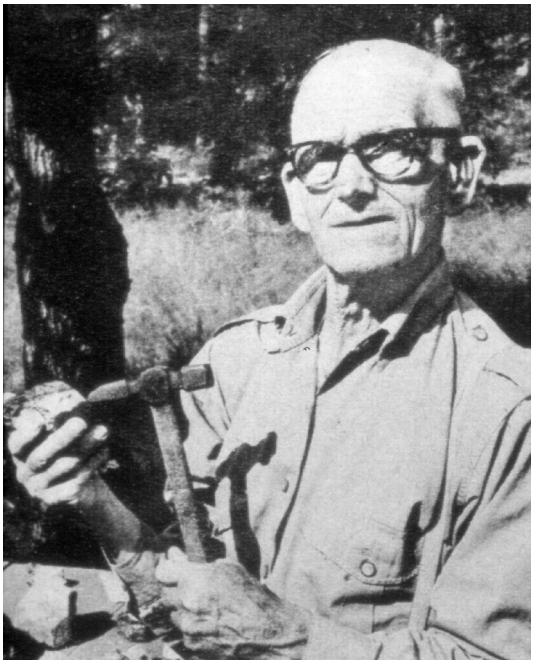
Iveland kommune

IVELAND MUNICIPALITY MINERAL EXHIBITION

Minerals from Iveland and Evje

THE MINERAL EXHIBITION



In 1971 the municipal council of Iveland decided to buy the mineral collection from the well-known miner and amateur geologist Olaf Landsverk.

A few years later the mineral collection board applied for funds from next year's municipal budget in order to buy new minerals. The board of culture decided against that, but agreed to support the purchase of individual minerals up to a maximum amount of 200 kroners per purchase.

During the years that followed, several good opportunities occurred to acquire new minerals to the collection.

Consequently the collection has grown to 700 mineral samples from 60 different contributors. The collection only contains minerals from the Iveland/Evje area.

In 2013 the local town council was invited to buy several private collections of high-quality minerals. The price tag was above half a million kr. A unanimous council decided to secure these collections. Through these acquisitions, Iveland municipality now is the owner of a unique mineral collection. Several of the minerals are of a quality that is among the best ever found in Iveland/Evje. Most of the collection is exhibited at the Åkle center. In addition to the mineral exhibition, charts and pictures present information about the minerals and the mining history in Iveland/Evje.

All texts and pictures are presented in this booklet.

The process of developing the exhibition has been a cooperation between the Iveland municipality and the Setesdalsmuseet. I would like to thank mineral consultant Ronald Werner for an excellent cooperation from the earliest stages of planning on. Ronald's contribution and competence has been decisive for the exhibition as it appears today.

I hope you will enjoy your visit to the exhibition.

Yours sincerely

Kjell Gunnufsen

Geologic consultant

Iveland municipality

1. Olaf Landsverk 1887-1966

Olaf Landsverk worked as a road inspector in Iveland. In addition he mined feldspar and quartz.
His sons Orest, Arthur, Willy and Ivar often helped him in the mines.
Olaf acquired great knowledge of the minerals he found.
He was visited by geologists and mineral collectors from all over the world. They wished to get knowledge about geology and swap minerals.
He built up a collection of 500 mineral samples representing 200 different mineral species.
Several museums throughout the world have minerals from Olaf in their collections. In 1960 Olaf assisted Norwegian geologists at a big international geological congress.
The very same year he was awarded the King's Medal of Merit in gold for meritorious services, and his contribution to geology.
The municipal council of Iveland bought Olaf's mineral collection in 1971. After that the collection has been considerably revised and expanded.

Olaf Landsverk studies his mineral collection

2. Feldspar

2a Feldspar

About 60% of the earth's crust consists of feldspar minerals.
Feldspars are a group of silicate minerals that contain varying amounts of the elements potassium, sodium and calcium.
In the pegmatites of Iveland/Evje microcline (kalispat) and albite (natronspat) are found.
The color varies from white, grey and brown to red and green.

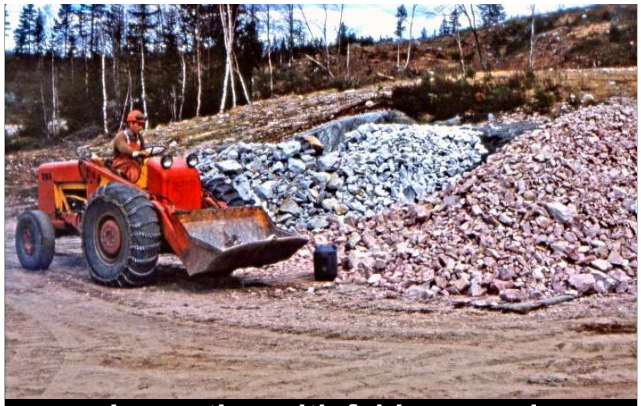
Torje Gjerustad pushes a wheelbarrow loaded with feldspar out of the mine

The largest known crystals in our area were found at Tveit. They were at least 6 meters long, and weighing more than 100 tons. Feldspar is used in the production of porcelain, china, glass, fuses, false teeth, paint, plastic and rubber.

2b Dental feldspar

Feldspar that is particularly pure can be used in the production of false teeth and ceramic fillings. That is why it is called "tannspat" or "dentalspat".
Tannspat from Iveland/Evje has been exported to Liechtenstein, Germany, Austria, the Netherlands and Japan.
Small scale mining of tannspat in some of the mines in Iveland/Evje continues as of today.

