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Soapstone in the North Quarries, Products and People 7000 BC – AD 1700

Gitte Hansen and Per Storemyr (eds)



UNIVERSITETET I BERGEN

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Editors of this book

Gitte Hansen

Per Storemyr

Editors of the series UBAS

Nils Anfinset

Randi Barndon

Knut Andreas Bergsvik

Søren Diinhoff

Lars L. Forsberg

Layout

Beate Helle, Bergen University Museum

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Preface

This book has been a long time in the making. It is an outcome of the five Norwegian University Museums' joint research programme *Forskning i Felleskap* (FIF, 2010–2015), supported by the Research Council of Norway. FIF kindly facilitated a number of workshops and meetings between archaeologists, geologists and craftspeople, all with a common interest in premodern soapstone quarrying and use. The result is the chapters of this book, which are based on studies carried out over the last two decades and, for the most part, are published scientifically for the first time. We very much thank the authors for participating in this venture. We also thank several colleagues – archaeologists, geoscientists and craftspeople – that assisted the editors in peer-reviewing the chapters: Irene Baug, Birgitta Berglund, Laura Bunse, Poul Baltzer Heide, Richard Jones, Tor Grenne, Torbjørn Løland, Therese Nasset, Astrid J. Nyland, Lars Pilø, Kevin Smith, Lars F. Stenvik, Frans Arne Stylegard and Stephen Wickler; we are very grateful for the job you have done. Not least, thanks go to Tromsø University Museum, NTNU University Museum (Trondheim) and the University Museum of Bergen for their economic support in publishing the book.

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Gitte Hansen

Per Storemyr

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Bakestones – Production and Trade in the Middle Ages

During the Middle Ages, bakestones, or stone griddles, were an important part of Norwegian households, representing everyday products required for the preparation of food over the hearth. Demand for these tools formed the basis for large-scale production, which is the subject of this paper. The study is based on analyses of an extended quarry landscape in Ølve and Hatlestrand in the County of Hordaland, representing the largest and most important production centre for bakestones in Norway. The griddles were produced from chlorite-rich talc-amphibole schist, a material able to withstand repeated heating and cooling without an imminent risk of fracturing. The range of products from the quarries also included tiles, building stones, and stone crosses. Small scale archaeological excavations in some of the quarries, and at a workplace where the finishing of bakestones took place, date the production to between the early Middle Ages (c. 11th or early 12th centuries) and the early modern period. The character and scale of production indicate an intense and well-organised activity, a specialisation where the quarries were exploited for profit. Most evidence points to a so-called semi-professional craft where people working and living at the surrounding farms also worked in the quarries. Some of the largest quarry sites may, however, have demanded different organisation and larger workforces. The bakestones were distributed all over Norway from the 1100s and into the early modern period. Outside Norway, they are mainly to be found within the North Atlantic region, whereas in Sweden and Denmark they are only found in small numbers, indicating random export.

Introduction

Throughout the Middle Ages, widespread use of a variety of stone objects can be traced. Many of these objects were needed in the daily household. This is the case for bakestones: flat stones, often circular or oval in shape, approximately 25–50 cm in diameter, and normally c. 1 cm thick, used for baking bread or heating other foodstuffs over the hearth. Characteristic of the bakestones are incised grooves or furrows in different patterns, on one or both of the sides (Figure 1). For centuries, stone griddles were important in Norwegian households, as everyday products for food preparation and demand for them was high. This formed the basis for large-scale production, which is the subject of this paper. The study is based on analyses of an extended quarry landscape in Ølve and Hatlestrand in the county of Hordaland in western Norway, carried out in connection with my doctoral project (Baug 2013, published 2015). I will present the archaeological investigations conducted in the quarries, and the results thereof. What was produced and when? Important questions to be included are: Was this production largely based on a local, and perhaps regional, need? Or was it large-scale production meant for widespread distribution and sale?

Geology of the bakestones

Bakestones had to be able to withstand repeated heating and cooling without an imminent risk of fracturing. Geological studies show they were made of two types of rock: soapstone and chlorite-rich talc-amphibole schist (Weber 1989; Tengesdal 2010:20–22, 31). The latter rock type has previously been referred to as *chlorite-rich talc-bearing green schist* (Baug 2015b). So far three production sites for chlorite-rich talc-amphibole schist are known of in Norway: one at Øye in Sør-Trøndelag, one at Ertenstein in Rogaland, and one in Ølve and Hatlestrand in Sunnhordland (Heldal & Storemyr 1997:9–12; Storemyr 2001:67; 2015:189–191; Lundberg 2007; Storemyr et al. 2010:189–192; Jansen 2013:78; Baug 2015b). The rock type at the latter production site has in some places been referred to as schistose soapstone (Naterstad 1984), but from a geological point of view the talc content of the stone is not considered large enough to use the term soapstone (Jansen pers. comm. 2009). A more precise term for this material would be chlorite-rich talc-amphibole schist, which in the following will be shortened to *chlorite schist*.

Ølve and Hatlestrand was, by far, the largest and most important production centre for bakestones in Norway (Baug 2015b). The chlorite schist is located along a 5–6 m thick layer in a greenstone complex, situated on the southern and eastern sides of Lake Kvitebergsvatnet, as well as on the western side of Kvinnherad Fjorden, which is a part of Hardanger Fjorden. During extraction, the layer of chlorite schist was followed into the rock. This resulted in overhangs and underground quarries (Baug 2015b:4).

In the quarries at Øye in Sør-Trøndelag, building stones for Nidaros Cathedral were the main items extracted, but small-scale extraction of bakestones was also carried out (Heldal & Storemyr 1997:5, 9–12, 18; Lundberg 2007; Storemyr et al. 2010:189–190). A similar situation is to be found in the medieval quarry site at Ertenstein farm in Rennesøy, in Rogaland, where building stones for the Romanesque part of Stavanger Cathedral were extracted (Storemyr 2001:67). The quarries at Ertenstein contain more mica and carbonate, and are thus easy to distinguish from Ølve/Hatlestrand and Øye (Jansen pers. comm., 2012). In medieval Norway, local, small-scale production of bakestones also occurred in a number of soapstone quarries used for vessel production and, at times, building stone extraction. This is evident from bakestone finds of soapstone in medieval towns, such as Bergen and Trondheim (Weber 1989; Tengesdal 2010).

Outside Norway, Shetland is the only place where production of bakestones has been documented. Here, bakestones were produced in soapstone quarries, along with soapstone vessels. The griddles extracted in Shetland were rectangular or sub-rectangular in shape (Weber 1999:134), and hence differ somewhat from the circular or oval Norwegian ones. Locally produced bakestones in Shetland are found in early Viking deposits, for instance at Old Scatness Broch, and are thus older than those from Norway. As bakestones are not known prior to the early Middle Ages in Norway (Petersen 1951:417–421; Granlund 1956:307; Baug 2015b), the Shetland bakestones have been suggested as an innovation which led to Norwegian production (Forster 2009:65).



