На основе термодинамики показано связь между разными физическими явлениями. В книге находим обсуждение теории Ландауа для фазовых переходов второго рода, включая условия на симетрию разрешенную ниже точки перехода. Теория иллюстрируется интересными примерами.

В конце книги авторы занимаются эффектами высших порядков. Рассмотрены нелинейные эффекты как пьезорезистивный, термогальваномагнитный, а также некоторые оптические и акустические эффекты.

Авторы часто пользуются современной научной литературой. Читатель находит многие экспериментальные данные и таблицы тензоров необходимые в научных исследованиях.

Согласно тому, как пишут самые авторы, в книгу не включены структуральная кристаллография, кристаллохимия и вопросы роста кристаллов и их дефекты. Объём книги не позволил дать примеры практических применений вытекающих с анизотропии физических свойств. Однако такие применения несомненно вытекают из содержания книги.

По сравнению с общеизвестной книгой Дж. Ная *Физические свойства кристаллов* (перевод с английского) Москва 1967, Ю. И. Сиротин и М. П. Шаскольская дают намного богаче современный и систематизированный материал. По содержанию обе книги в принципе похожи, хотя Най не даёт основ кристаллографии.

Думается, что книга может стать важным пособием для научных сотрудников, изучающих конкретный физический вопрос, или работавших над практическими применениями. Может также оказать большую пользу преподавателям физики твёрдого тела и кристаллографии. Первым показывает красоту кристаллографии и источник анизотропии наблюдаемых явлений, другим позволяет углубить знания о физических свойствах вытекающих из симетрии кристаллов. Из-за ясного и систематического изложения книгу можно рекомендовать молодым научным сотрудникам и студентам старших курсов.

Изложенный в книге материал представляет большой интерес как для физиков, так и для химиков.

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Acta Cryst. (1979). A**35**, 253–254

Optical data processing. Topics in applied physics. Vol. 23. Edited by D. CASASENT. Pp. xi + 286. Berlin, Heidelberg, New York: Springer, 1978. Price DM 86.00, $39.60.

At first sight a review of a book with this title may seem a little out of place in a crystallographic journal. There are many justifications, however, since in a very real sense one could regard the techniques of interpreting X-ray, electron and neutron diffraction data as optical data processing. Indeed one could argue that crystallographers have been performing these processes for a great deal longer than optical physicists. But without pressing this point too far it is abundantly clear that crystallographers can gain some very useful ideas from a study of modern optical techniques. It is particularly interesting to note the title of the second chapter of this book: *Optical transforms and coherent processing systems – with insights from crystallography.* This chapter alone would justify the place of the review in this journal. But more of that later.

The book contains eight chapters which, apart from the shorter introductory chapter, are of about the same length and each is complete in itself with a useful summary and set of references. The introductory chapter begins with a brief discussion of coherence and of the basic idea of optical transforms and then goes on to summarize the fundamental ideas of image processing, spatial filtering and pattern recognition.

Chapter 2 (mentioned above) gives an account of the development of techniques based on optical transforms and, on the face of it, would seem likely to be the most interesting chapter for crystallographers. However, the author (B. J. Thompson) concludes with the remark that '. . . there have been interesting pieces of work carried out by (X-ray diffraction) researchers actively engaged in optical analogue techniques that can provide considerable insight to those working in the various aspects of diffraction and optical processing'. My contention here would be that many crystallographers could gain a great deal of insight not only from this chapter but also from most of the others. In this chapter alone there are salutary reminders of the restrictions and limitations inherent in some optical techniques that can all too easily be ignored, with disastrous results.

Chapter 3 deals with optical enhancement and image restoration. Though written without explicit reference to techniques used by crystallographers there are a great many useful lessons to be learned both in relation to computer processing of crystallographic data and in relation to the interpretation of modified electron micrographs of crystallographically interesting structures.

Chapter 4 discusses synthetic aperture radar which, paradoxically, leads to resolution in the final image that can be hundreds or even thousands of times smaller than the diffraction limit set by the antenna used in the conventional way. The secret is, of course, that the small aperture is 'scanned' over the very much larger 'synthetic' aperture and so, in terms of information theory, far more data is available for correlation.

Chapter 5 deals with optical processing in measuring parallax from stereophotographs, particularly in aerial surveys. Crystallographers are not unfamiliar with the problem of relating two-dimensional and three-dimensional information and so again the material is not perhaps as far removed as it might seem.

Chapter 6, entitled *Nondestructive testing and metrology* is a fascinating and elegant discussion of holographic interferometry with some beautiful examples of the simulation of hologram interference fringes by moiré patterns.

Chapter 7, on biomedical applications, has, among other things, a valuable discussion of the problems of relating two-dimensional data to three-dimensional objects with internal structure.

The final chapter treats optical signal processing, that is the translation of electronic and other forms of data into light signals which can then be processed by optical methods which – being based on two-dimensional Fourier transformation – have all the attractions of simultaneous *parallel* processing.

