with the relevant salts insofar as they affect physical properties. For detailed descriptions of structures, chemical synthesis, and crystal growth, the authors direct readers to other texts, such as Ferraro and Williams's *Introduction to Synthetic Electrical Conductors* (Academic Press, 1987). Although *Organic Superconductors* describes, in commanding detail, the physics of organic superconductors, its readership should not be limited to physicists. Chemists, materials scientists, and anyone interested in superconducting organic materials can greatly profit from this comprehensive volume. Non-physicists will find that the introductory chapters provide useful background for the later discussions of the physics of these novel systems.

All of the rich electrical and magnetic phenomena associated with organic superconductors such as low dimensionality, charge density waves (CDW), spin density waves (SDW), Peierls transitions, and competing ground states, as well as the experimental methods used to study them, are presented in this volume. Every attempt is made to compare theory and experiment, and some background reading in a solid-state physics text will be required for those not acquainted with the field.

Seven of the ten chapters of the book are written by Ishiguro and the remaining chapters, dealing with theoretical aspects, are written by Yamaji. One major chapter deals with the mechanism, as yet unknown, of superconductivity in organic materials. From the outset, it is pointed out that the mechanism is "exotic" and may differ from that of the BCS theory. A central point is made that understanding the superconducting mechanism may lead to clarification of the magnitude that the T_c's can attain in these materials (the Holy Grail in the general field of superconductivity) and how to reach them. The authors review the several existing models and wisely point out that these studies are still in their initial stages and that there are, as yet, no firm conclusions. A chapter is also devoted to magnetic-field-induced spin density waves (FISDW) and the rich variety of phenomena associated with them.

Anyone interested in superconductivity will find the final chapter fascinating in that it discusses the many similarities between the high-T_c ceramic and organic superconductors. The authors suggest that the superconducting mechanisms operating in both of these types of materials may in the future be described by a theory other than that of BCS. Their conclusion, based on these similarities, is that since "high-T_c" is now a reality there is every reason to expect it to occur some day in organic systems. All in all, this book will richly reward the reader with new physical insights into the nature of organic superconductors.

JACK M. WILLIAMS
Chemistry and Materials Science Divisions, Argonne National Laboratory, Argonne, IL 60439

Ecological Interactions

Perspectives on Plant Competition. JAMES B. GRACE and DAVID TILMAN, Eds. Academic Press, San Diego, CA, 1990. xiv, 484 pp., illus. $79.95.

The study of plant competition is undergoing a period of major change, as researchers meld traditional demographic approaches with approaches that explicitly include the dynamics of limiting resources. This collection of papers provides an important overview of the field.

The stated purpose of the book is "to explore various perspectives on plant competition" and to clarify "underlying definitions, goals, and concepts associated with each perspective." The first goal is nicely achieved. A broad variety of topics related to plant competition (primarily resource competition among terrestrial plants) are reviewed and assessed. The second goal, a difficult one because of the changing nature of the field, is only partly achieved. One problem is that researchers have slightly different operational definitions of "competition," which, as is pointed out in several chapters, can lead to some confusion. Some authors define competition in terms of population densities or growth rates, others in terms of individual growth rates, others in terms of the ratio of biomass to area. Each usage has its own nuances and applications. There are several other discrepancies among chapters both in definitions of terms and in interpretation of data.

Most experimental studies in plant ecology over the last 30 years have involved manipulating the density of one or more populations and quantifying the response of others. This approach is well represented in this book by chapters on density-yield relationships in plants, as well as reviews of the role of competition in succession, biogeography, and agriculture. Turkington and Mehrhoff provide an interesting example of this approach from a series of density manipulations in permanent pastures that attempt to determine the ecological and evolutionary effects of competition on patterns of species abundance.

Perhaps more important, several chapters discuss two developing issues that must be considered in future research. The first issue has been especially important in the development of this field: an appreciation of the mechanistic basis of plant competition. Resource competition is controlled by an individual plant's effect on and response to resource availability. Though this fact has long been recognized, it generally has not until recently been applied in understanding and making predictions about competitive outcomes. The implications of understanding competition as an indirect interaction through resource effect–response are discussed by Goldberg, who also suggests that plants affect resource levels in many ways other than just through resource uptake. Berendse and Elberse also explicitly discuss competition as an effect–response phenomenon, with examples from heathland and grassland research. Tilman, who has pioneered a resource-based understanding of competition, provides a theoretical justification for using a single parameter for each species (R^*) to understand the outcome of competition. At this time, the best examples of the application of resource-based models of competition come from aquatic systems. Sommer provides a clear example from phytoplankton communities.

The second important issue discussed in this book is the role of competition in the context of the real, complex world. Many other forces, such as herbivory, disturbance, and abiotic stress, are important in determining species abundance and diversity. What is the relative importance of competition, and how might it interact with these other forces? In his contribution Connell points out that most of what is accepted as experimental evidence of plant competition could also be explained as representing indirect interactions mediated through a third species, especially by species at a higher trophic level. Though he perhaps overstates the case, this is an important concern for those looking at competition in the field. Other forces discussed in this volume with respect to their interactions with competition include herbivory, mycorrhizal and other fungal associations, and "harsh" environments (low resource levels). Oksanen takes a particularly interesting approach using an evolutionarily-stable-strategy model to predict the optimal growth form for plants as a function of light competition, herbivory, and primary productivity.

This is certainly a required book for those working on plant competition, and an important reference for ecologists and biologists in general. In many ways, it will be a landmark, providing a snapshot of research at a critical time in the development of this field.

THOMAS E. MILLER
Department of Biological Science, Florida State University, Tallahassee, FL 32306