Figure 1. Bakestone fragment from Bryggen in Bergen (Inventory no. BRM0/50119, University Museum of Bergen). (Photo: M. Gladki, Museumssenteret i Hordaland).

The quarries in Ølve and Hatlestrand

The communities of Ølve and Hatlestrand are located in Kvinnherad municipality on the western side of Hardanger Fjorden, around 100 km southeast of Bergen. So far 71 quarries have been identified in this area, located within the borders of nine historical farms; the majority located in Ølve (Figure 2) (Baug 2015b:7). Production was carried out in both underground and open-cast quarries.

Underground exploitation has left both overhangs and caves, ranging from a few metres to around 30 m deep (Figure 3). The entrances to the caves are located in hillsides along the sub-horizontal layer of chlorite schist. A few of the largest underground quarries comprise several caves. Some have entrances from the surface, while others can only be accessed through another cave. Several caves have collapsed, leaving large stone blocks inside, and in front of, the quarries, in some cases blocking access. Most quarries are located in the mountainous outer fields of the farms, whereas a few are to be found in the inner fields. Together, they have strongly altered the natural landscape.

In Ølve, the quarries are situated in a closely-spaced row along Fuglebergåsen hill, stretching along a north-south axis c. 60–145 m ASL. Many of the quarries overlap each other, and it is difficult to determine their individual layout. Each quarry site may thus comprise several quarries, probably used in different periods. In the middle of this area underneath the Kvitafjell rockshelter, a workplace is located. In Hatlestrand, most quarries are located closer to the sea and possible harbours. However, the production sites in Hatlestrand are generally fewer and more scattered, and many of them are smaller than those in Ølve (Baug 2015b:75–76).

The products were carved directly from the bedrock, generally by cutting the shape of the objects

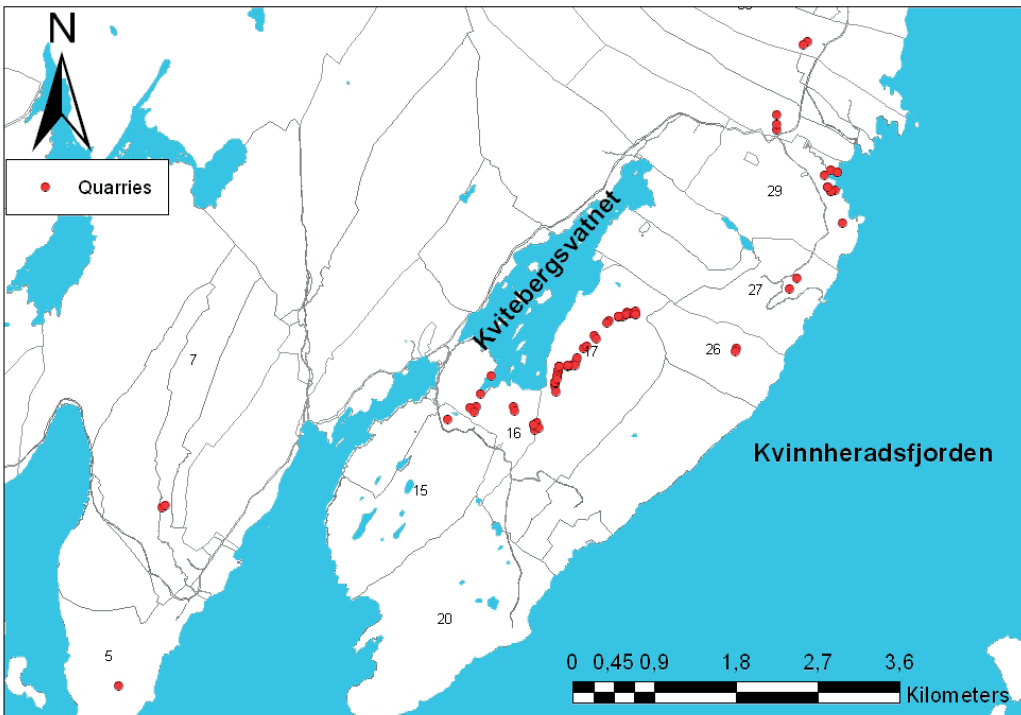


Figure 2. Identified quarries in Ølve and Hatlestrand. Farm numbers are specified for farms with quarries within their boundaries. (Source: Baug 2015b: Fig. 1.7).



Figure 3: Underground quarry at Fugleberg Farm in Ølve. Production marks of bakestone extraction are visible on the wall to the right (Photo: A. O. Martinussen, 2012).

into the rock and then splitting them individually loose along the cleavage. Extraction of large slabs, probably used for building stones, was carried out using a form of channelling with pick axes (or similar tools), and wedging with chisel-like tools. This technique is typical for cutting building stones out of soft rock, but is also known from ancient and medieval production of soapstone vessels and garnet micaschist quernstones (cf. Storemyr et al. 2010:191, 204; Harrell & Storemyr 2013 [2015]). The same technique was used in bakestone production. Here, however, only a small furrow was cut around the base of the bakestone before splitting it from the rock. As bakestone blanks are approximately 3 cm thick, wider channels were not needed. Imprints of bakestone extraction are also generally rounder or more oval compared to production marks from building stones. The production method left tall, carved walls in the quarries. Extraction of bakestones often left semi-circular marks resembling the negative imprint of a stack of coins, often with a sharp edge between individual stacks (cf. the carved wall to the right on Figure 3). Extraction of larger slabs generally left straighter, step-like walls, often with rectangular marks with straight or rounded corners. However, in several quarries it is difficult to identify the products extracted based solely on the cutting marks.

The range of products

The best known product type from the quarries in Ølve and Hatlestrand is bakestones (cf. Naterstad 1984; 1989; Weber 1984; 1989; 1990; 1999). Yet, traces of cutting in the quarries, as well as written sources, testify to a wide range of products. From the 16th century onwards, written sources provide information on the production of bakestones and roofing tiles (NRJ IV:474; Friis 1632:71-74; Hoff & Lidén 2000:156). According to the priest and writer Peder Clausson Friis, in the late 16th century thin stones used for baking flatbread were produced – the bakestones – but thin oblong slabs were also extracted for the purpose of drying corn and oats (Friis 1632:72). In the late 19th century, the

quarries allegedly also delivered building stones for castles in Denmark, as well as stones for window and doorframes, and cornerstones for the Skåla church in Kvinnherad, and for the main house at the Rosendal Barony (Haukenæs 1888:68, 135). In the 20th century, it was believed that vessels were also extracted from the quarries (Vaage 1972:125-128), but this kind of production has not been verified.

