tion of water from fluorine and boron in fluoborite, and the separation of aluminum and beryllium in beryllium-vesuvianite.

Various interesting peculiarities and singular properties of many of the minerals were indicated by Mr. Bauer, the more important of which are: Willemite from Sterling Hill is brown while that from Franklin is characteristically green. Calcite which contains a large amount of manganese is white, whereas the brownish calcite has little or no manganese. Franklin actinolite contains 10% ZnO. Specimens of axinite fluoresce in red colors while fluorite shows blue.

An iron arc was used to show the diversity of colors produced by the ultra-violet rays on Franklin minerals. Many choice specimens were exhibited by the speaker supplemented by a number shown by Mr. Toothaker, including one of 98.7% pure zincite, brown, green and a new find of blue willemite. Coxcomb white calamine, blue, black, brown and white calcite, rhodonite, axinite, Be-vesuvianite, a perfect rhombohedral cleavage of hematite and many other choice specimens were placed on exhibition.

The meeting adjourned after giving the speaker a rising vote of thanks.

LESTER W. STROCK, *Secretary.*

## BOOK REVIEWS

INTRODUCTION TO CRYSTAL ANALYSIS. Sir William Bragg. VII+168 pages with 8 plates and 105 figures. D. Van Nostrand Co., Inc., *New York*, 1929. Price $4.25.

Although this book covers much of the same subject matter included in a previous work "*X-rays and Crystal Structure*," the treatment is somewhat different. Originally presented as a series of lectures, there is a more technical approach to the subject. This means, perhaps, less appeal to the general reader, but a correspondingly greater usefulness to the student.

The first two chapters "Reflection by the crystal lattice" and "Methods of analysis" are developed in the usual way. The latter chapter contains a brief description of the rotating crystal method. The chapter on "Simple inorganic compounds" discusses diamond and graphite, fluorite, sphalerite, pyrite, calcite and quartz. In the case of quartz, the $\alpha$ to $\beta$ inversion and one type of twinning are correlated with the structure. Chapter IV, on "Space groups," contains several excellent diagrams illustrating some of the possible symmetrical arrangements of points in space. The crystallographer will look in vain, however, for any recognition of the contribution which his science has made in this field. One would never suspect that the 230 space groups had been completely defined before X-ray analysis had even been dreamed of.

The final chapters are entitled "Complex crystals" and "Metals." They consider very briefly the close-packing of oxygen atoms with reference to silicate structures; a few organic crystals; some common metals and alloys and the development of "fibre" structure through drawing and rolling.

The book is very condensed, and therefore limited in its explanations and examples. However, a sufficient number of typical structures have been included to make it a good summary of the types of problems that have been attacked, and to indicate, to some extent, the tremendous possibilities which lie in the future.

L. S. RAMSDELL

STEREOSCOPIC PHOTOGRAPHS OF CRYSTAL MODELS. F. 582, COMPLETE IN BOX WITH FOLDING STEREOSCOPE. £1.4.9. Adam Hilger, Ltd., 24 Rochester Place, *London*, N. W. 1, England.

This is the second series of 23 stereoscopic photographs of models illustrating the positions of the atoms in the crystalline structures of silicates which have been studied by means of the X-rays. A small descriptive pamphlet edited by Sir William and Professor W. L. Bragg accompanies the photographs.

The visualization of the complex structures of minerals is greatly clarified by this simple device and the folding character of the stereoscope makes it possible to pack both instrument and photographs in a small box, 4 x 5¼ in., which slips readily into a coat pocket.

W. F. H.

GEOLOGISCHE NOMENCLATOR (GEOLOGISCHE NOMENKLATUR, GEOLOGICAL NOMENCLATOR, NOMENCLATEUR GEOLOGIQUE), edited by L. Rutten. 338 pages, diagrams. G. NAEFF, *The Hague*, **1929.** Price $8.50.

This book though of greatest value to the student of general geology, contains however sufficient material to make it likewise of value in a working library in mineralogy and petrology. It is the result of the compilation of geologic words and phrases, in Dutch, German, English, and French, over a period of more than ten years, by members of the "Geologisch-Mijnbouwkindig Genootschap voor Nedreland en Kolonien." The results are published in parallel columns giving the equivalents of Dutch geological words and phrases in German, French, and English. Explanations of terms are in Dutch. At the end of the book are indices in the four languages enabling the reader to find a desired word in any of the languages mentioned and turn to the page where the translations are given.

