

A
SYSTEM
OF
MINERALOGY,

IN WHICH
MINERALS ARE ARRANGED ACCORDING TO
THE NATURAL HISTORY METHOD.

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GENUS III. OLIVENITE.

Oliven-Malachit, *Mohs*.

THIS genus contains four species, viz. 1. Prismatic Olivenite, or Phosphat of Copper, 2. Di-prismatic Olivenite, or Lenticular Copper, 3. Acicular Olivenite, 4. Hexahedral Olivenite, or Cube-Ore. * Atacamite.

1. Prismatic Olivenite, or Phosphat of Copper.

Prismatischer Oliven-Malachit, *Mohs*.

Phosphorsaures Kupfer, *Karsten*, in d. N. Schriften der Berlin. Ges. Natf. Fr. b. iii. s. 304.—Cuivre phosphaté, *Broch*. t. ii. p. 544.—Phosphorsaures Kupfer, *Leonhard*, Tabel. s. 61.—Cuivre phosphaté, *Brong*. t. ii. p. 227.—Phosphor Kupfer, *Karst*. Tabel. s. 64.—Cuivre phosphaté, *Haiiy*, Tabl. p. 92.—Pseudo-Malachit, *Haus*. Handb. b. iii. s. 1035.—Phosphor Kupfererz, *Hoff*. b. iv. s. 183.—Phosphat of Copper, *Aikin*, p. 92.

External Characters.

Its principal colour is emerald-green, which passes into blackish-green; externally it is sometimes greenish-black.

It occurs massive, in imperfect reniform masses, with a very drusy surface, and in coarse fibrous distinct concretions, which are straight and scopiform. Also crystallized in oblique four-sided prisms of 110° .

The

The crystals are small and very small, superimposed and in druses.

Externally it is shining; internally it passes from shining, through glistening, to glimmering, and the lustre is resinous, inclining to pearly. It has an oblique double cleavage, in which the folia are parallel with the sides of the prism of 110° .

The fracture is splintery.

The fragments are wedge-shaped splintery, or indeterminate angular, and rather blunt-edged.

It is opaque.

Its streak is verdigris-green.

It is as hard as apatite.

It is brittle and easily frangible.

Specific gravity, 4.0, 4.3, *Mohs.*—4.070, *Hersart.*

Chemical Characters.

On the first impression of the heat it fuses into a brownish globule, which, by the further action of the blowpipe, extends on the surface of the charcoal, and acquires a reddish-grey metallic colour.

Constituent Parts.

| | | |
|------------------|---|-------|
| Oxide of Copper, | - | 68.13 |
| Phosphoric Acid, | - | 30.95 |
| | | <hr/> |
| | | 99.08 |

Klaproth, Beit. b. iii. s. 201.

Geognostic and Geographic Situations.

Europe.—The principal locality of this rare mineral is Virneberg near Rheinbreitenbach on the Rhine, where it occurs along with quartz, calcedony, red copper-ore, and malachit.

lachit, in greywacke. It is said also to occur at Libethen near Neusohl, in Hungary, in a bed of copper-ore, along with quartz, in mica-slate.

America.—Farallon and Faluen in Chili*.

Observations.

It is distinguished from the other species of *Olivenite* by its dark external colour, form, and hardness.

2. Di-prismatic Olivenite, or Lenticular Copper.

Di-prismatischer Oliven-Malachit, *Mohs.*

Linsenerz, *Werner.*

Arsenate of Copper, in the form of an obtuse octahedron, *Bournon*, Phil. Trans. part i. 1801.—Linsenerz, *Mohs*, b. iii. s. 292.—Cuivre arseniaté obtus, *Brong.* t. ii. p. 230.—Linsenerz, *Karsten*, Tabel. s. 64.—Cuivre arseniaté primitif, *Haiiy*, Tabl. p. 90.—Linsenerz, *Hoff.* b. iv. s. 165.—Linsenkupfer, *Haus.* Hand. b. iii. s. 1051.—Octahedral Arseniate of Copper, *Aikin*, p. 93.

External Characters.

Its colour is sky-blue, which sometimes passes into verdigris-green.

It scarcely occurs massive, generally crystallized :

1. Very oblique four-sided prism, acutely bevelled on the extremity, and the bevelling planes set on the obtuse lateral edges.
2. Very flat, longish, rectangular double four-sided pyramid,

* Heuland.

ramid, in which the lateral planes of the one are set on the lateral planes of the other*.

