

A
SYSTEM
OF
MINERALOGY.

DESCRIPTIVE MINERALOGY,

COMPRISING THE
MOST RECENT DISCOVERIES.

BY

JAMES DWIGHT DANA,

SILLIMAN PROFESSOR OF GEOLOGY AND MINERALOGY IN YALE COLLEGE. AUTHOR OF A MANUAL OF GEOLOGY; OF
REPORTS OF WILKES'S U. S. EXPLORING EXPEDITION ON GEOLOGY; ON ZOOPHYTES; AND ON
CRUSTACEA, ETC.

AIDED BY

GEORGE JARVIS BRUSH,

PROFESSOR OF MINERALOGY AND METALLURGY IN THE SHEFFIELD SCIENTIFIC SCHOOL OF YALE COLLEGE.

"Hæc studia nobiscum peregrinantur....rusticantur."

FIFTH EDITION.

REWRITTEN AND ENLARGED, AND ILLUSTRATED WITH UPWARDS OF SIX HUNDRED WOODCUTS.

NEW YORK:
JOHN WILEY & SON, PUBLISHERS,
NO. 2 CLINTON PLACE.

1868.

C

H. = 2.5–3. G. = 7.21. Lustre adamantine, occasionally pearly. Color clear yellowish, sometimes a little greenish. Transparent to translucent.

Comp.—Pb Cl + Pb O = Chlorid of lead 55.5, oxyd of lead 44.5 = 100. Analysis by Dr. R. A. Smith (l. c.):

Pb Cl 55.18 Pb O 44.30 Moisture 0.07 = 99.55.

Rammelsberg found (Pogg. lxxxv. 141), Pb Cl 52.45, Pb O 46.42.

Pyr., etc.—Reacts like mendipite.

Obs.—From an old mine near Cromford in Derbyshire, with phosgenite. Crystals seldom large, but one measures two inches across; according to Kenngott (Min. Not., No. 11), 1 Δ 1, basal = 121° 2', and 2 \wedge 2 \wedge 2 \wedge , basal edge = 136° 17'; also, as a sublimation product at Vesuvius after the eruption of 1858 (R. Cappa, J. pr Ch., lxxx. 381).

151. MENDIPITE. Saltsyradt Bly (Salzsaures Blei) *Berz.*, Ak. H. Stockh., 184, 1823; Ed. J. Sci., i. 379, 1824. New ore of lead from Mendip, Peritomous Lead-baryte, *Haid.*, Mohs's Min., ii. 151, 1825. Muriate of Lead, Chlorid of Lead. Plomb chloruré, pt. *Fr.* Kerasine pt. [rest phosgenite] *Beud. Tr.*, ii. 502, 1832. Chlor-Spath *Breith.*, Char., 61, 1832. Berzelite *Levy Min. Heul.*, ii. 448, 1837. Mendipit *Glock.*, Grundr., 604, 1839.

Orthorhombic; $I \wedge I = 102^\circ 36'$. Observed planes, O , I , $i\bar{2}$, $i\bar{3}$. Occurs in fibrous or columnar masses, often radiated. Cleavage: I highly perfect; diagonal less perfect.

H. = 2.5–3. G. = 7–7.1. Lustre pearly and somewhat adamantine upon cleavage faces. Color white, with a tinge of yellow, red, or blue. Streak white. Feebly translucent—opaque.

Comp.—Pb Cl + 2 Pb O = Chlorid of lead 38.4, oxyd of lead 61.6 = 100. Analyses: 1, Berzelius (Ak. H. Stockh., 1823, Pogg., i. 272, and *Bamm.* 1st Suppl., 24); 2, Schnabel (ib., 3d Suppl., 78); 3, Rhodius (Ann. Ch. Pharm., lxii. 378):

1. Mendip Hills	Pb Cl 39.82	Pb O 60.18 = 100 Berzelius.
2. Westphalia	38.70	61.25 = 99.95 Schnabel.
3. " "	32.55	67.78 = 100.38 Rhodius.