Knut Mølland inspects dental feldspar



Large tips with feldspar and quartz in Mølland

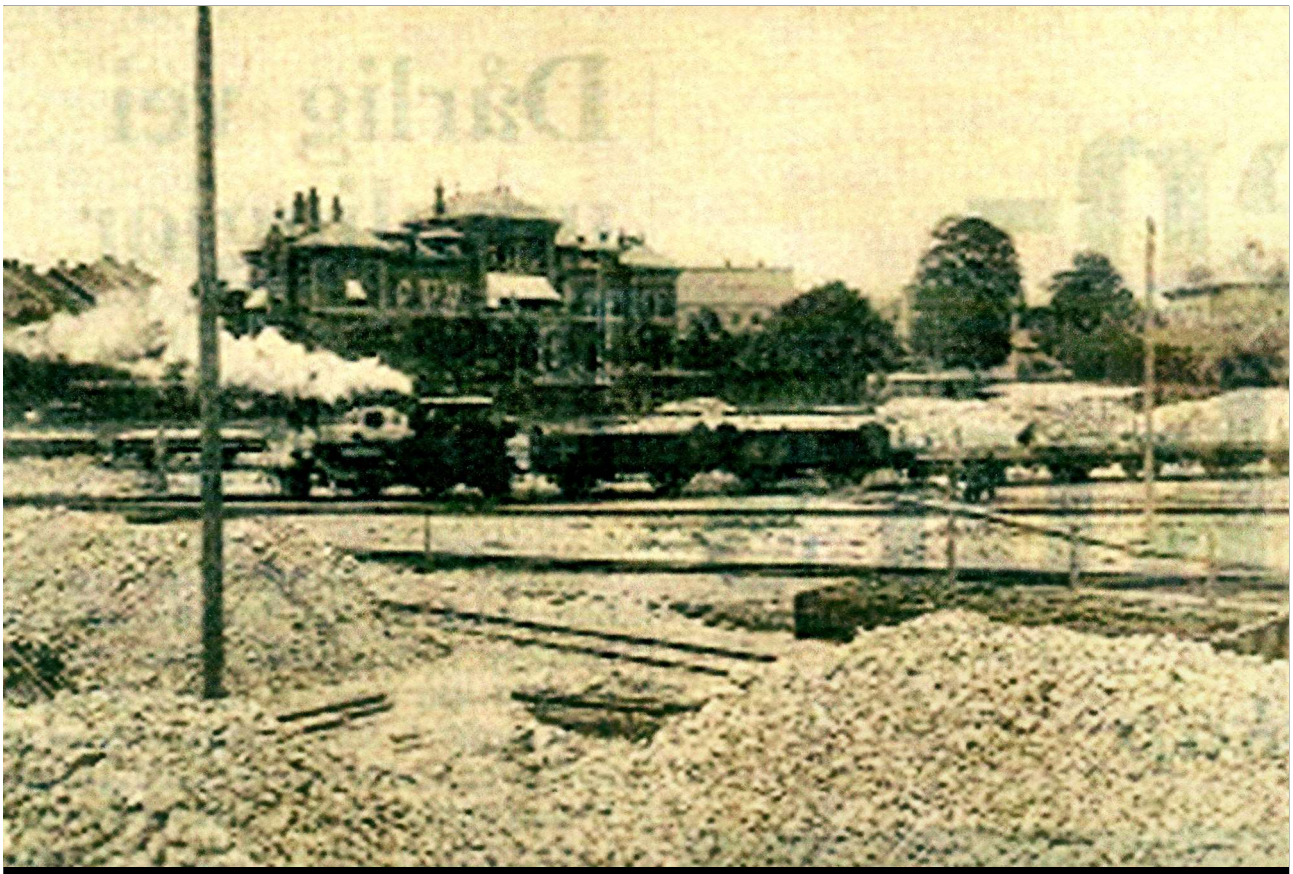
2c Tannspat from Mølland

In the eighties Knut Mølland mined microcline in "Knutehola" at Kjetevatn. He built a comfortable shelter that enabled him to sort feldspar during the winter. Sorting was very important, and even the tiniest impurities from other minerals had to be removed. In 1986 he started a company called "Iveland Mineral A/S", and several times a year he sent many tons of feldspar to factories in Liechtenstein, Germany, and Austria. The price was 1200 kr. per ton.

2d Amazonite

In several mines in Iveland/Evje a green variety of microcline called amazonite can be found. Amazonite from the Landsverk 1-mine in Evje is considered to be among the best in the world, and it is in high demand by stone cutters. Amazonite is mainly cut into cabochons: round or oval cut stones that you can fit into rings, bracelets or necklaces.

Ivar Gautestad found a lot of amazonite in the Landsverk 1 mine



A steam locomotive and tips of feldspar at the railroad station in Kristiansand around 1900

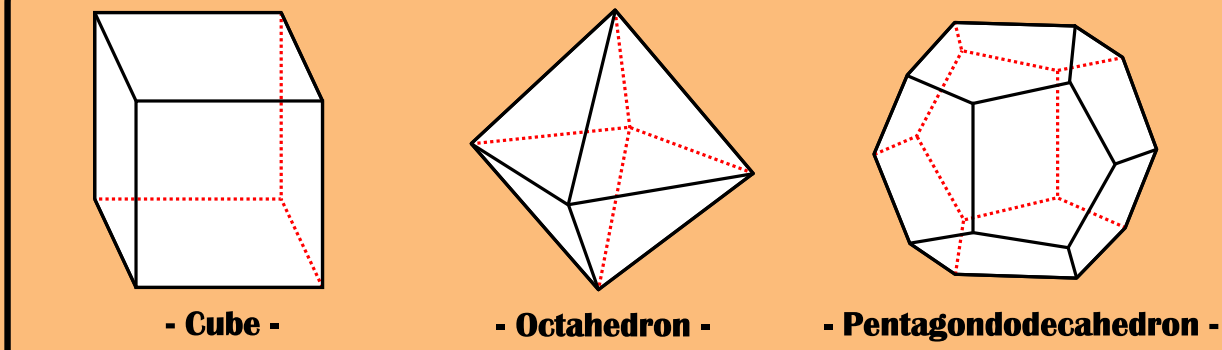
2c The use of feldspar from Iveland

Feldspar was the main product of the mines in Iveland/Evje and was sold to porcelain factories and producers of dentures all over Europe.
In 1949, Telleg Dalane, the owner of the Dalane farm in the south of Iveland, sent a sample from a small mine down at the Dalanekilen, to Porsgrunn Porselensfabrikk, in order to be analyzed. He received a letter from professor Bjorlykke, telling him that the feldspar was of first-rate quality.
Later on Tellef received 12 coffee cups and plates, and he was told that they were produced from his feldspar. As far as known, only one cup has survived.
Soon after this the mine came into operation, and became the largest in the area. The price was 20 kr. per ton for tannspat, and 10 kr. per ton for first class feldspar.

3. Pyrite

The name pyrite is derived from the old Greek word for fire. Pyrite resembles gold, but instead it consists of the elements iron and sulphur.
The best crystals from our area were found in Storsynken at Knipane in 2001.
Cubic crystals were once plentiful in the Landsverk 1 mine in Evje.

Arild Omestad donates a huge pyrite specimen to mayor Omdal



Crystal drawings of some types of pyrite crystals

4. Bismuth

Bismuth is the only example of a native element that has been found in the pegmatites of Iveland/Evje, and is very rare.

5. Sulfide minerals: molybdenite, bismuthinite, galena, pyrrhotite

Beside pyrite there have only been found a few other minerals that consist of a metal and sulphur. They all have a metallic appearance.
Sulfide minerals are relatively rare in Iveland/Evje.

Hitting the brakes at Eikåsen

6. Calcite

Calcite is the principal mineral in limestone.
Calcite is a relatively rare mineral in Iveland/Evje, but good finds have been made at Mølland and in the Landsverk 1 mine.

7. Fluorapatite

Apatite is a group of similar minerals with a varying content of fluorine, chlorine and hydroxyl-ions (OH).

Our teeth consist mainly of apatite.
In Iveland/Evje only fluorapatite has been found.
The name apatite originates from the Greek work "apatos" that means cheating. Apatite can be mistaken for other minerals like beryl or quartz.
Fluorapatite in our area forms blue or blue-green crystals, usually in the shape of hexagonal prisms.
The best fluorapatite crystals were found at Knipane.