The crystals are middle-sized and small, and sometimes crystallized in druses.

Externally it is smooth and shining; internally glistening and shining, and pearly, inclining to vitreous.

The cleavage is in the directions of the lateral and bevelling planes of the oblique four-sided prism.

The fracture is small-grained uneven, which sometimes passes into imperfect conchoidal.

The fragments are indeterminate angular, and rather sharp-edged.

It is translucent.

It yields a pale verdigris-green, or sky-blue coloured streak.

It is harder than gypsum, but not so hard as calcareous spar.

It is nearly brittle, and uncommonly easily frangible.

Specific gravity, 2.8, 2.9, *Mohs.*—2.881, *Bournon.*

Chemical Characters.

Before the blowpipe it is converted into a black friable scoria.

Constituent Parts.

| | | |
|------------------|---|----|
| Oxide of Copper, | - | 49 |
| Arsenic Acid, | - | 14 |
| Water, | - | 35 |
| | | 98 |

Chenevix in *Phil. Trans.* for 1801.

Geognostic

* The double four-sided pyramid is so flat, that it has a lenticular aspect; hence the name *Lenticular Copper* given to this species.

Geognostic and Geographic Situations.

It has been hitherto found only in Cornwall, where it is associated with copper-mica, and other cupreous minerals.

Observations.

It is characterized by its colour, form, and hardness. Its colour, form, and inferior hardness, distinguish it from *Blue Copper*; and the latter character distinguishes it from *Azurite*, and other similar blue-coloured minerals.

3. Acicular Olivenite.

Nadelförmiger Oliven-malachit, *Mohs.*

This species is divided into four subspecies, viz. *Radiated Acicular Olivenite*, *Foliated Acicular Olivenite*, *Fibrous Acicular Olivenite*, and *Earthy Acicular Olivenite*.

First Subspecies.

Radiated Acicular Olivenite.

Strahlerz, *Werner.*

Cupreous Arseniate of Iron, *Bournon*, Phil. Trans. for 1801, part i. p. 191.—Cuivre arseniaté ferrifere, *Brong.* t. ii. p. 232.—Strahlenkupfer, *Karsten*, Tabel. s. 64.—Cuivre arseniaté ferrifere, *Haüy*, Tabl. p. 91.—Strahlenkupfer, *Haus.* Handbuch, b. iii. s. 1050.—Strahlerz, *Hoff.* b. iv. s. 168.—Martial Arseniate of Copper, *Aikin*, p. 93.

External

External Characters.

Externally its colour is dark verdigris-green, sometimes bordering on blackish-green; internally it is pale verdigris-green, either pure, or intermixed with sky-blue.

It occurs massive and flat reniform; also in radiated prismatic concretions, which are straight and scopiform; and crystallized in flat oblique four-sided prisms, acuminate with four planes; sometimes the acute edges are truncated, when the prism appears six-sided, or all the lateral edges are truncated, when it appears eight-sided.

The crystals are generally small, and superimposed.

The external surface of the reniform shape is very drusy.

Internally the lustre is intermediate between shining and glistening, and is pearly.

The fragments are wedge-shaped.

It is translucent on the edges.

It is as hard as calcareous-spar.

It is brittle, and easily frangible.

Specific gravity, 3.400, *Bournon*.

Second Subspecies.

Foliated Acicular Olivenite.

Blättriches Olivenerz, *Werner*.

Arseniate of Copper, in the form of an acute octahedron, *Bournon*, Phil. Trans. part i. for 1801.—Cuivre arseniaté aigue, *Brong.* t. ii. p. 231.—Dichtes Olivenerz, *Karsten*, Tabel. s. 64.—Cuivre arseniaté octaèdre aigue, *Haiüy*, Tabl. p. 91.—Cuivre arseniaté en prisme tetraèdre rhomboidal, *Bournon*, Catalogue Mineralogique, p. 254.—Gemeines Oliven Kupfer, *Haus.*

Haus. Handb. b. iii. s. 1045.—Blättriges Olivenerz, *Hoff.*
b. iv. s. 171.—Prismatic Arseniate, *Aikin*, p. 94.

External Characters.

