

A
SYSTEM
OF
MINERALOGY,
COMPRISING THE
MOST RECENT DISCOVERIES:

INCLUDING
FULL DESCRIPTIONS OF SPECIES AND THEIR LOCALITIES, CHEMICAL ANALYSES
AND FORMULAS, TABLES FOR THE DETERMINATION OF MINERALS,
AND A TREATISE ON MATHEMATICAL CRYSTALLOGRAPHY
AND THE DRAWING OF FIGURES OF CRYSTALS.

ILLUSTRATED BY NUMEROUS WOOD CUTS AND FOUR COPPER PLATES.

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A.

H.=4. G.=3·14—3·178. Lustre vitreous; sometimes splendid; usually glimmering in the massive varieties. Streak white. Color white, yellow, green, rose and crimson-red, violet-blue, sky-blue, and brown: wine-yellow, greenish and violet-blue, are the most common; the red varieties are the rarest. Transparent—subtranslucent. Brittle. Fracture of fine massive varieties flat conchoidal and splintery.

Composition.—CaF=Fluorine 48·6, and calcium 51·4.

Berzelius found 0·5 of phosphate of lime in the fluor spar of Derbyshire. Kersten, in a fluor from Marienberg and Freiberg, detected a little muriatic acid. Schaffhäuti (Ann. d. Ch. u. Ph. lxxi, 344) states that a violet-blue fluor of Welsersdorf contained 0·02078 nitrogen, 0·00584 hydrogen, 0·0365 carbon, and 0·08693 chloric acid.

Below a red heat, the coarsely pulverized spar is vividly phosphorescent; the light is of various colors, and independent of the external color. The variety *chlorophane* emits a bright emerald-green light. At a high temperature, phosphorescence ceases, but it is partially restored by an electric discharge. (§ 222.) B.B. decrepitates, and ultimately fuses to an enamel. If the flame be continued, the fluorine is in part expelled, and the specimen assumes a cauliflower appearance. Gives the reaction of fluorine, (p. 165).

Seldom in beds, but generally in veins, intersecting gneiss, mica slate, clay slate, and also several secondary rocks. In the north of England, it is the gangue of the lead veins, which intersect the coal formations of Northumberland, Cumberland, Durham, and Yorkshire. In Derbyshire, it is abundant; and also in Cornwall, where the veins intersect much older rocks. It is a common mineral in the mining districts of Saxony. In the dolomites of St. Gothard it occurs in pink octahedrons; and at Münsterthal in Baden in flesh-red hexakisoctahedrons. It has been detected in cannel coal by Prof. Rogers.

The most remarkable locality of fluor spar in the United States, was discovered on the borders of Muscalonge lake, in Jefferson Co., N. Y., where cubical crystals, some of them more than a foot through, and having a greenish tinge, occur in granular limestone. Rossie and Johnsburgh, St. Lawrence county, have afforded some fine crystals of fluor. In Gallatin county, Illinois, for thirty miles along the Ohio, in the region southwest of Cone's Rock, at Shawneetown, and other places, a dark purple fluor, often in large crystals, occurs through the soil, or in limestone. At the north village of Westmoreland, N. H., two miles south of the meeting house, of white, green, and purple shades, constituting a vein with quartz; also, sparingly, at the Notch in the White Mountains, green octahedrons in a crystalline quartz. Some fine veins have been discovered on Long Island, Blue Hill Bay, Maine. It also occurs sparingly of a green color at Putney, Vt.; in Shenandoah county, Virginia, near Woodstock, in the fissures of a limestone; on the Potomac, at Shepardstown, in white limestone; in Smith county, Tennessee, in white and purple cubes; at Lockport, N. Y., in white cubes with celestine in limestone; in cubes near Rochester and Manlius in limestone; at Amity, N. Y., in thin seams with spinel and tourmaline; at the Southampton lead mine in Massachusetts; and near the Franklin Furnace, New Jersey.

The variety *chlorophane* forms two veins in gneiss, each about 18 inches wide, in the town of Trumbull, Conn., along with topaz and magnetic pyrites.

HAYESINE. Borate of lime, *A. A. Hayes*. Borocalcite. Boreaureralk.

In masses having a globular form, consisting of interwoven fibres. Opaque, snow-white, silky, and having a peculiar odor.