The feldspar was transported with the Setesdalsbanen from the railroad station in Iveland to the station in Grovane

8. What does (Y) or (Ce) following mineral names mean?

Some minerals from Iveland/Evje have a letter in brackets following their names.

The letter is a symbol of the chemical element that dominates in the mineral. The letter "Y" stands for yttrium, while "Ce" stands for cerium.

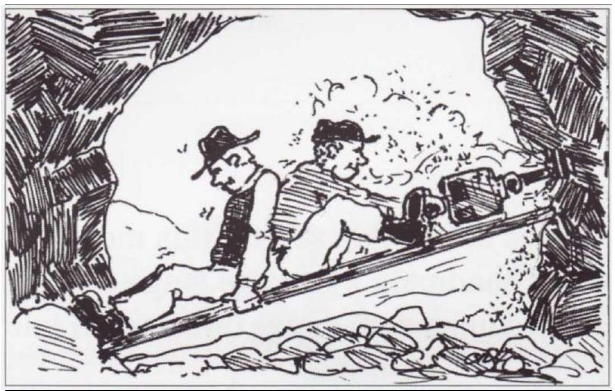
The same mineral may have two, three or several varieties, each having a different dominant element.

Torald and Tellef Grosås load feldspar on the Overland-truck of Anders Tveit

Arthur and Willy Landsverk sort feldspar in the Beinmyr mine

Large feldspar crystals in the Hovåsen mine

Arild Omestad at work with his shovel at Knipane



Preparations for the next blast with the petrol drill

9. "Black minerals"

Several minerals in Iveland/Evje have a brown or black color, and cannot be considered to be particularly beautiful.
Nevertheless, crystals from some of the black minerals are among the best in the world ever found.
Particularly worth mentioning are gadolinite–(Y), euxenite-(Y), aeschynite-(Y) and fergusonite-(Y).
All black minerals contain uranium and thorium and are therefore slightly radio-active. Additionally they contain unusual elements like yttrium, cerium, lanthanum, niobium, tantalum, zirconium etc. In the 20th century several minerals from Iveland/Evje have been used for research purposes. They were for instance also sold to the Atominstituttet at Kjeller.
Black minerals were an important by-product of the feldspar mining, particularly at Frigstad, Kåbuland and Håverstad.

10. Gadolinite-(Y)

Gadolinite-(Y) has a high content of beryllium and yttrium. Consequently this mineral was of interest to science, and it was sold for 2-5 kroners per kilo to American buyers in the beginning of the 20th century.
Thousands of kilograms of gadolinite have been found in the mines at Frigstad. Gadolinite-(Y) is often found as perfect crystals with shiny crystal faces.
The Slobrekka mine is famous for its world class gadolinite-(Y) crystals.
Around 1920 a single crystal weighing 500 kilograms was found. It is probably the biggest in the world.

Lunch in the Beinmyr mine

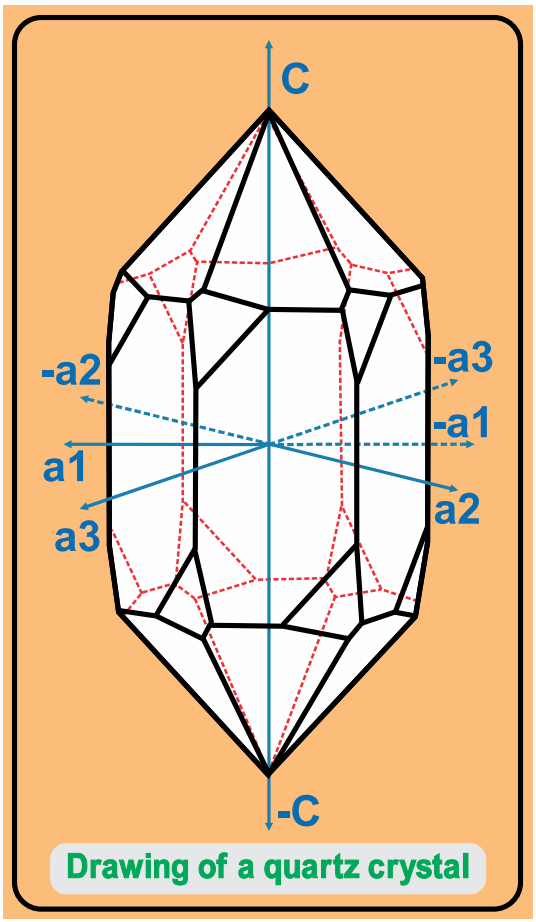
11. Monazite-(Ce)

Monazite-(Ce) is a common mineral in the Iveland/Evje area, and it often forms very nice crystals with a light brown/chocolate brown color.
Crystals up to 20 centimeters weighing 2-3 kilograms have been found.

Transport of quartz with horse and sled

12. Quartz

About 25% of the earth's crust consists of quartz, and it is the most common mineral after feldspar.
Quartz consists of the elements silicon and oxygen.
This mineral is quite hard, and it can scratch glass.
Quartz can often be found as beautiful hexagonal crystals, and in many different colors.
Completely clear transparent quartz is called rock crystal. Yellow quartz is called citrine. The purple color of amethyst is due to the presence of iron. Grey or black quartz is called smoky quartz. The reason for the grey/black color is the radioactivity originating from other minerals.



Drawing of a quartz crystal

13. Fersmite

Fersmite is an oxide mineral related to fergusonite-(Y) and polycrase-(Y), and only known from two mines our area.
In the Landsverk 1 mine fersmite has been found as yellow brown crust on columbite crystals.
At Litjern beautiful red, octahedral microcrystals up to 1-2 millimeters have been found in cavities of cleavelandite.

14. Rutile, anatase

Rutile consists of the elements titanium and oxygen.
Rutile from our area often contains significant quantities of niobium and iron and was called ilmenorutile.
Anatase is also a titanium oxide mineral, but has a different crystal structure.
It is known as a brown crust on titanite or euxenite–(Y) from two quarries in Iveland.

Large tip with quartz at the Hovåsen mine

15. Magnetite and hematite

Magnetite and hematite are iron oxide minerals.
Magnetite is a very common mineral in Iveland/Evje, while hematite is less common.
Magnetite occurs as pyramidal crystals or as irregular masses.
Magnetite is easily identified with the use of a magnet.
Hematite occurs as tiny crystals in cavities in the rock, or as inclusion in quartz and feldspar, thereby coloring these minerals red-brown.

Drilling a hole in the wall with the Pioneer

16. Ilmenite

Ilmenite is an oxide mineral that contains both iron and titanium.
Ilmenite typically forms thin plates of up to 1 m2 embedded in feldspar. Many of the rare minerals occur in association with ilmenite.

