

A
SYSTEM
OF
MINERALOGY.

DESCRIPTIVE MINERALOGY,

COMPRISING THE
MOST RECENT DISCOVERIES.

BY

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

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| 7. Easton, Pa.; silvery white | 1°—2° Graillich. |
| 8. Fassa, Tyrol; resembling meroxene | 1 —3 “ |
| 9. Easton, Pa.; green | 3 —4 “ |

Graillich found the angle O° , or zero, in mica from Zillertal; Norway, dark green; Kariat, dark olive-green; Retzbanya, greenish to colorless; Goshen, pistachio-green; Leonfelden, black; Magura, dark red; Altenberg, dark bluish; Horn, black; Bessterce, dark; Anaksirksarklich, liver-brown.

The Vesuvian biotite found on Mt. Somma (Meroxene of Breith.) occurs in brilliant crystals with numerous polished facets. Other foreign localities are named in connection with the analyses. The mica from Greenwood Furnace, Monroe, N. Y., analyzed by von Kobell (anal. 1), occurs in large and very regular rhombic prisms (sometimes 5 or 6 in. across) oblique from an acute edge; and also in tetrahedral pyramids; the faces of the pyramids incline to the cleavage plane at 113° to 114° ; v. Kobell gives for the angle $R \wedge R$ (faces of the pyramid) 71° to 72° . This is the same mica with that analyzed by Smith and Brush (anal. 2, 3), as Prof. Brush has assured himself by an examination of von Kobell's specimens at Munich.

Alt.—*Rubellan* is considered an altered biotite; it occurs in small hexagonal forms, of a red color, in a kind of wacke. Steatite is also a result of the alteration of this species, as in granite at Brünn and Thierschein. Among the above analyses, several indicate incipient change by the water and chlorine present. Mica, altered to magnetite, has been observed in the Tyrol.

The *Eukamptite* of Kenngott (Uob., 1853, 58, 1855, and described under the name *Chlorit ähnliches Mineral* in Ber. Ak. Wien, xl. 609, 1853) is a hydrous biotite, probably a result of alteration, from Presburg, Hungary. It is between mica and chlorite in its characters. Color nearly black, but in very thin folia brown to hyacinth-red or reddish-yellow; $H=2-2.5$; $G=2.73$. Composition, according to an analysis by v. Hauer (l. c.), Si 38.18, Al 21.60, Fe 19.92, Mn 2.61, Mg, by loss, 13.76, H 3.98=100, giving the oxygen ratio for R, \bar{R} , Si, H=1 : 1 : 2 : $\frac{1}{2}$. The *Voigtite* of Schmid may also be a hydrated biotite. See under HYDROUS SILICATES, p. 393.

290. LEPIDOMELANE. Hausmann, Gel. Anz. Gött., 945, 1840.

Hexagonal? In small six-sided tables, or an aggregate of minute scales. Cleavage basal, eminent, as in other micas.

$H=3$. $G=3.0$. Lustre adamantine, inclining to vitreous, pearly. Color black, with occasionally a leek-green reflection. Streak grayish-green. Opaque, or translucent in very thin laminae. Somewhat brittle, or but little elastic. Optically unaxial; or biaxial with a very small axial angle.

Comp.—An iron-potash mica. O. ratio for bases and silica 1 : 1; for R, \bar{R} , mostly 1 : 3, but varying to 1 to more than 3; of doubtful limits, on account of the doubts as to the state of the iron in most of the analyses. 1 : 3 for the ratio of R, \bar{R} gives $(\frac{1}{2}R + \frac{1}{2}\bar{R})^2 Si^2$. Differs from biotite in the smaller proportion of protoxyds and little alumina and magnesia, but appears to agree with it in optical characters.

