BOOK REVIEW

CATALOGUE OF METEORITES, WITH SPECIAL REFERENCE TO THOSE REPRESENTED IN THE COLLECTION OF THE BRITISH MUSEUM (NATURAL HISTORY). G. T. PRIOR. *London,* **1923,** x+196 pp. Price 10 *s.* Sold by British Museum, Cromwell Road, London, S. W. 7.

In this catalogue will be found, arranged alphabetically, the important data of 850 meteoritic falls, 193 of which are not represented in the British Museum. The information recorded includes in most instances the name by which the meteorite is generally known and its chief synonyms; the locality and date of fall; the weight and classificatory descriptive name; and references to the literature. The chemical analyses have been recalculated to express the percentage of nickeliferous iron, the ratio of Fe:Ni in the nickeliferous iron and the ratio of MgO:FeO in the magnesian silicates.

The system of classification adopted is that of Tschermak and Brezina as modified by Prior. Accordingly the three major divisions based on the relative amounts of nickeliferous iron and stony material are (a) Meteoric Irons or Siderites (b) Meteoric Stony-irons or Siderolites and (c) Meteoric Stones or Aerolites. This last division can be subdivided into (1) Chondritic Stones or Chondrites and (2)Non-chondritic Stones or Achondrites.

As this list includes the names of all meteorites known up to the end of 1922 the catalogue will serve as an extremely useful reference book.

W. F. H.

NEW MINERALS: NEW SPECIES

CLASS: COLUMBATES, TITANATES, ETC. DIVISION: $R'':R''''+R'''''$: $H_2O=1:1:2$

Ellsworthite

T. L. WALKER and A. L. PARSONS: Ellsworthite and associated minerals from Hybla, Ontario. *Contrib. Canad. Min., 1923, Univ. Toronto Stud., Geol. Ser.,* **16,** 13–20, 1923.

NAME: In honor of Dr. H. V. Ellsworth of the Geological Survey of Canada.

CHEMICAL PROPERTIES: Formula approximately $CaO.Cb_2O_5.2H_2O$ or $CaCb_2O_6(H_2O)_2$. Considerable $(UO_2)''$, some Fe, and traces of other elements replace Ca; considerable Ti, some Ta and Si, in some specimens U'''', and traces of others replace the Cb; there is also a little F present.

Two analyses by E. W. Todd gave for lighter and darker forms respectively: CaO 11.73, 13.62; MnO 0.43, 0.22; PbO 0.24, 0.41; Fe_2O_3 4.10, 3.80; Al_2O_3 0.42, none; rare earths 0.21, none; UO_3 18.50, 10.68; Cb_2O_5 34.22, 34.27; Ta_2O_5, 4.32, 4.27; TiO_2 10.47, 9.79; SnO_2 0.10, 0.25; SiO_2 2.54, 2.68; UO_2 none, 8.42; H_2O 12.22, 11.42; F 0.22, 0.49; sums 99.72, 100.32%.

First (Cb, Ta) : (Ti, Sn, Si, U'''') = 3:4; (Ca, Mn, Pb) : $(UO_2)''$: (Fe, Al, r.e.) = 10 : 3 : 2.

Second (Cb, Ta) : (Ti, Sn, Si, U'''') = 2:3; (Ca, Mn, Pb) : $(UO_2)''$: (Fe, Al, r.e.) = 7 : 1 : 1.

PHYSICAL AND OPTICAL PROPERTIES: Color amber yellow in one variety, dark chocolate brown in the other. Luster adamantine. Form massive. Fracture small conchoidal. Refractive index higher than 1.74; isotropic. H.=4; sp. gr. (yellow) 3.608, (brown) 3.758.

OCCURRENCE: Imbedded in salmon-colored calcite and smoky quartz in pegmatite formerly worked for feldspar on Lot 18, Concession VII, Monteagle Township, Hastings County, Ontario.

DISCUSSION: Rather close to ampangabeite, but probably sufficiently distinct to be classed as an independent species.

