is used. It is something of a drawback to the book that the work of Dupree, which is an extension of the method originally proposed by Klimontovich, is not included. Dupree's procedure allows even further simplification and physical insight.

A pleasant factor of the book is the use and coherent description of "fast" and "slow" scales in both space and time. Many of these motions follow from the pioneering work of Bogoliubov in nonlinear dynamics and fall naturally into the task of constructing various types of kinetic equations.

The latter part of the book is concerned with the inclusion in the theory of plasma radiation in the form of Cerenkov emission of plasma waves from high-velocity particles. This leads naturally to the construction of equations governing quasi-linear theory, and even to the construction of a form of plasma hydrodynamics including these effects. In addition, in many cases, the author includes the effects of static magnetic fields.

The book as a whole is well written, and even though the algebra sometimes becomes a bit formidable, the author continually gives a great deal of physical insight into the processes involved. It should be a necessary purchase for all serious plasma physicists.

E. A. FRIEMAN
Plasma Physics Laboratory, Princeton University, Princeton, New Jersey

Electronic Properties

Physics and Chemistry of the Organic Solid State. Vol. 3. DAVID FOX, MORTIMER M. LABES, and ARNOLD WEISSBERGER, Eds. Interscience (Wiley), New York, 1967. xiv + 520 pp., illus. $19.95.

This book is a splendid addition to the first two volumes of this series. It presents a critical review of progress, up to early 1966, in the field of exciton and charge-carrier generation and migration in organic solids, as well as that of photosensitization.

The book has four main divisions. The first, written by W. Helfrich, deals with steady-state and transient space-charge-limited and volume-controlled currents in organic solids such as anthracene, the polyphenyls, and the phthalocyanines. It is an excellent exposition of the most significant work that has been done on the flow, recombination, mobility, and trapping of carriers in organic crystals. Single-injection, double-injection, and recombination luminescence are discussed. The explanatory material is useful and clear. If the references are followed, it is possible for a beginner to encompass the entire state of the art in this field.

The second division, written by J. Bourdon and B. Schnuriger, deals with photosensitization of organic solids, and also provides a well-balanced presentation of the chemical and physical effects induced in a host by the addition of guest molecules either at the surface or in the bulk; the guest molecules either absorb light at longer wavelengths than the host can absorb and utilize, or increase the quantum yield of the absorbed light. Polymers and glasses are also included in the discussion. The photosensitization phenomena covered include charge-carrier production and luminescence, oxidation, polymerization and cross-linking, and photochromism. The list of references is especially good and fairly complete (the work done in this laboratory is not cited).

The third division, written by O. LeBlanc, Jr., is what I consider to be the most useful review of dark and photoconductivity in organic crystals available, certainly for the period reviewed, and even to this date. There have been thousands of experiments performed in this field, and there are quite a few that have not been interpreted properly. The author makes a seasoned, and in my view well-founded, selection and discussion of important experiments and in so doing performs a valuable service to those who are just entering this field. The materials covered include homomolecular (a good choice of a word) crystals such as anthracene, and also dyes, charge-transfer complexes, and TCNQ anion-radical salts. The subjects covered include the energetics of carrier generation in the dark and in the presence of light; carrier transport, trapping, and recombination; and electrode contacts.

The fourth division, written by S. A. Rice and J. Jortner, is a small book in itself, although it is entitled merely "Comments on the theory of exciton states in homomolecular crystals." It is a selective and superb review of the literature dealing with the theory of the interaction of a radiation field with a crystal lattice. The authors discuss among other things the nature of the low-lying electronically excited states of crystals of aromatic molecules; exciton transport and decay, interactions with other excitons, and ionization (including a discussion of photoconductivity); the properties of crystal excitations that are intermediate between the Frenkel and the Wannier excitons; and impurity states in molecular crystals, including mixed molecular crystals.

This book is primarily directed toward specialists but is so well written and selective in the material it includes that it can serve as a starting point for anyone who plans to enter the field.

MARTIN POPE
Chemistry Department, New York University, New York City

Radiation and Photochemistry

The Chemistry of Ionization and Excitation. Proceedings of a conference on radiation chemistry and photochemistry, Newcastle upon Tyne, Great Britain, Sept. 1966. G. R. A. JOHNSON and G. SCHOLES, Eds. Taylor and Francis, London, 1967. xvi + 328 pp., illus. $11.50.

For decades radiation chemists have made subtle advances toward photochemistry; the difference between the two disciplines is always apparent, but just what can be achieved by a liaison between the two always remains a golden promise. The conference at Newcastle, England, whose proceedings are published in *The Chemistry of Ionization and Excitation* is the most recent attempt to get photochemists and radiation chemists together. Surprisingly enough, at least a partial success is achieved, as some of the contributors made a genuine attempt to extrapolate their work into the other field.

The first section consists of review papers which present the current viewpoints in radiation chemistry, with appropriate emphasis placed on the role played by excited molecules. This, together with the paper outlining the optical approximation in radiation chemistry, gives the photochemist a clear idea of the role he might play in the chemistry of high-energy radiations.

The subsequent sections deal with the radiolysis of gases, organic liquids, and water. The papers presented are in the mainstream of current research, and in a short space give a reasonably balanced view of these fields. The supporting photochemistry is of great interest to the radiation chemist; in particular, the papers on the photochemistry of water and rigid organic media and on the photoionization of gases are note-