book might be compared with *The Feynman Lectures on Physics*, which it resembles closely both in style and format.

The book, which might more accurately be entitled "Particle Dynamics," commences with introductory chapters on the relation of physics to the natural world, on vectors, and on Galilean invariance. The next six chapters treat classical mechanics, including simple particle dynamics, the conservation of energy and momentum, the harmonic oscillator, elementary rigid-body dynamics (to be omitted from a minimum program), and inverse-square-law forces. After a descriptive chapter on the speed of light, one finally arrives at the primary goal of this volume, the Lorentz transformation of space and time (chap. 11) and of momentum and energy (chap. 12), ". . . a necessary prerequisite for the development of electricity and magnetism in Vol. II." The book concludes with a brief discussion of the principle of equivalence and a summary of elementary facts about the more important particles of modern physics.

Occasionally the authors' loose style leads to a certain vagueness. For example, the statement (p. 36) that the vector product is ". . . a vector in a somewhat restricted sense," without further explanation, is likely to perplex the student. Again, the statement that "The laws of mechanics of a mobile electron inside a fixed crystal may be quite unlike the simple laws which prevail in empty space" (p. 49) seems to imply that the laws of mechanics do not have universal validity. On the whole, however, the book is to be recommended, especially as a textbook for those students who are planning to major in physics.

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Space Engineering: Satellite Environment Data

Satellite Environment Handbook. Francis S. Johnson, Ed. Stanford University Press, Stanford, Calif., ed. 2, 1965. xiv + 193 pp. Illus. $7.50.

According to the editor of this handbook, "The first edition . . . was prepared in response to numerous requests from space engineering projects for the best available data on satellite environment." The appearance of a second edition some 3 years later is testimony to the success of that response and it is most welcome in view of the pouring forth of satellite data at "a bewildering rate" in the interim.

The eight short chapters survey the upper atmosphere, the ionosphere, energetic charged particles, solar radiation, micrometeorites, radio noise, terrestrial thermal radiation, and geomagnetism. The contributors—A. J. Dessler, W. B. Hanson, F. S. Johnson, H. C. Ko, B. J. O'Brien, and J. F. Vedder—are well abreast of their fields and have done an admirable job of summarizing their topics. Most of the chapters give rather thorough documentation for the data and results reported.

This book is intentionally brief, and as you might expect, the treatment of theory is generally superficial. It is also true that in such brief reviews, where the emphasis is on setting down the facts, it is not always possible for the authors to emphasize uncertainties and alternate points of view or interpretations as much as they might like to do. For these reasons I wish that each chapter had listed separately from the other references, perhaps with annotations, a number of current review articles that a reader could consult for additional study. With this one mild reservation, I can recommend the book as fulfilling its stated intent.

The editor's preface reminds us that, since the first edition was published, the basic ideas in space physics have changed surprisingly little, especially when measured against the avalanche of new data, a fact that might give us pause. It at least raises the question, with respect to much of space physics, of whether theory is playing its traditional role in the scientific method: Is theory made to serve sufficiently as the bridge that leads us to new observations from the results of older ones, or are we too often merely collecting those data that are collectable? In any event, let us hope that future editions will be able to record, in addition to the inevitable flood of new facts, substantial advances in our understanding of the "satellite environment."

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Antarctic Expedition

The Royal Society International Geophysical Year Antarctic Expedition. Halley Bay, Coats Land, Falkland Islands Dependencies, 1955–59. vol. 4, *Meteorology, Glaciology, Appendixes*. Sir David Brunt, Ed. Royal Society, London, 1964. 414 pp. Illus. $23.

In the preface to this valuable documentary, Sir Graham Sutton advises that it completes the record of the Royal Society Expedition to Halley Bay, Antarctica. Although the title emphasizes the principal subjects—meteorology and glaciology—the appendixes cover a wide field of additional topics such as embryology, physiology, oceanography, radio communications, and significant logistics information. The introduction, by Sir David Brunt, has been reprinted from volume 1, with slight modifications. Sir David reviews the development of international scientific efforts that led to the International Geophysical Year, 1957 and 1958, and provides an interesting résumé of committee activities and of personnel involved in the planning as well as in the actual antarctic operations. The editor's preface, which is also by Sir David, gives factual information on the technical contents of the volume. It is interesting to note that what some might interpret as a discrepancy in stating the position of the Royal Society base is in fact due to the westward movement of the ice shelf (approximately 365 meters or 1200 feet per year). These preliminaries would, perhaps, have been even more complete if the historical review had been extended into the post-IGY period to include mention of the Scientific Committee on Antarctic Research (SCAR) and the antarctic treaty.

The section on surface meteorology, by MacDowell, Ellis, and Limbert, comprises about two-thirds of the volume. It includes interesting paragraphs on the environment of the base, the methods of observation, instrumental performance, and a discussion of results. A large portion is devoted to tables that give results of synoptic observations made by MacDowell, Ellis, and Limbert.

