

SEEN THROUGH A MILLSTONE

GEOLOGY AND ARCHAEOLOGY OF QUARRIES AND MILLS

Bryggens Museum, Bergen, Norway 19 - 21st of October 2011



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Program, abstracts, list of participants, practical information

TUESDAY OCT. 18		
19:30-20:30	RECEPTION FOR THE PARTICIPANTS AT SCHØTSTUENE	

WEDNESDAY OCT. 19		
08:30-09:30	Registration	
Invited speakers		
09:30	Baug, Irene	Hyllestad Quernstone Quarries - a production site nominated for UNESCO's World Heritage List
10:00	Meyer, G.	The Norwegian millstone landscape: new insight from multidisciplinary research
Session 1. Chair: Lars Stenvik		
10:30	Anderson, T.J.	More about Early Querns and Millstones in Southern Spain
10:50	Boleti, Athina	Emery whetstones and querns in the Aegean and the Eastern Mediterranean. A diachronic approach
11:10	Coffee break	
11:40	Williams, David, Peacock, David and Tomlinson, Emma	Pompeian style mills in Jordan
12:00	Procopiou, Haris	Millstones in Bronze Age Crete: diversity and change
12:20	Thomas, Nathalie	An Overview of Bronze Age Whetstones (Aegean World)
12:40	Peacock, David	Cup and ring marks: rock art or rock mortars?
13:00	Lunch	
Session 2. Chair: Øystein J. Jansen		
14:00	Wefers, Stefanie and Mangartz, Fritz.	Elephantine and Aswan – Millstones for Egypt
14:30	Storemyr, Per	A prehistoric grinding stone quarry in the Egyptian Sahara
14:50	Gluhak, Tatjana M., Wefers, Stefanie	How to provenance ignimbritic rocks? The millstones of the Byzantine water-powered milling-complex in Ephesos
15:10	Jaccottey, Luc	Millstone petrography and quarries in Gaul from the end of the First Iron Age through the Roman period
15:30	Coffee break	
Session 3. Chair: Gurli Meyer		
16:00	Belmont, A. and Anderson, T.J.	Le Mont Vouan (Southeastern France): 2000 years of an enormous open-air and subterranean millstone quarry
16:20	Vargas Durán, M. A., Anderson, T.J., Gil Toja, A. and Pérez de Guzmán Puya, R.	Millstone and Quern Quarries in the Viar River Basin, Province of Seville, Spain
16:40	Hansen, Arild Marøy	Quernstone production and maritime transport from Hyllestad, Western Norway. A story of cultural heritage management in rural Norway.
17:00	Lisowska, E., Gunia, P. and Borowski, M.	Rotary quernstones production in south-western Poland during middle ages.
17:20	Galetti, Paola	Quality, production and trade in millstones in Medieval Italy: a summary of the archaeological and ethnographic research.
17:40	Pohl, Meinrad	Millstone-Quarrying - a conservative craft?
18:00	END FIRST DAY	
19:30	DINNER	

THURSDAY OCT. 20		
08.00	Departure field trip	
20:40	Arrival to Bergen	

FRIDAY OCT. 21**Session 4. Chair: Ingvild Øye**

09:00	Belmont, Alain	Norwegian quern and millstone quarries in their European context, as seen through field surveys and archives
09:30	Baug, Irene and Jansen Øystein J.	Did the North Atlantic region constitute a market for quernstones from Norway during the Viking Period and the Middle Ages?
09:50	Heldal, Tom, Grenne, Tor, Jansen, Øystein J., Lindahl, Ingvar, Løland, Torbjørn and Meyer, Gurli	The Saltdal and Sørfold millstone quarries, Northern Norway: a significant production area in the Middle Ages
10:10	Meyer, Gurli B. and Grenne, Tor	The Selbu millstone quarries in Norway: Industry in the wilderness
10:30	Holtmeyer-Wild, Vera	The archeological investigations at volcanic Mount Ruderbüsch, Western Eifel Region, Germany, 2007-2011
10:50	Coffee break	

Session 5. Chair: Timothy J. Anderson

11:20	Watts, Martin	Millstones in South-West England: types, sources, function and trade
11:40	Zachrisson, Torun	The millstone quarry Kvarnberget in Sala, Västmanland, Sweden and the lost settlement Onsalar
12:00	Lepareux-Couturier, Stéphanie	Intricate Dressing Patterns on Grinding Surfaces of Rotary Millstones from Antiquity in the Paris Basin (France): State of Research and Perspectives
12:20	Alonso, Natàlia, Cantero, Francisco José, Jornet, Rafel, López, Daniel, Montes, Eva, and Valenzuela, Sílvia	Milling wheat and barley with hand rotary querns in El Soudat (El Kef, Tunisia)
12:40	Watts, Susan	The Symbolism of Querns and Millstones
13:00	CLOSURE OF MEETING	
13:15	End/Lunch	

Posters

	Norum, Ellen Ingunn, Jones, Michael, Meyer, Gurli	Millstone - landscape values
	Prøsch-Danielsen, Lisbeth and Heldal, Tom A.	Mapping and interpretation of a millstone quarry at Nord-Talgje in the Boknafjord area in Rogaland, SW-Norway
	Vargas Durán, M. A., Anderson, T.J., Gil Toja, A. and Pérez de Guzmán Puya, R.	Millstone and Quern Quarries in the Viar River Basin, Province of Seville, Spain

Milling wheat and barley with hand rotary querns in El Soudat (El Kef, Tunisia)

Alonso, Natàlia¹, Cantero, Francisco José², Jornet, Rafel³, López, Daniel³, Montes, Eva⁴, and Valenzuela, Silvia²

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- 4) Universidad de Jaén, Facultad de Humanidades y Ciencias de la Educación, Campus Las Lagunillas, 23071 Jaén, Spain

Women of the agricultural village of El Soudat (El Kef, western Tunisia) still make by hand many of the cereal cleaning and milling tasks. The last cleaning, toasting and milling with hand rotary quern are domestic operations that have been observed ethnoarchaeologically within the framework of the project "El Soudat: ethnoarchéologie d'un village agricole en Tunisie (El Kef)". During this project the hand cleaning and the milling of common wheat, together with the cleaning, toasting and milling of hulled barley, and the cooking of diverse cereal meals were recorded. This work present the diverse steps for each process, the tools and the technical skills used in present-day Tunisia, as well as the different products, by-products and wastes of each stage and the use of them. Systematic samples were collected for archaeobotanical comparison.

More about Early Querns and Millstones in Southern Spain

Anderson, T.J.

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In the last two years, I have presented my ongoing research on querns, millstones, and quarries of southern Spain in meetings in Saint-Julien-sur-Garonne and in Rome. The objective of the present paper is to update the results of this work based on new quarry finds, and on new data collected through the survey of querns and millstones stored in excavation and museum depositories. Although the scope of my research spans all periods, from Protohistory to the 20th century, the focus of this paper is specifically that of early querns and millstones, for the most part, from Antiquity. This chronological ambiguity is unavoidable due to the fact that both quarry sites, and most of the millstone finds, are poorly dated.

At the moment of drafting this abstract, about 200 querns and millstones, spread in about 20 different institutions, have been studied with special attention focused on typology and

petrography. This work, following the model of a survey undertaken in Switzerland a decade back, is yielding interesting results. We can, for example, now start to define the morphology and the fittings of the small manual rotary querns, as well as discern preferences in rock types.

