ernment laboratories within the US and worldwide (principally Western Europe, Japan and Russia) actively contributing in journals and conferences. Historically, British laboratories have played an especially strong role in ion-implantation research, perhaps even out of proportion to the level of commercial exploitation of the associated technology. It is therefore quite appropriate to see in print this massive chronology of (British) contributions to ion implantation.

Their "magnum opus" represents effectively four relatively independent "books" in one. According to the authors, the main reasons for publication are to provide a summary for technologists interested in exploiting scientific ideas, and also to provide a text for student—who unfortunately cannot afford it—so as to increase academic involvement in a field dominated by government and industrial laboratories.

The first "book" by Geoffrey Dearnaley is a 150-page treatise on ion–solid interactions. He begins with a very readable and detailed discussion of energy-loss mechanisms. The role of interatomic potentials is blended informatively with experimental range data, which gives the reader the capability of estimating range and straggling distributions. Emphasis on the historical aspects from the days of H. A. Bethe and F. Bloch in the 1930's, the era of J. Lindhard and colleagues in the 1960's to the more recent work on the oscillations in the electronic-energy loss is quite refreshing. He discusses some channeling phenomena with currently important application of lattice location of impurity atoms.

The second "book" on the physical state of the ion-implanted solids by R. Stuart Nelson primarily deals with those aspects of radiation damage deemed important to ion implantation. A large portion considers high dose effects in metals with emphasis on electron microscopy. Although the author is eminently qualified to write in this field (he has made many significant contributions), this section lacks coherence. A very nice discussion on radiation-enhanced diffusion and precipitation during implantation, which overlaps somewhat with a similar section in the first book, rounds out Nelson's contribution.

The third "book" by J. Harry Freeman deals with the production and manipulation of ion beams for implantation. This section with its many excellent illustrations is a delight to read. It displays a thorough working knowledge of accelerator systems and heavy-ion sources. Certainly, this is a must for anyone concerned with the experimental aspects of ion implantation between the ion source and implantation target.

The fourth "book," by J. Stephen, is on the applications of ion implantation to semiconductors. This book was written to complement an earlier book *Ion Implantation in Semiconductors*, by J. W. Mayer, L. Eriksson and J. A. Davies (Academic, 1970), by placing emphasis on present-day semiconductor fabrication methods. The emphasis was placed on motivating semiconductor-device designers to evaluate the technique of ion implantation for incorporation into the device design.

A last section, with no author credit, is a summary of applications outside of semiconductors. It deals with many interesting applications such as low friction and wear resistance in metal surfaces, but reflects neither the rigor nor coherence of some of the earlier sections.

This book would serve the ion-implantation community better by being issued as three separate books: the nirst consisting of a combination of the first two sections by Dearnaley and Nelson on "Ion Penetration and Implanted Solids," the second by Freeman on "Ion Beams," and the third by Stephen on "Semiconductors." This would, it is hoped, bring the price within range of individuals and students. The technical quality of the printing and illustrations is excellent. On the whole, this book represents a highly readable and thorough review of the most important aspects of ion implantation.

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Structure-Borne Sound

L. Cremer, M. Heckl, E. E. Ungar
528 pp. Springer-Verlag, New York
1973. $36.10

Over many years Lothar Cremer has been a major contributor to architectural acoustics. In particular he has been the authority on all aspects of sound transmission in and through building structures, and he has published many papers on the subject, mostly in German but a few in English and at least one in Swedish. Much of this material was collected in an English-language monograph published by the British Council for Scientific and Industrial Research in 1949. The monograph was a sort of rough manuscript rather than a book, and it had limited circulation, but those of us who were fortunate enough to acquire a copy guarded it jealously as the one infallible guide in any problem involving the interaction of sound waves and structures. Here, for example, we found the definitive exposition of sound transmission through a wall, complete with both theoretical analysis and a detailed discussion of how to

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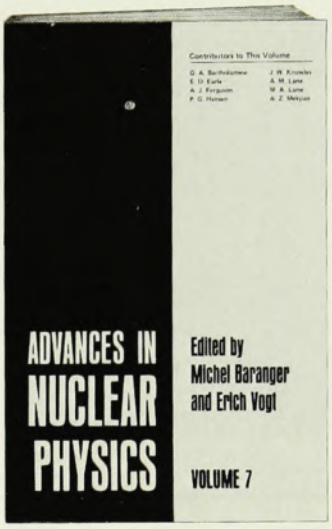

