quantitatively recording various types of radiations, including those which are extremely weak. The problematic "mitogenetic" radiations in the ultraviolet, described by A. G. Gurvich as detectable by biological systems, which were the basis of so much controversy in the 1930's, are conservatively treated by the authors of this book, who point out that "the solution of the whole problem of mitogenetic radiation is in its initial phase." The authors suggest that cellular ultraviolet radiation, the existence of which is indicated by some recent work, may merely be a special case of "dark chemiluminescence," the significance of which is as yet anything but clear.

The credibility of the existence of weak cellular ultraviolet radiation is enhanced by the detection of "dark luminescence," in the ultraviolet or in the visible below the threshold of visibility, from a variety of sources, such as mouse liver, lipids extracted from various human tissues, mitochondria, and growing cultures of yeast. (The data are summarized in a table.) The information pertaining to dark luminescence and the brief discussion of its significance are one of the unusual, interesting features of the book.

In chapter 4, the section on functional chemiluminescence (bioluminescence) is apt to prove disappointing to those who are well versed in this subject, partly because of certain errors, some of which (for example concerning the structure of *Cypridina* luciferin) could have been avoided by bringing the subject more up to date, and partly because of the brevity of the treatment, which includes detailed consideration of only three systems, among which, however, is the extraordinary system of the jellyfish *Aequorea*, along with the more familiar types found in luminous bacteria and the firefly. The molecular weight of the active component, that is, the bioluminescent protein aequorin, of the jellyfish system is given, probably through a misprint, as 3.5×10^3, instead of the more nearly correct figure of 3.5×10^4.

Some awkwardnesses in the translation are greatly outweighed by the value of the book as a whole. It is highly recommended to anyone who is more than casually interested in bioluminescence. Even some specialists may be impressed with the comprehensive discussions of the somewhat neglected use of fluorescence, which provides an unusually sensitive technique, in the investigation of structural and conformational changes in biomolecules, and also by certain other sections of the book.

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Approaches to Pulmonary Dynamics

Pulmonary and Bronchial Vascular Systems. Their Reactions under Controlled Conditions of Ventilation and Circulation. I. DE BURGH DALY and CATHERINE HEBB. Williams and Wilkins, Baltimore, 1967. xvi + 432 pp., illus. $16.25. Monographs of the Physiological Society, No. 16.

The Pulmonary Circulation and Interstitial Space. Proceedings of a symposium, Chicago, Aug.–Sept. 1968. ALFRED P. FISHMAN and HANS H. HECHT, Eds. University of Chicago Press, Chicago, 1969. xiv + 434 pp., illus. $15.

Daly and Hebb's *Pulmonary and Bronchial Vascular Systems* is an exposition based on classical physiological approaches to its subject. The two authors have devoted their professional lives to a consideration of the factors governing pressure, volume, and flow in the vascular systems of the lung. This book reflects this devotion, reviewing pulmonary and bronchial vascular hemodynamics, particularly as these are influenced by nervous impulses, vasomotor changes, and pharmacologic agents. The writing is lucid (in the best English tradition); the references are exhaustive and the conclusions are conservative.

Though the use of the smoked drum is now supplemented by the use of the oscilloscope, tubing of plastic and not of glass is used, and perfusion systems are more sophisticated, there is substantial doubt that the basic issues involved in the regulation of hemodynamics in the pulmonary circulation can be resolved by the methods of classical organ physiology. Thus this book, though it has a certain charm, does not have a modern flavor.

The Pulmonary Circulation and Interstitial Space presents newer approaches to the subject. This volume is an edited summary of a conference on the pulmonary circulation organized by the two editors as one of the satellite conferences of the International Physiological Meeting in 1968. Fishman has extensive experience and great skill in organizing meetings of this type, and this expertise is reflected in the book.

The book represents an attempt to focus on some new techniques and approaches for solving current problems involving the pulmonary circulation. This involves a multidisciplinary approach employing a number of experts, many of whom are not card-carrying pulmonary physiologists. The results are worthwhile though uneven. Organ physiology is frequently eclectic, and the same has been true of pulmonary physiology. Thus in embracing new disciplines (such as transport physiology, electrolyte metabolism, and systems analysis), there is a danger of simplistic approaches and interpretations. On the other hand, the book deals with a number of important subjects. The treatment of the role of the interstitial space of the lung in pulmonary hemodynamics, in liquid and solute exchanges in the lung, and in gas exchange is particularly noteworthy (indeed, the "interstitial space" was appended to the title of the book in the process of editing). The sections on pleural hydrodynamics and engineering approaches to pulmonary hemodynamics are also excellent. The comments by the invited discussants are generally pertinent and are an important element of the book, as are the summary statements of the section chairmen. In brief, the conference outlines some of the unsolved problems involved in understanding the pulmonary circulation. After reading the volume, one awaits the next conference (in say ten years) with some impatience.

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A Mineral Group

Feldspars. TOM. F. W. BARTH. Wiley-Interscience, New York, 1969. xii + 264 pp., illus. $14.50.

This book is the first modern attempt at a comprehensive review of feldspar mineralogy and crystallography. It is subdivided into six major sections: one on the general mineralogy and classification of the rock-forming feldspars, one on pseudosymmetry and twinning, one each on the structures, physical properties, and thermodynamic proper-

ties of the feldspars, and a collection of historical notes and old names. The book is profusely and well illustrated and handsomely printed.