Querns of volcanic material, for example, are dominant in central and eastern regions of our study area. The recent visit to the depository of the archaeological Museum of Murcia shows that most querns there (over 20) were hewn from a dark, highly vesicular volcanic material. This rock, however, does not resemble the product of the volcanic quarries recently identified in the Cabo de Gata (Almería), and it is unlikely that they travelled overland from quarries in the Campo de Calatrava (Ciudad Real) about 300 km away. Although we cannot exclude the possibility that they were imported from other regions in the Mediterranean, they more likely originate in still unidentified quarries in the SE Spanish volcanic fields, probably in the Province of Murcia.

A different trend appears in the south-central area of our study area, in the vicinity of the Straits of Gibraltar in the Province of Cádiz. Here biocalcarene (*ostionera* in Spanish), a yellowish, highly porous and shell-rich rock, is by far the dominant material based on the querns of the Roman cities of *Baelo Claudia*, *Traducta* and *Carteia*. This rock, also massively exploited for construction, was readily available and exploited in coastal millstone quarries like the case at the Bay of Trafalgar.

The larger animal or man driven millstones are still ill-defined. As we have previously noted, it is generally assumed that the large “dome” or “bell-shaped” lower stones, rarely unearthed with their corresponding upper stones, were paired with Pompeian type (hour-glass shaped) upper stones. Although this is true in certain isolated cases (probably long distance imports), we now are of the opinion that these “bell-shaped” *metae* were coupled with “ring-shaped” *catilli*, as is the case of most of the mills in the North African Roman site of *Volubilis*. The question of Roman watermills is also a puzzle! In spite of the many hydraulic works in Roman *Hispania*, we have hardly any evidence of Roman water-powered mills.

Did the North Atlantic region constitute a market for quernstones from Norway during the Viking Period and the Middle Ages?

Baug, Irene¹ and Jansen Øystein J.²

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During the Viking Period (c. 800–1030) and the Middle Ages (c. 1030–1537) there was a close connection between people from the North Atlantic region and Western Norway. Iceland, Shetland and the Faroe Islands were settled by Vikings from Norway, to a large degree from the western parts of the country.

The contact to the Norwegians was being maintained throughout the following centuries. In the Middle Ages people from the North Atlantic had a close political-administratively and economic connection to Norway, mainly Bergen and the coastal districts on the west coast of Norway. The somewhat short sea journey between the North Atlantic and western Norway, also made a close connection between the two areas possible, and during the Middle Ages large amounts of commodities were transported here.

Is this development also to be reflected in the quern stone material? Were quern stones from Norway distributed to the North Atlantic – and if so – was this distribution an exchange where the products went from hand to hand through a network of personal contacts, or was it an organized and regular trade?

The Norwegian quern stones are, almost without exception, made from garnet mica schist – a rock type which appears to be quite unique and exclusive for Norway when it comes to the production of quern stones. Several quarry sites with this type of rock have been identified in Norway, dating from the Viking Age to early Modern Period. A recent geological study of the mica schist from these quarries has proved successful in identifying the provenance of the quern stones from the different quarries.

At Shetland a range of different rocks occur – including garnet mica schist. Quern stones of garnet mica schist found at Shetland may thus be of local origin. At Iceland and the Faroe Islands, however, only volcanic rocks occur, and finds of quern stones made of garnet mica schist at archaeological sites would imply import – most likely from Norway or Shetland.

In order to look into Norway's role as an eventual supplier of quern stones to the North Atlantic region, provenance studies of quern stones in Iceland, Shetland and the Faroe Islands have been conducted. The results offer important information in the discussion of production and distribution of quern stones in North-western Europe.

Le Mont Vouan (south-eastern France): 2000 years of a vast, open-air and underground quern and millstone quarry

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During the 2005 colloquium of Grenoble, participants had the opportunity to visit three of the many underground quarries at the mountain of Mont Vouan, in south-eastern France, about 30 kilometres from Geneva. These impressive sites are the first of their type in France to be designated as Historical Monuments (2009).

During 2010 and 2011 a team from the LARHRA, a laboratory of the CNRS (French National Centre for Scientific Research), undertook a complete investigation of these quarries. This research consisted of examining archives dating from the 13th to the 20th centuries, aerial and field surveys, and excavations of four of the principal sites.

As a result of this research, the number of exploitations identified at Mont Vouan has increased drastically from 6 at the beginning of 2010 to more than 65. The results from dating of the different quarries span from the 1st century BC or AD to the 19th century. We estimate that the site yielded from at least 100.000 to 200.000 querns and millstones. During the 2000 years of production the site shows both constancy and variation in techniques and products, from small querns hewed in open-air quarries to the large millstones extracted in subterranean “cathedral-like” quarries. Four archaeological digs, up to now the largest of this type of undertaking in Europe, brought to light more than 300 tools dating from the 15th to the 19th century.

This paper will present the principal results of this research and focus in particular on the link between the Mont Vouan quarries and local power, territory and politics. The prosperity provided by these exploitations seems to be the origin of several Roman *villae*, of wars in the Middle Ages, of political disputes between neighbouring Communes since the 18th century even up to our time.

Norwegian quern and millstone quarries in their European context, as seen through field surveys and archives

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This paper is presented in the framework of the research project '**The Norwegian Millstone Landscape**,' spearheaded by the Geological Survey of Norway, and is based on research undertaken in French archives dating from the 17th to 19th centuries preserved in the National Libraries and other institutions in Paris. This study also takes into account field surveys made of Norwegian sites so as to compare them with between 200 and 300 European quern and millstone quarries.

The results of this research provide a comparison to scale of the principal Norwegian exploitations to analogous sites on the continent and at the same time offers a platform to determine whether they fall into established categories or are unique? Parallel to this it is of high relevance to compare issues like techniques, production and trade.

The principal conclusion is that millstone production in Norway was not an isolated industry but a vigorous participant in the international network of millstone commerce. Norwegian

quarries, on the whole, are similar to exploitations from Spain to Hungary and from Greece to Wales and demonstrate that extraction techniques were not issued from local traditions. Some features, however, of the way cylinders were hewn are of utmost interest because of their rarity. These features can be seen only in a few places outside of Norway in certain specific areas of Europe. We suppose that this is not a coincidence but the result of a technical transfer that probably took place during the Viking era.

For the more recent periods, French archives reveal interesting information on millstone trade, in particular on imports to Norwegian harbours, offering data that helps shed light on the rise or fall of some domestic quarries during 18th and 19th centuries.

Emery whetstones and querns in the Aegean and the Eastern Mediterranean. A diachronic approach

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Emery is an abrasive rock *par excellence* and owes this quality to its main component, corundum. On the Moh's scale, corundum is the hardest mineral after diamond. Emery sources are known in the Eastern Mediterranean, more precisely on the Greek islands (mainly Naxos and Paros in the Cyclades, but also Samos and Ikaria in the eastern Aegean), as well as on the Asia Minor coast (mainly the Menderes massif). The use of emery for abrasive purposes, such as whetstones, seems uninterrupted from prehistoric to modern times, when it became the object of heavy industrial exploitation (emery paper is one of the commonest products). Archaeological, historical and ethnographical data inform us about these uses of emery, also known as the "naxian whetstone" after the poet Pindare (5th century B.C.) and other ancient Greek authors. The present paper aims at a diachronic study of patterns of exploitation of emery whetstones and querns based on the above data, as well as on technomorphological and petrographic analyses of archaeological finds, and the study of emery sources and included emery mines.