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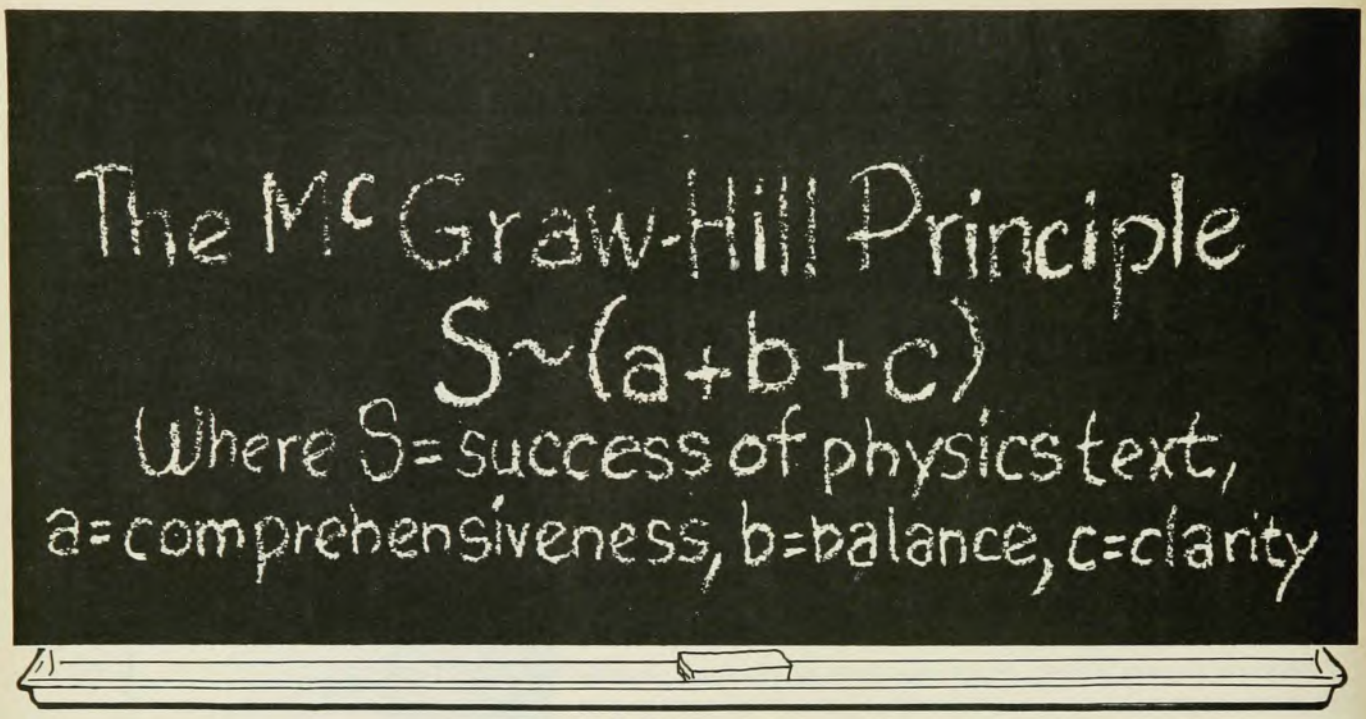

INTRODUCTION TO PHYSICS FOR SCIENTISTS AND ENGINEERS, Second Edition. **Frederick J. Bueche,** University of Dayton
1975, 888 pages, $16.95

An integrated, unified treatment of classical and modern physics written with clarity and noted for its ease of comprehension. Mathematical concepts are developed as the course demands them, and the author takes special care to avoid having the physical principles obscured by the mathematics used to express them. Revised on the basis of user comments, this edition contains material on fluid mechanics, continuum mechanics, and mechanical properties of materials. Chapters and sections have been consolidated for a more logical and coherent presentation, and more introductory level problems and questions have been added. A workbook featuring additional questions and problems is available.

ENERGY AND THE ENVIRONMENT
John M. Fowler, University of Maryland
1975, 336 pages, paper, $7.95

Written in an informal, journalistic style, this book conveys what energy is and how it relates to our environment. Dr. Fowler provides a basic nonmathematical explanation of fundamental concepts, including the origin, forms, uses, and distribution of energy, as well as the socio-political implications of energy production and distribution. Topics range from the effects of strip mining, oil spillage, and thermal pollution to the relationship between energy and the GNP, the ramifications of tapping solar energy, and changes in life styles and government policies. Additional problems and expansion of material in the text are included in a workbook.