Grave crosses have been extracted from some of the quarries, allegedly in the 1900s (Hoff & Lidén 2000:166). Geochemical analyses of grave crosses at the Skåla church in Kvinnherad indicate that they were produced in Ølve or Hatlestrand (Jansen pers. comm. 2009). They are shaped like Celtic crosses where the intersection is encircled. Quite similar crosses are found in eastern Norway, where several are considered to stem from the early 1100s and 1200s (Nordeide 2009:164–165; 2011:129, 133). Whether or not the production of crosses in Ølve and Hatlestrand also dates to the Middle Ages is not known. No remains have been documented in the quarries.

In several of the quarries, different products may have been extracted during different periods, while some quarries may have produced a range of different objects contemporaneously. In fact, extraction marks of tiles, slabs, and building stones dominate in most quarries, whereas production marks from bakestones are often difficult to identify. It is possible that later production of other objects has removed traces of bakestone production. Yet, finds of bakestone fragments in spoil heaps indicate that this extraction was carried out along with the production of other objects in all of the investigated quarries. Identification of the products extracted in different quarries is, however, difficult based only on production marks in the bedrock and from surface recovery. In most cases, the cutting traces do not give any clear indication of what objects were produced.

Archaeological investigations in the bakestone quarries

In connection with my doctoral project, archaeological research at selected locations within the quarry landscape in Ølve and Hatlestrand was carried out. The aim was to reach a better understanding of the quarries regarding scale of the production, production techniques, product types, and chronology. The main goal was to identify the objects produced and date the extraction in different quarries within the extensive production area. The considerable size of the quarry landscape only allowed investigation of selected sites, and it was important to obtain a representative sample through archaeological surveys. Quarries that differed with regard to products, size, technology, and geological conditions were studied. I also wanted to investigate quarries within different distances from possible harbours and transport routes. Changes in production methods and product

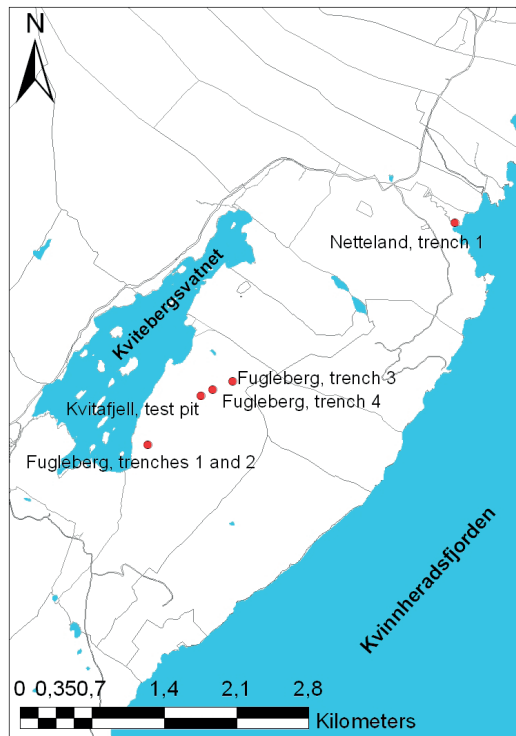


Figure 4. Map of excavation locations. (Source: Baug 2015: Fig. 6.1).

types also formed central issues. Four quarries and one workplace were selected and altogether five trenches and one test pit were dug, all of them in spoil heaps. They were excavated in order to analyse stratigraphical relationships and to collect material for ^{14}C -dating. The sites are all located in the outer fields of two historical farms, Fugleberg (farm no. 17) in Ølve, and Netteland (farm no. 29) in Hatlestrand (Figure 4) (Baug 2015b:75–104).

Investigated quarries at Fugleberg farm

The quarries investigated at Fugleberg are located on the hillside of Fuglebergåsen hill, c. 60–145 m ASL, a long distance from the fjord and possible harbours. Altogether, ten production sites have been identified, located both in the inner and outer fields of the farm (Baug 2015b:76–78). The farm does not border the sea, but had a mooring place, Støo (farm no. 19) on Kvinnheradsfjorden. In the Middle Ages Støo may have belonged to Skarvatun Farm (no. 18) (Nysæter 2013:148). Products from the quarries furthest east at Fugleberg may have been brought to Støo for further distribution, but the stones were probably also transported across steep terrain down to Kvitebergvatnet lake. Here, they may have been transported to the southern end of the lake, where a distance of c. 350 m separates the lake from the fjord. Three quarry sites of different scales were chosen for the survey at the farm. Additionally, a workplace where bakestones were finished was investigated.

Fugleberg, Trenches 1-2

Bakkhidlaren, one of the largest production areas in Ølve, is a coherent production area covering a distance of roughly 82 m, on a northeast-southwest axis, and was chosen as an investigation area. Extractions in both open-cast and underground quarries are documented, and altogether five underground quarries of different size have been identified. Inside the largest underground quarry



Figure 5. Carving traces in the underground quarry at Bakkhidlaren indicating extraction of tiles and slabs, possibly for building stones. (Photo: A. O. Martinussen).

in Bakkhidlaren, a small scrape (Inventory no. BRM652/1, University Museum of Bergen) and a wooden wedge (24 x 4 cm) were found, most likely representing tools used during extraction (Baug 2015b:79–80, 82). Similar wooden wedges have been found in several of the quarries in Ølve. Their exact function is not known, but they may have been used in connection with wedging the products loose along the cleavage plane. Wooden wedges are also known from the millstone quarries in Selbu in Sør-Trøndelag County (Rollseth 1947:152). The scrape was probably used in order to move the spoil away and clean up the quarry.

The production traces in Bakkhidlaren, both inside and outside the quarries, indicate extraction of several products, but without clear traces of bakestones in the underground quarries. Here, extraction of larger slabs, probably for building stones or tiles, seems to have dominated (Figure 5). A carved rockface to the north-east, resembling the negative imprint of a stack of coins, is the only area with clear traces of the extraction of bakestones.

