



Gruppo Umbro Mineralogico Paleontologico

FOSSILS & MINERALS

Review



**‘THE LAZIO CLASSICO’
MINERALS IN THE AREA OF VETRALLA**

NUMERO 2

MARZO 2017

'THE LAZIO CLASSICO', MINERALS IN THE AREA OF VETRALLA: 'TRE CROCI', 'CAPO D'ACQUA', 'FOSSO RICOMERO' / 'PIAN DI SAN MARTINO' AND 'CARCARELLE'

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For many years now most of our research on the territory of Lazio has revolved around the Vetralla town, following the path tracked by the pioneers of Lazio mineralogy.

In 1972 we began to search through the fields of Vetralla, Cura di Vetralla, San Martino al Cimino, Soriano al Cimino and several dry stone walls and accumulations of volcanic material were found, that were later observed again in great depth. The first tangible results of our research came about in 1973, there were some interesting mineralized projectiles that were discovered in the area of Fagianello near Tre Croci, containing Danburite crystals.

Since then our research has been more assiduous and extensive. A number of unidentified species were discovered in the Lazio region and unknown until now, thanks to the greater interest that university institutions have dedicated to these projectiles, new species have been identified in subsequent decades.

These particular blocks erupted by the Vicano volcano are called "projectiles" and have attracted the attention of scholars since the last century. These projectiles were named by Brocchi in 1817, as "primitive rocks", later Mercalli in 1889 called them "projectiles". The Frantappié in 1896 still defined them as "ancient rocks".

These projectiles have obvious differences between them, some are made up of potassium feldspar aggregates (sanidine), instead others form in plagioclase, others with pyroxene predominance are called 'femic', even rarer are the projectiles that have carbonate predominance.

All these "projectile" types were found both in the Vicana area and in the Cimina area. The study of the minerals found in these

projectiles but also in the lava, has allowed us today to have a precise picture of the processes that have led to the formation of these crystalline phases;

Some rare species such as Pepsosite-(Ce), Asbecasite-(Sb), Uranothorianite, Stillwellite-(Ce) and Hellandite (Ce), have been found for the first time in the Lazio volcanic region, in other cases recognized by 'IMA as new species including Vicanite-(Ce), Ciprianite-(Ce), Mottanaite-(Ce), Piergorite-(Ce).

The most important mineralogical areas in which we dedicate this work, are located near Vetralla in the direction of San Martino al Cimino: the area of Tre Croci, Strada del Pentolino (Road), the area of Fagianello and Capo d'acqua, Pian di San Martino and fosso Ricomero along both sides of the stream, Carcarelle and Tobia in the commune of San Martino al Cimino. The Capranica cave notorious for the discovery of Stoppanite and other very rare species, was excluded from this work, though will be the subject of other specific work.

In all of the locations mentioned above, there is still potential to discover mineralized blocks; close to the usual search locations the researcher must pay particular attention and carefully observe the waterfalls and/or streams. Formerly the plowed fields were the areas most frequented by researchers and collectors. Generally the farmers, during plowing work, cleaned up the land by gathering rocks at the side of the fields or reinforcing dry retaining walls or divisions between plots of land. These "walls" have been carefully observed and cleaned for potentially interesting blocks.

Today, the scarcity of new accumulations are due to the increasingly superficial plowing of the land that has led us to move away and look at the areas adjacent to those most frequented, in particular the depressions of the ground where water flows after storms or even inside within the waterways. Rainwater generally brings to light the interesting "sanidinite" blocks where it is still possible to make interesting discoveries.

DESCRIPTION OF MINERALOGIC SPECIES DISCOVERED

Pyrite: Pyrite is generally seen in conchoidal (cone shaped) fine grained masses, rarely found as cubic crystals and/or as isolated 'pentagonal dodecahedrons', sometimes oxidized by iron hydroxides. It is found in paragenesis with Magnetite, Titanite, Pyroxene, Black Mica, Hematite, Tourmaline and Anatase. It was found at 'Tre Croci', 'Capo d'acqua' and 'strada Fagianello' road (Vetralla).

Molybdenite: Molybdenite has sometimes been found in pseudo-hexagonal crystals, with highly irregular metallic luster, flexible and sometimes contorted. It is usually found in association with Gesso, Tourmaline, Rutile, Pyroxenes, Ilmenorutile and in the only block where Corundum was also found. Molybdenite has been reported by several researchers in sanidinite projectiles in the area of Tre Croci (Vetralla), although it can be considered quite a rare mineral.

Fluorite: Fluorite is a fairly common species within the sanidinite blocks, observed in vitreous whitish fine grained masses and only on few occasions has been found in crystals with octahedral habit with evident cube facets, inside the vacuoles of sanidinite projectiles. Perfect crystalline cubic crystals, within sanidinite projectiles were also found near 'Capo d'acqua'. In paragenesis with Thorite it may take on a slightly violet tint, though it is generally found in paragenesis with Black Mica, Hematite, Stillwellite (Ce), Tourmaline, Zircon and more rarely with Monazite- (Ce) and occasionally Pepprosite- (Ce). Sometimes it was found with Vonsenite inclusions. Fluorite is fairly common in the sanidinite sites of the town of 'Tre Croci' and 'Fagianello' in the immediate vicinity of Vetralla.

Spinel (Pleonaste): The Spinel in the Pleonaste ferri-ferrous variety was found throughout the area at certain times. Black and dark green octahedral crystals, 2-3 millimeters in maximum size have been found within the geodes of sanidinite projectiles and sometimes also within Pyroxinite. In paragenesis with Pyroxinite, Biotite and Anorthrite, it was found

in 'San Rocco' along 'Via Cassia-Cimina' (the road); with Titanite, Magnetite and Afghanite within most of the sanidinite blocks in the area around the town of Vetralla.

Magnetite: Magnetite is commonly found in monometric crystals of 'pentagonal-dodecahedron' habit, which are also very complex with many faces with maximum size of 3 to 5 mm and are black and very bright. It is in abundance in the vacuoles of the sanidinite projectiles in paragenesis with Titanite, Garnet, altered Pyrite, Black Mica, Pyroxene, Danburite, Zircon, Hematite, Tourmaline, Davyne, Hellandite (Ce), Anatase and Fluorite, or in veins and geodes of trachytic volcanic bombs near 'fosso Ricomero'. The mineral is observed in all the locations near the town of Vetralla (Tre Croci, Capo d'acqua, San Giovanni in Tuscia, Carcarelle, Fagianello) and San Martino al Cimino.

Corundum: This interesting mineral was discovered for the first time in 1990 by the late Luigi Mattei of Rome, it was found within a particularly compact and microgranular sanidinite projectile at the 'Tre Croci' site in the immediate vicinity of Vetralla. The crystals rarely look well-formed, usually have prismatic habit, very compressed almost pseudo-hexagonal, are more or less of grey or blue intensity, are millimeters in size and with a vitreous mother-of-pearl luster. It was found in paragenesis with Tourmaline and Mica.

Hematite: Hematite is found in tabular crystals almost rhombohedral, sometimes in very bright pseudocubes in the cavities of the sanidinite projectiles in the Vetralla area. It is found in paragenesis with Mica, Tourmaline, Danburite, Fluorite, Zircon, Thorite, Monazite- (Ce) and occasionally Osumilite-(Mg), Pseudobrookite; Only in some exceptional projectiles along with Pepprosite-(Ce) and Hellandite-(Ce). Beautiful crystallized specimens were found in projectiles along 'fosso Ricomero' in paragenesis with Phlogopite, Titanite and sometimes pseudobrookite. In the locality of Capo d'acqua, some specimens were found with brilliant iso-oriented crystals (Oligist) of 0.5 mm in size.

Perovskite: Perovskite, in its "probable Knopite variety", was found in the 1980's by Giancarlo Parodi, in pseudocube crystals of about a 1 millimeter border with metallic luster and blackish in colour. Also



Apatite celeste Loc. Fosso Ricomero 3 mm
Apatite Loc. Fosso Ricomero 1cm 1a



found (by Signoretti in 1998) in paragenesis with Phlogopite, Titanite and Apatite in the cavities of nodules (trachytic bombs) present in the lava near a trachytic outcrop in decomposed matter along the 'fosso Ricomero' (Vetralla).

Quartz: Quartz is a very common mineral found in small crystals with a maximum size of 2-4 mm. It is often found in paragenesis with Magnetite, Fluorite Titanite, Nosean, Vonsenite and Danburite in the sanidinite projectiles of the sites: Fagianello, Tre Croci and via Cassia 60km (Vetralla). In the past, quartz crystals were found, sometimes smoked inside the caverns of a lava in 'Le Piagge', not far from 'Soriano al Cimino'.

Tridymite: Tridymite was found in crystals a few millimeters in size, with tabular or lamellar habit, with pseudo-hexagonal contour and often trigeminal; Some findings were made with tridymite crystals with a needle-like habit, completely transparent or whitish. It has been reported at certain times within the vacuoles of lava blocks 'volcanic bombs' that were found along the 'fosso Ricomero' in paragenesis with Topazolite / Andradite, Cristobalite and Vonsenite crystals.

Cristobalite: Cristobalite is found in white spherical aggregates of up to one millimeter in size, in paragenesis with Vonsenite and Tridymite in an emerging lava near Poggio San Venanzio on the Cimino Volcano, not far from San Martino al Cimino. (Federico, 1967). Also found in exceptional globular crystals, clear transparent "drops of water" inside some "volcanic bombs" near 'fosso Ricomero' in paragenesis with Tridymite and spectacular transparent yellow or brown garnets.

Rutile and Ilmenorutile: The Rutile and Ilmenorutile were found in shades of grey with metallic luster, with a maximum size of 1 mm, prismatic stubby habit or isolated laminate, sometimes twisted within the vacuoles of some K-feldspar projectiles. The two species were found in paragenesis among themselves in association with Gesso, Tourmaline and Molybdenite within the cavity of a sanidinite projectile in the sites of Tre Croci (Vetralla) and San Giovanni in Tuscia.

