Obs.—As noted above, uraninite occurs either as a primary constituent of granitic rocks or as a secondary mineral with ores of silver, lead, copper, etc. Under the latter condition it is found at Johanngeorgenstadt, Marienberg, and Schneeberg in Saxony, at Joachimsthal and Přibram in Bohemia, and Rezbánya in Hungary. Occurs in Norway in pegmatite veins at several points near Moss, viz.: Åneröd (*bröggerite*), Elvestad, etc.; also near Arendal at the Garta feldspar quarry (*cleveite*), associated with orthite, fergusonite, thorite, etc.

In the U. States, at the Middletown feldspar quarry, Conn., in large octahedrons, rare; at Hale's quarry in Glastonbury, a few miles N.E. of Middletown. At Branchville, Conn., in a pegmatite vein, as small octahedral crystals, embedded in albite. In N. Carolina, at the Flat Rock mine and other mica mines in Mitchell Co., rather abundant, but usually altered, in part or entirely, to gummite and uranophane; the crystals are sometimes an inch or more across and cubic in habit. In S. Carolina, at Marietta. In Texas, at the gadolinite locality in Llano Co. (*nivenite*). In large quantities at Black Hawk, near Central City, Colorado. Rather abundant in the Bald Mountain district, Black Hills, S. Dakota. Also with monazite, etc., at the Villeneuve mica veins, Ottawa Co., Quebec, Canada.

Gummite. An alteration-product of uraninite of doubtful composition. In rounded or flattened pieces, looking much like gum. G. = 3·9–4·20. Luster greasy. Color reddish yellow to orange-red, reddish brown. From Johanngeorgenstadt, also Mitchell Co., N. C.

YTTROGUMMITE. Occurs with cleveite as a decomposition-product.

THOROGUMMITE. Occurs with fergusonite, cyrtolite, and other species at the gadolinite locality in Llano Co., Texas.

Uranosphærite. $(BiO)_2U_2O_7.3H_2O$. In half-globular aggregated forms. Color orange-yellow, brick-red. From near Schneeberg, Saxony.

Oxygen Salts.

6. SULPHATES, CHROMATES, TELLURATES.

A. Anhydrous Sulphates, etc.

The important BARITE GROUP is the only one among the anhydrous sulphates and chromates.

Mascagnite. Ammonium sulphate, $(NH_4)_2SO_4$. Usually in crusts and stalactitic forms. Occurs about volcanoes, as at Etna, Vesuvius, etc.

Taylorite. $5K_2SO_4.(NH_4)_2SO_4$. In small compact lumps or concretions. From the guano of the Chincha Islands.

Thenardite. Anhydrous sodium sulphate, Na_2SO_4. In orthorhombic crystals, pyramidal, short prismatic or tabular; also as twins (Fig. 346, p. 118). White to brownish. Soluble in water. Often observed in connection with salt lakes, as on the shores of Lake Balkhash, Central Asia; similarly elsewhere; also in S. America in Tarapaca. In the U. S. forms extensive deposits on the Rio Verde, Arizona. In California, at Borax Lake, San Bernardino Co.

Aphthitalite. Arcanite, $(K,Na)_2SO_4$. Rhombohedral; also massive, in crusts. Color white. From Vesuvius, upon lava; at Douglashall near Westeregeln in blödite; Rocalmuto, Sicily.

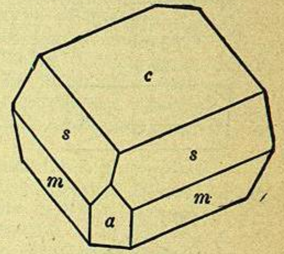
GLAUBERITE.

Monoclinic. Axes $\grave{a} : \bar{b} : \dot{c} = 1·2200 : 1 : 1·0275$; $\beta = 67° 49'$.

ca, $001 \wedge 100 = 67° 49'$. *cs*, $001 \wedge 111 = 43° 2'$.

mm'', $111 \wedge 1\bar{1}1 = 96° 58'$. *cm*, $001 \wedge 110 = 75° 30\frac{1}{2}'$.

953.



In crystals tabular ‖ *c*; also prismatic.

Cleavage: *c* perfect. Fracture conchoidal. Brittle. H. = 2·5–3. G. = 2·7–2·85. Luster vitreous. Color pale yellow or gray; sometimes brick-red. Streak white. Taste slightly saline. On the optical properties (see p. 225).