Two large spoil heaps are located at the southwestern end of the production site, just outside the underground quarries. Here, a search trench was established in each of the heaps. The content in Trench 1 concurred with the production marks on the rock and indicates only small-scale extraction of bakestones. Large slabs were the most common element in the trench, perhaps originating from

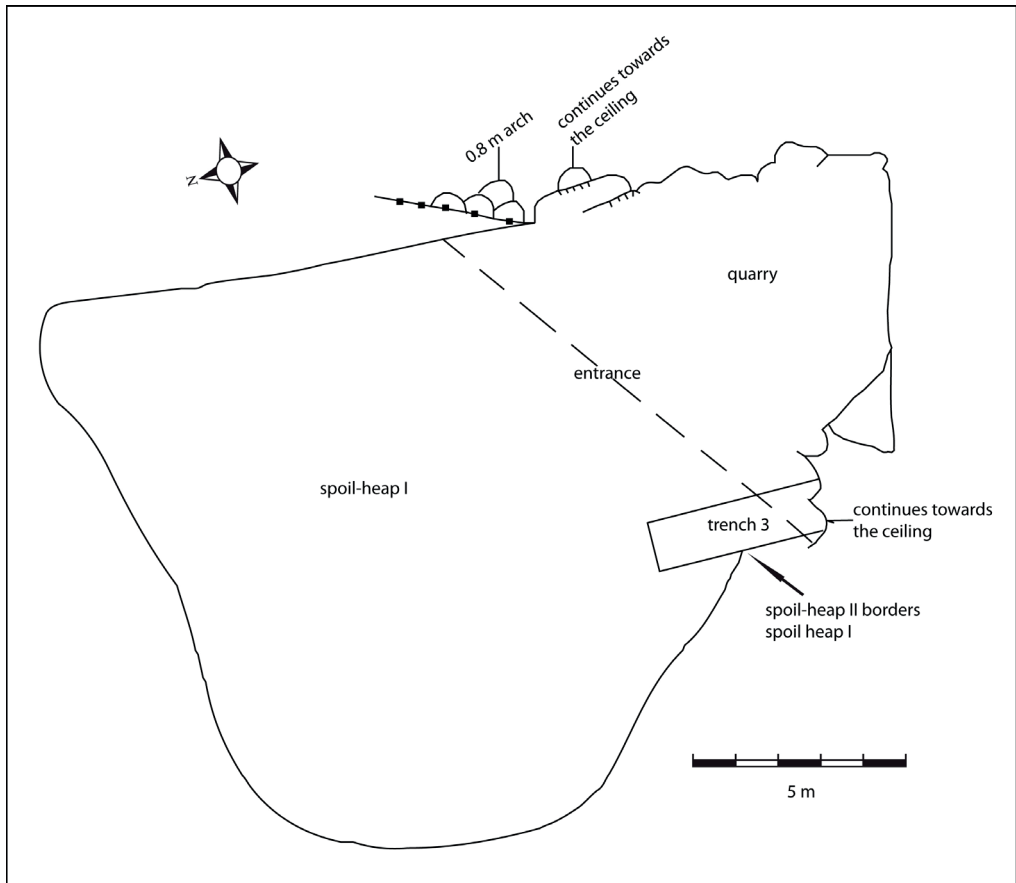


Figure 6. The investigated bakestone quarry at Fugleberg Trench 3. (Source: Baug 2015: Fig. 6.14).

production of tiles and slabs for building stones. No building stones were identified in the trench, but production cannot be excluded. In Trench 2, smaller flakes (spoil from the extraction) from 1 to 20 cm in length were the dominant items, but there were only a few fragments of bakestones. No datable material was found in either of the two trenches, thus the period of production remains unknown (Baug 2015b:81–86).

Fugleberg Trench 3

The second site excavated is located at the northern end of Fuglebergåsen hill, at a cliff where three small quarries were identified. The site selected for the investigation is an underground quarry, 1.6–2.5 m high, 9 m wide, and 10 m deep (approximately 80 m³). Production was mainly carried out inside the quarry. The spoil heap is located in front of the entrance, but large amounts of waste were also dumped inside the quarry. Here, most of the production marks have concave curves of a semi-circular shape with a diameter ranging between 55 and 65 cm, most likely originating from the extraction of bakestones. Some production marks, though, are more rectangular in shape, some with straight and others with rounded corners. Remains of channelling are also evident on the rock, indicating products other than bakestones.

Two different spoil heaps were identified (Figure 6). The main heap (Heap I) is located in front of the underground quarry, and is a result of production within the quarry. This heap is bordered by another heap (Heap II) in front of the southwestern end of the quarry opening. Heap II is, however, most likely a result of extraction in this part of the quarry



Figure 7. Fugleberg Trench 3 during excavation. (Photo: I. Baug).

Figure 8. ¹⁴C-analyses from Fugleberg Trench 3.

Lab. Ref.	Context	The age BP	Calibrated Age	Material
TUa-6697	Fugleberg Trench 3, layer 2	720 ± 35	AD1280—1295	Pine charcoal
TUa-6699	Fugleberg Trench 3, layer 4	800 ± 35	AD1225—1280	Birch charcoal
T-19070	Fugleberg Trench 3, layer 4	370 ± 45	AD1445—1635	Birch and pine charcoal
T-19071	Fugleberg Trench 3, layer 4	190 ± 45	Younger than AD1660	Birch and pine charcoal
TUa-6696	Fugleberg Trench 3, layer 6	960 ± 35	AD1025—1155	Pine charcoal
TUa-6698	Fugleberg Trench 3, layer 6	905 ± 35	AD1045—1190	Pine charcoal
TUa-6700	Fugleberg Trench 3, layer 7	2605 ± 35	805—790 BC	Deciduous trees charcoal
TUa-6701	Fugleberg Trench 3, layer 7	4440 ± 45	3260—2930 BC	Sallow, willow/aspen charcoal

site, both at the exterior rockface and from the southernmost quarry, which forms an overhang in the cliff. Trench 3 was laid out towards the rockface at the southern end of the quarry, covering parts of Heap II and, to the north, goes into Heap I (Baug 2015b:84–91).

Compared with the other investigated quarries, more fragments of bakestones were identified in Trench 3, indicating that they were the main product here (Figure 7). The diameter of the measurable bakestones found ranged from 27 to 55 cm in diameter, and they were made in different shapes – circular, oval, and drop shaped. Some of the production marks in the rock are about 60–70 cm in diameter, indicating that there was no standard size of the bakestones. They also vary in thickness; unfinished blanks are about 3–4 cm thick, while more finished bakestones with furrows on each side are about 1 cm thick (Baug 2015b:90).

Altogether eight samples for ^{14}C -dating were taken from the trench. Dating indicates that the production of bakestones goes back to the early Middle Ages, to the 11th or early 12th centuries. A second production phase is documented from the high Middle Ages (from the 13th century), continuing up until early modern period (c. the 15th to 17th centuries). There were also indications of products other than bakestones, most likely from the high Middle Ages onwards (Figure 8; Baug 2015b:86–92).

Fugleberg Trench 4

Located further south on Fuglebergåsen Hill, c. 200 m north of Kvitafjell, is the last investigated quarry at Fugleberg Farm, with remains of manufacture both in an underground and an open-cast quarry. The underground quarry is about 11 m wide, 7 m deep, and c. 2.2 m high (approximately 170 m³), with traces of a variety of production marks, both on the walls and in the roof. The spoil from the quarry is deposited beside the rockface, and formed into a heap (c. 20 m x 9 m). The production marks in the quarry vary in shape and size, indicating that there was not a standard measure for the objects made. Traces of bakestone production are few, and totally absent inside the underground quarry.

