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, England). As far as practicable books will be reviewed in a country different from that of publication.

Graphic prints and drawings of M. C. Escher: set of 35 35 mm colour slides. Hilversum: Polygoon. Price Dfl. 20, $ 5.50, £2·7*s*.

Many crystallographers will be familiar with the fascinating work of the Dutch artist M. C. Escher. One of Escher's preoccupations is the filling of two-dimensional space with objects that can be recognized as, or associated with, living creatures and many of his drawings are truly periodic. It is not surprising that X-ray crystallographers are interested in Escher's work when they are concerned with the ways in which nature solves the same problem of packing identical objects in periodic patterns. Escher's drawings are sufficiently complicated to illustrate most of the rules of plane group symmetry without presenting too many difficulties for the beginner. They are certainly superior to patterns of little circles, thinly disguised as atoms or molecules, which appear on the blackboards of crystallography classes and the reviewer has found Escher's drawing an admirable aid to the teaching of symmetry.

Out of the 35 slides in the set under review, 11 are of periodic patterns nearly all of which exhibit colour symmetry. The remainder form a good cross-section of Escher's work and include reproductions of such famous lithographs as 'Belvedere' and 'Waterfall' which depict impossible buildings and play tricks on our concept of the three-dimensional world. Also present are pictures which show a transition from a flat two-dimensional to a spatial three-dimensional world and others that use perspective in the cunning fashion so typical of Escher.

It is easy to think of works that one would like to see included in this set of slides, but very difficult to decide which of the reproductions already present they should replace. The quality of reproduction is satisfactory and if one can judge from the success of an evening showing the slides at a Department of Physics get-together at York, they are well worth buying.

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Hydrogen bonding in solids. By WALTER C. HAMILTON and JAMES A. IBERS. Pp. xv + 284. New York: Benjamin, 1968. Price $ 13.95.

Every year it becomes more difficult to write a good scientific book. The crazy tempo of the accumulation of experimental data, the continuous birth of new investigational methods, the rapid change in theoretical points of view and – perhaps the main thing – the unavoidable growth of several kinds of hybrid scientific topics – all this makes the problem of the successful selection of material and the scope and logical sequence of its exposition a matter of high scientific skill.

Surely there are subjects which do not require the author to make a choice between a lot of possible sections in a multidimensional space of science. This is so in the case of books about crystal symmetry, or the dynamics of material points, but such is not the case for a book dealing with hydrogen bonds.

Why hydrogen bonding in solids? Are the bonds in solids different in principle from bonds in the melt or in solution? Surely not. But the authors ingeniously give their book a secondary title – 'Methods of Molecular Structure Determination'. It is written with small letters but this is a mere formality since it is not customary to give a book such a long title. If we want to understand the principle of construction of the book, however, we must read the two titles together.

Our previous question – why in solids – was quite legitimate if one bears in mind the *nature* of bonding, but we agree with the authors that the methods of investigation of hydrogen bonding in solids are multifarious and there is some specificity which deserves attention and knowledge.

The second title is surely very important because the methods topic plays the first fiddle in the book. The title reflecting most truly the book content is the following: 'The methods of determining the structure of solids which are appropriate to the investigation of hydrogen bonds and exposition of some results of these investigations'.

My opinion that the authors are more interested in methods than in results is based on the fact that there are very few pages in the book dedicated to the crystallography of hydrogen bonding. The results are given as an aggregate of abstracts. We find practically no attempt to give any classifications of bonds, based on their very interesting geometry. (The brief and naive discussion on pages 18–21 does not count.) Physical, not chemical, classification of the crystallographic data is badly needed, but unfortunately is lacking in the book. The anisotropy of physical properties caused by hydrogen bonding is also outside the scope of the book. All things which are done with love and with enjoyment are done well; therefore I find the first 160 pages of the book much more interesting than the last 100 pages, where the description of hydrogen bonds in organic substances is given.

I think that the first chapters, *i.e.* Chap. 2, 'Diffraction Methods'; Chap. 3, 'Spectroscopic and Diffraction Studies'; Chap. 4, 'Rotation Motion in Solids and Neutron Spectroscopy', make the Hamilton–Ibers book a very valuable contribution to the literature of physical methods of investigation of the structure of matter. These chapters are written with a perfect and deep understanding of a very important thing – the interrelation of different methods. The whale cannot be caught with a fishing rod and nobody goes trout fishing with a harpoon. We have very few books, if any, discussing the possibilities of different structure methods in the same book and with the same high competence.

Therefore the book is interesting not only to the scientist interested in hydrogen bonding but extremely useful to every member of the crystallographic family.