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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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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

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A Versatile Resource – The Procurement and Use of Soapstone in Norway and The North Atlantic Region

‘... We would like to know if The Museum wants to receive such Bagatelles...’

(A soapstone spinning whorl, sent to the University Museum of Bergen in 1949)

‘...science is built upon Bagatelles... so nothing is too small... However some things, such as this spindlewhorl, can nevertheless be too small to be stored in a museum... So we hereby return your find...’

(The polite answer from the curator at the University Museum of Bergen in 1949).¹

Introduction

Soapstone is a remarkable rock. While it is very workable due to a high content of talc, the softest known mineral in existence, it is also durable, heat-resistant and has a high heat storage capacity. These properties have been recognised and valued since prehistory across the world and soapstone has been used for a very broad range of products. This book addresses soapstone use in Norway and the North Atlantic region, including Greenland (here: the North). Although the majority of papers deal with the Iron Age and Middle Ages, the book spans the Mesolithic to the early modern era, dealing with themes related to quarries, products and associated people and institutions in a wide sense. Recent years have seen a revival of *basic* archaeological and geological research into the procurement and use of stone resources. With authors from the fields of archaeology, geosciences and traditional crafts, this anthology reflects cross-disciplinary work grown out of this revival.

Soapstone and geology

Soapstone is a metamorphic rock in which talc is mixed with minerals such as chlorite, amphibole and carbonates. It mainly originates from deposits of ultramafic and mafic (dark) magmatic rocks such as dunite and peridotite, sometimes also gabbro, that have been subject to intensive transformation (metamorphose) through geological history. This transformation took place deep in the Earth's crust along the boundaries of colliding tectonic plates, which resulted in the formation of mountain chains such as the present-day Alps and Himalayas. However, soapstone deposits also occur in very old, Precambrian landscapes and along mountain chains that are now part of geologically stable continents and that are in the process of eroding, for example the mountains of Norway. Some 400 million years ago, the Norwegian mountains were part of a grand chain known as the Caledonides that also included present-day Greenland, several Atlantic isles, part of Scotland and part of the

American North-East. Since then, Norway and America have drifted apart due to the opening of the Atlantic Ocean (Ramberg et al. 2008).

Given their varying mineral content, soapstones also exhibit a range of properties. Some soapstones are rather hard, some extremely soft, while others grade into rocks often called talc schist or chlorite schist, the latter of which may have a different geological history, being sometimes formed from volcanic tuff and basalt. Some soapstones are transformed only a little from their parent rock; these are rather hard and may contain a certain amount of the mineral serpentine. Some soapstones are massive, but most are schistose and sometimes full of fissures. In fact there is no such thing as soapstone 'proper'; soapstone is a generic term for soft or 'weak' stone, usually rich in talc. If the talc content is very high, approaching 100%, we often use the term steatite. Most of the papers in the present book deal with various types of soapstone (used here as a generic term, since some of the following contributions also address chlorite schist).

The use of soapstone in the North

Around 200 old soapstone quarries are known in Norway, also Shetland and Greenland host such quarries. The earliest use of soapstone in Norway dates back to the Mesolithic, when the rock was formed into small animal figures, star-shaped hatchets, mace heads and tools, sometimes with decoration (Bjørge 1981; Bergsvik 2002; Skår 2003). Throughout prehistory and history, everyday objects such as fishing tackle (Olsen 2004; Sørheim 2004), textile tools (Hofseth 1985; Øye 1988), soapstone tempered pots (Engevik 2009), lamps (Bernhardt 2003), vessels (Lossius 1979; Resi 1979; Pilø 1989; Vangstad 2003) and griddles (bakestones, baking slabs) (Weber 1984; Tengesdal 2010; Baug 2015a) were produced for use in households of all social strata. From the Middle Ages onward, soapstone was massively quarried as a building and decorative stone for churches and other monumental constructions (Ekroll 1997; Storemyr 2015), with baptismal fonts (Solhaug 2001) and gravestones also often made of soapstone, the latter up until the early modern period (e.g. Voldheim 1995). In prehistory and the Middle Ages the stone was also used in connection with metalworking, e.g. as casting moulds (e.g. Rønne 1996; Pedersen 2010) and forge-stones (tuyères) (Baug 2011).

In some periods of prehistory, soapstone objects were distributed via long-distance networks. Presumably originating in Scandinavia (although the Alps is also a possibility), Bronze Age soapstone moulds are found in considerable numbers in Denmark (Skjølsvold 1961:107; Rønne 1996). During the Viking Age, cooking vessels were an important export article from Norway (and western Sweden) (Resi 1979; Risbøl 1994), and when pioneer settlers from Norway migrated across the North Atlantic, stone vessels were in their luggage (e.g. Forster 2004; Sindbæk 2015:200). The extraction, manufacture, distribution and use of soapstone raw materials and products from the outfields have thus been important for people in the North on a local, regional and at times also on a cross-regional and international scale.

Soapstone in Europe and across the world

The North is a soapstone region, but not unique as such. Soapstone is found and used in many parts of the world. There are extensive traditions, for example, in the Middle East, the Indian subcontinent and in parts of the Americas, most notably in Canada, along the Appalachians and in Brazil (overviews in Rapp 2009; Storemyr 2015). In Europe, key traditions are found across the Alps, but also in several parts of Italy and the Mediterranean. Importantly, most traditions show a development that is very similar to that which took place in the North, including the transition from figurines in the Stone Age, to cooking vessels and later building and decorative stone procurement. Long-distance export also took place. The Romans brought Alpine soapstone vessels to their northern *limes*, not far from



Figure 1. Soapstone impressions from places beyond the North Atlantic region. Top left: One among hundreds of old soapstone quarries in Egypt's Eastern Desert. Top right: Prehistoric Mesopotamian soapstone vessel, c. 4500 years old, now in British Museum. Bottom left: Extremely intricate soapstone sculpture at the Hoysaleswara temple in Halebidu, Karnataka, India, 12th century AD. Bottom right: The Roman Caurga quarry in Chiavenna, North-Italy. (Photos except bottom left: P. Storemyr; bottom left: Rakhee Goyal, with permission).

where soapstone from the North ended up in the Viking Age (north Germany/Friesland).