Eretveit Mine

17. Aeschynite-(Y)

Aeschynite-(Y), Mølland

Aeschynite-(Y) and euxenite-(Y) are closely related minerals, with only small structural differences. Both are oxide minerals that contain yttrium, titanium and niobium. In addition they always contain some percent uranium and thorium.
The radioactivity of these elements has destroyed the crystal gitter, thereby causing the mineral to have a brown to black color. Due to the damage to the crystal structure the crystals are very brittle.
Aeschynite-(Y) crystals from Mølland are considered to be among the best in the world.

"We took as many as we could carry..."

18. Faceted quartz.

Pure, transparent quartz is a very popular mineral for cutting faceted gemstones. In a mine on the Birkeland farm big pieces of clear smoky quartz have been found. The two largest faceted gemstones originate from this mine and have been cut by hand in Germany.
The Landsverk 1 mine is known for good quality quartz in beautiful yellow to brown colors. Water clear quartz is called rock crystal. Citrine is quartz with a yellow color, while purple quartz is called amethyst.

In 1993 king Harald and queen Sonja visited Iveland and Evje. Ragnhild Frigstad gave the king a beautiful faceted smoky quartz from the Birkeland mine as a gift.
(Fædrelandsvennen May 10, 1993)

KONGEPARETS REISE I SETESDAL I DAG

Dronning Sonja fikk en blomsterhilsen i funklende bergkrystall i gave fra Evje Mineralsenter. Ole Fritjov Frigstad, som er ansvarlig for senterets steinutstillinger, sier kvartsen kommer fra Iveland.

Ragnhilds gave til kongen

EVJE OG HORNNES: En diger, funklende smykkestein funnet i en hemmelig gruve på Iveland. Det var Evje-kvinnen Ragnhild Frigstads gave til kong Harald under kongeparets besøk i Evje i dag.

Av EIRIK VIGSNES
og ARILD JAKOBSEN (foto)

Steinen fant den 76 år gamle «stein-frelste» kvinnen i en av sine egne gruver på Ivelandsheia for mer enn 30 år siden. Den digre, gylne røk-kvartsen blir ett av kongens vakre minner fra besøket i Setesdalen.

Det vanket mange gaver til kongeparet da de besøkte Evje Mineralsenter på sitt andre stopp under Setesdal-besøket i dag, både håndvevet teppe og vakre steiner. Og den vakreste steinen var det Ragnhild Frigstad fra Evje som forærte kongen.

For Ragnhild Frigstad har steiner vært en kjær hobby i det meste av hennes voksne liv. Og hver eneste smykkestein og verdifulle mineral hun har hentet fram fra de dype gruvene på Iveland i årenes løp, representerer et verdifullt minne for henne.

– Det er så utrolig spennende å gå på skattejakt etter verdifulle steiner i gruvene. Den hobbyen har gitt meg mye, sier 76-åringen, som nylig ble delvis ufør som følge av et slag. Ragnhild har innsett at det er slutt på den tiden da hun kunne krabbe rundt i steinbruddene og lete etter skatter.

– I dag må jeg nøye meg med å se på noen av de steinene jeg har samlet gjennom et langt liv. Det er en liten historie bak hver eneste en av dem, sier hun.

Historien bak «kongesteinen» husker hun godt. Den fant hun for mer enn 30 år siden da hun bodde på Birkeland gård på Iveland sammen med sin mann.

– Jeg husker jeg var på steinjakt i en meget spesiell gruve hvor det finnes mange sjeldne mineraler. Plutselig kom jeg over den digre røk-kvartsen. Jeg trodde i grunnen ikke at det var en spesielt verdifull stein. Derfor gjorde jeg ikke noe mer med steinen, men la den i en skuff sammen med andre steiner jeg hadde funnet. Ragnhild forteller at det var Arnar Hansson, eier av Evje Mineralsenter, som sørget for å få røk-kvartsen finslepet av en spesialist i Tyskland for et par år siden. Først da kom de vakre fargene og den sjeldne glansen i steinen fram.

Og i dag skiftet altså røk-kvartsen fra Iveland eier. For Ragnhild var møtet med kongeparet og gaveoverrekkelsen enda et minne å ta vare på.

Mens kongen fikk Ragnhilds smykkestein i gave, mottok dronning Sonja en blomsterhilsen i krystall fra Evje Mineralsenter. Den består av sølvbeslått tre med en påmontert bergkrystall i full blomst. Bergkrystallen, som kommer fra Iveland, har Arnar Hansson nennsomt plukket ut fra senterets rike samling. Buketten er laget og montert av en Evje-kunstner.

Men det var ikke slutt med det. Kongeparet fikk også anledning til å plukke ut et par flotte steiner som skal få plass i en naturstein-mur på landstedet deres.

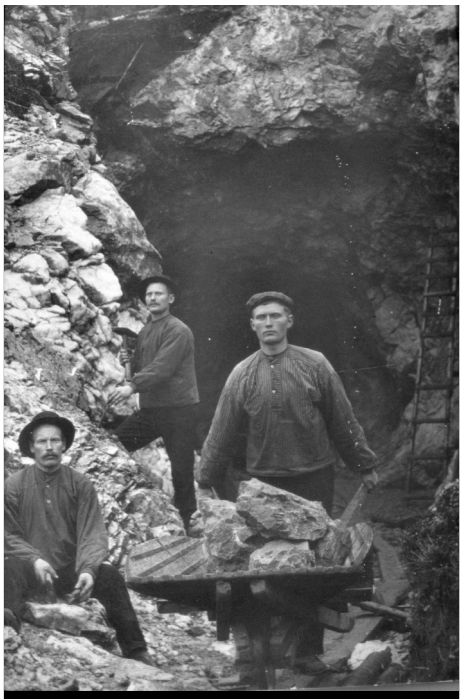
Under omvisningen i tunnelgangene på mineralsenteret kunne Arnar Hansson stolt vise fram den nye Ivelands-utstillingen, som viser en rekke helt unike steiner og mineraler fra de mange rike Ivelands-gruvene. Utstillingen er et av senterets nye trekkplastre foran årets sesong.

– Denne vakre smykkesteinen, gaven til kong Harald, fant jeg i en av gruvene på Iveland for mer enn 30 år siden, forteller Evje-kvinnen Ragnhild Frigstad (76).

Handmade necklace in silver with gemstones from the Birkeland farm. From left to right different varieties of garnet, beryl and quartz.

19. Polycrase-(Y)

The name of this mineral is derived from ancient Greek and means "many" and "mixture".
The mineral contains usually at least 9 different elements. It contains uranium and thorium and is therefore slightly radioactive.



The Eftevand brothers in the Eretveit mine

20. Liandradite

Liandradite is a very rare uranium mineral, also containing niobium and tantalum.
In our area it has only been found in the Ivedal quarry as a yellow crust on fergusonite-(Y).

