

Nassau; Lölling, Carinthia; Nerchinsk, Siberia, in fine crystals; leek-green, in the Cornish mines.

Occurs near Edenville, N. Y., with arsenopyrite; in Utah, Tintic district, at the Mammoth mine on enargite. As an incrustation on siliceous sinter of the Yellowstone geysers. Named from *σκόροδος*, *garlic*, alluding to the odor before the blowpipe.

Strengite. $\text{FePO}_4 + 2\text{H}_2\text{O}$. Crystals rare; in habit and angle near scorodite; generally in spherical and botryoidal forms. $G. = 2.87$. Color pale red. From iron mines near Giessen; also in Rockbridge Co., Va., with dufrenite.

Phosphosiderite. $2\text{FePO}_4 + 3\frac{1}{2}\text{H}_2\text{O}$. An iron phosphate near strengite, but with $3\frac{1}{2}\text{H}_2\text{O}$. From the Siegen mining district, Germany.

Barrandite. $(\text{Al, Fe})\text{PO}_4 + 2\text{H}_2\text{O}$. In spheroidal concretions, color pale shades of gray. From Bohemia.

Variscite. $\text{AlPO}_4 + 2\text{H}_2\text{O}$. Commonly in crystalline aggregates and incrustations with reniform surface. Color green. From Messbach in Saxon Voigtland; Montgomery Co., Arkansas, on quartz; in nodular masses from Utah.

Callainite. $\text{AlPO}_4 + 2\frac{1}{2}\text{H}_2\text{O}$. Massive; wax-like. Color apple- to emerald-green. From a Celtic grave in Lockmariaquer.

Zepharovichite. $\text{AlPO}_4 + 3\text{H}_2\text{O}$. Crystalline to compact. Color yellowish or grayish white. From Trencin in Bohemia.

Koninckite. $\text{FePO}_4 + 3\text{H}_2\text{O}$. In small spherical aggregates of radiating needles. Color yellow. From Richelle, Belgium.

Acid Hydrous Phosphates, etc.

PHARMACOLITE.

Monoclinic. Crystals rare. Commonly in delicate silky fibers; also botryoidal, stalactitic.

Cleavage: *b* perfect. Fracture uneven. Flexible in thin laminae. $H. = 2-2.5$. $G. = 2.64-2.73$. Luster vitreous; on *b* inclining to pearly. Color white or grayish; frequently tinged red. Streak white. Translucent to opaque.

Comp.—Probably $\text{HCaAsO}_4 + 2\text{H}_2\text{O} = \text{Arsenic pentoxide } 53.3, \text{ lime } 25.9, \text{ water } 20.8 = 100$.

Obs.—Found with arsenical ores of cobalt and silver, also with arsenopyrite; at Andreasberg in the Harz; Riechelsdorf in Hesse; Joachimsthal in Bohemia, etc. Named from *φάρμακον*, *poison*.

Haidingerite. $\text{HCaAsO}_4 + \text{H}_2\text{O}$. In minute crystal aggregates, botryoidal and drusy. $G. = 2.848$. Color white. From Joachimsthal with pharmacolite.

Wapplerite. $\text{HCaAsO}_4 + 3\frac{1}{2}\text{H}_2\text{O}$. In minute crystals; also in incrustations. Colorless to white. Found with pharmacolite at Joachimsthal.

Brushite. $\text{HCaPO}_4 + 2\text{H}_2\text{O}$. In small slender prisms; concretionary massive. Colorless to pale yellowish. Occurs in guano. **Metabrushite**, similarly associated, is $2\text{HCaPO}_4 + 3\text{H}_2\text{O}$.

Martinite. $\text{H}_2\text{Ca}_5(\text{PO}_4)_4 + \frac{1}{2}\text{H}_2\text{O}$. From phosphorite deposits (from guano) in the island of Curaçoa, W. Indies.

Newberyite. $\text{HMgPO}_4 + 3\text{H}_2\text{O}$. In white orthorhombic crystals. From guano of Skipton Caves, Victoria. **Hannayite**, from same locality, is a hydrous phosphate of ammonium and magnesium.

