a regrettable omission, in view of the book's 1959 copyright date.

The topics discussed are presented with a notable felicity of style. Mandl begins by axiomatically introducing creation and annhilation operators, that is, by omitting the usual treatment of harmonic oscillators. This topic is followed by a discussion of classical fields, field quantization, and the interaction representation; and the results obtained are applied in some detail to mesons, fermions, and photons. Then the author introduces interactions and this discussion leads to a consideration of the S-matrix and its representation in terms of Feynman diagrams. The elementary results are applied to Compton and Coulomb scattering. Finally, some of the refined results of diagrammatic techniques are presented and renormalization is discussed.

It is difficult not to recommend this book; the style of writing is uniformly high, but the book is inadequate as a text for a course in quantum field theory because of its omissions. It is, nevertheless, a valuable introduction to diagram methods and can be recommended to workers in statistical mechanics and solid state physics who may not be as interested as theoretical physicists in the intricacies of quantum electrodynamics.

GEORGE WEISS

Institute for Fluid Dynamics and Applied Mathematics, University of Maryland

New Books

Biological and Medical Sciences

Marti-Ibanez, Felix, Ed. *Henry E. Sigerist on the History of Medicine.* M.D. Publications, New York, 1960. 324 pp. $6.75. Twenty-seven papers are reprinted from various journals and books.

McDonald, Lawson, Ed. *Pathogenesis and Treatment of Occlusive Arterial Disease.* Lippincott, Philadelphia, Pa., 1960. 249 pp. $5. Proceedings of a conference held in London at the Royal College of Physicians on 13–14 November 1959.

Newell, Frank W., Ed. *Glaucoma.* Josiah Macy, Jr. Foundation, New York, 1960. 224 pp. $8. Transactions of the 4th conference, 1959.

Peeters, H., Ed. *Protides of the Biological Fluids.* Elsevier, New York, 1960 (order from Van Nostrand, Princeton, N.J.). 430 pp. $15.75. Proceedings of the 7th colloquium held in Bfuges; some of the papers presented at the colloquium have been published in *Clinica Chimica Acta*; only summaries of these papers are included in this volume.

Reynolds, S. R. M., and Benjamin W. Zweifach, Eds. *The Microcirculation.* Univ. of Illinois Press, Urbana, 1959. 178 pp. $4.50. Proceedings of the 5th conference on microcirculatory physiology and pathology; presents discussions on the factors that influence the exchange of substances across the capillary wall.

Roberts, D. F., and G. A. Harrison. *Natural Selection in Human Populations.* Pergamon, New York, 1959. 84 pp. $3. Papers given by invited speakers at the first full meeting of the newly constituted Society for the Study of Human Biology, 8 November 1958; contributors are L. S. Penrose, A. R. G. Owen, C. A. Clarke, P. M. Sheppard, T. Dobzhansky, and E. H. Ashton.

Roemer, Milton, I., Ed. *Henry E. Sigerist on the Sociology of Medicine.* M.D. Publications, New York, 1960. 407 pp. $6.95. Thirty-one essays, 28 of which have been previously published.

Semmes, Josephine, Sidney Weinstein, Lila Ghent, and Hans-Lukas Teuber. *Somatosensory Changes after Penetrating Brain Wounds in Man.* Harvard Univ. Press, Cambridge, Mass., 1960. 104 pp. $4.

Seven, Marvin J., and L. Audrey Johnson, Eds. *Metal-Binding in Medicine.* Lippincott, Philadelphia, Pa., 1960. 413 pp. $13.75. Papers and panel discussions from a symposium sponsored by Hahnemann Medical College and Hospital in May 1959.

Simpson, George Gaylord, Anne Roe, and Richard Lewontin. *Quantitative Zoology.* Harcourt, Brace, New York, rev. ed., 1960. 447 pp. $8. Complete revision of the first edition (by Simpson and Roe) published in 1939.

Smith, E. Lester. *Vitamin B_{12}.* Methuen, London; Wiley, New York, 1960. 208 pp. $3.

Stanton, Isabel Alice. *A Dictionary for Medical Secretaries.* Thomas, Springfield, Ill., 1960. 183 pp.

U.S. Public Health Service. *The Central Nervous System and Behavior.* Russian Scientific Translation Program, National Institutes of Health, Bethesda, Md., 1960. 1060 pp. Collection of 70 articles translated from the Soviet medical literature and prepared primarily for participants at the third Macy conference on the central nervous system and behavior.

Waterman, Talbot H., Ed. *The Physiology of Crustacea.* vol. 1, *Metabolism and Growth.* Academic Press, New York, 1960. 687 pp. $22.

Mathematics, Physical Sciences, and Engineering

Alt, Franz L., Ed. *Advance in Computers.* vol. 1. Academic Press, New York, 1960. 326 pp. $10.

Ashby, W. Ross. *Design for a Brain.* The origin of adaptive behavior. Wiley, New York; Chapman and Hall, London, ed. 2, 1960. 295 pp. $6.50.

Cooke-Yarborough, E. H. *An Introduction to Transistor Circuits.* Oliver and Boyd, London; Interscience, New York, 1960. 170 pp. $3.50.

Dean, John A. *Flame Photometry.* McGraw-Hill, New York, 1960. 362 pp. $11.50.

Earhart, E. W., and R. D. Hindson, Eds. *Flat Rolled Products.* pt. 2, *Semi-Finished and Finished.* Interscience, New York, 1960. 159 pp. $4. Volume 6 in the Metallurgical Society Conferences series.

George, Joseph J. *Weather Forecasting for Aeronuatics.* Academic Press, New York, 1960. 682 pp. $15.

Langlois-Berthelot, R. *Transformers and Generators for Power Systems.* Their behavior, capabilities and rating. Translated by H. M. Clarke. Philosophical Library, New York, 1960. 550 pp. $12.