

BOOK REVIEWS

The Exploration of Space. NAS-NASA-APS Symp. Proc. (Washington, D. C., Apr. 1959). Edited by Robert Jastrow. 160 pp. The Macmillan Co., New York, 1960. \$5.50.

The Exploration of the Solar System. By Felix Godwin. 200 pp. Plenum Press, Inc., New York, 1960. \$6.50. Reviewed by Herman Yagoda, *Ionospheric Physics Laboratory, Geophysics Research Directorate.*

IT is becoming steadily more difficult to anticipate the scope and contents of books devoted to the space sciences and technology from a reading of their titles. The situation is growing akin to the practice in the cinema industry where the title is designed to fit the space on the theater marquee or to draw the attention of a potential audience rather than to serve as an indication of the plot. Thus, the comprehensive title of the symposium, "The Exploration of Space", edited by Robert Jastrow, confines itself to our present knowledge of the solar system as glimpsed by astronomical observation through a turbulent atmosphere, the sampling afforded by meteoritic matter which chances to land on the earth's surface, and recent experimental probing largely in the vicinity of the earth as afforded by sensor instruments carried aboard high-altitude rockets and satellites. This series of essays was presented and discussed by a panel of experts under the chairmanship of Bruno Rossi at the National Academy of Sciences in conjunction with the April 1959 meeting of the American Geophysical Union.

The objectives of the symposium were (1) to awaken the interest of the scientific community in the problems facing space research; (2) to present an estimate of our present and near future capabilities for space exploration; and (3) to acquaint the experimentalist with existing instrumentation in space physics. These wide objectives are in large measure fulfilled by a series of essays covering the abundance of micro- and macrometeorites (Fred L. Whipple, H. C. Urey), the natural trapped radiation (J. A. Van Allen), and that generated in the Argus experiments as a result of the injection of electrons into the earth's magnetic field by high-altitude detonations of small A-bombs (N. C. Christofilos). Gerard P. Kuiper and G. de Vancouleurs present brief descriptions of the topology of the moon, and the atmospheres of Mars and Venus. Recent infrared spectra of Mars are discussed which are very suggestive of the presence of organic molecules on the Martian surface. Recent developments in our knowledge of the earth's atmosphere at high altitudes as gathered from satellite data and heating produced by trapped particles are

evaluated by Robert Jastrow. Thomas Gold and Eugene Parker contribute sections dealing with magnetic fields in the solar system and the plasma generated by the sun.

Some of the experimental aspects of space physics are covered by Homer E. Newell in a section describing large thrust rockets and their payload capabilities. The Nova, under development by NASA, will be capable of placing a 75-ton payload into a 300-mile orbit and thereby provide possibilities for manned laboratories and astronomical observatories. Present-day achievements in rocket astronomy are described by Herbert Friedman who discusses the results available on the solar spectrum and solar x rays secured by means of spectrographs and multiple pinhole cameras flown on Aerobee sounding rockets. The possibilities of making astronomical observations above the atmosphere by means of oriented satellites are discussed in a chapter by Leo Goldberg. The volume under review is a hard cover reprint of the papers and discussions of the symposium as published in the November 1959 issue of the *Journal of Geophysical Research*. As such the contents are readily available to the aficionados of the space sciences. The reprint in book form should help make the subject matter available to a wider audience.

In contrast, the work by Felix Godwin with the more modest title, *The Exploration of the Solar System*, deals with conceivable rocket propulsive systems for effecting soft instrument and manned landings on the moon and the neighboring planets. This enticing subject has been dealt with repeatedly in such well-known works as A. C. Clarke's *Interplanetary Flight* and its more popular version, *The Exploration of Space* (of identical title with the book edited by Robert Jastrow), and von Braun's *The Mars Project*, to mention but a few. The recent successful recovery of fairly massive objects from satellites injected into low-altitude orbits helps lend credence to the eventual landing and return of small explorational parties to the moon and possibly Mars and Venus. The extrapolations presented in fair detail by Godwin are rather ambitious, visualizing the landing of armadas of space ships on the moon by 1980 and the establishment of an embryonic colony on Mars some ten years later.

In view of the spectacular advances in rocket propulsion and guidance during the past decade one hesitates to take sides on these seemingly farfetched possibilities. Indeed, scientists aiming to exploit present-day satellite launching capabilities are in a similar dilemma in attempting to design instrumentation for specific experiments. This thought is stated

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PLASMA PHYSICS

by

**James E. Drummond; Boeing Scientific
Research Laboratories**

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Based on the recent conference in Plasma Physics conducted at the Stanford Research Institute, this text provides an extensive review of some of the important special areas in plasma physics such as quantum plasma physics, detailed statistical mechanics of plasmas and aerodynamic aspects of magnetohydrodynamics. Emphasis throughout is on the unsolved problems in plasma physics.

BASIC ELECTRONICS

by

**Paul M. Chirlian, Stevens Institute of
Technology; and Armen H. Zemanian,
New York University. Ready in April,
1961.**

Designed to be used as the first text in an undergraduate electronics sequence, this book examines the physics and equivalent circuits of the electronic devices. Emphasis is on physical electronics rather than circuitry. The physical phenomena of the various types of devices such as vacuum tubes, transistors, and tunnel diodes are examined with an eye to the similarities in these phenomena wherever appropriate.

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aply by Leo Goldberg, writing in the first volume under review: "The planning of astronomical experiments two or three years in advance presents some rather serious difficulties because the technology associated with space vehicles changes so rapidly that no one can be quite certain what the state of the art will be at the time a given experiment is scheduled."

Godwin, in considering the problems of local transportation on the new worlds, has designed a series of rocket-powered land-based vehicles for use on bodies such as the moon and Mars possessing small gravitational fields, and also contemplates the use of a dirigible balloon for exploring planets with a dense atmosphere such as Venus. The book is studded with numerous novel suggestions associated with the launching and exploratory operations and should provide stimulation to the younger engineering mind. It should also serve as an anodyne to those of us who are engaged in the discouraging task of trying to recover instrumentation from present-day high-altitude probes.

Nuclear Spectroscopy. Part A, 621 pp.; Part B, 522 pp. Vol. 9 of Pure and Applied Physics. Edited by Fay Ajzenberg-Selove. Academic Press Inc., New York, 1960. \$16.00 each. *Reviewed by Jacques Romain, University of Elisabethville, Katanga.*

A DETAILED review of so wide a field as nuclear spectroscopy can best be achieved by a team of experts familiar with the several topics included. Members of the team responsible for the preparation of this volume understood their task excellently, and the editor succeeded, to a fair extent, in solving the inevitable problems of duplication of material and disagreement in notation. A consistent use of notation has been maintained within the specialized sections, and inconsistencies from section to section have been reduced to a minimum. The articles have been coordinated and cross references are used. Because of the mixture of experimental and theoretical papers, the level of their presentation tends to fluctuate, but each author handles his material in a thorough manner and the resulting collection of papers provides a very good and up-to-date review of the field.

The book is concerned with the techniques of obtaining and analyzing the experimental data required in dealing with nuclear parameters and with the use of nuclear models in interpreting experimental results. It will be useful to specialists who wish to gain a broad view of the whole field of nuclear spectroscopy, and at the same time it is written in a way that will make it readable to graduate students concerned with acquiring a thorough understanding of the subjects discussed. A general knowledge of quantum mechanics and nuclear physics is assumed, but no previous specialized background in any of the particular topics is required.

The work is divided into two parts. The first deals with experimental techniques and results (spectroscopy of charged particles, gamma rays and neutrons, and