The range of topics coming within the scope of 'magnetism' as a subject is now very wide, and this is fully represented in this book. Readers will, therefore, make many different selections of the most interesting or most useful paper. In spite of the much-increased availability of Russian literature these days, many readers will regard the review of "Recent Work by Soviet Physicists on the Theory of Magnetism" by Vonsovskii as particularly valuable, not least because of the 188 references given. Following a similar paper by the same author at Kyoto, this would appear to be becoming a regular feature of these conferences. The question arises whether similar reviews from elsewhere might not also be useful.

Those of us who saw the remarkable film of spin-waves in chromium tribromide shown by Dillon, Walker and Remeika will be a little disappointed by the presentation of the photographs in their paper, but one must accept the inevitable limitations.

I feel compelled, however, to criticize the presentation of the book. The enormous size (30·7 × 22·5 × 6·0 cm) and weight (2·75 kg) make it most inconvenient to read. This is a book to be studied, not referred to as is a dictionary. Dimensions and weight are, therefore, important. If each successive paper had been begun on the same page as its predecessor, and if two whole pages had not been used for each chapter heading, the bulk of the book would have been much reduced. A count of the first 100 pages reveals the equivalent of more than 20 blank pages, indicating a possible reduction of 20 per cent in size and weight. This might also have affected the price, which is nearly 50 per cent higher than that of the Kyoto proceedings, in spite of the fact that the latter also contained 400 pages on the simultaneous crystallography conference. Finally, was a cloth binding (not paper) essential, and was one volume (not three) inevitable ?

Ziman[1] has cast doubt on the value of conference reports, particularly beyond the first year or two after publication. This report, however, justifies itself as well as may be. Because of the wide range of the papers given, it provides an introduction to the latest activity in many fields, and to the immediately preceding papers leading up to it. Workers compelled by the trends of their own research to cross for a time the boundary into other fields should thus find the book providing a valuable short cut to the most recent work.

J. H. DAVIS

[1] Ziman, J. M., *Bull. Inst. Phys.*, **13**, No. 7, 196 (1962).

OPTICAL ANALOGUE METHODS IN DIFFRACTION STUDIES

Optical Transforms

Their Preparation and Application to X-ray Diffraction Problems. By Dr. C. A. Taylor and Prof. H. Lipson. Pp. x + 182 + 54 plates. (London: G. Bell and Sons, Ltd., 1964.) 45*s*. net.

OPTICAL transform is the name given to the pattern of diffracted light given by an object such as a group of diffracting centres, a name based on the fact that the optical diffraction pattern corresponds to the Fourier transform calculated mathematically. In short, *Optical Transforms* is about the use of optical diffraction methods in place of mathematical methods for demonstrating the basic principles of diffraction and for solving diffraction problems. The experience of the authors has been mainly in crystal structure determination from X-ray diffraction patterns, but optical analogue methods are quite generally valid for all diffraction problems.

The book starts with a historical survey of the development of these methods, from their introduction by W. L. Bragg in 1939, through their application to the solution of fully ordered crystal structures (notably sodium benzyl penicillin), to recent applications to disordered or distorted structures. There follow chapters on basic concepts and the mathematical treatment of diffraction, on the optical apparatus necessary for observing and recording diffraction patterns (culminating in the large diffractometers used by the authors in Manchester), and on the preparation of 'masks'—sets of holes in opaque screens, representing atomic arrangements.

In the main part of the book the characteristics of optical transforms and their use in interpreting the X-ray diffraction patterns of crystals are considered in detail. The exposition here (and, indeed, throughout the book) is admirably clear, and all the points made are lavishly illustrated by many beautifully reproduced diffraction patterns. Authors and publisher deserve the highest praise for putting all this beautiful experimental material so clearly before the reader.

The educational value of this section of the book can hardly be exaggerated. By studying the examples and contemplating the diffraction patterns, the reader acquires a valuable appreciation of the reciprocal relation between the characteristics of an arrangement or pattern and those of its diffraction pattern; one grows, so to speak, a Fourier eye, and acquires some facility in the art of mentally turning things inside out—a facility which can scarcely fail to play a useful part in solving the practical problems of interpretation which confront the X-ray crystallographer. The authors justly say that the optical transform approach to diffraction emphasizes the basic physics, and observe that "this is particularly important in X-ray applications where there has been a tendency to over-emphasize the mathematical aspects". The choice of methods of approach to problems is to some extent a matter of personal taste; certainly, to those who prefer a physical rather than a mathematical approach it is refreshing to appreciate, for example, the broad principles of intensity statistics in terms of the characteristics of diffraction patterns rather than as the outcome of equations, or to see in a diffraction pattern a visual demonstration of the presence and orientation of a benzene ring or a chain of atoms.

In the latter part of the book the lessons learnt from optical analogues are applied to the solution of crystal structures from X-ray diffraction patterns; there is much useful information on practical procedures together with some detailed examples of structure determination. One of the more striking fruits of this approach is the recognition of two distinct features, such as a ring and a chain, in the same molecule, since the two features stamp their hall-marks as if independently on the diffraction pattern. The authors might have added even more striking examples: the transform concept has played an important part in revealing the helical conformation of chain polymers, notably synthetic hydrocarbons and nucleic acids—though optical analogues have been little used.

Crystallographers will ask whether optical analogue methods can play a useful part in their work, apart from the undoubted educational value. One of the reasons for the introduction of these methods—to relieve the crystallographer of the heavy burden of computation—is (for fully ordered structures) no longer operative in this age of electronic computers; and for solving the initial structure-puzzle the limitations of the methods tend to restrict their usefulness to molecules with marked regularities; nevertheless, wherever trial and error methods have to be used, the testing and above all the rational modification of trial models can be done rapidly and effectively by optical analogue methods. This book leaves one with the impression that the optical methods may be of most value in the study of distorted or partly disordered structures such as certain alloys and semi-crystalline polymers, where mathematical treatment is daunting even in the computer age. But all crystallographers, and indeed all diffractionists, whether or not they are likely to use optical analogue methods themselves, are strongly advised to read this book; they will get much pleasure and profit from it.

C. W. BUNN