The Grua Mining District, Oppland, Norway

By **Ronald Werner**

INTRODUCTION

The Grua area is one of the classic mining districts in Norway and famous for exciting mineral occurrences. As early as in the 16-th century, iron-ores from the Grua district were taken out and transported to a smelter in Hakadal, 20 kilometers to the south. In later times lead- and zinc-ores became important. Also of significance was the exploitation of limestone, marble and granite.

The mining in the Grua district has left the area with many signs of this industrial activity. All through the area you can find abandoned mines with extensive dumps, limestone-, marble- and granite-quarries, limestone-ovens, the remains of a cableway, an ore-washing plant and a smelter.

The ores that were taken out contributed to the local economy, and helped to developed this area. But the ores that were taken out, contained more than only the valuable metals. Together with the ores exciting crystals of minerals were found. The mines near Grua have been visited by many famous geologists because of these beautifully developed crystals.

Nowadays, all the mines have been abandoned, and it is very unlikely that work in the mines will ever be taken up again. But the remains of the mines remind us of an important era in the history of both Grua and Norway in general. And the beautiful minerals that have been found in the Grua district might increase our respect for nature.

The Hadeland Bergverksmuseum, dedicated to the mines and minerals of Grua, is a small museum, still. But thanks to the many interesting places in the area there is much to see and to learn. You can spend many days walking in the area, looking at all the remains of a rich era in Grua's history. And at the same time you can enjoy the Norwegian woods, dig for crystals or fish in one of the many lakes. This brochure is intended to be your guide and show you the interesting places.

GEOLOGY

In order to understand the origin of the ores in the Grua district, it is necessary to go back approximately 300 million years in the history. Norway was a completely different country then. Most of Norway was covered by kilometer thick layers of sedimentary rocks, like limestone, shale and sandstone.

The earth was very unstable in those times. The outside of the earth on which we live, is under-divided in a number of continental plates. Those continental plates are continuously moving, either away from, or towards each other.

Try to imagine the world as an orange that has been peeled, and you try to put back the pieces on the orange. The individual pieces of the peel -representing the continental plates of the earth-, will not fit very smoothly back on the orange. Such is also the case with the crust of the earth. In addition, the individual plates move in relation to each other. For instance, two colliding plates will create mountains. Incredible forces are at work in the crust of the earth.

300 million years ago the continental plate on which Oslo is situated, was put under enormous stress, and eventually fractured. The entire Oslo area, measuring 175 x 50 km, became an isolated piece of crust, and started to sink down between the larger pieces surrounding it (Fig. 1). All in all, the Oslo area sank down up to 2 kilometers! Such a structure is called a “rift valley”, or “graben”. A modern example is the enormous East African Rift Valley.

The fractures in the crust went all the way down into the earth, where there is no longer solid rock. Here, the rock can only exist in molten form, as magma. This magma is of course very hot, and is under very high pressure. The fractures made it possible for the magma to press itself up, all the way to the surface of the earth. This process is called volcanism, and when the magma reaches the surface of the earth, we get volcano’s! And indeed, in the Oslo area there must once have been hundreds of volcano’s, which covered the whole area with basalt and other volcanic rocks.

Even now, after all those millions of years, there are still remains of volcano’s to be seen not far from Grua. Examples of volcano’s are the Brandukampen, Ballangrudkollen, Viksbergene and Sølvsberget.

The volcanic processes went on for many millions of years, but eventually the situation became more quiet and the volcano’s ceased to be active. But beneath the surface of the earth there was still magma trapped in the enormous fractures. As said above, the original rocks in the area were limestone, shale and sandstone. The fractures in those rocks which made it possible for the magma to reach the surface of the earth, were completely filled up with the magma. This means that the extremely hot magma was in contact with the sedimentary rocks. The heat of the magma heated up the sedimentary rocks and altered them, comparable with the way a bread is

baked. And also, the magma contained solutions of elements like iron, zinc, lead, copper etc. which penetrated the sedimentary rocks. These processes of heating up and the penetration of solutions in the sedimentary rocks is called contact-metamorphosis, and is the reason for the presence of ores in the Grua district.