Trench 4 was laid out east of the quarry entrance, with the rockface at the southern end and the production heap at the northwestern end, and against the rock in order to investigate its height and also trying to reach the bottom of the quarry. Trench 4 was 4 m long and 1.1–1.4 m wide, and 1–1.4 m deep. The base of the heap was reached where carved rock appeared. This clearly demonstrates that the spoil heap covers an older worked out part of the quarry. The carved rockface at the bottom of the trench continues into the heap to the northeast (Figure 9).

All layers in the trench contained large



Figure 9. The carved rockface at the base of Fugleberg Trench 4, seen from the north. (Photo: I. Baug).

slabs, many over 1 m in diameter, but also a few unfinished and fragmented bakestones, varying in size from 43 to 65 cm in diameter, with no indications of a standard size. Fragments of bakestones were few compared to the larger slabs, which indicates that the griddles may not have been the main product in the quarry. This also fits with the production marks in the carved rock. For instance, the carved rock at the bottom of the trench seems to indicate the production of building stones. Unfortunately no organic material suitable for ^{14}C -dating was found (Baug 2015b:91–93).

The workplace at Kvitafjell

The last location chosen at Fugleberg farm was the workplace underneath Kvitafjell, a natural rock shelter stretching along a north-south axis. The rock type here is green schist without talc, and therefore no extraction has taken place. The site represents a workplace where the bakestones were finished. The workplace was discovered in the 1980s, when a fireplace, a tuyère, and 20 kg of iron slag was recovered (Weber 1984; Top. Ark). Spoil from the cutting of bakestones is located in large amounts underneath the overhang, extending 2 m out from the rock wall, following the length of the overhang for c. 30 m. A test pit was excavated underneath the overhang, in order to date the activity at the site. The test pit contained silt and flakes of c. 0.5–30 cm in size. There were more fragments from bakestones here than was the case for the investigated quarries. Most were small fragments, a few centimetres in length/width, but there were also some more or less complete bakestones of various sizes found: 42–55 cm in diameter and about 1 cm thick (Baug 2015b:90). After being extracted from the bedrock in the quarries as more or less round or oval, thin blanks, bakestones were transported to the workplace at Kvitafjell. Here, they were made thinner and received the characteristic furrows known from stone griddles found in consumer contexts (cf. Weber 1984; Tengedal 2010).

To make the bakestones thinner, coarse furrows were carved into the stone, probably using pickaxes, and the area between the furrows seems then to have been peeled off. A second phase of furrowing was then carried out, with thinner furrows closer together, in patterns, running in different directions, and obviously made by a finer tool than was used in the initial furrowing. On some griddles, furrows are carved only on one side, while others have them on both sides (Baug 2015b:96). It has been suggested that the furrows were vital for frying or baking. In medieval Bergen food remains on bakestones are only found on the furrowed side and not on the unfurrowed side of the bakestones (Tengedal 2010:70), which supports this assumption.

The deposit at Kvitafjell is 1.5 m thick, indicating an intensively used workplace. The activity dates to the 11th and early 13th centuries (Figure 10) (Baug 2015b:93–98). Investigations show that the rock shelter was mainly used for cutting bakestones. Remains of slag and the tuyère (Weber 1984; Top.ark. University Museum of Bergen) indicate that smithing also took place at the site, perhaps in order to sharpen the tools used in bakestone production. A few other workplaces have been identified in the quarry landscape in Ølve: one south-west of Kvitafjell and another at the neighbouring Tufta farm (Baug 2015b:93). The presence of workplaces indicates that blanks for bakestones were commonly transported from the quarries to suitable places for finishing. This may

Figure 10. ^{14}C -analyses from the workplace underneath Kvitafjell.

Lab. Ref.	Context	The age BP	Calibrated Age	Material
TUa-6702	Kvitafjell layer 2	875 ± 35	AD1160–1220	Pine charcoal
TUa-6703	Kvitafjell layer 4	845 ± 35	AD1170–1245	Birch charcoal
TUa-6704	Kvitafjell layer 4	950 ± 35	AD1030–1165	Pine charcoal
TUa-6705	Kvitafjell layer 4	840 ± 35	AD1170–1245	Pine charcoal

also explain the relatively low number of bakestone fragments found at the investigated quarry sites. Kvitafjell and the other identified workplaces may have operated as workplaces for several of the quarries nearby. However, unfinished bakestones in a different stage of the finishing process at the quarry sites indicate that such work was also occasionally carried out in the quarries. For instance, in the quarry at Fugleberg, in Trench 3, at least some of the products had been finished.

Investigated quarries at Netteland farm

Seventeen identified quarries are located in the community of Hatlestrand on the western side of Kvinnherad Fjorden. The largest concentration of quarries has been identified at Netteland farm (no. 29), which was selected as a research area. One quarry, Båtahidlaren, only 4 m ASL, was chosen for excavation. The quarry is located by Netlandsvågen only 14 m north of the main fjord. It is an underground quarry, 5.7 m wide, 9.5 m deep, and c. 2 m high at the entrance, becoming lower further inside, and where a minimum of 108 cubic metres of rock have been extracted. Semi-circular production marks on the rock wall have been identified inside the quarry; some of them from bakestone production. Above the underground quarry, c. 2.25 m in from its entrance, open-cast extraction is documented with a 1.4–1.8 m high carved rock wall (Baug 2015b:79, 97).

East and west of the underground quarry, the production site continues as an open-cast quarry and stretches over roughly 100 metres, reflecting intensive extraction. Part of the carved rockface west of the underground quarry appears as rather straight without the concave traces typical of bakestone production and most likely reflects extraction of building stones. At Båtahidlaren, bakestones, then, seem to represent a minor product, while building stones, and possibly tiles and slabs, seem to dominate. This was also substantiated by the content in the excavated trench.

A search trench was established north of the entrance into the underground quarry, along a partly covered rockface with production marks stretching along a north-south axis, with the underground quarry to the south. The area in front of the quarry thus seems to represent a previously worked out part of the quarry that has been covered with spoil from later activities, making it difficult to date the beginning of production. The spoil may possibly stem from both the extraction in the underground quarry and that from the rockface just above this. The trench was 3.8 m in length, 1.5 m wide, and 1.4–1.9 m deep. The combination of large, heavy stones and slabs and the depth of the trench made it difficult to continue excavating. As a result, the bottom level of the spoil heap was not reached, and its depth could not be estimated. Activity in the quarry was dated broadly from the 13th and 14th centuries to the modern period (Figure 11). The three ¹⁴C-samples show a reverse chronology with the oldest dates from the uppermost layer (layer 2). This indicates that the spoil has been disturbed by later activities, probably caused by moving of spoil to allow later extraction. Production may have been carried out in both the high and late Middle Ages but also later. The oldest production was, however, not uncovered (Baug 2015b:98–101).