Quality, production and trade in millstones in Medieval Italy: a summary of the archaeological and ethnographic research.

Galetti, Paola

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My contribution offers:

- an updated summary of the production places of millstones in North-Central Italy in the middle Ages;
- an updated map of commercial routes, underlining its characteristics;
- a specific focus on the most recent archaeological research results;
- a summary of the different material stored in ethnographic museums, trying to identify where they are from, and where they were used.

How to provenance ignimbritic rocks? The millstones of the Byzantine water-powered milling-complex in Ephesos

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In the 6th/7th century AD a water-powered workshop- and milling-complex had been built into the ruins of the so-called Hanghaus 2 in Ephesos. Once a luxury dwelling in the centre of Ephesos, the house was destroyed most probably by earthquakes in the third quarter of the 3rd century AD and has not been in use until the 6th/7th century AD.

Hanghaus 2 was excavated between 1967 and 1986 by the Österreichisches Archäologisches Institut (ÖAI) whose main concern were the antique dwellings. The workshop- and milling-complex situated along the western front of Hanghaus 2 and in large part on top of the antique remains was also uncovered during the excavations. Due to a cooperation of the ÖAI and Österreichische Akademie der Wissenschaften (ÖAW) with the Römisch-Germanisches Zentralmuseum (RGZM, Germany) it is possible to investigate the whole water-powered

complex. The presentation of this unique Early Mediaeval workshop-complex has been anticipated by archaeology.

Numerous millstone fragments point out that, amongst other machines, mills were in use processing cereals to make flour. They were without exception produced from ignimbrites (pyroclastic flow deposits). The rocks are well solidified and extremely heterogeneous, composed of an ash-groundmass with strongly weathered pumice-lapilli pointing to a strong hydrothermal alteration, and poorly sorted xenolith- (mainly rhyolitic, rare mafic), quartz- and feldspar-fragments. Fiamme-structures are not observable.

The millstones were grouped according to macroscopic characteristics, such as proportion and type of xenoliths, vesicularity, and alteration, aiming to include every type of ignimbrite in the sampling. Samples were taken using a diamond driller on a drilling machine. In total 20 millstones were sampled.

Because of their weight and the coastal position of Ephesos it can be presumed that the millstones were transported by the sea, so the provenance analyses are concentrated on the Aegean and on Western Turkey. However, ignimbritic rocks are very common in this region. Because of the heterogeneity of the rocks the analyses have to concentrate on the xenoliths-fragments: Mafic inclusions and tiny obsidian-drops can provide indications of the region: The volcanism of the Aegean and Western Turkey is subduction-related, but older, and commonly more K- and Ba- rich in Western Turkey (Miocene-Pliocene) than in the Aegean (Pliocene-Pleistocene).

The samples are cut into slices to gather all petrographic features. The single components for the geochemical analyses have to be extracted and separated. The geochemistry of the ash matrix, rhyolitic and mafic inclusions is measured by electron probe micro-analysis and laser-ICP-MS and compared to geochemical data of tephra and lavas in this region. If a constriction to a certain area or island is possible, fieldwork is necessary to collect comparison material and to localize maybe the quarries.

Quern stone production and maritime transport from Hyllestad, Western Norway. A story of cultural heritage management in rural Norway.

Hansen, Arild Marøy

Bergen Maritime Museum, Norway

A traditional Norwegian fairy tale explains why the ocean is salt: There is a quern grinding at the bottom of the sea, keeping the sea salty. This fairy tale forms the scaffold on which this paper is based. In 1990 Bergen Maritime Museum received a notice on the discovery of quern stones at the seabed of the sound of Alverstraumen north of Bergen. At that time there was no

knowledge of origin, amount, tradition or transportation of this durable cargo. The quarries from where the stones were carved were largely forgotten.

Shortly after the cargo was raised, the museum initiated a network along with other maritime institutions and individuals. As a result information about three more finds of quern stones from ship wrecks came up. Parallel to this the University of Bergen started the studies of the millstone quarries in Hyllestad through a master degree. At the same time an independent study was taking place in Denmark on provenance of fragments of quern stones from land excavations in eastern Denmark, western Sweden, and as far away as the Faroe Islands. Samples from all underwater finds were compared by the similar material from the Norwegian Millstone quarries. All indications pointed to Hyllestad in Sogn and Fjordane in Norway for the origin of the Alverstraumen cargo and a majority of the fragments from Denmark and Sweden.

Here I describe the process from the underwater documentation, the interdisciplinary research (archaeology, geology and history), to the raising, exposition and presentation of the cargo. The find is put into context of the Norwegian millstone quarries as well as the tradition and history behind. Today the quern stones from the cargo are exhibited at the millstone park in Hyllestad. This is part of the new strategy for the Bergen Maritime Museum of contributing to local identity, and to expand the perspectives of the cultural landscape. Just around 1990 the community of Hyllestad formed a quern stone guild and since that time they have put the local history and identity back on the map. All these activities together led to a rediscovery of many of the sites in the area.

The local interest resulted in the construction of houses, preparation of paths through part of the quarry landscape, teaching, guiding and reconstruction of techniques used in the quarries. The school at Hyllestad has worked in millstone teaching as part of their weekly scheme. Every year a new group of pupils are guiding and working in the park. An annual seminar called the "Hyllestadseminaret" was initiated in 1998. The seminar is attended by people from research institutions and interested laymen as well as invited guest from abroad. Each year, the seminar deals with different themes related to stone products and corresponding activities. The seminar has also been a door-opener for the Hyllestad-quarries in a broader context working as an arena for researchers to start new projects.

Maritime archaeology has for many years contributed to the seminars, and to the local exhibitions. Several maritime aspects like loading techniques, ships and sailing along the coast in the quern stone trade have been presented. This year there will be a maritime focus on stone products as cargoes and stone ballast. Included will be the raising of a large flagstone for exhibition. This is a product not earlier associated with this area.

Together with other factors, the first underwater finds have contributed to a large number of activities in Hyllestad, and what started as a distant find with an unknown history, still has a lot of potential for future research in the field. The last development includes further field work, both of land- and maritime archaeology and geology. The first MA-student has now, under a program by the University of Bergen, been awarded a Ph.d. scholarship, and two more MA-students are working with studies of different aspects of the quarries. A large research project called Millstone was initiated in 2009.

The website of the quern stone project of Hyllestad is: <http://www.kvernstein.no>

The English pages are maybe temporarily out of order, but a brief view of the many pages will reveal an activity not very common in a rural community counting just over 1600 people. It is no wonder that the people were proud to be honoured with a visit by the Royal Yacht “NORGE” with the King and Queen of Norway, opening their Quern Stone Park in 2002.

The Saltdal and Sørfold millstone quarries, Northern Norway: a significant production area in the Middle Ages

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In the municipality of Saltdal, Northern Norway, ancient millstone quarries are found in two separate areas, Setsaa and Saksenvik, both in outcrops of garnet mica schist. According to written sources, the millstone production was important as early as 1431 AD. It continued until the middle of the 19th century, although on a very small scale during the last few hundred years. New information about the millstone production has been revealed during the last ten years. Helge Titland, an interested layman, put many of the quarries on the map, proving that the extent of quarrying far exceeded what was previously believed. Tromsø Museum carried out rescue excavations at some quarry sites and C14 dating put the production back at least to the 11th century AD. Since 2009, extensive field surveys and provenance studies have been carried out by the Millstone research project. These have confirmed that Saltdal was a major production site in the medieval period and also shed more light on the production methods involved. A new quarry area, involving the same production methods and rocks, was discovered 20-26 km north of the Saltdal quarries, indicating that the medieval industry covered a much larger area and that there are probably more undiscovered quarries in the region. Preliminary provenance data suggest that the millstones from Saltdal were traded nationwide in the medieval period. Conclusively, the Saltdal millstone production appears to be older, larger and more important than previously thought.