The many names given to soapstone in Europe not only reflect the many uses of the stone, but also the fact that it is soft and workable. The contemporary English term *soapstone*, as well as the German *Speckstein* and the Danish *fedtsten*, are related to the 'soapy' or 'fatty' sensation one gets when handling the stone. However, the present Norwegian name is *kleberstein*, derived from *klåstein* or *kliberg* (loom weight). In Scandinavia alone, one may encounter perhaps a dozen names, including *jarstein*, (fishing line sinker), *esjestein* (tuyère, forge stone), *tolgestein/täljsten* (stone that can be worked with a knife), *mjukstein* (soft stone) and *vekten* (weak stone). The Romans used the name *lapis ollaris*, where *olla* means pot, just as the French and Italians do today (*pietre ollaire*, *pietra ollare*). The German *Topfstein*, or 'pot stone', has exactly the same meaning as the key term *grjotstein* (*grytstein*) in Old Norse (overview in Storemyr 2015; see also Helland 1893; Rüttimeyer 1924; Skjølsvold 1961; Lhemon & Serneels 2012; Dipartimento dell' Ambiente Ticino 1986).



Figure 2. Nidaros Cathedral in Trondheim, by far the largest 'soapstone building' in Europe. The West Front, one of Norway's most celebrated artistic works, was reconstructed/rebuilt and finished by 1969. (Photo: P. Storemyr).

In Europe, soapstone was in use by the late Palaeolithic c. 20–30,000 years ago, when it was carved into several so-called Venus figurines (e.g. White & Bisson 1998). In the Bronze Age and later in the Graeco-Roman period and Middle Ages, the use of soapstone was widespread in the Alps and the Mediterranean, as was the large-scale export of vessels and other items such as statuary and altars, and even wine glasses and plates (Rütimeyer 1924; Boscardin 2005; Lhemon & Serneels 2012; see also Bevan 2007 for Bronze Age vessels in general). Just as in Norway, soapstone was used in Alpine architecture during the Middle Ages, mainly for decorative purposes (e.g. de Quervain 1969). Otherwise, soapstone production in the Alps from the 16th century onward was related to stoves, a development again similar to that seen in Norway.

In the modern period, soapstone became part of the industrial revolution, not only in the North and in Europe, but also world-wide; during this time it was heavily used for lining industrial kilns and when processed to talcum powder it could be employed as a lubricant. Today, talc is used in many industries, including paper making, plastics, paints and coatings, rubber, food, electric cable, pharmaceuticals, cosmetics and ceramics (overview in Wikipedia's *Talc* article). Soapstone has also been used for architectural purposes during the modern period, in Europe but especially in Scandinavia during the late 19th and early 20th centuries (e.g. Ringbom 1987).

However, the largest-scale use of soapstone for one single building in the modern period was probably for the restoration of Nidaros Cathedral in Trondheim (Figure 2). When restoration started in 1869 the medieval cathedral was a half-ruin, yet exactly 100 years later, after hundreds of craftsmen had carved more than 30,000 tonnes of soapstone obtained from 30 quarries across Norway (as well as other stone from a further 40 quarries), the cathedral was finally restored to its

former glory. Nevertheless, restoring a cathedral is an unending task, with work currently ongoing for the foreseeable future through The Restoration Workshop of Nidaror Cathedral (NDR), one of the largest of its kind in Europe (Storemyr 2015).

Research revival in the North

Research into soapstone resources and their use in the North goes back to observations made by early historians in the 16th century, becoming a true field of research within archaeology and geology from the late 19th century onward (e.g. Friis 1632; Schøning 1778; Rygh 1885; Helland 1893). Nevertheless, until the early 2000s the list of standard references in the North was rather short. Regarding the extraction of soapstone, Arne Skjølsvold's (1961) survey of Viking Age quarries in southern Norway is the most frequently cited study on soapstone in the country. In terms of studies focussing on soapstone products, those carried out by Håkon Schetelig (1912), Sigurd Grieg (1933), Jan Petersen (1951), Siri Myrvoll Lossius (1977), Heid Gjøstein Resi (1979), Lars Pilø (1989) and Ole Risbøl (1994) formed almost the entire list. For more detailed overviews regarding the history and use of soapstone for multiple purposes in Norway, the contributions by Per Storemyr and Tom Heldal (2002) and Laura Bunsø (2016) should be consulted, while for Britain and the North Atlantic including Greenland, see Jette Arneborg (1984) and Amanda K. Forster (2004).

The surge of interest in soapstone studies that has taken place in the last decade or so is due to several factors. Within archaeology, domestic raw materials derived from the outfields, such as iron and stone used for everyday objects, have received increasing attention (see e.g. Holm et al. 2005; Larsen 2009; Baug 2013; Hansen et al. 2015; Indrelid et al. 2015), while the firmer establishment of medieval archaeology as a designated part of archaeology studies at university level in Scandinavia and Great Britain has been important for increased academic production (e.g. Risbøl 1994; Berglund 1995; Carelli & Kresten 1997; Baug 2002; Østerås 2002; Brodshaug 2005; Lundberg 2007; Schou 2007; Høegsberg 2009; Tengesdal 2010; Baug 2015b; Øye 2015). Irene Baug's long-term work on querns, millstones and bakestone procurement stands out among these studies, since it focused on large quarrying landscapes, several excavations, as well as defining actors and networks involved in the stone trade (Baug 2002, 2015b).

