

The Earth, the Planets and the Stars. Their Birth and Evolution. By K. E. Edgeworth. 193 pp. The Macmillan Co., New York, 1961. \$5.75. *Reviewed by Jacques E. Romain, General Dynamics.*

COSMOLOGY involves a comprehensive synthesis of every kind of physical concept, and therefore mirrors the contemporary state of physics as a whole. This privileged status makes it one of the most fascinating, but also one of the most controversial, subjects of the physical sciences, and its theoretical views are among the most vulnerable scientific theories.

These features are adequately set off in this book, which fulfills two main purposes: to give a brief critical exposition of the principal current theories, in order to discard those that prove unworkable and to evaluate the remaining ones against observational evidence; and to expound the author's own views suggested by the preceding analysis. The book deals with problems concerning the structure and past history of the Earth, the solar system, the stars, and the galaxies. The author's original theories (some of them unorthodox but all the more interesting to read) stress the necessity of explaining the cosmological appearances as the product of normal evolutionary forces rather than through improbable ad hoc hypotheses. They are mainly concerned with planetary instability in the structure of the Earth, the origin of the solar system (by the way, how does Pluto fit into the picture?), and stellar evolution.

Every chapter is divided into a number of very short sections and the book is so written that it can be read by the nonspecialized reader. A good many mathematical arguments are hinted at in several short appendixes. But perfect clarity is not achieved everywhere in the text, owing to the rather dry, laconic, not always sufficiently explicit style of writing.

The book is worth the effort of overcoming this drawback, for it is based on a thorough analysis of existing information and data, and the unsolved problems of cosmology are pointed out. It will be helpful to the reader with some background in the field, who will appreciate the bibliographical references, but I doubt whether the beginner can take full profit.

Space Astrophysics. William Liller, ed. 272 pp. McGraw-Hill Book Co., Inc., New York, 1961. \$10.00. *Reviewed by E. J. Öpik, University of Maryland.*

FIFTEEN lectures presented in 1959-1960 at the University of Michigan Astronomy Department by invited well-known specialists constitute this volume which deals for the most part with the exploration of space, or in the narrow sense of the word, exploration from space. An exception is the lecture by H. Bondi which considers cosmological consequences of a possible inequality of positive and negative elementary charges. Most of the others keep to factual and experimental data, even in the development of theories; however, T. Gold's article on the moon, crammed with many stimulating ideas (all of which need not neces-

sarily be correct), remains completely on a qualitative descriptive level.

The other articles contain much needed information, up to date at the time of presentation, concise in form, and extremely valuable to the researcher. Results of rocket-based ultraviolet and x-ray spectroscopy, and radiation measurements of the sun and sky background are given (R. Tousey, W. Rense, H. E. Hinteregger, H. Friedman, A. B. Boggess); plans for new experiments in these directions are developed (B. Rossi); theories of the solar corona, interplanetary gas, and solar wind are discussed in the light of available information (S. Chapman, L. Biermann, E. N. Parker); instrumental developments are theoretically considered, such as astrostats for space (R. A. Nidey), attitude control of satellites (R. B. Kershner and R. R. Newton), and grating mountings for space telescopes (T. Namioka).

Although far from completely covering all aspects of "space" astrophysics, the volume is an important contribution which the worker in the field of interplanetary, solar, and upper-atmospheric physics will appreciate. Two nonfactual articles adorn the volume, which otherwise would appear too utilitarian in its setup.

The Abundance of the Elements. By Lawrence H. Aller. Vol. 7 of Monographs and Texts in Physics and Astronomy, edited by R. E. Marshak. 283 pp. Interscience Publishers, Inc., New York, 1961. \$10.00. *Reviewed by C. C. Kiess, Georgetown College Observatory.*

AMONG the problems receiving much attention in astrophysical investigations of today is the determination of the relative abundances of the chemical elements in the stars, nebulae, and interstellar matter. This is because the results have an important bearing on the physical processes occurring in these objects and governing their evolutionary development. Naturally, the first object to be studied was the Earth itself for which, during the past three-quarters of a century, repeated analyses have yielded abundance-ratios of increasing accuracy, not only for the Earth's crustal materials, but also for those in its atmosphere and hydrosphere. In more recent years the frontiers for research of this kind have been expanded successively to include the sun and its planets, and the interplanetary matter. More recently, the stars and nebulae with their associated gaseous and particulate material have been brought within the range of observation.

The multilingual literature describing the various researches and their results is scattered through many publications, and very little of it has found its way into textbooks and reference works. Professor Aller, therefore, has done an eminent service in selecting the important topics from these publications and arranging them in logical sequence in his book. After an introductory chapter in which the scope of the