

of the book, is introductory and illustrates a dilemma faced by most writers of elementary texts. To many students, the material will seem like the "same old stuff" that they have encountered before about quantum mechanical atoms and small molecules. Some of the material will not be repetitive, such as the brief introduction to group theory and the basic statement of selection rules. The presentation is clear and traditional, and will be necessary for those who have escaped previous exposure to qualitative chemical quantum mechanics. Students to whom the material is old hat can skip most of it without loss.

The second chapter, entitled *Light Absorption and Its Physical Consequences*, is rather good and says many things that are ordinarily spread over many more pages in larger books. Many subjects, in addition to absorption and emission, are introduced. For example, the elementary concepts concerning electronic energy transfer are presented about as compactly as I have seen in any work. Interestingly, a considerable amount of chemical change creeps into the discussion despite the intent to emphasize physical processes. This probably only illustrates the fact that physical and chemical nonradiative decay of excited molecules are really not fundamentally separable processes.

The third chapter gives a series of illustrative case histories of photochemical studies. The choice of examples appeals to me and, irrespective of one's taste in examples, the presentation provides a very natural way of introducing many different experimental methods and mechanistic concepts. Even photochemical aficionados may enjoy reading the chapter, an easy evening's task, just to see the interesting, simple way in which the subject is unfolded.

GEORGE S. HAMMOND
University of California, Santa Cruz

Astrophysics

Cosmic Plasma Physics. A conference, Frascati, Italy, Sept. 1971. KARL SCHINDLER, Ed. Plenum, New York, 1972. xii, 370 pp., illus. \$22.50.

One of the needs of astronomers and space physicists is to find a way to bring some of the recently developed knowledge of plasma physics to bear on their subjects. It is by now a truism that the bulk of astronomy and space

physics is concerned with plasmas in one form or another and that more complex plasma phenomena such as wave turbulence and plasma instabilities are playing a significant role in these fields. Much knowledge of these phenomena has been gained in the past years, but as yet plasma physicists are not aware of their manifold applications to astronomy and space physics. It is just this need which a book such as this meets admirably.

Distinguished scientists from many areas of astronomy and space science were gathered together at the conference which this book reports, and each gave a lecture on his specific area of research. These lectures have been written up concisely so that it is easy and pleasant for the reader to gain a taste of each relevant bit of astronomy. By and large each author does a good job of summarizing the observational situation in his field. The presentations are usually cast in a sufficiently theoretical framework that the observations can readily be grasped and remembered without the reader's having to accept the theory. For me as a theorist, this has always been the easiest way to have observations presented. To most of the articles is appended a fairly representative bibliography which will enable the reader to enter the area more thoroughly if he chooses. The talks are labeled as invited survey papers or as contributed papers, but often the contributed papers are as informative as the survey papers in providing a picture of a particular area. Most important, the book was brought out in a remarkably short time so that the expositions had no chance to become dated before they appeared in print.

The topics covered are ionospheric, magnetospheric, and planetary physics, the solar wind, comets, solar flares, pulsars, x-ray sources, magnetic stars, cosmic rays, and the dynamics of the galaxy. In addition, a number of papers on relevant basic plasma theory such as collisionless shocks are presented. I was particularly fascinated by the article by Biermann on the exciting recent developments in theories of comets which have resulted from ultraviolet measurements. Also, Paul's article on collisionless shocks accomplishes the unbelievably hard task of providing a common framework for the plethora of such shocks. I was quite excited by the paper of Fahr on the interaction of the solar wind with the interstellar medium, from which it appears that people are at least having some success in understand-

ing how the solar wind terminates. The extremely interesting work of Coppi and Treves on x-ray sources indicates how far one can go in making models of these complex phenomena when new plasma ideas such as anomalous resistivity are introduced. The really tough problems associated with stellar magnetic fields are admirably summarized by Mestel in a survey paper. These are only a few of the really first-rate papers which give the book considerable distinction as well as make it an excellent survey book for plasma physicists.

RUSSELL M. KULSRUD
*Plasma Physics Laboratory,
Princeton University,
Princeton, New Jersey*

Books Received

Adolescents Grow in Groups. Experiences in Adolescent Group Psychotherapy. Irving H. Berkovitz, Ed. Butterworths, London; Brunner/Mazel, New York, 1972. xiv, 250 pp. \$10.

Advanced Inorganic Chemistry. A Comprehensive Text. F. Albert Cotton and Geoffrey Wilkinson. Interscience (Wiley), New York, ed. 3, 1972. xxiv, 1142 pp., illus. \$15.95.

Advances in Steroid Biochemistry and Pharmacology. Vol. 3. M. H. Briggs and G. A. Christie, Eds. Academic Press, New York, 1972. x, 258 pp., illus. \$14.

Algorithm Specification. A Symposium, New York, Mar. 1971. Randall Rustin, Ed. Prentice-Hall, Englewood Cliffs, N.J., 1972. xiv, 142 pp., illus. \$9.95. Prentice-Hall Series in Automatic Computation.

American Physicians in the Nineteenth Century. From Sects to Science. William G. Rothstein. Johns Hopkins University Press, Baltimore, 1972. xvi, 362 pp. \$15.

Animals and Man. Past, Present, Future. Richard G. Van Gelder. Illustrated by John R. Lane. Foundation for Environmental Education, New York, 1972. 66 pp. Paper, \$1.95.

Annual Review of Biophysics and Bioengineering. Vol. 1. Manuel F. Morales, William A. Hagins, Lubert Stryer, and William S. Yamamoto, Eds. Annual Reviews, Palo Alto, Calif., 1972. x, 590 pp., illus. \$10.

Application of Invariant Embedding to Reactor Physics. Akinao Shimizu and Katsutada Aoki. Academic Press, New York, 1972. x, 184 pp., illus. \$14.85. Nuclear Science and Technology, 9.

Artificial Cells. Thomas Ming Swi Chang. Thomas, Springfield, Ill., 1972. xiv, 208 pp., illus. \$16. American Lecture Series, No. 828.

The Assessment of Population Affinities in Man. J. S. Weiner and J. Huizinga, Eds. Oxford University Press, New York, 1972. xii, 224 pp., illus. \$20.50.

Astrodynamics. Orbit Correction, Perturbation Theory, Integration. Vol. 2. Samuel Herrick. Van Nostrand Reinhold,

(Continued on page 1130)