Analyses: 1, Soltmann (Pogg., l. 664); 2, Svanberg (Ak. H. Stockh., 178, 1839); 3-7, Haughton (J. G. Soc., xv. 129, xviii. 418, Phil. Mag., IV. xviii. 259); 8, Illing (Gieb. u. Heintz, ZS. Nat., 1854, 339):

	Si	Al	Fe	Fe	Mn	Mg	Ca	Na	K	H	
1. Wernland	37.40	11.60	27.66	12.43	—	0.26	—	9.20	0.60	99.49	Soltm.
2. Abborfors	39.45	9.27	35.78	1.45	2.54	3.29	0.31	—	5.06	1.83, Ca 0.32, F 0.79=	99.53 Svanb.
3. Jonesed, Sw.	39.70	12.25	23.55	0.96	1.00	7.25	4.48	0.47	7.30	1.00	99.76 Haughton.
4. Carlow Co.	35.55	17.08	28.70	3.55	1.95	3.07	0.81	0.35	9.45	4.30	99.61 Haughton.
5. Ballygihen	36.20	15.95	27.19	0.64	1.50	5.00	0.50	0.16	8.65	3.90	99.69 Haughton.
6. Glenveagh	36.16	19.40	26.31	0.82	0.40	4.29	0.58	0.48	9.00	2.40	99.64 Haughton.
7. Canton	35.50	20.80	19.70	7.74	1.70	4.48	0.56	0.10	9.00	0.25	99.81 Haughton.
8. Haindorf, Silesia	36.98	20.25	23.14	—	—	6.16	2.96	5.44	8.52	—	108.45 Illing.

The original lepidomelane, anal. 1, affords the O. ratio 1 : 3 : 4. The Irish variety (anal. 4, 5, 6, 7) affords as a mean result, 1 : 3.3 : 4.1; No. 4 is from Ballyellin, and 5, 6, from Donegal Co. The Abborfors mica affords 1 : 4.6 : 6.2; but if the water be made basic, 1 : 3.1 : 4.3; and anal. 8 corresponds to 1 : 3.2 : 3.8; both near 1 : 3 : 4. The mineral of the last has $G=3.96$, and is very fusible.

Fyr., etc.—B.B. at a red heat becomes brown and fuses to a black magnetic globule. Easily decomposed by muriatic acid, depositing silica in scales.

Obs.—A scaly-massive mineral at Persberg in Wermland, Sweden, containing imbedded prisms of hornblende, the scales half a line or so across; mica-like at Abborfors in Finland; in granite in Ireland, at Ballyellin in Carlow Co., Leinster, at Ballygihen in Donegal Co., and at Canton, mostly in largish crystals or plates ($\frac{1}{4}$ inch across and larger). The Donegal and Leinster Co. mica is optically uniaxial, according to Haughton. The granite contains also a white muscovite (see anal. 8-11, under MUSCOVITE); and in some cases the black and white form parts of the same crystal; and, where so, the optic-axial divergence of the muscovite was diminished, according to some trials, 20° . Named from *lewis*, *scale*, and *μλας*, *black*.

Alt.—Haughton gives the following as the composition of an altered form of the black mica of Donegal Co., Ireland (Nos. 5, 6, above); it was from Castle Caldwell: $\text{Si } 31.60$, $\text{Al } 19.68$, $\text{Fe } 23.35$, $\text{Fe } 4.04$, $\text{Mn } 1.20$, $\text{Mg } 7.03$, $\text{Ca } 0.45$, $\text{Na } 0.74$, $\text{K } 3.90$, $\text{H } 8.68=100.67$. It approaches a chlorite.

PYRROLITE of Breithaupt (B. H. Ztg., xxiv. 336) appears to be an altered lepidomelane, of a pearly lustre, and a color between olive-green and liver-brown; scaly massive in texture. In the analysis by R. Müller he found part of the mineral soluble in heated muriatic acid and part not; and in analyses of the whole and the parts separately, the following results:

	Si	Al	Fe	Fe	Mg	Ca	Na	K	H
1. The whole	39.38	6.65	19.89	16.43	0.56	5.47	2.81	7.86	1.39
2. Sol. part	36.08	4.99	25.98	14.28	—	5.43	3.68	7.96	1.31
3. Insol. part	50.14	12.03	—	23.43	—	6.88	—	7.52	—

The O. ratio for the soluble part is 2 : 3 : 5; for the insoluble, 3 : 2 : 10. It occurs at Brevig, Norway, with astrophyllite, wöhlerite, ægirite, etc.

