

## REVIEW.

*Notions de Minéralogie.* Par A. F. Renard, Professeur à l'Université de l'État à Gand, et F. Stöber, Chargé de Cours à la même Université. Pp. x. and 374, avec 732 figures dans le texte. Gand, Ad. Hoste, 1900.

The present work is intended primarily for the use of students reading Mineralogy at the University of Ghent and in the affiliated engineering and other schools; but the authors have also kept in view the needs of others, such as chemists and geologists who may wish to gain a knowledge of the subject as an aid to their own special studies. It is divided into two sections, dealing respectively with the general and the systematic parts of the subject.

Part I (pp. 1-189) is devoted to the discussion of the geometrical and physical properties of crystals and the general and chemical characters of minerals. Among the points worthy of note in an elementary book are the adoption throughout of Millerian indices, to the exclusion of the symbols of Naumann, and the free use made of the stereographic projection. The main facts and relations of geometrical crystallography are clearly explained, and some examples are given of the method of "working out" a crystal by means of zones. Questions of calculation involving trigonometry are for the most part omitted.

The systems are discussed at some length, and the principal forms of the holosymmetric and of the more important merosymmetric types and their common combinations described and figured. It is perhaps a little unfortunate that the authors, while using planes of symmetry as the basis for the division into systems, make no reference to the other elements of symmetry, and in the subdivision into classes continue to give prominence to holohedral and merohedral characters, in many cases without considering the symmetry of which these are the outcome. A sketch given of the principles of twinning, and mimetic twinning is illustrated a description of phillipsite.

In view of its doubtful existence, the third type of twin-plane might perhaps have been better omitted. It may be noted also that wulfenite is not now grouped with scheelite as "pyramidal hemihedral," having no equatorial plane of symmetry (though the absence of this is not indicated in the figure given).

In the part allotted to physical crystallography, special prominence is given to the determination of optical characters, in view of their importance in petrographic work, and there is a useful paragraph on the interpretation of partially visible axial figures. Some elementary explanation of the formation of interference figures might with advantage have been added.

Four pages are devoted to a discussion of the ellipsoid of elasticity and the wave surface, but it may be open to doubt how far these will be intelligible to a student after the short acquaintance with the subject gained from the preceding pages.

The thermal, electric and magnetic properties of crystals are shortly treated, and there is a paragraph on optical anomalies.

A noticeable feature of the short section on chemical crystallography is the inclusion of a number of microchemical tests, with figures of the crystalline products. The use of etching figures in determining the symmetry of a crystal finds a place in this part, which concludes with an interesting chapter on the modes of formation of minerals in nature and in the laboratory.

The second division of the book (pp. 191-366) contains good descriptions of about 130 of the more important minerals, together with notes in smaller type on some of the rarer species, of which however a rather excessive number is admitted. The classification adopted is that of Groth's *Tabellarische Übersicht*. At the end is added a useful list of the minerals found in Belgium, with their principal occurrences; the materials of this list have not been previously collected together.

The illustrations are numerous, but the lettering of them is not always very legible. Several printer's errors (especially in indices) will be found which have escaped inclusion in the list of errata.

As a whole, the book forms a useful introduction to the subject of which it treats.

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