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Viking Age economics: implications of industrial commodity production

Irene Baug, Dagfinn Skre, Torkil Sørle Røhr, Tom Heldal,
Birgit Maixner, and John Ljungkvist

Keywords: Economy / Scandinavia / Viking Age / Early Middle Ages / production / trade

Schlagwörter: Wirtschaft / Skandinavien / Wikingerzeit / Frühmittelalter / Produktion / Handel

Mots-clés: Économie / Scandinavie / époque viking / début du Moyen Âge / production / commerce

Introduction

How should early medieval Scandinavian societies be characterised in economic terms? Was the Viking Age (AD 750–1050) a transitional period between disparate economic systems, for instance, as suggested by Richard Hodges and Lotte Hedeager, between an ancient gift-giving and prestige-goods exchange system and the commodity production and monetised trade of the subsequent centuries¹? Or should the period's economic changes, indicated by, for instance, monetisation and urbanisation, not be conceived as a shift from one system to another but rather, as suggested by Chris Wickham, as the development of 'economic complexity' within the same socioeconomic system, the feudal, from the early Middle Ages until the Modern period²? And which role should be assigned to the urban markets introduced in Scandinavia in the 8th–9th centuries?

These wide-ranging questions are not explored in full here but are seen through the lens of industrial production of commodities, *in casu*, the production of a certain type of whetstone that commonly occurs in Viking Age sites. A recent paper marked the breakthrough in sourcing this fine-grained dark grey to purple type of whetstone to Mostadmarka in Malvik municipality, Trøndelag, present-day Norway (*Figs 1–2*)³. In this sparsely settled forested area lies Heingruva (*Fig. 1*), a huge quarry in the northern part of the geological formation Støren Nappe (s. *Fig. 5 below*). Data from thin-section and geochemical analyses of whetstone finds comply with the peculiar visual and geochemical characteristics of a particular geological unit within the Støren Nappe. While there are several minor quarries in the Støren Nappe, the sheer size of the ancient Heingruva makes this the most likely source of this whetstone type (*p. 120*), not excluding the others nearby.

Whetstones from Mostadmarka have been shown to occur in Ribe (Denmark) in the early 8th century and to be the dominant type of whetstones there from the 760s onwards. Also, they made out the main type of whetstone in 9th–10th century Kaupang (Norway) and in 9th–11th century Hedeby (Germany), and in the 10th century, people in Wolin (Poland) got most of their whetstones from Mostadmarka⁴.

¹ HODGES 1982; 1989a; 2012. – HEDEAGER 1994.

² E. g. WICKHAM 2000; 2005; 2008; 2021; 2023.

³ BAUG et al. 2019.

⁴ BAUG et al. 2019; 2020; 2023; 2024.



Fig. 1. The Heingruva quarry in Mostadmarka. The better part of the shaft is flooded, and only minor parts of the quarry faces are visible (right and centre).

Analyses presented in the following identify and date additional distributions, namely, firstly, within the region they were produced, Trøndelag, and in two neighbouring regions on the Atlantic coast (Norway): Helgeland to the north and Nordmøre and Romsdal to the southwest. Secondly, their distribution is mapped in Birka (Sweden), established in the late 8th and dwindling in the late 10th century, the only Viking Age town on the eastern side of the mountain ridge that runs along the Scandinavian Peninsula. And thirdly, likewise on the eastern side of the mountain ridge, the distribution of Mostadmarka whetstones is mapped in selected rural contexts from Småland in the south to Jämtland in the north (*Fig. 2*).

While previous contributions on Mostadmarka whetstone distribution have discussed long-distance trade and its sociopolitical contexts, the combined picture presented here of regional, interregional, and long-distance distributions allows different sets of questions to be discussed, namely, such that apply to the socioeconomic sphere.

The first set of questions pertains to whether a certain understanding of the emergence of industrial commodity production, common in Viking Age scholarship, applies to the whetstone industry, namely, that it emerged through agents gradually scaling up manufacture and distribution that at first was directed at satisfying household needs and local demands⁵. To explore such questions, analyses have been tailored to reveal whether the quarrying in Mostadmarka started on a modest scale to satisfy the needs of the quarriers' households, neighbours, and associates within the Trøndelag region. The analyses are also meant to reveal whether, at some later stage, the trade was expanded to long-distance trade in urban markets like Ribe and Birka, perhaps with an intermediate period of distribution to neighbouring regions along the Atlantic coast, all of which were connected by the sheltered coastal sailing route, the *Norvegr* (*Fig. 2*)⁶.

