# Notes and News

*Announcements and other items of crystallographic interest will be published under this heading at the discretion of the Editorial Board. The notes (in duplicate) should be sent to the Executive Secretary of the International Union of Crystallography (J. N. King, International Union of Crystallography, 13 White Friars, Chester CH1 1NZ, England).*

## *Anomalous Scattering*

### Errata

A list of corrections to errors noted in *Anomalous Scattering* (1975)) edited by S. Ramaseshan and S. C. Abrahams and published for the International Union of Crystallography by Munksgaard, Copenhagen has been compiled. As one of the corrections is substantial, readers already possessing a copy are advised to write requesting a list of the errata. Copies are available from Munksgaard International Publishers Ltd., 35 Nørre Søgade, DK-1370 Copenhagen K, Denmark or Polycrystal Book Service, P. O. Box 11567, Pittsburgh, Pa. 15238, U.S.A.

# Book Reviews

*Works intended for notice in this column should be sent direct to the Book-Review Editor (J. H. Robertson, School of Chemistry, University of Leeds, Leeds LS2 9JT, England). As far as practicable books will be reviewed in a country different from that of publication.*

**Theory of defects in solids.** By A. M. STONEHAM. Pp. xix+955, Figs. 115. Tables 95. Oxford Univ. Press, 1975. Price £29.25.

This book surveys the theory of the electronic properties of point defects in insulators and semiconductors. In the preface, the author states that the theory of defects has developed through a series of models, approximations, and assertions, that often the basis of these ideas has been forgotten in their evolution, and that he has tried to provide a critical survey of defect theory, stressing assumptions made and attempting to assess their validity. He has succeeded admirably in his objectives, *e.g.*, showing that straightforward applications of the effective mass theory to approximate solutions of the Schrödinger equation of an impurity system may result in poor answers, pointing out those defect types which are badly treated by use of Green's function method, *etc.*

The text is reasonably ambitious in scope, apparently free of errors, well written, although in a very concise style that may not appeal to some readers. This latter quality is compensated for in large part by extensive referencing.

There are four major divisions to the text: I – *The Perfect Solid*, II – *Electronic Structure of Isolated Defects*, III – *Calculation of Observable Properties of Defects*, and IV – *Comparison of Theory and Experiment*. This last division applies the theories to a broad range of very different defects and is extremely informative.

This book is expensive and decidedly not suitable as a classroom text. However, it is recommended for the experimentalist working in the broad area of point defects who desires a critical evaluation of current theories.

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**Solid state physics literature guides. Vol. 7. Scattering of thermal neutrons.** By ANDRE LAROSE and JAKE VANDERWAL. Pp. 527. New York: Plenum, 1974. Price: $58.90.

This publication runs to 527 pages of 27 × 20 cm and is a development of an earlier compilation which was circulated in 1974 by Professor B. N. Brockhouse of McMaster University, to which the present authors belong. The reviewer has used, as distinct from tested, the earlier work on a number of occasions and has found it valuable.

The present volume gives 8500 entries, from the discovery of the neutron in 1932 up to 1974. The main body of the work covers the period from 1945–1974 and the older publications, of which there are 81, are listed in a separate section. The book is divided into 25 sections, of which three predominate. Two of the latter are devoted respectively to studies of elastic and inelastic scattering and the publications are ordered on the basis of the chemical formulae of the substance concerned, with the addition of generic terms, such as perovskites and polymers, when papers deal with general categories of substances. The third major section, accounting for 150 pages, is an author index. This is arranged alphabetically, including 4822 names, each with his papers arranged in sequence of time. It is quite remarkable to see what an enormous majority of authors have contributed only one, or two, papers. The remaining sections of the book cover topics, rather than materials, and list the papers under journal names arranged alphabetically and then according to year of publication. Examples of topics are diffraction theory, scattering by molecular systems and neutron sources and, allowing for some subdivisions, there are about 40 different topics, mainly comprising three or four pages. Any such listing of papers gives a good account of the topic concerned. Among other sections there are particularly valuable lists of books, treatises and conferences proceedings, arranged separately for elastic nuclear scattering, inelastic nuclear scattering and magnetic scattering.

