when only a fraction of the bonds are broken (about 10–15%, as is well known). On page 136 it is assumed, according to M. Born, that melting occurs at the temperature when the rigidity modulus, G, equals zero. The loss of elastic stability corresponds to the breaking of the condition of homogeneous stability, which happens at a temperature not reached by experiment since the condition of heterogeneous equilibrium is disturbed at lower temperatures, which corresponds to the equality of the free energies of the two phases: crystal–liquid. It has to be mentioned that thermodynamically incorrect treatments of melting as a homogeneous process can be found in the papers and books of some other authors. It should be said, by the way, that in Table 4.10 incorrect values of the interatomic distances are given for the diamond-type structures (for diamond and silicon the lattice parameters are given with a misprint for the latter values).

In conclusion one may say that Reissland's book is an interestingly planned and useful monograph giving an account of the contemporary state of one of the most important parts of the physics of solids – the physics of phonons. The language of the book is simple and clear. Every chapter has a brief formulation of the basic theory and an account of obtained results and the book is illustrated by a number of well chosen figures. All this facilitates the use of the book. This book will undoubtedly find a wide circle of readers, from youngsters only beginning to study the principles of solid-state physics right up to the specialists working in this field who must take account of the influence of temperature and the thermal motion of atoms on the structure and properties of solids. The study of Reissland's book presupposes a knowledge of the general basics of the physics of solids and of quantum mechanics. The book should be useful not only to theoreticians, but also to experimentalists.

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X-ray diffraction by polymers. By M. KAKUDO and N. KASAI. Pp.xii + 464. Figs. 238, Tables 44. Amsterdam: Elsevier, Tokyo: Kodansha, 1972. Price *f* 125.00 (about U.S $48.10).

In writing this book on X-ray diffraction by polymers the authors' stated purpose was to provide 'an intermediate textbook bridging the gap between primers and specialist works', and on the whole they have been very successful in achieving this. The book is divided into three sections: Fundamental (seven chapters, 148 pages), Experimental (one chapter, 66 pages), and Analytical (six chapters, 216 pages); there is also an appendix, mostly of numerical tables, of 17 pages. The amount of space allocated to experimental techniques is perhaps disproportionately small: much is mentioned, but little is treated in detail. The gaps are partially remedied in the numerous applications to particular substances and particular problems in the analytical section, but this supplementary material on experimental methods is not systematically indexed or cross-referenced.

The fundamental section is thorough, beginning with the properties of X-rays, and proceeding through the theory of scattering by assemblages of atoms of varying degrees of order, to a brief but clear discussion of crystal symmetry and crystal structure. As would be expected, the Hosemann 'paracrystal' gets a good deal of attention. The section ends with a brief chapter summarizing the relationship between structure (including texture) and the X-ray diffraction intensity, and a slightly longer one putting forward models for the structure (texture) of high polymers.

It is perhaps worth while to list the chapters in the long analytical section, in order to give an adequate picture of its scope. They are: Identification of crystals by X-ray diffraction; Analysis of crystallite orientation; Crystal-structure analysis of high polymers; Analysis of the breadth and shape of diffraction patterns; Analysis using the total diffraction intensity distribution curves of high polymers; and Analysis of small-angle X-ray scattering. It is this part of the book that the reviewer found most impressive, with its numerous fully described practical illustrations. There are points about which one could quibble: the 'ASTM file' has been the 'JCPDS file' for many years now, and the Scherrer constant perhaps deserves a fuller treatment; but it is from this section that the beginner in the study of high polymers will begin to get a feeling of what has been achieved and what can be achieved.

The translation, by a London translation service, reads smoothly. The translator's name is not given. Very few misprints were noted, most of them in the six-page subject index. There is no author index.

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Multivariate error analysis. By A. A. CLIFFORD, Pp. ix+112, Figs. 8, Tables 4. London: Applied Science, 1973. Price £4.00.

Crystallography is not the only branch of science in which one becomes involved in determining a number of parameters from a much larger number of observable quantities. The parameters can be determined by least-squares techniques but in order to determine correctly the probable errors one must resort to multivariate analysis, which takes account of the covariance of the parameters.

This book deals with the theory of multivariate analysis in a clear and concise way which does not assume too much initial expertise on the part of the reader. The work is well printed and is in an attractive format with important equations boldly delineated.

The main part of the book occupies 82 pages, the remaining 30 being devoted to bibliography (one page), computer programs in Algol and Fortran and an index (two pages). The small size of the book is in disappointing contrast to its price.

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