Its colour is dark olive-green, which passes on the one side into pistachio-green, on the other into blackish and leek-green.

It seldom occurs massive, and in angulo-granular concretions, generally in drusy crusts, and in small crystals, which present the following varieties of form :

1. Oblique four-sided prism, acutely bevelled on the extremities, the bevelling planes set on the acute lateral edges.
2. Preceding figure, in which the obtuse lateral edges are more or less deeply truncated.
3. Acute double four-sided pyramid; sometimes the angles on the common base are flatly bevelled; and the bevelling planes are set on the lateral edges.

The crystals are small and very small, and always superimposed.

The planes of the crystals are smooth, shining, and splendid.

Internally it is glistening, and the lustre is resinous, inclining to pearly.

The cleavage or foliated structure is imperfect.

The fracture is small and imperfect conchoidal, which passes into uneven.

The fragments are indeterminate angular, and rather sharp-edged.

It ranges from translucent to translucent on the edges.

It yields an olive-green coloured streak.

It is as hard as calcareous-spar.

It is rather brittle, and easily frangible.

Specific gravity, 4.280, *Bournon*.—4.2, 4.6, *Mohs*.

Chemical Characters.

Before the blowpipe, it first boils, and then gives a hard reddish-brown scoria.

Constituent Parts.

| | | |
|------------------|-----|-------|
| Oxide of Copper, | - | 60.0 |
| Arsenic Acid, | - - | 39.7 |
| | | <hr/> |
| | | 99.7 |

Chenevix, Phil. Trans. 1801.

Geognostic and Geographic Situations.

It has been hitherto found only in the copper-mines of Cornwall.

Third Subspecies.

Fibrous Acicular Olivenite.

Fasriges Olivenerz, *Werner*.

Hæmatitiform and Amianthiform Arseniate, *Bournon*, Phil. Trans. for 1801.—Cuivre arseniaté capillaire et mamelonné, *Brong.* t. ii. p. 231, 232.—Fasriges Olivenerz, *Karsten*, Tabel. s. 64.—Cuivre arseniaté mamelonné fibreux, *Haiiy*, Tabl. p. 91.—Cuivre arseniaté en petites masses habituellement fibreuses et mamelonnées, *Bournon*, Catalogue Mineralogique, p. 259.—Fasriges Oliven Kupfer, *Haus.* Handbuch, b. iii. s. 1047.—Fasriges Olivenerz, *Hoff.* b. iv. s. 173.—Hæmatitic and Amianthiform Arseniate, *Aikin*, p. 94.

External

External Characters.

Its colour is olive-green of different degrees of intensity. The darker varieties border on blackish-green, the lighter pass into pistachio-green, straw-yellow, liver-brown, wood-brown, and greenish-white.

The colours are sometimes arranged in curved and striped delineations.

It occurs massive, and reniform; in fibrous concretions which are delicate, straight, and scopiform, and these are collected into coarse or small granular concretions, and sometimes traversed by others, which are curved lamellar; also crystallized in capillary and acicular oblique four-sided prisms, in which the obtuse lateral edges are truncated, and bevelled on the extremities, the bevelling planes being set on the acute edges.

The crystals are small and very small, and sometimes scopiformly aggregated.

Internally the massive varieties are glistening or glimmering, with a pearly or silky lustre.

The fragments are intermediate angular, and wedge-shaped.

It is opaque, seldom translucent on the edges, and only translucent in the crystals.

It is as hard as calcareous-spar.

It is rather brittle.

The fibres are sometimes flexible*.

Y 2

The

* The fibres are sometimes so delicate, so short, and so confusedly grouped together, that the whole appears like a dusty cottony mass, the true nature of which is discoverable only by the lens. At other times, this variety appears in thin laminae, rather flexible, sometimes scarcely perceptible to the naked eye, sometimes tolerably large, and perfectly like *Amianthus papyraceus*.—*Bournon*, Phil. Trans. for 1801, part I. p. 180.

The streak is brown or yellow.

Specific gravity, between 4.100 and 4.200, *Bournon*.

Constituent Parts.

| | Amianthiform. | Hæmatitiform. |
|------------------|---------------|---------------|
| Oxide of Copper, | - 50 | 50 |
| Arsenic Acid, | - 29 | 29 |
| Water, - | - 21 | 21 |
| | <hr/> 100 | <hr/> 100 |

Chenevix, in Phil. Trans. for 1801.