The "Nomenclator" is divided into sections with different authors. These are: Exogenic Processes and Physiography, by W. E. Boerman and K. Oestreich; Tectonic Geology, G. A. F. Molengraaff; Volcanology, B. G. Escher; Seismology, G. Van Dijk; Stratigraphy and General Paleontology, P. Kruizinga; Petrology, J. A. Grutterink; Ore Deposits, H. F. Grondijs and C. Schouten; Alphabetical Index by L. Rutten. The section on Petrology is divided into subsections dealing with: Crystals; Constituents of Igneous Rocks; Constituents of Sedimentary Rocks; Constituents of Metamorphic Rocks; Textures; Igneous Rocks; Sedimentary Rocks; Metamorphic Rocks; Structure; Classification; and Some Names of Rocks and Minerals. In the complete section about 500 petrologic and mineralogic terms and words are translated into the four tongues, while the index for the complete volume, in German for example, contains approximately 4,000 words and phrases. The mineralogist and petrologist will find additional useful terms translated in the sections on Ore Deposits and Volcanology.

The book is well printed and bound, the volume being 8 x 11 inches. It deserves a place in the library of any geologist engaged in investigative work involving constant reference to foreign literature.

JOHN T. LONSDALE

SPHÄRISCHE TRIGONOMETRIE FÜR NATURWISSENSCHAFT UND TECHNIK. FRANZ RAAZ. 66 pages and 11 text figures. Published by Theodor Steinkopff, *Dresden*, **1928**. Price 6 RM.

This is a book for the technician who occasionally, must solve a spherical triangle. The mathematics is rigorous but is not an end in itself. In 15 pages, the author derives the necessary formulas and proves that they will work for the general, unrestricted, (Möbius) triangle. He then gives a systematic classification of Euler ($180° < A+B+C < 540°$) triangles with sufficient emphasis on the impossible and ambiguous cases. Standard methods for solving and checking along with helpful hints from a computer's experience are given. The half-angle formulas are derived and examples are given to show how the use of them simplifies the solution of acute-angled triangles.

Applications to astronomy and to mathematical geography are not mentioned. A final chapter of 7 pages shows the application to crystallography. The orientation of any plane of a crystal, *i.e.*, the direction-cosines of its normal, can be mapped as a point on a unit sphere and the relations of intersecting planes can be found from a study of the points representing them. This chapter contains one of the few numerical examples which are worked out to the last digit.

The printing and style are satisfactory but some well-drawn figures have been so reduced that the lettering is indistinct. There is a three-page summary of formulas but no index. A bibliography lists 12 titles, 5 in trigonometry, 3 in astronomy, and 4 in crystallography; none are in English.

NORMAN ANNING

## NEW MINERAL NAMES

### Bismutotantalite

E. J. WAYLAND AND L. J. SPENCER: Bismutotantalite, a new mineral from Uganda. *Mineral. Mag.*, **22**, 185–192, 1929.

NAME: From its relation to the tantalite group.

CHEMICAL PROPERTIES: A tantalate of bismuth, $Bi_2O_3.(Ta, Nb)_2O_5$. Analysis by W. O. R. Wynn gave: $Bi_2O_3$ 52.26, $Ta_2O_5$ 40.12, $Nb_2O_5$ 6.63, MnO 0.12, $(Fe, Al)_2O_3$ 0.11, $SnO_2+Sb_2O_3$ 0.04, ign. loss 0.33, $ZrO_2$ trace, $TiO_2$ trace, $ThO_2$, etc., and $U_3O_8$ not detected. Sum 99.61. A partial analysis is also given. Insoluble in acids.

CRYSTALLOGRAPHICAL PROPERTIES: Orthorhombic. Habit prismatic. $a=0.7813$, $c=1.1363$. Forms $a$ (100), $m$(110), $g$(130), $\delta$(011), $k$(103), $\omega$(133) $x$(141). Parting in three directions observable.

PHYSICAL AND OPTICAL PROPERTIES: Color black, luster sub-metallic. Streak black. Fracture sub-conchoidal. Hd. 5–5½. Sp. Gr. 8.15. Under the microscope, transparent in thin splinters; color smoke gray. Extinction parallel. Biaxial. $n$ high, birefringence 0.1 to 0.15.

OCCURRENCE: Found in rough masses or crystals up to several pounds in weight in a pegmatite at Gamba Hill, 25 miles W. N. W. of Kampala, Uganda.

W. F. FOSHAG

### Fülöppite

I. DE FINÁLY AND SÁNDOR KOCH: Fülöppite, a new Hungarian mineral of the plagionite-semseyite group. *Mineral. Mag.*, **22**, 179–184, 1929.