

Conference on the Biology of the Mycoplasmas held in 1966. Fifteen of the chapters are updated and expanded versions of papers published earlier in the 871-page proceedings of the 1966 conference (*Biology of the Mycoplasmas*, Annals of the New York Academy of Sciences, vol. 143, 1967).

By usual definition, mycoplasmas are found in nature and L-phase organisms, as the editor prefers to call them, are derived from bacteria. Various properties shared by mycoplasmas and L-forms have led to a hypothesis that is difficult to substantiate, that is, that mycoplasmas are descendants of bacteria. The requirement for sterol, a property of animal cells not yet reported for bacteria, and the failure of nucleic acid homology techniques to confirm genetic relatedness are cited in this volume as evidence to the contrary. One may wonder, nevertheless, why other opposing arguments are not included.

Investigators delving into the possible role of L-phase organisms as agents of clinical disease will do well to read the chapter by W. Hijmans and his colleagues from the Netherlands. The thinking in this chapter, supported by 18 pages of references, does not seek to debunk the hypothesis that L organisms have such roles. However, the pitfalls for the researcher investigating this hypothesis are clearly and forcefully presented. Another chapter, by Z. A. McGee and R. G. Wittler, establishes acceptable terminology for the wall-defective variant phases of bacteria and brings together the most recent information on their clinical significance. A discussion of the taxonomic position of the mycoplasmas and the reasoning that led to their present classification was enlightening to this reviewer. *Mycoplasma*, the only genus so far assigned to the family Mycoplasmataceae, has 35 species which are listed by name in the book. Just what will be done with the T-strains of M. C. Shepard is not clear, but the possibility of another genus being assigned to this group appears to be under consideration. Since mycoplasmas are free of cell walls and differ in other important respects from bacteria, they should be aligned into a new class, and the suggested name is Mollicutes (soft skin).

The repetition appearing in the introductory sections of various chapters could have been avoided; however, the articles are well organized, clearly written, thoroughly referenced, and comprehensive. The book is not abundantly

illustrated, but does contain sparkling photographs of mycoplasma organisms as viewed under the electron microscope. Photographs shown in the chapter by W. A. Clyde which reveal the diversified morphology resulting from progress of growth are especially striking. The book, covering topics which range from studies of ultrastructure to the epidemiology of *Mycoplasma pneumoniae*, should be a useful addition to the wealth of reference material now available to educators, research workers, and students of microbiology.

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## Binary Semiconductors

**Semiconducting II-VI, IV-VI, and V-VI Compounds.** N. KH. ABRIKOSOV, L. V. PORETSKAYA, L. E. SHELIMOVA, and E. V. SKUDNOVA. Translated from the Russian edition (Moscow, 1967) by Albin Tybulewicz. Plenum, New York, 1969. viii + 25 pp., illus. \$19.50. Monographs in Semiconductor Physics, vol. 3.

In recent years the rapid development of the use of compound semiconductors for many diverse applications ranging from optoelectronic to thermoelectric devices has precipitated a correspondingly rapid increase in interest in their crystallography, phase chemistry, thermodynamic properties, and stoichiometry and in a range of preparative techniques. Interest in a more chemical approach to the materials aspects of semiconductors has arisen somewhat late in comparison to the rapid development of semiconductor technology. This is primarily because, compared to the elemental semiconductors silicon and germanium, which were the first developed and are still the most used, compound semiconductors are more sensitive to variations in preparative techniques and thermal history.

In this book the authors present a compendium of information of interest to the semiconductor materials scientist for the semiconducting compounds formed from elements of group II, IV, or V, and sulfur, selenium, and tellurium. There are three chapters, dealing respectively with  $A^{II}B^{VI}$ ,  $A^{IV}B^{VI}$ , and  $A_2^{VB_3^{VI}}$  compounds. In each chapter there is a concise and informative description of the crystal structure of the binary compounds. Also presented are

phase diagrams and, in many instances, a discussion of nonstoichiometry and thermodynamic properties of the binary systems. Tables of physical properties pertinent to semiconductor applications are also presented. Preparative techniques are discussed quite briefly. Each chapter finishes with a brief but useful description of the phase diagrams of some multicomponent systems based upon the binary systems discussed in that chapter. It does not appear that, for any of the reported data, a critical evaluation of the source material has been made.

This book will be of general interest to people who are concerned with materials problems encountered in the study and use of compound semiconductors. It is not, however, complete enough in detail to serve as a primary reference source for those who are doing research with a particular semiconductor, and to achieve such detail does not appear to have been the intention of the authors. An annoying drawback is that the bibliography has significant omissions, at least for the systems with which this reviewer is most familiar. Since one purpose a monograph such as this is expected to serve is to aid the researcher more quickly to find primary sources of data, this may be a serious limitation of the usefulness of this book for some readers.

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## On the Uses of Applied Physics

**Properties of Matter under Unusual Conditions.** In Honor of Edward Teller's 60th Birthday. HANS MARK and SIDNEY FERNBACH, Eds. Interscience (Wiley), New York, 1969. x + 390 pp., illus. \$19.50.

This book, honoring Edward Teller, consists of 16 articles by some of his colleagues and co-workers. The scope of the book, like the scope of Teller's scientific contributions, is rather broad, ranging from the study of elementary particles up to the study of cosmology. In between these extremes, there are articles on atomic, molecular, and solid state chemistry and physics, neutron and plasma physics, and geophysics. Personal appraisals of Teller's career and scientific style are included in brief articles by E. P. Wigner and W. Heisenberg. In some cases, the articles discuss work presently in progress under Teller's di-

rection; in other cases, the articles describe work done in a past collaboration; and in still other cases the discussions involve work only of related interest.