The ores were formed at considerable depth in the earth, but are nowadays found near the surface. During the millions of years after the forming of the ores, Norway has been exposed to erosion. And especially during the last ice-age which lasted till 10.000 years ago, enormous amounts of rock were removed. Therefore, we can nowadays see rocks at the surface that were formed at depths of several kilometers.

THE FORMING OF THE MINERALS

The minerals which were formed in the course of the above mentioned process of "contact-metamorphosis" have made the Grua district famous. Specimens of andradite and "uralite" from Grua went to museums all over the world.

The processes that created the minerals have been studied by many famous geologists. The most famous of these was the Swiss geologist Victor Moritz Goldschmidt, whose studies of the Oslo area contributed greatly to a better understanding of the forming of minerals as the result of contact-metamorphic processes. Such knowledge was not only of great significance for the science of geology, but finds application in many modern industrial processes too!

In general, contact-metamorphosis means that a specific rock is altered due to the effects of heat. Additionally, magma often contains gasses and fluids that easily escape out of the magma. Such gasses and fluids can under certain circumstances react with the neighboring rock, and cause additional changes.

Contact-metamorphosis of the sedimentary rock-types shale and sandstone will only result in the baking of these rocks. Shale will become a dark, black, usually very hard rock known as hornfels. Sandstone will be altered into quartzite.

The rock-type that is most easily affected by the processes of contact-metamorphosis is limestone, a rock composed mainly of calcite. Depending on the exact composition of the limestone, different processes will take place. If the limestone is very pure, exposure to the heat will only cause a re-crystallisation of the limestone and it will become a new rock: marble!

If, however, the limestone is impure, different processes can take place. The limestone can contain small amounts of quartz, which will react with the calcite and hornfels will be formed. But the limestone can also contain all kind of reactive elements, which can react with the gasses and fluids from the magma. The gasses

and fluids contain elements like iron, zinc, lead, copper, fluorine, sulfur and many others. When these come into contact with the impure limestone, many different minerals can be formed.

In the first place, the important ore-minerals will be formed: magnetite, pyrite, galena, sphalerite, chalcopyrite etc. But simultaneously other minerals without direct economical value are formed: andradite- and grossular-garnet, “uralite”, scapolite, epidote, quartz, fluorite, calcite and others.

The ores that were taken out in the Grua district contained iron, lead, zinc and copper. Those metals were found as the following minerals:

iron: magnetite, hematite, pyrite, pyrrhotite

lead: galena

zinc: sphalerite, hemimorphite

copper: chalcopyrite

It so happens, that the minerals without economical value very often form beautiful crystals. The early geologists understood that the studying of those crystals gave them important information about the way minerals are built up out of the natural elements. Such knowledge is fundamental to our modern technology.

In the Hadeland Bergverksmuseum you will see examples of the different rock-types found in the Grua district, the ore-minerals, the exciting minerals and fossils. In a following chapter the most important minerals will be described.

GEOLOGICAL ATTRACTIONS NEAR GRUA

The most important attraction in the Grua area is of course the Hadeland Bergverksmuseum. The mines and the other interesting geological sites in the Grua district and the surrounding area’s will be described, and on the map you will find their location. Some of the mines are protected, and the collecting of minerals, digging or other forms of physical change to the sites is forbidden.

------THE HADELAND BERGVERKSMUSEUM--------

The interest of geologists and mineral-collectors for the Grua district is only one of the fundaments on which the Hadeland Bergverksmuseum is founded. Among some local people grew a great curiosity for the history of the area. Those people saw the remains of the mines, and discovered that in less than a hundred years basically all the mines, machinery and buildings had been destroyed.

After the mines were shut down, all usable materials were removed. Nobody realised that by doing this, the local history was almost completely erased. This group of responsable people understood that without immediate action all would be lost for good.

