atoms in neighboring Bi layers is 3·68 Å, which is somewhat larger than the interatomic separation of Bi atoms in adjacent layers of metallic Bi (3·47 Å) and gives rise to a marked cleavage plane normal to the *c* axis.

The significance of the structure of InBi is its contrast to that generally found in 1:1 compounds formed by elements in which the average number of valence electrons per atom is four. In the case of the *B* sub-group elements of groups 3 and 5 of the periodic table, to which In and Bi belong, such compounds crystallize with the zinc-blende structure with tetrahedrally coordinated atoms and interatomic distances corresponding to the sum of the tetrahedral covalent radii of the atoms involved. The only exceptions in this series are the compounds involving the heavier and more metallic elements, namely TlSb and TlBi, in which the atoms are in the CsCl arrangement and the interatomic separations are equivalent to the sum of the metallic radii for eightfold coordination (Wyckoff, 1948). InBi appears to be intermediate between these two structural types as it possesses fourfold coordination and its interatomic distance, 3·13 Å, corresponds to the sum of the metallic radii of In and Bi with four nearest neighbours (1·47 and 1·60 Å respectively). This observed separation is appreciably greater than the value expected (2·92 Å) for a covalent bond; or for an ionic structure of the type $In^{3+}Bi^{3-}$ in which the radii would be 0·88 and 1·98 Å for the cation and anion respectively (Wyckoff, 1948). InBi belongs to the B-10 structural type (*Strukturbericht*), which is characterised by a bimolecular tetragonal unit cell developed from the space group *P*4/*nmm* and with atoms at the positions already quoted. A compound of this type can be described as a distorted CsCl arrangement when the axial ratio *c*/*a* approaches $1/\sqrt{2}$, (0·707), and the unknown coordinate, *z*, approximates 0·5 (*Strukturbericht*). However, the distortion in the case of InBi, due to an axial ratio of 0·955, is so great that fourfold coordination results and only a formal resemblance exists between InBi and the distorted CsCl arrangement which is possible in *B*–10 structural types.

References

Strukturbericht, **1**, 89.

Wyckoff, R. W. G. (1948). *Crystal Structures*, vol. 1, chap. 3. New York: Interscience Publishers.

Notes and News

Announcements and other items of crystallographic interest will be published under this heading at the discretion of the Editorial Board. Copy should be sent direct to the British Co-editor (R. C. Evans, Crystallographic Laboratory, Cavendish Laboratory, Cambridge, England).

International Union of Crystallography

With the approval of the Executive Committee, the Commission on Crystallographic Data has co-opted Dr Olga Kennard (U.K.) and the Commission on Crystallographic Apparatus has co-opted Dr M. M. Umanskij (U.S.S.R.).

Symposium on Crystallography in Santiago, Chile

A Symposium on Crystallography, organized by the Chilean Committee of Crystallography, was held at Santiago, Chile, from 7 to 9 June 1956. It was attended by members of three Chilean Universities who are working in this field.

Dr Sven Furberg, who is at present at Montevideo organizing a Crystallographic Laboratory on a UNESCO Technical Assistance Mission, attended this Symposium as the guest of honour.

A report on the Symposium of the International Union of Crystallography held in Madrid last April, submitted by Mr Enrique Grünbaum, was read during the sessions.

Papers by Jorge Muñoz-Cristi, George Mueller, Sven Furberg, Arnold Keller, Carlos Rivera, Nahum Joel and Isabel Garaycochea on subjects including mineralogy, crystal structure, X-ray diffraction, optical crystallography and crystallization problems were presented to this Symposium.

Book Reviews

Works intended for notice in this column should be sent direct to the Editor (P. P. Ewald, Polytechnic Institute of Brooklyn, 99 Livingston Street, Brooklyn 2, N.Y., U.S.A.). As far as practicable books will be reviewed in a country different from that of publication.

Microscopic Petrography. By E. W. Heinrich. Pp. xiv+296 with 131 photomicrographs, 21 other figures and 9 tables. New York, Toronto, London: McGraw-Hill. 1956. Price $6·50; 49*s*.

This book is designed to serve as a text for the systematic study of rocks under the microscope. It is intended for 'initial to intermediate students' (author's preface) but ranges over a wider field than many teachers would attempt at this level. The knowledge of mineralogy assumed in the reader is greater than would usually be possessed by second-year university students.

