Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (M. M. Woolfson, Physics Department, University of York, Heslington, York YO1 5DD, England). As far as practicable books will be reviewed in a country different from that of publication.

Optique – formation et traitement des images. By M. FRANÇON. Pp. xiii + 159. Paris: Masson & Cie. 1972. Price 58F.

It is quite remarkable how much information is packed into this small volume and one might even consider recommending it as a set of revision notes for second or third year students in the U.K. in spite of it being in French. It would also be an admirable book for a researcher faced with the need to use some aspect of modern optics but not having met it before. This is optics in a modern context based on Fourier transformation and transfer functions and with its relevance to information theory strongly underlined.

The first four chapters are concerned with interference and diffraction from the 'Franges de Young' to 'Diffraction par un réseau à deux dimensions'. Chapter five is devoted to partial coherence and in ten pages gives a masterly summary of the essentials. Chapter six deals with the special problems of interference in polarized light expounded in a very clear and concise way.

The second part of the book is devoted to image formation and includes chapters on image filtering, holography, interferometry, autocorrelation functions and finally a brief glimpse of some of the new optical phenomena which can be observed using laser sources including non-linear optics.

The diagrams are clear but there are no photographs. Nevertheless I found this a most attractive book and it is one of the very few in existence which manage to deal with optics in a modern and realistic way and yet remain readable and relatively free from elaborate mathematics. A very useful appendix provides a summary of essential Fourier transform theory. I strongly echo the hope of the author that the reader 'en fermant ce livre, poursuivra plus avant l'étude de cette belle science qu'est l'optique'.

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Crystal structure analysis: a primer. By JENNY PICKWORTH GLUSKER and KENNETH N. TRUEBLOOD. Pp. xv + 192. Oxford Univ. Press, 1972. Price £4.75, (Paper cover £2.10).

This book is designed to serve as an introduction to the principles of structure analysis by X-ray diffraction from single crystals and is intended for undergraduates and for graduate students who do not intend to specialize in crystallography but who wish to understand the concepts on which the method is based.

The analogy between light microscopy and X-ray diffraction is clearly described at the beginning of the book and is referred to regularly. The main part of the text is divided into three parts. Part I deals with crystals, diffraction from crystals and the experimental techniques and apparatus used. Part II is concerned with the examination of the diffraction pattern, the phase problem, space groups and symmetry and the derivation of a trial structure by Patterson synthesis and direct methods. Part III deals with methods of structure refinement and with structural information. The last quarter of the book is given over to appendices dealing with the more mathematical aspects of the subject, an excellent bibliography and a glossary of crystallographic terms.

In a book of less than two hundred pages on a subject which has so many facets omissions are inevitable but it is to be regretted that so little mention is made of the limitations of the method, scattering from perfect and mosaic crystals, the kinematic and dynamic theories, extinction and series termination effects.

However, this book can be highly recommended as an undergraduate text book and will be of interest to any scientist who desires an introduction to structure determination. The writing, printing and diagrams are first class.

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Theory of thermal neutron scattering. By W. MARSHALL and S. W. LOVESAY. Pp. xxiii + 599. Oxford Univ. Press, 1971. Price £12·00.

The appearance of this book reminds this reviewer of a quip made some years ago by the late, esteemed crystallographer Isidor Fankuchen upon the appearance of a masterful, highly mathematical treatise on the theory of X-ray scattering. Someone had commented that this was the best thing written in English and Fan's retort was that he had trouble recognizing it to be in English! Well, this new volume by W. Marshall and S. W. Lovesay, both distinguished and qualified theorists who have been close to neutron-scattering developments over the years, fits somewhat the same mould. Fortunately, mathematical development is international in character and the interspersed language is not all-important – seriously, the English here is very good as befits the British authors and publisher. Of more importance, the theoretical treatment of many neutron-scattering topics is collected here in the finest form to date and the authors are to be commended for this community service. The reading is very heavy more often than not and this volume should see infrequent withdrawal from the non-specialist's book shelf. To the specialist, however, working directly in the field, be it experimental search or theoretical interpretation, this treatise should serve as a standard reference source from which professional morsels can be plucked from time to time.