

## REVIEWS.

*Cristallographie (déformation des corps cristallisés ; groupements ; polymorphisme ; isomorphisme)*. Par FRED. WALLERANT. Pp. iii + 523, with 230 text-figures. (Paris: Librairie Polytechnique Ch. Béranger. 1909. Price 15s. net.)

The elaborate 'Traité de Cristallographie' of Professor E. Mallard, of which the first volume appeared in 1879, was to have been completed in three volumes. In the preface of the second, which was published five years later, it was stated that the final volume would be devoted to the facts which depend at once on the external form and the internal structure, namely, twinning, pseudosymmetric groupings, isomorphism, dimorphism, the genesis of crystals, &c. These were subjects which Professor Mallard himself had much studied, and the volume was expectantly awaited by crystallographers; but, unfortunately for the progress of the science, not only was the volume still unissued at the time of his early death in 1894, but it was found that the manuscript was not in a sufficiently advanced stage to admit of posthumous publication.

Since the issue of the first volume of Mallard's treatise, the researches of Sohncke, Schönflies, Fedorov and Barlow relative to the theory of crystal-structure, and the discovery of liquid crystals by Lehmann, have rendered it possible to make a decided advance in the correlation of various properties of crystals; and, in the light of these and similar researches, Professor Wallerant, himself a distinguished investigator, has written a book which admirably fills up the gap in the crystallographic treatise of his fellow countryman.

The following brief statement will suffice to make clear the scope of the volume and the mode of treatment adopted by the author.

The volume begins with an Introduction (27 pages) giving general ideas as to the structure of crystallized bodies; it includes an interesting sketch of the subject of liquid crystals.

The rest is divided into six Books. Book I (60 pages) treats of the homogeneous deformations of solid crystals; and gives an account of the

experimental researches which have been made relative to the development of twin-structure by pressure. In Book II (75 pages), crystalline groupings (simple and repeated twinning) are minutely discussed. Book III (40 pages) deals with apparent symmetry, and shows that all crystals whatsoever can be regarded as constituted of molecular groups with parallel orientation and each of them placed in a compartment of an approximately cubic network. Book IV (126 pages) describes the facts of polymorphism, and enters into the problems involved in the crystallization of mixtures of two substances; it includes an account of the theories of polymorphism. Book V (162 pages) gives an elaborate account of isomorphism; it includes a discussion of the relations of the composition of the mixed crystals to the composition of the mother-liquor from which they are deposited, also an account of the physical properties and structure of the mixed crystals. The last Book (26 pages) deals with the regular growths of crystals belonging to different species.

The numerous figures contribute much to making clear a volume treating of matters which are of great difficulty and at the same time of great interest. The book ought to be in the hands of every advanced student of crystallography.

L. F.

*Text-book of Petrology, containing a summary of the modern theories of petrogenesis, a description of the rock-forming minerals, and a synopsis of the chief types of the igneous rocks and their distribution as illustrated by the British Isles.* By Dr. F. H. HATCH. 5th edition. Pp. xvi + 404. (London: Swan Sonnenschein & Co. 1909. Price 7s. 6d. net.)

The fact that this well-known text-book has reached a fifth edition (two of them, however, being merely reprints of the second edition) shows that it has been of value to students of petrology. The first edition in 1891 contained 128 pages, the second (1892) 222 pages, and in the present edition the number of pages has been again almost doubled. The number of text-figures is also largely increased, being now 130. With such extensive additions it has been necessary to re-write the whole book, but the general arrangement of the second edition has been retained as far as possible. Part I (66 pages) deals with the mode of occurrence, structure, and composition of igneous rocks; Part II (84 pages) is devoted to the rock-forming minerals;

Part III (128 pages) to the classification and detailed description of the igneous rocks; and Part IV (104 pages) to the distribution of igneous rocks in the British Isles. An Appendix gives a concise table (4 pages), drawn up by R. H. Rastall and J. Romanes, for the determination of the commoner rock-forming minerals in thin section.

In the first part we now find a general and brief account of eutectics and the application of this principle to igneous magmas. The descriptive portion is largely increased by the addition of many chemical analyses of rocks, and many of the new names recently given to rock-varieties are included. Some of these names are quite trivial and can be of no permanent value, and being printed in the text in heavy type undue prominence is given to them, to the confusion and discouragement of the elementary student. The several sketch-maps illustrating the distribution of British igneous rocks are of especial interest. The main title of the book is perhaps somewhat misleading, since only the igneous rocks are dealt with.

*Hints for Crystal Drawing.* By Miss MARGARET REEKS. With a Preface by Dr. J. W. EVANS. Pp. xx + 148. (London: Longmans, Green & Co. 1908. Price 3s. 6d. net.)

The text of this book is in the main descriptive of forty-four full-page diagrams reproduced from the author's drawings of clinographic projections and orthographic plans of crystals. The representation of the axes in clinographic projection for the several systems of crystals is clearly explained, and the positions of the crystal-faces with reference to these axes are given by the Millerian indices. The directions of the edges are arrived at by the intersections of the several planes. This method of drawing crystals according to the principles of solid geometry is undoubtedly of considerable educational value to the student, and enables him to obtain a clear conception of the relation of the forms. On the other hand, it is perhaps more tedious than the newer methods of deducing the directions of edges from the stereographic or gnomonic projections of the poles.

The book is full of useful hints, many of which a serious student would no doubt find out for himself without following every step in the text. The reading of the text requires, indeed, a considerable amount of concentration, and it appears to be unnecessarily involved by the use of various contractions, whereby the same letter comes to have several different significations.

*Gold and Silver ; comprising an economic history of mining in the United States, the geographical and geological occurrence of the precious metals, with their mineralogical associations.* By Dr. WALTER R. CRANE. Pp. xi + 727, with 9 plates. (New York: John Wiley & Sons; and London: Chapman & Hall. 1908. Price 21s. net.)

This volume has been compiled by Dr. W. R. Crane, instructor in mining at the School of Mines in the Columbia University, to form part of the series on the 'Economic History of the United States' to be published by the Carnegie Institution of Washington. It contains full details relating to the history of discovery and the occurrence of gold and silver in all parts of the United States. Although the work is written rather from an economic and mining standpoint, still many points of mineralogical interest are mentioned. In table II of the appendix a useful summary is given of the form of deposit, country rock, and associated minerals met with in the several mines of each State.

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