The archeological investigations at volcanic Mount Ruderbüsch, Western Eifel Region, Germany, 2007-2011

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The investigations at Mount Ruderbüsch began in 2007/2008, when a hobby archeologist informed the professionals, that an exploitation place for prehistoric saddle querns was touched by a big modern quarry. That place was known from surveys for many years and the whole extinct volcano with its basaltic lava had been an area of open-cast mining for querns and millstones during many centuries.

In 2008 a dump of approximately 25 to 40 meters was excavated quite detailed by a team of archeologists and non-professionals (the responsible museum is the „Landesmuseum Trier“), encouraged and promoted by the scientifically interested engineers of the business concern, which carries on the modern quarry of today (an unusual piece of luck). The dump contained no tools, but was datable by quite a lot of iron-age saddle querns, which show different stages of production. Some small prehistoric finds as ceramics or flint were made as well, but weren't too helpful for temporary classification. To that dump there seems to be no exactly comparable archaeological record as far as I know. Around the dump the rest of the area, which was soon to be quarried, was observed by surveys, cuts and other investigations.

After this area had been explored, in 2010 the modern quarry began to grow bigger and the business concern made a request, to expand it up to the mountain peak, where there is quite a large area of medieval millstone quarries. This was admitted including the condition to support and to fund archeological surveys, and if necessary, excavations as well. There was a big part of the current quarries enlargement, where no historical remains could be observed. But at the highest point of the slope a small part of the medieval quarries and dumps was affected, which had to be examined. In consideration of territorial situation as well as state of research it was decided to observe this domain during the modern reduction, meanwhile profiles and directions of this attack were determined by archeological ideas. This process was realized very slowly and in teamwork with a well versed quarrying staff, so that the structure of the dumps could be well observed and several big millstones were recovered.

The field studies affirmed the supposed use of the mountain's stone from at least iron age to medieval times and rendered a lot of interesting details especially concerning the iron age exploitation. They showed as well that archeological investigations in quarries needn't necessarily to be difficult to arrange: If they take place in quarries which are still in use and if cooperation with today's industry is possible, the modern business can provide nearly the whole working equipment, which is quite the same in archeological as in modern activity.

Millstone petrography and quarries in Gaul from the end of the First Iron Age through the Roman period

Jaccotey, Luc

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The choice of rock in ancient millstone production is a basic feature of the history and study of grinding stones. Indeed, the choice of the rock depends on a set of criteria drawn up by Fronteau and Boyer in 2010: availability (easy access and transport), grinding properties, workability (ability to be fashioned) and hardness (resistance to wear). The different choices of petrography can vary depending on the type of mill. The evolution of mills between the end of the First Iron Age and the Roman period is especially relevant to this question with the introduction of the rotary motion that supplanted the to-and-fro motion of the earlier saddle quern, as well as the emergence of more complex, collective grinding, installations powered both by animal (e.g. Pompeian mills) and by water.

Our research undertaken in France in the last years in the framework of the project "Typological and Technological Evolution of Millstones from the Neolithic to the End of the First Millennium" has been monitoring specifically the evolution of grinding tools from the end of the First Iron Age (c. 500 BC) through the end of the Roman Empire (c. 400 AD). The study of the types of rock chosen for millstones should allow us to assess whether changes in the type of rock are synchronous or not with the technological developments. This work will also focus on trying to link rock types with their quarry sites and establish their spheres of distribution of the production centers. We will attempt to illustrate these developments both for the whole of France and, on a smaller scale, in several different trial regions.

Intricate Dressing Patterns on Grinding Surfaces of Rotary Millstones from Antiquity in the Paris Basin (France): State of Research and Perspectives

Lepareux-Couturier, Stéphanie

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The dressing of grinding surfaces of millstones to maintain their “sharpness” is a technique known since ancient times. This was for the most part carried out by randomly pecking the grinding surface. More complex dressing patterns, requiring technical knowledge of the progress of the grain through the stones, is observed on Olynthian hopper-rubbers in the Mediterranean since the Classical Period. More intricate dressing patterns were also applied in Antiquity to rotary querns in *Germania*, in northern and eastern Gaul, and in certain areas of

the southeastern Narbonnese Gaul. Although millstone dressing appears to wane after Antiquity, it was massively adapted in Modern Times and was, in fact, a fundamental aspect of milling as late as the 20th century. In the Paris Basin Region in Antiquity dressing millstones with intricate patterns seems to have been common. The study of a collection of Antique mills allows us to offer a typology of dressing techniques on millstones regardless of their different means of traction. The recurrence of certain patterns of furrows and their symmetry on both the upper and lower grinding surfaces allows us, based on comparison with the patterns of modern millstones, to suggest the direction of rotation. The reasons behind dressing millstones in Antiquity remain still largely unknown. Modern archaeological experimentation with reconstructed mills bearing ancient dressing patterns might help answer a number of questions of concerning this aspect of the history of ancient agricultural techniques.

Rotary quern stone production in south-western Poland during the middle ages

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The south-west part of Poland covers an area called the Sudety Mountains. From historical and geographical points of view the region is called Lower Silesia. The mountains were formed as a result of the long lasting geological episodes called the Caledonian and the Variscian orogenies. The rocks are dominated by various types of granites to gneisses, mica schist's and amphibolites.

The historical period studied in this paper covers the time span between the 6th and 12th century. During this period Slavs came from east and started to form tribes that formed the basis of economic functioning of this region. One of the economic branches was the exploitation and trade of stone material. The most visible relict of this activity was quern stone production. Studies of the archaeological sites show that most quern stones were made from granite and a minor amount from garnet-mica schist.

The granitic querns originate from quarries located on the north slopes of the Sleza Massiv. During a period from the Roman Period until the 15th century these quarries were exploited. The quarries were archaeologically excavated in the 20th century firstly before the Second World War and again in the sixties and nineties. Both Polish and German archaeologists discovered relicts of ancient and medieval extraction sites and large amounts of unfinished

quern stones. Quern stones made from these quarries are widely distributed in Lower Silesia. In addition, quern stones were produced from erratic blocks of granite.

A few sites in the region display production of quern stones from garnet-mica schist. During field investigations carried out in 2009 one of these quarries was excavated. It is situated in Kamieniec Zabkowicki close to a settlement from the 9th to the 10th century. From this Slavic settlements a small number of quern stones and unfinished products made from garnet-mica schist were found. Studies performed by electron microprobe were carried out on quern stones, other artefacts and local occurrences of garnet-mica schist.

The Selbu millstone quarries in Norway: Industry in the wilderness

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The quarry landscape of Selbu constitutes more than 1000 large and small quarries over a distance of 30 km in a remote mountain area southeast of Trondheim. The quarries were worked at least from the 16th century until the early 20th century. Today most of the quarries form a prominent part of the Skarvan-Roltdalen national park, along with other cultural landscapes like bog iron bloomery furnaces, copper mines and mountain farms.