Pyr., etc.—In the closed tube decrepitates and becomes more yellow. B.B. on charcoal fuses easily, and is reduced to metallic lead with elimination of acid vapors, giving the coal a white coating of chlorid of lead, the inner edge of which is yellow from oxyd of lead. With salt of phosphorus bead, previously saturated with oxyd of copper, colors the O.F. azure-blue. Soluble in nitric acid.

Obs.—This rare mineral was formerly found at the Mendip Hills, in Somersetshire, in small radiated crystalline masses on earthy black manganese; it has been met with at Tarnowitz, Silesia, in clay in opaque prismatic crystals; at mine Kunibert near Brillon in Westphalia.

152. SCHWARTZEMBERGITE. Oxychloroiodule de plomb (fr. Atacama) *Domeyko*, Ann. d. M., VI. v. 453, 1864. Schwartzembergite *Dana*.

Rhombohedral. In druses of small crystals. Also in thin amorphous crusts, compact, passing into earthy.

H. = 2–2.5. G. = 5.7, Schwartzemb.; 6.2–6.3, Liebe. Lustre adamantine. Color honey-yellow, when purest; also straw-yellow, inclining to lemon-yellow, sometimes a little reddish. Streak straw-yellow. Brittle.

Comp.—PbI + 2 Pb O, Liebe. More probably, as the analysis so gives, Pb (I, Cl) + 2 Pb O, with I: Cl = 3: 2. Analysis: K. T. Liebe (Jahrb. Min., 1867, 159):

Pb Cl	Pb I	Pb O	Pb $\bar{3}$	Pb \bar{O}	$\bar{S}b$
11.40	30.89	48.92	5.51	1.88	0.91 = 99.51

Liebe regards all the ingredients as impurities except the iodid and oxyd of lead. Domeyko in an imperfect analysis (l. c) obtained Pb Cl 22.8, Pb I 18.7, Pb O 47.1, S 2.5, Ca 1.7, gangue 5.3 = 98.1.

Fyr., etc.—Very fusible, like cerargyrite; in fusing loses its color. On charcoal metallic globules. In a matrass abundant violet vapors of iodine. No effervescence with nitric acid, but loses color, becoming first brownish and then white, and, if some water be added, it dissolves completely on heating.

Obs.—Forms crusts in galenite at a mine 10 leagues from the port of Paposo in the desert of Atacama, where it was discovered by Mr. Schwartzemberg.

153. ATACAMITE. Sable vert cuivreux du Perou, Chaux cuivreuse unie à un peu d'acide muriatique et d'eau, *Rochefoucauld, Baumé & Fourcroy*, Mem. Ac. Paris, 1786 (pub'd in 1788); *Berthollet*, ib., 474 (note added in 1788). Kupfersand, Salzsauers Kupfer, *Karsk.*, Tab., 46, 76, 1800. Cuivre muriaté H., Tr., 1801. Muriate of Copper. Atacamit, Salzkupfererz, *Blumenbach*, Handb. Nat., 1805. Kupferhornerz, Atacamit, *Ludwig*, Min., ii. 178, 1804. Smaragdochalcit *Hausm.*, Handb., 1039, 1813. Halochalcit *Breith.*, Handb., 165, 1841. Remolinite *B. & M.*, Min., 618, 1852. Marcyite *Shep.*, Marcy's Expl. Red River, 135, 800, Washington, 1854, Am. J. Sci., II, xxi. 206; Dana, ib., xxiv. 122. Botallackite *A. H. Church*, J. Ch. Soc., II. iii. 212, 1865.

