slide preparation, or inoculation procedures; nor will he learn any of the pitfalls of field plot work or greenhouse tests.

He will, however, find a succinct discussion of each of the genera known to contain species parasitic on plants. Each chapter begins with a brief history of the genus, a general description of its morphology with emphasis on diagnostic characters, a review of publications on the biology and host-parasite relations, and a recommendation for control. The chapter ends with a brief list of references.

As a text for college work in nematology, this book invites comparison with Christie's *Plant Nematodes: Their Bionomics and Control* (1959) and Thorne's *Principles of Nematology* (1961). Christie's book is heavily inclined to plant pathology and Thorne's to nematode taxonomy. Each reflects the experience of a lifetime of work in the field at a time when the nematologist ranged over the entire vast territory of his subject. Neither book is a satisfactory elementary text. Jenkins and Taylor have succeeded in assembling a brief, simple review of some aspects of the subject written in a straightforward manner. It is a useful, but not a sufficient introduction to plant nematology.

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Boron Compounds

Polyhedral Boranes. EARL L. MUETTERTIES and WALTER H. KNOTH. Dekker, New York, 1968. viii + 197 pp., illus. $13.50.

The existence of complete series of polyhedral borane anions and carboranes was not apparent at the beginning of the present decade. A thorough review of this subject has not recently been attempted in a single volume, and consequently this book will be of more than passing interest to research workers in all fields of chemistry. One very strong point in its favor is the emphasis placed upon the many exciting and unsolved problems inherent in the field of polyhedral boranes and carboranes. As extreme examples, the imaginative physical-organic chemist will certainly see the probable utilization of polyhedral borane and carborane substituents as probes for the elucidation of organic reaction mechanisms, and those interested in the structure of electrolyte solutions will find a complete shopping list of novel anions available for further experimentation. In addition, this book could amply serve as a textbook in a short special-topics course for graduate students in inorganic chemistry.

The authors have expounded their own views on reaction mechanisms and the thermodynamic properties of the best-characterized polyhedral species. This is fitting, since a good deal of the original work was carried out in their own laboratory. Their attempt to bring the reader up to date is illustrated by the inclusion of a final chapter which deals with research carried out while the manuscript was in preparation. An underlying theme is the necessary comparison of polyhedral borane structures with the structures of transition metal coordination compounds and the thermal rearrangement of the former species. Synthesis methods are succinctly described.

The book is completely documented, and amply illustrated. Certain drawings have been somewhat stylized or otherwise distorted, but the serious reader will find no objection to them. The style and organization of this little volume should allow the uninitiated to develop a good understanding of this very new topic with a minimum of frustration. If this indeed proves to be the case we may expect to see the profitable application of polyhedral boranes to many other fields of chemical science.

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A Problem in Theoretical Physics

The Many-Body Problem in Quantum Mechanics. N. H. MARCH, W. H. YOUNG, and S. SAMPANTHAR. Cambridge University Press, New York, 1967. x + 459 pp., illus. $14.50.

Several different branches of theoretical physics can claim significant advances in the past decade and a half as a result of the development of powerful and sophisticated methods of treating the quantum-mechanical many-body problem. But aside from the common difficulty in treating a system of many interacting particles, the form and even the statement of the problem are different in different areas. Nuclear physicists are usually interested in the energy of a particular state, and their problems have to do with the complicated forces and large degeneracies. Atomic physicists know the forces, but have to deal with degeneracies and a relatively small system. Solid-state physicists, on the other hand, are frequently less interested in ground-state energies than in the spectrum of the elementary excitations and in the temperature-dependent response of a large system to external stimuli. Naturally enough, then, most books on many-body theory either have been primarily concerned with formalism or with treating in depth only one branch of the problem, or have combined a discussion of formalism with a collection of reprints of important papers dealing with specific problems.

The present work attempts to include all the areas of physics in which substantial progress has been made on the many-body problem. The authors' intent is "to provide, for the reader who [wants] to learn about the many-body problem, an account both of the methods used and the physics which emerges, within a single cover," and there are chapters on single-particle approximations, atoms and molecules, second quantization, many-body perturbation theory, Fermi fluids, nuclear matter, superconductivity, many-boson systems, grand partition functions, and Green functions, together with ten appendices. There are several problems provided with each chapter and a serviceable index at the end.

This treatment would probably be rather difficult for a student with no previous knowledge of many-body theory. Everything is here, but because of the large scope of the book the introductory chapters are necessarily brief and the discussion of basic concepts tends to be a bit superficial. However, the book is highly recommended for a physicist who has some knowledge of the formalism or for one who has worked in one area and wants to learn of techniques used in others. For such a reader, the chapters are self-contained and the notation is standard. A typical section contains a brief discussion of the physical picture, an outline of the appropriate calculation with important references given directly in the text, and a presentation of the results. There are strong sections on Fermi fluids and many-boson systems. Perhaps the weakest chapters are those on atoms and on nuclear matter, in

neither of which is there much discussion of progress since 1958. There are a few errors and confusing points in the text. These turn up mostly in the introductory sections, where they might be troublesome to a beginning student but would not be likely to trouble the more sophisticated reader. To him I recommend this book as a useful guide to many-body physics.

