

# QUERNSTONES, GRINDSTONES AND HONES IN MEDIEVAL SWEDEN

Peter Kresten

*Geoarchaeological Laboratory*

*Riksanantikvarieämbetet, UV Uppsala, Box 137, S-75104 Uppsala, Sweden*

## **Abstract**

A review of the most important quarries for stone artefacts is given. For quernstones, Malung, Storsjön, Lugnås, Selbu and Hyllestad are the most important sites. Grindstones originate mainly from Orsa and Burgsvik which also have supplied sandstone hones. Phyllite hones from Eidsborg are very abundant among Medieval finds.

Quernstones, grindstones, and hones are frequent finds during archaeological excavations. The provenance of the finds is of principal interest to the archaeologist, even if awareness of variations in quality and use has become more widespread during recent years. Provenance determinations involve nondestructive methods such as measurements of density or magnetic susceptibility and, if permitted, destructive methods such as thin sectioning for petrographic studies, or taking a piece of the rock for chemical analysis. In all cases, the material has to be compared with reference samples from known quarries. The provenance can only be determined to a certain degree of certainty. It is known that some quarries, such as Eidsborg (Moore 1983) have virtually indistinguishable “twins” elsewhere. During the last five years’ work on these items, the following quarries have shown to be the most important ones with respect to Swedish finds.

## **Quernstone quarries**

Most finds of quernstones can be located to a geographic area and, often, to a particular quarry. Being large objects, regular quarrying is invariably found. Most of the quernstone quarries are well known but previously unknown minor quarries are still found.

### *Malung (Dalecarlia, Sweden)*

*History:* The earliest known written record mentioning the quarries at Kvarnberget is from 1677–8 although they would have been operative already during the Middle Ages (Pettersson 1977). Trade with surrounding Dalecarlia and the adjacent parts of Värmland is documented.

*Geology:* The principal quarries at Kvarnberget are located in a strongly foliated Proterozoic argillaceous sandstone with beds of schist and conglomerates. The quarry area is almost two kilometres long and about one hundred metres wide. Vast amounts of tailings are piled up and a large number of unfinished or broken stones are found. The volume of broken rock suggests that between 30 000 and 120 000 pairs of quernstones have been produced (Kresten, Larsson & Larsson 1996).

*Archaeology:* Finds of quernstones identified as derived from Malung have been found in, e.g. Sigtuna, Uppsala, Västerås, Enköping, Stockholm, Nyköping, Söderköping, Lund and at Öland (Kresten 1994, 1995, 1996c; Elfwendahl & Kresten 1994). The majority of the finds are from the Middle Ages; occasional finds date back to the Vendel and Viking periods.

*Diagnostic features:* The rock is strongly foliated, with quartz grains measuring 2–4 millimetres set in a fine-grained matrix composed of muscovite and quartz. Some samples contain feldspars suggesting a volcanic admixture – they could derive from the southernmost part of the quarry which is inaccessible for sampling, or from another quarry.

#### *Storsjön (Gästrikland, Sweden)*

*History:* The earliest written records are from 1720 (Pettersson 1977). Much of the documented trade was by boat northwards to the area around the Bothnian Gulf. Quarrying went on until about 1905.

*Geology:* Quernstones were quarried from loose boulders of Jotnian sandstone; existing quarries have been principally used for various types of building stones. Most sought after was the “Ginsborn stone”, a light greyish red to pink sandstone with pale spots, which was only lightly cemented.

*Archaeology:* Quernstones were quarried already during the Vendel and Viking periods. Most of the finds are from Gästrikland and its southern neighbour Uppland (e.g. Elfwendahl & Kresten 1994).

*Diagnostic features:* The only Jotnian sandstone used for quernstones, apart from the more whitish or yellowish Roslagen sandstone occurring as glacial boulders along the coast.

#### *Lugnås (Västergötland, Sweden)*

*History:* The earliest written record is from 1744 (Pettersson 1977). The stones were exported to Dalecarlia, Uppland, Närke, and Bohuslän. Some export occurred to Norway, particularly to Austland (Rønneseth 1977).

*Geology:* The rock is a deeply weathered “iron gneiss” containing quartz, potash feldspar, kaolinite and hydrobiotite as its main constituents. Most of the quarries are under ground, with tunnels extending as far as five hundred metres.

*Archaeology:* No finds that could be dated have been recorded so far. A quernstone found during excavations at the monastery of Varnhem which burnt 1234 is reputedly derived from Lugnås (Pettersson 1977) but seems to have disappeared.

*Diagnostic features:* The pale pinkish colour of the rock, a fairly coarse grain, and abundant white kaolinite.

#### *Selbu (Sør Trøndelag, Norway)*

*History:* The earliest written records date back to the beginning of the 17th century, but it is assumed that the industry has Medieval roots (Rolseth 1947). The quernstones were exported to all parts of Norway, and adjacent Swedish counties. During the 19th century, about 75% of all Norwegian stones were from Selbu. The industry ceased to exist during the 1920s.

*Geology:* The rock is a biotite-schist with megacrysts of garnet and/or staurolite, belonging to the rocks of the Gula group (late Precambrian to early Cambrian; Wolff 1976). About three hundred individual quarries are known in the area.

*Archaeology:* Occasional finds of Selbu stones in Orsa and Mora (Dalecarlia) as well as at Delsbo (Hälsingland) are probably from the 18th–19th century.