Composition.—CaB³+6H= Lime 18·51, boracic acid 45·95, water 35·54. Hayes obtained Lime 18·89, boracic acid 46·11, water 35·00. In warm water the fibrous masses expand and form a consistent paste with more than eight times their volume.

This salt occurs quite abundantly on the dry plains near Iquique, S. A., associated with magnesian alum, (Pickeringite of Hayes), where it was obtained by Mr. J. H. Blake.

A similar compound (probably the same mineral) has been analyzed by Ulex (Ann. Ch. u. Pharm. lxx, 49) with the following result:

Lime 15·7,	Soda 8·8,	Boracic acid 49·5,	Water 26·0,
15·9,	“ 8·8,	“ 49·5,	“ 25·8,

giving the formula $\text{Na B}^3 + \text{Ca}^2\text{B}^3 + 10\text{H}$. It occurs in Southern Peru, in white resiniform masses, from the size of a hazelnut to that of a potato, and is there called *teza*. On fracturing them, they are found to consist of white silky interwoven fibres, which rapidly absorb water, and have a slight saline taste.

HYDROBORACITE. Hydrous Borate of Lime and Magnesia. Hydrous Calcareo-borate of Magnesia, *Thomson*.

Resembles fibrous and foliated gypsum.

H.=2. G.=1.9. Color white, with spots of red from iron. Thin plates translucent.

Composition.— $\text{Ca}^2\text{B}^3 + \text{Mg}^2\text{B}^3 + 18\text{H}$ = Boracic acid 47.43, lime 14.52, magnesia 10.53, water 27.52. Analyses by M. Hess, (*Pogg.* xxxi, 49):

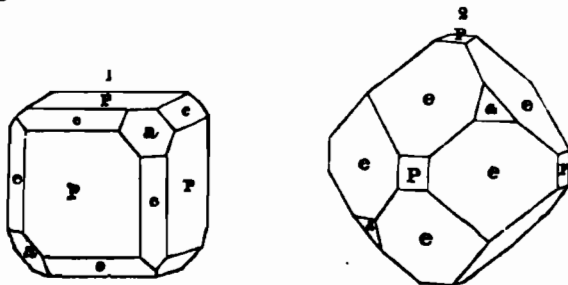
	B	Ca	Mg	H
1.	49.922	13.298	10.430	26.330=100.
2.	49.22	13.74	10.71	26.33 =100.

B.B. fuses to a clear glass, tinging the flame slightly green, and not becoming opaque. In a matrass affords water. Somewhat soluble in water, and yielding a slightly alkaline reaction. Dissolves easily in muriatic and nitric acids.

Hydroboracite was first observed by Hess, in a collection of Caucasian minerals. The specimen was full of holes filled with clay, containing different salts. It may be mistaken for gypsum, but is readily distinguished by its fusibility.

BORACITE, *Werner*. Borate of Magnesia, *F.* Borazit. Magnésio-borátée, *H.*

Monometric; hemihedral. In cubes, dodecahedrons, and other forms, with tetrahedral replacements, figs. 28, 33, pl. 1, and the following:



Cleavage octahedral, in traces. Also amorphous.

H.=7. G.=2.974, *Haidinger*; 2.9134, massive, *Karsten*. Lustre vitreous, inclining to adamantine. Streak white. Color white, inclining to gray, yellow, and green. Subtransparent—translucent. Fracture conchoidal, uneven. Pyro-electric.

Composition.— Mg^2B^3 = Magnesia 30.45, boracic acid 69.55. *Stromeyer*, (*Gilbert's Annalen*, xlviii, 215), *Arfvedson*, (*K. V. Ac. H.*, 1822, p. 92), and *Rammelsberg*, (*Pogg.* xlix, 445), obtained

Boracic acid,	67	69.7	69.252
Magnesia,	33=100, <i>St.</i>	30.3=100, <i>Arf.</i>	30.748=100, <i>Ram.</i>

A compact boracite from *Strassfurth* afforded *Karsten*, (*Pogg. Ann.* lxx, 557), magnesia 29.48, boracic acid 69.49, with 1.03 of carbonate of iron and manganese, and hydrated oxyd of iron.

TACHYLITE.—Massive, or in plates. No cleavage. $H=6.5$. $G=2.5-2.54$. Lustre vitreous to greasy. Color velvet-brown—black. Opaque. Fracture small conchoidal.

