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 BOOK REVIEWS
 

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**Methods of Experimental Physics.** Volume 6. Solid State Physics. Part A. Preparation, Structure, Mechanical and Thermal Properties. Edited by K. LARK-HOROVITZ and VIVIAN A. JOHNSON, Purdue University, Lafayette, Indiana. Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1959. xvi + 466 pp. 16 × 23.5 cm. Price, \$11.80.

One suspects that books like this are conceived in a publisher's office and brought to press through a reliable process for the accelerated gestation of scientific literature. As von Braun remarked apropos of rocket research, "They think they can produce a baby in a month by putting nine women on it." The present volume had thirty-two authors and four editors. Since the authors are all highly competent in their fields, and most of them write clearly, the final result is a readable collection of personal essays on various kinds of experimental work. The diversity of approach and lack of organization that make the book inadequate as a reference work make it interesting, and sometimes even entertaining, to read.

Here is an innocent account by three physicists of the purification of sodium chloride. "Table salt is an appreciably better starting point than most C.P. reagents. After solution and filtration a dithizone extraction removes most of the ever present lead. Bromide and iodide are removed with chlorine, and potassium by ion exchange chromatography. . . . Iron, magnesium, sulfate, and materials such as silica introduced by previous purification steps are removed by HCl precipitation, gentle drying minimizes hydrolysis, and vacuum fusion and Czochralski growth reduce oxygen and other adsorbed gases."

Many chapters are so short (5 or 6 pages) that most value has been squeezed out (electron microscopy, thin films, ceramic techniques), and some of the longer chapters (30 to 40 pages) contain little but standard textbook material (X-rays, thermal properties). Three articles stand out by their excellence: Faust on surface preparation, a model of organization that indicates what the entire book might have achieved through competent editing; Amelinckx on dislocations, a 36 page introduction dealing mostly with descriptive theory; and Jamieson and Lawson on solid state studies under high pressure.

Other major articles discuss electron diffraction and mechanical properties. There is a contribution from the Bell Telephone Laboratories on control of impurities in semiconductor materials, and one on the growth of single crystals that is disappointing in its lack of specific details. One short section, on density measurements, provides formulas for estimating the errors of the different methods discussed. How useful to have had such information on all the other measurements described!

The book has a complete author index and an inadequate subject index. The production is good, with numerous clear line drawings.

Despite its shortcomings, this is a book that scientific libraries should provide so that research workers can read it through to glean new ideas. It is not, however, the kind of book that deserves a place in the working library of a thrifty scientist, nor is it likely to achieve status among standard reference handbooks and encyclopedias.

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**Advances in Enzymology and Related Subjects of Biochemistry.** Volume XXI. Edited by F. F. NORD, Fordham University, New York, N. Y. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. v + 521 pp. 16 × 23.5 cm. Price, \$12.50.

This volume is composed of eight chapters on various topics in enzymology. The first chapter by Walter C. Schneider entitled *Mitochondrial Metabolism* is a well-written and painstaking review of a great deal of modern work on mitochondria, and thus should be very useful to most read-

ers. In the opinion of the reviewers, however, many may wish to substitute their own analysis of the data for that of the author since the latter leaves one confused, particularly concerning the presence or absence of a number of enzymes in mitochondria. More attention might have been given to the problem of apparent loss of high-molecular weight enzymes such as catalase from the mitochondria during various isolation procedures, and, in general, a more penetrating analysis of a smaller number of points than are considered might have been desirable.

The second chapter, by D. E. Green, entitled *Electron Transport and Oxidative Phosphorylation*, gives Green's interesting and challenging analysis of the interlinking of enzymes and cofactors in the electron transport system. The role of copper and nonhemin iron in the electron transport system is examined, the functions of prosthetic groups and cofactors are discussed, and finally the probable reaction sequences of components in the system and its subdivisions are given. The interesting suggestion is made that lipoprotein serves to keep the prosthetic groups of the enzymes dissolved in lipid and thus isolated from the aqueous phase, and also possibly serves to stabilize sensitive phosphate esters.

The first part of the chapter is concerned with a discussion of the physical nature of the mitochondrion and the isolation of various types of subparticles from it which have different enzymatic activities. Here unfortunately a number of concepts are presented which do not seem to bear close analysis, such as the idea that the mitochondrion is a giant molecule. The probable existence of a soluble internal phase in the mitochondrion seems to have been overlooked. The symbols used by Green are not the easiest to keep in mind. The diagram on page 122 is obscure in regard to the function of cytochrome b.

The chapter covers much constructive thinking by the author about his work and the work of others, and undoubtedly will contribute to an improved understanding of the electron transport system.

The third chapter, by Bo G. Malmstrom and Andreas Rosenberg, entitled *Mechanism of Metal Ion Activation of Enzymes*, reviews a fair amount of literature on this topic. The first few pages which are concerned with classification of metallo-enzymes might have been condensed. The chapter contains material on possible enzymatic reaction mechanisms involving metals, ways in which the metal might complex with enzymes and substrates, and factors which may account for metal specificity such as stereochemistry, size of the metal in question, charge, and electronic properties. The mechanism of action of metallo-coenzymes is considered.

The chapter presents worthwhile material but it appears to the reviewers that it does not offer a great deal in regard to the planning of future experiments. Two possible types of mechanism for metal action in metallo-enzymes suggested by the senior reviewer have not been considered (A. L. Dounce, *J. Cell. Compt. Physiol.* 5, Suppl. 1, 235 (1956); *Enzymologia*, 17, 182 (1955); see also *ibid.*, 18, 390 (1956)).

Chapter 4 entitled *Durch Metall-Ionen Katalysierte Vorgänge, Vornehmlich im Bereich der Seltener Erdmetalle* by Eugen Bamann and Heinz Trapmann presents much material on the splitting of organic phosphate esters of various types by rare earth metals such as cerium and lanthanum, as well as something concerning the catalytic action of these

metals in breaking other types of bonds (N-P, C-C,  $-\overset{\text{O}}{\parallel}{\text{C}}-\text{NH}$ ,

and  $-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{C}-$ ). The considerable similarity of the behavior of the rare earth metals to the behavior of the natural phosphatases is surprising and leads one to question a statement in the previous chapter to the effect that the protein component of a metallo-enzyme cannot function by enhancing the catalytic effect of the metal itself. Mechanisms are included for some of the catalytic actions of the rare earth metals. The use of rare earths gas tools in analytical chemis-