Section 4 deals with diffraction geometry. Relationships for fixed-crystal, moving single-crystal, Weissenberg, Buerger precession and random-orientation methods are summarized. No attempt is made to give a detailed account of the principles of these methods (references are provided to suitable textbooks); however, a sufficient description of the various methods is included to explain the application of given tables of functional relationships. A rather extensive review of the precision measurement of lattice parameters of polycrystalline specimens is also given in this section.

Section 5 deals with the Physics of diffraction methods, including a brief discussion, formulas and tables relating to polarization, temperature and structure factors and absorption corrections; this section concludes with a summary of the mosaic theory and formulas for integrated intensities. Section 6 is concerned with Fourier synthesis and structure factors. Formulas for various projections, transforms and structure parameter refinements are summarized and various aids for the practical evaluation of Fourier series and structure factors are described.

Section 7, entitled special topics, includes treatments of close packing, the use of statistical methods for the detection of symmetry elements, and inequality relations between structure factors. Useful exponential and trigonometric tables are provided in section 8. The volume concludes with a dictionary of crystallographic terms in English, French, German, Russian and Spanish.

The International Union of Crystallography and, in particular, the editors, editorial committee and contributing authors are to be commended for the preparation of this valuable reference work. Volume III is to be a compilation of physical and chemical data.

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Theory and Applications of Nuclear Induction. By AJIT KUMAR SAHA, Professor of Nuclear Physics, and TARA PRASAD DAS, Reader in Nuclear Physics. Saha Institute of Nuclear Physics, 92, Upper Circular Road, Calcutta 9, India. 1957. x + 516 pp. Price, $6.00.

This book, which bears the publication date 1957 and the manuscript for which was essentially completed in 1953, should perhaps be described as a textbook on the theory and application of nuclear induction. The things which it does are done in very great detail and the reader who is not well acquainted with the field and who wants not a general review of it but a really detailed account will find it a good book to start with. It contains too a bibliography, through 1956, which will be useful. But of course the fact that treatments will not be found for the newer topics in the field, which is still a rapidly developing one, constitutes a major weakness of the book.

The first two of the seven chapters give the classical and quantum-mechanical theory of nuclear induction. Two more chapters give an account, which is extremely detailed and perhaps excessively so, of the experimental procedures for both the Bloch and Purcell type of experiment with many of their modifications and the results of measurements of relaxation times and other such parameters. The other three chapters give a good general discussion of nuclear relaxation times, electric quadrupole interaction effects, chemical shifts and so on. But in these chapters and elsewhere throughout the book the great mass of detail and the often pedantic treatment will disturb the reader whose interest in the subject is a more general one.

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Theory of Unimolecular Reactions. By NOEL B. SLATER, University of Leeds, England. Cornell University Press, 124 Roberts Place, Ithaca, New York. 1959. xi + 230 pp. 16 × 24.5 cm. Price, $4.75.

Workers in the field of chemical kinetics will welcome this book in which the author presents his theory of the specific unimolecular reaction rate with exemplary clarity and thoroughness. The earlier investigations in the theory of unimolecular reactions are reviewed and serve to introduce the reader to the general problem. Following a chapter on normal mode analysis, the average behavior of a sum of normal vibrations is discussed. The first-order unimolecular rate is formulated first from the point of view of the frequency of peaks in the sum of normal vibrations, and then by using transition-state theory. The author's examination of the concepts involved in transition-state theory is of particular interest.

Another chapter is devoted to the problem of the general pressure rate constant, and here the contrasts between Slater's detailed theory of the dissociation probability and earlier theories are made quite clear. The numerical problems encountered in the application of the theory are fully discussed, and as an illustrative calculation the pressure dependence of the decomposition rate constant of nitryl chloride is worked out in detail. This calculation vividly exposes the fact that in the absence of a complete potential energy surface for the molecule, the selection of the critical coördinate is to a large extent arbitrary, even when the general mode of decomposition is known from chemical evidence. In particular, the author's section of the combination of the chlorine–nitrogen and chlorine–oxygen distance as the critical coördinate in nitryl chloride seems to have been dictated by an urge to obtain agreement between the theory and experiment, rather than by any logical molecular considerations.

After examining the assumption of the random incidence of dissociation configurations the author concludes by giving his approach to a quantum mechanical unimolecular rate theory.

A unified presentation of Slater's theory has been needed; in addition the entertaining style, mathematical rigor, and clear exposition of the transition-state theory will make this book appealing and useful even to those not directly concerned with gas phase unimolecular reactions.

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Solid State Physics. Advances in Research and Applications. Volume 9. Edited by FREDERICK SEITZ, Department of Physics, University of Illinois, Urbana, Illinois, and DAVID TURNBULL, General Electric Research Laboratory, Schenectady, New York. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1959. xv + 548 pp. 16 × 23.5 cm. Price, $14.50.

In keeping with the high standards set by the preceding eight volumes, volume 9 of the "Solid State Physics" series, edited by Seitz and Turnbull, again serves as an excellent guide to the recent advances in the ever expanding field of solid state research. The topics discussed in the present issue are: (1) The Electronic Spectra of Aromatic Molecular Crystals by H. C. Wolf; (2) Polar Semiconductors by W. W. Scanlon; (3) Static Electrification of Solids by D. J. Montgomery; (4) The Interdependence of Solid State Physics and Angular Distribution of Nuclear Radiations by E. Heer and T. B. Novey; (5) Oscillatory Behavior of Magnetic Susceptibility and Electronic Conductivity by A. H. Kahn and H. P. R. Frederikse; (6) Heterogeneities in Solid Solutions by A. Guinier; and (7) Electronic Spectra of Molecules and Ions in Crystals: Part II. Spectra of Ions in Crystals by D. S. McClure.

For the chemist this book contains two gems—the articles by Wolf and McClure. The organic and physical chemist will delight in the thorough review of the electronic spectra of crystalline aromatics. This article, when combined with McClure's very detailed survey of a similar nature in volume 8 of this series [D. S. McClure, *Solid State Physics*, **8**, 1 (1958)], serves as a comprehensive introduction to this fast growing field. The inorganic chemist need not despair, however (nor the physical chemist for whom this volume is a double boon), for the complete and knowledgible discussion of crystalline (or ligand) field theory given here by McClure will warm the cockles of his heart.

The remaining chapters of this book delve into domains which have become, for the most part, the private stamping grounds of the physicist. This circumstance is to be deplored as these realms of endeavor are as much a part and parcel of chemistry as they are of physics. For example, a glance at the articles on polar semiconductors and on the oscillatory behavior of magnetic susceptibility and elec-