related active area is the determination of defects and atomic steps on surfaces, and all of these topics have received considerable attention in this volume.

Many of the contributions, there are sixty five in all, are excellent but often represent work already published, albeit in a slightly different form. Few of the contributions are really reviews but many fall into the category of being a statement of the current position. This volume, then, is for the serious surface scientist and it will have a fairly limited 'time of usefulness'.

P. J. DOBSON

Philips Research Laboratories
Cross Oak Lane
Redhill
Surrey RH1 5HA
England

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Structure and statistics in crystallography. Edited by A. J. C. WILSON. Pp. vii+225. New York: Adenine Press, 1985. Price US $65.00.

This book describes the proceedings of the symposium on Crystallographic Statistics held in Hamburg, West Germany in August 1984 in the course of the Thirteenth International Congress of the International Union of Crystallography. It also includes a few papers presented in the main Congress but which were considered as closely linked with the symposium topic.

The first and last contributions in the book stand out on their own, the first by J. Karle on the statistical basis underpinning direct methods and the last on 'expert systems' of data acquisition. The direct-methods contribution does not contain any new material but it is a splendid review of the theoretical developments which led to direct methods having their present pre-eminence and in which Karle and Hauptman played such a leading role. The 'expert systems' paper by H. J. Milledge and her collaborators presents the principles by which the data-acquisition process by a diffractometer may be optimized by analysing the data during collection.

The remainder, the bulk, of the book divides into two roughly equal parts - the first concerned with intensity statistics and the second with refinement processes. A most interesting paper by Weiss *et al.* deals with the representation of probability density functions by Fourier series, which is much better than previous methods using the central-limit theorem or based on the Edgeworth or Gram–Charlier series. There follow three papers dealing respectively with the effects of heavy atoms, non-crystallographic centres of symmetry and non-crystallographic translational symmetry on the normal or cumulative intensity or $|E|$ distributions. Since many crystal structures contain heavy atoms or a great deal of symmetry to do with the chemistry of molecules rather than the requirements of space groups, it is clear that departures from idealized random distributions of almost-equal atoms must be common. The papers presented here show much success in predicting distributions from known structural features; it is not quite so clear that the inverse problem has been solved.

After a paper by Parthasarathy & Elango on the best way of testing for symmetry elements from intensity statistics the section is rounded off by a contribution from Wilson on fluctuations and errors in intensity distributions. He concludes, regretfully, that there is no obvious easy way of representing distributions modified by random or systematic errors.

The second section, on refinement, starts with a paper by Prince commenting on the precision and accuracy which may be obtained in structure refinement by the Rietveld method. He concludes that while the calculated standard deviations may give a general indication of the precision of the parameters found they are not an accurate assessment of the r.m.s. errors. Clearly this paper was controversial; the following paper by Rollett is a discussion of Prince's paper and he comes to a contrary conclusion.

The next two papers are concerned with the application of information theory to refinement. The first, by Collins, is on the very topical subject of parameter estimation by entropy maximization. This is a good paper to read; firstly it confirms that there is a certain arbitrariness in the entropy function which is maximized and secondly it demystifies a topic which for many crystallographers has taken on the characteristics of a deity - all powerful and incomprehensible. The following paper by Wilkins *et al.* is similarly to be commended especially in providing a practical procedure for incorporating prior knowledge into information-theory procedures.

The three papers which follow, on the modification of weights in least-squares analysis, variance of intensities in the Bond method and the use of maximum likelihood and minimax methods, are useful but not exceptional in any way. However, the final paper in this section, by Prince & Nicholson, on the influence of individual reflections on precision in least-squares refinement, links very nicely with the already-mentioned final paper by Milledge *et al.* Here we are shown how one should concentrate time and effort in measuring just that selection of reflections which most influence the determination of parameters rather than measuring everything indiscriminately with equal effort.

The book is well produced, attractively printed and a useful addition to crystallographic literature. There is something here for the theorist and experimentalist alike and, at least, it should be available on the shelf of the local library.

M. M. WOOLFSON

Department of Physics
University of York
York YO1 5DD
England

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Crystal structure analysis: A primer. 2nd ed. By J. P. GLUSKER and K. N. TRUEBLOOD. Pp. xviii+269. Oxford University Press, 1985. Price hardback £29.00, US $37.50; softback £17.00, US $18.95.

The first edition of this text came out 13 years ago in 1972, and was reviewed then by J. L. Lawrence [*Acta Cryst.* (1972), A**28**, 680], who concluded '... this book can be