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Magnetic States

Theory of Magnetism in Transition Metals. Proceedings of the International School of Physics "Enrico Fermi," Course 37, Varenna, Italy, June 1966. W. MARSHALL, Ed. Academic Press, New York, 1967. xiv + 454 pp., illus. $18.50.

The theory of transition metals has seen rapid and fruitful development during the last few years as a result of the increasing availability of sophisticated methods for treating the many-electron problem and also of large-scale computers which have made detailed calculations possible. The transition metals are distinguished from their simple counterparts like Al and Na by the presence at the Fermi surface of *d*-shell electrons, which are responsible for their magnetic properties. An adequate description of cooperative magnetic states such as ferromagnetism in materials like nickel or iron is not possible without a fairly realistic treatment of the Coulomb interaction among the electrons. It is for this reason that this problem and its simplified counterpart, a transition metal impurity in a metal possessing a localized magnetic moment, has had its fascination for the many-body theorist.

The various theoretical ramifications of this problem, as well as some of the relevant experimental results, are discussed in this record of Course 37 in the Italian Physical Society's famous summer school. The venerable state of this school among rapidly multiplying contemporaries is attested to by the many courses on widely varying subjects in physics that it has presented over the past decade or so. It is regrettable and surprising, in view of their almost consistently high scientific quality, that the lectures collected in this series of volumes have not received more attention.

The organizer of the present school and the editor of this volume, Walter Marshall, has selected a group of lecturers who are clearly expert in this field. The lecturers have for the most part expended considerable effort to present rather sophisticated subject matter in a sound pedagogical manner. The theoretical viewpoints cover a spectrum ranging from the phenomenological to highly abstract mathematical formulations.

The phenomenological emphasis is to be found in Friedel's lectures on ferromagnetic transition metal alloys. These lectures abound in the seemingly simple kind of physical insight, which comes only after thorough understanding, for which the author has become justly famous. The band-theoretical single-particle aspects are surveyed in lectures by Lomer and Phillips. The more sophisticated theoretical techniques are discussed for the most part in connection with localized magnetic moments and in particular in connection with the Kondo effect, a resistance anomaly resulting from these moments at low temperatures. This latter problem seems to have had the same fascination for theorists during the past few years as Mount Everest did for mountaineers during the early 1950's. The very extensive treatment of this problem by Suhl is noteworthy not only because of its insight but also for providing a systematic presentation of scattering theory, which is becoming an increasingly important tool in solid state theory. This same theoretical approach is also discussed extensively by McMillan and Anderson in connection with disordered structures such as liquid iron. The viewpoint taken here, which to a certain extent parallels that to be found in recently published work of others, may well prove to be the one which will ultimately permit detailed calculations for realistic disordered materials. The contributions of many of the other lecturers are no less significant, but the preceding examples should suffice to establish the kind of fare to which the students attending this school were exposed.

This book will be found useful not only by the cognoscenti but also by the uninitiated as a detailed summary of current theoretical approaches and accomplishments in this field, the more so since its publication comes at a time when the field is still very active.

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Platelet Function

Physiology of Hemostasis and Thrombosis. A conference held in conjunction with the 14th Symposium on Blood, Detroit, Jan. 1966. SHIRLEY A. JOHNSON and WALTER H. SEEGERS, Eds. Thomas, Springfield, Ill., 1967. xiv + 338 pp., illus. $13.75. American Lecture Series Publication No. 675.

The conference whose proceedings are reviewed here was concerned with the current concepts of hemostasis and thrombosis with particular reference to the role of platelets. There are altogether 28 papers in the book including a historical review and various designated discussions. Each paper deals with some aspect of platelet function, the subjects ranging from the initiation of viscous metamorphosis in vitro to factors involved in the production of platelet thromboemboli in vivo. The observation in 1961 of Gaarder and associates that adenosine diphosphate (ADP) produces aggregation of platelets in vitro stimulated much research into platelet function, morphology, and metabolism, and as a consequence there is now a large and unfortunately confusing literature on these subjects. This excellent book has made a timely appearance and does a great deal to dispel much of the confusion. The editors have achieved a balance between papers which deal with the more fundamental aspect of platelet function and those which deal with hemostasis in the patient.

After a historical introduction by Rebuck, Lüscher and Davey give a useful account of the initiation of platelet viscous metamorphosis, having first defined viscous metamorphosis as "the sum of the morphological, biochemical and functional changes of the blood platelets such as are, for instance, induced in vitro by the addition of thrombin to a suspension of platelets in an adequate buffered medium containing calcium ions." In subsequent chapters these morphological, biochemical, and functional changes are discussed. White gives an excellent account of the chemical ultrastructure of platelets and, using cytochemical techniques adapted for use in electron microscopy, shows where substances such as ADP and fibrinogen are located in the platelet. This chapter, along with several others dealing with platelet structure and shape, is illustrated with excellent electron microphotographs. The mechanism of platelet aggregation by ADP is reviewed and discussed by Salzman, and in the penultimate chapter Mustard and his colleagues discuss the role of platelets in