According to the theory of atom for atom replacement on a volume basis in crystals, the interpretation of the columbate minerals is somewhat different from that usually adopted. Most of the early analyses have been so unsatisfactory that it hardly seemed worth while to apply this theory to them, but now that two accurate analyses made on optically controlled material, indicating a highly complex composition, are available, it may be attempted. Disregarding elements present in amounts less than 0.50%, the approximate volumes of the essential constituents of ellsworthite are, as estimated by averaging or interpolating in existing X-ray crystal structure data:

Ca	22	Cb	14	Si	7+
Fe	10	Ta	12	O	1
U	11	Ti	12	H_2O	11

The two largest atoms, calcium and columbium, are obviously the dominant ones in the compound, and others replace them. The current ideas that Fe″ and $(UO_2)''$ replace Ca in the crystal (as they do in solution) are, however, believed open to question. There is little difficulty in tantalum or titanium, atom for atom, replacing columbium; and if, as seems probable, the volume of silicon in complex compounds is greater than that given (based on study of the adamantine form of the free element), it can likewise enter in this way. The oxygen atoms, being relatively very small, dispose themselves in various interspaces in the amount required by the valence relations, while the water groups may play one of several roles, without affecting the general interpretation of the compound.

Accepting the atom for atom replacement theory, the calculation of "molecular ratios" of a complex crystalline substance will differ from the procedure in the case of a compound in solution, in that the oxides in any one group used must contain corresponding numbers of the atoms other than oxygen; the dominant oxide in the present case being Cb_2O_5, its replacers are to be formulated as Fe_2O_3, Si_2O_4, Ti_2O_4, U_2O_4, Ta_2O_5 and U_2O_6. The ratios of the essential constituents of the two forms of ellsworthite based on the analyses above quoted would then give the following:

		I				II			
Oxide	**Wt.**	%	**Mol. ratios**			%	**Mol. ratios**		
CaO	56.1	11.73	209	209	3	13.62	243	243	4
Cb_2O_5	266.2	34.22	128			34.27	129		
Fe_2O_3	159.7	4.10	26			3.80	24		
Si_2O_4	120.2	2.54	21			2.68	22		
Ti_2O_4	160.0	10.47	65	282	4	9.79	61	291	5
U_2O_4	540.4	——	—			8.42	16		
Ta_2O_5	443.0	4.32	10			4.27	10		
U_2O_6	572.4	18.50	32			10.68	19		
H_2O	18.0	12.22	679	679	10	11.42	634	634	11

The formulas derived by this method, $Ca_3R_8O_{39}(H_2O)_{10}$ and $Ca_4R_{10}O_{49}(H_2O)_{11}$, are rather complex, but there is no evidence that the columbo-titanates ever really approximate to simple compounds. E. T. W.

CLASS: SILICATES; SUB-CLASS, "META-SILICATES." DIVISION: $R':R'':R'':R''':Si=1:1:1:1:4$.

Tuxtlite = Diopside-jadeite

Henry S. Washington: The jade of the Tuxtla statuette. *Proc. U. S. Nat. Mus.*, **60**, *No.* 14, 12 *pp.*; The jades of middle America. *Proc. Nat. Acad. Sci.*, **8**, 319-326, 1922; this mineral p. 321.

Name: After the locality, *Tuxtla*. Also termed diopside-jadeite, from the composition, a solid solution (?) of these two minerals.

Chemical properties: A combination of equal amounts of diopside and jadeite, $MgCaSi_2O_6+NaAlSi_2O_6$ or $NaMgCaAlSi_4O_{12}$; theory Na_2O 7.4, MgO 9.6, CaO 13.4, Al_2O_3 12.2, SiO_2 57.4, sum 100.0%. Analysis gave: Na_2O 6.94, K_2O 0.25, MgO 8.72, FeO 1.33, CaO 12.76, Al_2O_3 12.33, Fe_2O_3 1.41, MnO 0.05, H_2O- 0.20, H_2O+0.10, Cr_2O_3, TiO_2 none, SiO_2 55.50, sum 99.59%. May be a solid solution of the one mineral in the other, or a double salt analogous to dolomite, etc.

Physical properties: Color pea green; sp. gr. = 3.270; H. = 6.5; in thin section typical of the jadeite member of the pyroxenes.

Optical properties (Merwin): Homogeneous and uniform; $\alpha=1.666$, $\beta=1.674$, $\gamma=1.688$, $\gamma-\alpha=0.022$. Optic axial angle about 75°; sign +. Optic plane $=b$, $\alpha_\wedge c=45°$.

Occurence: Known only in the Tuxtla statuette, plowed up near San Andrés de Tuxtla, Mexico; dates from about 96 B.C.

Discussion: More study as to the nature of the solid solution relations seems called for, yet in view of the homogeneity and distinctive properties of the material, it may be accepted as a species. E. T. W.

"Mayaite"

H. S. Washington, *loc. cit.*, p. 325.

Name: After the *Maya* nation, which valued this material as a gem-stone.