Results from these analyses are thereafter brought into the discussion of a second set of questions, which pertains to the research problems raised at the start of this paper. To be brought

Fig. 2. Regions, sailing routes, sites, and whetstone quarries discussed in this paper. The smaller quarries in Årekoll ▢ and Soknedal have no proven quarrying in the period discussed here. In the 9th–10th centuries, the sheltered route along the western coast of the Scandinavian Peninsula, the *Norvegr*, gave rise to the name of the kingdom it connected, Norway. In this and other maps, currently cultivated land is yellow, roughly indicating the extent of agrarian settlement in the period discussed here.

⁵ E. g., MARTENS 1988.

⁶ SKRE 2018; ØSTMO 2020.



to speak on these quite general issues, results from analyses of whetstone production and distributions are set in the context of additional Scandinavian evidence on industrial commodity production. Iron blooming forms a relevant comparison, and this evidence extends industrial commodity production back into the early first millennium AD. Also, 9th–10th century production and distribution of soapstone cooking vessels adds relevant aspects.

Initially, some clarifications need to be made as to which properties of whetstones and cargoes allow these two lines of socioeconomic argument to be pursued here, of what is meant here by ‘industrial commodity production’, and by the terms ‘regional’, ‘interregional’, and ‘long distance’.

Whetstone properties, cargoes, industries, and travel times

Whetstones have three properties that make analyses of them relevant for discussing the types of questions addressed here. For one, unlike most other Northern goods, lost or discarded whetstones survive all sorts of decomposition and are easily recognised during excavations. In addition, they were used by everyone and are thus often retrieved in sufficiently high numbers to allow quantitative analyses. And thirdly, unlike iron and soapstone, low-cost methods have been developed to reliably source the two dominant types of whetstones traded in this period to narrow geological formations in, respectively, Mostadmarka and Eidsborg (*Fig. 2*)⁷. The various properties of these rocks, including why they are ideal for whetting, have been discussed elsewhere⁸.

Why are whetstones relevant for the discussions of general patterns of trade? In the pre-Modern period, most sledge- and shiploads were multi-product freights. For instance, English 13th–14th century custom accounts abound with records of composite cargoes, many of them containing whetstones⁹. Rather than describing an actual ship load, the list in the 1226 translation into Old Norse of the *Tristram's Saga* rather serves to demonstrate the wide range of Northern goods. While the 12th century French original mentioned that falcons were brought by Norwegian merchants onboard a ship that arrived in a French harbour, the translator, a certain Robert working under the auspices of King Hákon Hákonarson of Norway, added numerous items. He mentioned vair from squirrels, ermine from stoats, sable from martens, and furs from beavers and bears, as well as walrus tusks, hawks, two falcon species, wax, goatskins, hides, stockfish, tar, sulphur, oil from seal or whale blubber, and, in Alexander Bugge's translation, *alskens norrøne varer*, ‘all sorts of Nordic produce’¹⁰. In this chivalric romance, low-cost commonplace commodities like iron and whetstones may have been included in the latter category. Although few or no cargoes contained such a wide assortment of goods, the mapping of whetstone distribution has the potential to reveal profound patterns in the distribution of multi-product freights from Trøndelag and neighbouring regions.

In addition to mapping trade patterns, studies of whetstone distribution have the potential to characterise products in social terms. Iron, whetstones, and soapstone vessels were not among the prestige or luxury items often associated with 1st millennium long-distance exchange, such as furs, weaponry, and exquisite tableware, but were rather for everyday use across the social-class spectrum. Even a slave needed access to a whetstone to sharpen his knife, the

⁷ BAUG et al. 2019, 52–64.

⁸ BAUG et al. 2019, 50–51; 2024, 52.

⁹ NEDKVITNE 2014.

¹⁰ Translation by BUGGE 1898, 118.

