these books. These include the dielectric theory of ionicity, electrical studies of native donors and acceptors in ZnTe, ZeSe, CdTe, and CdSe, detailed studies of the shallow acceptors Li and Na in CdS, and the deep acceptors P in ZnSe and Cu in ZnO, studies of the isoelectronic traps, and experiments in ion implantation.

The author succeeds in his primary goal of providing the reader with a concise summary of electrical and optical phenomena in II-VI compounds and their commercial applications. In order to remain concise, he excludes all discussion of the physical chemistry of defects or the observation of defects by electron spin resonance. This makes it rather difficult for the reader to gain an understanding (insofar as one exists) of the role of native defects in determining why these materials behave the way they do. For instance, no explanation is given why various II-VI compounds will not conduct both *n*-type and *p*-type.

C. H. HENRY
Bell Telephone Laboratories, Murray Hill, New Jersey

Film Physics

Thin Film Phenomena. KASTURI L. CHOPRA. McGraw-Hill, New York, 1969. xx, 844 pp., illus. $24.50.

Chopra has set out to write a one-volume review of the research on thin solid films that has been carried out during the last few years. Much of the recent effluence has been stimulated by device-development programs. The quantity has been enormous and the quality mixed. A brave attempt is made in *Thin Film Phenomena* to touch on all significant scientific and technical accomplishments involving films, however prepared. The discussion of individual points is necessarily brief. Typically, there is an outline of the theoretical ideas followed by a recital of experimental results. The treatment is critical ("Wherever disorder exists in the literature, I have declared my own views and provided a reasonable synthesis.") and conservative ("Both the observed . . . effect and the explanation offered need further verification.").

The major theme of the book is that films usually have complicated microstructures which play a role at least comparable to that of the thinness of the samples in determining the observable physical properties. Sections of the book on nucleation and growth give reasonably complete discussions of what is known about the way the special structures found in evaporated and sputtered films come about. The effect of structural details on physical properties is then illustrated in chapters on mechanical properties and on electrical and thermal transport in metal, semiconductor, and insulator films. I find these parts of the book especially satisfying, quite possibly because the areas are ones in which Chopra has himself made numerous research contributions.

A very good chapter discussing ferromagnetism in films has been contributed by M. H. Cohen. It is the one case where Chopra has deviated from his plan of presenting a unified treatment by doing everything himself.

The main part of the book is rounded out with chapters on optical properties of films and on superconductivity. Although not exhaustive, these contain a large amount of material and offer a reasonable entry into the described areas of research.

There is one case in which I would want to quarrel a little with Chopra's insistence on the critical importance of microstructure. Very fortunately, superconducting properties are determined by a spatial average over a region containing thousands of atoms. This largely, though not completely, eliminates the influence of the microstructure and is probably responsible for the considerable success that has been experienced with superconducting film experiments.

Another minor reservation I have about the book concerns the section on experimental technique. Every word is true but there are not enough of them. Film preparation is made to sound simple and straightforward, almost trivial. This is an illusion which could bring forth another flock of complicated measurements on poorly characterized samples, just the sort of thing against which the author does battle throughout most of the book.

Chopra has made a good job of an impossible task. Everyone engaged in research using thin films will want to buy this book. The good sections are too numerous and too long to Xerox. The book is a bargain. Chopra provides a review of over 2000 research papers for about a penny apiece.

ROLFE E. GLOVER, III
Department of Physics and Astronomy, University of Maryland, College Park

Books Received

Advances in Food Research. Vol. 17. C. O. Chichester, E. M. Mrak, and G. F. Stewart, Eds. Academic Press, New York, 1969. x + 302 pp., illus. $14.50.

Afro-American Anthropology. Contemporary Perspectives. Norman E. Whitten, Jr., and John F. Szwed, Eds. Free Press, New York; Collier-Macmillan, London, 1970. x + 470 pp. + plates. $5.95.

Analysis of Reflector Antennas. W. V. T. Rusch and P. D. Potter. Academic Press, New York, 1970. x + 182 pp., illus. $12.50. Electrical Science Series.

Annual Summary of Information on Natural Disasters. No. 1, 1966. UNESCO, Paris, 1970. 84 pp., illus. Paper, $3.50.

The Architecture Machine. Toward a More Human Environment. Nicholas Negroponte. M.I.T. Press, Cambridge, Mass., 1970. x + 154 pp., illus. Paper, $5.95.

Atomic, Molecular, and Solid-State Theory and Quantum Biology. Proceedings of an international symposium, Sanibel Island, Fla., January 1969. Part 2. Per-Olov Löwdin, Ed. Interscience (Wiley), New York, 1970. Illus. Paper, $32.50. International Journal of Quantum Chemistry Symposium No. 3, pp. 349–910.

Basic Nutrition and Diet Therapy. Corinne H. Robinson. Macmillan, New York; Collier-Macmillan, London, ed. 2, 1970. x + 358 pp., illus. Paper, $4.25.

Bleeding Problems in Clinical Medicine. Armand J. Quick. Saunders, Philadelphia, 1970. xii + 228 pp., illus. $9.50.

Cell Fusion. The Dunham Lectures, Cambridge, Mass., 1969. Henry Harris. Harvard University Press, Cambridge, 1970. x + 110 pp., illus. Cloth, $6; paper, $2.95.

Climate, Man, and History. Robert Claiborne. Norton, New York, 1970. 444 pp., illus. $8.95.

Computer Languages. A Practical Guide to the Chief Programming Languages. Peter C. Sanderson. Philosophical Library, New York, 1970. viii + 200 pp. $15.

The Cuyahoga River Watershed. Proceedings of a symposium, Kent, Ohio, November 1968. G. Dennis Cooke, Ed. Institute of Limnology and Department of Biological Sciences, Kent State University, Kent, Ohio, 1969. viii + 144 pp., illus. Spiral bound, $4.

The Design Within. Psychoanalytic Approaches to Shakespeare. M. D. Faber. Science House, New York, 1970. xii + 554 pp. $13.50.

Dictionnaire d'informatique. Anglais-Français. Michel Ginguay. Masson, Paris, 1970. vi + 140 pp. Paper, 36 F. Les techniques de base de l'informatique.

Diversity and Stability in Ecological Systems. A symposium, Upton, N.Y., May 1969. Biology Department, Brookhaven National Laboratory, Upton, N.Y., 1969 (available from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.). viii + 266 pp., illus. Paper; $3; microfiche, 65¢.

Electric Power Transmission. The Power System in the Steady State. John Zaborszky and Joseph W. Rittenhouse. Rensselaer Bookstore, Troy, N.Y., 1969. Two volumes, xii + 676 pp., illus. Paper, $6.

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