The quarries were worked in late autumn and winter when the Selbu farmers had time available and when the frost minimized water problems. All transportation was by foot, horse, or horse and sledge. The distance from the farms was up to 25 km. The finished millstones were carried from the farms either to markets in Trondheim, at least 50 km by horse and cart combined with boat transport, or 80-90 km by horse and sledge to the important winter market at Røros.

The long distance to the markets and the extremely harsh working conditions in the winters were serious competitive disadvantages for millstone production at Selbu. Still, apparently against all odds, Selbu millstones dominated the Norwegian market after medieval times until natural millstones were outmatched by artificial stones.

What made the production in Selbu so dominating in the market despite the remoteness of the quarries? Here we address this question from a geological resource point of view.

Millstone – landscape values

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The millstone industry in Selbu lasted for 400 years up until 1914, by which time over 1100 quarries could be found in the mountains. “Millstone” is a project led by the Norwegian Geological Survey (NGU) and my part in this project is to investigate what values people in Selbu attach to the quarry landscape. The study takes its starting-point in theory concerning how landscapes are seen, experienced and valued by people and how identity and landscape are connected. The methods used are semi-structured interviews with informants living in Selbu and analysis of historical documents and pictures. Many of the informants have a connection to “Kvernsteinslaget”, a local association established last winter to secure that the history of the millstone industry will not be forgotten. In interviews the informants have mentioned the harsh conditions the workers lived and worked in as an important part of the remembered history. Other things mentioned are that the whole community was affected by the industry in some way or another and that the subsistence economy disappeared earlier in Selbu than in other communities because of the millstone industry. This early change to a monetary household is, according to several informants, special for Selbu. “Distance” is a word often mentioned by the informants. Both distance in time between now and 1914 when the industry ended and the distance between the quarries up in the mountains and the community in the centre of Selbu. For some, distance in time is a negative thing; the facts about the industry and the life they lived up in the mountains are forgotten. For others this distance makes the story more interesting. Several of the informants are hunters and they are used to walk in the mountains. For them the distance to the centre of Selbu makes the quarries and the history more interesting. The establishing of Skarvan and Roltdalen National Park is mentioned by some of the informants, some thinks that a National Park is not positive for the maintenance of the quarries and the landscape that surround them. Others think the opposite, that the National Park protects this landscape.

Millstones are seen several places in Selbu, they are used in stairs, garden tables and as decoration. It seems to have been common to go up in the mountains in the summer to choose a millstone and then to bring it home in the winter.

Cup and ring marks: rock art or rock mortars?

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All over western Europe prehistoric rock art is dominated by cup shaped depressions sometimes encircled by one or more concentric rings. These are usually regarded as a form of art with some unknown religious or ritual significance. They are generally found on flat-lying slabs of rock, which are commonly composed of sandstone, psammite or gritstone. However, study of ethnographic evidence from widely separated areas such as North America or East Africa suggests that they may have a utilitarian explanation. Similar depressions are used as grinding hollows for food stuffs or sometimes for gaming or breaking up ores. It is suggested that British and other European examples might be explained in this way. It is possible that they were locii where locally gathered berries, fruits or nuts were ground, but it seems more likely that concentrations mark places where people gathered for ritual feasting which would include grinding and the preparation of food on the spot. They would thus be the upland equivalent of the great middens characteristic of the late Bronze Age – early Iron Age Wessex the best known of which are East Chisenbury, Potterne or All Cannings Cross. Climatic conditions in upland Britain would lead to the ready dispersal and degradation of midden material leaving little trace other than marking on the rock.

Millstone-Quarrying - a conservative craft?

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In the Eastern Eifel area in south-western Germany grindstones and millstones were produced from the Neolithic until the 20th century.

Regarding millstone-quarrying in Mayen and Niedermendig it had been axiomatic that the way of millstone-production has not changed significantly from the early Middle-Ages until the middle of the 20th century, when the production ceased. However a general overview dealing with this axiom is lacking.

The results of current research do suggest that millstone quarrying in Mayen and Niedermendig indeed proved to be very conservative.

The properties of resource and deposit led a production which was tied to the resource and made trade with the raw material unfavourable. The properties of the rock proved to be prohibitive for an economical use of innovative techniques. This resulted in the fact that even the tools, which were used in millstone production, remained almost unchanged from the Middle Ages until the 20th century. The only significant improvement seems to have happened in the sector of conveyance.

Also the range of products proved to have been very stable. Already in the 14th century the millstones were divided into categories, determined by their measurements. Even though the measurements were subject to minor changes, the categories remained almost unaltered until the 20th century.

The available data supports the assumption, that also the numbers of the workforce in the quarries were relatively stable from the 9th to the beginning of the 19th century. A largely stable workforce and, due to the exclusion of innovations, an also largely stable productivity resulted in a very stable quantity of produced millstones.

Also the unique principle of organization of the production, which can be verified from the 15th century, prevailed at least until the middle of the 19th century. Not to mention that the ways, on which the millstones were transported, remained the same throughout the ages, too.

In the case of Mayen and Niedermendig the assumption of an almost unaltered production - at least from the 15th century until the 19th century - proved to be correct.

Millstones in Bronze Age Crete: diversity and change

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The beginning of the second millennium B.C. in Crete (Minoan Period) is characterised by the emergence of the palatial system, which will be maintained in the Aegean world until the end of the XIII century. This phenomenon was accompanied by the development of a self-sufficient subsistence agriculture based on cereals and pulses, vine and olive. Within the palaces, but also within urban or rural settlements provision is made for the storage of agricultural surpluses. Grinding and pounding tools are very abundant, and were used not only for processing agricultural products, but also for mineral resources, implying to the development of specialised crafts (pottery, metallurgy, faience etc.). A study based on raw material, techniques of manufacture and use (residue and use wear analysis) of these grinding and pounding tools showed that despite an apparent homogeneity, several changes are apparent in their production process and function.

During the Bronze Age, raw material's procurement concerns the gathering of natural blocks. Local, often quartzitic, sandstones, predominate but local porous and friable grainstones have also been introduced in the Late Bronze Age. The case study of Galatas' palace, where the introduction of friable stones coincides with grinding intensification associated with feasting practices suggest that despite their friable nature grainstones could have been perceived as raw materials of choice because they required no maintenance.

If the general morphology of querns seems unchanged during the Minoan period, the investment in manufacture changes considerably. It is during the palace period, and within the palaces and sanctuaries, that we find the grinding stones in which most of time and effort has been invested.

Use wear studies (with low magnification and interferometry) and residue analysis (phytoliths, starch grains and chemical analysis) permitted to detect diagnostic use wear traces and thus to identify patterns of distribution of mineral and cereal processing within settlements.

This variability reflects not only distinct technical choices but also modification concerning the organisation of production and cereal meal's consumption.

Mapping and interpretation of a millstone quarry at Nord-Talgje in the Boknafjord area in Rogaland, SW-Norway.

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As part of an ongoing project The Norwegian Millstone landscape, attention has been paid to one millstone quarry of local/regional character lying on the island Nord-Talgje in the Boknafjord area in the county of Rogaland in SW-Norway. The quarry covers an area of approximately 20600 m², where the bedrock consists of foliated mica schist with garnet. The physical properties of the bedrock delimited the quarry to a small headland at the southern part of the island. Approximately 550 negative imprints from sampled rotary querns are visible, ranging in size from the smaller, manually operated querns with a diameter of 40-44 cm to the larger water driven millstones with a diameter up to 158 cm. The size-measured imprints seem to fit into 9 groups, where the majorities are clustered around 45-54 cm in diameter. It is a general trend that the larger querns are cut into the smaller ones, but some deviations exist. The quarry has further been divided into five separate "fields", where the two easternmost only include few smaller rotary hand querns probably belonging to the oldest experimental phase. In the remaining three areas, at least two different quarrying techniques (direct carving from bedrock and carving from blocks extracted by wedging) have been observed, possibly displaying different time periods of millstone quarrying. In addition, remains of buildings, a built-up pathway and a built-up platform possibly representing an area for producing quern blanks from blocks are found. The possible connection between the quarrying and other features and the age of quarrying will be discussed.