Simultaneously, geoscientists have become a driving force in research on stone and quarries as seen in a historical and cultural context. This development was initiated through the geoarchaeological work of Storemyr (1997, 2003, 2015) in Central Norway from the early 1990s onward, together with Heldal at the Geological Survey of Norway (NGU) and the NDR (e.g. Heldal & Storemyr 1997; Storemyr & Heldal 2002; Storemyr et al. 2002, 2010). This research was later widened in the form of regional and international studies involving NGU as a coordinator of large-scale, cross-disciplinary research projects, such as *QuarryScapes* ('Conservation of Quarry Landscapes in the Eastern Mediterranean', 2005–2009, www.quarryscapes.no, main results in Abu-Jaber et al. 2009) and the *Millstone* project (2009–2013, several contributions in Selsing 2014). Within these projects, new research strategies and methodologies were developed that have also been instrumental in the field of soapstone studies.

In particular, geoarchaeological research taking place from the late 1990s onward, as summarised in the monography *Steinbyen Bergen* (Heldal et al. 2000), focusing on stone procurement in the Bergen region was of key significance for the development of soapstone studies. This work was later extended to probably the most extensive programme of soapstone provenance ever undertaken worldwide. Some of the first results of this programme were published in 2009 (Jansen et al. 2009), with many of the more recent studies included in the current volume.

In Britain, geoscientists have generally become more strongly involved in the study of stone and



Figure 3. Archaeological fieldwork as winter is approaching at Norway's oldest dated soapstone quarry (pre-Roman Iron Age) – Kvikne in Hedmark county. (Photo: T. Heldal).

quarries, as part of what one may call the ‘natural science turn’ in archaeology (e.g. Jones et al. 2006; Jones et al. 2007; see also Kristiansen 2014).

The current book presents research carried out in Norwegian, British and Danish contexts during recent years and, for the most part, is scientifically published here for the first time. The papers can be read individually but can also be quarried (sic!) thematically. Classical aspects related to quarries and quarrying range from tool marks to property owners, while those related to products range from basic research on typology and chronology to provenance. The social context of the procurement and use of soapstone is also discussed in several contributions.

Quarries

Quarry surveys

Despite being published nearly 125 years ago, Amund Helland's (1893) description of Norwegian soapstone quarries remains the most comprehensive overview existing for this country. Indeed, Skjølsvold's (1961) seminal work on south Norwegian soapstone quarries as Viking Age production centres relied on (and extended) Helland's findings, although Birte Weber's (1984) survey of the Ølve-Hatlestrand bakestone quarries in Hardanger provided important new insight. It was not until the 1990s that Helland's picture was truly extended, especially on the coast of Helgeland in Nordland County (Berglund 1995, 1999) and in central Norway (Heldal & Storemyr 1997; Østerås 2002; Storemyr 2003, 2015; Lundberg 2007; Østerås 2008; Storemyr et al. 2010). In the Hordaland region, quarries have been investigated in connection with Baug's doctoral work (Baug 2015b) and with

