Modern High School Physics divides the subject into eleven units, bearing the following titles: Foundation of Mechanics, Wave Motion, The Fluid State, Heat—Energy in Motion, The Nature and Propagation of Light, Electricity and Magnetism, Alternating Current Phenomena, Electronics, Nuclear Energy, Relativity and Recent Advances in Physics.

The most useful part of the book is the general discussion at the beginning of each unit. The outline that follows in each unit is, in this reviewer's opinion, too brief to be of much use. Here the teacher should use his own ingenuity in the selection of actual topics. But if he has caught something of the spirit of Mr. Vitrogan's introductory discussions, his outline is apt to be a cut or two above existing ones in being comparatively free of descriptions of such hallowed items as refrigerators, streamlined trains, and portable x-ray machines.

There are places in the text where more precision of statement would have been welcome: Statics is termed the "conditions under which a body is in a state of equilibrium" (p. 19); one item listed under "Categories of Subject Matter" carries the title "Heat as energy in motion (radiation)" (p. 14); "disordered electromagnetic waves represent a form of heat which belongs to empty space" (p. 40); and an ion is somewhat unconventionally defined as "a fundamental physical particle with an electric charge" (p. 56).

In spite of the fact that the text often suggests a popular rather than a penetrating understanding of physical phenomena, the booklet is a step in the right direction; and it is to be hoped that it will encourage others to explore new ways of presenting the subject to the great majority of high-school physics students.

The Earth: Its Origin, History and Physical Constitution (4th Revised Edition). By Sir Harold Jeffreys. 420 pp. Cambridge U. Press, New York, 1959. $13.50. *Reviewed by S. F. Singer, University of Maryland.*

FIRST published in 1924, this venerable book is now in its fourth edition. No major changes have been made compared to the third edition. As the author points out, the field of geophysics has become so vast that no single person can really be an expert in all aspects of it. This statement is unfortunately evident in the book by the absence of any discussion of the subject of terrestrial magnetism. However, all the topics which are discussed can claim Jeffreys as one of the leading authorities and originators.

The publication of this edition comes at a time of renewed interest in the properties of the earth and of other planets. Here the plan of the author has been to apply planetary theories not just to the earth but indeed to extend them to other planets, which is of course very commendable. This feature of the book is not reflected in its title nor in its table of contents. Since a simple measurement, such as the density of the surface rock of the moon or of Mars or Venus,

gives immediately some ideas on the properties of the core, many of the theories discussed in the book will probably be subject to test within the next few years. From this point of view the appearance of this edition is very timely. It does not of course include any discussion of the results of recent satellite experiments on the figure of the earth, but it gives an excellent basis for understanding the implications of such measurements. About one third of the book is concerned with seismology, the theory of elastic waves, and the properties of rocks. Another third is concerned with the effect of stresses in the earth, the figures of the earth and moon, and includes new treatments of tidal friction, of creep of rocks under pressure and its implication for polar wandering, convection currents, and continental drift.

The age of the earth, its thermal history, and the origin of its surface features occupy the last third of the volume. Here the author expresses his own preference for the theory that the earth was at one time fluid and that the radioactive material was concentrated in a thin crust at the surface. The last chapter consists of a number of special problems, many of them controversial. Some of the interesting questions discussed there include the shifts of the earth axis and continental drift, which gives the author a chance to expound his own views. On the subject of the surface features of the moon, however, he is content to quote the many diverging opinions without taking a firm stand.

Lunar and Planetary Exploration: Colloq. Proc., Vol. 1 (No. 2, Santa Monica, Calif., July 1958, 23 pp.; No. 3, Caltech Jet Propulsion Lab, Oct. 1958, 40 pp.). Missile Div., North American Aviation, Inc., Calif., 1958. Paperbound. *Reviewed by Robert E. Street, University of Washington.*

ACCORDING to the foreword in each of these: "The colloquium is an informal gathering for periodic discussion of the scientific and engineering aspects of lunar and planetary exploration. It is intended to bring together scientific and engineering people for the exchange of space information; to define the scientific values of lunar and planetary exploration; to investigate experimental methods and instrumentation for achieving the desired results; . . . Flight trajectories and the mechanics of vehicle design and performance will be excluded from discussion except as required to define the limitations placed upon a scientific mission by the vehicle." Judging by the list of participants, which includes the names of many outstanding earth scientists as well as engineers and scientists from industry, the group is small and composed principally of people from the Southern California area.

The first of these two issues (No. 2) is composed of papers by Chew and Olson of North American Aviation, Wilson of the Rand Corporation, and Stephenson of California Research Corporation on the engineering problem associated with going into space for the benefit of the astronomers, chemists, and physicists present, who may not be so familiar with rocket and missile technology. The other one (No. 3) is a presentation of present knowledge and conjectures of the physical and chemical nature of the moon, Mars, and Venus with suggestions for experiments to be performed if and when man is able to land on the moon. Of the longer papers, the one by Urey on the chemistry of the moon is interesting and controversial; O'Day in "Power for a Lunar Colony" expects to obtain all of this from solar energy; Tombaugh has suggestions for the best place to land on the moon with some information on Mars. Richardson's paper is on Mars and Venus while Arnold and Greenfield suggest specific experiments to be carried out on the moon.

The discussions of the papers are in many ways more interesting. The lack of knowledge of the moon and planets is so great that many conclusions reached in these discussions are frankly admitted to be subjective. Apparently available from the company for the asking, these and future issues are recommended to anyone interested in scientific aspects of space exploration, presented in well-written nontechnical form.

Solid State Physical Electronics. By Aldert van der Ziel. 604 pp. Prentice-Hall, Inc., Englewood Cliffs, N. J., 1957. $9.75. *Reviewed by C. Kittel, University of California at Berkeley.*

THIS is a useful book. In it one can find out how a range of solid-state and electron emission devices work and one can get an idea of their performance characteristics. It is not a simple book. To use it with profit, the reader will have to understand more about atomic physics and statistical mechanics than is covered in the three chapters devoted to these subjects. There are a large number of excellent problems. The chapters on magnetic materials are relatively weak and could be improved in a second edition. The dependence of the book on the literature of one Dutch company is a little overwhelming.

Elements of Biophysics. By James E. Randall. 333 pp. The Year Book Publishers, Inc., Chicago, Ill., 1958. $8.00. *Reviewed by Joseph G. Hoffman, University of Buffalo.*

IN the preface the author points out that rigorously quantitative and analytic aspects of biophysics are often frightening. To avoid these perilous aspects the text is written in an easy kind of stream-of-consciousness style wherein precision of statement is unnecessary. Thus, under radioactivity the opening sentence is: "Some atoms of some elements have unstable composition and will spontaneously break down into more stable atoms." In a later section an unclear distinction about atoms is made and some are called "chemical atoms".

The restatement of physical principles is quite novel and peculiar. Under Mathematical Concepts the text reads: "The sinusoidal wave occurs frequently in nature