

# Book Review

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**Magnetism, A Treatise on Modern Theory and Materials.** Volume I. Edited by GEORGE T. RADO and HARRY SUHL. Academic Press, Inc., 111 Fifth Ave., New York 3, N. Y. 1963. xv + 688 pp. 15 × 23 cm. \$19.

This book is a part of a three-volume series with the object of presenting a comprehensive review of the theory and properties of magnetic materials. The subtitle of this volume is "Magnetic Ions in Insulators, Their Interactions, Resonances and Optical Properties." Since the magnetic properties of isolated ions, atoms, and molecules have been quite well understood for a number of years, the principal subject of this book is a description of cooperative phenomena: ferromagnetism, ferrimagnetism, and antiferromagnetism. These subjects, which occupy a large place in present day solid state physics research, are excellently treated. In spite of the fact that the twelve chapters were written by fifteen authors, the book achieves a structural unity. Each chapter contains a historical discussion of the particular subject to be covered. Then follows a critical evaluation of the state of the subject at the present time. As a part of this critical discussion almost all of the authors detail problems that remain to be solved and their frank discussion of present day problems is one of the valuable contributions of this work.

Chapters 1 and 2 about spin Hamiltonians and exchange interactions were written by K. W. H. Stevens and P. W. Anderson, and introduce the basic theory necessary for the treatment of magnetic phenomena using the "isolated ion" approach. In Chapter 8 L. R. Walker discusses spin wave theory, which is a complement to the localized ion model. These chapters on theory would make excellent starting points for the worker interested in becoming competent in this area of knowledge.

Chapters 3-7 present the specific topics of weak ferromagnetism (T. Moriya), anisotropy and magnetostriction of ferromagnetic and antiferromagnetic materials (J. Kanamori), magnetic annealing (J. C. Slonczewski), optical spectra in magnetically ordered materials (S. Sugano and Y. Tanabe), and optical and infrared properties of magnetic materials (K. A. Wickersheim). Chapters 9-12 treat antiferromagnetic and ferrimagnetic resonance (S. Foner), ferromagnetic relaxation and resonance line widths,

(C. W. Haas and H. B. Callen), ferromagnetic resonance at high power (R. W. Damon), and microwave devices (K. J. Button and T. S. Hartwick).

There is some question as to whether this book will be beneficial to chemists at the present time. If the history of electron or nuclear magnetic resonance can serve as a guide it will be approximately 8-10 years before a large number of chemists become greatly interested in cooperative magnetic phenomena. This is the time that it usually takes for an active research field in physics to generate chemical applications that are then taken up by chemists. The chemist can make valuable contributions in this field, however, because he brings an intuitive feeling to subjects such as this, which many times leads to new answers and discoveries. If this book serves to acquaint chemists with some of the exciting features of cooperative magnetic phenomena, it will have served a worthwhile purpose.

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## BOOKS RECEIVED

July 1965

ROBERT A. PLANE and RONALD E. HESTER. "Elements of Inorganic Chemistry." W. A. Benjamin, Inc., 1 Park Ave., New York, N. Y. 1965. xiv + 188 pp. Hardback, \$8.00; paperback, \$3.95.

DANIEL A. GREENBERG. "Mathematics for Introductory Science Courses: Calculus and Vectors with a Review of Algebra, Analytic Geometry, and Trigonometry." W. A. Benjamin, Inc., 1 Park Ave., New York, N. Y. 1965. vii + 214 pp.

Sadtler Research Laboratories, Editors. "High Resolution Spectra of Inorganics and Related Compounds." Sadtler Research Laboratories, Inc., 3314-20 Spring Garden St., Philadelphia, Pa. 1965. i + 342 pp. \$135.00 (universities), \$160 (industry).