Cryptomelane: Criptomelane is very common in grey and black fine grained masses often covering crystals of other minerals. It is located inside sanidinite and femic projectiles around Vetralla ('Tre Croci', 'Capo d'acqua',...)

Anatase: This mineral, although quite rare, has been found on several occasions in aggregates of very small and very bright black crystals of varying sizes from 0.1 to 0.5 millimeters. Isolated crystals were observed with developed pyramidal forms and much more rarely, in tabular crystals. It is generally found in paragenesis with Magnetite, altered Pyrite, Mica, Pyroxene, Hematite and Tourmaline in the cavities of some sanidinite projectiles in the towns of 'Tre Croci' (Vetralla) and 'San Giovanni' in Tuscia.

Pseudobrookite and Kennedyite: The two minerals were found in very well defined and bright crystals, very elongated prismatic or radial information up to 3 millimeters in length. Some observed crystals were tabular and flattened. They can be found more or less in dark orange, tending to be brownish. Commonly in association with Titanite, Hematite and very rarely with Osumilite- (Mg). It has been found in beautiful specimens within the geodes of some particular sanidinite projectiles including the volcanic bombs found in the 'fosso Ricomero' area.

Guarinite: This interesting discovery was made in 2004 by the late Luigi Mattei of Rome, in a block along the 'strada del Pentolino' (Pentolino Road), found in orange-colored crystals of flattened prismatic habit, almost always in parallel association to 0.5-1 mm in size. Initially, it was thought to be Lavenite, but through accurate examinations conducted by the Department of Mineralogy at the University of Rome, via x-ray diffraction on a single crystal, found that those crystals were Guarinite.

Baddeleyite: Baddeleyite is not a common species, it is found in tabular monoclonal crystals, very flattened, thin and elongated that can reach up to 2 mm in size. It almost always appears green and rarely in a red brick colour in paragenesis with Pyroxene, Titanite, Magnetite, Zircon, Thorite, Epidote and Stillwellite-(Ce). Also observed, were polychrome and epideictic crystals. It was also rarely found, in the locations of

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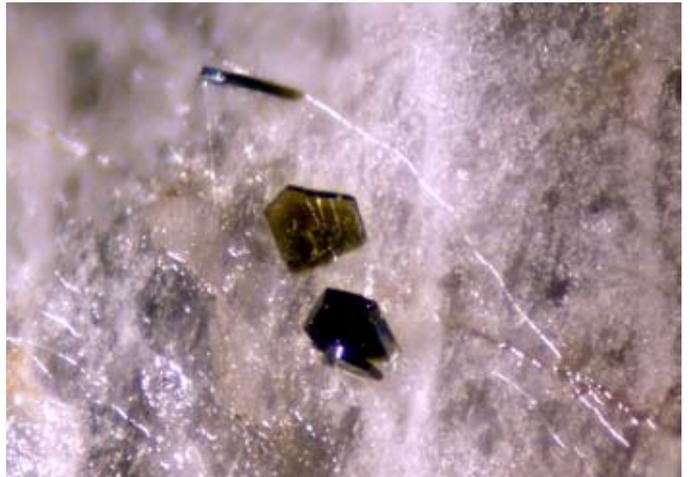
Apatite Loc. Fosso Ricomero 1cm



Badeleyite Loc. Capo d'Acqua 2mm 1dmf



Badeleyite Loc. Tre Croci 1 mm



Badeleyite 1,2 mm Loc. Tre Croci



Badeleyite 1,5 mm Loc. Tre Croci



Badeleyite 2 mm Loc. Tre Croci



Badeleyite 2,2 mm Loc. Tre Croci



Badeleyite 4 mm Loc. Tre Croci

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Baddelyite, 7 mm Loc. Tre Croci



Betafite 1 mm Loc. Carcarelle



Betafite 1 mm Loc. Tre Croci



Britholite 0,4 mm Loc. Tre Croci



Britholite Loc. Capo d'Acqua 1 mm



Britholite Loc. Capo d'Acqua 1,5 mm



Britholite Loc. Capo d'Acqua 1,5 mm



Britholite 1 mm Loc. Tre Croci

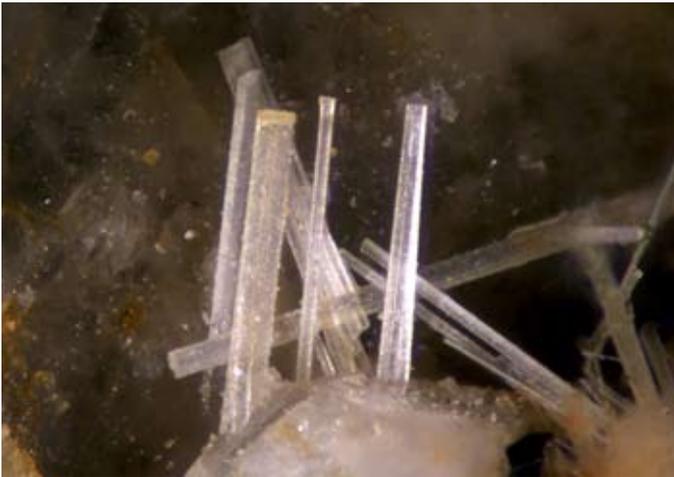
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Pirocloro Loc. Tre Croci 0,5mm



Pitiglianoite Loc. Tre Croci 3 mm 1a



Pitiglianoite 3 mm Loc. Tre Croci



Rutilo sgt 0,5 mm



Rutilo sgt 1 mm



Rutilo sgt 1,5 mm 1a



Rutilo sgt 1,5 mm



Rutilo sgt 3 mm

'Tre Croci', 'Capo d'acqua' and 'Via Cassia' 60 km near Vetralla, in 'Carcarelle', in the municipality of 'San Martino al Cimino', and inside a sanidinite-plagioclase projectile at 'San Giovanni' in Tuscia.

Uraninite and Uranothorianite: The two minerals have been recognized within some geodes of particular sanidinite projectiles near 'Tre Croci' and 'Pian di San Martino'. They come in perfectly bright crystals of cubic habit with variable sizes from 0.2 to 1.5 millimeters, in paragenesis with Thorite, Zircon, Titanite, Magnetite and more rarely Betafite.

Pyrochlore, Uranpyrochlore, Betafite and Calciobetafite: These minerals are very rarely observed in crystals with octagonal habit, sometimes very deformed to appear prismatic and especially with acicular form. The color is generally dark red tending to be black or orange. It has been observed in the vacillations of the sanidinite projectiles in paragenesis with Zircon, Zirconolite, Thorite, Uranothorianite, Mica, Titanite, Magnetite in the town of 'Tre Croci', via Cassia 60kms and 'Capo d'acqua' near Vetralla in the Carcarelle area. From the study carried out by Enrico Caprilli, "Minerals from the Pyrochlore group can be subdivided into three subgroups according to the content of Ti, Nb and Ta (in apfu - atom per formula unit), Betafite, Pyrochlore and microlite respectively. Within these subgroups the individual species are then distinguished according to the content of Ca, Na, K, Sn, Ba, REE, Pb, Bi, U. Most of the Lazio Pyrochlores contain more than 33% of Ti apfu and more 20% Na + K and U and therefore are all classified (except some exceptions = Calciobetafite) as Betafite". Those "elongated" crystals, were defined as "pyrochlore type", exquisitely orange, sometimes very lustrous and vitreous, which were found by the authors in a sanadinite projectile at 'Carcarelle'. The crystals observed were about 0.5-1 mm in size.

Zirconolite: The presence of this rare mineral in the 'vicano-cimina' area, was confirmed and followed by studies in the department of Mineralogy at the University of Rome. It is observed in small dark stubby red crystals, sized between 0.2 and 0.5 mm in combination with Pyrochlore, Baddeleyite, Titanite and Magnetite. It was found in some projectiles in the 'Carcarelle' area. From the study by 'Della Ventura'

in (Il Cercapietre 2004) the following is reported: "Zirconolite has a layered structure that can be stacked on top of each other with different orientations and sequences. This allows the formation of minerals that have the same chemical composition, but structures with different symmetries, called Polytypes. Since the various structures of zirconolite have slightly different chemical compositions, they are defined polytypoids. Currently there are five known polytypoids of the $\text{CaZrTi}_2\text{O}_7$ composition:

The current known $\text{CaZrTi}_2\text{O}_7$ polytypoids are five: an orthorhombic (Zirconolite3O), twotrigonal (Zirconolite 3T, -6T) and two monoclonal (Zirconolite 2M, -4M). Pyrochlore is also considered to be a polytypoid of the $\text{CaZrTi}_2\text{O}_7$ composition, where Zr is replaced by Ca, Th, U and REE. "

Limonite: Limonite is shown in a film or crust formed by the alteration of iron ore. It is present in all projectiles where the iron ore minerals have undergone immediate altered processes.

Calcite: Calcite is found in crystals with lamellar habit or in thin-white tufts that cement other minerals inside the vacuoles of sanidinite and pyroxenite projectiles. It was also noted in small-elongated prismatic opaque crystals, in some projectiles in the town of Tre Croci (Vetralla).

Barite: Barite was discovered and determined only a few years ago, it is seen in small prismatic crystals, transparent tabular and geminated within small geodes of a dark grey lava block. The presence of Celestine barite, was instead reported inside some sanidinite projectiles, as a product of alteration of other sulfur containing minerals, such as feldspathoids.

Vonsenite: The mineral is found in magnificent black acicular crystals, with a maximum size of 10-20 mm, metallic in appearance, in tufts or as hollow 'felt-like' crystals. It is almost always associated with Sanidine, Magnetite, Titanite, Danburite, Noseane, Afghanite, Davyne and Zircon crystals. The Vonsenite crystals are quite commonly observed completely or partially within sanidine, Danburite and Sodalite crystals.