The first object that was restored was the old limestone oven at the Østhagan Landskapsvernområde. And it must have been fate, that shortly after the restoration of the oven, large quantities of valuable minerals were found during the construction of the Grua tunnel in 1991/1992. These minerals deserved to be exhibited in a museum!

The local community and a number of dedicated volunteers spent many months restoring the Grua Jernbanestasjon, and making the place suitable for exhibiting those minerals. And simultaneously all kind of relicts from the mines could get a place in this museum.

The museum was officially opened in september 1993, and has been open every weekend since. During the sommer of 1994 the museum was opened 6 days a week. And the future of the project is brighter than ever!

The local community has bought an old building belonging to one of the mining-companies, and appointed this to become the new home for the Hadeland Bergverksmuseum. This building -Bråten- is much larger than the station, and will allow the exposition to be expanded. It is expected that maybe already in 1997/8 the Hadeland Bergverksmuseum can move to this new place.

And in the meantime a project to make the Nyseter mines accessible for the public was succesfully accomplished. Since autumn 1994 many hundreds of people have been guided through the most impressive mine in the Grua district.

The museum offers a representative collection of the rocks and minerals found in the Grua district. In a following chapter you will find descriptions of the minerals and the rocks. at display in the museum.

----------THE MINES----------

1) KARLSTJERN: near lake Nedre Karlstjern there are 2 small mines and one somewhat larger mine. The ore minerals that have been taken out were sphalerite, galena and maybe chalcopyrite. Samples of these minerals can still be found on the dumps.

2) LYKKENS PRØVE: this was a very small mine near the beautiful lake Svea. The mine was once famous among collectors for superb specimens of azurite, probably Norway's finest. Nowadays it is difficult to find specimens at all. Other minerals found here include malachite, cerussite and hemimorphite. The occurrence is more unusual in Norway, because the last ice-age has throughout the entire country removed nearly all such zones of the ore-mineralisations.

3) MUTTAGRUVEN: the mine is located 20 meters after the cattle-grid in the road to Svea, at the right side. The mine is fenced in and practically inaccessible. The ore that was taken out was galena. This is a protected mine.

4) MUTTATJERN: this mine is located 50 meters further down the road, at the left side. In the first place you can see in a roadcut a 30 cm broad galena-vein. A little further down the hill there is a small pit which worked in the same vein. Also protected!

5) NYSETER: this was by far the largest and most important mine in the Grua district. The ore that was taken out was sphalerite, a zinc ore. The ores were discovered in 1888. Belgium, English, German and Norwegian mining companies have intermittently operated the mines till 1927. There are three levels of mining galleries underground, two large open pits and a number of smaller pits. Some of the smaller pits are actually iron-mines, and are much older than the zinc-mines. On certain days it is possible to visit the mines, guided by someone from the Hadeland Bergverksmuseum. The open pits behind the fences are an impressive sight, but for reasons of security it is forbidden to climb over the fence.

6) RISTIREVBERGET: this was a very small mine not far from the Skjærpemyr mines. The ores that were found here, are galena, chalcopyrite and pyrite.

7) SKJÆRPEMYR: at the Skjærpemyr there are several small mines where zinc-, lead- and copper-ores were taken out. The lead-ore contained some silver. The Skjærpemyr mines are the most interesting and richest mines in the Grua district as far as the minerals are concerned. At least 45 different minerals are found here! The mines are protected, but picking up stones from the surface without digging or hammering is allowed.

8) TYPOGRAFHJEMMET: is a small zinc-mine north-east of Grua, situated in the middle of woods. Interesting minerals were not found here.