Soapstone deposits of Norway

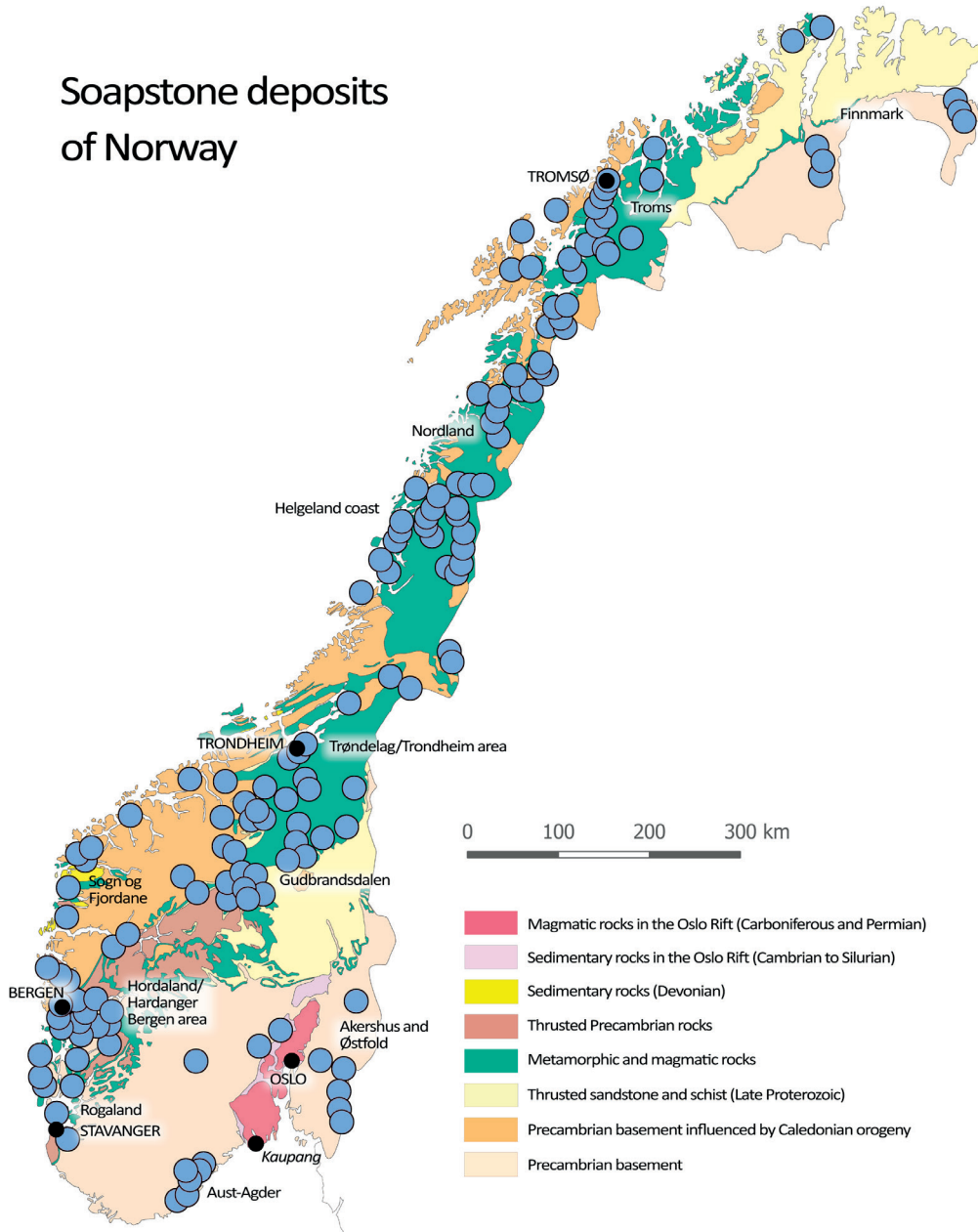


Figure 4. Simplified geological map of Norway with most of the known soapstone deposits plotted (blue circles). Almost all of the deposits have been used as quarries. Note that most deposits are located within Caledonian/Cambro-Silurian rocks (green color), but that there are also deposits in the Precambrian basement. (Map P. Storemyr based on data from the Geological Survey of Norway (<http://geo.ngu.no/kart/mineralressurser>).

Øystein J. Jansen and Haldal's studies of stone use in Bergen and the Bergen uplands (Haldal et al. 2000; Jansen et al. 2009). With the research presented in the current book, the number of Norwegian soapstone quarries that have been studied and the work published has increased considerably.

Stephen Wickler, Ingvar Lindahl and Lars Petter Nilsson, give a first overview of geological and archaeological evidence for soapstone deposits and quarries in northern Norway, beyond (Saltfjellet in Nordland County)(see also Wickler 2015), with the authors evaluating the current state of knowledge regarding this resource in the northernmost part of the country. This survey initially prepared the ground for Bunse's Ph.D. research. In the present volume Bunse presents data from 11 soapstone deposits in northern Norway. Birgitta Berglund, Haldal and Tor Grenne discuss quarries on the Helgeland coast in Nordland County in relation to the extraction of ashlar for local churches. Soapstone and chlorite schist quarries for building stone in the Hordaland and Trøndelag regions are discussed in the contribution by Jansen and Haldal. And Hordaland's quarries are also discussed in relation to vessel production during the Viking Age and Medieval period by Gitte Hansen, Jansen and Haldal.

The quarry as a workspace

There may be large differences between individual quarries, reflecting the extent and quality of resources at hand, availability, the 'market' situation and traditions that developed in certain places. Some quarries are very small and were only active over short time spans; others may best be described as quarry landscapes that have been in use over centuries, even millennia, comprising many quarry faces, spoil heaps and infrastructure such as access roads, paths, shelters and smithies, even harbour facilities. It is a relatively simple task to work a small vessel extraction site, at which only one or a few persons are active. Larger building stone quarries must be organised much like a building site, including a 'master' supervising many people with different levels of qualification and experience. In between – and this probably includes the majority of Norwegian soapstone quarries – a variety of organisational forms may have been implemented.

Although Skjølvold's archaeological and ethnographic work (1961, 1969, 1979) touched upon quarry organisation, it was with Baug's research on millstone and bakestone quarries (2002, 2015b) and the many studies within the QuarryScapes and Millstone projects (see above), as well as with Storemyr's (2015) work in central Norway, that workspaces and – not least – the term *quarryscape* (quarry landscape) were first studied and elaborated upon. Notably, *quarryscape* is now not only defined as a technical term, but also with a view to social space, i.e. how people interacted within and beyond the confines of a production site. The latter may include boundaries and ownership and will be mentioned below.

In recent research, Skjølvold's focus on detailed observations of toolmarks, extraction techniques and estimates of extraction volume are coupled with geological information regarding rock properties and craftspersons' knowledge of workability and tool use (e.g. Storemyr 1996; Storemyr et al. 2002; Østerås 2002; Turner & Sherratt 2009; Haldal 2015; Bunse & Stavsøien 2016). Such cross-disciplinary work has raised the study of quarry sites to a new level of qualitative insight.

In this volume, Eva Stavsøien describes how iron pickaxes were used experimentally to reproduce the main medieval soapstone extraction technique for building stone, which involved carving channels around the blocks and loosening them with wedging along the cleavage at the bottom. This method is reminiscent of vessel extraction techniques, but was refined, adapted and used all the way up to the early 20th century in Norway. Stavsøien's work relies – implicitly – on domestic observations, but also on a several thousand years old tradition of soft stone quarrying that encompassed Ancient Egypt, the Roman world and the European Middle Ages. In fact, it may well be that the quarrying techniques

used in e.g. the Trondheim region in the Middle Ages were influenced by English and, by extension, Roman practices, as Storemyr and Heldal argue in their contribution. In addition to showing that manual extraction of stone is not as time-consuming as one would expect, Stavsøien also underlines the tacit knowledge involved in stone quarrying. Although the quality of the rock sets the limits, it is the fine-tuned, 'timeless' interaction between the craftperson, the tools at hand and the rock with its varying properties, that determines the end-quality of the extracted stone product.

Stone extraction always destroys marks from previous quarrying; researchers thus only find traces of the most recent activity. Although in many cases it is possible to reconstruct quarrying processes, as shown by Heldal (2015), many soapstone quarries were used over thousands of years and it has not yet been possible to find or reconstruct the earliest extraction methods, such as those employed by Mesolithic people who carved soapstone figurines and other artefacts, which were most certainly derived from domestic quarries (that were also used in later periods), as argued by Knut Andreas Bergsvik in this volume. Grenne, Bodil Østerås and Lars F. Stenvik also address the problem of time-depth in their contribution on the Kvikne pre-Roman Iron Age soapstone vessel quarry.