Orthorhombic. $I \wedge I = 112^\circ 20'$, $O \wedge 1-\bar{i} = 131^\circ 29'$; $a:b:c = 1.131:1:1.492$. Observed planes: vertical, $I, i-\bar{i}, i-\bar{i}, i-\bar{i}, i-\bar{i}$; domes, $1-\bar{i}, 1-\bar{i}$; octahedral, $i-\bar{i} \wedge i-\bar{i}$, ov. $i-\bar{i}, = 106^\circ 34'$, $i-\bar{i} \wedge i-\bar{i}$, ib., $= 139^\circ 4'$, $1-\bar{i} \wedge 1-\bar{i}$, top $= 105^\circ 40'$, $I \wedge 1 = 143^\circ 42'$, $1 \wedge 1$, mac., $= 126^\circ 40'$. Usual in modified rectangular prisms, and rectangular octahedrons. Twins: composition-face I ; consisting of three individuals. Cleavage: $i-\bar{i}$ perfect, $1-\bar{i}$ imperfect. Occurs also massive lamellar.

H. = 3—3.5. G. = 4—4.3; 3.7, *Breith.* Lustre adamantine—vitreous. Color various shades of bright green, rather darker than emerald, sometimes blackish-green. Streak apple-green. Translucent—subtranslucent.

Comp.—3 Cu H + Cu Cl H = ($\frac{2}{3}$ Cu + $\frac{1}{3}$ Cu Cl) H = Oxyd of copper 58.6, chlorid of copper 30.2, (chlorine 16.0, copper 14.3), water 16.2 = 100. The ore of Cobjia (anal. 1) and *botallackite* (anal. 8) contain half more of water, giving the formula 3 Cu H + Cu Cl H + 2 aq. Analyses: 1, *Berthier* (Ann. d. M., III. vii. 542); 2, 3, *Bibra* (J. pr. Ch., xvi. 203); 4, 5, *F. Field* (J. Ch. Soc., vii. 193); 6, *Mallet* (Ramm., 5th Suppl., 57); 7, 8, *Church* (J. Ch. Soc., II. iii. 81, 213):

	Cl	Cu	Cu	H	
1. Bolivia, Cobjia	14.92	50.00	13.38	21.75	= 100 <i>Berthier</i> .
2. " Algodon	14.96	52.54	13.33	19.17	= 100 <i>Bibra</i> .
3. " "	15.07	52.40	14.00	18.53	= 100 <i>Bibra</i> .
4. Copiapo	14.94	—	56.46	17.79	<i>Field</i> .
5. " "	15.01	—	56.24	18.00	<i>Field</i> .
6. Chili	16.33	55.94	14.54	12.96	quartz 0.08 = 99.85 <i>Mallet</i> .
7. Cornwall	15.20	54.32	13.57	16.91	= 100 <i>Church</i> .
8. Botallackite	14.51	66.25	—	22.60	= 103.36 <i>Church</i> .

Anal. 4 corresponds to Cu Cl 28.22, Cu 53.99, H 17.79; and 5 to Cu Cl 28.35, Cu 53.62, H 18.00. For other analyses see *Ulex*, Ann. Ch. Pharm., lxi. 361.

Fyr., etc.—In the closed tube gives off much water, and forms a gray sublimate. B.B. on charcoal fuses, coloring the O.F. azure-blue, with a green edge, and giving two coatings, one brownish and the other grayish-white; continued blowing yields a globule of metallic copper; the coatings touched with the R.F. volatilize, coloring the flame azure-blue. In acids easily soluble.

Obs. This species was originally found in the state of sand in the Atacama province, northern part of Chili. It occurs in different parts of Chili, especially at Los Remolinos; also in veins in the district of Tarapaca, Bolivia; at Tocopilla, 16 leagues north of Cobjia, an important locality, in Bolivia; with malachite in South Australia; at the extraordinary malachite locality in the Serra do Bembe, near Ambriz, on the west coast of Africa; at the Estrella mine in southern Spain; at St. Just in Cornwall, in crusts and stalactitic tubes. Botallackite occurs at the Botallack mine, Cornwall, in thin crusts of minute interlacing crystals, closely investing killas; *Schwarzenberg* in Saxony; also supposed to invest some of the lavas of Vesuvius, but questioned by *Scacchi*, the mineral so called being a basic sulphate (Mem. Incend. Vesuv., 1855).