Composition.—Analysis by Gmelin, of the variety from Vogelgebirge,

Si	Ti	Al	Fe	Ca	Mg	Na	K	Mn	H&Am
50.22	1.42	17.84	10.27	8.25	3.37	5.18	3.87	0.40	0.50=101.81,

leading to the formula R^3Si^2+AlSi . But the species is probably bad. A similar mineral from Säsebühl near Dransfeld, afforded Schnedermann,

Si 55.74,	Al 12.40,	Fe 13.06,	Mg 6.92,	Na 3.88,	K 0.60,	Mn 0.19,	H 2.78=99.80.
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B.B. melts easily, with intumescence to a brown slag or opaque glass.

Occurs at Säsebühl in basalt and wacke, and resembles obsidian or gadolinite in external characters; also at Vogelgebirge; sp. gr. of this variety, (called *Hyalomelan* by Hausmann), 2.7144. (*Breithaupt*, *Kastner's Archiv*. vii, 112. *Gmelin*, *Pogg. xlix*, 233).

On the north shore of Lake Superior occurs a mineral resembling Tachylite, (and not Tautolite, as it has been called); also in a trap dyke at Johnsburg, Warren Co., N. Y.

TETRADYMITZ, p. 414.—The Virginia tellurium ore, referred to tetradymite, was first made known by C. T. Jackson, in the *Am. J. Sci.* [2], vi, 188, 1848, where after some blowpipe trials, it was published as essentially a telluret of lead. Two analyses by Jackson, recently made (private communication), have afforded

Te 81.61	Bi 55.28	Au, Fe earthy matter 3.6,	S and loss 9.53,	Se trace.
32.550	58.568	" "	2.7	" 3.65, Se trace=95.466.

The tests and trials gave no weighable quantity of selenium, and in this respect the results differ widely from Fisher's, (p. 415). Dr. Jackson adds the following particulars with regard to the mineral. In foliated scales or lamellar masses, frequently intersecting one another. Lustre splendid and metallic. Streak lead-gray. $H=1$. Laminae or scales flexible like graphite, and sectile.

Occurs in mica slate and in quartz veins in nodules and incrustated with yellow oxyd of bismuth, associated and mixed with native gold, or having gold between its folia, the proportion of gold amounting to 2 to 5 per cent. Also incrustating masses of gold, and sometimes the gold is marked with impressions of the edges of the crystals of the tellurium ore.

TITANIC IRON, p. 432.—Hermann infers that titanic iron contains protoxyd of iron and titanic acid, instead of peroxyds of iron and titanium, as suggested by Rose, (see p. 433), and he makes Fe , $FeTi$, Fe^2Ti^2 isomorphous, (*J. f. pr. Ch.* xliii, 60).

Rammelsberg objects to this view, remarking on the improbability of it, and stating that the hypothesis of isomorphism between compounds of the kind mentioned is altogether an assumption. The argument drawn by Hermann from the magnetism of the mineral is set aside by the observations of Rose and Scheerer, (*Ramm.* 4th Supp. p. 236).

TOURMALINE, p. 362.—Analyses by Hermann, (*J. f. pr. Ch.* xxxv, 382),

	Si	B	Al	Fe	Fe	Mg	Mn	Li	Na
1. <i>Black</i> ,	39.00	10.72	30.65	1.68	6.1	9.44	—	—	0 2.50=100.
2. <i>Brown</i> ,	37.80	9.90	30.56	0.50	12.07	1.42	2.50	0.50	2.09, 0 1.66=100.
3. <i>Green</i> ,	40.54	11.78	31.77	—	3.65	6.44	0.90	2.09	—, 0 1.66, Cr 1.17=100.
4. <i>Red</i> ,	42.89	5.84	44.09	—	—	0.45	0.27	2.19	3.12, 0 1.66=100.
5. <i>Red</i> ,	39.70	6.65	40.29	—	—	0.16	2.30	3.02	7.68=100.

ULEXITE.—The species of borate, (see p. 217), analyzed by Ulex, from Chili, differs so widely from that examined by Hayes, that it seems to require a distinct appellation.

URANITE, p. 409.—Analysis by Werther, (*J. f. pr. Ch.* xliii, 332),

P 14.00,	S 63.28,	Ca 5.86,	Ba 1.08,	H 14.80=98.47,
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agreeing with the result obtained by Berzelius. The mineral was from Autun.