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Noseana verde 3 mm Loc. Tre Croci



Noseana verde 3 mm Loc. Tre Croci



Orneblenda rossa 1979 8 mm Loc. Tre Croci



Peprrossite 1,5 mm Loc. Tre Croci



Peprrossite 2 mm Loc. Tre Croci



Phillipsite 2 mm Loc. Fagianello



Piergorire 1,5mm Loc. Tre Croci



Pirocloro 0,4 mm Loc. Tre Croci

It has been observed in almost all areas of the Vetralla area (Tre Croci, San Giovanni in Tuscia, Capo d'acqua, Fagianello, ...) and San Martino al Cimino (Carcarelle). It has also been reported in paragenesis with Topazolite / Andradite, Tridymite and Cristobalite in the cavities of volcanic bombs along the Fosso Ricomero.

Pepprosite-Ce: This is one of the most difficult species to observe, it was noted for the first time in the Sabatino volcano, the discoveries were sporadic in the Vetralla area. Pepprosite- (Ce) has been found in some sanidinite projectiles within sites of Tre Croci near Vetralla and the Carcarelle area, there is a species rich in rare earths. Pepprosite- (Ce) is a rare aluminum borate and rare earth, with a predominance of cerium and of intense yellow color. It is observed in aggregates of hexagonal tabular crystals. Pepprosite- (Ce) is found in paragenesis with Mica, Hematite, Tourmaline, Fluorite, Zircon, Thorite and rarely with Monazite- (Ce)

Gesso: Gesso is not a common species in the volcanic projectiles of the Vicano, it generally appears in prismatic laminar crystals, vitreous and transparent or in granular white masses inside sanidinite projectiles. It is found in paragenesis with Mica, Fluorite, Zircon, Thorite, Tourmaline, Rutile, Afghanite and other rare species such as Molybdenite and Corundum. It has been observed a few times in the blocks in the Tre Croci area.

Apatite: Apatite is often found in the geodes of sanidinite projectiles in thinly elongated hexagonal prismatic crystals that are generally perfect, transparent from 1-1.5 millimeters in size, in paragenesis with Magnetite, Titanite, Zircon, Thorite, Mica, Baddeleyite and Pyrochlore. It is quite a common mineral in the projectiles of the entire research area of Vetralla (Tre Croci, Capo d'acqua, Fagianello, via Cassia 60km) and Carcarelle (San Martino al Cimino). The Fluoroapatite crystals are extremely beautiful are apple green or blueish, transparent up to 1 cm, found within a "volcanic bomb" near the fosso Ricomero. The mineral in this case can be seen in paragenesis with crystals of Titanite, Mica, Pseudobrookite and remarkable garnet crystals of the Topazolite grossular series.

Monazite Group: Among the minerals of the Monazite group, the only terms related to Monazite- (Ce) and Britholite- (Ce) usually are very small, can be observed through a stereoscopic microscope. Monazite- (Ce) was found in small prismatic, yellowish-colored crystals and were observed in paragenesis with Mica, Hematite, Tourmaline, Fluorite, Zircon, Thorite and exceptionally with Pepprosite-Ce. It was found in a projectile in the area of Tre Croci (Vetralla). Monazite crystals rarely can be recognized at first sight because they take on crystallizations similar to Titanite or even Stillwellite- (Ce). Britholite- (Ce) is found in prismatic crystals milky or fresh vibrant green in colour, sometimes tending to be celestial. The Britholite crystals (Ce) may appear similar to the Berillo family, and are often found in association with minerals in the Hellandite- (Ce) group.

Bastnasite-Ce: Bastnaesite- (Ce) is a REE carbonate fluoride (Della Ventura, Bellatreccia from 'Cercapietre 2004') it was determined in numerous projectiles generally associated with Cheralite-Ce, usually in micrometric granules.

Forsterite: Forsterite is not very common and is observed in dense, opaque prismatic crystals, sometimes with many faces varying in size from 1 to 3 mm and honey yellow in colour. This species has been found only in some rare sanidinite projectiles in Carcarelle (San Martino al Cimino) in paragenesis with Biotite, Wollastonite, Augite, Horneblende and sometimes Anorthite; It seems that it has also been reported in some projectiles found near 'Tre Croci'.

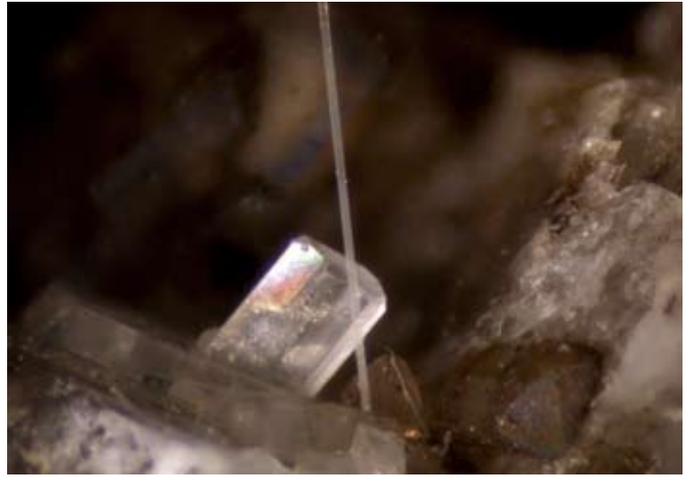
Clinohumite: The Clinohumite was determined only a few years ago, these are crystalline or orange granules tending to be red brick in colour and found inside some sanidinite vacuoles contained in volcanic bombs that can be found near fosso Ricomero.

Grossular, Andradite and Melanite: The minerals of the garnet group are found in perfect and very bright crystals of rombohedral habit and are light yellow, brown, dark brown, orange and black in colour. It can be found in paragenesis with Vesuvianite, Afghanite, Epidote, Horneblende, Augite, Hauina and Sodalite, and sometimes Wollastonite and Akermanite-Ghelenite

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Vishnevite Loc. Tre Croci 4 mm



Zircone 1,3 mm, Loc. Tre Croci



Zircone 1,5 mm Loc. Tre Croci



Zircone 1mm capo d'acqua 1bmf



Zircone, thorite, 0,2 mm Loc. Tre Croci mf



Zircone policromo 1 mm Loc. Tre Croci



Zircone rosa, 2 mm, Loc. Tre Croci



Zircone su thorite 1 mm Loc. Tre Croci

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Sanidino 7 cm Loc. Fosso Ricomero



Sanidino gem doppio baveno F.Ricomero 5 cm 1a



Sanidino gem doppio baveno F.Ricomero 5 cm



Sanidino gem.carlsbad F.Ricomero 6 cm 1a



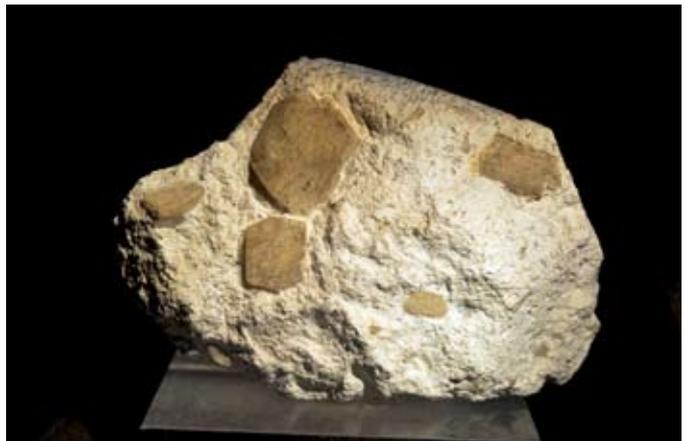
Sanidino gem.carlsbad F.Ricomero 6cm 1b



Sanidino gem.carlsbad, F.Ricomero 6 cm



Sanidino Soriano Al cimino 3,5 cm



Sanidino Soriano al cimino, x 3 cm 1a

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Sanidino Soriano al Cimino, x 3 cm



Sodalite 1,5 mm Loc. Carcarelle



Sodalite 1mm Loc. Tre Croci Iamf



Sodalite Loc. Fagianello 2 mm



Sodalite Loc. Fagianello 3 mm



Sodalite Loc. Fagianello 2,5 mm



Stillwellite, Strada del Pentolino 2 mm 1a



Stillwellite, Strada del Pentolino 2 mm

in the metamorphic or carbonic projectiles of the vicano-cimina area and more rarely, in the projectiles of the Vetralla area Tre Croci, via Cassia 60km, San Giovanni in Tuscia) and Carcarelle area. The examples of Topazolite and Grossular are magnificent and are very transparent in orange, greenish or red, which contain black Andradite crystals that were found inside a “volcanic bomb” near the fosso Ricomero in close paragenesis with Cristobalite e Tridymite.

Zircon: Zircon is found in tetragonal crystals of usually well formed prismatic habit, colourless or rosé, gray and sometimes multicoloured. Usually, it can be seen in the geodes of sanidinite blocks with plagioclase. It is seen in association with Magnetite, Titanite, Hematite, Mica, Tourmaline, Fluorite, Augite, Horneblende, Garnets, Thorite and more rarely with Uranothorianite, Monazite, Betafite and Pepposite (Ce). It can be found in all research areas in the Vetralla area.

Thorite: Thorite is observed in impressive prismatic crystals of up to 5 millimeters in size, usually elongated and transparent, more rarely observed in individual acicular. It is seen in emerald green and sometimes is iso-orientated and epitaxial on Zircon crystals. It is observed in paragenesis with Zircon, Titanite, Magnetite, Biotite, Tourmaline, Hellandite-Ce, Horneblende and much more rarely with Uranothorianite, Uraninite, Betafite, Vicanite and Pepposite-Ce. It is found in geodes of sanidinite blocks in the area of Vetralla (Tre croci, Fagianello, Capo d’acqua, via Cassia 60km) and Carcarelle.

Gadolinite: This species was found very few times, it is seen in small light blue prismatic crystals, some tend to be grey. The crystals are rarely perfect, usually observed in malformed clusters or in complex associations. Gadolinite crystals were found in sanidinite projectiles in the area of Tre Croci and San Giovanni in Tuscia in paragenesis with Zircon, Danburite, Magnetite, Titanite, Mica, Thorite, Vonsenite and Hellandite- (Ce).

