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Once an indispensable resource, today a national park: the Selbu millstone quarries in Norway

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The resource

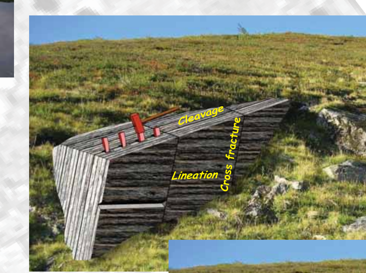
Quarry wall showing cross fractures and lineation

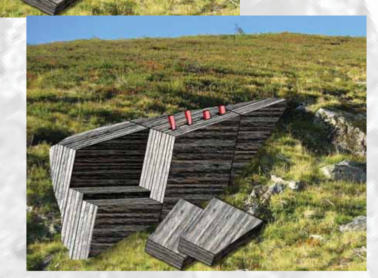
Close-up of naturally weathered surface of staurolite-biotite schist

Throughout the history, millstones were produced from a micaschist with a biotite-rich (black mica) soft matrix. Scattered, 1-4 millimetre crystals of the hard mineral staurolite stick out on the grinding surface and give good grinding properties. Structures that facilitated extraction of the rock is 1) a well developed cleavage (schistosity); 2) fractures that occur at 0.5-2 meter intervals across the cleavage; 3) a lineation that is perpendicular to the cross fractures.

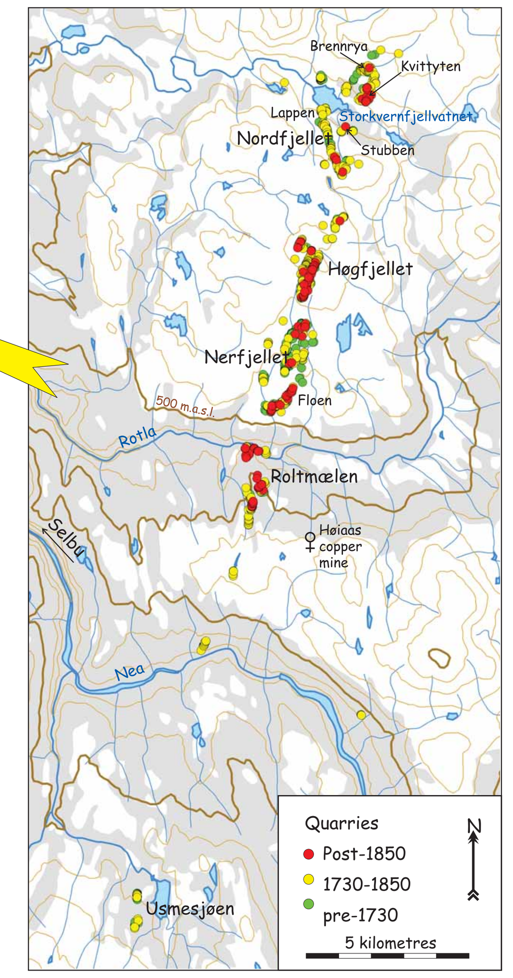
Production

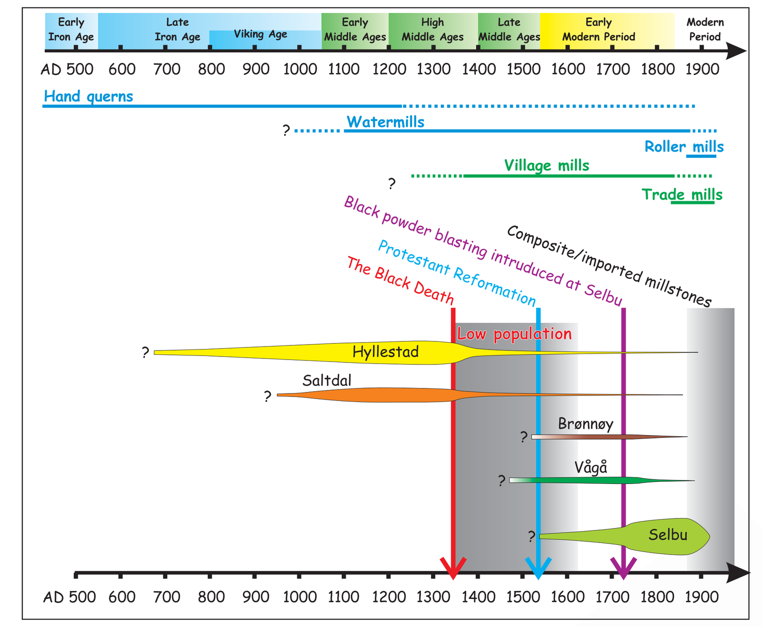
In contrast to older quarries elsewhere in the country, where the millstone roughouts had been carved directly on the bedrock surface, the Selbu quarries extracted rock slabs that were subsequently carved to form millstones. This technique was used through the whole history, although powder blasting gradually replaced hand tools for splitting and cutting of rock slabs.