9) ØSTHAGAN: this is one of the main attractions in the Grua district. On a fenced-in area of 0,3 km-2 you will find two limestone-ovens, several limestone-quarries and some very old iron-mines. In addition, the geology of Østhagan is very good visible at many places thanks to the exploitation of limestone. The iron-mines at Østhagan were already operated in the early 16-th century, which makes them among the oldest in Norway. Just before entering the Østhagan area, you will see the opening of one of the mines at the left side of the road. A couple of years ago the mine was emptied for water, and many interesting old things were found. On the fenced-in area there are three more iron mines. The limestone quarries are much younger. The exploitation of limestone was started in 1910, and continued intermittently till 1937. The limestone was burned in the two limestone ovens. The restoration of the ovens will be continued in the near future, but already now it is possible to get a good impression of how these ovens worked. The burnt limestone was used for cement. Østhagan is also famous for it's rich occurrence of dark green andradite-garnet crystals. It is among the richest occurrences of garnet in Europe. This is a protected area and mineral collecting is not allowed.

10) OTHER MINES: in the period between 1880 and 1930 there were registered about 140 “skjerps”, small exploration shafts in order to establish if an occurrence is profitable enough to become a mine. This means that throughout the entire Grua district there have been numerous efforts to find ore-deposits. Only a few of these have actually been taken into exploitation. While walking through the forests, you might every now and then see a small hole in the ground, and realize that people have been digging here in order to find ores.

----------OTHER ATTRACTIONS----------

1) GRANITE QUARRIES: at several places along the railway between Bjørgeseter and Grua there are small quarries were granite has been taken out. The granite was used by the railroad company for enforcement of walls along the tracks, by the limestone company as the fundament of the ovens and by the local people as fundaments for houses. At many places you can see the typical red color of the granite along the road south of Grua.

2) MARBLE QUARRIES: near Grua there are two marble quarries. One is directly west of Mylla, the other is situated between Nedre- and Øvre-Karlstjern. Somewhat outside the Grua district, a few kilometers south-west of Gran near the Viiksbergene, there is another marble quarry. The marble was used for building purposes.

3) OPPEN LIMESTONE QUARRY: this quarry is situated at the road from Svea till Kalvsjø and is still in operation. The limestone is used for cement production and the neutralization of the water in the lakes.

4) FOSSILS: at many places the sedimentary rocks in the Grua district contains fossils. The richest occurrences are near Lunner. During the construction of the new road in the direction of Jevnaker hundreds of tons of limestone with Pentamerus fossils were taken out. In the sides along the road it is still possible to see the fossils sitting in the rock. Other fossils found here include corals and sea-lilies.

4) VOLCANO’S: the remains of the volcano’s as such are maybe not a big attraction, but are mentioned for those of you with a deeper interest for geology. The part of the volcano that still exists, is the so-called “volcanic neck”, a tube through which the magma traveled upwards to the surface of the earth. The rock in these necks is much harder than the surrounding sedimentary rocks, and was not as deeply eroded away. Therefore form the necks prominent hills in the landscape. This phenomena can be seen also at other places in the Oslo area.

5) CABLEWAY: the zinc-ores that were taken out at Nyseter were shipped down by means of a cableway. The cableway ran from Nyseter all the way down to the “vaskeriet” in Grua, where the ore was washed. At several places the fundaments of the cableway can still be seen.

6) ORE-WASHING PLANT: the “vaskeriet” is the place where the ores from Nyseter were washed in order to get a product that was ready for extraction of the zinc. The purified ores were shipped to Germany.

7) BLYVERKET: this is a smelter located along the Sveaselva, south of Grua. Lead-ores from Mutta- and Skjærpemyr mines were melted in order to extract the lead. Around the smelter piles of slags can be seen.

THE ROCKS OF THE GRUA DISTRICT

The rocks found in the Grua district belong to different groups of rocks. The plutonic rocks form at great depths by crystallisation of magma (=molten rock). The volcanic rocks are formed when magma reaches the surface of the earth, and cools off very rapidly. The composition of volcanic rocks corresponds with the plutonic rocks, but they are much more fine-grained. The sedimentary rocks can be formed as the result of two different processes. In the first place they are formed when already existing rocks are eroded, transported away and accumulated at a specific place. The second possibility is when enormous quantities of small organisms with a calcareous skeleton die, and the skeletons accumulate.