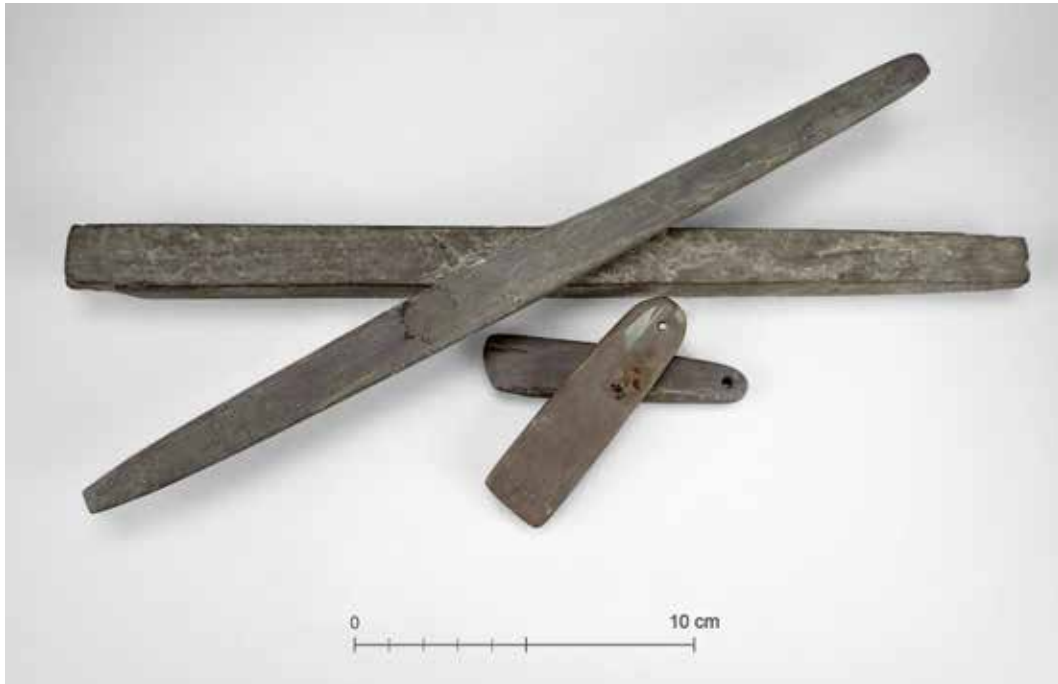


Fig. 3. Mostadmarka whetstones from Birka graves. The two shorter have inventory numbers SHM 34000:Bj 956 (upper) and SHM 34000:Bj 894 (under), both the longer have inventory number SHM 34000:Bj 842.

only thing he was entitled to own, according to the 12th century Gulapíng law code¹¹. Industrial production and bulk trade of low-cost items highlights different aspects of economies than do analyses of the so-called prestige-goods exchange.

The next clarification pertains to the term ‘industrial commodity production’. What distinguishes commodity production is that goods are produced to be traded, not to be consumed in the households of producers or their employers or to be distributed locally – that would be autarkic production. As applied here, ‘industrial’ means that production has been successfully organised to maximise output of products of even quality. Standardisation of products and plants are signs of such efforts, and output volumes may be assessed from the sizes and numbers of plants and quantities of refuse there or from the numbers of products retrieved in distribution areas and sites. For instance, calculated from slag quantities in production plants, the total annual yield from iron blooming in 2nd–6th century Trøndelag was 40 tonnes from 400–500 plants, reaching a maximum of 80 tonnes at the end of the 3rd century¹². The average annual production in 12th–13th century Hedmark (Norway) was 700 tonnes from some 7000 plants¹³. In both regions, output volumes exceeded regional needs by far, and plant layouts and products were standardised¹⁴.

Quarried whetstones have similar geological characteristics and standardised shapes, either oblong with a rectangular cross section or smaller with a hole for suspension (*Fig. 3*), while

¹¹ Article 56: SIMENSEN/JØRGENSEN 2021, 91.

¹² SKRE 2025, 333–335 figs 48–49.

¹³ RUNDBERGET 2017, 315.

¹⁴ SKRE 2025, 342–353 with references.

all these characteristics vary among rocks from the alternative source, namely such that were picked up from beaches, moraines, or screes. In the main Mostadmarka quarry, the opencast Heingruva mine (*Fig. 1*), modest quarrying happened in the 17th century, but the bulk of the thousands of tonnes that have been extracted from that quarry were mined in the 8th–12th centuries¹⁵. Assessment of traded volumes have been made for Ribe only, cautiously suggesting that an absolute minimum of several hundred Mostadmarka whetstones arrived there annually¹⁶.