Inevitably a publication of this kind cannot satisfy every requirement and the choice of the 40 topics is necessarily somewhat arbitrary: for example a rather obvious absentee is 'defects', or something equivalent to it. It might be expected, too that the author index would include books and not simply journal publications. However, these are no more than small blemishes on what seems a very worthwhile publication, providing a lot of information not previously accessible.

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**The physics of liquid crystals.** By P. G. DE GENNES. Pp.xi + 333, Figs. 130. Oxford Univ. Press, 1974. Price £11.50.

This book is based on Professor de Gennes's lecture notes on the physics of liquid crystals. Anyone who has attended his lectures knows what an inspiring teacher he is and how much he has influenced recent researches in this field. The book certainly succeeds in conveying the author's enthusiasm for the subject and also in highlighting some of the important questions that still remain to be answered.

Chap. 1 describes the main types of liquid crystals, their structural features and properties, with typical examples of the 'building blocks' that give rise to the mesophases. Chap. 2 deals with long and short-range orientational order in nematics. The order parameter is defined and related to macroscopic properties, such as the anisotropy of the diamagnetic susceptibility, *etc.* Statistical theories of long-range order – the hard-rod model and the Maier–Saupe treatment – are then outlined briefly. This is followed by a discussion of the Landau–de Gennes model and its applications to static pretransitional short-range order effects in the isotropic phase.

The principles of the continuum theory of nematics are introduced in Chap. 3. The Oseen–Zocher–Frank equations of curvature elasticity are set up and applied to various problems, *e.g.* the static theory of distortions, the orienting influence of walls, magnetic and electric field effects, fluctuations and light scattering. The chapter ends with a discussion of Ericksen's general definitions of stresses and torques. Chap. 4 describes with illustrative photographs the various types of defects and textures in nematics arising from singularities and discusses their significance in terms of the continuum theory. Chap. 5 deals with the dynamical properties of nematics. The basic equations in the Ericksen–Leslie as well as the Harvard formulations are examined and compared, and the various techniques of measuring the coefficients of viscosity are surveyed. The problem of electrohydrodynamic instabilities, which is a topic of importance in electro-optic display technology, is considered in detail and finally methods of studying relaxation phenomena in nematics are reviewed.

Chap. 6 is devoted to the cholesteric liquid crystal which is the twisted form of the nematic. It begins with a theoretical treatment of the unique optical properties of this phase and then goes on to discuss the extension of the continuum theory of nematics to allow for the helical symmetry. The rest of the chapter covers the static theory of distortion by magnetic fields, flow and permeation, electric field effects and convective instabilities, thermomechanical coupling and the Lehmann rotation phenomenon, defects and textures.

The last chapter deals with smectics. Attention is confined mainly to the *A* and *C* types as the structures of the other smectic modifications are not yet completely understood. The continuum theory of smectics is developed and applied to problems of static and dynamic distortions in the structure. The chapter concludes with a discussion of phase transitions and precritical behaviour. In particular, the smectic *C*–smectic *A*, the smectic *A*–nematic and the smectic *C*–nematic transitions are considered and formal analogy is drawn with transitions in superconductors and superfluids.

There is one unfortunate feature of the book which it is the reviewer's duty to record. It contains an inordinately large number of 'typographical' errors, many of which are by no means of a trivial nature and might be disconcerting to a beginner. There are some 50 errors in the mathematical expressions and 17 errors in the figure and equation numbers referred to in the text. The figures themselves are carelessly drawn. For example, in Fig. 3.7 showing the twisted nematic, the axis of twist is marked as 'the easy axis of wall 2'; in Fig. 3.20(*b*) illustrating the origin of flexoelectricity in a nematic subjected to a bend deformation, some banana-shaped molecules have their dipoles pointing out from the concave side and others from the convex side; in Fig. 7.4 giving phase diagrams for mixtures of smectics *A* and *C*, the latter is shown as the higher-temperature phase.

It is nevertheless a valuable book written in an inimitable 'open-ended' style and studded with beautiful examples and solved problems. Altogether, it is a must for everyone interested in liquid crystals.

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