

## REVIEWS.

*Manual of Determinative Mineralogy, with an introduction on Blowpipe Analysis.* By George J. Brush. Revised and enlarged by Samuel L. Penfield. 14th Edition. 164 pp. and Tables. London: Chapman and Hall. 1896.

Professor Brush's work on the determination of minerals by the aid of the blowpipe evidently meets a need, for it has run through 13 editions since its appearance in 1874, and it has now been found desirable to re-issue it in a semi-revised state under the editorship of Professor Penfield, whose name on the title page is a guarantee that the 14th edition will not fall behind its predecessors in usefulness.

The work in its present form consists of an introduction, followed by chapters on Apparatus and Reagents, Reactions of the Elements, Summary of Reactions and Tables for the Determination of Minerals.

The chapter entitled "Introduction and Chemical Principles" provides us with definitions of atomic weights, valence, chemical affinity, and the like, and instructs us how to calculate the formula of a mineral from its percentage composition. The judicious reader will skip all this, for if skilled in chemistry he will have nothing to learn from it, and if a beginner will be none the better for its perusal, and can more profitably occupy his time in learning the elements of his subject than in studying a book which should only be in the hands of those who have already obtained some knowledge of chemistry. The account of apparatus and reagents does not differ materially from that contained in other text books. The descriptions are clear, and so thoroughly illustrated by excellent drawings that no difficulty ought to be found in following them. In a book planned on a somewhat ambitious scale and of comparative costliness, we may fairly expect comprehensiveness of treatment, and it is therefore with a sense of disappointment that we search in vain for an account of the use of the spectroscope and for a table of spectra, and find no mention of Bunsen's flame reactions or of the aluminium plate support introduced by Ross. The distinctive and valuable feature of the book is, no doubt, the detailed account of the reactions of the elements and the summary of the same, contained in the third and fourth chapters.

The author does not limit himself to the blowpipe characters merely, but wisely includes the more important of the "wet" tests as well, and gives us in small print much excellent advice as to the quantities to take and the best conditions to employ to ensure the success of the experiments. These hints are evidently the result of much laboratory experience, and the student of mineralogical chemistry will do well to take them to heart.

The concluding chapter is occupied by Professor Brush's edition of von Kobell's well-known tables for the determination of minerals. Criticism of these is superfluous, more especially in view of the somewhat irritating statement made in the preface that the tables are even now under revision, and will be issued as soon as possible, together with a short chapter on crystallography and the physical properties of minerals.

We greatly regret that Professor Penfield was unable to complete the revision before the publication of this edition; for, had he done so, its value would have been greatly enhanced, and most mineralogists would have been content to wait indefinitely for the chapter on crystallography, if only the tables had been brought up to date. Even in its present state the book is one which ought to be found in every mineralogical institute in the English-speaking world.

A. H.

Max Bauer. *Edelsteinkunde, eine allgemein verständliche Darstellung der Eigenschaften, des Vorkommens und der Verwendung der Edelsteine, nebst einer Anleitung zur Bestimmung derselben.* 711 pp. 20 coloured plates, 94 woodcuts. Tauchnitz, Leipzig, 1897.

This attractive book, to which attention was called in this Journal (Vol. XI. p. 92) on the appearance of the first part, is now complete. The excellent coloured plates, representing both natural and faceted stones, which were, according to the prospectus, to have been eight in number, have ultimately reached the number of 20, and are the most striking feature of the book. The only coloured plates of gem-stones, or indeed of minerals of any form, which can be compared with them are those which adorn Kunz's well-known work on the precious stones of North America.

Professor Bauer's treatise, though containing much that is of popular interest, is by no means a mere popular book for the general reader. It professes to be designed for mineralogists, lapidaries, and jewellers, and is full of scientific information. The first 124 pages are occupied with the general properties of minerals, in which the reader will find a full account of the various methods of determining the specific gravity, the

hardness, the optical and other physical characters, of gem-stones; a chapter on their applications—on the forms of faceted stones, and on the method of facetting; on their engraving, colouring and mounting; on imitation jewels, and on the comparative value of the various stones. All this is told in a simple and intelligible manner, and should be of the greatest practical value for the class of readers for whom it is designed; equally with the remainder of the book, this part may be recommended to every mineralogist as containing valuable and interesting information not easily found elsewhere; and it teems with useful hints and explanations.