Homilite: For many years, this interesting mineral of the Gadolinite group, has been a “meteor” of Lazio mineralogy, mentioned several times but has never had the scientific certainty of its true existence. It seems to have been found inside a projectile near the town near Tre Croci in 1997 and the determination was only reported in the ‘Micro’ No. 1 2004 magazine. It is seen in green crystals tending to be blueish in colour and up to 1.5 mm in size.

Scheelite: Scheelite is a rare mineral and has been observed a few times by the authors and there are few well-crystallized specimens. It appears in crystals that rarely exceed 1 millimeter in size, are orange or pink in color or colourless, with the characteristic of crystallographic habit within sanidinite projectiles from the Tre Croce area.

Titanite: Titanite is one of the most common minerals in the sanidinite sites of the entire Vicana-Cimina area. It is observed in prismatic, stocky disphenoidal or spearheaded crystals of varying sizes from 0.5 to 10 millimeters. The crystals are more or less intense orange, are usually transparent and well-formed. The crystals are rarely abundant with faces and geminated. It’s paragenesis with Magnetite, Vonsenite, Horneblende, Augite, Danburite, Zircon, Tourmaline and Fluorite is remarkable. It can be found in the towns of Tre Croci, Fagianello, Fosso Ricomero, San Giovanni in Tuscia, via Cassia 60 km, Capo d’Acqua, all near Vetralla and in the Carcarelle area. What is considered unique are thin titanite crystals that appear needlelike inside some volcanic bombs found on the fosso Ricomero edges, in paragenesis with Fluorapatite, Pseudobrookite.

Vicanite-Ce: For this species Vetralla and Carcarelle are the “type locality”. Vicanite- (Ce) has been found only in very few projectiles, it is observed in magnificent prismatic crystals green in colour, usually transparent and vitreous inside particular sanidinite projectiles rich in Analcime, found in the area of Tre Croci in the area of Vetralla and in the Carcarelle area. Except for two / three findings, there are no reports of additional mineralized blocks with the presence of Vicanite- (Ce). Its crystals are sometimes abundant with faces and different in shape. The size of the crystals vary from 0.2 to 1.5 millimeters. Extraordinarily, some crystals of dimensions up to 3 mm have been found by the authors. Vicanite- (Ce) is located in beautiful paragenesis with Magnetite, Zircon, Thorite, Uranothorianite, Titanite, Apatite, Stillwellite- (Ce) and Clinoamphibole.

Hellandite- (Ce), Ciprianiite- (Ce), Mottanaite- (Ce), Piergorite (Ce): The story of this group of minerals was born about thirty years ago and has undergone various problematic phases. For the first time in 1975-1978, tabular crystals, almost lamellar

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Allanite 2 mm Loc. Carcarelle



Anatasio 0,4 mm Loc. Pian di san martino



Anatasio 0,6 mm Loc. Carcarelle



Andradite e cristobalite Loc. Fosso Ricomero 1mm



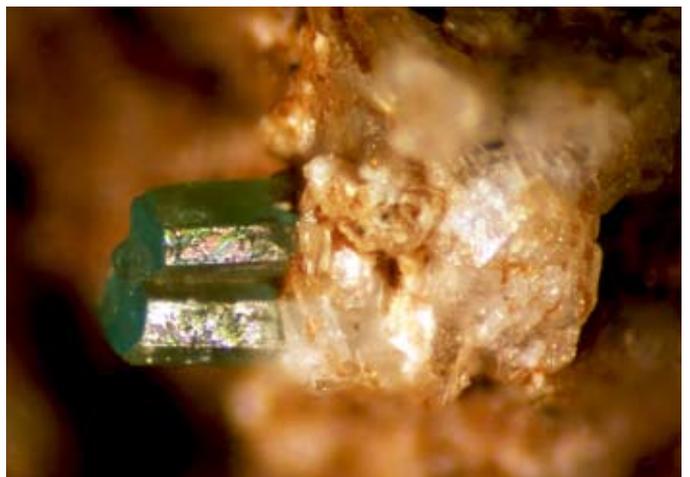
Anortite 3 mm Loc. Capo d'Acqua



Anortite 12 mm Loc. Tre Croci



Anortite 12 mm Loc. Tre Croci



Apatite celeste fosso Ricomero 3 mm 1a

light brown in colour with various nuances were observed. Initially, these crystals were attributed to Allanite. Subsequently, a few researchers provided further samples at the University of Rome and these were studied as Hellandite term, with a chemical composition different from those known, up until that time that they were Y type. Our Hellandite was not Y but contained Th, U and REE. These motivations led to an in-depth study. A few years later similar crystals were found by Ezio Bernabé in a location near Vetralla (62km from Via Cassia) and were verified by Professor White of Smithsonian of Washington, as Tadzihikite and had a strong enrichment in Th. There was a lot of confusion at this point. Research and analysis gained strength and thanks to the use of new analysis instrumentation, researchers at the University of Rome have been able to define these crystals into a group of four distinct mineralogical species, Hellandite (Ce), Piergorite- (Ce), Mottanaite- (Ce) and later also added the fourth species, Piergorite (Ce). The four minerals of the group at view, cannot be distinguished and are often within the same crystal, all the terms may also be present. For simplicity, we will continue to call these species as Hellandite (Ce). The work of Giancarlo Della Ventura of the Department of Geological Sciences at the University of Rome, has made it clearer on this enigma that has lasted for over twenty years. We can state with a certain tolerance of error, that colorless crystals are almost always attributable to the “predominant Piergorite”, those that are brown in colour in the area of Vetralla and Pian di San Martino have a certain predominance in Mottanaite, the dark ones of Tre Croce and Carcarelle lead towards Hellandite- (Ce). Ciprianite- (Ce) appears to be most common in the Sabatino volcano blocks. However, for conventional purposes, it is preferred to call these crystals as Hellandite- (Ce) group, because to be certain of the association of a crystal, this must be destroyed for chemical analysis and the neighboring crystal could be different. In the general list of minerals in Lazio, the chemical formulas of the terms recognized and approved by the I.M.A. have been reported. Therefore, they are attributable to this term, all tabular iso-oriented crystals of up to 2-3 millimeters of color vary between light brown to dark brown, yellowish or creamy white, sometimes transparent. The crystals always present with lamellar habitus due to the wide development of the pinacoid (010); Easily crumbled according to the levels (010). The crystals show a gemination compared to the level (100), they are lamellar, but are consistently elongated with polysynthetic gemination and have

low birefringence. To complete the information, it should be added that Tadzihikite- (Ce) belongs to the same group, but it does not seem to have been reported in our projectiles, although several Hellandite (Ce) groups have been exchanged in the past with this name “improper”.

Epidote: Epidote was found in Tre Croci and Capo d’Acqua in geodes of sanidinite blocks in thin prismatic crystals, sometimes acicular light green or occasionally yellowish with a maximum size of 2 millimeters.

Allanite- (Ce): Allanite- (Ce) is seen in beautiful tabular prismatic crystals, very shiny, thin, with dimensions of up to 1 mm and are dark grey or brown in colour. The crystals were always found together with Magnetite, Titanite, Mica, Hematite, Thorite, Zircon and Horneblende.

Vesuvianite: Vesuvianite although it is a fairly common mineral in our region, in the sanidinites of the vicano-cimina area it is quite rare. In the Vetralla area, reddish or brown crystals of about 1-3 mm, usually perfect and radiant, are observed in paragenesis with Sanidine, Pyroxene, Mica, Danburite and Cancrinite.

Stillwellite-Ce: Stillwellite- (Ce) crystals found within the sanidinites of this area, are certainly the best crystals ever found on a global level; They are observed with a very bright prismatic habit, almost always abundant with faces and with beautiful finishes and may present complex shapes. It is generally observed with a pink, violet color although colorless crystals have been found. To identify the crystals visually, references can be made to the pentagonal shape in the faces that constitute the termination of the crystal. The Stillwellite crystals (Ce) were found in the Vetralla area (Tre Croci, via del Pentolino e Capo d’Acqua) and some sporadic finds were also made in the Carcarelle area.

Ekanite: For the first time in 1982, Ekanite was found in the volcanic structures of our region by the Varese researcher Corrado Tumaini, in a sandinite projectile near the quarry of Casa Collina in Pitigliano. Its presence was certified by analysis carried out at the University of Milan (Gramaccioli with personal communication by Corrado Tumaini). Later, was also found in some projectiles at the Tre Croci site at Vetralla and Carcarelle. From the analysis (by Ventura), the Vetralla area Ekanite is particularly rich in uranium and thorium. The mineral presents

in splendid tetragonal crystals of prismatic or stocky habit with emerald green characteristic, in association with Zircon crystals, Apatite, Thorite, Titanite, Danburite and Quartz crystals.

Tourmaline: Tourmaline is a fairly common mineral in sanidinite blocks throughout the area of Vetralla San Giovanni in Tuscia. It presents in prismatic crystals with very bright faces of radius fibrous structure of up to 10 mm in length. Crystals have been found in these colours; black, brown, green, colorless, sometimes with clear blackheaded polychrome. Tourmaline crystals have been found in the geodes of sanidinite projectiles in the areas of Fagianello, Tre Croci, Capo d'Acqua, Carcarelle and amazing ones found in San Giovanni in Tuscia.

Osumilite- (Mg): Osumilite- (Mg) has been found in small compressed prismatic flat crystals with hexagonal contour of intense clear blue color with a maximum size of 0.5 millimeters. Classical paragenesis with Hematite and Pseudobrookite in some sanidinite projectiles in the fosso Ricomero area (De Casa of 1987; Parodi of 1989).

Augite, Aegirine-augite and Diopside: The pyroxenes are very common in all sanidinite but also femic projectiles, Augite and Aegirine-augite are certainly the most common terms, they appear in bright black and green crystals; Intense and perfect in size also several millimeters inside the interstices of sanidinite projectiles. They are found in almost all sandinite projectiles in the Vetralla area.

