a most favourable impression. The authors of individual sections have achieved a satisfactory balance between the encyclopaedic and the critical and they have together produced a creditable exposition of dispassionate scholarship. The "mainstream" analytical chemist will welcome particularly the chapters on microscopy and refractometry where a hitherto scattered literature has been collected into a unified whole with an analytical emphasis.

With several of the techniques discussed the problem is not complete when a result is read from the instrument; representation, storage and retrieval of information are becoming increasingly pressing problems, and the authors have rightly considered these in fair detail.

Weaknesses can inevitably be found in a work of such dimensions. For example, Chapter 1 on emission spectroscopy lists 185 selected literature references, yet line broadening is discussed without reference to the literature and hollow cathode sources are described without reference to design considerations. These are, however, minor shortcomings in a volume notable for clarity of layout and excellence of literary presentation.

The firm editorial hand is evident throughout in the maintenance of overall balance and adequate cross-referencing between this and other volumes in the series. This volume more than maintains the high standard set by earlier ones in the series and is encouraging testimony to the worthwhile nature of the daunting task which the editors have undertaken. J. K. FOREMAN

# FRESH IDEAS IN SOLID STATE THEORY

## Many Body Theory

Edited by Ryogo Kubo. (1965 Tokyo Summer Lectures in Theoretical Physics, Part 1.) Pp. iv+160. (Tokyo: Syokabo; New York: W. A. Benjamin, Inc., 1966.) $7.45.

THIS book contains ten of the more important contributions to the 1965 Tokyo Summer Lectures in Theoretical Physics. It is to the credit of Professor Kubo, the editor, that it escapes the scrappiness and lack of cohesion which can result when isolated papers are detached from the coherent background of cross-questioning and informal discussion against which they were originally presented.

The contributions form a well-balanced selection, though the authors do not always attack their subject on the same level: H. Mori's article on "Relaxation Phenomena near the Critical Points" requires careful study, while D. Pines's "Elementary Excitations in a Homogeneous Base Liquid" is more intuitive, although it ends with some interesting speculations on the occurrence of zero sound. Between these extremes lies a wide spectrum of different approaches, but they have this in common: the authors are concerned with physically relevant ideas, and for the most part include only enough mathematical formalism to clothe them respectably. Nevertheless, the mathematics makes no concessions to the unsophisticated, and heavy reliance is placed on diagrams.

The presentation is consistently clear, and the many misprints are not, on the whole, obtrusive. J. M. Luttinger's "A New Mechanism for Superconductivity" is, however, mathematically cryptic, and the elision of definite and indefinite articles, common in "Japanese" English but rare elsewhere in this book, is an unnecessary barrier to comprehension.

Apart from those already mentioned, the authors include K. A. Brueckner, W. Kohn, J. R. Schrieffer and P. G. de Gennes. To the solid state theorist these are names to conjure with, and they do not disappoint here: Brueckner's articles on "Liquid Helium-Three", "Nuclear Structure" and "Correlated Crystals" are lucid and comprehensive, while Schrieffer studies the quasi-particle approximation in normal and superconducting metals, using Migdal's simplification of the electron–phonon vertex function to obtain explicit expressions for the electron self-energy valid to all orders in the electron–phonon coupling strength. W. Kohn, summarizing his own work on the subject, formulates the problem of the inhomogeneous electron gas in terms of a functional $F[n(\mathbf{r})]$ characterizing the ground state, while de Gennes discusses Landau–Ginsburg theory and Type II superconductors.

In short, ideas abound in this lively volume; many of them need the firm anchorage of further work, but this is not in the nature of a criticism. I recommend the book both to graduate students and to more senior workers who are seeking inspiration suitably leavened with information. A. E. K. DOWSON

# NMR THEORY

## The Theory of Nuclear Magnetic Resonance

By Igor Vladimirovich Aleksandrov. Translated by Scripta Technica, Inc. Translation edited by Charles P. Poole, jun. Pp. x+197. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1966.) 70*s*.

THIS book is a translation of the original Russian version which was published in 1964. In view of its title and contents, it immediately invites comparison with the classic and authoritative book by Abragam which was published in 1961. Incidentally, it is surprising to find no reference to Abragam's book in this. The comparison is not favourable to Aleksandrov, for his book gives an impression of a laboured and pedestrian approach, in spite of some quite elegant mathematics, and one feels that the author experienced no joy in his work. The field is one capable of more exciting and yet sound presentation, as has been shown by Abragam, Slichter and Pople.

The book presents the basic theories of magnetic resonance relaxation, a few topics in the theory of line shapes in solids, the theory of the chemical shift and the indirect spin–spin coupling in molecules, and in a final chapter a hotchpotch of minor problems in nuclear magnetic resonance. This presentation is in quite a logical order but does not achieve the unity required of a book, and this is emphasized by the different notation used in reporting the theories of Kubo and Tomita, Bloch and Redfield. While this is helpful to persons familiar with their notations, and it is no doubt deliberate, it makes it very difficult to compare the several theories. No real and searching comparison of the differences and relative advantages of the theories is presented, which is unfortunate because many experts in the field would be glad to see this discussed.

The discussion of the difficult and complex matter of the chemical shifts and $J$ couplings is thorough, but I suspect that it may by now be rather out of date in view of the great interest in this field. It is remarkable that here, as indeed throughout the book, virtually no experimental results are quoted. They are unusually lacking even for an avowedly theoretical treatment and they are certainly necessary in the molecular theory which is notorious in its disagreement with experiment.

The translation is not convincing and the editing is not thorough. There are words not to be found in English or improperly used (kinetical, nontrivial, nonzero, etc.), a number of misleading mathematical errors ($t-t_0-i\hbar\lambda$ for $t_0-t-i\hbar\lambda$, errors of sign, omission of symbols, etc.), and a large number of printer's errors (Poole for Pople, both *Tr* and *Sp* used, etc.). The price is on the high side. A useful reference book but no more. J. G. POWLES