Figure 11. C14-analyses from Netteland Trench 1.

Lab. Ref.	Context	The age BP	Calibrated Age	Material
TUa-6706	Netteland Trench 1, layer 2	750 ± 35	AD1265–1290	Oak charcoal
TUa-6707	NettelandTrench 1, layer 3	595 ± 35	AD1310–1405	Birch, bird cherry/rowan charcoal
TUa-6708	Netteland Trench 1, layer 3	140 ± 35	AD1680–1940	Hazel nut

Organisation of production

Was the quarrying carried out by full-time specialists or was it a seasonal activity conducted by local farmers? The character and scale of the production indicate an intense and well-organised activity, where large-scale production took place from the early Middle Ages onwards. Specialisation is defined by Cathy Costin as production where people produce for profit or commercial returns, as distinguished from a domestic mode of production where people primarily produce for their own subsistence (Costin 1991:3–4). The scale of production and the widespread distribution (see below) certainly indicate specialisation, whereby the quarries were exploited for profit. Who controlled the quarries and who were the stonecutters? In order to answer this, quarrying and the people involved need to be understood in relation to the societies of which they were part, and an important precondition for doing so is to date the activity. It is difficult to reach conclusions for the entire production landscape regarding chronological development because few quarries can be dated. The small scale investigation and the small number of datable sites can only suggest certain trends. The investigations indicate that production of bakestones began in the early Middle Ages, in the 11th or early 12th centuries (cf. Figures 8–10) and continued throughout the Middle Ages and into the early modern period. It is, however, only at the bakestone quarry at Fugleberg farm (Trench 3) that the initial production phase could be dated.

I have earlier shown that all farms located within the quarry landscape in Ølve and Hatlestrand belonged to different estates and not to the peasants themselves during the Middle Ages and after the Reformation. Several of the farms with quarries within their boundaries were owned by ecclesiastical institutions from the middle of the 12th century onwards. These included Halsnøy Abbey, Archbishop Olav Engelbrektson, Munkeliv Abbey in Bergen, the Bishop in Bergen, and, possibly, the local churches of Kvinnherad and Ølve (Baug 2015a; Baug 2015b:135–141). These landowners may have organised production and distribution, while the activities were carried out on a daily basis by local tenants. Possibly, at an early phase, the quarries may have formed an element of a *veitsle*-system, where bakestones were produced as tributes to the landowners. Later during the Middle Ages tenancy was increasingly based on fixed rents, where land rent was normally paid in products manufactured at the tenant farms. The quarried stones may have formed part of the land rent (Baug 2015a; Baug 2015b:142–143).

The quarries may thus represent a situation termed ‘proto-industrialisation’ by the historian Franklin Mendels (1972). According to Mendels, this kind of semi-professional craft existed before industrialisation, in rural societies where agriculture constituted the main activity. The quarrying documented in Ølve and Hatlestrand seems to have been labour intensive, and know-how with regard to stone quality and extraction techniques were undoubtedly important. Yet, the stonecutters need not have been working full-time in that role. The work in the quarries may well have been conducted on a seasonal or part-time basis, in combination with other tasks they had to perform at the farms they worked and lived on. It is probable that an experienced person would be able to make the objects without being a full-time specialist. In the millstone quarries in Selbu in Sør-Trøndelag County, intensive exploitation aimed at larger markets took place in the early modern period. Yet year-round production or a hired work force was not necessary, and extraction was carried out during the winter season by local farmers from the Selbu district (Rollseth 1947). A similar situation may have existed in Ølve and Hatlestrand, where people working and living at the different farms, as farmers, tenants, or semi-free workers, were the ones working in the quarries. Quarrying may have been carried out during the winter season: the off-season for agricultural work (Baug 2015b:146).

However, within the central production areas, such as Fugleberg farm and perhaps also Netland farm, extraction was on a larger scale and may have demanded different organisation and a larger

workforce. Knowledge of quarrying operations (i.e. how to organise quarry work) must have been important. Although annual production volumes cannot be estimated, the numbers of quarries and size of the quarry areas indicate that the households may have included hired workers. A hierarchy based on specialisation of workers may have developed. It is also possible that quarries where large-scale production occurred were rented out to agencies other than tenants, a situation known from, for instance, Germany in the Middle Ages (Pohl 2012:77–78).

Bakestones as commodities – where were they distributed?

The quarry landscapes in Ølve and Hatlestrand indicate large-scale and long-lasting production aimed at large markets. Thus, an interesting question is: Are the products found in contexts outside the areas near the quarries? What markets were central for the bakestones? Archaeological finds of griddles outside the quarries indicate their distribution as commodities on a regional and international level.

Bakestones are found in large quantities within Norwegian towns, such as Oslo, Bergen, Trondheim, and Stavanger. Many of the fragments found in medieval urban contexts have traces of extensive use. Even though it is difficult to detect using archaeological material, redistribution from the towns should also be expected, as indicated by finds in several places in the rural areas of western and northern Norway (<http://www.unimus.no/arkeologi/forskning/index.php>; Reiersen 1999:47–48).

As Bergen was the closest town to the production areas in Ølve and Hatlestrand, it may have been the main distribution centre. This is indicated in the archaeological assemblage from Bergen. At the medieval settlement site of Bryggen in Bergen (BRM 0, inventory no. University Museum of Bergen), nearly 1600 bakestone fragments have been found within the five northernmost house rows, later denoted as Gullskogården, dating from c. 1120–1702. About 90 per cent of this material is made of chlorite schist (Tengesdal 2010), with Ølve and Hatlestrand as the most probable production area. The earliest fragments of bakestones found in Bergen are dated to c. 1100–1120s (15 fragments), even though one fragment may stem from the period c. 1070–c. 1100. This latter date is considered uncertain (Hansen 2005:178–179), but is not contradicted by the dating of the production in Ølve. From the period c. 1120–1170/71, more than 250 fragments have been found at Bryggen, most of them of chlorite schist, but nearly as many were of soapstone (Tengesdal 2010:36, 46–47). At Bryggen, chlorite schist dominates as a raw material throughout the Middle Ages. However, bakestones of soapstone are quite common during the period 1120–1198, but decrease during the period 1248–1413. In the latter period, bakestones of chlorite schist superseded those of soapstone (Tengesdal 2010:31–36). This may have to do with the large-scale, well organised production that developed in Ølve and Hatlestrand, as well as the quality of the products from these quarries. This may have led to an increase in distribution during the high and late Middle Ages.

