International Union of Crystallography

Structure Reports

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International Union of Crystallography

Prices of publications to customers in the Netherlands

Owing to the introduction of a turnover tax in the Netherlands, it will be necessary to increase the prices of some Union publications to customers in the Netherlands.

The increases will apply to the publications handled by A. Oosthoek's Uitgevers Mij N.V. and are: *Structure Reports* Dfl. 5.00 per volume (Dfl. 2.50 for personal subscribers), *Fifty Years of X-ray Diffraction* Dfl. 2.00, and *Symmetry Aspects of M. C. Escher's Periodic Drawings* Dfl. 1.00. The prices of the small incidental publications remain unaltered.

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International Union of Crystallography

Structure Reports

From time to time the Commission on *Structure Reports* requires new members to act as Co-editors for the production of volumes of *Structure Reports*, and also people who are willing to assist with the writing of critical reports for the Co-editors. Anybody who has an interest in assisting with this work of critical assessment and reporting of structural data, and maintaining the Union's bank of structural data in *Structure Reports* is invited to communicate with the General Editor: W. B. Pearson, Divison of Pure Physics, National Research Council, Ottawa 7, Canada.

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International Union of Crystallography

International Tables for X-ray Crystallography

Volume III (*Physical and Chemical Tables*) of *International Tables for X-ray Crystallography* has now been reprinted and is again available from the publishers, The Kynoch Press, Witton, Birmingham 6, England. The price is £6.10*s*. per copy. A preferential price of £3.15*s*. is available for *bona fide* crystallographers, who must give an undertaking when purchasing that the volume is for their *personal use only*. The prices for Volume I (*Symmetry Groups*) and Volume II (*Mathematical Tables*) are the same.

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.

Amphiboles (crystal chemistry, phase relations and occurrence). By W. G. ERNST. Pp. x + 125. New York: Springer-Verlag, 1968. Price DM 27,20. US $ 6.80.

This book is the first to be published in a series of monographs entitled *Minerals, Rocks and Inorganic Materials*, and it is one of the sub-series *Experimental Mineralogy*. These volumes are intended to provide a medium for the publication of extensive reviews of selected topics, of a kind which are not catered for by the standard journals (and not normally by review journals), or by textbooks or advanced works of reference. The sub-series is intended to give for particular mineral groups a critical presentation of the results and implications of phase equilibrium studies.

The amphibole minerals have a basically simple chain-like crystal structure, determined by Warren in 1929. Two varieties, crocidolite and amosite, are important industrially since they are the raw materials of many asbestos products, and many other amphiboles are of widespread geological occurrence in igneous and metamorphic rocks. Although the structure is simple it incorporates sites for large, medium and small sized atoms of varying valencies so that there is considerable chemical complexity. This perhaps explains the relative lack of detailed study on the crystal chem-

istry and phase equilibria of amphiboles hitherto, but improved techniques have led to a great increase in this kind of work in recent years.

The present volume deals in separate chapters with experimentally and theoretically derived phase relationships of the main amphibole sub-groups, and puts these in an appropriate setting by discussing in earlier chapters the crystal structures and chemical variability of amphiboles, and also by giving, for each sub-group, an account of the natural modes of occurrence of the minerals, the kinds of rock in which they occur, and the common mineral associations.

The crystal structures of the amphibole minerals are very effectively summarized, but perhaps undue weight is given to conclusions from single-projection structure determinations as compared with more recently completed full three-dimensional solutions. Unfortunately, a number of the latter are known to have been completed within the last few years but have so far only been published as abstracts of conference proceedings. Discussion of the ordering of cations (Fe, Mg, Al) in nearly equivalent sites is not as clear or as detailed as it might be. It is given in terms of ionic sizes only, and important crystal field effects are not mentioned at all.

The treatment of phase equilibrium relationships is extremely helpful to the reader. A good deal of the experimental work on amphiboles has in fact been done by Ernst and his co-workers within the last decade. Ernst discusses the way in which experimental results bear relation to natural occurrences of amphiboles in terms of temperature, pressure, oxidation potential, ranges of solid solution, and abundances of elements in different geological environments. He is perhaps unduly gloomy therefore in stating in the last paragraph of the book that 'because of the complex and subtle relationships between bulk compositions of the host rocks and amphibole compositions, very little can be said regarding amphibole parageneses in igneous and metamorphic rocks, in spite of painstaking studies by numerous investigators'.

This book and others in the series will undoubtedly be useful, as intended, to students and research workers who are interested in rocks and minerals, but the intention stated in the foreword '... to publish, at reasonable prices...', must be said to have been forgotten, ignored or revised. It is not uncommon for reviewers to feel that prices of books are high, but this one is unusually so. The price is not explained by an exceptionally lavish production; many of the figures, for example, are direct copies of varying quality from papers in journals.

A feature of this volume, which may not be typical of the series, is that in spite of a long reference list (comprehensive until early 1967), a rather high proportion of its content is available in a relatively small number of recently published papers.

J. ZUSSMAN

Department of Geology and Mineralogy
University of Manchester
Manchester 13,
England

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.