Comp.—$Na_2SO_4.CaSO_4$ = Sulphur trioxide 57·6, lime 20·1, soda 22·3 = 100; or, Sodium sulphate 51·1, calcium sulphate 48·9 = 100.

Pyr., etc.—B.B. decrepitates, turns white, and fuses at 1·5 to a white enamel, coloring the flame intensely yellow. On charcoal fuses in O.F. to a clear bead; in R.F. a portion is absorbed by the charcoal, leaving an infusible hepatic residue. Soluble in hydrochloric acid. In water it loses its transparency, is partially dissolved, leaving a residue of calcium sulphate, and in a large excess this is completely dissolved.

Obs.—In crystals in rock salt at Villa Rubia, in New Castile, Spain; also at Aussee, Upper Austria; Berchtesgaden, Bavaria; Westeregeln; Stassfurt. In crystals in the Rio Verde Valley, Arizona, with thenardite, mirabilite, etc.; Borax lake, San Bernardino Co., California.

Langbeinite. $K_2Mg_2(SO_4)_3$. Isometric-tetartohedral. In highly modified colorless crystals. G. = 2·83. From Westeregeln, Germany.

Barite Group. RSO_4. Orthorhombic.

		$m \wedge m'''$ $110 \wedge 1\bar{1}0$	dd' $102 \wedge \bar{1}02$	oo' $011 \wedge 0\bar{1}1$	$\breve{a} : \bar{b} : \dot{c}$
Barite	$BaSO_4$	78° 22½′	77° 43′	105° 26′	0·8152 : 1 : 1·3136
Celestite	$SrSO_4$	75° 50′	78° 49′	104° 0′	0·7790 : 1 : 1·2801
Anglesite	$PbSO_4$	76° 16½′	78° 47′	104° 24½′	0·7852 : 1 : 1·2894
Anhydrite	$CaSO_4$	(83° 33′)	(58° 31′)	(90° 3′)	0·8933 : 1 : 1·0008

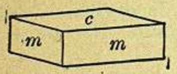
The BARITE GROUP includes the sulphates of barium, strontium, and lead, three species which are closely isomorphous, agreeing not only in axial ratio but also in crystalline habit and cleavage. With these is also included calcium sulphate, anhydrite, which has a related but not closely similar form; it differs from the others conspicuously in cleavage. It is to be noted that the carbonates of the same metals form the isomorphous ARAGONITE GROUP, p. 353.

BARITE. Heavy Spar. Barytes. Schwerspath *Germ.*

Orthorhombic. Axes $\breve{a} : \bar{b} : \dot{c} = 0{\cdot}8152 : 1 : 1{\cdot}3136$.

mm‴, $110 \wedge 1\bar{1}0$ = 78° 22½′.
cd, $001 \wedge 102$ = 38° 51½′.
co, $001 \wedge 01\bar{1}$ = 52° 43′.
dd‴, $102 \wedge 10\bar{2}$ = 102° 17′.
oo‴, $011 \wedge 01\bar{1}$ = 74° 34′.
cz, $001 \wedge 111$ = 64° 19′.

954.



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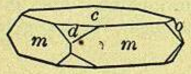

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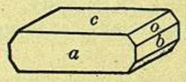

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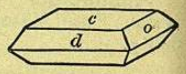

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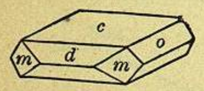

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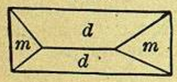

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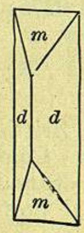

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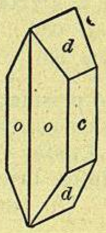

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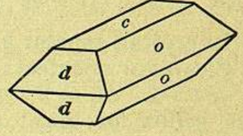

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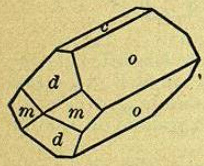

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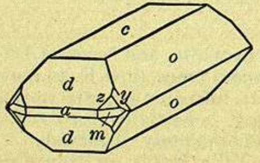

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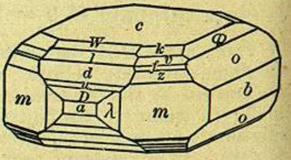


Crystals commonly tabular ‖ *c*, and united in diverging groups having the axis $\bar{b}$ in common; also prismatic, most frequently ‖ axis $\bar{b}$, *d* (102) predominating; also ‖ axis $\dot{c}$, *m* prominent; again ‖ $\breve{a}$, with *o* (011) prominent. Also in globular forms, fibrous or lamellar, crested; coarsely laminated, laminæ convergent and often curved; granular, resembling white marble, and earthy; colors sometimes banded as in stalagmite.

