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, Bar-