The last category of rocks are the metamorphic rocks. These include all the rocks that are formed when the original rocks are altered due to the influence of temperature and/or pressure. The rock-type “gneis” which is very abundant in Norway, is the best known example. The contact-metamorphic rocks in the Grua district also belong to this group.

Diabase is a dark plutonic rock occurring as veins (“dikes”) in the sedimentary rock.

Gabbro is a dark rock that is found in the volcanic necks, for instance the Brandbukampen. Because this rock crystallized underground, it is not a volcanic, but a plutonic rock!

Granite is a rocktype that consists feldspar and quartz in a ratio of approximately 4 to 1. The granite in the Grua area is named “Grua granite” because it is a slightly unusual type. Grua granite has a characteristic red color, and can be seen directly south of Grua at many places.

Hornfelses include a variety of different contact-metamorphic rocks, that are formed when shales and limestones are exposed to molten rock.

Limestone (kalkstein) is a sedimentary rock consisting mainly of calcite. The limestone in the Grua district was formed in between 500 and 300 million years. Limestone is formed at the sea-bottom through accumulation of billions and billions of skeletons of small organisms. Often the limestone can contain well-preserved fossils of shells or other organisms.

Rhombenporphyry is a volcanic rock that occurs as veins (“dikes”) in the Grua district. Characteristic for this rock is that it consists of a dark, very fine-grained ground-mass with white, pale brown, large crystals of feldspar floating in the rock. The feldspar crystals typically have a rhombic shape.

Sandstone is a sedimentary rock consisting mainly of sand, glued together by calcite or other substances.

Shale (leirskifer) is a sedimentary rock with a red, brown, dark gray or black color. It is formed from clay at the sea-bottom from very fine grained mud.

Skarn is a contact-metamorphic rock that is formed when limestone is altered by exposure to molten rock, and a variety of different minerals are formed. These minerals include calcite, garnet, pyroxene, epidote, scapolite, quartz etc.

Syenite is a rock-type that resembles granite very much, but contains typically less or no quartz. The red rock near Harestua is syenite and not granite! At the Øståsen syenite forms a large massive. Syenite is for mineral-collectors a very interesting rock, because syenite often contains cavities with beautifully crystallized minerals.

IMPORTANT MINERALS FROM THE GRUA DISTRICT

Aegirine is a mineral from the pyroxene-group, and is found commonly as green needles in the syenites and granites near Harestua. During the construction of the new Riksveg 4 excellent pieces were found.

Andradite and grossular are both garnet-minerals, and are practically indistinguishable from each other. In general, andradite is much more common in the Grua district than grossular. Garnets form characteristic crystals (Fig. ?), and are usually easily recognized. The color varies from pale yellow, green, red, brown to almost black. The largest and best andradite-crystals were found in the quarry at Østhagan, where the dark-green crystals could reach a size up to 10 centimeters. The smaller, reddish-brown andradite crystals found at the Skjaerpemyr are also very popular with mineral collectors.

Azurite is a mineral that forms when copper-ores are exposed to water and air. The crystals (Fig.?) have a beautiful azure-blue color, and azurite is therefore easily recognized. Azurite was once plentiful at Lykkens Prøve, and probably Norway's finest specimens were found here. There is little left nowadays. Azurite can also be found at the Skjaerpemyr.

Calcite is the most common minerals in the Grua area, considering that it is the main component of limestone and marble. However, as beautiful crystals the mineral is much rarer. The best calcite crystals were found in the winter of '91/'92 in the Grua tunnel, while the tunnel was being constructed. Calcite is a mineral that occurs in many different types of crystals. The crystals can be rhombohedral or scalenohedral in many different varieties (Fig.?). The rhombohedral crystals are the most common, and can reach a size of 20 x 30 cm. The color varies from white, colorless, yellow, red-brown to brown. Typical for calcite is it's low hardness: the mineral is easily scratched with a pocket-knife.