The same authors show how spades made from wood, some perhaps reinforced with iron, were used to relocate quarry spoil in order to ensure ample working space for the extraction of more stone. Originally found and discussed by Skjølvold (1969), the spades in question constitute a group of rare finds directly related to everyday work in a quarry.

Further regarding everyday work, a groundbreaking discovery is reported by Østerås, related to the largest, mainly late Viking Age and medieval vessel quarry in central Norway, at Slipsteinsberget in Trøndelag. For the first time, buildings unequivocally used by medieval quarryworkers are documented in Norway. One of the buildings was used as a workshop for manufacturing vessels, the other probably as living quarters. Østerås argues that the buildings, among many other observations, are testimony to the significance of the quarry as a site of professional craftsmanship that potentially exported up to 30,000 vessels over a 400-year period.

Østerås uses the volume of spoil as the main indicator of the amount of vessels produced at the Slipsteinsberget quarry. Similarly, Storemyr and Heldal, in their 'biography' of the Bakkaunet building stone quarry in Trondheim, use the volume of the large spoil heaps as a clue to estimate the total amount of stone extracted (up to 15,000 m³ over c. 150 years). Bakkaunet supplied Nidaros Cathedral and several other regional buildings with stone in the Middle Ages. The authors argue that the majority of the stone was extracted via large underground galleries – galleries that are now hidden behind scree and thus not available for inspection.

Bakkaunet may have been the largest underground quarry active during the Norwegian Middle Ages, but it is also important in a European context, with very few underground quarries known from this early period across the continent. However, Bakkaunet was not the only underground quarry in Norway; several, mainly small-scale, vessel quarries are recorded. Baug, in this volume, describes underground operations at the Ølve-Hatlestand bakestone and building stone quarries in Hordaland County. Although these quarries are generally younger and were worked over a longer time span, they are nevertheless very substantial, overall perhaps matching Bakkaunet.

The above examples show that some of the quarrying taking place during the Norwegian Middle Ages was driven by people with competence beyond the knowledge needed for the operation of the earlier, traditional, relatively small-scale vessel quarries. Larger-scale quarrying was mainly introduced alongside Christianity, with the extraction of building stone generally not undertaken before the first churches were erected in the 11th century.

Products

Repertoire: 'Small objects' and beyond

Whereas vessel, bakestone and building stone production sites attracted a certain degree of attention in earlier research (Helland 1893; Skjølsvold 1961, 1969; Weber 1984), little archaeological documentation is available on the production of small objects such as spindlewhorls, casting moulds or fishing tackle (but see Tuastad 1949; Hansen 2005:168–170, 194–196; Baug 2011).

In Bunse's study of north Norwegian soapstone outcrops the extraction of small objects were documented in five quarries, although no blanks or objects were found in the associated spoil heaps. In the chapter by Bunse indirect evidence – tool marks and techniques used in the quarries, as well as the range of objects found in consumer contexts in the quarry uplands – is studied in order to assess the chronology of the quarries and their presumed products, with the latter potentially including fishing tackle, moulds for casting, as well as scoops, i.e. small vessels with a handle. This is the first modern study of quarries focusing on small objects in Norway.

Grenne, Østerås and Stenvik also address an 'unidentified' object type. In 2004, rectangular extraction marks were uncovered at the Kvikne quarry. The authors argue that forge-stones or tuyères may have been produced there to supply the large-scale iron production that took place in the region from around 500 BC through to the Roman Iron Age. Baug gives an overview of the range of products quarried at the Ølve-Hatlestrand chlorite schist quarry landscape in Hordaland County. Although this area was by far Norway's most important producer of bakestone during the Middle Ages, Baug shows that the repertoire of products went well beyond bakestones throughout the Middle Ages and the early modern period, and included building stone, slate and crosses. Evidence for the latter is substantiated by Jansen and Heldal in their contribution on the provenance of building stone used in the vanished church(es) at Onarheim (Tysnes, Hordaland), in which it is shown that the Ølve-Hatlestrand quarries were responsible for stone delivery.

Typology and chronology of 'small objects' and vessels

Stray soapstone finds were seldom kept in Norwegian museum collections in the early days of archaeological research; since no typology had been established for such plain domestic objects, the finds could not be dated without contextual information and their origin/provenance could not be determined. This said, the earliest study with relevance to the typology and chronology of soapstone objects was published by Oluf Rygh in 1885, in which Stone Age star-shaped hatchets and Iron Age vessels were listed among the finds.

Yet, dating artefacts typologically is an archaeological tool that requires basic research in order to establish types and subsequently date the established types through independent means. Among portable soapstone finds, vessels have been given most attention. Schetelig (1912) established the first more complete chronology of prehistoric vessels, with other early works including Petersen (1951) and O. Møllerop (1960). Pilø (1989) later revised Schetelig's chronology and suggested that the earliest Norwegian vessels were manufactured in the late Bronze Age. Production continued throughout the pre-Roman Iron Age, after which there was a hiatus until the beginning of the Viking Age, although soapstone was an important temper in so-called bucket-shaped ceramic vessels during both the Roman and Migration periods (e.g. Engevik 2009).