Stercorite. Microcosmic salt. $\text{HN}_3(\text{NH}_4)\text{PO}_4 + 4\text{H}_2\text{O}$. Phosphorsalz *Germ.* In white crystalline masses and nodules in guano.

Hureaulite. $\text{H}_2\text{Mn}_5(\text{PO}_4)_4 + 4\text{H}_2\text{O}$. In short prismatic crystals (monoclinic). Also massive, compact, or imperfectly fibrous. Color yellowish, orange-red, rose, grayish. From Limoges, commune of Hureaux, France. In the U. States, at Branchville, Conn.

Forbesite. $\text{H}_2(\text{Ni, Co})_2\text{As}_2\text{O}_8 + 8\text{H}_2\text{O}$. Structure fibro-crystalline. Color grayish white. From Atacama.

Basic Hydrous Phosphates, etc.

Isoclasite. $\text{Ca}_3\text{P}_2\text{O}_8 \cdot \text{Ca}(\text{OH})_2 \cdot 4\text{H}_2\text{O}$. In minute white crystals; also columnar. From Joachimsthal.

Hemafibrite. $\text{Mn}_3\text{As}_2\text{O}_8 \cdot 3\text{Mn}(\text{OH})_2 + 2\text{H}_2\text{O}$. Commonly in spherical radiated groups. Color brownish red to garnet-red, becoming black. From the Moss mine, Nordmark, Sweden.

EUCHROITE.

Orthorhombic. Habit prismatic $mm''' = 62^\circ 40'$. Cleavage: *m, n* (011) in traces. Fracture small conchoidal to uneven. Rather brittle. $H. = 3.5-4$. $G. = 3.389$. Luster vitreous. Color bright emerald- or leek-green. Transparent to translucent.

Comp.— $\text{Cu}_3\text{As}_2\text{O}_8 \cdot \text{Cu}(\text{OH})_2 + 6\text{H}_2\text{O} = \text{Arsenic pentoxide } 34.2, \text{ cupric oxide } 47.1, \text{ water } 18.7 = 100$.

Obs.—Occurs in quartzose mica slate at Libethen in Hungary, in crystals of considerable size, having much resemblance to diopside. Named from *ευχροα*, *beautiful color*.

Conichalcite. Perhaps $(\text{Cu, Ca})_2\text{As}_2\text{O}_8 \cdot (\text{Cu, Ca})(\text{OH})_2 + \frac{1}{2}\text{H}_2\text{O}$. Reniform and massive, resembling malachite. Color pistachio-green to emerald-green. From Andalusia, Spain; Tintic district, Utah.

Bayldonite. $(\text{Pb, Cu})_2\text{As}_2\text{O}_8 \cdot (\text{Pb, Cu})(\text{OH})_2 + \text{H}_2\text{O}$. In mamillary concretions, drusy. Color green. From Cornwall.

Tagilite. $\text{Cu}_3\text{P}_2\text{O}_8 \cdot \text{Cu}(\text{OH})_2 + 2\text{H}_2\text{O}$. In reniform or spheroidal concretions; earthy. Color verdigris- to emerald-green. From the Ural.

Leucochalcite. Probably $\text{Cu}_3\text{As}_2\text{O}_8 \cdot \text{Cu}(\text{OH})_2 + 2\text{H}_2\text{O}$. In white, silky acicular crystals. From the Wilhelmine mine in the Spessart, Germany.

Volborthite. A hydrous vanadate of copper, barium, and calcium. In small six-sided tables; in globular forms. Color olive-green, citron-yellow. From the Ural.

Cornwallite. $\text{Cu}_3\text{As}_2\text{O}_8 \cdot 2\text{Cu}(\text{OH})_2 + \text{H}_2\text{O}$. Massive, resembling malachite. Color emerald-green. From Cornwall.

Tyrolite. Tirolit. Kupferschaum *Germ.* Perhaps $\text{Cu}_3\text{As}_2\text{O}_8 \cdot 2\text{Cu}(\text{OH})_2 + 7\text{H}_2\text{O}$. Usually in fan-shaped crystalline groups; in foliated aggregates; also massive. Cleavage perfect, yielding soft thin flexible laminae. Color pale green inclining to sky-blue. From Libethen, Hungary; Nerchinsk, Siberia; Falkenstein, Tyrol; etc. In the U. States, in the Tintic district, Utah. Some analyses yield CaCO_3 , usually regarded as an impurity, but it may be essential.