Cleavage: *c* perfect; *m* also perfect, Fig. 954 the form yielded by cleavage; also *b* imperfect. Fracture uneven. Brittle. H. = 2·5–3·5. G. = 4·3–4·6; 4·489 cryst. Luster vitreous, inclining to resinous; sometimes pearly on *c*, less often on *m*. Streak white. Color white; also inclining to yellow, gray, blue, red, or brown, dark brown. Transparent to translucent to opaque. Sometimes fetid, when rubbed. Optically +. Ax. pl. ‖ *b*. Bx ⊥ *a*. $2E_r = 63° \ 5'$, $\beta_y = 1{\cdot}6371$, (see further p. 224).

Var.—*Ordinary.* (*a*) Crystals usually broad or stout; sometimes very large; again in slender needles. (*b*) *Crested;* massive aggregations of tabular crystals, the crystals projecting at surface into crest-like forms. (*c*) *Columnar;* the columns often coarse and loosely aggregated, and either radiated or parallel; rarely fine fibrous. (*d*) In globular or nodular concretions, subfibrous or columnar within. *Bologna Stone* (from near Bologna) is here included; it was early a source of wonder because of the phosphorescence it exhibited after heating with charcoal. "Bologna phosphorus" was made from it. (*e*) Lamellar, either straight or curved; the latter sometimes as aggregations of curved scale-like plates. (*f*) Granular. (*g*) Compact or cryptocrystalline. (*h*) Earthy. (*i*) Stalactitic and stalagmitic; similar in structure and origin to calcareous stalactites and stalagmites and of much beauty when polished. (*h*) *Fetid;* so called from the odor given off when struck or when two pieces are rubbed together, which odor may be due to carbonaceous matters present.

The barite of Muzsaj, Hungary, and of Betler, near Rosenau, was early called *Wolnyn*. *Cawk* is the ordinary barite of the Derbyshire lead mines. *Dreelite*, supposed to be rhombohedral, is simply barite. *Michel-lévyte* from Perkin's Mill, Templeton, Quebec (described as monoclinic), is peculiar in its pearly luster on *m*, twinning striations, etc.

Comp.—Barium sulphate, $BaSO_4$ = Sulphur trioxide 34·3, baryta 65·7 = 100.

Strontium sulphate is often present, also calcium sulphate; further, as impurities, silica, clay, bituminous or carbonaceous substances.

Pyr., **etc.**—B.B. decrepitates and fuses at 3, coloring the flame yellowish green; the fused mass reacts alkaline with test paper. On charcoal reduced to a sulphide. With soda gives at first a clear pearl, but on continued blowing yields a hepatic mass, which spreads out and soaks into the coal. This reacts for sulphur (p. 262). Insoluble in acids.

Diff.—Characterized by high specific gravity (higher than celestite, aragonite, albite, calcite, gypsum, etc.); cleavage; insolubility; *green* coloration of the blowpipe flame. Albite is harder and calcite effervesces with acid.

Obs.—Occurs commonly in connection with beds or veins of metallic ores, especially of lead, also copper, silver, cobalt, manganese, as part of the gangue of the ore; also often accompanies stibnite. Sometimes present in massive forms with hematite deposits. It is met with in secondary limestones and sandstones, sometimes forming distinct veins, and in the former often in crystals along with calcite and celestite; in the latter often with copper ores. Sometimes occupies the cavities of amygdaloidal basalt, porphyry, etc.; forms earthy masses in beds of marl. Occurs as the petrifying material of fossils and occupying cavities in them.

Fine crystals are obtained at the Dufton lead mines, Westmoreland, England; also in Cumberland and Lancashire; in Derbyshire, Staffordshire, etc.; Cleator Moor; Alston Moor. In Scotland, in Argyleshire, at Strontian. Some of the most important of the many European localities are Felsöbánya, Nagybánya, Schemnitz, and Kremnitz, in Hungary, often with stibnite; Hüttenberg, Carinthia; Freiberg, Marienberg, in Saxony; Clausthal in the Harz; Přibram, Bohemia; with the manganese ores of Ilefeld, Œhrenstock, etc.; Auvergne.