From these data on standardisation and output volumes, it seems fair to characterise both 2nd–6th century iron blooming in Trøndelag and in 12th–13th century Hedmark, as well as 8th–12th century whetstone quarrying in Mostadmarka, as industrial commodity production. The term ‘industry’ serves to distinguish these types of production from other contemporary types of production, not to align them with late-medieval or modern industries. By making comparisons with contemporary lines of production rather than considering the same line of production in an evolutionary perspective, awkward terms like ‘proto industry’ are avoided. That term was coined by Franklin Mendels, “for lack of a better name”, to characterise 17th–18th century pre-mechanised industries, and has been applied to 8th–14th century iron blooming by Bo Strömberg and Bernt Rundberget¹⁷.

Conventionally, the terms regional, interregional, and long-distance trade refer to the traditional settlement regions of Scandinavia, often separated by uninhabited areas like woodlands or mountains (*Fig. 2*). In the following, travelling across two–three regions is regarded as interregional, while that which extends beyond that is considered long distance. In the context of this paper, only transport within the three Atlantic-coast regions would be intra- and interregional, while the remaining destinations would demand long-distance transport. Based on figures in relevant literature, the following durations may be suggested for long-distance cargo transport from Trøndelag by sledge and sailing ship under adequate conditions¹⁸:

- by sledge to Birka, 600 kilometres, 10–15 days,
- by ship to Kaupang, 1000 kilometres, 10–15 days,
- by ship to Ribe, 1200 kilometres, 12–18 days,
- by ship to Hedeby, 1500 kilometres, 15–23 days,
- by ship to Wolin, 1600 kilometres, 16–24 days

Poor snow or weather conditions would of course extend travel times.

Methods: archaeology

Since whetstone quarrying was first taken up and into the Modern period, whetstones have had a generic shape, and dating of individual finds thus depends on them being found in datable contexts. Except for the well-dated stratified deposits in urban settlements, graves offer the most precise dating. Thus, in this study, the dating of whetstone finds is based on the typological classification and dating of grave goods other than whetstones. A large proportion of grave goods consists of chronologically non-significant objects, and in many cases the poor state of preservation, especially of the iron objects, makes typological identification difficult or impossible. Thus, dating grave assemblages rests on identifying chronologically significant items like

¹⁵ BAUG et al. 2019, 58 figs 6–7.

¹⁶ BAUG et al. 2019, 64.

¹⁷ MENDELS 1972, 241; STRÖMBERG 2008; RUNDBERGET 2017.

¹⁸ Sledge: SINDBÆK 2005. – Sailing ship: ENGLERT 2007; ENGLERT/OSSOWSKI 2009; KASTHOLM 2024.

weapons (swords, spears, axes, shield bosses), jewellery (brooches, beads, finger rings), combs, keys and horse harnesses¹⁹.

The chronological scheme applied here divides the period AD 710–1000 into six phases (*Tabbs 1–7*). It was developed from existing chronologies by John Ljungkvist for his phasing of the 6th–11th century Valsgårde cemetery in Uppland (Sweden)²⁰. For the present purposes, datings of 8th century phases have been modified further based on the recent Posthustorvet excavation in Ribe²¹.

Whetstones in Atlantic-coast regions

This sample was defined by identifying Iron and Viking Age grave assemblages containing whetstones in the Norwegian University Museums' collection databases (*Universitetsmuseenes samlingsdatabaser*), resulting in a total of 160 assemblages. Among the 160, closed finds with reliable find contexts and finds that could be dated within the given periods were selected, leaving 53 assemblages with 62 whetstones for chronological analysis.

Whetstones in Baltic-coast regions

With the aim of producing a chronological and geographical overview of the whetstone-grave evidence, accessible Iron and Viking Age grave assemblages containing whetstones were selected from rural cemeteries in regions between Småland in the south to Jämtland in the north, resulting in a total of 62 whetstones from equally many graves. The sample is not deemed statistically solid but held to be sufficient to reveal the approximate periods when Mostadmarka whetstones were available in these regions.

