Domains, and Micromagnetics. Individual articles (twelve each in Volumes I and III, seven in Volume II, A) run the gamut from statistical mechanics to the structure and switching of permalloy films and include excellent discussions of exchange, anisotropy energy, ferro- and antiferromagnetism, spin waves, resonance and relaxation, optical properties, domains, spin arrangements and neutron diffraction, hyperfine interactions, crystal structure and symmetry considerations, annealing, crystal preparation, permanent magnet materials, and microwave devices.

Magnetism, equally with any other branch of modern physics, is a rapidly expanding field of study and bedevilled by the "information explosion". Thus, regrettably, some parts of the presentation will be significantly out of date before the final volume becomes available. This very defect underscores, of course, the magnitude of the task that the editors set themselves, and it would be churlish to be other than most grateful to them and their contributors for this massive and highly valuable work of reference. A word of warning to the casual title reader and purchaser (if such exists): this is *not* an exhaustive review of magnetism; it is a review of magnetically ordered materials, and paramagnetism is all but totally excluded.

The Theory of Magnetism. An introduction to the Study of Cooperative Phenomena. By Daniel C. Mattis. 303 pp. Harper and Row, New York, 1965. $11.50. *Reviewed by Daniel B. Butrymowicz, National Bureau of Standards.*

The increasing volume of published literature on magnetism and other cooperative phenomena reflects the great activity and complexity in this field of theoretical physics. Giant strides are being made in the understanding of cooperative phenomena in systems of large numbers of interacting particles. Here is a book that presents most of the material likely to aid in the solution of those problems that limit our understanding.

The introductory chapter is an excellent historical summary of theory of magnetism, beginning with the ancient Greeks and ending with the developments of the past few years. Chapter 2 is devoted to obtaining a qualitative understanding of the meaning of exchange and its importance for a theoretical interpretation of magnetism. An introduction to the quantum theory of angular momentum follows. In Chapter 4 the author shows how intra-atomic exchange (Hund's rule), as put forward by J. C. Slater in the late 1920's, is necessary for understanding the magnetic properties of the ferromagnetic transition metals.

Three chapters deal with the statics and dynamics of magnetism. Included is a brief but adequate treatment of the equations of motion of spin waves. The author's discussion of the quantum theory of spin waves in insulators makes use of the semiclassical theory as a guide in the development of some of the well-known approximate theories. Another chapter deals with theory of magnetism and magnons in metals; it begins with a review of band theory in the one-electron approximation (emphasizing tight binding), continues with the reasons for strong magnetic properties, and ends with the derivation of the theory of magnons in metals for several models.

Chapter 8 introduces the reader to some of the problems of elementary statistical mechanics, as well as the elementary theory of thermodynamics in magnetism.

A final chapter details the two-dimensional Ising model. The principal properties of the model are derived by using only elementary properties of spins one-half and their transformation to fermions. Although the main results are for the two-dimensional net, many of the formulas can be extended to three dimensions.

The book is by no means a comprehensive treatise, nor was it intended to be. In choosing the subject matter, the author has emphasized strong interactions among two or more particles, especially where collective phenomena are involved. He has omitted all time-dependent or irreversible phenomena, spin-orbit coupling (and other causes of magnetic anisotropy), the theory of the Landé g factor in solids, and experimental and technical properties. Such omissions are taken care of in a bibliography, which consists mainly of annotated references to the omitted material; this in effect extends the scope of the book considerably. Material covered in the text is referred to in footnotes.

Several problems are included since the book was written primarily for the beginning student in solid-state physics. Solution of these will require a knowledge of principles rather than skill in numerical computation. To comprehend the more theoretical subject matter of theories of magnetism in metals, the Ising model, and spin waves, it will be of benefit for the reader to have had an introductory course in quantum mechanics. Some familiarity with statistical mechanics will also help, but it is not essential.

The volume can certainly be recommended as a textbook, since it is clearly written with unity and continuity throughout. The specialist working in this area of physics will find it highly useful since the author has reviewed each of the topics sufficiently in depth to give a coherent picture of the advances made to date. Finally, it will be of value to other scientists interested in learning of the progress being made in our understanding of magnetism as a cooperative phenomenon.

Boolean Algebras (2nd ed.). By Roman Sikorski. 237 pp. (Springer-Verlag, Berlin) Academic, New York, 1964. $9.50. *Reviewed by Dagmar Renate Henney, The George Washington University.*

It is rumored that one of the members of his examining committee at the University of Warsaw had jested that because of the number of papers that had already been published by Sikorski they would have to award the doctor's degree to him. But he added that if he published another set like it, they would have to take back his degree.

Of course he was passed with flying colors, and the second edition of his book indicates Sikorski's success as a noted mathematician and author. Of the two possible approaches to the theory of Boolean algebras, that is the algebraic or the set-theoretical, the author chooses the set-theoretical aspect for his book. The book consists of two chapters and an appendix.

Chapter 1 is devoted to the study of Boolean algebras from the point of view of finite Boolean operations only (part of the contents can also be found in Birkhoff's *Lattice Theory* and Herme's *Einfuehrung in die Verbandstheorie*). Chapter 2 seems to be the first systematic study of Boolean algebras with infinite Boolean operations, and it is the chapter that differs considerably from the first edition. Several sections of Chapter 2 have been extended, and others have been completely rewritten.

No knowledge of lattice theory or abstract algebra is assumed in Chapters 1 and 2, and only fundamental notions from general set theory and set-theoretical topology are needed to comprehend these chapters. Less familiar topological theorems are recalled, and only a few examples use more advanced topological means. All theorems in both chapters are given with full and accurate proofs. On the other hand, no complete proofs are given in the appendix, which contains mainly a brief exposition of certain applications of Boolean algebras to other parts of mathematics.

A comprehensive bibliography (consisting of almost twenty pages) is given at the end of the treatise. Another excellent publication of the Springer-Verlag.

Mechanics of Incremental Deformations. Theory of Elasticity and Viscoelasticity of Initially Stressed Solids and Fluids, Including Thermodynamic Foundations and Application to Finite Strain. By Maurice A. Biot. 504 pp. John Wiley, New York, 1965. $17.50.

Reviewed by Jacques E. Romain, Centre de Recherches Routières, Sterrebeek (Brabant), Belgium.

By "incremental deformation" is understood the deformation of a prestressed continuous medium under the action of an additional stress. The continuous medium may be initially at rest or not. The main subjects in which this concept is of use are stability problems and continuous flow; in the latter case the velocity field and rate variables are obtained by a limiting process. The bulk of this book is concerned with stability problems, especially in geophysical applications (horizontal structures submitted to gravity and prestressed by