In the U. States, formerly in *Conn.*, at Cheshire, intersecting the red sandstone in veins with chalcocite and malachite. In *N. York*, at Pillar Point, opposite Sackett's Harbor, massive; at Scoharie, fibrous; in St. Lawrence Co., crystals at De Kalb; the crested variety at Hammond. In *Penn.*, in crystals at Perkiomen lead mine. In *Virginia*, at Eldridge's gold mine in Buckingham Co. In *N. Carolina*, white massive at Crowders Mt., Gaston Co., etc. In *Tenn.*, on Brown's Creek; at Haysboro', near Nashville; in large veins in sandstone on the W. end of I. Royale, L. Superior, and on Spar Id., N. shore. In *Missouri*, not uncommon with the lead ores; in concretionary forms at Salina, Saline Co., Kansas. In *Colorado*, at Sterling, Weld Co.; Apishapa Creek; also in El Paso and Fremont Cos. In fine crystals, near Fort Wallaçe, New Mexico.

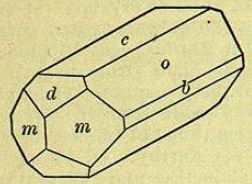
In Ontario, in Bathurst, and N. Burgess, Lanark Co.; Galway, Peterborough Co.; as large veins on Jarvis, McKellars, and Pie islands, in L. Superior, and near Fort William, Thunder Bay. In Nova Scotia, in veins in the slates of East River of the Five Islands, Colchester Co.

Named from *βαρυς, heavy.*

CELESTITE. Cœlestine.

Orthorhombic. Axes $\breve{a} : \bar{b} : \dot{c}$ = 0·7790 : 1 : 1·2800.

966.



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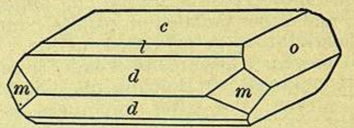


mm''', 110 ∧ 1$\bar{1}$0 = 75° 50′. *cd*, 001 ∧ 102 = 39° 24½′.
cl, 001 ∧ 104 = 22° 20′. *co*, 001 ∧ 011 = 52° 0′.

Crystals resembling those of barite in habit; commonly tabular ‖ *c* or prismatic ‖ axis $\breve{a}$ or $\bar{b}$; also more rarely pyramidal by the prominence of the forms *ψ* (133) or *χ* (144). Also fibrous and radiated; sometimes globular; occasionally granular.

Cleavage: *c* perfect; *m* nearly perfect; *b* less distinct. Fracture uneven. H. = 3–3·5. G. = 3·95–3·97. Luster vitreous, sometimes inclining to pearly. Streak white. Color white, often faint bluish, and sometimes reddish. Transparent to subtranslucent. Optically +. Ax. pl. ‖ *b*. Bx ⊥ *a*. $2E_y$ = 89° 36′. β_y = 1·6237.

Var.—1. *Ordinary.* (*a*) In crystals of varied habit as noted above; a tinge of a delicate blue is very common and sometimes belongs to only a part of a crystal. The variety from Montmartre, called *apotome*, is prismatic by extension of *o* (011) and doubly terminated by the pyramid *ψ* (133). (*b*) Fibrous, either parallel or radiated. (*c*) Lamellar; of rare occurrence. (*d*) Granular. (*e*) Concretionary. (*f*) Earthy; impure usually with carbonate of lime or clay.

Comp.—Strontium sulphate = $SrSO_4$ = Sulphur trioxide 43·6, strontia 56·4 = 100. Calcium and barium are sometimes present.

Pyr., **etc.**—B.B. frequently decrepitates, fuses at 3 to a white pearl, coloring the flame strontia-red; the fused mass reacts alkaline. On charcoal fuses, and in R.F. is converted into a difficultly fusible hepatic mass; this treated with hydrochloric acid and alcohol gives an intensely red flame. With soda on charcoal reacts like barite. Insoluble in acids.

Diff.—Characterized by form, cleavage, high specific gravity, *red* coloration of the blowpipe flame. Does not effervesce with acids like the carbonates (e.g., strontianite); specific gravity lower than that of barite.

Obs.—Usually associated with limestone, or sandstone of various ages; occasionally with metalliferous ores, as with galena and sphalerite at Condorcet, France; at Rezbánya, Hungary; also in beds of gypsum, rock salt, as at Bex, Switzerland, Ischl, Austria. Luneberg, Hannover; sometimes fills cavities in fossils, e.g., ammonites; with sulphur in some volcanic regions as at Girgenti, Sicily.