Discussion: A name proposed for the series of minerals composed of solid solutions of tuxtlite and albite in all proportions. This series is abundantly represented among Middle American "jade" objects, there being probably two sources of supply, one perhaps in Oaxaca, Mexico, the other in Guatemala. E. T. W.

CLASS: SILICATES; SUB-CLASS, HYDROUS ORTHO-SILICATES; DIVISION $R''':Si:H_2O=4:3:5$.

Kochite

S. Kōzu, K. Seto, and K. Kinoshita: Studies on a new mineral, kochite. *J. Geol. Soc. Tokyo*, **29**, 1-16 (1922). S. Kōzu and S. Saiki: Dehydration of kochite in aqueous vapor at atmospheric pressure. *id.*, 148-154; through *Min. Abstr.* **2**, 51.

Name: From the locality, *Kochi*-mura.

Chemical properties: *Formula*, $2Al_2O_3.3SiO_2.5H_2O$ or $Al_4(SiO_4)_3(H_2O)_5$.

theory, Al_2O_3 43.0, SiO_2 38.0, H_2O 19.0, sum 100.0%. Analysis gave: Al_2O_3 44.13, Fe_2O_3 none, CaO 0.50, MgO 0.08, SiO_2 36.94, TiO_2 0.05, P_2O_5 trace, H_2O 18.94, sum 100.64%. The H_2O is given off at 725-800° in air, 775–950° in aqueous vapor.

CRYSTALLOGRAPHIC PROPERTIES: *System*, isometric. Forms, (100) modified by (111).

PHYSICAL AND OPTICAL PROPERTIES: Color white. Habit, granular aggregate of crystals up to 0.05 mm. in diam. Sp. gr. (15°) = 2.929; $n_D = 1.590$.

OCCURRENCE: In Kōchi-mura, province of Rikuchu, Japan.

DISCUSSION: Appears to be a well marked new species. There is a possibility that it may represent a pseudomorph after some member of the gehlenite group (the crystals of which might be pheno-isometric) analogous to an alteration product from Orawitza, (Dana, System, p. 476 and 694) which has the same Al_2O_3:SiO_2 ratio, and which being a colloid would be variable in H_2O content. E. T. W.

ABSTRACTS: MINERALOGY

REALGAR. R. PILZ, R. SCHRÖDER, AND V. THOST. *Beitr. Kryst. Min.*, **1**, 173-80, 1918; thru *Mineralog. Absts.*, **1**, 343.

Realgar crystals rich in faces are described from Binnenthal, Felsö-Bánya, and China. Seventeen new forms are noted. The axial ratios are calculated as:

	$a:b:c$	β
Binnenthal	0.7207:1:.4859	66°15′
Felsö-Bánya	0.7205:1:.4855	66 15
Allchar (comparison)	0.7203:1:.4858	66 15.6

E. F. H.

PYRARGYRITE MULTIPLE TWINNING. O. B. BÖGGILD, V. GOLDSCHMIDT, AND R. SCHRÖDER. *Beitr. Kryst. Min.*, **2**, 17-25, 1919; thru *Mineralog. Absts.*, **1**, 344.

Complex cyclical groups are caused by multiple twinning on the plane *u* $(10\bar{1}4)$.
E. F. H.

FURTHER GROWTH OF ORTHOCLASE IN SOIL. O. MÜGGE. *Centr. Mineral.*, **1917**, 121-3.

A new growth of orthoclase is recorded as occurring on fragments of the mineral found in soil near Carlsbad and in the Fichtelgebirge. E. F. H.

THE SYMMETRY OF HALITE. V. ROSICKÝ. *Beitr. Kryst. Mineral.*, **1**, 241-56, 1918; thru *Mineralog. Absts.*, **1**, 306.

Cleavage blocks of pure halite were etched with concentrated NaCl solutions, containing 1-2% added H_2O, Na_2CO_3, KCl, or HCl, etc. While the rectangular etch figures are usually parallel to cleavage edges, with added H_2O or Na_2CO_3 they are turned thru 6-27°. This is interpreted to indicate gyrohedral symmetry.
E. F. H.

CRYSTALLOGRAPHIC OBSERVATIONS ON GYPSUM. V. ROSICKÝ. *Rozpravy České Akad.* cl. 2, 25, no. 13, 17pp. **1916**; thru *Mineralog. Absts.*, **1**, 311.

Natural etching on gypsum from Komořany, Bohemia, is similar to that