21. Microlite, betafite

Microlite and betafite belong to a group of complex oxide minerals, containing calcium titanium, niobium, tantalum, uranium and several other elements.
Beautiful red micro crystals, often together with fersmite, have been found in the Litjern mine.
Some of Norway's largest microlite crystals were found in the Solås mine.

Feldspar mining provided many farmers with some welcome extra income

22. Tantalite-(Mn)

Tantalite and columbite are related oxide minerals that contain different amounts of iron, manganese, niobium and tantalum.
The crystals of these two minerals are visually difficult to distinguish. Tantalite-(Mn) tends to be more black, while columbite-(Fe) is more grey-black.

23. Euxenite-(Y)

The name euxenite is derived from old Greek meaning hospitable, because it contains several rare elements. Euxenite-(Y) is one of the most common of the "black minerals". Crystals of euxenite-(Y) can be up to 20 centimeters in diameter. The mineral is radioactive due to the presence of some uranium and thorium.

24. Davidite-(Ce)

In the fifties the Landsverk brothers found several hundreds of kilos of a black mineral they assumed to be gadolinite. The material was sold to the U.S.A. where they found out that it wasn't gadolinite.
All the material was returned to Norway where an analysis showed it to be a completely new mineral, called davidite-(Ce).

The Landsverk brothers at work in the Tuptane mine

25. Keiviite-(Y)

Keiviite-(Y) is related to thortveitite, but it has only been found as brown masses in a few of the mines in Iveland/Evje. Keiviite-(Y) is often found in association with tombarthite-(Y), and it can only be distinguished from the latter by X-ray analysis.

26. Tombarthite-(Y)

Tombarthite-(Y) was discovered in the Høgetveit mine and in 1986 described as a new mineral species. It occurs as dark, chocolate brown masses. It has been named after the well-known Norwegian geology professor Tom F. W. Barth.

The Landsverk brothers are looking for thortveitite in theTuptane mine

Olaus Thortveit as guide for an unknown guest in a mine in Iveland

27. Thortveitite

27a Olaus Thortveit

When feldspar dealer Olaus Thortveit visited a small mine at Knipane in Iveland, he was shown samples of a mineral unknown to the miners.
Olaus was interested to find out what mineral this was, and sent samples to the mineralogical-geological museum in Oslo for analysis. It turned out to be a completely new mineral species and named after the Olaus Thortveit.
Olaus was a very dedicated mineral collector, and at the constitutional anniversary exhibition in Oslo in 1914 he displayed his collection.
After the exhibition Olaus donated his collection to the geological museum.
He was awarded King's Medal of Merit in gold for his contributions to geology.

Olaus Thortveit (1872-1917) with the King's golden Medal of Merit

27b. Thortveitite

In 1911 thortveitite was discovered in Iveland, as the first mineral in the world containing the metal scandium as the most important element.
In the fifties the Americans were interested in buying all available thortveitite, thereby causing a genuine "thortveitite fever" in Iveland/Evje.
1 gram of thortveitite cost about 20 kroners, which was three times the price of gold.
Scandium was used in medicine and scientific research. Especially ultra-light and strong alloys with aluminum and the development of strong lasers made that scandium was in demand.

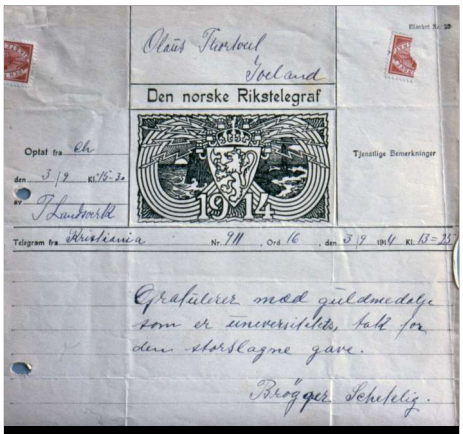
27c. Thortveitite in a tobacco box

The miners were very well aware of the value of thortveitite, and even the tiniest grains were taken care of.
In the Eretveit mine tiny pieces of thortveitite were picked using tweezers and collected in an old tobacco box.
This box contains about one-third of the annual salary of the average miner.

Theodor Gautestad and Knut Nateland proudly show some of their finest thortveitite crystals

27d. Thortveitite in bottles

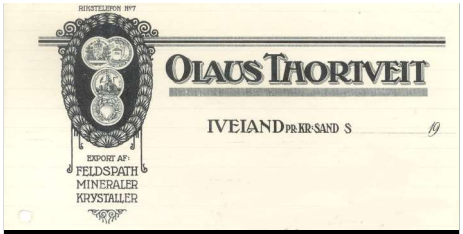
Thortveitite was used in scientific research both in Norway, Europe and the U.S.A.
There was a huge demand for thortveitite in the middle of the 20-th century, and at its top the price reached more than 20.000 krones per kilo.
The total content of the three bottles is 0,9 kilogram representing a value of 18.000 kroners, which was a fortune at that time.
During those times some of the mines were operated for thortveitite exclusively.


Den norske Rikstelegraf
1914
Telegram with congratulations from the geologists Brögger and Schetelig for Olaus Thortveit

28. Mica

28a. Muscovite

Mica is a group of minerals with perfect cleavage in one direction. Mica can be split up in paper thin sheets.
Mica is, together with feldspar and quartz, one of the three principal minerals in the pegmatites of Iveland/Evje.
In our area, two types of mica are very common; light colored muscovite and black biotite.
Muscovite is used in a large number of applications. An important application is insulation of heat or electricity, thanks to muscovite's excellent insulating properties.
In Iveland/Evje crystals with a surface of up to 1 square meter have been found. Many tons of muscovite have been mined in Iveland/Evje.
During the Second World War the Germans used mica from our area in their war industry.


OLAUS THORTVEIT
IVELAND PR. KR. SAND S
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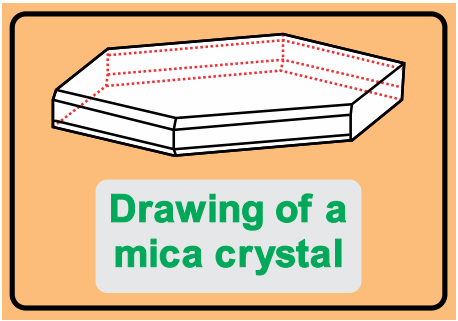
FELDSPATH
MINERALER
KRYSTALLER
Letterhead of Olaus Thortveit


Drawing of a mica crystal


A rich zone with mica crystals in the Steli mine

28b. Biotite (black mica)

Biotite is the collective name for different types of black mica.
Biotite is very common and is usually found together with muscovite in the pegmatites.
Crystals with a size of one square meter have been found, though good crystals are very rare.
Many of the rare minerals can often be found in association with biotite.

28c. Bityite

Bityite is a rare mica mineral containing lithium. It has been found in minor quantities in the Litjern and Steli mines.