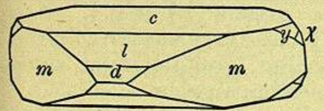
Specimens, finely crystallized, of a bluish tint, are found in limestone about Lake Huron, particularly on Drummond Island, also on Strontian Is., Put-in-Bay, L. Erie, and at Kingston in Ontario, Canada; Chaumont Bay, L. Ontario, Schoharie, and Lockport, N. Y. A blue fibrous celestite occurs at Bell's Mills, Blair Co., Penn. In Mineral Co., W. Virginia, a few miles south of Cumberland, Md., in pyramidal blue crystals. In Texas, at Lampasas, large crystals. With colemanite at Death Valley, San Bernardino Co., California. In Canada, in crystalline masses at Kingston, Frontenac Co.; Lansdowne, Leeds Co.; in radiating fibrous masses in the Laurentian of Renfrew Co.

Named from *cœlestis, celestial,* in allusion to the faint shades of blue often present.

ANGLESITE. Bleivitriol, Vitriolbleierz *Germ.*

Orthorhombic. Axes $\breve{a} : \bar{b} : \dot{c}$ = 0·7852 : 1 : 1·2894.

968.



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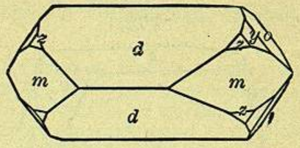

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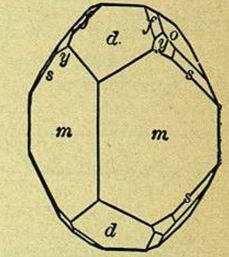


mm''', 110 ∧ 1$\bar{1}$0 = 76° 16½′ *cd*, 001 ∧ 102 = 39° 23′.
cl, 001 ∧ 104 = 22° 19′. *co*, 001 ∧ 011 = 52° 12′.

Crystals sometimes tabular ‖ *c*; more often prismatic in habit, and in all the three axial directions, *m*, *d*, *o*, predominating in the different cases; pyramidal of varied types. Also massive, granular to compact; stalactitic; nodular.

Cleavage: *c*, *m* distinct, but interrupted. Fracture conchoidal. Very brittle. H. = 2·75–3. G. = 6·3–6·39. Luster highly adamantine in some specimens, in others inclining to resinous and vitreous. Color white, tinged yellow, gray, green, and sometimes blue. Streak uncolored. Transparent to opaque. Optically +. Ax. pl. ‖ *b*, Bx ⊥ *a*. $2H_{a.y}$ = 89° 52′, Dx. Indices measured by Arzruni:

	α	β	γ	2V	2V (calc.)
For C at 20°	1·86981	1·87502	1·88630		
D "	1·87709	1·88226	1·89365	75° 24′	68°
F "	1·89549	1·90097	1·91263		
D at 50°	1·87636	1·88166	1·89281	77° 40′	69½°
" 100°	1·87529	1·88080	1·89134	82° 44′	72°
" 200°	1·87260	1·87833	1·88754	89° 17′	77°

Comp.—Lead sulphate, $PbSO_4$ = Sulphur trioxide 26·4, lead oxide 73·6 = 100.

Pyr., **etc.**—B.B. decrepitates, fuses in the flame of a candle (F. = 1·5). On charcoal in O.F. fuses to a clear pearl, which on cooling becomes milk-white; in R.F. is reduced with effervescence to metallic lead. With soda on charcoal in R.F. gives metallic lead, and the soda is absorbed by the coal. Difficultly soluble in nitric acid.

Diff.—Characterized by high specific gravity adamantine luster; cleavage; and by yielding lead B.B. Cerussite effervesces in nitric acid.

Obs.—A result of the decomposition of galena, and often found in its cavities; also surrounds a nucleus of galena in concentric layers. First found in England at Pary's mine in Anglesea; at Leadhills; in Derbyshire and in Cumberland in crystals; Clausthal, in the Harz; near Siegen in Prussia; Schapbach and Badenweiler in Baden; Felsöbánya and elsewhere in Hungary; Nerchinsk, Siberia; and at Monte Poni, Sardinia; Granada; massive in Siberia, Andalusia; in Australia, whence it is exported to England. In the Sierra Mojada, Mexico, in immense quantities mostly massive.