CHALCOPHYLLITE.

Rhombohedral. Axis $c = 2.5538$. $cr = 71^\circ 16'$, $rr' = 110^\circ 12'$.

In tabular crystals; also foliated massive; in druses. 946.

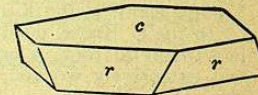
Cleavage: *c* highly perfect; *r* in traces. $H. = 2$. $G. = 2.4-2.66$. Luster of *c* pearly; of other faces vitreous or subadamantine. Color emerald- or grass-green to verdigris-green. Streak somewhat paler than the color. Transparent to translucent. Optically —.

Comp.—A highly basic arsenate of copper; formula uncertain, perhaps $7\text{CuO} \cdot \text{As}_2\text{O}_5 \cdot 14\text{H}_2\text{O}$.

Pyr., etc.—In the closed tube decrepitates, yields much water, and gives a residue of olive-green scales. In other respects like olivenite. Soluble in nitric acid, and in ammonia.

Obs.—From the copper mines near Redruth in Cornwall; at Sayda, Saxony; Moldawa in the Banat. In the U. States, in the Tintic district, Utah.

Veszelyite. A hydrous phospho-arsenate of copper and zinc, formula uncertain. Occurs as a greenish-blue crystalline incrustation at Morawitz, in the Banat.



WAVELLITE.

Orthorhombic. Axes $a : b : c = 0.5049 : 1 : 0.3751$. Crystals rare. Usually in aggregates, hemispherical or globular with crystalline surface, and radiated structure.

Cleavage: p (101) and b rather perfect. Fracture uneven to subconchoidal. Brittle. $H. = 3.25-4$. $G. = 2.316-2.337$. Luster vitreous, inclining to pearly and resinous. Color white, passing into yellow, green, gray, brown and black. Streak white. Translucent.

Comp.— $4AlPO_4 \cdot 2Al(OH)_3 + 9H_2O =$ Phosphorus pentoxide 35.2, alumina 38.0, water 26.8 = 100. Fluorine is sometimes present, up to 2 p. c.

Pyr., etc.—In the closed tube gives off much water, the last portions of which react acid and color Brazil-wood paper yellow (fluorine), and also etch the tube. B.B. in the forceps swells up and splits into fine infusible particles, coloring the flame pale green. Gives a blue with cobalt solution. Heated with sulphuric acid gives off fumes of hydrofluoric acid, which etch glass. Soluble in hydrochloric acid, and also in caustic potash.

Obs.—From Barnstaple in Devonshire; at Zbirow in Bohemia; at Frankenberg, Saxony; Minas Geraes, Brazil, etc.

In the United States at the slate quarries of York Co., Pa.; White Horse Station, Chester Valley R. R., Pa.; Magnet Cove, Arkansas.

Fischerite. $AlPO_4 \cdot Al(OH)_3 + 2\frac{1}{2}H_2O$. In small prismatic crystals and in drusy crusts. Color green. From Nizhni Tagilsk in the Ural.

Peganite. $Al(PO_4) \cdot Al(OH)_3 + 1\frac{1}{2}H_2O$. Occurs in green crusts, of small prismatic crystals, at Striegis, near Freiberg, Saxony.

TURQUOIS. Turquoise.

Massive; amorphous or cryptocrystalline. Reniform, stalactitic, or incrusting. In thin seams and disseminated grains. Also in rolled masses.

Cleavage none. Fracture small conchoidal. Rather brittle. $H. = 6$. $G. = 2.6-2.83$. Luster somewhat waxy, feeble. Color sky-blue, bluish green to apple-green, and greenish gray. Streak white or greenish. Feebly subtranslucent to opaque.

