

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.

MICHAEL P. GREENE

*Department of Physics and Astronomy,
University of Maryland, College Park*

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.

H. EHRENREICH

*Division of Engineering and Applied
Physics, Harvard University,
Cambridge, Massachusetts*

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. SEEGER, 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 Rebeck, 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

hemostasis and experimentally induced thrombosis in pigs. One is struck by the susceptibility of the platelet surface to the injurious effects of a wide variety of substances, including antigen-antibody complexes, polystyrene, and collagen.

In summing up the symposium Greenwalt reminds us that much of the work presented is concerned with platelets of animal species and that it is not possible to say to what extent the platelets of guinea pigs, dogs, and rabbits are suitable models for learning what happens in man. This book is well produced, it contains many excellent microphotographs of platelets, and the lists of references which appear at the end of each chapter are up to date and fairly comprehensive. To anyone wishing an authoritative account of platelets and their function in hemostasis this book is to be recommended.

C. R. RIZZA

*Oxford Haemophilia Centre,
Churchill Hospital,
Oxford, England*

Hibernators

Mammalian Hibernation III. Proceedings of the 3rd international symposium, Toronto, Sept. 1965. KENNETH C. FISHER, ALBERT R. DAWE, CHARLES P. LYMAN, EDUARD SCHÖNBAUM, and FRANK E. SOUTH, JR., Eds. Elsevier, New York, 1967. xiv + 535 pp., illus. \$22.50.

Students of mammalian hibernation comprise an informal but rather cohesive group tracing its origins to the first international symposium on this subject in 1959 and to the subsequent formation of the Hibernation Information Exchange. The proceedings of their third symposium differ from those of earlier ones [*Bull. Mus. Comp. Zool. Harvard Coll.* **124** (1960); *Ann. Acad. Sci. Fennicae Ser. A IV* **71** (1964)] in emphasizing review papers. Those by E. T. Pengelley and F. Strumwasser *et al.* deal with the important question of factors governing the timing of various events associated with hibernation. The latter authors treat methods of analyzing circadian rhythms and show the relevance of these to the study of various functions of hibernators. Their suggestions concerning possible mechanisms for triggering periodic arousals and for controlling the circadian rhythm of hibernation found in certain ground squirrels appear worthy of careful consideration.

Current knowledge of mechanisms governing sleep does not suggest any close relation to those of hibernation, according to W. C. Dement. N. Mrosovsky documents the superiority of hibernators over other mammals in reactivity and behavioral capacities at low body temperatures. Little is known concerning the learning capacities of these heterotherms. H. T. Hammel's account of the central neural mechanisms controlling thermoregulation and of the modifications of these mechanisms that might occur in hibernators upon entry into and during torpor is obviously relevant to the understanding of many aspects of the hibernation process.

Much of the material in the 1959 symposium dealt with animals in the process of arousal. The increasing application of procedures allowing study of torpid animals without disturbance is reflected in B. W. Johansson's review of cardiovascular function. K. C. Fisher and J. F. Manery further enhance understanding of the physiology of dormant individuals through an analysis of problems of water and electrolyte metabolism and of the handling of nitrogenous wastes.

F. E. South and W. A. House treat energy metabolism of hibernators, including a consideration of metabolic pathways and the utilization of various energy stores. R. L. Smalley and R. L. Dryer provide an evaluation of the role of brown fat in hibernation; its role now appears to extend to other things in addition to thermogenesis.

Tissue functions of hibernators have undergone significant compensation for temperature, as is evident from the contributions by J. W. Hudson and J. S. Willis. The latter's paper can be read with profit by persons interested in temperature adaptation in poikilotherms as well as by specialists on hibernation.

Hibernators appear to have special utility in studies of the action of certain agents. J. P. Schmidt and R. G. Lindberg consider them in connection with such things as ionizing radiation, parasites, infectious agents, and certain aspects of space research.

Twelve invited research reports augment the various reviews. The only unsatisfactory aspect of the proceedings is the treatment of the discussion following these contributions. The various comments are condensed in such a manner as to mute the controversy that must have developed on a few occasions. However, this does not seri-

ously detract from the usefulness of the proceedings volume with its bibliography of more than 1300 titles. It provides a valuable appraisal of the current state of research on hibernation and some indicators of directions for future studies.

WILLIAM R. DAWSON

*Department of Zoology,
University of Michigan, Ann Arbor*

Weapons

Fungicides: An Advanced Treatise. Vol. 1, Agricultural and Industrial Applications, Environmental Interactions. DEWAYNE C. TORGESON, Ed. Academic Press, New York, 1967. xviii + 697 pp., illus. \$29.

Fungi and men compete with each other in the balance of nature. If a fungus wins, the balance goes one way. If man wins it goes another. A fungus won in 1845 by killing the potatoes in Ireland. The Irish starved. Another fungus won in 1943 by killing the rice in Bengal. The Indians starved. Fungi came close to winning in the South Pacific during World War II. They rotted everything in sight from the lens mountings on range finders to the shoes on the feet.

Man fights back with fungicides—chemical compounds to kill fungi. The first great dramatic win by man was Bordeaux mixture, a copper complex that saved the French wine industry in 1885. Forty years earlier it would have saved the Irish potato crop.

Since 1885, fungicides have become so plentiful, so complicated, and so scientifically interesting that they now demand a two-volume advanced treatise that covers the theory and to some extent the practice.

The first volume covers agricultural and industrial uses. Since agriculture consumes the lion's share of fungicides, the most data have been developed in that field, and thus the most attention is devoted to it. To use the modern idiom, the book is a conglomerate. It was edited by D. C. Torgeson and written by numerous authors scattered over the world. Since the editor has chosen his authors well, he has produced a good book which all the fungicide people and many others as well will want to have.

Perhaps the most fascinating chapter is that by Van Der Plank, who covers the quantitative relationship between the amount of fungus in the vicinity of a crop and the amount of disease that