In Oslo, some 300 bakestones were identified in the excavations at the sites of *Mindets tomte* and the *Søndre felt* in the medieval part of the town, and c. 49 per cent of these (132 fragments) are of chlorite schist considered to stem from Ølve and Hatlestrand. In Trondheim, from the large site Folkebibliotekstomten, nearly 400 bakestones were found. About 35 per cent of these (141 fragments) are considered to stem from Ølve and Hatlestrand, whereas the rest are described as *local stone* (Weber 1989:18), most likely stemming from various soapstone quarries. The bakestones found in Gamlebyen in Oslo and in Trondheim have been dated from c. 1050–1100 onwards (Weber 1984:159). As is the case in Bergen, in Oslo and Trondheim an increase in the number of chlorite schist bakestones relative to those made of soapstone seems to have taken place during the high and late Middle Ages, from c. 1300–1400. However, griddles of soapstone are still present in the assemblages,

and thus reflect a situation somewhat different to Bergen (Weber 1989:18). Even though production in Ølve and Hatlestrand starts in the early Middle Ages, it is not until the high and late Middle Ages that the chlorite schist starts to dominate, suggesting a specialisation in bakestone production. The large numbers of bakestones that have been found in the towns signifies a more or less regular trade. The chlorite schist seems, however, to have been far more dominant in Bergen compared to the other medieval towns. This may have to do with its proximity to the quarries in Ølve and Hatlestrand.

As stated above, the quarries in Ølve and Hatlestrand were not the only possible production sites of chlorite schist bakestones. The quarries at Øye, in the community of Melhus, in the county of Sør-Trøndelag, are also a possible provenance, especially with regard to the finds from Trondheim, which is closer to Øye than Ølve/Hatlestrand. However, it seems unlikely that bakestones from Øye were traded over long distances, as the extraction traces are few and do not indicate large-scale production. It is, however, possible that later extraction of building stones may have removed traces of bakestone production (Storemyr et al. 2010:192; Storemyr 2015:191). In the medieval town Stavanger too, the geology of bakestones varies, and also here provenances other than Ølve and Hatlestrand are possible. Some bakestones were of soapstone, whereas others have a different composition. Some of these stones may come from the chlorite schist quarry site at Ertenstein in Rennesøy, in the northern part of the county of Rogaland, where building stones were also extracted during the Middle Ages (Storemyr 2001:67; Baug 2015b:4, 116).

In northern Norway, bakestones are found at farmsteads and farm mounds and are more frequent in coastal areas compared to the inland (Reiersen 1999:47–48), but bakestones were not commonly used in northern Norway. It has been suggested that their distribution in these rural sites indicates an export limited to central places, or so called hubs, along the sea route. That is, sites located within the catchment areas of medieval towns, or connected to the towns' trade networks (Øye 2009:232). The towns' involvement in distribution may, in this way, have influenced the area within which the bakestones were used. Bakestones of both soapstone and schist have been identified (Reiersen 1999:47), but whether or not any stem from the quarries in Ølve and Hatlestrand is not known. The limited number of bakestones in northern Norway may be connected with differing food traditions. According to written sources from the late Middle Ages, bread was normally baked in the ashes in northern Norway. It was also more common for people to eat dried fish rather than bread (Grøn 1927:53; Granlund 1956:309). Most likely, regional differences existed with regard to the role of bread in the daily diet, and in some areas foodstuffs other than bread may have been preferred. It was thus not just a question of geography and proximity to the sea that were decisive for the distribution of bakestones (Baug 2015c:38).

Outside Norway, bakestones are principally found within the North Atlantic region. Iceland, Shetland, and the Faroe Islands are the only areas where bakestones, most likely from Norway, have been found in large quantities (Hamilton 1956:183; Arge 1989:119; Smith 1999:127; Weber 1999:134–139; Forster 2004). In Shetland, Norwegian stones have been found dating from the 1100s onwards (Weber 1999), and were thus transported to the North Atlantic islands at more or less the same time as they appeared in Norwegian towns.

Archaeological finds of bakestones indicate that these implements were also known in Sweden and Denmark (Campbell 1950:14; Larsen 2005a:377; Bergström 2007:134). Bakestones are found in towns and areas with close trading contacts to Norway in the Middle Ages, such as Lund in Sweden, and Århus and Tårnby in Denmark (Andersen et al. 1971:108–109; Larsen 2005a:377; Baug 2015b:116). Only small numbers of bakestones have been documented, and they seem to have rarely been used in Sweden and Denmark. However, a thorough investigation of these finds is lacking.

Direct distribution between the quarries and consumers outside Norway most likely did not

take place, and redistribution from the towns is expected. In medieval Norway foreign trade was mainly organised through Bergen. The landowners need not have been central agents in the trade, but they would most likely have ensured that their surplus production was taken to market (Skre 2008, 353). They would normally have their land rent products brought into the towns where they were sold on (Helle 1982, 330-337, 346, 354). Producers and landowners may have organised the transport of stone products to the towns, and the ecclesiastical institutions owning land within the quarry areas may thus have been directly or indirectly involved in the distribution of the products. Both Norwegian and foreign merchants were probably involved in exporting the bakestones further afield. From about 1180–90 at the latest, Bergen had direct contact with areas around the North Sea (Helle 1982:323; Nedkvitne 1983), which might explain the presence of Norwegian bakestones on the North Atlantic islands. Even though people from these islands travelled to Bergen from the 1100s onwards in order to buy and sell, trade was mainly organised by Norwegian traders and ecclesiastical institutions in Bergen, which annually sent several ships westwards with Norwegian commodities (Helle 1982:165, 360–365), most likely including bakestones. In a charter issued by King Håkon Håkonsson dated to 1217–1219, Halsnøy Abbey was to have the same rights as canons in the Bergen diocese to send their land rent commodities to Iceland for sale (RN I, 430). This may have included products from the bakestone quarries in Ølve belonging to the monastery. Thorough geological investigation of the North Atlantic bakestones is lacking, and their provenance cannot be established with certainty. Spectrographic analyses of bakestones found in the Faroes indicate that they stem from Ølve (Arge 1989:119), but it is difficult to separate Ølve and Hatlestrand from the quarries in Øye, in the county of Sør-Trøndelag, using this method (Jansen pers. comm. 2011). However, based on the close contact between Bergen and the North Atlantic region, combined with the relatively few traces of bakestone extraction in Øye, it is perhaps more likely that the bakestones stem from Ølve and Hatlestrand. Trading ships from Bergen may possibly, at times, have transported bakestones to Sweden and Denmark. It is also possible that bakestones were brought there by merchants and other travellers as personal belongings. There is, however, no evidence to indicate a large and regular export of these products to southern and eastern Scandinavia.

The distribution of bakestones, then, seems mainly to be connected to the Norwegian cultural sphere, including the islands in the North Atlantic. Different food traditions and alternative ways of cooking may have limited the market for bakestones, and they never managed to gain a foothold in foreign markets (Baug 2015c). Food processing represents a conservative aspect of culture, where not only traditions and availability, but also strategic decisions and social roles, are important factors (Øye 2009:225; Baug 2015c). This may have made it difficult for bakestones to gain importance outside of the Norwegian cultural sphere.