In spite of the diversity of subjects discussed in these articles, certain basic threads extend through from one article to another. For the most part the emphasis is away from setting up formalisms, but toward getting to the basic physics as quickly as possible. Much of the work discussed by the authors has to do quite frankly with applied physics, both with regard to developing weapons for national defense and to applying research efforts to entirely peaceful projects. Furthermore, examples are given in which valuable information of a purely scientific nature can be obtained from nuclear explosions as well as other applied research.

A perhaps more direct path to the peaceful uses of scientific investigations, namely controlled thermonuclear research, is described by the extensive review article (126 pages) by R. F. Post. This article describes clearly essentially all the basic background material with which one should be acquainted upon entering seriously into the field. The strong relationship between this subject and space physics is also brought out. Extensive references are given where the details would be too lengthy or tedious to be included in the article. In several of the articles, mention is made of the usefulness of sophisticated numerical computations in implementing many of the diverse scientific programs. One of the most classic cases is that of neutronics. Fluid flows in general have received much numerical treatment. One of the more recent and most interesting applications of computational techniques is the computer simulation of plasmas. There are also several articles which have relatively little direct connection to applied science of any sort, those on cosmology and on elementary particle physics. One might end this paragraph by pointing out an attitude that most contributors to this volume have in common with Teller to one degree or another, namely, a tremendous enthusiasm for the application of science to practical purposes but an equal enthusiasm for the purely scientific knowledge that can be gained both in the process and apart from it.

It is worthwhile to add one technical point concerning Critchfield's article on the eigenvalues of Casimir operators. Subsequent to the printing of the present book, Louck (*Amer. J. Phys.*, in press) has found a general (but quite

different and more complicated) formula for the eigenvalues of the Casimir operators. Although Critchfield has checked this result against his (with reasonable definitions of the symmetric functions) through order seven, the results have not been related to each other theoretically.

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## Ultrasound and Its Uses

**Ultrasonics.** Theory and Application. G. L. GOBERMAN. Hart, New York, 1969. xii + 212 pp., illus. \$12.

This book is intended to provide the undergraduate student and general research worker with an introduction to the interactions of ultrasonic energy and matter. As the author readily admits, such an undertaking requires a selection of the topics that are to be treated in detail. In this selection, much more attention is paid to theory than to industrial applications. The use of ultrasonics as a research tool is well covered, however. Algebra and a little calculus suffice for following derivations; the style is straightforward and easy to understand.

The general treatment approaches matter as a continuum for waves, with lumped equivalent circuits derived on a voltage-force analogy. The author often uses transmission-line theory rather than energy as a unifying concept. The references are often selected for historical perspective rather than for up-to-date research results; the latest journal reference is 1966.

Several topics of direct use to the research worker receive special attention. The discussion of the near field of pistons will be of interest to those who assume that a plane radiator radiates plane waves. Gain from focusing devices and radiation pressure in linear systems are well presented. Piezoelectric transducers receive a relatively complete treatment, but with little attention to coupling coefficient as a useful parameter. Most of the examples make use of quartz rather than ferroelectric materials. Magnetostrictive devices receive much less attention. Design equations for sandwich (Tonpilz) transducers will provide only a general background, with little information on practical difficulties of construction. Ultra-high-frequency resistive layer transducers receive brief notice.

There is an excellent summary of the theory of cavitation in liquids, with comments on the inadequacies of present data that should spur action. Relaxation processes provide a basic concept for the author's treatment of absorption, dispersion, propagation in solids, and shear waves in liquids. In the treatment of phonons their interaction with electron spin waves receives special attention. Measurement schemes using traveling waves, reverberation, streaming, and the ultrasonic interferometer are presented, with estimates of accuracy.

In accordance with the intent of the text, discussion of applications is rather sketchy, with references that the reviewer found inadequate. One could wish for mention of the analytical work of the Krautkraemers in ultrasonic pulse-echo flaw detection. Medical applications fare somewhat better; the author's earlier text *Ultrasonic Techniques in Biology and Medicine* (Iliffe, 1967) is a useful reference. Sonar, blind guidance delay lines, image converters, and viscometers average less than a page each.

The book provides an excellent introduction to the field for its intended audience. For the reader wishing more detailed information, or data on applications, the references make a useful starting point.

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**Correction:** The price given for *Peregrine Falcon Populations: Their Biology and Decline*, edited by Joseph J. Hickey (University of Wisconsin Press), which was reviewed in *Science* 31 October, was incorrect. The correct price is \$10.

## Books Received

**Advanced Physical Chemistry.** A Survey of Modern Theoretical Principles. S. M. Blinder. Macmillan, New York; Collier-Macmillan, London, 1969. xx + 556 pp., illus. \$13.95.

**Advances in Electronics and Electron Physics.** Vol. 26. L. Marton and Claire Marton, Eds. Academic Press, New York, 1969. xii + 444 pp., illus. \$19.50.

**Advances in Marine Biology.** Frederick S. Russell and Maurice Yonge, Eds. Academic Press, New York, 1969. x + 454 pp., illus. \$17.50.

**Advances in the Biosciences.** Vol. 1, Schering Symposium on Endocrinology, Berlin, May 1967. G. Raspé, Ed. Pergamon, New York, 1969. viii + 324 pp., illus. Paper, \$9.

(Continued on page 1322)