Millstone roughouts carved from large rock slab





Since pre-Viking Ages, millstone production in Norway was based on direct carving of garnet micaschist on bedrock surfaces. The soft, mica-rich matrix in these rocks allowed easy carving, while the hard garnet crystals would stick out on the worn surface and maintain good grinding properties without frequent surface dressing. Through the Middle Ages domestic supply of stone for querns and small watermills was dominated by the Hyllestad quarries, which also exported vast amounts of millstones to Denmark and present-day southern Sweden. Most early millstone quarries were located near permanent settlements close to the sea, with easy access to harbour and markets.

Apparently, quarrying at Hyllestad almost came to an end in the Late Middle Ages. A subsequent rise of millstone production was seen in the 16th century at Selbu, in quarries that were located in remote mountain areas. This dramatic change in market dominance may have been caused by a combination of several factors:

- Social and trade structures collapsed after the Black Death and millstone trade was practically in ruins due to the small population density, leaving the market open for 'newcomers' when population and trade recovered.
- Dissolution of church and monastic land including major millstone quarry areas after the Protestant Reformation may have been accompanied by loss of know-how in quarrying, and at the same time opened opportunities in areas with public land such as Selbu.
- Technical achievements and new social structures after the Middle Ages led to increasing demands for larger and stronger millstones. While small millstones could be extracted by direct carving in the earlier quarries, geological conditions at Selbu allowed easy splitting of rock slabs that were subsequently carved to larger millstones that also had improved grinding properties.

The people

The men working the quarries were mostly farmers from the Selbu village. The quarrying took place after the farm work season was finished, in October-November. Quarrying rights were heritable and often held by different farms. Each farm had their mark for tools and personal belongings. This mark was carved into the rocks close to the quarry in order to mark the right to the resource. From the middle of the 19th century the farmers were often organised in teams sharing larger quarries, houses and smithies.

Quarrymen 1895

Owner's mark on rock surface

For more than 350 years, during long and extremely harsh winters, farmers from Selbu extracted millstones from more than 1000 quarries located in remote mountain areas. The transportation was long and the working conditions hostile. Yet the Selbu area developed into the largest millstone production area in Norway through the Early Modern period.

The earliest reference to millstone quarrying in Selbu is a travelogue from 1591–1592 by the clergyman Peder Claussøn Friis, who claimed that in this area there were "produced millstones of better quality than anywhere else in the kingdom and the stones are widely distributed in the country".

Quarrying continued until ca. 1910, and throughout the history it was highly important for the Selbu community. Most of the more than 30 km long "millstone zone" is on public land, which meant that any person was free to open a quarry unless the spot was already claimed by another. Up to 300 farmers and peasant were working in the mountains for periods of 2-5 months in the autumn and winter. The impact that millstone quarrying had on the local community is reflected in the abundance of written communications describing daily life and work in the quarries, some of which were originally told by the quarrymen themselves.

From mountains to markets

The millstones were horse-sledged 15-30 km to the village, usually in April when snow conditions allowed relatively easy transport on snow crust. At the farms, stone pairs were fit together by manually rotating the upper stone; final surface dressing was done by "sand grinding".

The stones had even longer journeys to make: they were brought to merchants in Trondheim and other cities in Norway in addition to Arkhangelsk in Russia and possibly other markets in Northern Europe. Today we find the millstones at abandoned and restored mills and in museum collections throughout Norway.

Wall painting in Selbu town hall

Selbu millstone in museum collection. Staurolite "knobbles" stick out on the worn grinding surface

Old, water-filled quarries

Quarry landscape Høgfjellet, Selbu. Young quarries to the right and in the background, old quarries to the left

House ruins from different parts of the quarry history

The quarries

Recent field studies combined with written accounts and court records provide insight into the organisation of the millstone quarrying and trade at Selbu. While early quarrying was based on wedging and splitting by simple hand tools in shallow and small quarries, there was a gradual increase in the use of black powder after it was introduced in the early 18th century. A change from small-scale quarrying to increased industrialisation in deep and wide quarries is seen after the 1840s, after the onset of the Industrial Revolution in urban parts of Norway. The change was partly incited by the central authorities due to a need for more organised and efficient operations of the important millstone production.

Changing landscapes - changing use

Skiing in the quarry landscape

Schulzhytta, tourist cabin

Photo by Per M. Storhaug

Restored cabin used by quarrymen (above); restored timber capstan (right)

The Selbu quarries lie largely within the Skarvan-Roltdalen National Park, which was established in 2004 partly on the basis of its cultural heritage value in a wilderness area practically untouched by modern technological development. In addition to millstone quarries there are abundant traces of bog ironworks, Sami settlements, pitfalls, old copper mines, tar kilns, hill farm buildings, remote hayfields and old transport routes.

The most significant quarry areas are subject to a particularly strict protection regime within the park. The millstone landscapes and its associated traces of infrastructure are meant to undergo a natural transformation, with a gradual 'return to the original landscape' without human interaction; the only exceptions are a few restored timber capstans and a cabin used by quarrymen in the late 19th century.

With its marked trails that connect tourist cabins, the national park is a spectacular hiking area. Organised horse-riding is available and has the potential of further development of tourism based on the quarry landscapes and millstone history.

Acknowledgements

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