Horneblende ferroan: Horneblende is a fairly common mineral in sanidinite blocks; It is presented in well-formed and bright prismatic crystals, a few millimeters in size, in dark green, red brick or black colour. It is observed together with Titanite, Magnetite, Afghanite, Thorite, Zircon, Danburite, Hellandite-Th, Vonsenite and exceptionally with Ekanite and stillwellite-Ce. It is quite common in the sanidinite projectiles in the areas of Tre Croce, Fagianello, Capo d'acqua, San Giovanni in Tuscia, via Cassia 60km (Vetralla) and Carcarelle in the commune of San Martino al Cimino. In 1975, a large lava block of about 30 cm was found in the town of Tre Croci, whose geode and vacuoles completely filled with thin

and elongated red brick Horneblende crystals of up to 15-20 mm.

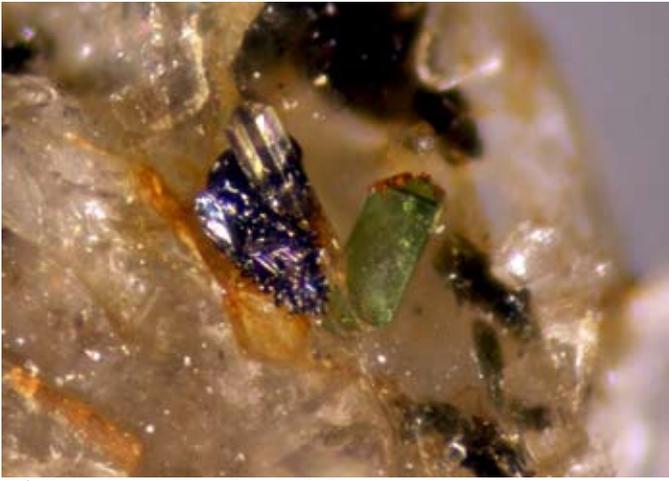
Phlogopite: Phlogopite is a term of the group of mica very common in sanidinite. It comes in hexagonal-shaped lamellar crystals, very bright and sometimes semi-transparent, with dimensions up to 5 millimeters. It has been found frequently at Fagianello and Capo d'acqua, but it can be seen throughout the Vetralla area. The best crystals are undoubtedly found in the geodes of volcanic bombs along the fosso Recomero, where red-colored brick crystals appear in beautiful paragenesis with crystals of Hematite, Titanite, Tridymite and sometimes transparent Topazolite / Andradite crystals.

Sanidine: Sanidine is the mineral that is an essential part of the bottom layer of some projectiles and is also found in crystals isolated in the geodes of the projectiles themselves. In the projectiles it is generally presented in very transparent crystals. Along fosso Ricomero, within a bank of trachyte in decomposed matter, it is recalled in the past, large geminate crystals were found in Karlsbad and rarely in Bavena, in grey or violet opaque colour, brilliant and perfect in size that reached extraordinary dimensions of 7-8cm. There are very beautiful crystals found within a very clear trachyte a few kilometers from the town of Soriano al cimino.

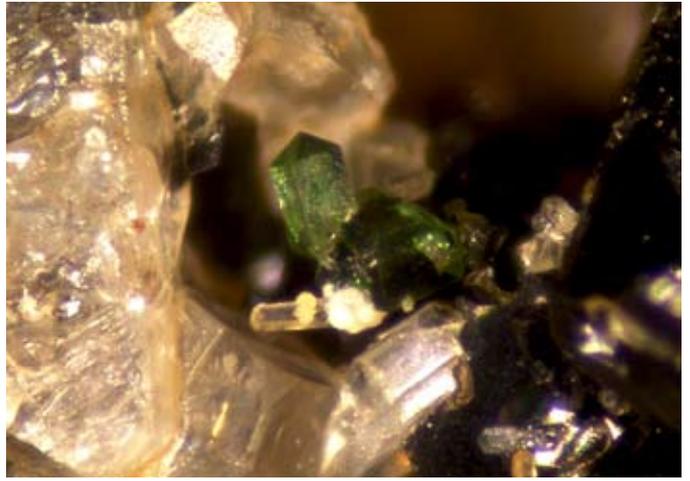
Anorthite: Anorthite is found in the vacuoles of "pyroxene" projectiles in opaque white crystals, rarely well formed with dimensions up to 10 millimeters. Extraordinarily, crystals even up to 2 cm were found. It is standardly associated with Augite, Mica, Magnetite. It was found in the town of Tre Croci, Capo d'acqua and via Cassia 60 km in the vicinity of Vetralla and Carcarelle area.

Danburite: Danburite is found in crystals that are always very clear, colourless, sometimes yellowish or reddish by alterations of iron hydroxides. The size of the crystals rarely exceeds 10 millimeters. Sometimes crystals with tapered faces can be detected and may often include Vonsenite crystals. In April 1995, it was remarkable to find a large sanidinite block in San Giovanni in Tuscia where all interstices and geodes presented crystallization of Danburite, in crystals up to 5-6 mm in paragenesis with tourmalines of various colors, white amphibole and fibrous (Richterite). The

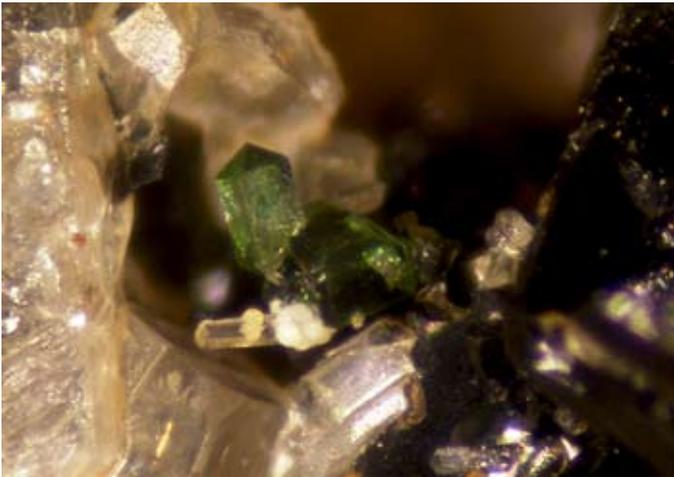
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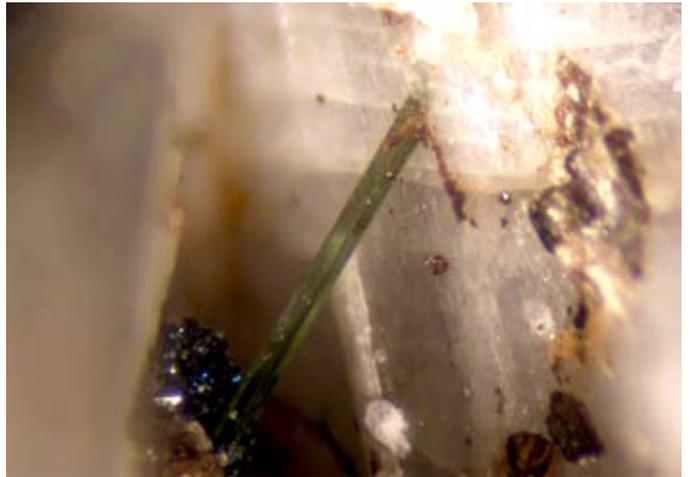
Thorite Loc. Tre Croci 0,8 mm



Thorite Loc. Tre Croci 1 mm 1a



Thorite Loc. Tre Croci 1 mm



Thorite Loc. Tre Croci 2 mm



Thorite, Loc. Carcarelle 1,3 mm



Thorite, Loc. Tre Croci 1,5 mm



Thorite Loc. Tre Croci 4 mm



Titanite 1 mm Loc. Capo d'Acqua

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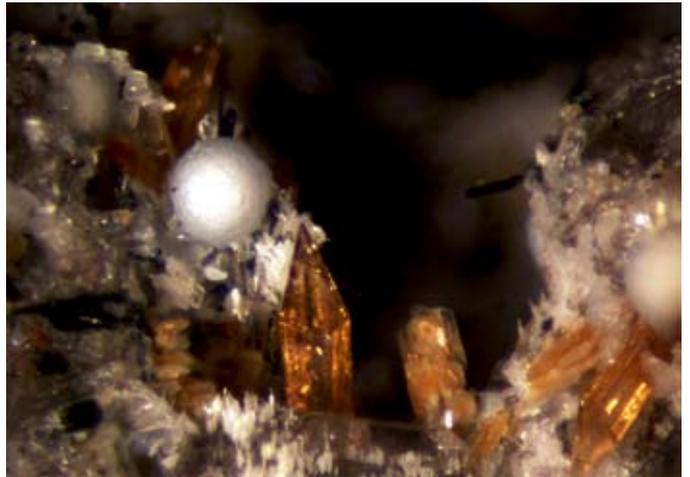
Titanite 2,2 mm Loc. Fosso Ricomero



Titanite 2,5 mm Loc. Fosso Ricomero



Titanite biterminata 2 mm Loc. Capo d'Acqua



Titanite cristobalite globulare, 2 mm F. Ricomero



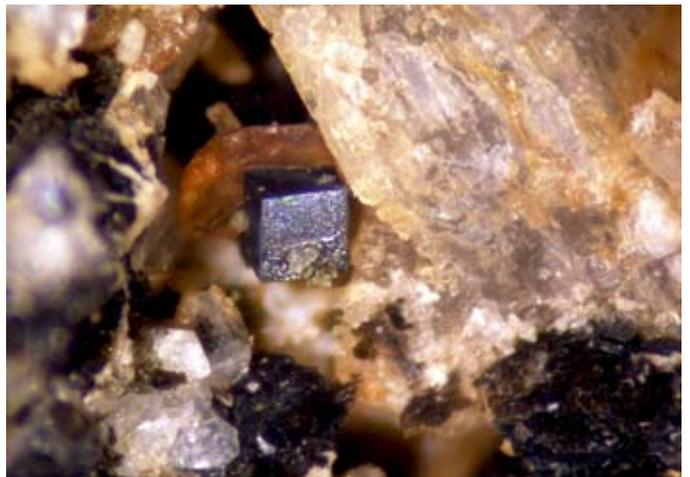
Tridimite Phlogopite 5 mm Loc. Fosso Ricomero



Uraninite-thorianite, uraninite-thorianite, Tre-Croci, 1



Uranothorianite 1mm Pian di San Martino 1a



Uranothorianite 1,2 mm Tre Croci-

Danburite crystal associations are also very beautiful; Titanite, Tourmalin, Magnetite, Zircon, Thorite, Uranothorianite, Vonsenite, Apatite, Afghanite, Horneblenda, Mica and Quartz in the sanidinites of Tre Croci, Capo d'Acqua, San Giovanni in Tuscia, via Cassia 60km near the town of Vetralla and Carcarelle area.