In the United States in crystals at Wheatley's mine, Phenixville, Pa.; in Missouri lead mines; in crystals of varied habit at the Mountain View mine, Carroll Co., Maryland. In

Colorado at various points, but less common than cerussite. At the Cerro Gordo mines of California (argentiferous galena), with other lead minerals. In Arizona, in the mines of the Castle Dome district, Yuma Co., and elsewhere.

Named from the locality, Anglesea, where it was first found.

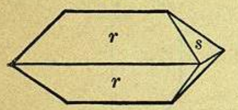
ANHYDRITE.

Orthorhombic. Axes $\breve{a} : \bar{b} : \grave{c}$ = 0·8933 : 1 : 1·0008.

mm''', 110 ∧ $1\bar{1}0$ = 83° 33′ ss', 011 ∧ $0\bar{1}1$ = 90° 3′
rr', 101 ∧ $\bar{1}01$ = 96° 30′ bo, 010 ∧ 111 = 56° 19′

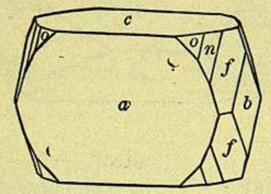
Twins: 1, tw. pl. *d* (012); 2, *r* (101) occasionally as tw. lamellæ. Crystals not common, thick tabular, also prismatic ∥ axis $\bar{b}$. Usually massive, cleavable, fibrous, lamellar, granular, and sometimes impalpable.

971.



972.

973.



971, 972, Stassfurt, Hbg. 973, Aussee, Id.

Cleavage: in the three pinacoidal directions yielding rectangular fragments but with varying ease, thus, *c* very perfect; *b* also perfect; *a* somewhat less so. Fracture uneven, sometimes splintery. Brittle. H. = 3–3·5. G. = 2·899–2·985. Luster: *c* pearly, especially after heating in a closed tube; *a* somewhat greasy; *b* vitreous; in massive varieties, vitreous inclining to pearly. Color white, sometimes a grayish, bluish, or reddish tinge; also brick-red. Streak grayish white. Optically +. Ax. pl. ∥ *b*. Bx ⊥ *a*. $2E_r = 70$. $\beta = 1{\cdot}576$.

Var.—1. *Ordinary.* (*a*) Crystallized; crystals rare, more commonly massive and cleavable in its three rectangular directions. (*b*) Fibrous; either parallel, radiated or plumose. (*c*) Fine granular. (*d*) Scaly granular. *Vulpinite* is a scaly granular kind from Vulpino in Lombardy; it is cut and polished for ornamental purposes. A kind in contorted concretionary forms is the tripestone (*Gekrösstein* or *Schlangenalabaster*).

2. *Pseudomorphous;* in cubes after rock-salt.

Comp.—Anhydrous calcium sulphate, $CaSO_4$ = Sulphur trioxide 58·8, lime 41·2 = 100.

Pyr., **etc.**—B.B. fuses at 3, coloring the flame reddish yellow, and yielding an enamel-like bead which reacts alkaline. On charcoal in R.F. reduced to a sulphide; with soda does not fuse to a clear globule, and is not absorbed by the coal like barite; is, however, decomposed, and yields a mass which blackens silver. Soluble in hydrochloric acid.

Diff.—Characterized by its cleavage in three rectangular directions (pseudo-cubic in aspect); harder than gypsum; does not effervesce with acids like the carbonates.

Obs.—Occurs in rocks of various ages, especially in limestone strata, and often the same that contain ordinary gypsum, and also very commonly in beds of rock-salt; at the salt mine near Hall in Tyrol; of Bex, Switzerland; at Aussee, crystallized and massive; Lüneburg, Hannover; Kapnik in Hungary; Wieliczka in Poland; Ischl in Upper Austria; Berchtesgaden in Bavaria; Stassfurt, in fine crystals, embedded in kieserite; in cavities in lava at Santorin.

In the U. States, at Lockport, N. Y., fine blue, in geodes of black limestone, with calcite and gypsum; in limestone at Nashville, Tenn., etc. In Nova Scotia it forms extensive beds.

Anhydrite by absorption of moisture changes to gypsum. Extensive beds are sometimes thus altered in part or throughout, as at Bex, in Switzerland, where, by digging down 60 to 100 ft., the unaltered anhydrite may be found. Sometimes specimens of anhydrite are altered between the folia or over the exterior.

