abound; very sophisticated mathematical techniques are used and the average research worker can often have difficulty relating the theory to real physical situations. On the other hand, the emphasis may be largely phenomenological, concerned for example with the geometrical relationships between phases in martensitic transformations or relying on semi-empirical theories to describe phenomena such as spinoidal decomposition.

Both these approaches are exemplified in this book. There are chapters on thermodynamics and statistical mechanics which clearly describe such basic ideas as Landau theory and the Ising model and, indeed, include a brief (three-and-a-half page) introduction to the renormalization group. There is also a long chapter (equivalent to nearly a quarter of the book) entitled *Various kinds of phase transitions* which describes phenomenologically, and with reference to many examples, nucleation and growth theory, martensitic transitions, order–disorder transitions, spinoidal and eutectic decompositions and transitions in glasses, liquid crystals and organic solids. Other chapters (there are seven altogether including an introduction) discuss crystal chemistry and the role of soft modes in phase transitions, and the final chapter, entitled *Properties of solids and phase transitions*, discusses magnetic crystals, metal–insulator transitions and ferroelectricity. Thus practically every topic with which a research worker in the field should be familiar is discussed in greater or lesser detail and this book is certainly a valuable introduction to the subject and should be of particular help to graduate students. Moreover it contains over 800 references to the literature through which a more detailed study of most of the topics discussed could be made.

What this book does *not* do, despite the authors' stated intention, is to provide a unified presentation of the subject. Various theoretical approaches, for example the Landau and Tizza theories of second-order transitions described in chapter two, are discussed without any attempt to relate them to each other or even to define their respective areas of applicability. The renormalization group may still have little to tell us about martensitic transitions, but it has greatly enhanced our understanding of ferromagnetism and some of the properties of soft modes. However, this theory is not mentioned in either of these contexts. Some of the arrangements of topics are also rather surprising: ferromagnetism could well have been discussed along with other *various kinds of phase transitions* in chapter 4, rather than not being mentioned until the last chapter; there would seem to be no logical reason for discussing ferroelectricity twice in widely separate chapters (using a different system of units each time) and it is certainly wrong to give the impression that the Landau rules governing the symmetry relations between different phases are particularly relevant to ferroelectrics rather than being generally applicable to any continuous structural phase transition.

Nevertheless this book is a very valuable description of the many aspects of the theory of phase transitions and should certainly be read if only to challenge research workers to work towards a more general unified understanding of the subject.

A. I. M. RAE

Department of Physics
University of Birmingham
Birmingham B15 2TT
England

Acta Cryst. (1980). A**36**, 333

Synchrotron radiation: techniques & applications (Topics in current physics, No. 10). Edited by C. KUNZ. Pp. xvi + 442. Berlin, Heidelberg, New York: Springer-Verlag, 1979. Price DM78.00, *ca* US $42.90.

With the rapidly increasing attention being given by crystallographers to the advent of synchrotron radiation sources, this book is a very useful overview of the present situation.

There are seven chapters written readably, if rather tersely, by nine authors (from Germany, USA, Japan and the UK); line diagrams are plentiful and clear, and there are well over 1000 references to the original literature. The first two chapters give the detailed physics of synchrotron radiation, its properties and the devices used to generate it. The rest of the book deals with the range of applications of the radiation: spectroscopy receives by far the greatest coverage; however, some ten pages are devoted to experiments in the X-ray range, including four pages on topics involving X-ray diffraction.

The 'present situation' is, of course, developing very rapidly. Thus, plans are already being seriously worked out for the building of a 'European' synchrotron facility, larger and better than any of those mentioned in this book. Whether all the dreams of the enthusiasts will be realized is hard to say but, in the meantime, for those who want to know what synchrotron radiation is, and what it is mostly used for, this book is good reading.

J. H. ROBERTSON

University of Leeds
Leeds
England

Acta Cryst. (1980). A**36**, 333

Optical crystallography (5th edition). By E. E. WAHLSTROM. Pp. 488. Chichester, England: Wiley, 1979. Price £12·00.

Wahlstrom's book is by now well known to all crystallographers. First published in 1943, it has been with us, in successively improved editions, for over 35 years. The edition previous to the one now being commented upon was published in 1969 and a fairly detailed review was published then in this Journal [Woolfson, M. M. *Acta Cryst.* (1969), B**25**, 2422 or (1970), A**26**, 167]. That review concluded with the remark that the book was highly recommended to all crystallographers.

This fifth edition is at least as good as its predecessor of ten years ago and, to all appearances, better. The style of production, lay-out and clarity of headings are all noticeably up-graded; in particular, the diagrams, previously lavish and excellent, are better than ever. The only important thing that has not been included is the use of colour pictures, which is a real loss for such a subject as optical crystallography; but of course, colour would have rendered the book more expensive. At £12, relative to today's prices, it is a bargain.

J. H. ROBERTSON

University of Leeds
Leeds
England