Chalcopyrite is the only copper-ore found in the Grua district, and of little economical significance. In some ore-zones the metallic, golden-yellow parts are chalcopyrite. The mineral is easily distinguished from other similar minerals like pyrite: chalcopyrite is very soft, and can be scratched with a pocket-knife. Green and blue stains on the rock are often an indication for the presence of chalcopyrite.

Epidote is an attractive green mineral, which occurs both as large masses and as beautiful groups of crystals. Especially at Nyseter large blocks of green epidote are found. These are sometimes used by cutters for making cabochons. Some of Norway's finest epidote crystals were found at a building-site in the center of Grua. The crystals (Fig.?) have a beautiful dark emerald green color, and grow in delicate radiating groups. The finest specimens are in a private collection. Epidote is not a rare mineral and occurs at many places in the Grua area.

Feldspars are a group of minerals with many different members. In the Grua district are found albite, orthoclase and microcline. Albite and orthoclase occur mainly as veins in massive epidote at Nyseter, and as pseudomorphosis after scapolite at Nyseter and Østhagan. Together with calcite and quartz from the Grua tunnel small crystals of albite and orthoclase formed a crust over the calcite and quartz.

Microcline is found together with smoky quartz in cavities in the syenite near Harestua and at the Østasen. The crystals have a orange-brown color and can be max. 10 cm large.

Fluorite is a mineral that often is found as purple, green or colorless masses and crystals. Crystals are very rare in the Grua district, but purple veins through the rock can be seen at several places. In the ore-zones fluorite is seen every now and then as purples masses.

Galena is a metallic, gray-silvery lead mineral, easily recognized because of it's high specific weight. Veins and masses of galena occur at many places in the Grua district, and many of these have been exploited. Especially near lake Muttatjern and at the Skjaerpemyr have lead ores been taken out. The galena of Mutta contained according to Goldschmidt (1911) approximately 0,15 % silver, which added extra value to the lead-ores. Also the galena of the Skjærpemyr contained some silver. Crystals of galena are very rare in the Grua district (Fig.?)

Greenockite is a bright, canary yellow cadmium-mineral. Most zinc-ores contain small quantities of cadmium, which will be dissolved outof the sphalerite when the ore is for a longer time exposed to water and air.

Gypsum is a mineral that is formed when ore's are exposed to water and air, and are decomposed. Especially at Nyseter are some mine-walls covered with millions of small, colorless, sparkling gypsum crystals. Gypsum is a fragile mineral and it is not easy to collect specimens.

Hedenbergite is a typical mineral in contact-metamorphic zones. The mineral is a member of the group of pyroxene minerals. In the Grua district the mineral is found in massive zones of densely packed fiber's of a dark green color.

Hematite is a mineral consisting of iron and oxygen, and might in a few cases have played a subordinate role as iron-ore. The other name for hematite is "bloodstone", because of the dark red color of powder and thin fragments of the mineral. Hematite occurs both as metallic, dark gray to black masses, and as small rose-like groups of thin, tabular crystals. Especially nice crystal-groups are found at Nyseter.

Hemimorphite is especially found at the Skjaerpemyr. Hemimorphite is a zinc-silicate mineral, and was formed because solutions containing silica reacted with sphalerite. The sphalerite was earlier formed because of a contact between limestone and syenite. Later, a granite intruded, and gave off silica-rich solutions. Hemimorphite forms radiating aggregates of max. 3 cm. In cavities it is possible to find clear, lineal-shaped crystals (Fig.?). Hemimorphite is also found at Lykkens Prøve.

Hydrozinkite is a bright white alteration product of sphalerite. At many places in the Nyseter mines white stains of hydrozinkite indicate the presence of sphalerite. The mineral forms because of the exposure of sphalerite to water and air.

Magnetite is a metallic black iron-oxide, and was an important iron-ore. Magnetite occurs at many places in the contact-zones in large black masses. A magnet will be attracted by magnetite present in the rock. Especially good observable is this at Østhagan, in the left wall of the first iron-mine left of the road. Magnetite is a heavy mineral, having a specific weight of 5,2 kg/dm3.

