end of each chapter is well chosen. This book is generally suitable for students at the graduate level. It could be used as an introductory text only with careful supplementation by the teacher.

This treatise is a succinct summary of the internal radiation dose questions of the past and a commentary on present dosimetry. One can only hope that, in this field where the literature contains many reports and conference proceedings edited by one or two investigators but consisting of the diverse reports of many, more books of this caliber will be forthcoming.

McDONALD E. WRENN
Institute of Environmental Medicine, New York University Medical Center, New York City

Geo- and Cosmochemistry

Origin and Distribution of the Elements. An international symposium, Paris, 1967. L. H. AHRENS, Ed. Pergamon, New York, 1968. xviii + 1178 pp. + plates. $48. International Series of Monographs in Earth Sciences, vol. 30.

This book should have been issued as two volumes. The first half deals with the sun, stars, meteorites, and planets, whose composition was governed by nuclear and cosmochemical processes. The second half deals with the earth, whose surface composition is determined largely by geochemical processes. There is little contact or interaction between these two areas, as is shown by the author index: most authors are cited either in the first or in the second half of the book, not in both.

Of the 90 papers in this volume, 16 are in French and one in German. The remainder, including seven papers from the U.S.S.R., are in English. Much of this material has been published elsewhere, before or after the symposium, and so the total amount of new information is disappointingly small for a volume of this size. Nonetheless, there are more first-rate papers in this book than can be mentioned in this brief review.

Sections 1 and 2, Theories of Origin (11 papers) and Solar, Stellar, and Interstellar Abundances (10 papers) contain a fair cross section of recent work in the field. Fowler, Gibbons and Macklin, and Bernas *et al.* review some of the laboratory data on which theories of nucleosynthesis are based. Cameron presents a new table of the abundances of the elements in the solar system, based largely on Type I carbonaceous chondrites. This paper, and a review of abundances in the solar photosphere by Müller, are likely to be widely cited. Pottasch discusses abundances in the solar corona, which sometimes differ greatly from those in the photosphere. Bidelman, Warner, and Pagel give authoritative surveys of magnetic, late-type peculiar, and old stars, respectively.

Section 3, Meteorites (21 papers) ranges farther afield than the title of the book suggests. In addition to a number of straightforward papers on the abundances of individual elements, by Ahrens, Schmitt, Ehmann, Reed, and Smales and their respective coworkers, it also contains discussions of meteorite ages (Reynolds, Turner, and Burnett *et al.*), orbits (Wänke, Wetherill, and Yokoyama *et al.*), classification (Fredriksson *et al.*), mineralogy (Jedwab), and atmospheric ablation (Cantelaube and Pellas).

Section 4, Planets, Asteroids, Comets, Tektites (5 papers) is a catchall. It contains an interesting review of planetary atmospheres (Owen), two papers on tektites (Taylor, Mills), one on radiation effects (Zeller), and one on zodiacal dust (Rhee).

Part 5, Terrestrial Abundances (43 papers), is divided into three sections. The first contains several papers on abundances in major rock types (Turekian, Taylor, Barth, and Schroll), along with a number of more highly specialized ones on granitoids and ultramafic rocks. The second and third sections are devoted to individual elements, gases, sedimentary rocks, water, and other topics. Some of the more interesting papers deal with composition of the earth's interior as inferred from the abundances of potassium, uranium, and thorium (Shaw), potassium and rubidium (Erlank), or rare earths (Philpotts and Schnetzler); distribution of transition-metal ions in silicates in terms of crystal field theory (Allègre *et al.*, Burns); and sediments (Wedepohl, Bienner *et al.*). Spencer, Degens, and Kulbicki demonstrate how factor analysis can simplify the interpretation of large quantities of geochemical data. Goni and Guillemin show that many trace elements are not uniformly distributed throughout the host crystal, but are concentrated along grain boundaries and crystal defects.

Typography and proofreading are both excellent. Regrettably, the publishers have used paper of high wood pulp content, perhaps in view of the ephemeral nature of some of the papers in this volume. The price has nonetheless been set at a steep $48. Since so much of the material in this volume is available elsewhere, highly specialized, or far removed from any one reader's field of interest, only ardent bibliophiles will want to acquire this volume. Most geochemists, cosmochemists, and astrophysicists will probably be content to consult it in their institutional libraries.

EDWARD ANDERS
Enrico Fermi Institute, University of Chicago, Chicago, Illinois

Enzyme Kinetics

Behavior of Enzyme Systems. JOHN M. REINER. Second edition. Van Nostrand Reinhold, New York, 1969. xviii + 350 pp., illus. $14.50.

This reviewer was first stimulated to enter the field of enzyme kinetics by figuring out why in the previous edition of this book the author could not show consistency between the product inhibition data for creatine kinase and the equations he had derived for a two-substrate ordered mechanism. It was thus a shock to find the same error still present (pp. 144–45) after ten years in this new edition, but this incident really characterizes the entire book. Enzyme kinetics has come of age in the last ten years, but the author has remained stationary and seemingly unaware of what has been going on. Few references are more recent than 1960, and no mention is made of the growing body of literature in which analyses of initial velocity and inhibition patterns are used to deduce the order of addition and release of reactants in complex mechanisms. No mention is made of the prediction of kinetic patterns by inspection. In short, one searches in vain for any of modern enzyme kinetics, either theory or practice. The author writes with a breezy style that is fun to read, but what one is reading is all ten years old. New sections have been added on allosteric kinetics and on enzyme mechanisms, but the author does not really come to grips with these subjects, either, and one does not get a clear picture of the present state of our knowledge of these important fields. A good book on enzyme kinetics is badly needed, but this is not it.

W. W. CLELAND
Department of Biochemistry, University of Wisconsin, Madison