Building stones – commissioned work from the quarries?

As noted, bakestones were not the only type of product extracted from the quarries in Ølve and Hatlestrand. Stone crosses and building stones represent different product categories with a far more limited distribution than bakestones, both in time and space, and there is no evidence to indicate that they were distributed via market places and towns as the bakestones were. Building stones seem to represent items aimed at, and commissioned by, the upper strata of society. The production of building stones, and perhaps also crosses, may have been initiated by specific orders and instructions from customers (Baug 2015b). Grave crosses were produced in the 1900s (Hoff & Lidén 2000:166), and have been identified in the churchyard of the Skåla church in Kvinnherad. How far back this production goes is, as previously mentioned, not known. Crosses were, in all likelihood, commissioned

products and their production took place on a small-scale.

Using stone as a building material was a new technique in Norway at the very beginning of the Middle Ages which was introduced from abroad. Most buildings built of stone were churches and castles, with the Church or the King as owner and builder. Thus, the production of building stones was connected to the elite (Baug 2015b:158). Plans for the buildings may have been worked out in detail before construction was started, and measurements and patterns needed may have been sent to the quarry before production, a situation known from medieval quarries in England. Trimming the building stones as far as possible at the quarry site would also reduce weight before transport (Salzman 1967:123). Building stones should thus be regarded as a commissioned product with a much more limited distribution than bakestones.

Building stones from the quarries have so far only been identified in Onarheim church in Tynesnes, Hordaland. The church is mentioned in written sources from 1327 (DN X, 25), but construction most likely started in the latter half of the 1100s (Hoff & Lidén 2000:267–268). Geochemical analysis confirms that the building stones stem from the quarries in Ølve/Hatlestrand (Jansen & Heldal 2009; Jansen & Heldal this vol.), indicating extraction of building stones in the early Middle Ages. Onarheim farm belonged to elite members of society in the Middle Ages, and was settled by magnates with close connections to the King (Håkon Håkonssons saga, chapter. 23 and 87). The church was most likely built as a private church, but was in use as a parish church from at least 1347 when it is mentioned as such in written evidence. There was also a guild at Onarheim farm in the Middle Ages (DN IV, 316; Hoff & Lidén 2000:267). This emphasises Onarheim's function as a religious, judicial, and cultural centre in western Norway, and also links products from Ølve and Hatlestrand to the societal elite in the Middle Ages.

Different types of products from the quarries may thus have been subject to different forms of production and transaction. While bakestones testify to serial production aimed at large markets, building stones indicate production of commissioned items for agents or institutions belonging to the upper strata of society.

Concluding remarks

The quarries in Ølve and Hatlestrand represent a long-abandoned proto-industrial landscape where large-scale production of several product-types took place over a period of hundreds of years. Two types of production can be documented from the Middle Ages: large-scale, serial production of a household product aimed at large markets – the bakestones; and commissioned production of building stones for more limited groups belonging to the societal elite. Intensive activity through the centuries has led to profound changes in the landscape.

The production of bakestones may be regarded as a commercial activity and, from the 1100s onwards, bakestones became a common household utensil in both urban and rural areas of Norway. The Ølve-Hatlestrand area evidently played a major, but not unrivalled, role in the production of bakestones. An increase in griddles of chlorite schist is documented fairly late, in the period between the 1200s and 1400s, and in some areas, such as Bergen, they superseded bakestones of soapstone.

Most evidence points towards a semi-professional craft carried out by people living and working on the surrounding farms. Such part-time or seasonal production most likely reflects the situation at most production sites. Yet, the largest quarry sites may have demanded larger workforces and management, where full-time stonemasons may have been engaged. As the earliest dating from the quarries largely corresponds with finds of bakestones in urban contexts in the 12th century, the bakestones may have been produced for a large market at an early stage. The occurrence of bakestones

decreases with distance, and the distribution seems to be closely linked to towns' trade networks, but also to food traditions. The quarries in Ølve and Hatlestrand, then, bear witness to an activity important for people over large areas. Yet, the bakestones never managed to get a foothold outside Norway and the North Atlantic region, and only random export can yet be documented outside this area.

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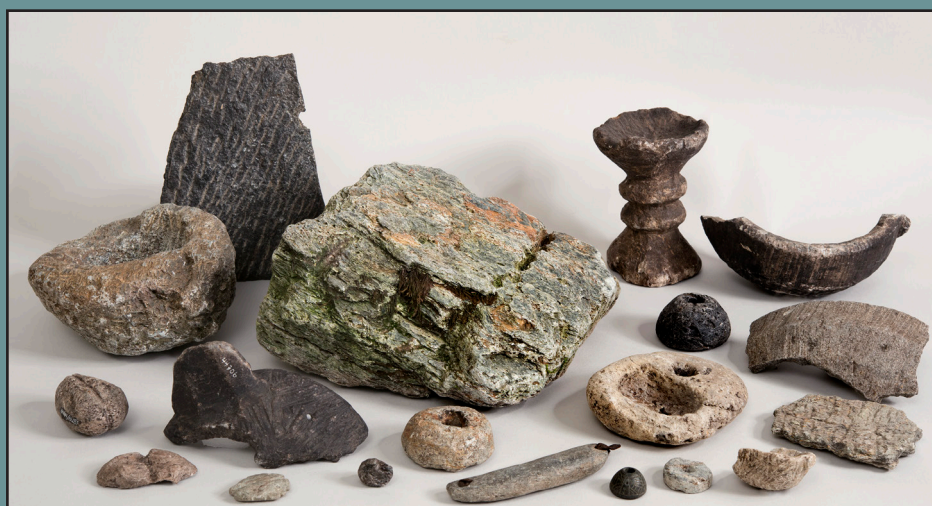
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Soapstone in the North. Quarries, Products and People. 7000 BC – AD 1700

Soapstone is a remarkable rock. While it is soft and very workable, it is also durable and heat-resistant, and with a high heat-storage capacity. These properties have been recognised and valued around the world since prehistoric times, and soapstone has been used for a multitude of purposes, ranging from everyday household utensils to prestigious monuments and buildings. This book addresses soapstone use in Norway and the North Atlantic region, including Greenland. Although the majority of the papers deal with the Iron Age and Middle Ages, the book spans the Mesolithic to the early modern era. It deals with themes related to quarries, products and associated people and institutions in a broad context. Recent years have seen a revival of basic archaeological and geological research into the procurement and use of stone resources. With its authors drawn from the fields of archaeology, geosciences and traditional crafts, the anthology reflects cross-disciplinary work born of this revival.



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