nuclear data used to illustrate the theory presented. Frequently, only one or two examples are given to demonstrate an important physical theorem. An extensively organized presentation of the actual data would give the reader a chance to judge for himself the validity of the theoretical arguments. Although the collective nuclear model has certainly come of age, it is not yet so well understood that we can afford to forget the data and references on which it is based. The basic framework for a first-class reference volume is present in this text, and it would be a pity not to utilize it as such in the future.

A less important omission (but still worthy of note) is the SU(3) description for collective nuclei. Rowe argues that this approach is "not *really* rotational." This is true, but SU(3) can certainly be used to describe certain rotational nuclei. Personally, I would have liked to have seen a chapter of the book devoted to this subject.

There are a few other omissions, such as the description of the fission process (as the author notes in the preface). Several topics (notably: Hartree–Fock calculations in the 2sld-shell, the Peierls–Yoccoz method, and the work of Abe Klein and his collaborators) are only given very brief attention. The emphasis in the book is definitely centered about the author's own research interests. Thus, the discussion of the "equations of motion" approach is one of the clearest treatments of this topic to be found in the literature. This more than makes up for the omissions listed above. After all, any expert is bound to emphasize his own speciality.

In summary, Rowe has written a very pedagogical book of great value to physicists encountering the concepts of collective nuclear motion for the first time. The framework for a primary reference volume in nuclear physics is present, and could be exploited by expanding the data presentation and including an extensive bibliography.

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Introduction to Electrodynamics and Radiation

W. T. Grandy, *ed.*
284 pp. Academic, New York, 1970. $12.50

Despite some 40 years of intensive research in nuclear physics (strong and weak interactions) and 55 years of gravitation theory, there is little doubt that of the three fundamental interactions the electromagnetic ones are by far the best understood. Their application in almost every aspect of our highly technological civilization has become common knowledge. The study of the foundations of electromagnetic theory is therefore a standard part of the graduate education of every physicist. This includes classical as well as quantum electrodynamics. The difficulty here is that the latter seems relatively inaccessible, especially to those who do not wish to delve into relativistic quantum field theory.

Here is an attempt at a solution of this difficulty, and I might add a successful one. This book is written for the first- or second-year graduate student who has had at least one graduate semester each of quantum mechanics and of electrodynamics but who has not had much more mathematics than these courses ordinarily require.

Of the 16 chapters half are devoted to classical electrodynamics (mostly relativistic), the other half to quantum electrodynamics of which only the last chapter is relativistic. The first half includes radiation theory and a fine introduction to the classical theory of charged particles. The treatment here is much more complete than in most books on electrodynamics and clarifies many misconceptions still to be found in the current research journals.

In the second half, the author succeeds in showing a great deal of the physics (including comparisons with experiments) and of the computational techniques (Feynman diagrams and radiative corrections) of quantum electrodynamics to a reader with only nonrelativistic quantum mechanics as background. Extensive references to more advanced texts and to original articles are provided.

This text is an ambitious undertaking. It covers a great deal of ground in only 270 pages. Of course, the reader must also pay for it; he is on his own in finding his way between some of the equations, because no step-by-step derivations are given. The average student on this level may not always have the mathematical facility to fill in the gaps; at times he may have to consult some of the various references; this is especially important for the classical theory where a working knowledge is the desirable aim. The exercises and numerous problems in each chapter are posed with this end in mind. In any case, the conscientious teacher using this text must be alert to these difficulties.

The author, of necessity, had to make a selection of topics; this is always a rather subjective matter. For example, arguments in the preface to the contrary, I would have preferred one or two other subjects in place of a chapter on Riemannian geometry in a book entirely devoted to flat-space physics.

Nevertheless, this concisely written but utterly readable book is a success in its unorthodox task: It gives a well-rounded introduction to electromag-

netic interactions including quantum electrodynamics on a relatively elementary mathematical level. The omission of drudgery of detail, the emphasis on results of the theory and their comparison with experiment, the insistence on presenting criticism and advanced research results even if proofs are beyond the scope of the present book, all this makes for exciting reading and certainly whets the appetite of all those who really want to know.

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Concepts of Nuclear Physics

By B. L. Cohen
435 pp. McGraw-Hill, New York, 1971. $14.95

In his preface to this book Bernard Cohen points out that it is possible for a person to earn a PhD in physics without ever being exposed to nuclear physics. The same is not true of atomic physics where, even on the secondary-school level, it is part of the science curriculum. He describes the book as an attempt to introduce the same logic into the teaching of an advanced undergraduate or first-year graduate course in nuclear physics as is presently employed in the teaching of atomic physics. It is an attempt that is largely successful. Whether it will make nuclear physics as familiar to undergraduate physics majors as atomic physics is now is an open question. It is certainly worth a try.

The author is eminently qualified to write such a book. He has a long and distinguished career as an experimental nuclear physicist with a very good instinct for key experiments. His research has covered a number of important areas in the field. He admits that the material covered in the book is weighted heavily towards areas in which he has had research experience, and it is. This is, in fact, one weakness of the book. There are a number of important areas in which he has not worked and these are given short shrift indeed.

Early in the book a chapter is devoted to the quantum theory of a particle in a potential well. Although it is assumed that most students taking a course in nuclear physics based on this book will have had a course in modern physics that includes quantum mechanics, for those who have not, this chapter should suffice. On several occasions further on in the text, material is treated in greater depth than can be handled by the quantum theory given in this chapter, but this is always carefully noted and the student can omit these sections without loss of continuity. The remaining material covered includes an excellent chapter on nuclear force, chapters on general nuclear properties, on models —particularly the quasiparticle concept with a good description of energy gap —applied to spherical even-even nuclei and then to the more complicated odd-A nuclei, both spherical and spheroidal, as well as to nuclei possessing permanent deformations. Then follow descriptions of nucleon, beta and gamma emission and then two chapters on nuclear reactions—one devoted to compound nucleus reactions and the other to direct reactions. Both of these chapters are done very well. In addition, there is a chapter devoted to experimental methods in nuclear physics and another to applications of nuclear physics.

No important topic in the field is excluded but, as mentioned above, certain aspects of nuclear structure physics are given rather cursory treatment. For example, only two pages of text are devoted to gamma-ray angular correlation studies, one page to the Doppler-shift attenuation method of measuring nuclear lifetimes and one page to Coulomb excitation. Vast amounts of information about nuclear structure have come from applications of these techniques, and to devote such little attention to them is peculiar.

Aside from this, however, the book is a valuable and unique addition to the literature on nuclear-structure physics. It is well written and provides a lucid description of nuclear phenomena at a level suitable for advanced undergraduate or first-year graduate students.

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Quantum Physics

By E. H. Wichmann
423 pp. McGraw-Hill, New York, 1970. $6.95

Eyvind Wichmann's book, which is Volume 4 of the five-volume Berkeley Introductory Physics series, represents a distinctive solution to the problem of creating an intellectually stimulating introductory course in "modern physics." The text will be enjoyable reading for any instructor, and should fascinate a student who is willing to shift back and forth rapidly from trusting acceptance to critical thinking as Wichmann takes him on a grand tour through quantum physics.

The tour covers many of the expected points, including such standard topics as the discovery and properties of photons, energy levels and atomic spectra, wave properties of material particles, Schrödinger's equation including applications to barrier penetration and eigenvalue problems and basic properties of nuclei and elementary particles. But the approach is fresh and unconventional, illuminated by Wichmann's enthusiasm and sophistication. For