each genus and species heading there is listed the source of the original or amended designation, with the location of the type species if known. A brief and generally adequate description of each species is given, with notes on depth and distribution in the North Sea and the North Atlantic. For each species are included one or more line drawings, indicating external appearance and the arrangement of organs in the zooid removed from the test, and two distribution charts, one showing the precise locations from which the museum specimens have been taken, and the other the general locations from which specimens have been reported.

This little volume is an exceptionally valuable handbook for all marine zoologists who collect ascidian material from anywhere in the world. It should make it possible to identify most of the common species of the North Atlantic without further references. Many of the doubtful or less common species which are not listed can be placed as to genus by comparison with the descriptions given. In addition, the book will be of great assistance in the currently important attempt to work out accurate distributional data for sessile marine species and their yearly or seasonal changes. Millar's *Ascidiacea* will be needed by all university and museum libraries, and by all zoologists interested in ascidian species anywhere in the world.

H. H. PLOUGH
Department of Biology, Amherst College, Amherst, Massachusetts

Radiation

The Middle Ultraviolet. Its Science and Technology. A. E. S. GREEN, Ed. Wiley, New York, 1966. 404 pp., illus. $15.75

The title of this book is misleading. A balanced treatment of the basic science and technology relating to the generation and detection of middle-ultraviolet radiation and to its interaction with gases, solids, and liquids has not been attempted. The book is primarily for the space scientist; the radiation source is the sun, the attenuating media are the atmospheres of the planets, many of the instruments are for flight. The wavelength region of 1700 to 3400 Å has received most emphasis, but no rigid limits have been imposed.

The first chapter is an informative historical account of the airborne spectroscopic studies which extended knowledge of the intensity distribution of the sun's radiation to wavelengths shorter than 2000 Å. In the next three chapters, properties of the principal atmospheric constituents are discussed: included is a summary of certain quantitative calculations for N_2 and O_2. The background radiance of the earth in the middle ultraviolet is the subject of chapters 5 and 6, and in chapter 7 consideration is given to the general problem of atmospheric attenuation of radiation along slant paths. A brief introduction to the subject of air pollution and some thoughts on the use of ultraviolet spectroscopy as a means of identifying trace pollutants form chapter 8.

In the foreword (by Stanley S. Ballard), it is noted that this book contains an "unusual mixture of topics and subjects" which results "in a treatment that is far from uniform." This comment, applicable to the first part of the book, is further justified by the second. Here are chapters in which rocket exhaust plumes, atmospheric entries and chemical perturbations, and electron impact excitations are discussed in addition to aspects of planetary and astronomical spectroscopy. Several of these chapters, for example, those entitled "The ultraviolet spectroscopy of planets" and "Ultraviolet technology," are useful summaries of extensive fields. The latter chapter deals with the techniques employed in the spectral region 1000 to 4000 Å. It includes concise descriptions of radiation sources, filters, detectors, diffusers, and so on, and is a most welcome inclusion.

This compilation, in its entirety, will probably appeal to few. However, sections will be well received. The book is clearly printed, well bound, and contains many references.

R. BRYAN CAIRNS
GCA Corporation, Bedford, Massachusetts

Positional Astronomy

Principles of Astrometry. With Special Emphasis on Long-Focus Astrometry. PETER VAN DE KAMP. Freeman, San Francisco, 1967. 239 pp., illus. $6.50.

You might summarize my impression as "beware of titles unless you pay attention to subtitles." Its author is a master of long-focus astrometric techniques, and this magnificent little book well lives up to its title-plus-subtitle.

The book is divided into three sections, the second of which contains the heart of the matter. This second section must be read and savored, for it tells us how to wring greater and greater accuracy from very stubborn material by using great care in obtaining and measuring the material. The author underplays the value of the Turner coefficients and prefers to use dependence methods. The latter are computational artifices derived from the former, and the reader must pay strict attention to the condition under which the two give the same results. This condition is emphasized on page 104 in the book. It is apparent in this section that the work of Schlesinger and Hertzsprung of the early 1900's forms the basis of the present-day methods and that van de Kamp and K. Strand are the modern apostles.

The first section picks out those parts of spherical astronomy essential for the purpose of the book. It is very well arranged, and chapter 4, "Systematic patterns in proper motions," is a most important inclusion. The third section might well be considered an appendix, for it consists of two brief chapters dealing with errors and least squares.

The technical aspects of the book are selectively, but excellently, referenced. There is no recourse to the modern escape mechanisms of "unpublished note" or "private communication." Many little interesting details about observing and reduction techniques are slipped in and, to my knowledge, appear in print for the first time. This alone makes the book a valuable addition to the literature. Some people may criticize the use of "old-fashioned" mathematical notation, but such notation insures that everyone can read it.

Astronomers have long suffered from a dearth of textbooks on specialized topics. This volume helps to fill the void in one area. It can be used at the undergraduate level, or along with V. V. Podobed's *Fundamental Astrometry* and selected papers in the literature in a one-semester graduate seminar. The book is recommended to the professional and student alike and will no doubt be in every astronomer's personal library for handy reference. It will be especially useful to astronomers who do not work in astrometric areas.

LAURENCE W. FREDRICK
Leander McCormick Observatory, University of Virginia, Charlottesville