A Brevig mica afforded A. Dufrance (ZS. G., xiv. 100) $\text{Si } 35.93$, $\text{Al } 10.98$, $\text{Fe } 9.82$, $\text{Fe } 26.93$, $\text{Mn } 0.72$, $\text{Mg } 5.13$, $\text{Ca } 1.04$, $\text{Na } 5.18$, $\text{K } 0.24$, $\text{H } 4.30$, $\text{Ti } 0.99=101.26$. It is probably an altered mica, as shown by the amount of soda present.

BASTONITE is a mica in large plicated plates, of a greenish-brown color, greasy lustre, very small optical angle, easily fusible into a black enamel, discovered by Dumont in a quartzite from Bastogne, Duchy of Luxembourg (Descr. Min., 498, 1862).

A brownish-black mica from Renchtal, in the Schwarzwald, with slight optic-axial angle and pearly metalloidal lustre, afforded Nessler (Jahresb., 1863, 820) $\text{Si } 38.34$, $\text{Al } 33.80$, $\text{Fe } 13.73$, $\text{Fe } 7.40$, $\text{Mg } 0.36$, $\text{Na } 0.56$, $\text{K } 4.22$, $\text{H } 1.36$, Fr. , $\text{Ti } 0.60=100.37$.

291. **ANNITE Dana.** The lepidomelane of Cape Ann, described and analyzed by J. P. Cooke (Am. J. Sci., II. xliii. 222), differs, according to the analyses, in having the O. ratio 1 : 2 : 3, instead of 1 : 3 : 4. In optical and other physical characters it is like lepidomelane. It occurs in plates and disseminated scales; $\text{H}=3$; $\text{G}=3.169$; color black; streak dark green; opaque, except in very thin folia. Cooke obtained:

	Si	Al	Fe	Mn	Fe	Mg	Li	K	Na, Rb	H	Si F ^a
A. (3)	39.55	16.73	12.07	0.60	17.48	0.62	0.59	10.66	tr.	1.50	0.62=100.42.
B.	37.39	16.66	13.74	0.64	19.03	0.59	—	10.20	—	1.75	—=100.

Anal. B is deduced from A on the supposition that the mineral was mixed intimately (as a result of contemporaneous crystallization) with cryophyllite, an associated species at the locality, and that the amount of lithia indicated the proportion of cryophyllite. O. ratio deduced for the latter for R , R , Si , $\text{H}=6.2 : 12.1 : 19.9 : 1.6$. It may be found that the biotites having the O. ratio for R , $\text{R}=1 : 2$ should be here placed.

Occurs in the Cape Ann granite, with cryophyllite, orthoclase, albite, and zircon (cyrtilite).

292. ASTROPHYLLITE. *Astrophyllit Scheerer*, B. H. Ztg., xiii. 240, 1854.

Orthorhombic; habit monoclinic. $I \wedge I=120^\circ$. Usually in tabular prisms; often lengthened into strips with parallel sides in the direction of the shorter diagonal. Observed form a narrow tabular crystal, terminating in front in two planes of an octahedron, and below these one of a macrodome; the front angle of the former 160° , and the edge between the planes inclined to O 125° ; O on the macrodome 130° . Cleavage: basal eminent. Sometimes in stellate groups.

$\text{H}=3$. $\text{G}=3.324$, Pisani. Lustre submetallic, pearly. Color bronze-yellow to gold-yellow. Powder resembling that of mosaic gold. Translu-