It is doubtful whether the method of estimating specific gravity (given on p. 27) by means of four standard mixtures of methylene iodide and benzene is so reliable as might be imagined from the description. In practice such mixtures so rapidly increase in density owing to evaporation of the benzene that they would require continual re-determination, and it is far easier to work always by comparison with standard indices of known minerals, and to dilute the heavy liquid as required.

We miss one method that deserves description in a treatise on the determination of gem-stones, on account both of its scientific interest and practical value, namely, Kundt's method of exhibiting the pyroelectricity of tourmaline by dusting a cooling crystal with a mixture of red lead and sulphur. This is not alluded to either in the first chapter nor yet in the description of tourmaline, and yet it is in reality a most useful method of testing a tourmaline, and one which can often be easily applied even to a mounted stone.

We miss also any allusion to the method of determining the refractive power of a gemstone by means of total reflection. The reflectometer is an instrument so easily used and so convenient for the examination of stones, whose index of refraction is less than that of methylene iodide or of monobromo-naphthalene, that it might well have been described.

The remainder of the treatise deals with the various gem-stones in succession; and here the reader will find copious information about the occurrence and association of the different minerals on a far larger scale than has been previously attempted by books of this class. All the more important localities are explained by means of sketch maps, and the descriptions, historical, geographical and mineralogical, of the regions in which diamonds, rubies, lapis lazuli, and the other minerals have been worked, are most complete.

Under quartz (agate) will be found a very interesting illustrated account of the famous cutting and polishing industry of Oberstein.

The book is one which stands quite alone at present as a scientific

treatise on precious stones in all their modern aspects, and should be of great use.

Among the coloured figures special attention should be called to the highly successful representation of emeralds on Plate 12, of topaz on Plate 13, and of garnets on Plate 14.

The volume closes with a chapter on the identification of precious stones, and an appendix on pearls and coral.

H. A. M.

*Crystallography for Beginners* by C. J. Woodward, B.Sc. London, 1896.

Few chemists are likely to question the value of the study of crystals as an aid to the accurate determination of the products of the organic laboratory. Many, however, seem to be of the opinion that crystallography is a subject of such an abstruse and mathematical character, that it is hopeless to attempt its mastery. This unfortunate misconception has no doubt been fostered to some extent by the lack of elementary text books to lead the beginner by easy stages up to the study of those more elaborate treatises which at first sight appear formidable to students without mathematical training. All, therefore, who are anxious to see fresh interest aroused in the study of crystals will welcome the little book before us, which in a simple, yet accurate and logical manner, sets forth within the limits of nine short lessons the chief facts and principles of the science.

Anyone who works conscientiously through the text and the illustrative examples at the end of each section, cannot fail to obtain a good grasp of the meaning of symmetry, the law of rational indices, the Millerian notation, and the method of representing the faces of crystals by means of the stereographic projection.

It should, however, be noted, that in making a projection of a crystal the eye is usually imagined as placed at the south pole of the sphere and not at the north pole, as represented in fig. 16. The concluding lessons are devoted to the forms of the cubic system, the choice of axes and parameters, Naumann's notation, the physical properties of crystals, and an explanation of the meaning of hemihedrism. At p. 100 the author's work and the scientific interest of the book cease together, for the appendix, some 60 pages, is given over to an entirely separate treatise, a translation from the German of Dr. Weisbach of a series of directions for identifying minerals by the application of simple tests. That tables of this sort have a certain value cannot be denied; but at the end of a work on crystallography they seem out of place—a chapter on organic

chemistry would hardly be more incongruous; and it is greatly to be regretted that they should have been allowed to monopolise space which could have been so much more profitably devoted to a consideration of twins, the forms of most of the systems, and the 32 crystal classes, all of them points passed over in silence in the body of the work. As far as it goes, however, the book is certain to prove useful to the beginner, and it will, we hope, do much to render more popular a fascinating and useful but neglected subject.

A. H.