The opening chapter, 'Methods of Microscopic Study', is an up-to-date account of techniques for the preparation of thin sections, for the staining of certain selected minerals and for micrometric analysis, with brief mention of other methods. The remainder of the book divides into three sections, one on igneous rocks (84 pages), a second on sedimentary rocks (71 pages), and the third on metamorphic rocks (103 pages). The comprehensive account of igneous rocks is based on a simple mineralogical classification and each class is described under four sub-headings: definition, mineralogy, textures and microstructures, and occurrence. It is under the second of these that the treatment in this book shows most advances over older textbooks on petrography. An attempt to describe sedimentary rocks under the same subheadings is less successful and inevitably breaks down in the descriptions of the clays. A distinctive feature of the sedimentary section is a welcome account of the petrography of the evaporites, illustrated by line drawings based on those of F. H. Stewart. The classification adopted for the metamorphic rocks breaks away from the conventional and by many will be regarded as unsatisfactory in its omission of reference to grade or initial nature of the rocks. The book is mercifully free from too many varietal names, though the principles of selection that have led to the retention of 'unakite' but the rejection of 'enderbite' are not obvious. The photomicrographs give a clear idea of the actual appearance of rocks under the microscope, but, as is widely recognized, are less suited to the illustration of textural detail than good line drawings can be. No references to original papers are given, the short bibliography referring to various books that will enable the reader to extend his enquiries into the field of petrogenesis.

The crystallographer seeking general descriptions of the natural occurrences of minerals in rocks will have difficulty with this book—it is much more a volume to be read by geologists or even specialist petrologists.

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Landolt–Börnstein, Zahlenwerte und Funktionen. Band 1: Atom- und Molekularphysik; Teil 4: Kristalle. Compiled by W. Biltz†, W. Döring, Th. Ernst, A. Faessler, W. Fischer, A. M. Hellwege, E. Hertel†, S. Koritnig, H. Krüger, G. Leibfried, U. Meyer-Berkhout, K. Molière, H. Pick, W. Schröck-Vietor, H. Seidel, F. Stöckmann, R. Suhrmann; edited by K. H. Hellwege. Pp. xi + 1007 with 930 figs. Berlin, Göttingen, Heidelberg: Springer. 1954. Price DM. 318.

To collect all the known numerical facts about crystals within the covers of a single volume might seem a well-nigh impossible task. Such a book would have to include the greater part of the *International Tables*, nearly the whole of the *Strukturbericht* and *Structure Reports*, together with an almost equally great volume of material relating to the absorption and re-emission of X-ray, ultra-violet, visible, infra-red and micro-wave radiation by crystals. This stupendous task has in fact been accomplished in the present volume of *Landolt–Börnstein*, with a completeness, accuracy and degree of detail that is altogether surprising.

The broad aim of the work is to include those facts of crystal physics which are susceptible to treatment by the methods of atomic physics and of which a fairly complete picture can be given. This includes all detailed X-ray structural studies; it also includes spectroscopy of crystals in general; but subjects like crystal phosphorescence and semi-conductors are not included. Just what has been accomplished in this big volume of over 1000 large and closely printed pages can perhaps best be made clear by giving a brief resumé of the contents.

The first section (§ 1501, 14 pp.) presents an admirable and compact summary of the crystal classes, translation groups and space groups, with an enumeration of their symmetry elements. Both the Schoenflies and shortened Hermann–Mauguin symbols are used, with all the transformations for different orientations of the reference axes. One excellent and most useful reference feature is that the slightly different nomenclatures used in the 1935 and 1952 *International Tables* are set out side by side in adjacent columns.

The next section (§ 1502), occupying 504 pages, or almost exactly half of the volume, is devoted to lattice types, structure and dimensions of crystals. The inorganic sub-section, by Th. Ernst, gives first a fully illustrated description of all the structure types of the Ewald–Hermann *Strukturbericht*, and this is followed by a table giving the structure type, space group and unit-cell dimensions of the elements and some 4239 inorganic compounds and alloys. This is an invaluable collection of material, conveniently and systematically arranged. A list of mineral names and 3056 literature references, to the end of 1951, complete this part. The organic sub-section, by E. Hertel, is even more detailed. It is well known that these compounds cannot be usefully classified into a small number of structure types, and the chemical molecule itself is generally the unit of structure about which information is sought. A different kind of arrangement is therefore required, and the one used meets the need well. All the compounds for which unit-cell data are known (to mid 1953) are first listed in an extensive 'review' table. This gives first the molecular formula, according to which the compounds are arranged (C–H, C–H–Halogen, C–H–O, etc.), followed by the name, with any necessary phase data, the full structural formula, the space group, unit-cell dimensions and contents, a cross reference to the following illustrated table of organic structures, and the literature references. This comprehensive table contains data for over 1000 organic structures. In the illustrated table which follows there are 219 entries and these include most of the important structure determinations up to the end of 1952. In this section the entries are arranged according to symmetry and the number of molecules per unit cell, and so to find a given substance it is of course necessary to get its reference number from the previous chemically classified list. This beautifully illustrated table is undoubtedly a very major contribution to the literature of the subject. The diagrams are all specially drawn to a uniform style, and although they are projections they do succeed in portraying the details of the structure in a very clear and concise manner. In addition, coordinates are given in full, together with some of the important interatomic