years. Surely, this book by Jones and March is the first book since Ziman's *Principles of the Theory of Solids* (1960; second edition 1972) that has attempted to treat a large segment of the field at both the professional and the pedagogical level. There are several satisfactory introductory (graduate or advanced undergraduate) texts on solid state; but by and large even the most recent of these do not really "roll up their sleeves" and get into the details of modern calculations as employed in research. These two volumes have set out to do just this, and, somewhat to this reviewer's surprise in view of the magnitude of the task, the authors have produced a very informative compendium of recent activity in theoretical solid state physics.

These two volumes definitely should be bought by any library that hopes to have a reasonably balanced reference text covering the past decade of theoretical solid state. It is not likely that students can afford them, but they would be of great use to someone teaching an advanced graduate course in solid state theory—not necessarily as a text, but as a guide to topics and literature, enriched by spelling out of details, and to snags in calculations. The material is readable by any well-trained student with a year's graduate experience who has had an introductory course in solid state physics.

Volume 1 deals with equilibrium properties (electronic, lattice, and magnetic phenomena). Volume 2 covers transport, defects, superconductivity, and optical properties. Where needed, symmetry theory, many-body theory, Green's functions, and diagrammatic perturbation techniques are introduced. It is these methods that, not having been used extensively in solid state until the past 10 or 15 years, have not found their way into most general surveys of the subject. Here the details of the methods are given, both in the text and in appendices.

A more specific listing of topics, though still abbreviated, is as follows. Volume 1: foundations of symmetry and crystallography; Bloch, Wannier, and other representations, with some examples from calculations; collective properties of the electron gas, with application of many-body methods; the inhomogenous electron gas; phonons, with some discussion of anharmonicity, and phonon Green's functions; magnetism, spin waves, magnetic phase transitions, dynamics of magnetic systems; interaction of particles with a crystal (phonon and neutron scattering). Volume 2: transport theory; optical properties; superconductivity; polarons and excitons; defects and disordered systems. Both volumes have extensive and useful appendices; of particular note to this reviewer are the selection of topics in group theory as applied to solid state and the summary of many-body techniques.

Overall this ambitious project has come off well. As the authors themselves recognize, no single group of theorists at present is in a position to have first-hand knowledge of the whole subject, and they have consulted various well-informed colleagues in an effort to be complete. Nonetheless, the scattered discussion of phase transitions, the absence of discussion of quantum solids and related topics, and the cursory treatment of optical properties (except for metals) are definite deficiencies, in this reviewer's opinion. Another reservation concerns the style of presentation of the material. Although the presentation is extensive it is sometimes uneven, often carrying derivations out in much greater algebraic detail than seems necessary or repeating material that can be found in many introductory texts. This can show a student at least some of the pitfalls which are otherwise hidden, but it makes for a voluminous book.

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The Pyrethroids

Pyrethrum. The Natural Insecticide. Papers from a symposium, St. Paul, Minn., Aug. 1972. JOHN E. CASIDA, Ed. Academic Press, New York, 1973. xviii, 330 pp., illus., + plates. $16.

Pyrethrum is a flower, rather than an insecticide. Specifically it is the generic name of a group of plants from which is extracted "pyrethrin," made up of a mixture of four esters derived from two acids and two alcohols. Pyrethrin is widely used for domestic purposes, because of its very low hazard and rapid action. Synthetic pyrethroids, such as allethrin, have been available for years, but recently a new group of synthetic compounds has leaped into prominence. These are compounds such as resmethrin, first described in 1967. This and its derivatives may usher in a new era of astonishingly potent yet safe compounds, which will have the distinction of a botanical pedigree but which will be produced synthetically.

This book is the outcome of a conference sponsored by the Pyrethrum Board of Kenya. Perhaps as a result, it dwells almost exclusively upon naturally occurring pyrethroids, and it is a disappointment that a book published at this point in time fails to mention the new synthetics even in the section "pyrethrum in the future." This fact and the use of the term "natural insecticide" in the title will tend to reinforce a widely held and absolutely false notion that naturally occurring insecticides are safe and synthetic ones are dangerous. The fallaciousness of this view can be illustrated by pointing to the considerable hazard of the "natural" insecticide nicotine and the remarkable safety of such synthetic compounds as malathion and carbaryl.

The book certainly provides a very comprehensive picture of all aspects of natural pyrethroids. About one-third is devoted to practical considerations, describing the utility of these compounds in controlling a variety of pests. The chapters dealing with control of agricultural and forest insects will be of special interest because use of pyrethroids for these purposes has been very small, owing to their high cost and brief effectiveness. Another third of the book deals with toxicity and mode of action; the brevity of the nine-page chapter on teratogenic, carcinogenic, mutagenic, and allergenic effects bears witness to the amount still to be done in this area, particularly with an insecticide in which human inhalation is probably more common than with any other pesticide. The balance of the book deals primarily with the chemistry and biochemistry of natural pyrethroids, their history, and (briefly) their production.

Within the limitations indicated above, this is an outstanding book. Each chapter is written by an outstanding authority, and the totality of the coverage and the excellence of the book's production make it an extremely satisfying book to read. For the average reader, it may tell more about pyrethrum than he wants to know. But for anybody working seriously with the chemistry, biochemistry, or utilization of insecticides, it will provide plenty of interesting reading, and an invaluable reference source.

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