In archaeological research on the Viking Age and Medieval period, emphasis on the exotic, foreign and/or luxurious has long prevailed, with material culture bearing evidence of long-distance contacts, trade and powerful institutions traditionally receiving more attention than ordinary

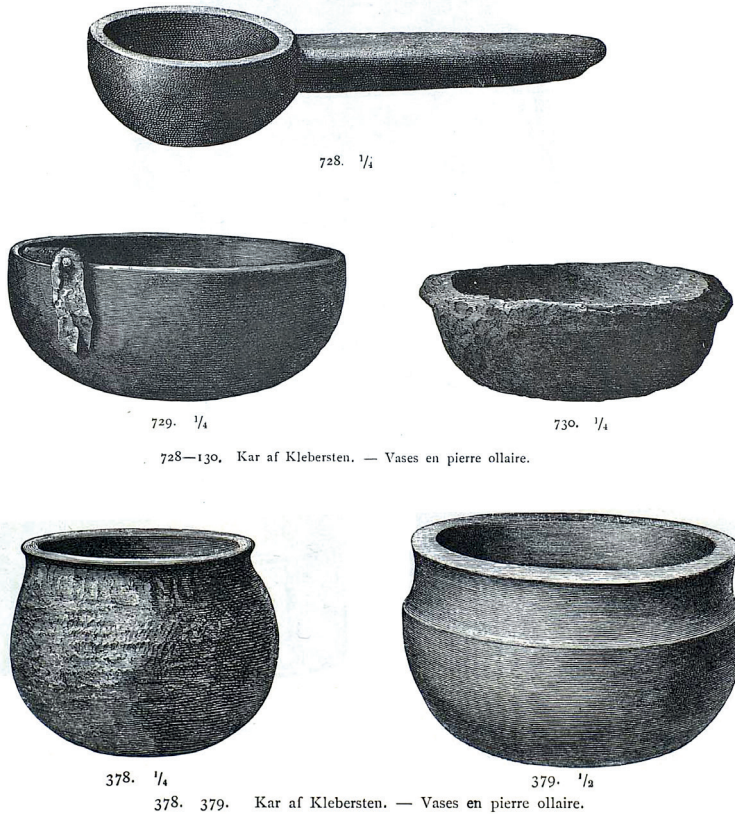


Figure 5. The first scientific drawings of soapstone vessels in Norway, mainly from the Iron Age. (Illustrations from Rygh 1885).

domestic products testifying everyday life. It is probably not a coincidence that studies of Viking Age soapstone vessels have been carried out mostly on vessels found ‘abroad’ in Denmark, north Germany and the North Atlantic region, far from their origin. As foreign and exotic, such displaced objects show the diverse contact networks and diaspora of the Vikings (see e.g. Resi 1979; Risbøl 1994; Forster 2004; Sindbæk 2015). In contrast, contributions dedicated to Viking Age soapstone artefacts found in domestic contexts are far fewer (see e.g. Resi 1987; Forster 2004; Baug 2011).

Medieval soapstone vessels in Norway have been the subject of only a few typological studies, with Grieg’s work (1933) on artefacts from medieval Norwegian towns being the sole overview available for some time. More recently, the comprehensive works of Myrvoll Lossius (1979) and Hilde Vangstad (2003) stand out, while for the North Atlantic region the comprehensive contributions of Arneborg (1984), Forster (2004) and Mogens S. Høegsberg (2009) are important. From the Middle Ages onward, soapstone and chlorite schist were used as building materials in both Norway and Greenland.

Several papers in this volume present basic research on soapstone products. A common tool type made of soapstone in Mesolithic western Norway includes the ‘coffee bean shaped’ objects associated with fishing. Based on earlier investigations, Bergsvik divides the objects into types and discusses their

chronological and geographical distribution. Through comparative study of the objects' weight, the size of fish hooks and fish caught at contemporary coastal residential sites, he argues that the objects were line-sinkers used in connection with rod fishing or trolling.

The contribution by Wickler, Lindahl and Nilsson provides the first published overview of the range and amount of soapstone objects found in the northernmost parts of Norway. Among datable finds, only a small percentage predate the late Iron Age, with most from the Middle Ages or later. There is also considerable variety; bronze-casting moulds and forge-stones are among the finds, but household vessels and tools related to textile production and fishing constitute the largest groups.

Høegsberg presents part of his doctoral work (Høegsberg 2009) on Norse Greenland from the Viking Age to c. AD 1450. Portable soapstone objects are the most frequent find category and Høegsberg gives a synopsis of almost 1200 objects from six sites at the so-called Eastern and Western settlements of western Greenland. Just as in north Norway, the category with the most numerous finds is vessels, although textile tools and moulds for casting, e.g. spinning whorls, are also found. The inventory has close parallels in contemporary finds of soapstone across the Norse world. However, a few unique vessel types are found, with the Norse Greenland assemblage generally characterised by its many ornamented objects, which are rarely found in Norway (cf. Lossius 1977; Vangstad this vol.).

Vangstad's chapter presents the main results of the largest typological and chronological study of Norwegian medieval soapstone vessels to date (Vangstad 2003). Based on a detailed study of 806 cooking vessels from the harbour and living quarters on the *Bryggen* wharf in Bergen, western Norway, she extends the typology of medieval vessels established by Myrvoll Lossius (Lossius 1977) and provides a well-dated overview of the use of soapstone vessel types from the late 11th century throughout the medieval and early modern periods. Temporal changes in the consumption of soapstone vessels in Bergen are discussed in the context of changing food habits and shifts in the mode of vessel production.

In Forster and Richard Jones' contribution, an overview of vessel types found in the North Atlantic region is given, based on Forster's previous studies (Forster 2004).

Quarries and products

Provenance studies

Object provenance is a pillar of archaeological research, especially with regard to the study of distribution and trade networks. However, it is often very difficult to determine the origin of soapstone objects. When Skjølsvold (1961:10) brought up the question with a geologist colleague, he was warned that such attempts would involve a tremendous amount of work and would probably lead nowhere. Generally, the reason for this supposition is that there may be limited geological variation between different deposits and simultaneously significant internal differences within one single deposit. Nevertheless, this pessimism did not deter the researchers who used geochemistry in the first attempt in the North at locating the origins of the soapstone objects found at Haithabu (Alfsen & Christie 1979; Resi 1979).