Comp.—A hydrous phosphate of aluminium colored by a copper compound, $AlPO_4 \cdot Al(OH)_3 + H_2O =$ Phosphorus pentoxide 32.6, alumina 46.8, water 20.6 = 100. The copper salt probably has the composition $2CuO \cdot P_2O_5 \cdot 4H_2O$.

Pyr., etc.—In the closed tube decrepitates, yields water, and turns brown or black. B.B. in the forceps becomes brown and assumes a glassy appearance, but does not fuse; colors the flame green; moistened with hydrochloric acid the color is at first blue (copper chloride). With the fluxes reacts for copper. Soluble in hydrochloric acid.

Obs.—The highly prized oriental turquoise occurs in narrow seams (2 to 4 or even 6 mm. in thickness) or in irregular patches in the brecciated portions of a porphyritic trachyte and the surrounding clay slate in Persia, not far from Nishâpûr, Khorassan; in the Megara Valley, Sinai; in the Kara-Tube Mts. in Turkestan, 50 versts from Samarkand.

In the U. States, occurs in the Los Cerillos Mts., 20 m. S. E. of Santa Fé, New Mexico, in a trachytic rock, a locality long mined by the Mexicans and in recent years reopened and extensively worked; in the Burro Mts., Grant Co., N. M.; pale green variety near Columbus, Nevada.

Natural turquois of inferior color is often artificially treated to give it the tint desired. Moreover, many stones which are of a fine blue when first found retain the color only so long as they are kept moist, and when dry they fade, become a dirty green, and are of little value. Much of the turquoise (not artificial) used in jewelry in former centuries, as well as the present, and that described in the early works on minerals, was *bone-turquoise* (called also *odontolite*, from *ὀδὸν*, *tooth*), which is fossil bone, or tooth, colored by a phosphate of iron. Its organic origin becomes manifest under a microscope. Moreover, true turquoise, when decomposed by hydrochloric acid, gives a fine blue color with ammonia, which is not true of the odontolite.

Wardite. $2Al_2O_3 \cdot P_2O_5 \cdot 4H_2O$. Forms light-green or bluish-green concretionary incrustations in cavities of nodular masses of variscite from Utah. $H. = 5$. $G. = 2.77$.

Sphærite. Perhaps $4AlPO_4 \cdot 6Al(OH)_3$. In globular drusy concretions. Color light gray, bluish. From near St. Benigna, Bohemia.

Liskeardite. $(Al, Fe)AsO_4 \cdot 2(Al, Fe)(OH)_3 + 5H_2O$. In thin incrusting layers, white or bluish. From Liskeard, Cornwall.

Evansite. $2AlPO_4 \cdot 4Al(OH)_3 + 12H_2O$. Massive; reniform or botryoidal. Colorless, or milk-white. From Zsetcznik, Hungary.

CERULEOLACTITE. Perhaps $3Al_2O_3 \cdot 2P_2O_5 \cdot 10H_2O$. Crypto-crystalline; milk-white to light copper-blue. From near Katzenellnbogen, Nassau; also East Whiteland Township, Chester Co., Penn.

Angelite. $2Al_2O_3 \cdot P_2O_5 \cdot 3H_2O$. In tabular monoclinic crystals and massive. $G. = 2.7$. Colorless to white. From the iron mine of Westana, Sweden. The same locality has also yielded the following aluminium phosphates.

BERLINITE. $2Al_2O_3 \cdot 2P_2O_5 \cdot H_2O$. Compact, massive. $G. = 2.64$. Colorless to grayish or rose-red.

TROLLEITE. $4Al_2O_3 \cdot 3P_2O_5 \cdot 3H_2O$. Compact, indistinctly cleavable. $G. = 3.10$. Color pale green.

ATTACOLITE. $P_2O_5 \cdot Al_2O_3 \cdot MnO \cdot CaO \cdot H_2O$, etc.; formula doubtful. Massive. $G. = 3.09$. Color salmon-red.

PHARMACOSIDERITE.

Isometric-tetrahedral. Commonly in tubes; also tetrahedral. Rarely granular.

Cleavage: a imperfect. Fracture uneven. Rather sectile. $H. = 2.5$. $G. = 2.9-3$. Luster adamantine to greasy, not very distinct. Color olive-, grass- or emerald-green, yellowish brown, honey-yellow. Streak green to brown, yellow, pale. Subtransparent to subtranslucent. Pyroelectric.