Malachite is a bright green alteration mineral of chalcopyrite, formed when this ore is exposed to water and air. Malachite is often found together with azurite. Fine malachite was once found at Lykkens Prove.

Pyrite is a very common, metallic, yellow colored mineral. Pyrite occurs both massive and as crystals, that can be either cubes, octahedrons or pentagondodecahedrons (Fig.?). In some cases pyrite will have been taken out as an subordinate iron-ore. In general the quantities of pyrite were too small to be taken out as ore. In the center of Grua, during construction work at the roadside in front of the shops, were for a couple of years found Norway's finest octahedral pyrite specimens.

Pyrrhotite is a metallic, bronze-brown iron mineral. Another name for pyrrhotite is "magnetkies", an old German name, referring to the weak magnetic properties of the mineral. As can be seen in the museum, a magnet will sit fast on pyrrhotite. On the Nyseter the mineral is common, especially in small quarries south-southeast of the main mining area. In material from the Grua tunnel small tabular, 6-sided crystals have been found.

Quartz is a very common mineral on earth, and also common in the Grua district. Quartz generally forms crystals that have a characteristic 6-sided shape. The top of the crystals are 6-sided pyramids (Fig.?). The color is white to colorless, but somewhere near Nyseter purple colored amethyst-quartz has been found. The crystals can reach sizes up to 10 cm, but on average they are much smaller, in between 0,5 and 1 cm. In the syenite rocks a black variety of quartz can be found: smoky quartz. Specimens are found near Harestua, and at the Østasen in roadcuts at the Fylkesveg, east of Roa/Gran. The crystals occur in cavities in the syenite, together with feldspar crystals.

Scapolite is a somewhat rarer mineral in the Grua district, but is not uncommonly found at Nyseter as veins in massive epidote. Scapolite is also found at Østhagan in the vicinity of the Kalkoven. The mineral occurs characteristically as white, pale tan or pale rose crystals, that resemble pieces of wood to a certain extent. The crystals are long prismatic, and form aggregates in which many crystals are intergrown (Fig.?). Such aggregates are grown in large cavities in dark-green andradite. In most cases the scapolite has been altered to feldspar.

Sphalerite is the most abundant ore mineral in the Grua district, and was exploited as zinc ore. The Nyseter mine was the most important source of zinc ore, but ore was also taken out from the Mutta mines and at the Skjaerpemyr. Sphalerite occurs mainly as brown, massive mineral in the contact-zones. Tetrahedral crystals (Fig.?) of sphalerite were found in the Mutta mines, Nysaeter, and in recent times, in the Grua tunnel. This last occurrence has yielded very good, dark-brown crystals up to 3-4 cm.

“Uralite” is one of the more famous minerals found in the Grua district (Fig.?). It is actually a pseudomorphosis of an amphibole mineral after a pyroxene mineral. In other words: the crystals were formed as crystals of a pyroxene mineral, and later the whole substance of the crystals was replaced by an amphibole mineral. The largest and finest crystals were found in 1902 when the Grua railroad tunnel was constructed. Goldschmidt (1911) describes a crystal of 7 x 12 x 10 cm. The color of “uralite” is light green. When the crystals are studied more closely, the surface is uneven, and they seem to be built up of fiber’s.
At the Skjaerpemyr it is still possible to find large pieces of “uralite” together with reddish-brown garnet. In this material are cavities that are filled by calcite, visible as white veins. When the calcite is dissolved by acid, the cavities are usually lined with small but perfect crystals of “uralite” and andradite-garnet. The largest uralite crystal found at the Skjærpemyr measured 8 cm.

Wulfenite is a lead-molybdenum mineral, that is rare in Norway. In the Grua district wulfenite occurs at some places somewhat more abundantly. At the Skjærpemyr and Lykkens Prøve honey-brown crystals (Fig.?) were found together with malachite and azurite.
During the construction of the new Riksveg 4 a number of very beautiful crystals were found. The largest crystal measures 3 mm in length, and is among the largest crystals of this mineral found in Norway.