Over the past two decades, archaeologists and natural scientists have explored the fuller potential of visual observation and analytical methods, such as petrography, mineralogy and geochemistry, to determine the provenance of soapstone (see Jones et al. 2007 with references; Jansen et al. 2009 with references; Jansen 2015). Common to these studies is the insight that the success rate is higher if multiple methods are applied, preferably within cross-disciplinary work involving both cultural and natural historical approaches.

In this volume, British and Norwegian researchers present explorative, multi-approach and cross-disciplinary provenance studies on building stone for churches and monuments, as well as on household vessels. Berglund, Heldal and Grennes's contribution addresses the link between quarries on the Helgeland coast and six medieval churches. Through field survey of possible Viking Age and medieval soapstone quarries, four quarry areas are identified as the most likely suppliers of building stone. Through a combination of building archaeological studies, visual geological characterisation of masonry and quarries, and comparison of the soapstone's main and trace element (MTE) composition, successful links are made between the churches and a number of quarries.

The study by Jansen and Heldal also addresses the provenance of building stone. The now vanished medieval and early modern generations of Onarheim church in Hordaland were built in, among other stone types, soapstone and chlorite schist. Analyses of geochemical datasets including MTE, strontium (Sr)/neodymium (Nd) isotopes and rare earth elements (REE) are combined with visual geological characterisation of masonry and quarries. Whereas the authors suggest a local as well as a regional origin for the soapstone ashlar, the chlorite schist ashlar were extracted at the nearby Ølve-Hatlestrand quarry landscape (cf. Baug this vol.). The reference material used for the analyses of chlorite schist is derived from all the known medieval chlorite schist bakestone quarries in Norway, including the Øysand quarries at Trøndelag and Ertenstein in Rogaland County. An important outcome of the study is that chlorite schist quarries in Norway can be distinguished on the basis of Sr/Nd isotopes, a finding that will certainly aid future studies on the distribution and trade of chlorite schist bakestone.

Forster and Jones' contribution investigates the provenance of Norwegian-style vessels used by pioneering settlers during the 9th–10th century *landnám* phase of the North Atlantic region, as well as Shetland-style vessels from the 10th–13th century. With Forster's morphological studies as a point of outset, matches between 17 vessels found in Shetland, Orkney, the Faroe Islands and York (England) and quarry datasets from Norwegian and Shetland quarry areas are addressed. Visual geological characterisation is combined with a comparison of the soapstone's REE composition, while an exploratory analysis of MTE composition is carried out using a portable XRF device. The latter method is non-destructive, so its use on artefacts is promising for future research. Since datasets for the relevant south Norwegian quarries are still limited, the authors were not able to track objects to specific Norwegian quarries. The study, however, identifies groups of artefacts that are of similar origin.

Hansen, Jansen and Heldal address the provenance of 146 cooking vessels from Viking Age Hordaland and early medieval Bergen, with the vessels' geochemistry (MTE and REE) compared with similar data from 38 quarries across the Hordaland region. This research thus represents a very extensive study on soapstone provenance even in a wide international perspective. Geochemical matches between vessels and quarries are evaluated using knowledge of the geological history of the region, as well as an array of archaeological data and methods. Finally, each vessel is given a score expressing the reliability of the match – or lack thereof – between the vessel and the regional quarries. The success rate of this interdisciplinary effort is high and the study provides a fresh dataset to be explored as regards cultural and social implications in future research. The authors draw attention to the following immediate results: many quarries have now tentatively been dated via vessel matching; quarry-districts have been discerned; contours of regional production and trade in soapstone vessels are substantiated, and it is seen that Viking Age rural households received fewer vessels from areas beyond the Hordaland region than their early medieval urban counterparts. In other words, there must have been a cross-regional trade in soapstone vessels during the early Middle Ages.

Cultural and social aspects

Was the production of vessels and other small objects aimed at the producers' own household, or was it undertaken by professional actors for sale on a wider market or for distribution through other mechanisms? How was building stone procurement organised? Were there markets for building stone, or was the stone commissioned? These classical research questions are typically asked in studies investigating stone resources.

Several works have provided a better understanding of the ownership and control of soapstone resources (e.g. Skjølsvold 1961; Østerås 2002; Schou 2007; Baug 2015b; Storemyr 2015), although in recent years the social identity of the people who carried out work in connection with production and distribution has also received attention (e.g. contributions in Hansen et al. 2015). Both the organisation of production and the social identity of the actors involved are reflected in many of the contributions in the present volume.

Based on considerations of extraction volume and the organisation of workspace during the pre-Roman Iron Age at Kvikne, Grenne, Østerås and Stenvik argue that vessel and possible forge-stone production was carried out periodically by artisans and that production was most likely aimed at regional consumption. They also suggest that the artisans were local to the region.

Torbjørn P. Schou addresses Viking Age production and trade in vessels in the Agder region, the southernmost part of Norway, connecting data from quarry sites close to waterways and rich grave finds in the region that indicate prosperity. Schou argues that soapstone production was organised by local magnates and that the industrial-scale production of the quarries was directed towards consumers in southern Scandinavia. Soapstone vessel production was important for the power structures and hierarchical development in the region; production and distribution is thus seen from both a local and international perspective.

Østerås discusses ownership, workspace and the scale of medieval vessel production at Slipsteinsberget in Trøndelag. She shows that production must have been aimed at a wide market and that it was carried out by professional craftspeople.



Figure 6. The soapstone quarry as a workspace, as a cultural and social space. Eva Stavsjøien experimenting with extraction of ashlars in the Klungen soapstone quarry (Øysand quarry landscape) by Trondheim. The picture gives a fairly good idea of how work was carried out in a medieval soapstone quarry aimed for production of building stone. (Photo: P. Storemyr).