Comp.—Perhaps $6FeAsO_4 \cdot 2Fe(OH)_3 + 12H_2O =$ Arsenic pentoxide 43.1, iron sesquioxide 40.0, water 16.9 = 100.

Pyr., etc.—Same as for scorodite.

Obs.—Obtained at the mines in Cornwall, with ores of copper; at Schneeberg and Schwarzenberg, Saxony; at Königsberg, near Schemnitz, Hungary. In Utah, at the Mammoth mine, Tintic district. Named from *φάρμακον*, *poison*, and *σίδηρος*, *iron*.

Ludlamite. $2Fe_3P_2O_8 \cdot Fe(OH)_2 + 8H_2O$. Occurs in small green tabular crystals (monoclinic), near Truro, Cornwall.

Cacoxenite. *Kakoxen Germ.* $FePO_4 \cdot Fe(OH)_3 + 4\frac{1}{2}H_2O$. In radiated tufts of a yellow or brownish color. From near St. Benigna in Bohemia; Lancaster Co., Penn.

Beraunite. Perhaps $2FePO_4 \cdot Fe(OH)_3 + 2\frac{1}{2}H_2O$. Commonly in druses and in radiated globules and crusts. Color reddish brown to dark hyacinth-red. From St. Benigna, near Beraun, in Bohemia. *Eleonoreite*, in tabular crystals, is the same mineral. From the Eleonore mine near Giessen.

GLOBOSITE, PICITE, DELVAUXITE are other hydrated ferric phosphates.

CHILDRENTITE.

Orthorhombic. Axes $a : b : c = 0.7780 : 1 : 0.52575$.

$mm''', 110 \wedge \bar{1}0 = 75^\circ 46'$.

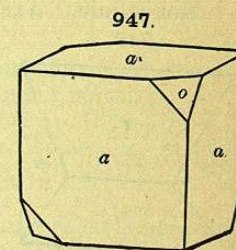
$rr', 131 \wedge \bar{1}31 = 39^\circ 47'$.

$rr''', 131 \wedge \bar{1}31 = 105^\circ 9'$.

$ss', 121 \wedge \bar{1}21 = 49^\circ 56\frac{1}{2}'$.

Only known in crystals. Cleavage: a imperfect. Fracture uneven. $H. = 4.5-5$. $G. = 3.18-3.24$. Luster vitreous to resinous. Color yellowish white, pale yellowish brown, brownish black. Streak white to yellowish. Translucent.

Comp.—In general $2AlPO_4 \cdot 2Fe(OH)_2 + 2H_2O$. Phosphorus pentoxide



30.9, alumina 22.2, iron protoxide 31.3, water 15.6 = 100. Manganese replaces part of the iron and it hence graduates into eosphorite.

Pyr., etc.—In the closed tube gives off neutral water. B.B. swells up into ramifications, and fuses on the edges to a black mass, coloring the flame pale green. Heated on charcoal turns black and becomes magnetic. With soda gives a reaction for manganese. With borax and salt of phosphorus reacts for iron and manganese. Soluble in hydrochloric acid.

Obs.—From Tavistock, Devonshire. In U. States, at Hebron, Me.

Eosphorite. Form and composition as for childrenite, but containing chiefly manganese instead of iron. In prismatic crystals; also massive. Color rose-pink, yellowish, etc. From Branchville, Conn.

Mazapilite. $\text{Ca}_3\text{Fe}_2(\text{AsO}_4)_4 \cdot 2\text{FeO}(\text{OH}) + 5\text{H}_2\text{O}$. In slender prismatic crystals. G. = 3.567–3.582. Color black. From Mazapil, Mexico.

Calcioferrite. $\text{Ca}_3\text{Fe}_2(\text{PO}_4)_4 \cdot \text{Fe}(\text{OH})_3 \cdot 8\text{H}_2\text{O}$. Occurs in yellow to green nodules in clay at Battenberg, Rhenish Bavaria.