Shed for the workers in the Hovåsen mine

Olav P. Tveit shows Olav Vatnestrøm columbite crystals in the Hovåsen mine

28d. Illite

Illite is considered to be an alteration mineral of muscovite. It has been found as fine-grained masses in cavities of cleavelandite.

29. Chrysoberyl

Chrysoberyl is an oxide mineral containing aluminum and beryllium. Chrysoberyl has been found in several of the mines in Iveland/Evje as green crystals, often as twin crystals or triplets.

The Håland mine

30. Columbite-(Fe)

Columbite-(Fe) is an oxide mineral containing iron, manganese and niobium. The name originates from Columbia, a poetic name for the U.S.A. The ratio between iron and manganese determines the type of columbite. In the samples at display iron dominates and are therefore called columbite-(Fe).Columbite-(Fe) is often found as beautiful grey black crystals with metallic luster and highly appreciated by mineral collectors. The best crystals are found in the Steli and Brattekleiv mines.

Olav P. Tveit in the Hovåsen mine

31. Allanite-(Ce)

Allanite-(Ce) is a relatively common mineral related to epidote.
The crystals vary considerably in size and appearance. Extremely thin and long needles have been given the local name "stråleorthitt", referring to the ray-like groups of crystals embedded in feldspar.
Shorter, but considerably thicker crystals often display well-developed crystals faces. Large, coarse crystals weighing over 100 kilos have been found.
Allanite-(Ce) is sometimes partially or completely altered into secondary minerals like bastnäsite-(Ce) or ancylite-(Ce).

"Sulitjelma-Knallen"

32. Micro minerals

Many of the minerals found in nature measure a few millimeters or even less. Studying these so called microminerals requires the use of a loupe or binocular microscope. Also in Iveland/Evje several interesting and beautiful microminerals have been found. The picture from the sample below shows tiny flakes of muscovite crystals perched on black tourmaline needles. The field of view measures approximately 5 millimeters. In recent years several new microminerals have been discovered in our area.

Micro crystals of muscovite on tourmaline, Solås mine

33. Milarite

Milarite is a rare beryllium mineral, formed by the alteration of beryl due to exposure to hot, circulating water in the pegmatite. Apart from milarite, also bertrandite and bavenite are formed this way.

Bjørulf Galteland transports feldspar with horse and wagon

34. Titanite

Titanite contains the element titanium, hence the name of this mineral. Titanite is often found in perfect, brown crystals in a shape resembling an envelope. The best crystals have been found at Knipane. Often titanite contains considerable quantities of yttrium and was called "yttrotitanite", a now obsolete name.

35. Apophyllite, chabazite, heulandite, prehnite and stilbite

These minerals form typically at the end of the formation of the pegmatites, in cavities in the rock. This is the result of hot, circulating water in the pegmatite altering other minerals (i.e. feldspar). These minerals are usually found as small but well-developed crystals.

36. Schorl

Schorl belongs to the group of tourmaline minerals, and has been found in Iveland/Evje mainly as black, thin needles embedded in feldspar or mica. Schorl is uncommon.

37. Gahnite

Gahnite is also called "zinc spinel". It has been found as dark green octahedral crystals.

38. Epidote, clinozoisite

Epidote and clinozoisite are very similar minerals belonging to the clinozoisite group.
Epidote is the more common of these two minerals in Iveland/Evje. Epidote usually has a dark green color. The best epidote crystals have been found at Knipane. Beautiful microcrystals are found in the Landsverk 1 mine in Evje.
Clinozoisite is usually much lighter green in color, sometimes even colorless.
Very rare are the manganese containing, pink clinozoisite crystals found at Knipane, Kleppstjern and Tuftane.

County governor Djupedal drilling a hole in the Steli mine

39. Fluorite

Fluorite is a mineral containing calcium and fluorine. Fluorite is formed during the end-stage of the formation of the pegmatites, and fills up cavities in the rock, or sometimes forms perfectly developed crystals. The Landsverk 1 mine is famous for groups of beautiful purple crystals.

Fluorite crystals from the Landsverk 1 mine in Evje

The miners were usually real roughnecks...

40. Zircon

Zircon is an important mineral for the age-dating minerals and rocks.
Zircon often forms well-developed, prismatic crystals with end planes resembling a pyramid.
Alvite is a variety of zircon containing considerable amounts of the rare element hafnium.

41. Xenotime-(Y)

Xenotime-(Y) is an yttrium phosphate mineral and relatively common in Iveland/Evje.
Xenotime-(Y) crystals resemble a double pyramid, and have a grey to brown color.
A beautiful epitaxial intergrowth of xenotime-(Y) and zircon is one of the most sought after items for micromineral collectors.

Xenotime-(Y), Eretveit

42. Fergusonite-(Y)

Fergusonite is one of the more common "black minerals" in our area. This mineral often forms long, tapering crystals with a rectangular crosscut. It contains yttrium, niobium, thorium, uranium and several other rare elements.

43. Thorite

Thorite is a silicate mineral containing thorium and some uranium. Thorite is related to zircon. The crystals are red brown.

44. Samarskite-(Y)

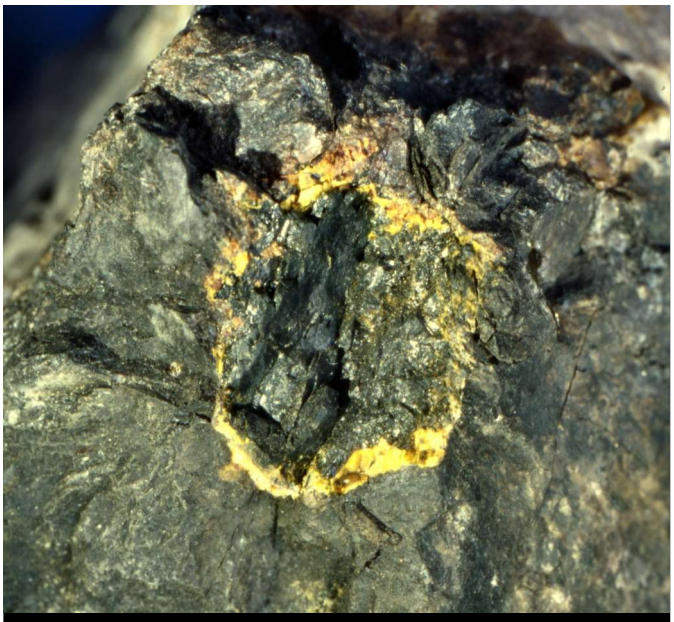
Samarskite-(Y) has been found as small, well-developed crystals. But more often it can be found as black masses together with columbite. Samarskite-(Y) has a relatively high thorium and uranium content.