For optics researchers this book is a most valuable review of the 'state of the art' and will be rapidly recognized as such. I would warmly commend it, however, to any crystallographer – young or old – who is interested in looking behind the routine techniques that can all too easily be accepted without question. It will set up new trains of thought and stimulate closer analysis of the potential and limitations of some of our methods that could be very rewarding.

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Electron density mapping in molecules and crystals. Edited by F. L. HIRSHFELD. Pp. v + 143. Weizmann Science Press of Israel, 1977. Price $13.00.

This double issue of the *Israel Journal of Chemistry* (Vol. 16, Nos. 2 and 3) reports the lectures given at the Bat-Sheva Seminar on Electron Density Mapping in April 1977. Though 14 authors have been involved in the 19 chapters and 2 appendices, the care of the authors and editor has resulted in a coherent publication which will be invaluable to anyone interested in precision studies of electron density.

In alphabetical order the authors are I. Absar, P. Coppens, Y. M. Engel, D. Feil, A. T. Hagler, N. K. Hansen, F. L. Hirshfeld, K. Kurki-Suonio, P. F. Price, B. Rees, V. H. Smith, E. D. Stevens, R. F. Stewart and S. Vega. Their names are sufficient to indicate that this is an authoritative publication.

The topics covered include: basic concepts of quantum chemistry for electron density studies; diffraction physics; total X-ray scattering; symmetry and its implications; density functions and many-centred finite multipole expansions; charge deformation models; vibrational averaging; systems for study; experimental problems; modified least-squares formalisms and Fourier methods; assessment of accuracy; representations of the electron density and its topographical features (this chapter contains some beautiful and instructive diagrams); spatial partitioning of charge density; conformational properties; NQR in solids.

The results for specific molecules and crystals are illustrative rather than comprehensive, and the strength of the volume lies in its descriptions of methods. The volume is complementary to the posthumous work by Barrie Dawson: *Studies of Atomic Charge Density by X-ray and Neutron Diffraction – A Perspective* (*Advances in Structure Research by Diffraction Methods*. Vol. 6, Pergamon, 1975). Dawson goes more deeply into a more restricted set of topics. The present volume is well presented and should be on the shelves of all crystallograhic libraries.

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Acta Cryst. (1979). A**35**, 254

Books Received

The following books have been received by the Editor. Brief and generally uncritical notices are given of works of marginal crystallographic interest; occasionally a book of fundamental interest is included under this heading because of difficulty in finding a suitable reviewer without great delay.

Images. By C. A. TAYLOR. Pp. viii + 205. London: Wykeham Publications, 1978. Price £4·50. Profusely illustrated, this new member of Wykeham Science Series, addressed primarily to sixth-form school students, is a most readable, enjoyable and illuminating introduction to all kinds of imaging process: from the humble camera to electron microscopy, holography, Schlieren techniques and medical imaging The underlying physics is the unifying theme. X-ray diffraction receives due mention, in its place.

Landolt–Börnstein. Numerical data and funcational relationships in science and technology. Group III. Crystal and solid state physics. Vol. 7. Crystal structure data of inorganic compounds. Part *c*1. By W. PIES and A. WEISS. Key element N. Substances No. *c*1 to *c*1133. Pp. xxv + 260. Berlin: Springer, 1978. Price (cloth) DM 290·00, US$145.00.

Three-dimensional nets and polyhedra. By A. F. WELLS, Pp. x + 268, Figs. 224, Tables 41, New York: John Wiley, 1977. Price £22·00, $36.00. A review of this book, by Walter Gebert, has been published in the September 1978 issue of *Acta Crystallographica*, Section B, page 2958.

Crystal growth and materials. ECCG1, Zürich, 1976. Edited by E. KALDIS and H. J. SCHEEL. Vol. 2 of the series: **Current topics in materials science.** Edited by E. KALDIS. Pp. xvi + 916. Amsterdam: North Holland, 1977. Price $122.50, Dfl. 300.00. A review of this book, by M. B. Small, has been published in the October 1978 issue of *Journal of Applied Crystallography*, pages 673–674.

Preparation and crystal growth of materials with layered structures. Physics and chemistry of materials with layered structures. Vol. 1. Edited by R. M. A. LIETH. Pp. ix + 280. Dordrecht, Boston: Reidel, 1977. Price Dfl 95·00, US $38.00. A review of this book, by B. G. Silbernagel, has been published in the November 1978 issue of *Acta Crystallographica*, Section B, page 3498.

Crystal Growth 1977. Edited by P. L. PARKER, A. A. CHERNOV, G. W. CULLEN and J. B. MULLEN. Pp. xvi + 662. North Holland, 1977. Price Dfl 350.00, US$152.25. A review of this book, by B. Cockayne, has been published in the December 1978 issue of *Journal of Applied Crystallography*, page 720.