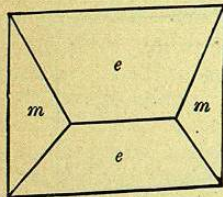
Borickite. Perhaps $\text{Ca}_3\text{Fe}_2(\text{PO}_4)_4 \cdot 12\text{Fe}(\text{OH})_3 + 6\text{H}_2\text{O}$. Reniform massive; compact. Color reddish brown. From Leoben in Styria; Bohemia.

RICHELLITE. Perhaps $4\text{FeP}_2\text{O}_8 \cdot \text{Fe}_2\text{OF}_2(\text{OH})_2 + 36\text{H}_2\text{O}$. Massive, compact or foliated. Color yellow. From Richelle, Belgium.

LIROCONITE.

Monoclinic. Axes $a : b : c = 1.3191 : 1 : 1.6808$; $\beta = 88^\circ 33'$.

949.



$mm', 110 \wedge \bar{1}\bar{1}0 = 105^\circ 39'$. $me', 110 \wedge 011 = 46^\circ 10'$.
 $ee', 011 \wedge 0\bar{1}\bar{1} = 118^\circ 29'$. $m'e', \bar{1}\bar{1}0 \wedge 011 = 47^\circ 24'$.

Crystals resembling rhombic octahedrons. Rarely granular. Cleavage: m, e indistinct. Fracture subconchoidal to uneven. Imperfectly sectile. H. = 2–2.5. G. = 2.882–2.985. Luster vitreous, inclining to resinous. Color and streak sky-blue to verdigris-green.

Comp.—A hydrous arsenate of aluminium and copper, formula uncertain; analyses correspond nearly to $\text{Cu}_3\text{Al}(\text{AsO}_4)_3 \cdot 3\text{CuAl}(\text{OH})_6 \cdot 20\text{H}_2\text{O}$ = Arsenic pentoxide

28.9, alumina 10.3, cupric oxide 35.9, water 24.9 = 100. Phosphorus replaces part of the arsenic.

Pyr., etc.—In the closed tube gives much water and turns olive-green. B.B. cracks open, but does not decrepitate; fuses less readily than olivenite to a dark gray slag; on charcoal cracks open, deflagrates, and gives reactions like olivenite. Soluble in nitric acid.

Obs.—From Cornwall; Herrengrund in Hungary.

Chenevixite. Perhaps $\text{Cu}_2(\text{FeO})_2\text{As}_2\text{O}_8 + 3\text{H}_2\text{O}$. Massive to compact. Color dark green to greenish yellow. From Cornwall; Utah.

HENWOODITE. A hydrated phosphate of aluminium and copper. In botryoidal globular masses. Color turquoise-blue. From Cornwall.

Chalcosiderite. $\text{CuO} \cdot 3\text{Fe}_2\text{O}_3 \cdot 2\text{P}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$. In sheaf-like crystalline groups, as incrustations. Color light siskin-green. From Cornwall.

ANDREWSITE, also from Cornwall, is near chalcosiderite.

Kehoeite. A hydrated phosphate of aluminium, zinc, etc. Massive. G. = 2.34. From Galena, So. Dakota.

Goyazite. Perhaps $\text{Ca}_3\text{Al}_6\text{P}_2\text{O}_{23} \cdot 9\text{H}_2\text{O}$. In small rounded grains. Color yellowish white. From Minas Geraes, Brazil.

Plumbogummite. A hydrated phosphate of lead and aluminium. Resembles drops or coatings of gum; as incrustations. Color yellowish, brownish. With galena at Huelgoet, Brittany, and elsewhere.

Uranite Group.

TORBERNITE. Copper Uranite. Kupferuranit *Germ.*

Tetragonal. Axis $c = 2.9361$. Crystals usually square tables, sometimes very thin, again thick; less often pyramidal. Also foliated, micaceous.

Cleavage: c perfect, micaceous. Laminæ brittle. H. = 2–2.5. G. = 3.4–3.6. Luster of c pearly, other faces subadamantine. Color emerald- and grass-green, and sometimes leek-, apple-, and siskin-green. Streak paler than the color. Transparent to subtranslucent. Optically uniaxial; negative.

