Electrical Properties

Organic Semiconductors. FELIX GUTMANN and LAWRENCE E. LYONS. Wiley, New York, 1967. 876 pp., illus. $27.95. Wiley Series on the Science and Technology of Materials.

The abrupt increase in research activity related to the electrical properties of organic solids during the middle and late 1950's was due, at least in part, to intense activity in industrial laboratories. So far, the hope of joining the potent capabilities of inorganic semiconductors with the infinite variety of synthetic organic chemistry has not been realized. Low carrier mobilities and difficult contact problems have limited the development of useful devices.

Perhaps it was the lack of commercial success which stimulated the wide range of exploratory studies of electrical and electro-optical phenomena in a great many different materials. This monograph by Gutmann and Lyons is a timely and important effort to record and organize the literature of this field.

The authors have chosen to offer complete coverage and ready accessibility to the literature rather than a selective or critical analysis. The heart of the book is really the 1677 references given at the ends of the 11 chapters, the 146 pages of tabulated data, the 695 references to these tables, and the 47-page index. The remaining, narrative parts of the book provide a guided tour through this vast literature, which extends from 1888 to 1966. The tour is well done. Chapters are arranged around central topics such as sample preparation and ionized states. References are given, in order of appearance, at the end of each chapter, and awkward page shuffling is minimized by the repetition of references at the end of each chapter in which they appear. The tables summarize experimental results obtained on hundreds of different compounds, and they frequently contain detailed information about experimental conditions of purification, electrode preparation, and so on. The very complete subject and author index provides an indispensable cross reference to this vast compilation. (Anthracene, as might be suspected, is the longest entry in the index, occupying more than half a page.)

For this exhaustive collection and organization of the literature alone, the book would be indispensable to anyone engaged in research related to organic semiconductors. Students desiring a casual insight into this large and growing field will similarly find this a useful, if somewhat lengthy, volume. The material is presented in a most lucid and well-organized fashion.

The researcher desiring a critical or discriminating survey of an unfamiliar field, or the student looking for more than a casual introduction, will be somewhat less well served. Advances in experimental techniques and in theoretical understanding have shown much of the early literature to be quite meaningless, yet for the most part the authors refrain from making such judgments. This same rather flat approach is evident in the expository sections of the book. Semi-empirical equations are sometimes presented with no more qualifications than are given to rigorously derived equations of statistical mechanics.

The authors were right in opting for completeness, but their own broad competence would have justified a more critical and selective analysis of that material.

All in all, this is a distinguished addition to the Wiley series on the Science and Technology of Materials. It presents a much more coherent and better-organized survey than the two volumes *Physics and Chemistry of the Organic Solid State,* edited by Fox, Labes, and Weissberger (Interscience, 1963). The Gutmann and Lyons review will remain the definitive work covering the past half-century.

JAMES F. HORNIG
Department of Chemistry, Dartmouth College, Hanover, New Hampshire

Plasma Physics

Photoionization Processes in Gases. GEOFFREY V. MARR. Academic Press, New York, 1967. 296 pp., illus. $12.50.

Many aspects of ionization phenomena in gases have been summarized in general books on the subject or in handbooks. However, the volume of literature has reached such a point that books summarizing fairly narrow fields have become increasingly important additions to the scientific literature. This volume on photoionization processes in gases is an excellent example of such a book. Marr, who is a physicist at the J. J. Thomson Physical Laboratory at the University of Reading in England, has produced a useful and carefully prepared work that treats the interaction of photons and visible radiation with gases and ionized media. The largest area of plasma physics not covered is that of the interaction of laser beams with gases, and I was sorry not to have any discussion of laser-induced ionization phenomena. Nevertheless, Marr's treatment of the general subject will be useful not only for the teacher of gaseous electronics and plasma physics, but for those who are involved in research in these areas as well.

If there is a weakness in the book, it comes from the inclusion of a chapter entitled "The plasma state," in which Marr gives a superficial summary of standard gas-discharge effects, the operation of Geiger counters, proportional counters, the nature of streamers, and other phenomena controlled by photoionization. These are treated much more adequately in many other books on ionization physics, and mixing these details with the more fundamental treatment of the rest of the book tends to weaken the impact of the author's specific contributions.

SANBORN C. BROWN
Department of Physics, Massachusetts Institute of Technology, Cambridge

A Compendium of Creatures

The History of Four-Footed Beasts and Serpents and Insects. Vol. 1, The History of Four-Footed Beasts (620 pp., illus.), and Vol. 2, The History of Serpents (246 pp., illus.), by EDWARD TOPSELL. Vol. 3, The Theater of Insects (270 pp., illus.) by T. MUFFET. Facsimile reprint of the 1658 (London) edition, with an introduction by Willy Ley. Da Capo Press, New York, 1967. $65.

This set of volumes is a lovely facsimile edition of the first animal book in English to be printed in Great Britain. As such, *The History of Four-Footed Beasts and Serpents and Insects* has some place in the history of printing.

Its zoological importance is entirely of a different character. The first two volumes, produced by Topsell, are little more than translations of Conrad Gesner's great assembly of Renaissance animal lore, the *Historiae Animalium.* Although Gesner's work may be thought of as a descendant, in arrangement and form, of the biological works