A prehistoric grinding stone quarry in the Egyptian Sahara

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During the 2007 "North Kharga Oasis Survey" led by Prof. Salima Ikram of the American University in Cairo a silicified sandstone ("quartzite") quarry for procurement of typical "Saharan" basin grinding stones was discovered about 200 km to the west of the Nile Valley. This is the first grinding stone quarry that has been reported from the Eastern Sahara. Probably dating to the Neolithic period, the quarry is small, yet thousands of rough-outs were manufactured at the place and presumably used at habitation sites 10-50 km away. Bearing witness of organised work, located near a desert route and a significant rock art site, the quarry raises many questions about prehistoric procurement strategies, some of which will be elucidated in this presentation.

An Overview of Bronze Age Whetstones (Aegean World)

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This study is related to the design and the use of stone tools specific to abrasion actions in the Aegean World during Bronze Age.

At the beginning of metallurgy, people were sharpening and maintaining tools. Thus, whetstones, polishers and other abrasive tools were used and kept alive. Various stones as sand, schist or emery have been employed for their manufacture. Indeed, the exploitation of whetstones quarries and the circulation of raw materials in a long distance are well-known by the texts, such as Pliny's Natural History during the Roman Antiquity. The layers of "κρητική ακόνη" (Cretan Stone) - famous during the Antiquity - have been exploited in Crete since the protohistory until now.

This work investigates all the steps of the operating process (*Chaîne opératoire*), from the extraction of raw materials to the use of stone tools. For that purpose, we have adopted an interdisciplinary approach which associates the petrographic analysis of tools, study of their morphology and use-wear analysis (macroscopic and microscopic observations). This study already showed the variability of the materials exploitation, the diversity of use of tools and finally their symbolic value.

Résumé

Mon étude porte sur la conception et l'utilisation d'outils lithiques spécifiques aux actions d'abrasion dans le monde égéen durant l'Age du Bronze.

Dès l'apparition de la métallurgie, l'Homme aiguisé et entretient des outils. Des pierres à aiguiser, polissoirs et autres outils de « l'abrasion » sont ainsi utilisés et préservés. Pour les confectionner, on recherche des roches abrasives de différentes granulométries, comme le grès, le schiste ou encore l'émeri. En effet, l'exploitation des carrières de pierres à aiguiser spécifiques et la circulation des matériaux à grande distance est bien connue par les textes, tels les écrits de Pline à l'époque romaine. Plus précisément en Crète, les gisements de «κρητική ακόνη» (Pierre ~~cr~~oise), réputés durant l'antiquité classique, ont été exploités depuis la protohistoire jusqu'à nos jours.

Dans le cadre de mon d'étude, j'ai pris en compte toutes les étapes de la chaîne opératoire, de l'extraction de la matière première à l'utilisation des outils. Dans ce but, j'ai adopté une approche pluridisciplinaire qui associe l'analyse pétrographique des outils, l'étude de leur morphologie et celle de leurs traces d'usures (observations macroscopiques et microscopiques). Cette étude a déjà montré la variabilité de l'exploitation des matériaux, la diversité des usages des outils ainsi que leur valeur symbolique.

The millstone quarry Kvarnberget in Sala, Västmanland, Sweden and the lost settlement Onsalar

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At the millstone quarry Kvarnberget of Sala, Västmanland, one of the largest in the region north of the lake Mälaren, rotary querns were produced (known as Salgryt). The quarry is well known since it was the subject of property rights disputes in 1490 between the village Ösby that owned the quarry and the neighbouring village Åby. Less well known is that the quarry also is placed on the grounds of a lost settlement called Onsala, (*Odin sala), later divided between the medieval villages mentioned above.

The rotary querns reach the Nordic countries in the Roman Iron Age. This type of quern is introduced at the same time as the oldest known bread appear in the Nordic countries, dated to 200 A. D according to recent analysis by Liselotte Bergström (2007). The querns are very efficient and can be produced from local rocks. Despite this, the rotary querns seem to spread very slowly into the Iron Age society. Today we assume that bread was everyday food in the Iron Age. But bread was associated with the gods and eaten in special places and on special occasions. It is illustrated by the fact that this type of quern first appears on holy places, like Helgö in Mälaren, some hundred years later in Migration Period hill forts (400-550 AD) and

at the same time in the elevated settlement of the elite. That a millstone quarry is situated in a settlement connected to a place name linking the god Odin to a building with large halls (-sala, cf Uppsala), next to a settlement called Hov is interesting. It poses questions in this case around a production site placed on the grounds of a settlement where gods were believed to be present, lying where a large plain turns into the wooded areas of the Bergslagen.

Millstone and Quern Quarries in the Viar River Basin, Province of Seville, Spain

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The millstone quarry sites are located in the Natural Park of the Sierra Norte, in the Andalusian Province of Seville, in the Valley of the Viar River, a tributary of the Guadalquivir River. The Viar basin is a continental basin with deposits dating from the Lower Permian age (300 million years) to presumably the Lower Triassic Age (235 million years). The deposits are made up of fluvial conglomerates constituted of a mixture of local screes and braided conglomeratic sandstones, red beds, and acidic volcanoclastic deposits. In general, the facies is lacustrine, with trace fossils, drifted plant remains, and occasional small trees in shales and siltstones. Due to the great geological diversity, the area is currently a candidate for the network of European Geoparks.

The first quarry site, discovered in 2010 by forest workers, is 5.5 km ESE of the town of Almadén de la Plata. A sector of about 20 extractions, measuring 50 cm in diameter, is found in a thalweg, uphill from the Calzadilla stream. Other sectors, numbering between a half a dozen and a dozen extractions for both querns (50 cm) and millstones (80 cm), are found in the riverbed about 50 m to the south. The quarries are limited to areas where the outcrop, a brownish coarse sandstone (or micro-conglomerate) contained rounded clasts, usually smaller than 1 cm. Quarrymen seem to have avoided the areas with larger inclusions. In southern Spain, stones of this type often outfitted flour mills.

The extraction techniques are difficult to observe due to an intense weathering of the rock surface. The smaller extractions seem to follow a consistent method. First a circular trench was cut with a pick around the cylinder. Then, to dislodge the block, small circular holes (up to 30) were bored at regular intervals (every 6-7 cm) around the circumference. The larger extractions probably used wedges.

The date of the site is not known. The name *Calzadilla* is the diminutive of “*calzada*,” meaning road. This winding valley is known to have been an important commercial artery since very early times. The smaller cylinders are larger and flatter than the typical Roman

querns. They also are narrower and lighter than modern animal fodder querns (19th and 20th centuries). We suspect, therefore, that they date to late Roman or Medieval times, possibly during the Islamic domination. Their morphology and extraction techniques recall the Medieval coastal extractions studied by Joaquín Sanchez on the Island of Minorca. The larger cavities, exploited presumably for watermills, are still relatively modest (80 cm) and also suggest an early date.