Comp.—A hydrous phosphate of uranium and copper, $\text{Cu}(\text{UO}_2)_2\text{P}_2\text{O}_8 + 8\text{H}_2\text{O}$ = Phosphorus pentoxide 15.1, uranium trioxide 61.2, copper 8.4, water 15.3 = 100. Arsenic may replace part of the phosphorus.

Pyr., etc.—In the closed tube yields water. In the forceps fuses at 2.5 to a blackish mass, and colors the flame green. With salt of phosphorus gives a green bead, which with tin on charcoal becomes on cooling opaque red (copper). With soda on charcoal gives a globule of copper. Soluble in nitric acid.

Obs.—From Gunnis Lake and elsewhere in Cornwall; Schneeberg, etc., Saxony; Joachimsthal, Bohemia.

Zeunerite. $\text{Cu}(\text{UO}_2)_2\text{As}_2\text{O}_8 + 8\text{H}_2\text{O}$. In tabular crystals resembling torbernite in form and color. G. = 3.2. From Schneeberg, Saxony; near Joachimsthal; Cornwall.

AUTUNITE. Lime Uranite. Kalkuranit *Germ.*

Orthorhombic. In thin tabular crystals, nearly tetragonal in form and deviating but slightly from torbernite in angle; also foliated, micaceous.

Cleavage: basal, eminent. Laminæ brittle. H. = 2–2.5. G. = 3.05–3.19. Luster of c pearly, elsewhere subadamantine. Color lemon- to sulphur-yellow. Streak yellowish. Transparent to translucent. Optically —. Ax. pl. $\parallel b$. Bx $\perp c$. $\beta = 1.572$.

Comp.—A hydrous phosphate of uranium and calcium, probably analogous to torbernite, $\text{Ca}(\text{UO}_2)_2\text{P}_2\text{O}_8 + 8\text{H}_2\text{O}$ or $\text{CaO} \cdot 2\text{UO}_3 \cdot \text{P}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$ = Phosphorus pentoxide 15.5, uranium trioxide 62.7, lime 6.1, water 15.7 = 100.

Some analyses give 10 and others 12 molecules of water, but it is not certain that the additional amount is essential.

Pyr., etc.—Same as for torbernite, but no reaction for copper.

Obs.—With uraninite, as at Johannegeorgenstadt, Falkenstein. In the U. States, at Middletown and Branchville, Conn. In N. Carolina, at mica mines in Mitchell Co.; in Alexander Co.; Black Hills, S. Dakota.

Uranospinite. Probably $\text{Ca}(\text{UO}_2)_2\text{As}_2\text{O}_8 + 8\text{H}_2\text{O}$. In thin tabular crystals rectangular in outline. Color siskin-green. From near Schneeberg, Saxony.

Uranocircite. $\text{Ba}(\text{UO}_2)_2\text{P}_2\text{O}_8 + 8\text{H}_2\text{O}$. In crystals similar to autunite. Color yellow-green. From Falkenstein, Saxon Voigtland.

Phosphuranylite. $(\text{UO}_2)_3\text{P}_2\text{O}_8 + 6\text{H}_2\text{O}$. As a pulverulent incrustation. Color deep lemon-yellow. From Mitchell Co., N. C.

Trögerite. $(\text{UO}_2)_3\text{As}_2\text{O}_8 + 12\text{H}_2\text{O}$. In thin druses of tabular crystals. Color lemon-yellow. From near Schneeberg, Saxony.

Walpurgite. Probably $\text{Bi}_6(\text{UO}_2)_3(\text{OH})_{24}(\text{AsO}_4)_4$. In thin yellow crystals resembling gypsum. G. = 5.76. Color yellow. From near Schneeberg, Saxony.

Rhagite. Perhaps $2\text{BiAsO}_4 \cdot 3\text{Bi}(\text{OH})_3$. In crystalline aggregates. Color yellowish green, wax-yellow. From near Schneeberg, Saxony.

Mixite. A hydrated basic arsenate of copper and bismuth, formula doubtful. In acicular crystals; as an incrustation. Color green to whitish. From Joachimsthal; Wittichen, Baden; Tintic distr., Utah.