Nepheline: Nepheline presents in crystals with stocky hexagonal habit and vitreous luster. The crystals are colourless, sometimes yellowish resulting from alterations. It was found, though not common, within some sanidinite projectiles in the town of Tre Croci and Capo d'Acqua.

Tuscanite: This species is quite common in volcanic structures from Vulsino and those from Sabatino in the Vicana area are particularly rare. There have been a few discovered in the Vetralla area.

Analcime: Analcime is present in fine glassy opaque or transparent crystals of icositetrahedron habit and up to 2- 3 mm in size. It is found in sanidinite projectiles rich in plagioclase, in paragenesis with Vicanite-(Ce), Mica, Titanite and Horneblenda. It was found in the area of Fagianello and Tre Croci near Vetralla and Carcarelle area.

Vishnevite: Vishnevite, once defined as "Cancrinite Type", is found in elongated hexagonal crystals usually colourless and completely transparent with a variable size between 0.2 to 3 mm. Although there are other terms of the group (Pitiglianoite, Afghanite) in the nearby area, the Vishnevite crystals are not common, therefore accurate investigations should be conducted to accurately identify the species. Crystals of this cancrinite term although not common, have been found in the interstices of the sanidinite projectiles, in most of the localities of the near by vicana area.

Pitiglianoite: Pitiglianoite Crystals were verified only a few years ago and refer to the Cancrinite group term, these vitreous elongated crystals, are often clustered or interwoven with each other in sanidinite vacuoles, sometimes appear placed at the rod end of the structure. Among the terms of the group, Pitiglianoite is considered to be one of the rarest.

Liotite: This Cancrinite term is definitely the least common. There are only a few "evident" finds. In the Vicana area, it was determined only in volcanic projectiles. Liotite generally appears in small transparent hexagonal crystals, abundant in faces.

Afghanite: Afghanite appears in hexagonal crystals with typical striations and triangulations. When the crystals are fresh, they show a clear transparency, can even reach up to 10 mm in size. Normally the crystals appear altered. As with the entire Cancrinite group, a chemical analysis is required for the absolute certainty of the species. It is found in sanidinite projectiles in almost the entire nearby vicana area, though rare finds with clear and well-formed crystals are rare.

Franzinite: Franzinite is a term of the Cancrinite group that is the least common in the nearby vicana area. It comes in hexagonal crystals, vitreous and white colors with typical striations. It was determined only in a few sanidinite projectiles in the areas of Tre Croci and Capo d'Acqua. To ensure certainty, chemical analysis is required, as with all other species in this group.

Davyne: Davyne is not a common mineral, seen in hexagonal crystals that are usually flattened with whitish and pearlescent lustrous surfaces of up to 10 mm in size and under "black light" – ultraviolet light it has a slightly pink color. It has been reported in some sanidinite projectiles in paragenesis with Magnetite, Danburite, Tourmaline, Vonsenite, in the localities of Tre Croci and Fagianello, very close to Vetralla.

Sodalite: Sodalite is found in crystals with rhombidodecahedron habit, is colorless, grey, yellowish, sometimes greenish, usually very bright and transparent with a maximum size of 4-5 millimeters. Beautifully associated with Sodalite, Magnetite, Titanite, Mica, Stillwellite-(Ce), Afghanite, Apatite and Thorite. It has exceptional transparency and crystallographic beauty and was discovered in 1993 within a sanidinite block in Carcarelle, in the municipality of San Martino al Cimino. Interesting discoveries were made also near Vetralla (Tre Croci, Capo d'acqua and the Fagianello locality).

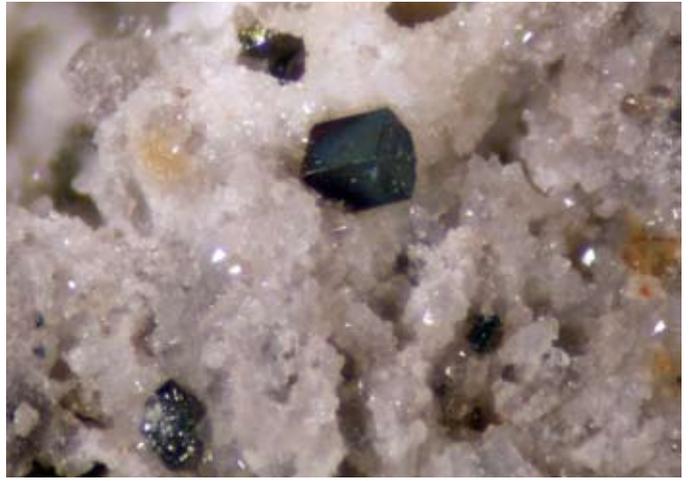
Nosean: Nosean appears in rhombidodecahedron crystals, transparent green in colour or more common in shapeless granules. The crystals can even reach up to 3-5 millimeters in size, usually bright and clear. Nosean can be found in paragenesis with Sanidine, Afghanite, Vonsenite, Titanite, Magnetite, Apatite and Augite. Under "black light" – ultraviolet light the Nosean assumes a pink-orange color. It is found in the sanidinite projectiles in the localities of Tre Croci, Capo d'Acqua and Carcarelle.

Hauyne: Hauyne, unlike other Lazio areas, is not very common in neighbouring projectiles, where we consider their discoveries are rare and unusual. Generally, it is observed in granules, noticeable under

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Uranothorianite 1,3 mm Loc.Pian di San Martino



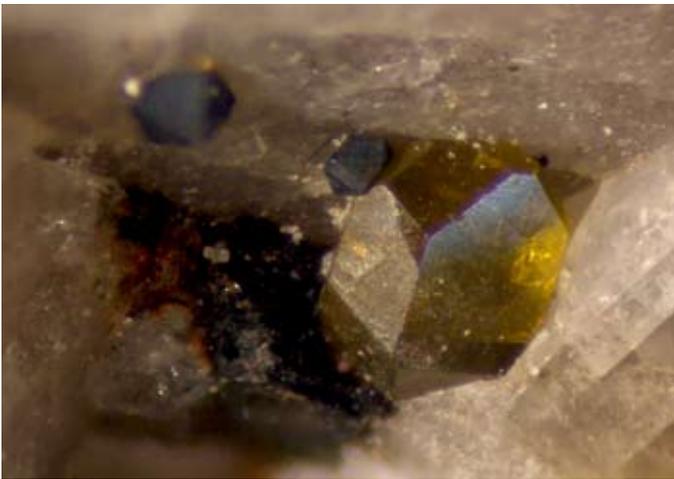
Uranothorianite Loc.Pian di san Martino 1,5 mm



Uranothorianite Pian di San Martino, 1 mm 1b



Uranothorianite Pian di San Martino, 1mm



Vicanite 3 mm Loc. Carcarelle 1a



Vicanite 3 mm Loc. Carcarelle



Vicanite Loc. Carcarelle 1,5 mm



Vishnevite Capo d'acqua 1,5 mm

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Stillwellite, Strada del Pentolino 2,6 mm



Stillwellite-ce 1 mm Loc. Tre Croci



Thorite 0.8mm Loc. Carcarelle



Thorite 1 mm Loc. Carcarelle



Thorite 1,5 mm Loc. Tre Croci



Thorite 2 mm Loc. Tre Croci



Thorite biterminata 1,2 mm Loc. Tre Croci



Thorite su zircone Loc. Tre Croci 1 mm

black light – ultraviolet light, due to their red fluorescence. However, crystals rarely sometimes reach even 5 mm in size with rhombidodecahedron habit and vary between emerald and celestial color. It often appears in rounded formations. Good examples of crystallized Hauyne were found inside a sanidinite block in the Botte locality, near Vetralla and Carcarelle.

Scapolite: The existence of Scapolite has only been established recently, even though it has been known for many years. It was found in flattened, transparent and tapered crystals of dimensions up to 6 millimeters in size. A very nice paragenesis with Danburite and Grenade was found in a sandinite projectile in Via Cassia 62km near Cura di Vetralla. It has also been found several times in the locality of Capo d'acqua.

Asbecasite-(Sb): The existence of this very interesting mineral, was only discovered in 1991. The mineral was found in the geode of k-feldspar crystals in the locality of Tre Croci, it is presented in tabular pseudo-hexagonal crystals of cream white color, with dimensions of about 1-2 millimeters, similarly crystallographic to those of the sinchisite. It was reported in an interesting sanidinite projectile in the locality of Capo d'acqua. (Maras et al.1991, Della Ventura et al., 1991)

Sinchisite: Sinchisite is a rare species in the nearby area. It is presented in microscopic contoured hexagonal crystals, generally assembled within one another and are cream white in color. It was found in the locality of Tre Croci.

Helvite: Helvite is found in tetrahedron crystals, in red, yellow to dark brown, or black in colour with vitreous lustre. This mineral is rarely found in the interstices of grey-coloured sanidinite projectiles in paragenesis with Titanite, Magnetite and Mica found in Tre Croci (via del Pentolino) and 59km from Via Cassia. "An interesting find of tetrahedral crystals, inside some cavities, were observed within a sanidinite block near Fosso Ricomero (Pian di San Martino). From the first discovery, it seems that this is a term containing Manganese and Lead. To date, the study carried out by Della Ventura et al. Concerns only the EDS spectrum, but it is unclear whether it is actually an oxide or carbonate or other. The presence of minerals containing Mn such as Helvite and that are strongly altered from being reduced to pseudomorphosis of amorphous Mn oxides, may be

useful in the hypothesis of a very late formation of these minerals, which could be attributed to a group term Coronadite, Quenselite, Magnetoplumbite, Zenzenite. The analysis and work is continued to determine the mineral."