The Ølve-Hatlestrand chlorite schist quarries in Hordaland have been subject to more extensive archaeological research than any of the other quarries covered in this publication (Baug 2015b). Baug discusses the organisation of ownership and workforce connected to the large-scale production of bakestones in these quarries. Based on detailed reconstruction of ownership, she discusses models of organisation and shows that the quarries were owned by powerful ecclesiastical institutions. She argues that whereas bakestone was a commodity that could be regularly traded, other products such as building stone and perhaps crosses were most likely commissioned. She also suggests that although people from surrounding farms worked as ‘semi-professional’ craftspeople, some of the larger quarries may have demanded a different organisation and a larger workforce.

Storemyr and Heldal similarly reconstruct ownership at the medieval Bakkaunet building stone quarry in Trondheim, arriving at similar conclusions to those of Baug. The Archbishopric at Nidaros would have owned the quarry, just as it did all the substantial quarries used for Nidaros Cathedral and many other regional churches. The authors argue that these quarries were operated by the Cathedral workshop (lodge) and worked in a highly professional manner, including a quarry master that supervised the work. Stone extracted was not sold on markets, but was instead used solely for the Cathedral or commissioned for other churches.

A different situation may have existed in Bergen. Alf Tore Hommedal addresses the link between the Lyse quarry, operated by the Cistercians of Lyse Abbey close to Bergen, and 13th century royal and ecclesiastical building projects in the town, contextualising the results of previous geological provenance studies carried out by Jansen and Heldal on building stone in medieval monumental architecture. Hommedal shows that Lyse Abbey was instrumental in providing large royal and ecclesiastical institutions with soapstone from the 13th century onwards, and also argues that the work force at the Lyse quarry comprised lay brothers from the abbey.

Berglund, Heldal and Grenne discuss control and ownership of the building stone quarries that delivered stone for six churches in Helgeland, contextualising the results of provenancing studies. The authors suggest that whereas church builders supported by state power obtained their soapstone from quarries owned by clerical institutions, churches built on private initiative used soapstone from quarries that do not seem to have been owned by clerical institutions. Control and ownership of quarries thus seems to have been diverse.

The social and cultural background of quarrying and the consumption of soapstone is further addressed by several authors. Bunse calls attention to the ethnic dimensions of soapstone use; the northern Norwegian deposits in her study are located in areas containing primarily Sámi or mixed Sámi and Norse settlements during the late Iron Age and Medieval period, which may indicate a multi-ethnic use. Furthermore, some deposits were not used as quarries and may instead perhaps have served as sacred places in Sámi traditions. Bergsvik points out that soapstone sinkers are a regional feature of Mesolithic hunter-fisher populations in western Norway. Høegsberg suggests that Norse Greenlanders’ keenness to decorate soapstone objects was related to continuity with the past and with cultural connections to Scandinavia. Vangstad also comments on the issue of identity in relation to the use of indigenous soapstone vessels in an urban context characterised by a large international population. Forster and Jones track migration and settlement of Norwegians and people of Norwegian descent in the North Atlantic region through vessel analysis.

Outlook

The resolution of interesting and relevant research questions is dependent on the analytical methods available. Recent advances in *basic* research on soapstone quarries and objects, as well as collaboration

between archaeology, geoscience and traditional crafts (and history, ethnography etc.) have introduced a range of new methods and approaches. While this anthology may, correctly, give the impression that many questions have been resolved over the last few decades, new research always provides new questions to answer and tasks to pursue.

Although soapstone has been very important over millennia in many parts of the world, very little cross-cultural research has been carried out. When designing future studies, comparative ethnological, geoarchaeological and experimental investigations should be considered, not only from a theoretical perspective, but also in a practical manner, e.g. as cross-cultural fieldwork. There is much to be learnt from comparative research, not least as to how and why people extracted, traded and used soapstone the way they did.

Recalling the citation at the beginning of this article, soapstone objects and fragments were previously regarded as difficult artefacts to handle rather than as valuable archaeological sources to be included in museum collections. Today even the smallest stray finds are kept and cared for in museum archives. This shows that times have changed; a small stray find may potentially be the ‘missing link’ in understanding the *Chaîne opératoire* from quarry, via workshop, to consumer. Moreover, a humble find on an archive shelf may be just the material needed in modern provenance studies.

Likewise, the restoration of buildings made from soapstone used to involve the removal of original medieval ashlar and decoration, which ended up on waste heaps. Today, most soapstone buildings are well cared for, and, following the standards of modern heritage management, original objects are rarely replaced but are instead kept at the buildings as authentic testimonies to medieval craftsmanship.

However, the conservation of soapstone quarries deserves much more attention, with many destroyed by urban expansion and the building of new infrastructure over the last 10–50 years. Furthermore, merely a handful of quarries across Norway and the North Atlantic feature some form of signage for visitors, while only one quarry in Norway (Kvikne) is subject to a dedicated management plan. Clearly, there is a need to intensify conservation in a broad sense if we want to maintain the field of soapstone research – all the way from quarry, artefact and building to people involved with this important outland resource.

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Endnote

¹Free translation of correspondence between a lay finder and the University Museum of Bergen's curator in 1949. The finder sends a stray found soapstone spindle whorl to the museum, and writes like this: '...Steinen er kanskje ikkje av so stort vitsskapeleg verd men vi ville gjera vor plikt med aa senda han. Av interesse er det aa faa vita om vi skal senda slike bagatellar oftare...'. The curator at the museum politely answers like this: '... Takk for den tilsendte steinen... slike snellehjul seier i regelen ingenting, då dei var i bruk i same form gjennom 1000 år, og vi brukjar ikkje samle på dei utan dei kjem frå forhistoriske graver... Ei anna sak er at De spør om De oftare skal sende slike 'bagateller'. Jo, det er det vi helst vil. Vitsskap er bygd opp av bagateller. Ingen ting er for smått til å samlast inn, men eit og anna kan nok - som her - vere for smått til å samlast på i eit museum...' (Topografisk arkiv, University Museum of Bergen).