Geognostic and Geographic Situations.

It is associated generally with the other arseniates of copper, and various ores of copper.

It occurs principally in Cornwall; it has been lately discovered in small quantity at Zinwald in Saxony, and, I believe, also in the Kaisersteimel, on the Rhine.

Fourth Subspecies.

Earthy Acicular Olivenite.

Cuivre arseniaté terreux, *Haiiy*, Tabl. p. 91.—Erdiches Olivenkupfer, *Haus.* Handb. b. iii. s. 1049.

External Characters.

Its colours are olive-green, verdigris-green, and siskin-green.

It occurs massive, disseminated, and in crusts.

It is dull.

The

The fracture is fine earthy.

It sometimes occurs in concentric lamellar distinct concretions.

It is opaque.

It is soft and very soft.

Geognostic and Geographic Situations.

It occurs along with the other subspecies of olivenite in the copper-mines of Cornwall.

4. Hexahedral Olivenite, or Cube-Ore.

Wurfelerz, *Werner*.

Wurfelerz, *Reuss*, b. iv. s. 163. *Id. Lud.* b. i. s. 183.—Arseniksaures Eisen, *Suck*, 2^{ter} th. s. 297.—Wurfelerz, *Bert.* s. 420. *Id. Mohs*, b. iii. s. 437.—Fer arseniaté, *Lucas*, p. 148.—Wurfelerz, *Leonhard*, Tabel. s. 68.—Fer arseniaté, *Brong.* t. ii. p. 182. *Id. Brard*, p. 332.—Wurfelerz, *Karsten*, Tabel. s. 66.—Pharmakosiderit, *Haus.* s. 138.—Arseniate of Iron, *Kid*, vol. ii. p. 101.—Fer arseniaté, *Häuy*, Tabl. p. 100.—Pharmakosiderit, *Haus.* Handb. b. iii. s. 1066.—Wurfelerz, *Hoff* b. iv. s. 177.—Arseniate of Iron, *Aikin*, p. 107.

External Characters.

Its colour is pistachio-green, of different degrees of intensity, which passes on the one side into olive-green, on the other into blackish green; it rarely approaches to leek-green.

It occurs massive; and crystallized in the following figures:

1. Perfect cube.

2. Cube

2. Cube, in which four diagonally opposite angles are truncated.
3. Cube truncated on all the edges.
4. Cube truncated on all the edges and angles.

The crystals are small and very small, and always superimposed and in druses.

The planes of the crystals are smooth and splendent.

Internally it is glistening, and the lustre is intermediate between vitreous and resinous.

It has a cleavage which is parallel with the truncations on the angles.

The fragments are indeterminate angular, and rather sharp-edged.

It is translucent, or translucent on the edges.

The streak is straw-yellow.

It is harder than gypsum, but softer than calcareous-spar.

It is rather brittle, and easily frangible.

Specific gravity, 3.000, *Bournon*.—2.9, 3.0, *Mohs*.

Chemical Characters.

Before the blowpipe it melts, and gives out arsenical vapours.

Constituent Parts.

| | | | |
|-----------------------------|--------|------------------|-------|
| Iron, - - - | 48 | Arsenic Acid, | 31.0 |
| Arsenic Acid, | 18 | Oxide of Iron, | 45.5 |
| Water of crystallization, - | 32 | Oxide of Copper, | 9.0 |
| Carbonate of Lime, | 2 to 3 | Silica, - - - | 4.0 |
| | ----- | Water, - - - | 10.5 |
| | 100 | | ----- |
| | | | 100 |

Vauquelin, in *Brong.*

Min. t. ii. p. 183.

Chenevix, in *Phil.*

Trans. for 1801.

Geognostic

[Subsp. 1. *Compact Atacamite, or Muriate of Copper.*

Geognostic Situation.

It is found in veins, accompanied with ironshot quartz, copper-glance or vitreous copper, copper-pyrites, and brown iron-ore.

Geographic Situation.

It occurs in Tincroft, Carrarach, Muttrel, Huel-Gorland, and Gwenap mines in Cornwall; and at St Leonard, in the department of Haut-Vienne in France.

* *Atacamite, or Muriate of Copper.*

Salzkupfererz, *Werner.*

This species is divided into two subspecies, viz. *Compact* and *Arenaceous*.