Feldspars are a difficult subject on which to write a book. There have been nearly as many advances in our fundamental knowledge of feldspars in the last two or three years as in all previous years, and therefore, although the author provides excellent coverage of the literature through 1967, and although the coverage is not dogmatic and he indicates what problems are in need of further study, the book is out of date.

The book is also flawed by loose organization, uncritical discussion of the cited references, and an imprecise and confusing terminology. Some material is repeated and many subjects are mentioned long before they are fully explained. The chemistry of the feldspars is, for reasons obscure to this reviewer, treated as a separate subject only in the preface. The concept of "structural state" is not treated as such. There is in fact no attempt early in the book to set up a chemical-crystallographic framework in which feldspar composition, phase relations, and crystal chemistry could be discussed. There is hardly any critical synthesis of earlier work. Authors are quoted correctly in context, but contradictions arise from the inclusion of data from papers that supersede earlier work which may be cited elsewhere in the book. There are occasional factual slips, as when the author states (p. 133) that artificially prepared maximum-microcline–low-albite solid solutions will break down in a few days at room temperature. The reader is plagued by the lack of a consistent nomenclature and classification of feldspars, despite the fact that the entire first section is devoted to this topic. Mineral names, particularly those of alkali feldspars, are used loosely, often with meanings based on field occurrence or morphology rather than on strictly applied chemical or x-ray crystallographic characteristics. Many mineral names (clevelandite, anemousite, isomicrocline, and moonstone, to name a few) are defined and used in the text when they would be more properly placed in a separate glossary.

In summary, it is my opinion that the present volume will be of limited use either to the student or to the professional mineralogist. The professional mineralogist will find it useful mainly for the completeness of the bibliography and as a guide to the critical problems in feldspar mineralogy for which more data are needed. The deliberate omission of determinative tables reduces its usefulness as a text for students. The book is, however, a necessary first step toward synthesizing the knowledge gained so far on feldspars, a task which can approach completion only when feldspar research reaches a breathing point.

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Radiation Detection

Semiconductor Detectors. G. BERTOLINI and A. COCHE, Eds. Interscience (Wiley), New York; North-Holland, Amsterdam, 1968. x + 518 pp., illus. $22.50.

This book, well and clearly written by the editors and a number of others prominent in the radiation detector field, concerns itself with the uses and study of silicon and germanium radiation detectors having good energy resolution.

The topics covered include semiconductor properties of silicon and germanium; the behavior of lithium in silicon and germanium; theoretical determination of the mean energy for electron-hole pair creation and the Fano factor; characteristics and construction of diffused, surface barrier, and lithium-drifted detectors; low-noise electronics, pulse-shape and time-resolution studies; neutron, heavy-charged-particle, beta-ray, x-ray, and gamma-ray spectroscopy, including particle identification and channeling; and the search for new semiconductor materials for gamma-ray spectroscopy. The chapter on this last subject, by G. W. Mayer, also sheds light on fundamental properties of compound semiconductors.

Considerable information is included from papers presented at the 1966 scintillation and semiconductor counter symposium, the 1966 New York meeting on semiconductor materials for gamma-ray detectors, and the 1967 Gatlinburg meeting on semiconductor detectors.

According to the editors, this volume is directed both to nuclear spectroscopists and to students of physical properties of semiconductors; one would have to agree that these two groups could derive considerable benefit both from a first reading of it and from having it available for reference. The chapters on spectroscopy are alone worth the price of admission and will be invaluable to the physicist attempting to choose the right detector for his experiment.

The bibliography (including many useful survey articles) is excellent. Delightfully, there are only five "private communications" out of nearly a thousand references.

This book provides instant access to almost everything in the literature through 1967 but does not contain much new information. The editors, of course, cannot be blamed for the absence of information on recent advances in certain fast-moving areas, such as the very-low-noise field effect transistors that became available about a year ago.

The section on low-noise electronics includes a good fundamental discussion of noise in field effect transistors and an analysis of various pulse-shaping networks, but lacks a thorough discussion of how to use d-c restorers and any consideration of practical fine tuning of field-effect-transistor preamplifier systems for optimum performance. A full treatment of these subjects would be invaluable to many experimenters.

Although this book may be of only modest value to producers of semiconductor detectors, it will be a valued possession of those who actually employ them.

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Atomic Scattering

Electronic and Ionic Impact Phenomena. H. S. W. MASSEY, E. H. S. BURHOP, and H. B. GILBODY. Second edition, in four volumes. Vol. 1, Collision of Electrons with Atoms. H. S. W. Massey and E. H. S. Burhop. xx + 664 pp., illus. $32. Vol. 2, Electron Collisions with Molecules and Photo-ionization. H. S. W. Massey. xviii pp. + pp. 665–1316 + plates. $32. Oxford University Press, New York, 1969. International Series of Monographs on Physics.

It has become customary, in the atomic scattering field, to divide the subject matter roughly into two parts. In the first, the projectile is a light particle such as an electron, a positron, or a photon; in the second, both projectile and target are heavy atoms, ions, or molecules. The division is made because of the natural grouping of experimental and theoretical techniques as well as the historical divi-