„Sorting radioactive minerals was not the most pleasant job"

Remains of the Einerkilen uranium mine, ca. 1970

45. The Einerkilen uranium mine, Evje

After the Second World War many countries were interested in finding uranium deposits.
In a pegmatite at the shore of the Einerkilen lake relatively large quantities of uranium ore were found. A mine was started in 1948, but was only operated for about 2 years. The mine employed up to 30 workers.
It was soon found out that the ore contained less uranium than predicted and mining was not profitable.
At the same time Norway was able to buy uranium from the Netherlands, which they had managed to hide from the Germans during the war.
The Einerkilen mine is the only uranium mine in Norway.



Black uraninite with a yellow secundary mineral from the Hovåsen mine

46. Uranium minerals

Uraninite is pure uranium oxide, often found as black cubes with a size of up to 2 centimeters. Uraninite is not particularly rare in Iveland/Evje.
Uraninite is often altered into colorful secondary minerals like thorogummite, schoepite, schröckeringite, vandendriesscheite and uranophane.

47. Garnet: almandine-spessartine

47a. Garnet: almandine-spessartine

Almandine and spessartine are closely related minerals belonging to the garnet group. The only difference is the ratio between iron and manganese; almandine contains more iron, while spessartine contains more manganese.
Garnet is often found as well-developed crystals and highly appreciated by mineral collectors.
Almandine is only known from the Steli mine, where it is found in considerable quantities. In all other cases the garnet is spessartine.
Especially good crystals have been found in the Rossås and Mølland mines. At the Birkeland farm beautiful orange, gemstone grade spessartine has been found.

Spessartine, Mølland

47b. Faceted spessartine

Precious orange spessartine is relatively rare and highly valued as gemstone. The material found at the Birkeland farm was of exceptional quality. Many high priced faceted gemstones have been cut from this material.

Theodor Gautestad has found a huge beryl crystal, Beinmyr mine

48. Beryl

48a. Beryl

Beryl is among the most common accessory minerals in Iveland/Evje.
Beryl forms thick, prismatic crystals with a 6-sided crosscut.
In our area, beryl can form crystals of up to 3,5 meters long and weighing up to 3 tons.
The color is usually pale yellow to green. Precious blue beryl is known as aquamarine, while yellow-orange beryl is called goldberyl.
Beryl was in certain periods an important by-product of the mines, and was sold for 3-4 kroners per kilo to industry.
Beryl contains the ultra-light and very strong metal beryllium, used in alloys with aluminum or copper. Nowadays beryllium is indispensable in many high-tech applications.

48b. Faceted beryl

Beryl is a common mineral found in substantial quantities during the mining of feldspar.
Especially at Knipane and Rossås precious beryl with a beautiful blue color was found.
The exhibition displays a choice of faceted aquamarine gemstone cut by Ivar Gautestad.

48c. The find of the huge goldberyl crystal

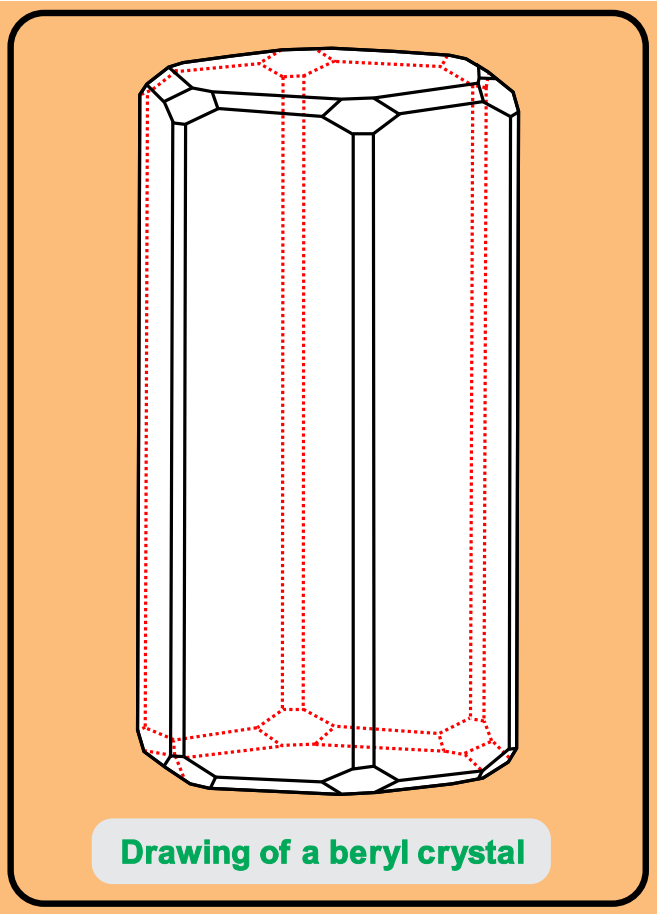
During the mining of feldspar at Knipane, a big yellow beryl crystal was found by Bjarne Engestøl.
The crystal broke into two pieces due to the blast.
One piece is at display in the exhibition, while the other piece was sold.
The crystal contained considerable amounts of facet-grade material and many beautiful gemstones were cut from this material.
The quality of the goldberyl from Knipane is among the best in the world.

Theodor Gautestad cleaning a beryl crystal weighing 1,6 tons

Beryl crystal in the Håland mine

Orest Landsverk und Bjarne Engestøl have found large beryl crystals in the Kongsberg mine at Knipane

Goldberyl from Knipane



Drawing of a beryl crystal

Arthur and Willy Landsverk in the Beinmyr mine

Minerals found in Iveland and Evje

Aeschynite-(Y), blomstrandin: Brøgger 1906, Selbekk s.163
Albite, plagioklas: Scheerer 1845, Selbekk s.454-455
Albite var. Oligoclase, plagioclase: Scheerer 1845
Allanite-Ce, orthit: Scheerer 1845, Selbekk s.347-348
Almandine, garnet: Andersen 1931, Selbekk s.290
Analcime, GM-film 29825
Anatase, Ljosland, Iveland. GM-film 19993
Ancylite-(Ce), (Neumann 1985)
Antophyllite, Ivedal
Arsenopyrite, Håverstad, GM-film 1539
"Asbestos" (Chrysotile/Antigorite), Frigstad (further study required)
Bastnäsite-Ce, Neumann & Bergstøl 1963, Selbekk s.209
Bavenite, Frigstad 1968, Selbekk s.396
Bertrandite, Vogt 1911, Selbekk s.282,330-331
Beryl, Brøgger 1906, Selbekk s.358-359
Betafite, Bjørlykke 1931, Selbekk s.170-171
Biotite, Scheerer 1845, Selbekk s.417
Bismite, Frigstad 1968, Selbekk s.138
Bismuth, Bjørlykke 1937b, Selbekk s.28
Bismuthinite, Schetelig 1922, Selbekk s.68-69
Bismutite, Frigstad 1968, Selbekk s.210
Bityite, mindat.org
Calcioancylite-(Ce), Selbekk s.217
Calcite, Barth 1931
Carnotite, Neumann 1985, Selbekk s.186
Cerianite-(Ce), Neumann & Bergstøl 1963, Selbekk s.176
Chabazite-(Ca), GM-film 15145
Chalkopyrite, Scheerer 1845
Chalcocite, Bjørlykke 1935, Selbekk s.38
Chamosite, Kjell Myre/Harald Breivik, analysert
Churchite-(Y), Bjørlykke 1966, Selbekk s.275
Clinoclore, klorit: Schei 1905
Clinozoisite, Frigstad 2 (Kjørka), GM-film 17742
Corundum, Larsen 2014
Crysoberyll, Schetelig 1913, Selbekk s.117)
Coffinite, from Eretveit, GM-film 11467, Selbekk s.299
Columbite-(Fe), columbit: Brøgger 1906, Selbekk s.156
Columbite-(Mn), Selbekk s. 157
Covellite,