A second smaller site is located about 15 km to the SE near the Cerro del Castillejo at a large outcrop of sandstone, similar to that of the first site. Here can be seen less than half a dozen very small (between 35- 40 cm) and undated circular extractions. Since they are found behind a wire fence, the extension of this site cannot be estimated.

Millstones in South-West England: types, sources, function and trade

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The majority of published millstone studies have tended to concentrate on a specific type or source of stone, or on a specific archaeological or historical period. This paper sets out to provide an overview of millstones in a particular region, the south-western counties of England, over a period of two millennia, from the introduction of power-driven millstones in the Roman period to the end of the tradition of milling with stones in the twentieth century. The purpose of the paper is to examine the different types and sources of millstone that were used primarily for grinding cereal grains, and to consider what changes in size, form and material can reveal about the economic pressures and product requirements in different time periods. The south-west region has many survivals of millstones, both of local origin and imported from other parts of England and mainland Europe, and there are a number of useful documentary sources concerning the manufacture and trade of such stones from the medieval period onwards. It is suggested that analysis of both artefacts and related documentary evidence on a regional basis could form a model for future studies of millstones both elsewhere in England and in other countries, and that such an overview may serve to place millstones and their uses in a broader context than simply a material-based or time-specific one. While the continuity of use of millstones for milling grain and processing other raw materials over a period of some two thousand years is well known, particular trends with regard to the size of stones and changes in the technology of millstone dressing and connecting the drive, for example, are less well documented. This makes the identification and dating of surviving stones that are no longer in their working contexts problematical. This paper sets out to broaden our understanding of these interesting and durable artefacts.

The Symbolism of Querns and Millstones

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From the earliest saddle querns through to rotary querns and to millstones powered firstly by animal and later by water and wind power, querns and millstones are one of mankind's oldest and longest used craft tools. They have been used for grinding many different materials but are synonymous with grinding grain. From the earliest cultivation of cereals in the Near East some 10,000 years ago through to the advent of roller milling in the 19th century querns and millstones were not only of vital importance at a daily subsistence level but in consequence familiar to everyone, as indeed they still are in some parts of the world. As everyday tools and functioning as a key part of the process that transforms a raw material into a refined, usable product they have thus been well-placed through which to explain some of life's great mysteries from the turning of the seasons to the birth, life and death of the individual to the reconciliation of the Old and New Testaments to why the sea is salt. The symbolic meanings of querns and millstones are, however, not just linked to their transforming properties but also to how they operated and who used them and even potentially to their size and colour. Bringing together mythology, legend and literature with history, archaeology and living tradition this paper explores the symbolism and meaning of querns and millstones from the prehistoric period through to the present day.

Elephantine and Aswan – Millstones for Egypt

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Compared to other rich artefacts, especially of Pharaonic times, millstones from Egyptian sites have rarely found their way into the perspective of scientists. In January 2011 a short field trip onto the island of Elephantine near Aswan brought some new aspects on this subject to light. First of all, it was astonishing how many millstones – mostly of “pseudo-Pompejan” or of Olynthian type – have been produced not only on Elephantine but equally in Aswan, since the local granite, although famously used in large quantities for sculpture, sarcophagi etc., is not the best choice for a millstone: In a rather short time the grinding face is polished and needs re-dressing to function properly. Lack of better material, e.g. volcanic rock, might be the reason for the use of granite. All Olynthian millstones found on Elephantine and in Aswan were standardized, very heavy, upper stones. Unfortunately, up to now no dating is

possible. Maybe they belong to Ptolemaic or even later Pharaonic times. The “pseudo-Pompeian” millstones are preserved as upper as well as lower stones. A few of them could be dated to the Early Byzantine period. How many millstones of both types have been produced is not clear, but since they show up at many different places on Elephantine and Aswan, they give the impression of quite a developed industry.

Pompeian style mills in Jordan

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Pompeian style mills represent the industrial revolution in the world of quernstones. Simple in design, donkey mills provided the means for grinding greater quantities of grain and their presence is indicative of larger-scale production and hence a bigger population. They are also thought to have been used for industrial purposes, for example in mines where they may have been used for grinding ore. The present paper examines their occurrence in Jordan which, during the Greco-Roman period of influence, comprised a number of semi-independent city-states joined under the umbrella of the Decapolis, including: Gerasa (Jerash), Philadelphia (Amman), Raphana (Abila), Dion (Capitolias), Gadara (Umm Qays), and Pella (Irbid). An examination is made of the slightly different forms used in the Decapolis for Pompeian style mills and, at the same time, the types of stone employed. The latter identified through petrological and chemical analysis in order to source production, to see whether this was likely to have been local as opposed to imported.

