

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.

The prodomus of Nicolaus Steno's dissertation concerning a solid body. Contributions to the history of geology. Volume 4. Edited by GEORGE W. WHITE. Pp. vii + 115. New York: Hafner, 1968. Price \$ 12.50.

This edition of a geological classic first published in 1669 will appeal to crystallographers with a historical bent primarily for its discussion on the shapes of crystals. The author had noticed that although crystals of a particular material (*e.g.* quartz or haematite) came in a great variety of shapes and sizes, the same interfacial angles recurred in every specimen. He went on to discuss the growth of crystals in a fluid medium, but for him, this was only a special case illustrating the main problem of the book: how are solids of all kinds formed in nature?

The answer given was that 'if a solid body has been produced according to the laws of nature, it has been produced from a fluid . . . either immediately from an external fluid, or through one or more mediating internal fluids'. Internal fluids accounted for the growth of animals and plants; sedimentation, incrustation or crystallization from external fluids explained the formation of rocks and minerals. Parallels between animal or plant growth and the formation of minerals can be found in most studies of geology made in this period. Fossils might be taken as evidence that rocks were of a quasi-organic nature, but Nicolaus Steno, the author of this book, had found fossils with exactly the same form as living creatures. He was thus among the first to recognize that fossils were the remains of dead animals.

For Steno, then, the parallels between biology and geology were of a more subtle kind, based on his notion of the formation of solids from liquids. In this he probably owed something to a theory of mineral-bearing fluids which originated with Agricola in 1546, as well as to the contemporary Cartesian idea of an 'attenuated fluid pervading all things' which he mentioned. But the reader is offered little guidance on these matters by the editors of the present volume. John Garrett Winter, the translator of Steno's Latin, has provided a competent biography of the author, but little in the way of historical background, while William H. Hobbs, in a foreword, is content to see the book as a modern text-book before its time. But in fairness, it should be said that this material was written for an earlier edition of the work, in 1916. The editor of this 1968 reprint, George W. White, has seen fit to provide only a two-page outline of more recent historical researches. The value of the new edition would have been greatly enhanced if a new introduction had been provided, relating Steno's ideas more clearly to those of his predecessors and contemporaries, and giving proper documentation for his influence on the later development of geology and crystallography.

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Structure Reports for 1958. Vol. 22. General Editor W. B. PEARSON. Section Editors A. TAYLOR, J. S. KASPER AND A. MCL. MATHIESON. Pp. viii + 890. Utrecht: Published for the International Union of Crystallography by N.V.A. Oosthoek's Uitgevers Mij, 1968. Price Dfl. 140.

This volume continues the very well known series which has become such an important part of the reference library of crystallographers. All the crystallographic studies published in 1958 which have reported new cell sizes, space group or optical information and atomic positions, are critically abstracted. Included also are reports of polymorphism and such phenomena as low angle scattering in glass and epitaxy. Information reported is in very large part derived from X-ray diffraction but a number of neutron diffraction studies are also included.

As in previous volumes of this series new information is compared with any earlier related work and any differences discussed. Structure determinations are fully reported giving, besides the atomic positions, the isostructural relationships and interatomic distances and angles. Thermal factors are considered in the calculated interatomic distances in some cases but are not directly reported. Line drawings of structures and of phase relations and cell sizes are often included. The source of material, methods used, calibration controls and other pertinent information is briefly but fully recorded.

As in the past this volume contains excellent subject, formula and author indexes, as well as a separate one for carbon compounds. This series continues to be a necessity to the crystal structure worker, therefore as structure studies expand in wider fields and to more complex compounds it is increasingly desirable that the present time lag in the preparation of these essential reviews be reduced. There is evidence that this is being done.

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Crystals and their structures. By ARTHUR P. CRACKNELL. Pp. ix + 231. Oxford: Pergamon Press, 1969. Price (hard cover) 45s, \$7.00, (soft cover) 35s, \$5.50.

This book deals, at an elementary level and in a descriptive way, with the properties and structures of crystalline and near-crystalline materials.

It is intended as reading matter for advanced sixth-form pupils studying physics or chemistry or as general background reading for first-year undergraduates.

The first two chapters, comprising one third of the book, are concerned with the symmetry of crystals, point groups, Bravais lattices and space groups. The treatment is quite sound but, in the reviewer's opinion, some topics, *e.g.* symmorphic space groups and *d*-glide planes, should have been

excluded completely. They were dealt with so scantily that they could not easily be understood and their inclusion added nothing to the overall understanding of the material.

A chapter on the internal structure of crystals gives a brief account of each of the three main types of diffraction experiment, with X-rays, electrons and neutrons and also of electron microscopy. There are useful descriptions of electrostatic lenses and of how a magnetic structure can be elucidated with neutrons. A very important point, not made at all, is that structural information may be difficult to obtain from diffracted data, which is, after all, one of the basic features of structural crystallography.

The next chapter deals with the forces which bind crystals together, ionic and covalent bonding forces and van der Waals forces. The section of this chapter which deals with energy-band theory is done quite well and should be useful at the introductory undergraduate level.

The book concludes with three short chapters, one dealing with defects, dislocations and non-crystalline materials and

the final two with coloured symmetry and with elementary group theory.

A useful appendix includes instructions for making cardboard models (octahedron, rhombic dodecahedron, *etc.*) and gives some tips for crystal growing.

The book is interspersed with numerous examples, some fairly difficult, whose usefulness would have been enhanced had solutions, perhaps even worked solutions, been provided.

To summarize – some flaws but a good book on the whole. It can be recommended to that class of readers for which it is intended.

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Books Received

The following books have been received by the Editor. Brief and generally uncritical notices are given of works of marginal crystallographic interest; occasionally a book of fundamental interest is included under this heading because of difficulty in finding a suitable reviewer without great delay.

Manual of Petrographic Methods. BY ALBERT JOHANNSEN. Pp xxviii+649. New York: Hafner Publishing Co. Inc. 1968. (Originally published 1918). Price \$12.50.

This book is a facsimile of the second edition, first produced in 1918. The bulk of the work is a treatment in considerable depth of optical mineralogy with detailed descriptions of techniques for examining mineral crystals by microscopy and by other optical methods.

The last hundred-or-so pages deal with the measurement of specific gravity, the separation of the constituents of rocky specimens and the preparation of thin sections of rock.

Igneous rocks and the depths of the earth. BY REGINALD ALDWORTH DALY. Pp.xvi + 598. New York: Hafner Publishing Co., 1968. (Originally published 1933). Price \$12.00.

This work was originally published in 1933 and includes some revised chapters of *Igneous Rocks and their Origin* (1914).

It gives a comprehensive descriptive account of igneous activity in the earth's crust and surveys the theories which have been put forward to explain the observations.