Leucite: Leucite appears in vitreous white icositetrahedron crystals within some leucotephritic specific grey blocks. The crystals are vitreous and transparent and rarely reach 2-3 millimeters in size. Furthermore, there are also huge threads of dark grey lapilli with millions of white opaque crystal inclusions, in the way of disintegrated chaolinized leucite also of remarkable size. These threads are commonly seen throughout the vicana-cimina area.

Pollucite: Pollucite is the first discovery of this species in our region, as well as the first Cesium mineral in a projectile from the area of Vetralla / Tre Croci. The spectrum showed the presence of Si Al and Cs as well as a very small percentage of K, which would bring this Pollucite to have a chemical composition very close to the extreme term. The discovery of transparent Pollucite crystals, definitely showed a very high percentage of K.

Richterite: This amphibole term has been reported in several blocks of both sanidinitic and leucotephritic. The analysis carried out at the University of Rome provided proof of the presence of this amphibole, although it would be necessary to carry out analysis on other comparable formations as well. It is found in clusters of white felted crystals.

Ferrierite: Ferrierite is a mineral recently discovered, although there have been several reports of its existence over the past decades. It is found in acicular crystals or globular aggregates of brown red color, few millimeters in size and in paragenesis with Heulandite in the vacuoles of a light greyish to celestial coloured leucotephritic rock, which was found near Tobia. The verification of this mineral species was carried out at the Euratom Center for Ispra (VA) on specimens supplied by the late Giancarlo Pierini of Varese.

Heulandite: Heulandite, just like Ferrierite, is a mineral recently verified; It is found in mother-of-pearl crystals of about 1 millimeter in size, in avana white with Ferrierite within a particular Leucotephrite in the locality of Tobia near Vetralla.

Phillipsite: Phillipsite is found in well-formed white mother of pearl coloured crystals. These crystals are found isolated, bi-terminated, often clustered and rarely

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with cross-gemination. Crystals can reach up to 10 millimeters in size. They were found in a solid grey projectile found in the locality of Fagianello near Vetralla.

Chabazite: It was found only in a single grey block in the locality of Fagianello, near Vetralla. It was observed in small white cubic crystals.

Stilbite: Stilbite was found within some dark grey lava blocks rich in geodes containing greenish vitreous leucite crystals. The stilbite was observed in colourless prismatic crystals, bound to sheaves a few millimeters in size, in paragenesis with Heulandite, Ferrierite, Mica Flogopite, Magnetite and rarely Sodalite crystals. The mineral was found within the geodes of a dark grey volcanic block in the locality of Tobia, near Vetralla.

Thomsonite: Thomsonite has been found in a certain altered sanidinite projectile located near Tre Croci and was presented within the geode group of perfectly isolated or geminated transparent crystals with a maximum size of 0.5-1 mm.

Clinoptilote: Clinoptilote was found in a highly altered leucotephritic block and was verified only recently. It is found in small tabular white crystals, sometimes gathered like a fan. It is a term of very rare zeolites within our volcanic region.



Afghanistanite Loc. Capo d'Acqua 1,5 mm



Afghanistanite 5 mm Loc. Tre Croci



Afghanistanite 6 mm Loc. Tre Croci



Afghanistanite 3 mm Loc. Tre Croci

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Magnetite 3,2 mm Loc. Tre Croci



Magnetite 5 mm Loc. Tre Croci



Mejonite 1,5 mm Loc. Tre Croci



Monazite 1 mm Loc. Tre Croci



Noseana 2 mm Loc. Tre Croci



Noseana ed Hellandite 2 mm Loc. Tre Croci



Afghanite 2 mm Loc. Tre Croci



Afghanite 2 mm Loc. Tre Croci

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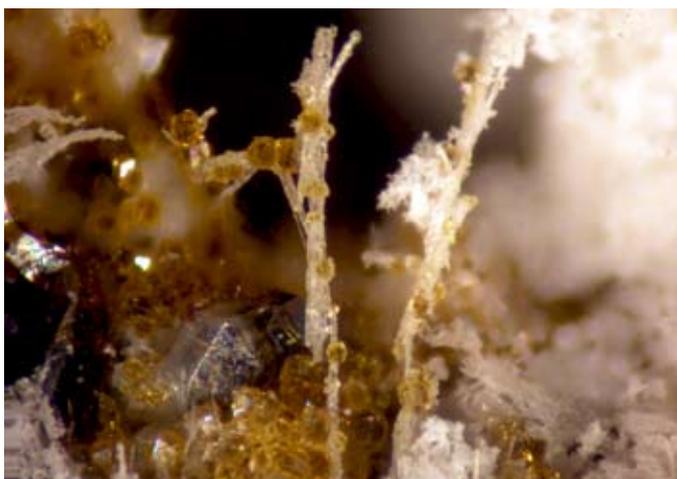
Carbonato Apatite 4 mm Loc. Tre Croci



Corindone 2 mm Loc. Tre Croci



Corindone 2 mm Loc. Tre Croci



Cristobalite e Grossularia Loc. Fosso Ricomero 2 mm



Danburite 2 mm Loc. Tre Croci



Danburite caramellata Loc. Tre Croci 2 mm

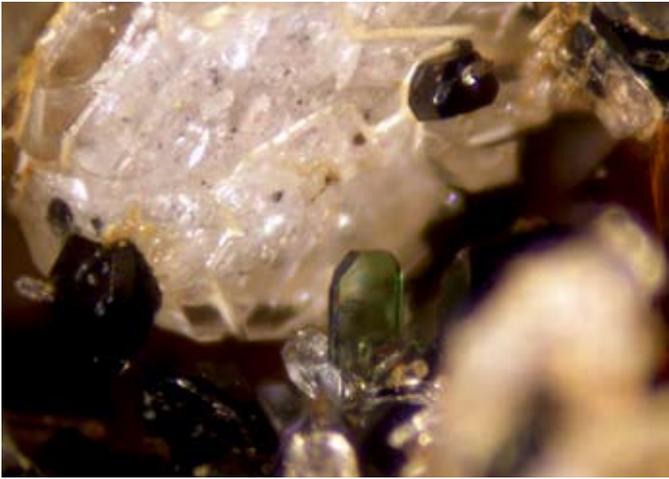


Davyina 1,5 mm Loc. Tre Croci



Ekanite 0,5 mm Loc. Carcarelle

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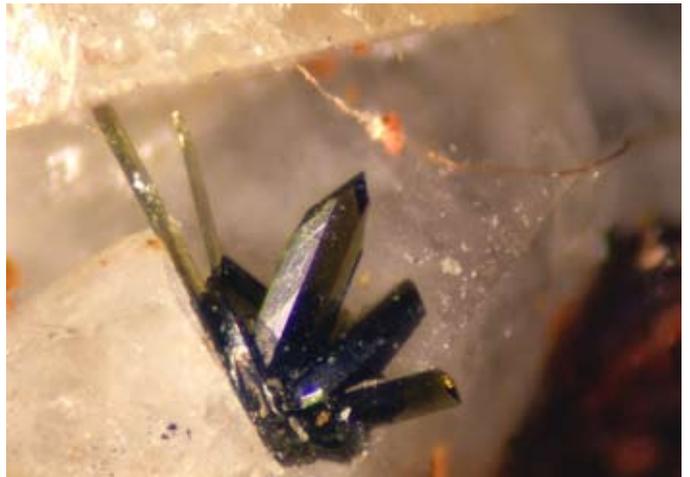
Ekanite 1 mm Loc. Carcarelle



