ample room for further research and to predict that in the next few years much progress will be made in this area. It should then be possible to make accurate predictions of polymer compositions which would have a desired set of viscoelastic properties and to predict those properties for an unknown or unavailable polymer.

In closing, it may be noted that the publishers, like the author, have done an outstanding job.

DEPARTMENT OF CHEMISTRY
STANFORD RESEARCH INSTITUTE MAURICE L. HUGGINS
MENLO PARK, CALIFORNIA

Properties and Structure of Polymers. By ARTHUR V. TOBOLSKY, Professor, Department of Chemistry, Princeton University. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1960. ix + 331 pp. 16.5 × 23.5 cm. Price, $14.50.

This book is primarily concerned with the mechanical properties of polymers, particularly the *viscoelastic* properties. The subject is approached from both the phenomenological and the mechanistic point of view.

The first two sections of the book, entitled "Elasticity and Viscosity" and "Aspects of Polymer Physics," are introductory in character. Basic concepts of statistical mechanics and thermodynamics required in later sections are presented, together with discussions of polymer chain conformations, glass transitions and crystallization, elasticity of rubber networks, and viscous flow of liquids.

The following three sections, entitled "Mathematical Treatment of Linear Viscoelasticity," "Viscoelastic Behavior of Polymers" and "Chemical Stress Relaxation," constitute the core of the book. The material presented is taken largely from the work of the author and his students, a limitation which is made less serious by the wide range and high quality of Professor Tobolsky's research in this field. The viscoelastic behavior of polymers in the glassy region, the transition region and the rubbery region are all thoroughly treated. The role of chemical scission and crosslinking reactions in creep and stress relaxation is given particular attention.

The final section, on "Polymerization Equilibria," has only a tenuous connection with the central theme of the book. It is a brief, interesting discussion of a particular problem in the chemistry of polymerization reactions.

This book is well-written, clear, and thorough within the area covered. It should be of interest to all polymer chemists and physicists.

POLYMER RESEARCH LABORATORY
THE DOW CHEMICAL COMPANY TURNER ALFREY, JR.
MIDLAND, MICHIGAN

Introduction to Solids. By LEONID V. AZÁROFF, Associate Professor of Metallurgical Engineering, Illinois Institute of Technology. McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, N. Y. 1960. xiv + 460 pp. 16 × 23.5 cm. Price, $9.50.

The stated purpose of this book is to provide a broad background at an elementary level for "all who are interested in solids." The word "all" is notably treacherous. In fact the author appears to have achieved his purpose for chemists, metallurgists and engineers, but not for physicists, who would require more precision. Certainly all students of chemistry would profit by a careful reading of this book, preferably as advanced undergraduates or beginning graduate students. There is no other book that provides such a lucid introduction to so broad a territory.

The basic approach of the book is by way of the structure of crystals, in theory and practice. The first 86 pages are a succinct review of crystallography. The description of closest packing and the structures based on it is the best I have seen, with clever new illustrations at last replacing Barlow's medieval drawings.

The following chapters are on imperfections, mechanical properties, crystal growth, phase transformations, bonding of atoms, metals, semiconductors and insulators. It would be too much to expect the author to sustain the freshness and cogency of the sections on crystallography as he ventures farther from this field, which is his own. Although the general level of accuracy remains high, occasional errors have been noted. The section on "elements of thermodynamics" would profit by omission. The distinction between the Gibbs function G and the Helmholtz function A is quite confused, and the student is not warned of the pitfalls attending the choice of F as the symbol for the latter. We find also the optimistic statement that "It can be shown that the electrical conductivity in most metals is completely explained by the so-called free-electron theory that does not take the crystal structure into account." We find wrong values of quantum numbers attached to pictures of d-orbitals and an unduly weak description of the Fermi energy. More careful editing would have caught some grammatical errors and such amusing (E.E.?) jargon as "transient-like."

All quibbling aside, the book deserves to have an immediate success with students. It should give a much overdue impetus to education in the field of the solid state.

DEPARTMENT OF CHEMISTRY
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Photoconductivity of Solids. By RICHARD H. BUBE, RCA Laboratories, Radio Corporation of America, Princeton, New Jersey. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1960. xix + 461 pp. 15.5 × 23.5 cm. Price, $14.75.

This carefully written treatise on photoconductivity of solids provides a unified physical description and interpretation of photoconductivity, a subject of great importance in the study and understanding of solid state phenomena. It has developed rapidly since the end of World War II. This treatise on photoconductivity in solids deals with the topics: historical survey, electron processes in crystals, photoconductivity processes, preparation of photoconductors, electrode effects, imperfection photoconductivity, energy bands and excitation transitions, free carrier scattering and mobility, traps and trapping effects, recombination processes, theoretical viewpoints on photoconductivity, topics related to photoconductivity and survey of applications of photoconductors.

The author has been a research physicist at the David Sarnoff Research Center of the RCA Laboratories and has been an active experimentalist in the field of luminescence and photoconductivity in the last twelve years.

The book is a valuable handbook to all chemists who are active in the solid state work. Its twenty-two page chapter on the preparation of photoconducting materials is of particular use to synthetic chemists. Chemists cannot claim to a knowledge of solid state phenomena unless they understand photoconductors. Dr. Bube's book is very helpful in gaining such an understanding.

DEPARTMENT OF CHEMISTRY
PRINCETON UNIVERSITY JOHN TURKEVICH
PRINCETON, N. J.

Organometallic Chemistry. ACS Monograph No. 147. Edited by H. ZEISS, Research Associate, Monsanto Chemical Company, Dayton, Ohio. Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. 1960. xiv + 439 pp. 16 × 23.5 cm. Price, $17.50.

The volume of research in organometallic chemistry is increasing rapidly with new findings of bedeviling interest to organic, inorganic and physical chemists reported daily. It is difficult to write about such a rapidly advancing field. The authors have made no attempt to be comprehensive; the book consists "of a series of research subjects which are under active investigation—at the present time—by their respective authors." The result is a book of fascinating reading and its primary aim—to stimulate further research—is admirably accomplished.

The chapter headings and their authors are: 1. Carbon–Metal Bonding, J. W. Richardson. 2. Benzyne Chemistry, R. Huisgen. 3. Vinylmetallics, H. D. Kaesz and F. G. A. Stone. 4. Organoboranes, C. Brown. 5. Organo-Aluminum Compounds, K. Ziegler. 6. Organosilylmetallic Chemistry, H. Gilman and J. S. Winkler. 7. Cyclopentadienyl Metal Compounds, P. L. Pauson. 8. Arene Complexes of the Transition Metals, H. Zeiss. 9. Transition Metal Alkyls and Aryls, G. E. Coates and F. Glockling. 10.