theory where they exist, and to a remarkable extent he finds the time to explain discrepancies between naïve theoretical predictions and the facts. This attitude lends an air of intellectual stimulation and is bound to capture the respect of the reader. I was most impressed by the lucid presentation of the simple electrostatic explanation for the geometry of molecules. It alone is worth the price of the book.

This otherwise excellent little book is badly marred by confused symbolism and typographical errors, particularly in the first two chapters. On the other hand, there are few errors in content, and the book is handsomely printed and sturdily bound. Students and instructors alike will find this book valuable and stimulating.

RICHARD H. EASTMAN
Department of Chemistry,
Stanford University

Nuclear Physics

Nuclear Reactions. vol. 2. P. M. Endt and P. B. Smith, Eds. North-Holland, Amsterdam; Interscience (Wiley), New York, 1963. x + 542 pp. Illus. $18.50.

This second volume of the series published about four years after its companion volume, consists of four articles that review recent progress in various aspects of nuclear reactions (247 pages). The remainder is devoted to tables of the coefficients $C^{N}{}_{KM}$ which apply to the analysis of angular correlation measurements of the radiative decay of aligned nuclei. The tables are preceded by a 23-page introduction and guide to their use. Thus, the second half of the book is devoted to mathematical tables which make completely dull reading for those not interested in using them, but which are invaluable to experimentalists who need them for present or future planning and analysis of experiments. This extensive section, by Philip B. Smith, seems particularly appropriate in view of the anticipated wave of experimentation using multiparameter analyzer systems.

The four articles in the first half of the book are: (i) "Nanosecond experimentation with pulsed machines," by Stewart D. Bloom (41 pages); (ii) "Nuclear fission," by J. R. Huizenga and R. Vandenbosch (71 pages); (iii) "The giant resonance of the nuclear photoeffect," by E. G. Fuller and Evans Hayward (82 pages); and (iv) "Vibrations of spherical nuclei," by J. M. Araújo (53 pages). The authors are all distinguished experts in their fields, and their articles are generally very well-written reviews in which they attempt to summarize advances and new developments made in these areas in the time that has elapsed since the last major review article on the topic to about 1960. Their attempts to avoid the repetition of material covered in previous reviews frequently results in the complete omission of important areas of the subject.

The first article is devoted to experimental methodology, with particular emphasis on machine techniques for obtaining concentrated nanosecond width bursts from accelerators, and time-to-pulse height circuits suitable for nanosecond time-of-flight studies. Bloom includes many suggestions for future areas of experimentation which should be of considerable interest to those planning experiments in this field. To benefit fully from the somewhat sketchy tour provided in this article its readers must do several times as much reading from the extensive lists of references. (This is also true of the other articles.)

The second article emphasizes developments since Halpern's extensive article on nuclear fission in the *Annual Reviews of Nuclear Science* (1959). The rapid developments since Halpern's article are quite impressive.

I found the third article, by Fuller and Hayward, especially interesting. A large fraction of their article is devoted to a systematic development of the theory of the absorption and scattering of photons in the giant resonance region and to a critical discussion of the present status of the experimental work in this field, work to which the authors have made major contributions. All experimental results are critically reevaluated to provide an extremely valuable up-to-date analysis of the field. For a complete picture the reader should also read the earlier treatments by Bishop and Wilson, by Wilkinson, and by Stephens and the recent book by J. S. Levinger (listed in the references).

In the fourth article Araújo omits discussion of the vibrational states of deformed nuclei and concentrates on the more controversial subject of the collective vibrational motion of "spherical nuclei" near closed shells. The alternate interpretation of Davydov and his collaborators is mentioned but not discussed. The article is mainly devoted to the theoretical aspects of the subject.

The review articles are well written and authoritative, and they are comparable to the better articles found in *Annual Reviews of Nuclear Science* and similar works. The reader is expected to have a reasonably sophisticated background, and formulas and symbols are occasionally used without definitions of all symbols.

The book should prove to be a must for physicists working in these areas, but its price is such that access to a library copy will probably satisfy most users. The exponentially increasing pace of physics publication places an increasing emphasis on the need for frequent review articles as essential instruments for the effective dissemination of new knowledge to a wide audience.

JAMES RAINWATER
Department of Physics,
Columbia University

Russian Translation

Radio Wave Propagation and the Ionosphere. Ya. L. Al'pert. Translated from the Russian. Consultants Bureau, New York, 1963. x + 394 pp. Illus. $22.50.

This is an English translation of a Russian book first published in Moscow (1960), and it represents a considerable expansion and updating of a previous monograph entitled *Propagation of Radio Waves* (1953). The book is divided into two well-organized parts, the first of which covers the ionosphere and the second the propagation of radio waves of different frequencies. The translation is well done and exhibits a minimum of idiomatic awkwardness.

The presentation of the material on the ionosphere is closely linked to the radio methods by which most of the information on the ionosphere has been obtained. The main topics are the structure of the ionosphere, its formation, the regular variations in its electron density, effective collision frequency and absorption of radio waves in the ionosphere, and irregular phenomena in the ionosphere.

In the second part the general laws of the propagation of radio waves are reviewed, and then the details of propagation are presented in different wave