Cuprite, Kjell Myre/Harald Breivik
Davidite-(Ce), Neumann 1959, Selbekk s.140
Diaspore, Larsen 2014
Elbaite, Frigstad 1968
Epidote, Andersen 1931
Euclase, Strand 1953, Selbekk s.300
Euxenite-(Y), euxenit: Brøgger 1906, Selbekk s.165
Fergusonite-(Y), fergusonit: Schei 1905, Selbekk s.249
Fersmite, Gunnar H. Hansen/Alf Olav Larsen, Selbekk s.164
Fluocerite-(Ce), Neumann & Bergstøl 1963, Selbekk s.108
Fluorapatite, apatit: Scheerer 1845, Selbekk s.266-267
Fluorapophyllite-(K), Selbekk s.412-413
Fluorite, Andersen 1931, Selbekk s.107
Fourmarierite,(Åmli 1969, Selbekk s.184
Gadolinite-(Y), gadolinit: Scheerer 1845, Selbekk s.322-323
Gahnite, Frigstad 1968, Selbekk s.120
Galenite, Andersen 1931, Selbekk s.63
Goethite, Mølland 9, GM-film 16707
Gypsum, Høgetveit, GM-film 20466
Hellandite-(Y), Einerkilen, Canadian Mineralogist 1095-1115 (2012)
Hematite, Scheerer 1845
Heulandite,
Illite, mica group (må bestemmes nærmere)
Ilmenite, Andersen 1931, Selbekk s.135 og 149
Kainosite-(Y), Selbekk s.357
Kamphaugite-(Y), Selbekk s.218, Knut Eldjarn
Kasolite,
Keiviite-(Y), thalenit: Schetelig 1931, Selbekk s.329
Lanthanite-(Nd), Selbekk s.213
Laumontite, Schei 1905, Selbekk s.470
Lepidolite, Schetelig 1922, Selbekk s.424
Liandratite, Ivedal, Selbekk 2007, Selbekk s.176
Linneaite, Selbekk s.65 (Flåt Nickelgrube, usikkert)
Magnetite, Scheerer 1845
Malachite, Knipan 1, GM-film 17553
Melanterite, Selbekk s.237 (Flåt Nickelgrube)
Microcline, Scheerer 1845, Selbekk s.447, 450-452
Microlite (hydroxycalciomicrolite), Bjørlykke 1935, Selbekk s.169-170
Milarite, from Brattekleiv, GM-film 22834, 28747
Millerite, Helvig Hansen, Selbekk s.60 (Flåt Nickelgrube)
Molybdenite, Barth 1931, Selbekk s.75-76
Monazite-(Ce), monazit: Brøgger 1906, Selbekk s.258-259
Monazite-(Nd), Selbekk s.260
Montmorillionite, Frigstad 1968
Muscovite, Scheerer 1845
Natrolite, Iveland kraftstasjon, Myre 2008 (visuelt dokumentert)
Nickelhexahydrite, Selbekk s. 236 (Flåt Nickelgrube)
Opal, Frigstad 1968, mindat.org
Orthoclase var. Adularia, Frigstad 1968
Pentlandite, (Flåt Nickelgrube)
Phenakite, Vogt 1911
Polycrase-(Y), Scheerer 1845, Selbekk s.165-166
Prehnite, Neumann 1985, Selbekk s.411
Pumpellyite-(Fe2+), Neumann 1985
Pumpellyite-(Fe3+),
Pyrite, Barth 1931
Pyrophanite, Neumann 1985, Selbekk s.136
Pyrrhotite, «magnetkis»: Scheerer 1845
Quartz, Scheerer 1845, Selbekk s.143
Rhabdophane-(Ce), Skripeland 1 og Birkeland 4, GM-film 17587, Selbekk s.274
Riebeckite,
Rozenite, Neumann 1985, Selbekk s.234
Rowlandite-(Y), Neumann 1960, Selbekk s.342
Rutile, Frigstad 1968
Samarskite-(Y), samarskit: Brøgger 1906, Selbekk s.152
Scheteligite,
Schoepite, Neumann 1985, Selbekk s.184
Schorl, turmalin: Barth 1931, Selbekk s.364
Schröckeringite, Neumann 1985, Selbekk s.219
Siderite, Thortveitit gruve, Kåbuland, GM-film 29167
Sillimanite, Larsen 2014
Spessartine, granat: Andersen 1931, Selbekk s.289
Sphalerite, Landsverk, Evje, GM-film 22474
Stilbite-(Ca), stilbit: Frigstad 1968
Stilpnomelane, Frigstad 1968, Selbekk s.444
Tantalite-(Fe), Selbekk s.158
Tantalite-(Mn), tantalit: Bjørlykke 1935, Selbekk s.158
Tengerite-(Y), Schetelig 1931, Selbekk s.212
Thorite, Brøgger 1906
Thorogummite, Åmli 1969, Selbekk s.299
Thortveitite, Schetelig 1911, Selbekk s.328
Titanite, sphen: Scheerer 1845, Selbekk s.312-313
Tombarthite-(Y), Neumann & Nilsen 1968, Selbekk s.300
Topaz, Brøgger 1906, Selbekk s.-307-308
Triplite, Bjørlykke 1937c, Selbekk s.260
Tveitite-(Y), Neumann 1985, Selbekk s.108
Törnebohmite-(Ce), Neumann & Bergstøl 1963, Selbekk s.315
Uraninite var. Cleveite, Schei 1905, Selbekk s.174
Uranophane, Åmli 1969, Selbekk s.325-326
Vandendriesscheite, Åmli 1969, Selbekk s. 185
Violarite, Selbekk s.67 (Flåt Nickelgrube)
Xenotime-(Y), xenotime: Brøgger 1906, Selbekk s.256
Yttrialite-(Y), Neumann 1959, Selbekk s.329
Yttrofluorite, Axel Müller, Canadian Mineralogist 1095-1115 (2012)
Yttrotantalite-(Y), Bjørlykke 1935, Selbekk s.153
Zinnwaldite, Oftedal 1941, Selbekk s.425
Zircon, Brøgger 1906, Selbekk s.296
Zoisite, Neumann 1985, Selbekk s.351