*Diagnostic features:* The rock is a darkish, fairly fine-grained biotite schist with evenly spread megacrysts of garnet and/or staurolite.

#### *Hyllestad (Sogn og Fjordane, Norway)*

*History:* The municipal law of Bergen from 1278 has a reference to quernstone quarries which could be those at Hyllestad (Pettersson 1977). The organised industry ceased to exist in about 1890 (Rønneseth 1977).

*Geology:* About twenty-five larger and many more minor quarries occur in the Åfjorden area, along a distance of some twenty kilometres. The rock is a muscovite-garnet-kyanite schist with occasional staurolite or chloritoid.

*Archaeology:* The excavations of Bryggen in Bergen have yielded 66 finds of quernstones, the majority of which are from Hyllestad (Marøy Hansen 1992) with dates in the range 1100–1400. At Roskilde Museum are several quernstones from Hyllestad which are finds from Roskilde town, and from Kongsgaarden at Lejre, all from the Viking period. In Sweden, Hyllestad material is the dominating quernstone in Medieval Scania and occurs sporadically in Medieval Visby (Kresten 1995, 1996a, 1996b).

*Diagnostic features:* There is no muscovite-garnet-kyanite schist known as quernstone material other than the one from Hyllestad. In particular, the (often pale blue) kyanite is most diagnostic.

### **Grindstone quarries**

Grindstones (i.e. mounted rotating sharpening tools) almost invariably are made from rather loosely cemented, fine-grained sandstones. In Sweden, only three major production areas are found which implies that the provenance of almost all archaeological finds can be established with reasonable certainty.

#### *Orsa (Dalecarlia, Sweden)*

*History:* The earliest written sources mentioning grindstone quarries are from the mid-16th century (Pettersson 1989). From that time, the trade to Värmland, Västmanland, Södermanland and Uppland is documented. Small-scale production of grindstones and hones exists even today.

*Geology:* The Orsa sandstone is a relatively fine-grained, rather pure quartz sandstone of Silurian (Wenlockian?) age. It occupies much of the so-called “Siljan Ring”, a Palaeozoic meteorite impact structure. A large number of larger and smaller quarries are found, preferentially along the north-western edge of the Siljan Ring and along the canyon of the river Ämån. The sandstone is fairly loosely cemented; a harder siltstone is the preferred material for hones.

*Archaeology:* Platelets of sandstone have been used for sharpening tools already during the Neolithic. Grindstones of Orsa sandstone occur from the 11th century onwards; hones are even slightly earlier (Elfwendahl & Kresten 1994; Kresten 1996d). The early grindstones have round axis holes which change to square ones from about the mid-14th century.

*Diagnostic features:* The colour is very variable, but light yellow or greyish hues prevail. The dull appearance and relatively fine and even grain is characteristic, as are lenses of clay, often still plastic.

### *Burgsvik (Gotland, Sweden)*

*History:* Export of hones and grindstones to Scania and central Sweden is documented from about the 13th century. Quarrying is still going on.

*Geology:* The Burgsvik sandstone (Silurian) occupies much of southern Gotland. It is a grey, buff or yellow sandstone with intercalated layers of shale and, more rarely, limestone. Numerous small quarries occur along the south-western coast of Gotland, and Burgsvik and Uddvide.

*Archaeology:* Hones of Burgsvik sandstone have been used already during the early Neolithic. Hones of Burgsvik sandstone are found from the end of the 10th century onwards, grindstones about half a century later (Elfwendahl & Kresten 1994; Kresten 1995, 1996b–d).

*Diagnostic features:* The rock is similar to the Orsa sandstone but more greyish and compact. In addition, fossils such as mollusc shells occur fairly frequently in the Burgsvik material, but never at Orsa.

### **Honestone quarries**

Many Swedish hones are from the Orsa or Burgsvik sandstones (see above), or from various types of Cambrian sandstone found, *in situ* or in the glacial drift, in many parts of central and southern Sweden. Hones are frequently made of “local” material, sandstones, shales or schists found nearby, in outcrops, eskers or along river beds. Being small personal items, they can be readily transported by their owner. All this makes provenance determinations more difficult than is the case for most other stone artifacts. A characteristic type of material which occurs at most sites is the one from Eidsborg.

### *Eidsborg (Telemark, Norway)*

*History:* Quarrying has occurred probably since the 8th century (Livland 1992), most certainly since the early 10th century (Moore 1983; Myrvoll 1984, 1988). Eidsborg hones have been exported to England, Holland, Denmark, Germany and Poland (Ellis 1969; Moore 1983, 1990; Myrvoll 1984, 1988, 1991; Livland 1992; Resi 1990). The importance of the industry is shown by the estimate that only one of the quarries has produced about ten million hones (Falck-Muus 1920). Production was abandoned in the 1970s.

*Geology:* The rock is a strongly lineated quartz-muscovite-phyllite (or: -schist). Two main types are distinguished. “Hardstein” is a fine-grained, bluish green to greyish blue rock, while “blautstein” is silver-grey to yellowish white due to higher muscovite content.

*Archaeology:* Most, if not all, excavations in Sweden from the end of the 10th century onwards have produced Eidsborg hones, commonly of the “hardstein” type (Elfwendahl & Kresten 1994; Kresten 1995, 1996a–d). Finds from other countries are discussed in the references above.

*Diagnostic features:* Both types are readily recognisable, given some practice. Characteristic in thin section is that the quartz grains commonly are enveloped by muscovite flakes, a texture which renders it as prime hone material.

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