Zinkosite. $ZnSO_4$. Reported as occurring at a mine in the Sierra Almagrerá, Spain.

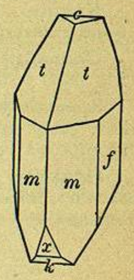
Hydrocyanite. $CuSO_4$. Found at Vesuvius as a pale green to blue incrustation after the eruption of 1868.

CROCOITE. Rothbleierz, *Germ.*

Monoclinic. Axes $\grave{a} : \bar{b} : \grave{c}$: = 0·9603 : 1 : 0·9159; β = 77° 33′.

mm''', 110 ∧ $1\bar{1}0$ = 86° 19′. tt', 111 ∧ $1\bar{1}1$ = 60° 50′.
ck, 001 ∧ $\bar{1}01$ = 49° 32′. ct, 001 ∧ 111 = 46° 58′.

974.



Crystals usually prismatic, habit varied. Also imperfectly columnar and granular.

Cleavage: *m* rather distinct; *c*, *a* less so. Fracture small conchoidal to uneven. Sectile. H. = 2·5–3. G. = 5·9–6·1. Luster adamantine to vitreous. Color various shades of bright hyacinth-red. Streak orange-yellow. Translucent.

Comp.—Lead chromate, $PbCrO_4$ = Chromium trioxide 31·1, lead protoxide 68·9 = 100.

Pyr., **etc.**—In the closed tube decrepitates, blackens, but recovers its original color on cooling. B.B. fuses at 1·5, and on charcoal is reduced to metallic lead with deflagration, leaving a residue of chromium oxide, and giving a lead coating. With salt of phosphorus gives an emerald-green bead in both flames.

Obs.—First found at Berezov, in crystals in quartz veins; also at Mursinka and near Nizhni Tagilsk in the Ural; in Brazil, at Congonhas do Campo; at Rezbánya in Hungary, Moldawa in Hungary; on Luzon, one of the Philippines; from Tasmania; in the Vulture district, Maricopa Co., Arizona.

The name *Crocoite* is from κρόκος, *saffron.*

Phœnicochroite. Phœnicite. A basic lead chromate, $3PbO.2CrO_3$. In crystals and massive. Color between cochineal- and hyacinth-red. From Berezov in the Ural.

Vauquelinite. A phospho-chromate of lead, perhaps $2(Pb,Cu)CrO_4.(Pb,Cu)_3P_2O_8$. In crystals; also mammillary and reniform. Color green to brown. From Berezov in the Ural.

Sulphates with Chlorides, Carbonates, etc.—In part hydrous.

LEADHILLITE.

Monoclinic. Axes $\grave{a} : \bar{b} : \grave{c}$ = 1·7476 : 1 : 2·2154; β = 89° 48′.

mm''', 110 ∧ $\bar{1}10$ = 120° 27′. cx, 001 ∧ 111 = 68° 31′.
cw, 001 ∧ 101 = 51° 36′. cm, 001 ∧ 110 = 89° 54′.

Twins: tw. pl. *m*, analogous to aragonite. Crystals commonly tabular ∥ *c*.

Cleavage: *c* very perfect; *a* in traces. Fracture conchoidal, scarcely observable. Rather sectile. H. = 2·5. G. = 6·26–6·44. Luster of *c* pearly, other parts resinous, somewhat adamantine. Color white, passing into yellow, green, or gray. Streak uncolored. Transparent to translucent.

Comp.—Sulphato-carbonate of lead, perhaps $4PbO.SO_3.2CO_2.H_2O$=Sulphur trioxide 7·4, carbon dioxide 8·2, lead oxide 82·7, water 1·7 = 100.

Pyr., **etc.**—B.B. intumesces, fuses at 1·5, and turns yellow; but becomes white on cooling. Easily reduced on charcoal. With soda affords the reaction for sulphuric acid. Effervesces briskly in nitric acid, and leaves white lead sulphate undissolved. Yields water in the closed tube.

Obs.—Found at Leadhills, with other ores of lead; Red Gill, Cumberland; at Matlock, Derbyshire. From the Mala-Calzetta lead mine near Iglesias, Sardinia (*maxite*). Observed from Arizona, at the Schulz gold mine with wulfenite, vanadinite, cerussite; partly altered to cerussite.

Susannite. Regarded at one time as rhombohedral and dimorphous with leadhillite, but probably only a modification of that species. From the Susanna mine, Leadhills, in Scotland.