worthy. The section dealing with the radiolysis of water is particularly well represented by both the ^{60}Co γ-ray and pulse radiolysis techniques. The different papers are all good examples of the type of approach used to study the radiolysis of water. There are papers on the nature of the processes leading to the formation of molecular products, a controversial issue right now. The rate processes of the primary species in water are measured and discussed, together with an interesting treatise on the reactions of hydrated electrons.

The book is dedicated to J. J. Weiss, who has been "from youth to age of unusual strength" in both fields of research. It is a worthy tribute to his many contributions, and I recommend it to all radiation chemists, and to photochemists who have a passing interest in the chemistry created by ionizing radiation.

J. KERRY THOMAS
Chemistry Division, Argonne National Laboratory, Argonne, Illinois

The Three-Body Problem

Theory of Orbits. The Restricted Problem of Three Bodies. VICTOR SZEBEHELY. Academic Press, New York, 1967. xvi + 668 pp., illus. $25.

The subtitle of this book more closely characterizes its contents than does the title. Chapter 1 gives a carefully delineated mathematical description of the restricted problem of three bodies. Chapter 2 considers the various possibilities in the reduction of the order of the system of differential equations. Chapter 3 treats regularization as it may be applied to the restricted problem. Chapter 4 treats the totality of solutions, the zero-velocity curves, and regions of motion in various cases. There are 17 pages of tables, giving specific numerical results. Chapter 5 deals with motion near the equilibrium points and with stability, including some nonlinear phenomena. Chapter 6 is a relatively short treatment of Hamiltonian dynamics in the extended phase space. It serves as preparation for a chapter on canonical transformations of the restricted problem. Chapter 8, on periodic orbits, was almost omitted from the book, the author tells us, but he steers deftly across a broad sea of information (which is much better for the reader than the trite excuse "beyond the scope of this book"). Chapter 9, on numerical explorations, is the longest one; it provides a well-balanced coverage of the history of results down to the present time. The final chapter, on modifications of the restricted problem, deals with the three-dimensional case, the elliptic case, Hill's problem, and the problem of Euler-Lagrange.

As a textbook, whether for a formal course or not, this is a remarkable book. I am reminded of the succinct advice for a public speaker: "Stand up; tell them what you are going to tell them—tell them—then tell them what you told them." Each chapter opens with a few paragraphs that set the stage for the material it contains. Each chapter ends with notes, certainly the most interesting part of the book and, except for the extensive list of references, probably the most valuable part for the reader. On every page, one feels the author, the teacher, hovering intently over the reader, his student, to make sure he is getting every point as completely as possible. One is impressed with the extensive detail and erudition of this field which the author commands. He treats both the classical problems of astronomy and the modern problems of the space age with great depth and clarity. This is the kind of book every good teacher would be proud to publish in his own field, and the author may well take delight in his accomplishment.

PAUL HERGET
Cincinnati Observatory, Cincinnati, Ohio

Luminescence

Fluorescence: Theory, Instrumentation, and Practice. Based on an American Chemical Society symposium, Miami Beach, Fla., April 1967. GEORGE G. GUILBAULT, Ed. Dekker, New York, 1967. xxviii + 697 pp., illus. $15.75.

This book is a collection of 14 papers presented at a symposium organized by the Analytical Division of the American Chemical Society. It is not easy to summarize a book like this in a short review, since the papers vary widely in their emphasis and outlook. Many are review papers which present good overall views of a particular area, whereas others are more concerned with the work of the authors' own laboratories.

The papers can be roughly divided into four groups: two general papers dealing with the influence of structure and environment on electronic states, energies, and luminescence yields; five papers best described as treating the applicability of particular techniques of luminescence measurements; two papers describing new instruments for specialized fluorescence measurements; and five papers reporting on specific problems which have been studied by fluorescence techniques.

Judged as a collection of scientific papers, this book certainly belongs in any scientific library. But I am more concerned with its value as a reference book for a scientist or a laboratory engaged in luminescence research. From this point of view, the meat of the book is in the first two groups of papers mentioned above, and the value of any paper is largely measured by its comprehensiveness. The two papers in the first group, by E. L. Wehry and M. Kasha, together give a fairly complete summary of various factors that are known to affect fluorescence measurements. The value of the papers in the second group lies in the fact that they can suggest powerful techniques for attacking many different research problems. The chapters that I believe will be found especially useful are the one on use of energy transfer (by F. Wilkinson, largely describing the work of the late J. T. Dubois), and the paper on phosphorimetry by W. J. McCarthy and J. D. Winefordner. Both of these are also quite complete in their treatment.

The book as a whole is not, however, a comprehensive work on fluorescence, since it covers only a limited set of topics in this broad area. There is, for example, little or no discussion of such important matters as luminescence of molecular crystals, fluorescence lifetimes, or the fluorescence of large molecules in the gas phase. Unfortunately, no really comprehensive work on luminescence is available, so its place in the laboratory must be filled by other books such as this one. On the whole, I expect the book to be useful in my own work in spite of its limitations, and I believe that others will also find it useful.

A couple of other points perhaps deserve mention. The book is reproduced directly from a typed manuscript, so its 700 pages are comparable to about 300 pages of the usual printed book. It does include an excellent index, which is essential in locating specific information in a book of this type.

S. J. STRICKLER
Department of Chemistry, University of Colorado, Boulder