application to thermal convection and curved flows. The final sections consist of statistical physical aspects and discussion contributions.

It is to be hoped that this volume will provide a forceful stimulus for further research in the general field of the stability of fluids. This is necessary not only to provide further understanding of fluid flow problems in general, but also for technological applications.

The book is well produced and will be a necessity in every library catering for a serious study of the modern aspects of transport process in fluids and their applications.

The latest volume by Professor Hill on matter and equilibrium is an introductory text aimed at a wide audience. The first six chapters which make up the smaller half of the book deal with states of matter, ideal gases, intermolecular forces, imperfect gases and Van der Waals equation, solids and liquids. (One even meets the equation

$$E = \frac{3NkT}{2} + \frac{2\pi N^2}{V}\int U(r)g(r)r^2\mathrm{d}r.)$$

The chapters on thermodynamics cover the first and second laws, binary liquid solutions and chemical equilibrium.

The text is well produced with liberal spacing for equations, diagrams and tables and the material presented in such a manner that the average first year university student should finish the book with sufficient interest and understanding generated in the topics discussed to tackle more advanced texts from a firm footing.

E. MCLAUGHLIN

WYCKOFF ON CRYSTALS

Crystal Structures

Vol. 3. By Ralph W. G. Wyckoff. Second edition. Pp. viii + 981. (New York and London: Interscience Publishers, a Division of John Wiley and Sons, Inc., 1965.) 210*s*.

THIS is one of the essential secondary sources in the well constructed chain of data books on crystallography. Dr. Wyckoff must have been providing this admirable service for the past 45 years, for his first compilation of this kind appeared in 1924. The aim is simply the description of every crystal structure which has been reliably determined. Unit cell dimensions, symmetry data, atomic parameters, a projection of the structure and a drawing showing the packing of spherical space-filling atoms are provided for each structure. The accuracy of a structure is indicated only by the number of figures quoted. A full bibliography eliminates the reference back to earlier editions of Wyckoff. In this second edition (really the fourth) the loose-leaf presentation of the previous edition, so infuriating to the occasional user, has been abandoned in favour of the conventional book format. The great success of the bound book as a social invention has clearly inhibited the development of possible competitors.

Every branch of science has the problem of coping with the information explosion. In crystallography the mass of data to be handled can probably be supported for several doubling periods yet. The difficulty is to present it in assimilable form, since the human brain can take in information (and make sense of it) far faster in forms other than the tables of numbers which are the diet preferred by computers. The problem resides in the computer–brain interface and is the matching of the computer, which has a very fast serial mode of operation, to the human sense organs and brain which, although slow, operate very effectively in a parallel mode.

Wyckoff is perhaps the last of the big pre-computer compendia. His drawings of crystal structures as sphere packings can now be done automatically by computer. It must be said that the two-dimensional drawings are not really very informative and do not compete with models. Stereoscopic pairs produced by computer would be welcome. Ball and spoke models, suitable as they are for human beings, are bulky, expensive, difficult to reproduce and, above all, unsuitable for the computer which, with perhaps the hologram, is becoming our repository of information.

We want to be able to ask more and more sophisticated questions about our stock of solved structures. The great inventions of crystallography—the Patterson function and the Fourier transform—were great because they admirably matched complex numerical data to the human brain. We need more inventions of this type which will enable us to organize more and more data about structures, to appreciate more complex structures and to show up deeper regularities in crystal structure. Until these are produced Wyckoff will continue to be indispensable.

A. L. MACKAY

ELECTRON MICROSCOPES

Electron Microscopy of Thin Crystals

By P. B. Hirsch, A. Howie, R. B. Nicholson, D. W. Pashley and M. J. Whelan. Pp. ix + 549. (London: Butterworth and Co. (Publishers), Ltd., 1965.) 150*s*.

A SUMMER school of twenty lectures on electron microscopy was held in July 1963 in Cambridge. This book is substantially that course but expanded. The object was advanced instruction in the electron microscopy of crystalline specimens and the content is restricted to the aspects originally treated in the lecture course. There are eighteen chapters. The first three deal with elementary instrument theory, specimen preparation and instrumental attachments. Illustrations are excellent and there is an extensive bibliography; there is much practical "know how" in these chapters. The next three chapters deal comprehensively and compactly with the theory of electron-diffraction patterns and their interpretation. The mathematical treatment is condensed but sufficient. Then follow treatments of image contrasts, including Moiré patterns, examples of varieties of dislocations (with admirable pictures), and rather more formidable sections on wave-mechanical formulation and on theories of faulted crystals, in which stacking faults justly occupy a prominent place. It is naturally to be expected that the main attention would be devoted to various kinds of dislocations, and indeed this is the case. Chapter 12 extends the earlier mathematical treatments to include matrix formulation of electron diffraction.

From that point onwards the nature of the content changes abruptly to a description of practical techniques, including dark field electron microscopy, contrast from two-phase materials (again well illustrated), periodic structures with their Moiré patterns, studies of magnetic domains, foil thickness measurement (non-optical methods), particle size determination and so on. The last chapter, which might have been an appendix, deals with inelastic scattering and Kikuchi bands. The editing seems slightly mixed up here, so that some items are out of position.

The book ends with a curious collection of appendixes. A close-packed extensive table covering 19 pages is devoted to a list—it is nothing more—of mainly electrolytic polishing techniques, and no fewer than 272 references are given. There is no really specialized know-how in this list. Cleavage, evaporation and deposition techniques for producing some specimens are also listed, but again no really essential details are given in any of these tables. Atomic scattering amplitudes for electrons for atoms from $Z = 1$ to $Z = 104$ are listed. Several pages are devoted to worked examples of indexed diffraction patterns and to typical problems. These will help the younger investigator.