Ematite Loc. Fosso Ricomero 1,5 mm



Epidoto 1 mm Loc. Carcarelle



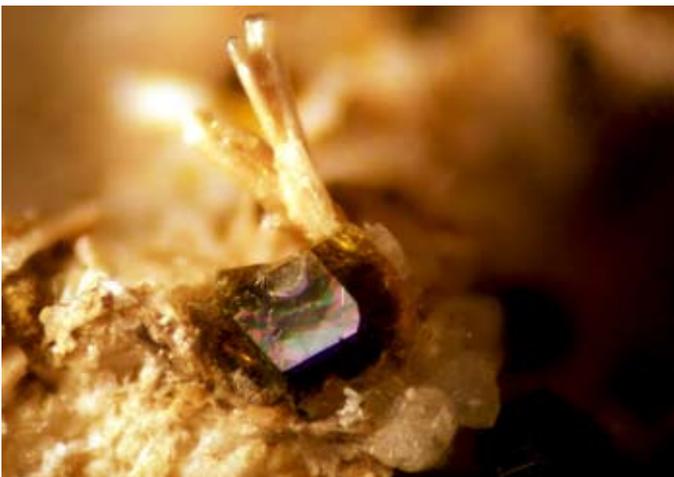
Epidoto 1,5 mm Loc. Tre Croci



Epidoto 2 mm Loc. Tre Croci



Fluorite Loc. Tre Croci 2 mm



Grossularia 1 mm e Cristobalite, Fosso Ricomero

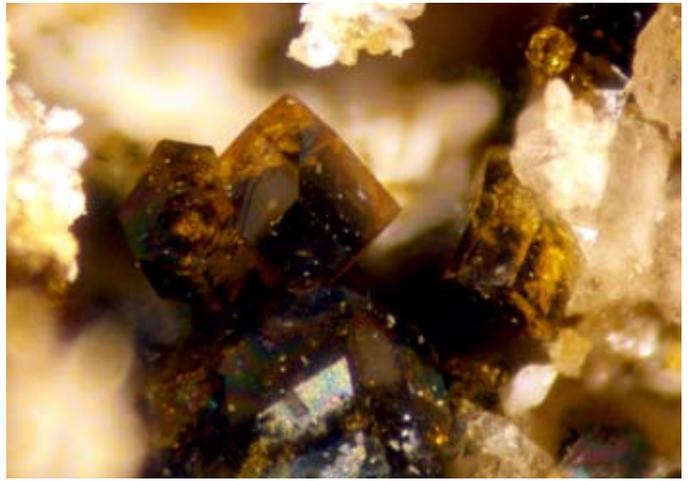


Grossularia 1 mm Loc. Carcarelle

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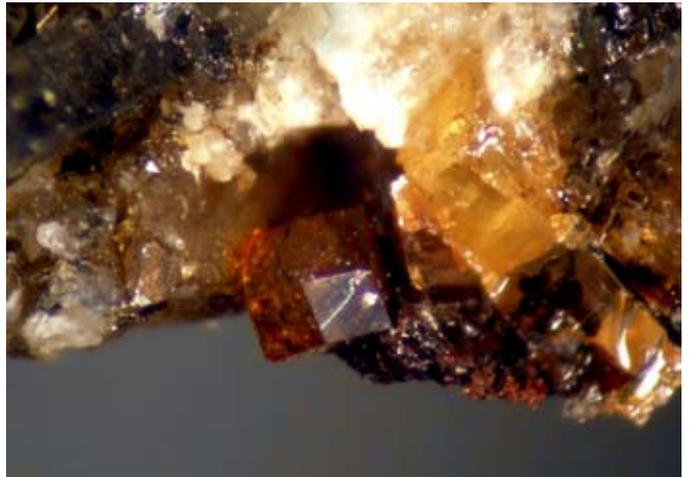
Grossularia 1,5 mm Loc. Fosso Ricomero



Grossularia 3 mm Loc. Fosso Ricomero



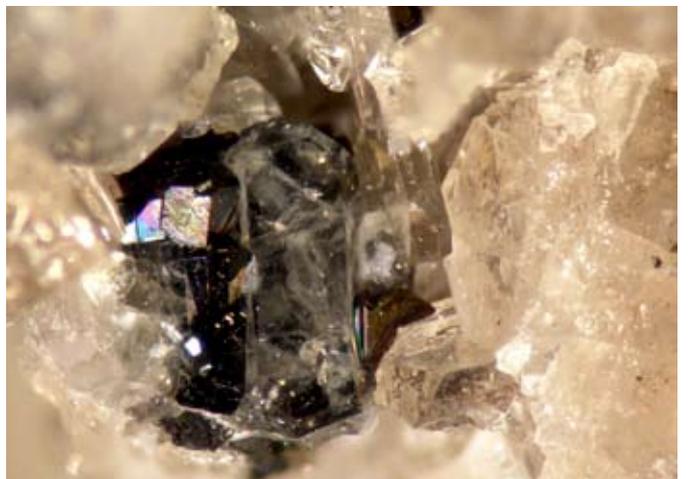
Grossularia Loc. Carcarelle 1mm



Grossularia Loc. Carcarelle 1mm



Guarinite 0,5 mm Loc. Tre Croci



Hauyňa 1,5 mm Loc. Tre Croci



Hauyňa 1mm Loc. Tre Croci



Hellandite-(ce) 3 mm Loc. Tre Croci

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Zircone titanite Loc. Tre Croci 1,2 mm 1mmf



Zirconolite 1,5 mm Loc. Carcarelle



Loc. Carcarelle



Loc. Carcarelle



Loc. Capo d'Acqua



Loc. Tre Croci



Afghanite geode 6x3 mm Loc. Tre Croci

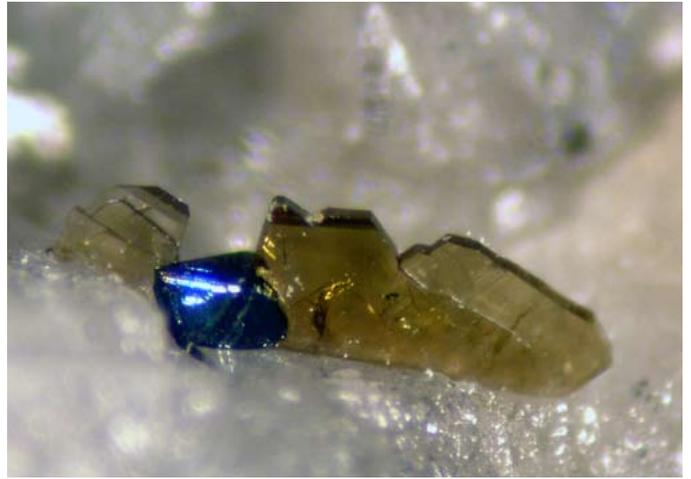


Afghanite 2 mm Loc. Carcarelle

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Hellandite-(ce) 3 mm Loc. Tre Croci



Hellandite-(ce) group, 5 mm, Pian di San Martino



Hellandite-ce Pian di San Martino 1,2 mm



Hellandite-ce Pian di San Martino 2,2 mm



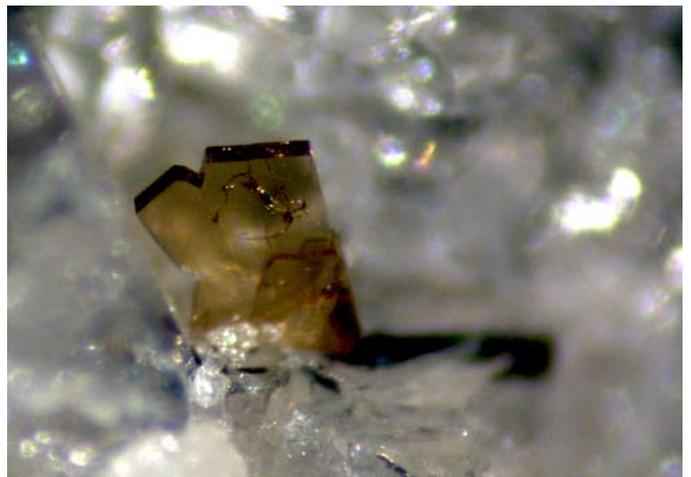
Hellandite-ce Pian di San Martino, 2 mm



Hellandite-ce Pian San di Martino 1 mm



Hellandite-ce Loc. Tre Croci 2,5 mm



Hellandite-ce group, 2 mm Loc. Tre Croci



Helvite 0,4 mm Loc. Carcarelle



Helvite Loc. Strada del pentolino 0,6 mm



Helvite Loc. Tre Croci 0,5 mm



Helvite Loc. Tre Croci 0,5 mm



Helvite Loc. Tre Croci 1 mm



Hematite Loc. Capo d'Acqua 1,2 mm



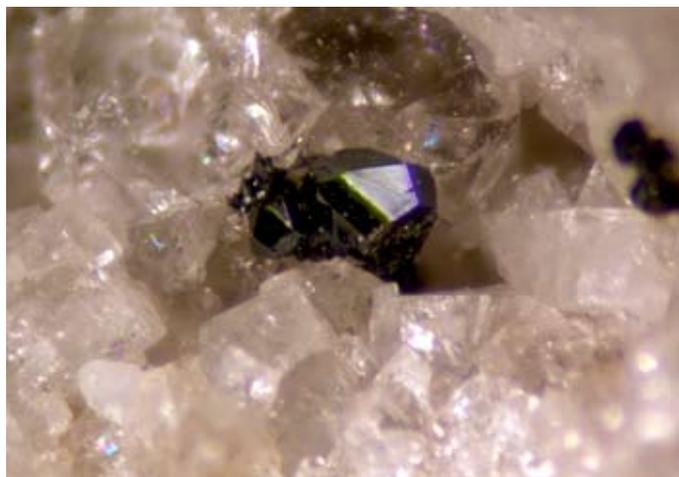
Hematite Capo d'Acqua 1,2mm



Hematite Loc. Capo d'Acqua 1,5 mm



Hematite Loc. Capo d'Acqua 1mm



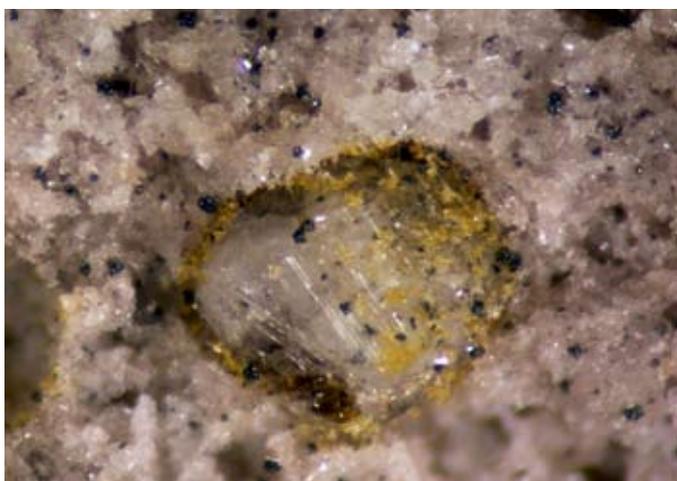
Hematite Loc. Tre Croci 1mm



Hematite, 3 mm, Loc. Tre Croci



Humite, Loc. Tre Croci, 1,6 mm



Liottite Loc. Tre Croci 2 mm



Magnetite Loc. Capo d'Acqua 2 mm



Magnetite Loc. Tre Croci 2 mm



Magnetite Loc. Tre Croci 3 mm

MUSEO DEL CAVATORE

Via 17 Agosto 1944, 10/a Vellano (PT) tel. e fax 0572 409181 +39330910517



GeoElsa

**MOSTRA DI
MINERALI - FOSSILI
CONCHIGLIE**

Organizzazione:

**Associazione Mineralogica
e Paleontologica Senese**

Gruppo Mineralogico Senese

Gruppo Paleontologico "C. De Giuli"



Comune di

Colle di Val d'Elsa

8 - 9 Aprile 2017

**Palazzetto
dello
Sport**

Via Liguria, 1

**Colle
di
Val d'Elsa (SI)**

Ore 09:00 - 19:00

Informazioni:

**Info@geoelsa.it
www.geoelsa.it**



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