

to crystal structure analysis, the other to electron diffraction by gases and vapours. The treatment here is particularly concise: the whole of crystal structure analysis, including the problems of the accurate determination of electron density and the assignment of absolute configuration, is condensed into 43 pages. Nevertheless, this section is entirely clear and is successful in explaining to the non-crystallographer the nature of the method and the meaning of the results.

Methods giving indirect information on aspects of molecular structure, such as those based on dielectric and optical properties (dielectric constant, dipole moments, molar refractivities, Kerr effect), are treated in the penultimate chapter and the final chapter is devoted to a discussion of the meaning of the various structural parameters and to a comparison and assessment of the different methods for obtaining them.

Perhaps not everyone would agree with some of the authors' concluding comments, such as, 'The spectroscopic approach is more radical' than diffraction methods. It would be better to say that these approaches are quite different both in their philosophy and in their results: Diffraction allows us to 'see' molecules with no direct indication of their energy states, while spectroscopy, by dealing with energy transitions, gives direct information as to their energy states. Therefore there is really no problem of superiority between the two methods: they are merely complementary. Also, the sentence 'Nevertheless the spectroscopic method operates in a setting that seems to be closer to whatever reality may underlie our concept of the molecule' is objectionable because the concept of an energy level has no *a priori* reality greater than that of a molecule. Indeed, both concepts can be regarded equally as abstractions which the human mind uses to describe what the senses receive in the experiments.

The book closes with three appendices giving character tables for some important point groups, some mathematical demonstrations and a series of problems useful for the student who wishes to verify in practice what he has learned in the theoretical study.

The book is well and rigorously written and, even if it is often rather concise, it is always clear and convincing. It is not only a very good text book for introducing students to these important fields of modern physical chemistry but it can also be useful to anyone who wants to have a sound general knowledge of the fundamentals of the most important structural methods.

M. NARDELLI

*Istituto di Chimica Generale ed Inorganica  
Università degli Studi di Parma  
Via M. D'Azeglio 85  
43100 Parma  
Italy*

**Molecular structure by diffraction methods.** Vol. 3. By G. A. SIM and L. E. SUTTON (Senior Reporters). Pp. xiv + 514, Figs. 89, Tables 47. The Chemical Society, 1975. Price £26.00 (US \$71.50).

*Molecular Structures by Diffraction Methods* is an annual series containing comprehensive reports on the determination of molecular structures by diffraction methods, and is part of the series *Specialist Periodical Reports* issued by The Chemical Society. In Vol. 3, papers concerning X-ray diffraction studies published in the period April 1973 – March 1974 are reviewed. In the neutron diffraction section papers appearing up to September 1974 are included.

The X-ray and neutron diffraction sections are restricted essentially to structural results for molecules and finite ions. No reviews of theoretical aspects, such as direct phase determination, are given. The reports are systematic and contain a large amount of information. In many cases structural relationships between different compounds are indicated. The reports are very valuable for the specialist chemist who has not been able to keep up with the literature in his field. Moreover, scanning through the reports gives new ideas about structural principles and can stimulate interest in new fields. The large number of structural formulae given in the book are very helpful.

In the electron diffraction section papers up to the end of August 1974 are reviewed. The section makes clear, even to a chemist who is not a specialist in this field, which types of structural studies of gaseous molecules are of interest nowadays. The review of apparatus development is restricted to America, Canada and Japan. It is planned to give the developments in Europe and Russia in a later report.

The chapter *Gases and Crystals: A Comparative Study* is extremely useful as it shows clearly that for a large number of molecules the structures are different in the two phases.

The book contains an author index, and there are only a few misprints. It can be recommended to all structural chemists and should be on the shelves of all libraries in chemical laboratories.

A AFJE VOS

*Laboratory of Structural Chemistry  
University of Groningen  
Zernikelaan, Paddepoel  
Groningen  
The Netherlands*

**Anomalous scattering.** Edited by S. RAMASESHAN and S. C. ABRAHAMS. Copenhagen: Munksgaard, 1975. Pp. xi + 539. Price D. Kr. 200.00.

A review of this book by M. M. Woolfson has been published in the November 1976 issue of *Acta Crystallographica*, Section A, page 1037.