BOOK REVIEWS

CRYSTALLOGRAPHY AND PRACTICAL CRYSTAL MEASUREMENT. A. E. H. TUTTON. 8-vo, two volumes. Vol. I, Form and Structure, XVIII +746 pages, with 589 text figures and index; Vol. II, Physical and Chemical, VIII+pages 750 to 1446, with 342 text figures and index for both volumes. Macmillan and Company, Limited, *London*, 1922. Price $35.00.

These volumes constitute a most noteworthy contribution to the literature of crystallography, especially in the English language. They are based upon the first edition, which appeared in 1911, just prior to von Laue's startling discovery in 1912, since which time such remarkable advances in our knowledge of crystal structure have been made. All of the material and illustrations of the author's monograph, CRYSTALLINE STRUCTURE AND CHEMICAL CONSTITUTION, now out of print, have been incorporated in this edition. Furthermore, so much new material has been added, that it became necessary to issue the work in two volumes. Obviously, it is impossible in so short a review, as this must necessarily be, to adequately stress all of the excellent features of the work, for the various phases of crystallography are presented in a very exhaustive manner. An endeavor has also been made to have the material up-to-date.

Volume I, CRYSTAL FORM AND STRUCTURE, is divided into two parts: (a) CRYSTAL FORM AND GONIOMETRY, and (b) CRYSTALLINE STRUCTURE AND ITS X-RAY ANALYSIS. In Part I, the fundamental laws, the geometrical properties of crystals, and the various methods of measurement are discussed in great detail. Part II is one of the most important sections of the book, since it contains chapters summarizing the advances made since the introduction of X-ray analysis. This is clearly seen from the following list of subjects considered in this part:—Composite Crystals and Twinning; Cleavage, Gliding; Asterism; Hardness; Crystal Viscosity; Foam Cell and Pulsation-Cell Theories; Crystals as Homogeneous Structures; Density, Volume, and Structure; 14 Space Lattices; Molecular Distance Ratios; 65 Regular Point Systems and the 230 Space Groups; Determination of the Density of Crystals and Calculation of Volume Constants; X-ray and Crystal Structure; Absolute Measurement of the Dimensions of the Space Lattice Cell,—Methods of Laue, Bragg, and Debye and Scherrer; Law of Atomic Diameters; Fedorov's Theory of Cubic and Hypohexagonal Types and of the Correct Descriptive Setting of Crystals; His Method of Crystallochemical Analysis; Theory of Pope and Barlow; Moseley's Law, Atomic Number and Atomic Structure.

Volume II, PHYSICAL AND CHEMICAL, is also made up of two parts, III and IV. Part III, which is given over to CRYSTAL OPTICS AND MICROSCOPY, contains a systematic discussion of the optical properties of crystals and the methods involved in their determination. CRYSTAL CHEMISTRY AND DEFORMATIONAL PHYSICS AND ITS INTERFEROMETRY are the general subjects assigned to Part IV. Here, isomorphism and related topics, the thermal, elastic, electrical, and magnetic properties of crystals, and "liquid crystals" are treated.

The price, $35.00, for the two volumes, which are excellent examples of the printer's skill, is practically prohibitive from the standpoint of private ownership. The work is, however, indispensable to teachers of and workers in mineralogy and the allied sciences, and should therefore be added to all scientific libraries.

EDWARD H. KRAUS.

DIE KRISTALLE ALS VORBILDER DES FEINBAULICHEN WESENS DER MATERIE. FRIEDRICH RINNE. 8-vo. 101 pages, with 5 plates and 100 figures. Borntraeger Brothers, *Berlin*, 1921.

This is an excellent survey of our present knowledge of the structure of matter, and can be recommended heartily to all students of mineralogy, physics, and chemistry interested in this important field of investigation. The treatment is very concise, and all phases of the subject have been covered. It is to be regretted that a complete bibliography was not included.

Aside from a short introduction, this little volume contains 14 chapters. There is also a very brief section devoted to concluding remarks. The subjects discussed include:—Leptonology (the study of the fine or ultimate structure of matter), Leptonological units of matter, General outline of the ultimate structure of matter, Metamorphosis-series of matter, General tectonic arrangement of the fine structure of matter, Relationship of the ultimate structure of mixed crystals and intergrowths, Morphotropy and topotropy, Isotypy, Crystal growth and solution, Chemical processes based upon observations on crystals, Analogy between the morphological effect of physical and chemical fields upon crystal structure, and Physiology of crystals and types of atoms.

The numerous text-figures are an important feature of this timely treatise. Sepia prints of Röntgen, Groth, von Laue, and Schönfliess appear as full page plates.

E. H. K.

NOTES AND NEWS

NOTE ON AN UNUSUAL CARBONACEOUS SUBSTANCE. A rather interesting carbonaceous substance was recently sent to the Mineralogical laboratory of the University of Michigan by Mr. J. Moyer of the North Dakota Agricultural College. The accompanying letter stated that it was from an arid part of North Dakota, and was the residue formed by the evaporation of a peculiar black water which had seeped thru lignite to the surface.

The substance is soft and dark brownish black in color, somewhat resembling dried muck. It is unusual in being rapidly and completely soluble in water, giving a dark brown and almost opaque liquid, all of which passes readily thru a quantitative filter paper, and reacts alkaline to litmus. It is insoluble in alcohol, ether, or benzene. It does not melt, but when heated first gives up water, then a combustible gas, and finally the fixed carbon burns off and leaves a rather large amount of yellowish ash. Qualitative tests indicate that the ash is principally sodium carbonate.

The original material liberated CO_2 with HCl, but the carbonaceous portion did not dissolve. After leaching out all the ash with acid, the residue was insoluble in water, but immediately went into solution when sodium bicarbonate was added.

Evidently the material is of the nature of a "humus acid," with a large proportion of sodium carbonate ash. The alkali carbonate dissolves when the material is placed in water, and the resulting liquid takes the humus compound into solution. It is well known that humus acids are held in solutions by alkali carbonate waters. The carbonaceous substance was probably leached out of the lignite by alkaline water, and was precipitated, by evaporation, with enough sodium carbonate to act as the solvent when pure water was again at hand.

EDW. F. HOLDEN.