First Subspecies.

Compact Atacamite, or Muriate of Copper (*).

Festes Salzkupfererz, *Werner.*

Cuivre muriaté massif, *Brong.* t. ii. p. 228.—*Gemeines Salzkupfererz*, *Karsten*, Tabel. s. 64.—*Cuivre muriaté*, *Häuy*, Tabl. p. 89.—*Blättricher & Strahliger Smaragdochalsit*, *Haus.* Handb. b. iii. s. 1039.—*Salzkupfererz*, *Hoff.* b. iv. s. 180.—*Muriate of Copper*, *Aikin*, p. 92.

External

(a) I place this mineral immediately after the Genus *Olivenite*, on account of its resemblances to it; but want of accurate information in regard to it, prevents me including it as a species of that genus.

External Characters.

Its colour is leek-green, which passes on the one side into blackish-green, on the other into pistachio-green.

It occurs massive, disseminated, imperfect reniform, in prismatic distinct concretions, which are short, small and scopiform, also in granular concretions; in crusts or investing; and in short needle-shaped crystals, of the following forms:

1. Oblique four-sided prism, bevelled on the extremities; the bevelling planes set on the acute lateral edges.
2. The preceding figure, in which the acuter lateral edges are deeply truncated, thus forming a six-sided prism.

Internally it is shining and glistening, and pearly.

It has an imperfect cleavage.

The fragments are indeterminate angular.

It is translucent on the edges.

It is soft.

It is brittle, and easily frangible.

Specific gravity, 4.4 ?

Chemical Character.

It tinges the flame of the blowpipe of a bright green and blue, muriatic acid rises in vapours, and a bead of copper remains on the charcoal. It is soluble in nitric acid without effervescence.

Constituent

[Subsp. 2. *Arenaceous Atacamite, or Copper Sand.**Constituent Parts.*

| | | |
|------------------|-------|---------|
| Oxide of Copper, | 73.0 | 76.595 |
| Water, - - | 16.9 | 12.767 |
| Muriatic Acid, - | 10.1 | 10.638 |
| | <hr/> | <hr/> |
| | 100.0 | 100.000 |

Klaproth, Beit. b. iii. *Proust*, in Journ. de
s. 200. Phy. t. 50. p. 63.

Geognostic and Geographic Situations.

It occurs in veins at Los Remolinos, La Soledad, Guasco, Caymas, and Ojanos, in Chili; also at Virneberg near Rheinbreitenbach on the Rhine, and at Schwarzenberg in Saxony. In the fissures of the lavas of Vesuvius, particularly those of the years 1804 and 1805.

Observations.

This mineral was first brought from Chili to Europe, by Mr Christian Heuland, brother of the present Mr Heuland, the first and principal collector of the minerals of that remote and interesting country.

Second Subspecies.

Arenaceous Atacamite, or Copper-Sand,

Kupfersand, *Werner*.

Cuivre muriaté pulverulent, *Haüy*, t. iii. p. 561. *Id.* *Brong.*
t. ii. p. 229.—Sandiges Salzkupfer, *Karsten*, Tabel. s. 64.—
Cuivre muriaté pulverulent, *Haüy*, Tabl. p. 89.—Sandiger
Smaragdochalzit, *Haus.* Handb. b. iii. s. 1040.

External

External Characters.

Its colour is grass-green, inclining to emerald-green.

It occurs in scaly particles, which are shining, glistening, and pearly.

It does not soil.

It is translucent.

Constituent Parts.

| | | | |
|-----------------------|---|----|-------|
| Oxide of Copper, | - | 63 | 70.5 |
| Water, | - | 12 | 18.1 |
| Muriatic Acid, | - | 10 | 11.4 |
| Carbonate of Iron, | - | 1 | |
| Mixed Siliceous Sand, | | 11 | |
| | | 97 | 100.0 |

La Rochefoucault, Berthollet,
and *Fourcroy, Mem. de*
l'Acad. 1786, p. 158.

Proust, Journ. de
Phys. t. 50.
p. 63.

Geognostic and Geographic Situations.

It is found in the sand of the river Lipas, 200 leagues beyond Copiapu, in the desert of Atacama, which separates Chili from Peru.

Observations.

It was brought from South America by the traveller Dombey.