The section on glaciological observations is divided into two parts. In the first, MacDowell discusses observations in the vicinity of the base, and in the second, MacDowell, Barclay, and Burton cover observations made during sledge journeys. The first part provides a description of the environment and factual information on snow accumulation measurements. This covers the accepted methods of stake and pit measurements, with a discussion of seasonal and daily variations. Recordings of the wind profile immediately above the ice shelf and measurement of the actual temperature of the ice shelf are also included in the first part.

The second part, a review of sledge journeys made by MacDowell, Barclay, and Burton on the ice shelf, describes snow accumulation, ice-hill investigations, and surface features. This is followed by a short, attractively illustrated paper, "Snow surface studies" by Tribble.

Space does not permit details on other parts of the appendix. With a few exceptions, these are largely operational or logistic in nature and provide an additional valuable record of personal experience and initiative in antarctic research.

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Radiation Chemistry

Introduction to Radiation Chemistry. I. V. Vereshchinskii and A. K. Pikaev. Translated from the Russian (Moscow, 1963) by J. Schmorak. Gabriel Stein, Scientific Editor. Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1964. viii + 335 pp. Illus. $15.25.

This is a good, well-written book that covers the literature of all radiation chemistry, rather lucidly and selectively, through 1960. There are several references to 1961 publications and, surprisingly, an occasional reference to a 1962 publication. But the abrupt advances of the last 4 years are not discussed—despite the false impression, created by the publisher of the translation, that this is a 1964 book. Furthermore, the price seems extraordinarily high for a book printed by photo-offset (even for a book so well printed as this one). However, the important fact is that every serious worker in radiation chemistry should be aware of this book and its utility.

Vereshchinskii and Pikaev appear to have worked separately on chapters close to their particular areas of specialization, but, very likely because of the excellent work of the translator and particularly of the scientific editor, Gabriel Stein, the style and manner of presentation are consistently smooth.

I do not pretend that this book is without minor inaccuracies, irritations, inelegancies, or confusions. They are there—but only to a minimal degree. The figures are adequate. The word "obviously" (the flag of danger ahead) appears too often, "recombination" is employed when "combination" is clearly meant (a misusage common among kineticists), the words "reverse reaction" are used when the more inclusive "back reaction" is intended, and there is no author index. The treatment of the radiation chemistry of water and aqueous solutions seems to be complete (as of the time that the book was written), and the theory is well handled. However, in this volume, as in the other treatments of the radiolysis of water, the subject (even with present knowledge of the solvated electron) is so involved that one cannot expect to learn a lot in hasty reading. On the other hand, meaning, in any portion of this book, is rarely obscure.

Introduction to Radiation Chemistry, like other publications from the U.S.S.R., reveals that the Russians remain consistently aware of the problems created by the existence of chemical effects of high-energy radiation (as in nuclear power technology) and of the technological possibilities of radiation chemistry (as in polymers and organic synthesis).

A beginner in radiation chemistry can read this book, learn the fundamentals, and not be led astray. He also will obtain valuable information on dosimetry which is not otherwise available in such a succinct or informative collection. An advanced worker will find a good review and comparison of different points of view regarding both theory and experiment, well-documented and very useful tables and charts, and an extraordinary bibliography of information (particularly on the Russian literature). An investigator entering a new field in radiation chemistry is well advised to consult the pertinent portions of this book first. I recommend it highly, and I congratulate all those involved in this exceptionally well-done job.

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International School of Physics

Advanced Plasma Theory. M. N. Rosenbluth, Ed. Academic Press, New York, 1964. xiv + 266 pp. Illus. $9.75 (contributors: W. B. Thompson, Russel Kulsrud, G. Ecker, M. N. Rosenbluth, H. P. Furth, P. A. Sturrock, C. Mercier, B. Bertotti, and M. Kruskal).

This book is Course 25 in the Proceedings of the International School of Physics, "Enrico Fermi," sponsored by the Italian Physical Society. It covers the principal series of lectures given at Varenna during July 1962. The director of the course was Marshall Rosenbluth of the United States. The main emphasis of the book is on the plasma theory that has been developed in connection with controlled thermonuclear research, and the faculty was drawn primarily from the controlled fusion laboratories of the United States and Western Europe.

Although each chapter is written by an independent author, the arrangement is good in that the more basic and more fully developed subjects appear at the beginning and are followed by several shorter chapters on newer areas of research or special problems.

The first chapter is devoted to plasma kinetic theory. The author emphasizes the physical processes involved rather than seeking the most general formulation of kinetic theory. Transport processes in the presence of a magnetic field are discussed, and methods of obtaining the transport coefficients are given. This section contains a useful list of the important relations and coefficients. The Fokker-Planck equation for a plasma in a magnetic field is discussed in detail. There has been considerable research in this field in recent years, and an important feature of this chapter is that these results are brought into perspective.

In the second chapter three energy principles for the stability of static equilibria are derived. These correspond to three models that are useful in describing a plasma. The first is the set of magnetohydrodynamic equations for one fluid with a scalar pressure and infinite conductivity. The second is the collisionless limit described by the Vlasov equations, and the third is the infinite conductivity fluid theory, but with a tensor pressure. The derivation of comparison theorems between the energy principles adds to the value of this chapter. The