detailed description of the determination of a number of rather complex crystal structures. Chapters X, XI and XII of the third part are written by C. Weeks. Together with the exercises introduced by the author in the theoretical part of the monograph, there are practical examples in the final chapters which turn the monograph into a very useful textbook for mastering this new variant of direct methods. The idea of application of cosine seminvariants to crystal-structure determination, which appears to be worked out in a rigorous and systematic manner, brings us nearer to the stage where the calculation of the phases of structure amplitudes from X-ray diffraction experimental data will become a routine procedure. Following the monographs by H. Hauptman and J. Karle, *Solution of the Phase Problem*, New York, 1953; by A. I. Kitaigorodskii, *Theory of Structure Analysis*, Moscow, 1957; and by M. M. Woolfson, *Direct Methods in Crystallography*, Oxford, 1961, the book under review is undoubtedly an important contribution to the development of the theory and application of direct methods of crystal-structure determination.

In conclusion, the reviewer would like to say that it is perhaps regrettable that no references are found to the above mentioned monographs by Kitaigorodskii and Woolfson as well as to the works of I. M. Rumanova [*Dokl. Akad. Nauk SSSR*, (1954), **98**, No. 3, 399], S. V. Borisov, V. P. Golovachev & N. V. Belov [*Kristallografiya*, (1958), **3**, No. 3, 269] and to some other works which are important for understanding the development of direct methods. Because of this, the bibliography at the end of the book appears to be rather impoverished.

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Phase transitions and critical phenomena, Vol. 1. Edited by C. DOMB and M. S. GREEN. Pp. 506, 105 Figs., 4 Tables. London and New York: Academic Press, 1972. Price £ 10·00.

This book is the first of a series of volumes whose aim is 'to present a coherent account of all that is definitely known about phase transitions and critical phenomena and to provide a standard reference for some time to come, particularly for graduate students'. At present two volumes have been published and two more are in preparation. This volume is subtitled 'Exact Results' and comprises a collection of eight specially invited papers.

A brief introductory chapter by C. N. Yang on the historical development of the subject is followed by a chapter by R. B. Griffiths entitled 'Rigorous Results and Theorems'. The idea of the thermodynamic limit is introduced and its existence in the case of the Ising models of the ferromagnet and the lattice gas is proved. The remainder of the chapter surveys a number of topics such as the conditions for the existence or otherwise of phase transitions in one- and two-dimensional lattices and the inequalities relating various critical-point exponents.

Following chapters on Dilute Quantum Systems and C^* Algebra by J. Ginibre and G. G. Emch respectively, the topics of one- and two-dimensional systems are taken up again. The detailed discussion of one-dimensional lattices and their partition functions by C. J. Thompson may seem somewhat out of place when it is realized that phase changes occur in one-dimensional systems only in the exceptional cases of particular long-range interactions. However the susceptibility of one-dimensional models to exact analysis makes them a useful illustration of the statistical-mechanics method. The chapter on two-dimensional Ising models by H.N.V. Temperley includes a description of what is still the most famous exact result in the theory of phase transitions: Onsager's solution to the two-dimensional Ising model. This solution is described in some detail and its mathematical implications are discussed. The final two chapters of the book discuss the transformation of Ising models (I. Syozi) and the analysis of two dimensional 'ice-like' ferroelectric models (E. H. Lieb and F. Y. Wu). This last chapter which occupies nearly one third of the book, describes a number of two-dimensional problems with directed bonds, whose partition functions can be evaluated exactly and whose critical behaviour can thereby be predicted.

This book is not one in which crystallographers should expect to find theories which will explain their experimental results on, for example, structural phase transitions in crystals. It is significant that none of the well known names of the experimental or theoretical workers in the Edinburgh lattice-dynamics group appear in the extensive list of references, even although one third of the book is devoted to a study of (albeit two-dimensional) ferroelectric lattices. This serves to emphasise the dichotomy between those who are looking for a theory which will explain their experimental results and those who are looking for models capable of rigorous theoretical investigation; it is to be hoped that future volumes in the series will attempt to bridge this gap. In the meantime the mathematically well equipped graduate student or research worker who wishes to study a rigorous treatment of the theory of phase changes could well find this book useful.

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Practical methods in electron microscopy. Vol. 1. Edited by AUDREY M. GLAUERT. Pp. viii + 444, 211 Figs., 8 Tables. Amsterdam: North Holland, 1972. Price *f* 110.00 (*ca.* US $34.50).

This book, as its title implies, is essentially directed at research workers who want to know exactly how the various operations in electron microscopy are carried out. It is written by people who have intimate knowledge of the subject, and, in addition to full descriptions of experimental detail, lists of suppliers of necessary items – ranging from electron microscopes themselves to storage boxes for specimens – are given at the end of each section.

The format of the book is rather odd. It is three books in one, and the first part has its own appendices and index. The second part has two sections, each with its own chapter numbering, but with appendices at the end of the first section and index at the end. Thus the book has three Chapter 1's, for example. It is all very confusing and makes cross-referencing very difficult.

The subjects treated are specimen preparation, inter-