

the Mechanical Arts," published a little more than a century ago (1807), which, for its time, and as the work of one man, was as wonderful as the present index. The comparison affords a more trustworthy indication of the advance of natural knowledge during the nineteenth century than could probably be obtained in any other way.

G. C. F.

*A NEW TEXT-BOOK OF MINERALOGY.*

*Mineralogy: an Introduction to the Theoretical and Practical Study of Minerals.* By Prof. A. H. Phillips. Pp. viii+699. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1912.) Price 16s. net.

PROF. PHILLIPS'S text-book on mineralogy follows, on the whole, the usual lines of such works, and in price and size comes intermediately between Miers's well-known treatise, which appeared eleven years ago, and Dana's small book, a new edition of which, prepared by Ford, was published recently. By his experience in teaching the subject the author is well qualified to write a book suitable for students who wish to acquire a sound working knowledge of mineralogy.

As will be evident from the titles of the three parts into which it is divided, viz., crystallography, descriptive mineralogy, and determinative mineralogy, the book is comprehensive in its scope. Since each forms a subject wide enough to fill a book in itself, the author of a work dealing with all three is confronted with the difficulty of deciding how to keep the size within reasonable dimensions. On the whole, Prof. Phillips has succeeded in well covering all the ground necessary for the average student of mineralogy. We must acknowledge a debt of gratitude to him for resisting the temptation—irresistible to most writers on crystallography—of devising a brand new set of names for the thirty-two classes of crystal symmetry; he has wisely followed Miers, because the latter's nomenclature embodies the type of symmetry, and is therefore more easily remembered. Some surprise may be felt that little trace of Penfield's teaching should be evident in the discussion of the method of drawing crystals; the old one, in which an axial-cross is used, alone is considered, and no mention is made of the simple and convenient methods based upon the stereographic or gnomonic projections.

The whole subject of the goniometrical measurement of crystals is treated in a very elementary manner, and is confined to the instrument with a single circle; the theodolite goniometer, with two circles, which is used by many crystallographers

in the United States, especially those who have studied under Goldschmidt, is not referred to, and it would seem that few students at Princeton University prosecute their studies very deeply into crystallography. The optical characters of crystals, on the other hand, are more fully dealt with, the reason no doubt being that an adequate knowledge is essential to the practical petrologist in the determination of the constituent minerals of a rock from a microscopic study of a thin-section.

The first part includes an interesting chapter on the relations of individual crystals, in which attention is directed to the parallel growths of one mineral on another, the full importance of which subject has largely been brought out by Barker's researches during recent years.

The second part includes three chapters which we should have imagined more in place in the first part, viz., the relation of the minerals to the elements, which covers such matters as topic parameters and the classification of minerals, the origin of minerals, and, lastly, the physical properties—for instance, cleavage and fracture, hardness, specific gravity, structure, colour, phosphorescence, &c. The part proper is devoted to concise descriptions of the characters and localities of the principal mineral species. At the head we have an abstract of their properties—chemical composition, crystalline system and type of symmetry, common forms, hardness, specific gravity, streak, colour, lustre, transparency, refractive indices—and then follows a general description of the crystals from the principal localities; in certain instances a few words are said about the use of the mineral or the metal derived from it.

Part iii. is given up to the methods of blowpipe analysis, the apparatus used, and the tables necessary for the identification of the various minerals, and is founded on Brush's well-known book. The tables provided include also one for the determination of minerals from their physical characters, dependence being placed mainly upon the hardness, streak of the softer and colour of the harder minerals, specific gravity, and cleavage, and another for the determination of the principal rock-forming minerals from their optical characters as given in a thin-section. The book ends with a full index, the use of which is facilitated by the employment of a different type for the numbers of the pages in each part of the book.

So far as we have tested it, the book seems satisfactorily accurate. Two curious mistakes have, however, crept into the description of the Cullinan diamond, the date of the discovery being wrongly stated to be June 6, instead of January 25, 1905, and the weight given being too high.