INTRODUCTION TO GENERAL RELATIVITY, Second Edition
Ronald J. Adler, Federal University of Pernambuco, Recife, Brazil; **Maurice J. Bazin,** Rutgers University; and **Menahem Schiffer,** Stanford University
1975, 576 pages, $19.95

This text stresses the close interaction between the mathematical and physical concepts underlying the theory of general relativity. It concentrates on a clear and orderly exposition of fundamental concepts, and covers significant recent developments in the field of general relativity, such as background electromagnetic radiation, solar oblateness, radar time delay, and gravitational collapse and black holes. Numerous exercises, worked examples, and challenging problems have been added to this edition.

THE ELECTROMAGNETIC FIELD
Albert Shadowitz, Fairleigh Dickinson University
1974, 741 pages, $16.95

An exceptionally well-balanced treatment of both theory and practical applications. Although the book stresses mastery of the necessary mathematical techniques, the author consistently relates the theory to its physical significance. Each section of each chapter is followed by several worked-out examples and 15 to 20 problems, with a total of over 1100 problems, most of them class-tested.

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measure the relevant elastic properties of building materials.

Two decades later, Manfred Heckl collaborated with Cremer to produce a revised and expanded German-language version, published in 1967 under the title *Körperschall-Physikalische Grundlagen und Technische Anwendungen*. Now, translated back into English by Eric Ungar, with some further revisions and additions, it becomes available at last to the whole community of English-speaking acousticians.

The subject of structure-borne sound is a difficult one, involving the complexities of airborne waves in spaces as well as those of propagation in various structural elements and assemblies. The authors steer a careful course through these intricacies, finding solutions that are at the same time physically realistic and amenable to mathematical analysis.

Although it is primarily a theoretical book, most of the results are supported by experimental evidence. Appropriately it begins with a review of transducer characteristics and the measurement techniques needed for such experimental studies. The next few chapters examine the vibration behavior of simple structural elements, the concept of impedance as it applies to coupling between airborne sound waves and structures, damping mechanisms and methods of expressing them in mathematical analysis, and similar basic material. Finally this material is used to describe the behavior of structural systems of special interest in building acoustics. The authors make no attempt at an exhaustive bibliography, but the more essential references, especially to experimental work, are included.

For any acoustician with a claim to competence in this field the book should become an essential reference. For many engineering problems it will constitute a direct basis for design; for the theorist, it will provide the starting point for the study of other more complex ystems. For the neophyte it will provide an integrated and lucid exposition of the ramifications of structure-borne sound.

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Treatise on Solid State Chemistry Vol. 1: The Chemical Structure of Solids

N. B. Hannay, ed.
540 pp. Plenum, New York, 1974. $35.00

This is the first volume of a six-volume treatise whose stated purpose is to outline the basic chemistry, physical chemistry and chemical physics of solids, and to help define the field of solid-state chemistry.

In this volume, N. B. Hannay has assembled eight chapters contributed by nine well-known specialists on various aspects of the chemical bond, structure, composition and defects in solids. As is to be expected in an endeavor of this kind, the sought-after unity is elusive, and the various contributions have differing degrees of excellence. Nevertheless, to those working in the solid-state sciences, this book will be of value in introducing them to subjects outside their area of specialization.

The content of this book can be divided into four parts: chapters 1, 2 and 3 deal with the chemical bond, energy bands and phases, chapter 4 is a presentation of the relation between properties and structure, chapters 5 and 6 constitute an introduction to crystal defects and chapters 7 and 8 comprise an outline on the characterization of solids.

In chapter 1, J. C. Phillips summarizes an approach to the chemical bond in solids that is in the Pauling tradition. That such an approach is useful, and even necessary, in spite of the great sophistication of modern solid-state theory illustrates the complexity of the nature of crystals.

Dennis Weaire's chapter is a well done, straightforward exposition on energy bands. One wishes, however, that he would have paid some attention to the theory of cohesion and its relation to the chemical bond. It would have been more in accord with the objectives of the book.

The most successful part of this book consists of chapters 5 and 6 by Morris E. Fine and George G. Libowitz respectively on defects in crystals. Fine's chapter is an excellent descriptive account of structural defects, while that of Libowitz is a unified presentation of point-defect equilibrium in elemental and compound crystals, including the effects of non-stoichiometry and external pressure.

By contrast, other parts of the book suffer from a lack of unity inherent in the subject matter itself. Chapters 7 and 8, for example, sometimes give the impression of cataloguing techniques without sufficient analysis of results. The problem of the characterization of solids is of critical importance, but depends on such a great variety of methods that it is difficult to summarize.

One of the most interesting chapters is the one by J. H. Wernick in which he describes magnetic, superconducting, dielectric and mechanical properties in terms of structure and composition. It is a good exposition of how the atomistic controls the macroscopic.

In summary, this is a useful book for graduate students as well as more ad-