SEEN THROUGH A MILLSTONE: GEOLOGY AND ARCHAEOLOGY OF QUARRIES AND MILLS

Bryggens Museum, Bergen, Norway 19 – 21st of October 2011

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SEEN THROUGH A MILLSTONE

Bryggens Museum, Bergen, Norway 19 - 21st of October 2011

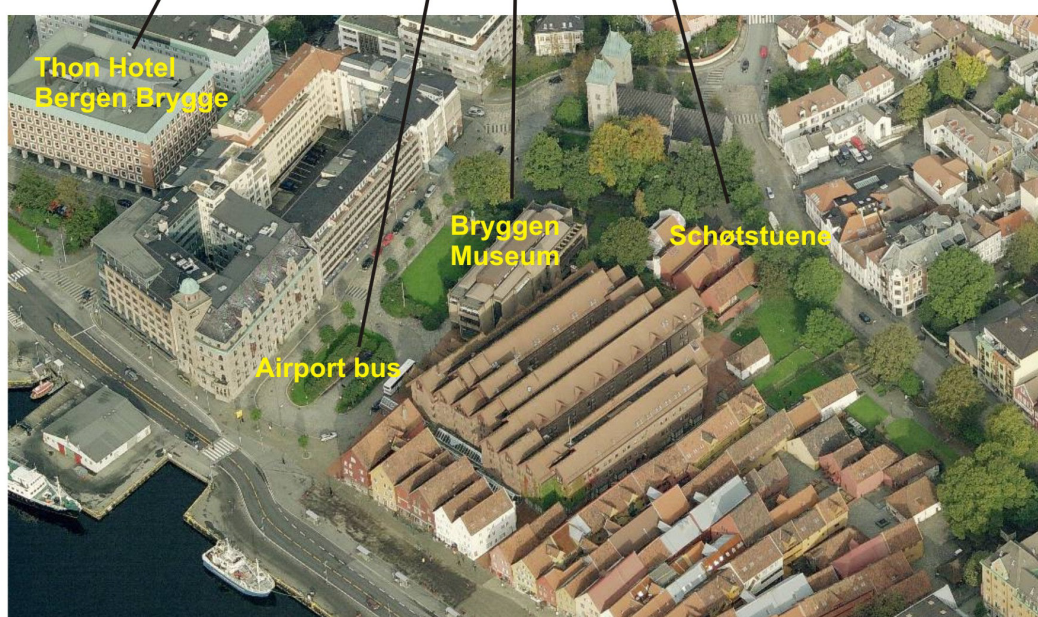
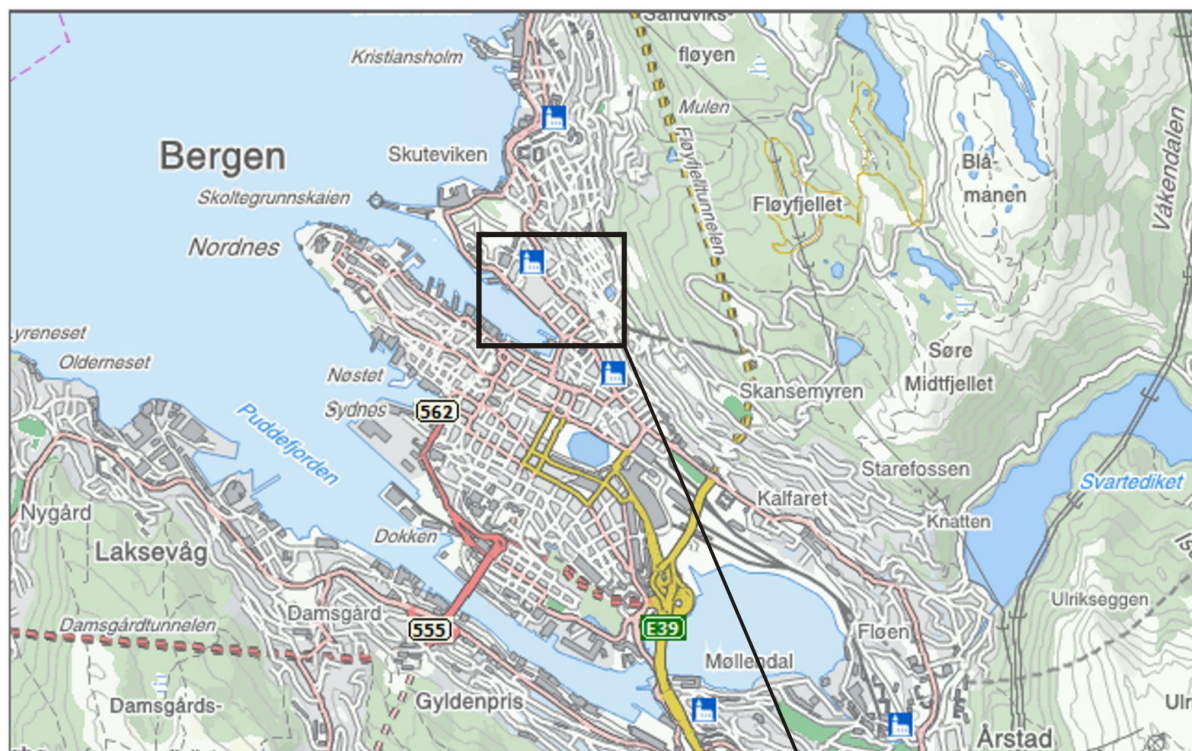
Practical information

- The airport bus will take you to the centre of Bergen
- For those staying at Steens Hotel, leave the bus outside the bus station and walk 500 metres (see map) or take a taxi
- For those staying at Thon Hotel Bergen Brygge, stay on the bus to the last stop (Radisson Blue Hotel, Bergen Brygge)
- Walk one block to the hotel (see map)
- The conference will take place at the Bryggen Museum, close to the Thon Hotel Bergen Brygge
- The reception Tuesday night will take place at Schøtstuene (see map). Please meet in the reception at Thon Hotel Bergen Brygge 19:15 or outside Schøtstuene 19:30.
- The boat to Hyllestad will leave from Strandkaiterminalen close to Bryggen (see map)

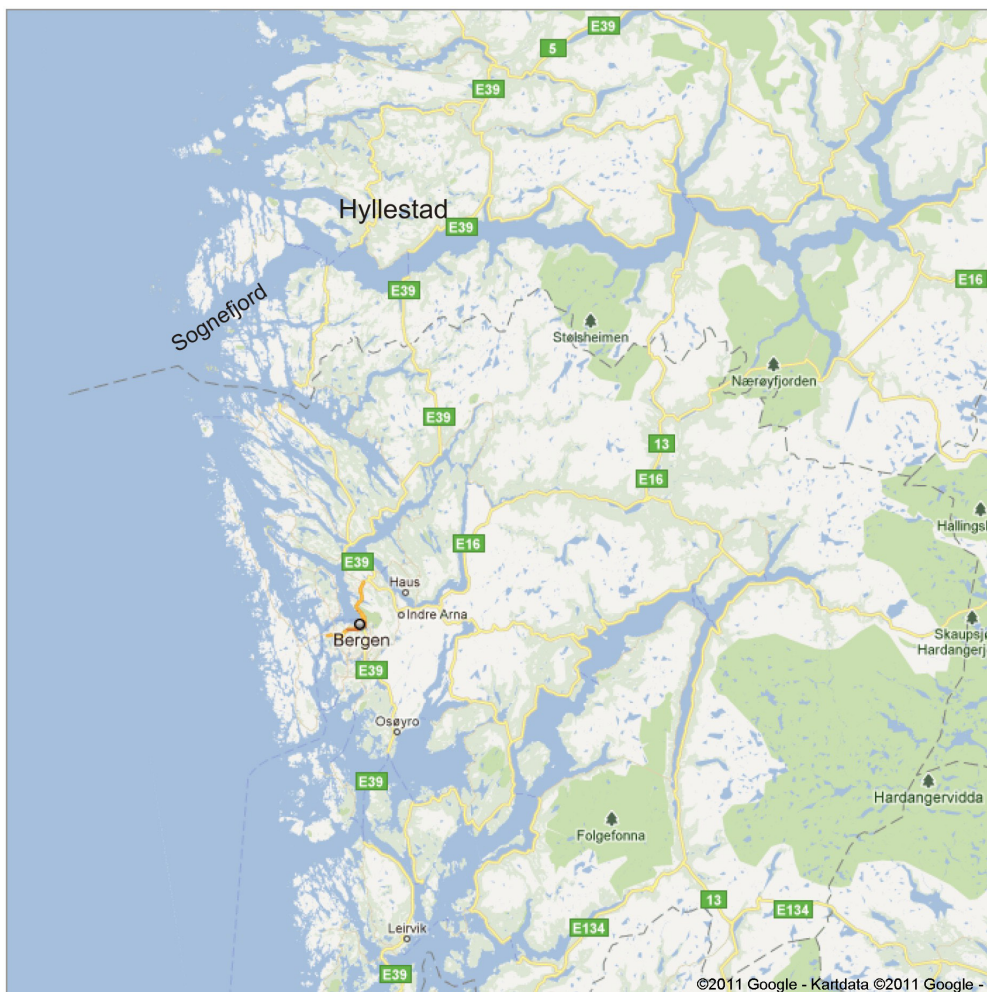
Steens Hotel:



Bryggen area:



Boat terminal (leaves 8:00 October 20)



SEEN THROUGH A MILLSTONE

Bryggens Museum, Bergen, Norway 19 - 21st of October 2011

Daytrip by boat to Hyllestad 20. October 2011

From Rome 2009 some of you will remember



In Hyllestad you will meet young pupils telling the millstone history from their point of view. In addition, researchers will guide you through the quarry landscape. In Skor, you will see several traditional mill houses surrounding a beautiful waterfall.

You will also get an insight in the daily life in a small society on the west coast of Norway.

Hyllestad is a beautiful place surrounded by tall mountains, but the weather may change rapidly from good to bad. So please be prepared for some rain and wind.

Kind advice: Good shoes for walking in wet and slippery terrain. Clothes that will keep you dry and warm all day through.

See you in Hyllestad 20. October!!