Whetstones in Birka graves and settlement

Birka is the largest and best researched Viking Age site in present-day Sweden; since the early 1800s, numerous excavation campaigns have been conducted in cemeteries and the 'black earth' town deposits. The vast majority of graves, dated to the period 750/775–980, are found in seven cemeteries situated close to the town²². More than 1100 burials have been excavated, most of them by Hjalmar Stolpe in the 1870s–90s²³. More recently excavated graves have been published by Lena Holmquist Olausson²⁴.

By searching the Swedish History Museum database, a total of 137 whetstones from 115 Birka grave assemblages were identified, 56 inhumations, 56 cremations, and three uncertain or mixed burial types. Of the 115, 69 assemblages containing 80 whetstones could be dated within a century or less. To obtain a firmer basis for assessing the proportion of Mostadmarka whetstones in the whole corpus, the 46 less precisely dated assemblages containing 57 whetstones are included in the corpus analysed here.

¹⁹ Weapons: PETERSEN 1919; JØRGENSEN/NØRGÅRD JØRGENSEN 1997; NØRGÅRD JØRGENSEN 1999; ANDROSHCHUK 2014. – Jewellery: PETERSEN 1928; ØRSNES 1966; CALLMER 1977; VINSRYGG 1979; JANSSON 1985; CALLMER 1997; RUNDKVIST 2010; RØSTAD 2021). – Combs: CALLMER 2020. – Keys and horse harnesses: PE-

TERSEN 1951; FEVEILE/JENSEN 2000; PEDERSEN 2014.

²⁰ LJUNGKVIST 2008.

²¹ SINDBÆK 2022; LJUNGKVIST/LINDHOLM 2023.

²² GRÄSLUND 1980, 4–6.

²³ ARBMAN 1940–43; GRÄSLUND 1980.

²⁴ OLAUSSON 1993.

The database of the Swedish History Museum has 1430 entries with whetstones from the Birka settlement. Several of the entries contain more than one whetstone, and the total number of whetstones is thus much higher. A random selection of 357 (27 %) of the 1313 whetstones retrieved during Björn Ambrosiani's settlement excavations 1990–95 was analysed for this study²⁵.

By scanning the surfaces of whetstones from graves with a SEM instrument (scanning electron microscope), Martin Ježek has found that some of them bear traces of precious metals and thus have been used as touchstones, which indeed may have been an additional function for some of them²⁶.

Methods: geology

Geological provenance analysis follows the procedure established by Irene Baug et al.²⁷. Starting with a visual inspection, the finds are sorted by colour, texture and grain size of the material. Any material that is not comparable to rocks from known Scandinavian quarries are categorized as unknowns. The remaining finds are selected for further inspection after which they are sorted into the lithological groups 1) Mostadmarka, 2) possible Mostadmarka, 3) Eidsborg (Norway) and 4) possible Eidsborg. In this study we found only a small number of whetstones resembling rocks from the Eidsborg quarries, and therefore, a representative selection of whetstones that had been categorised as Mostadmarka or possible Mostadmarka only was sent to chemical analysis.

The method for chemical analysis is destructive and requires 2–3 g of each whetstone. Thus, 2–3 g of the larger fragments are sawed off prior to analysis, whereas the smaller fragments are destroyed in their entirety. The material is then crushed, milled into a powder and melted into glass discs via a flux. The XRF-method for chemical analysis is performed on these glass discs.

Results: geology

Chemical comparison was made with samples from known whetstone quarries sampled and analysed by I. Baug et al.²⁸. As in previous studies from Baug et al., comparison focuses on several chemical parameters including MnO, MgO, Al₂O₃, TiO₂/Fe₂O₃ and Fe₂O₃/MgO²⁹.

As shown in *Figure 4*, there is a good overlap between the chemical analyses of quarry samples and the lithological groups that resulted from the visual examination of whetstones. The overlap between these new analyses and those of similar finds in Wolin and Ribe is generally excellent.

The apparent shift in chemical composition between finds and quarry samples is a matter of representativity. While the data from quarry samples are probably representative for the material being produced, the finds are likely not. The best material was probably favoured for sale, not an average of the quarries, and we also suspect that wear and tear may have altered the finds. During use, the softer parts of the whetstones will be worn off to a greater extent than

²⁵ AMBROSIANI 2021, 305; 308.

²⁶ JEŽEK 2017.

²⁷ BAUG et al. 2019; 2023; 2024.

²⁸ BAUG et al. 2019.

²⁹ BAUG et al. 2019; 2023; 2024.

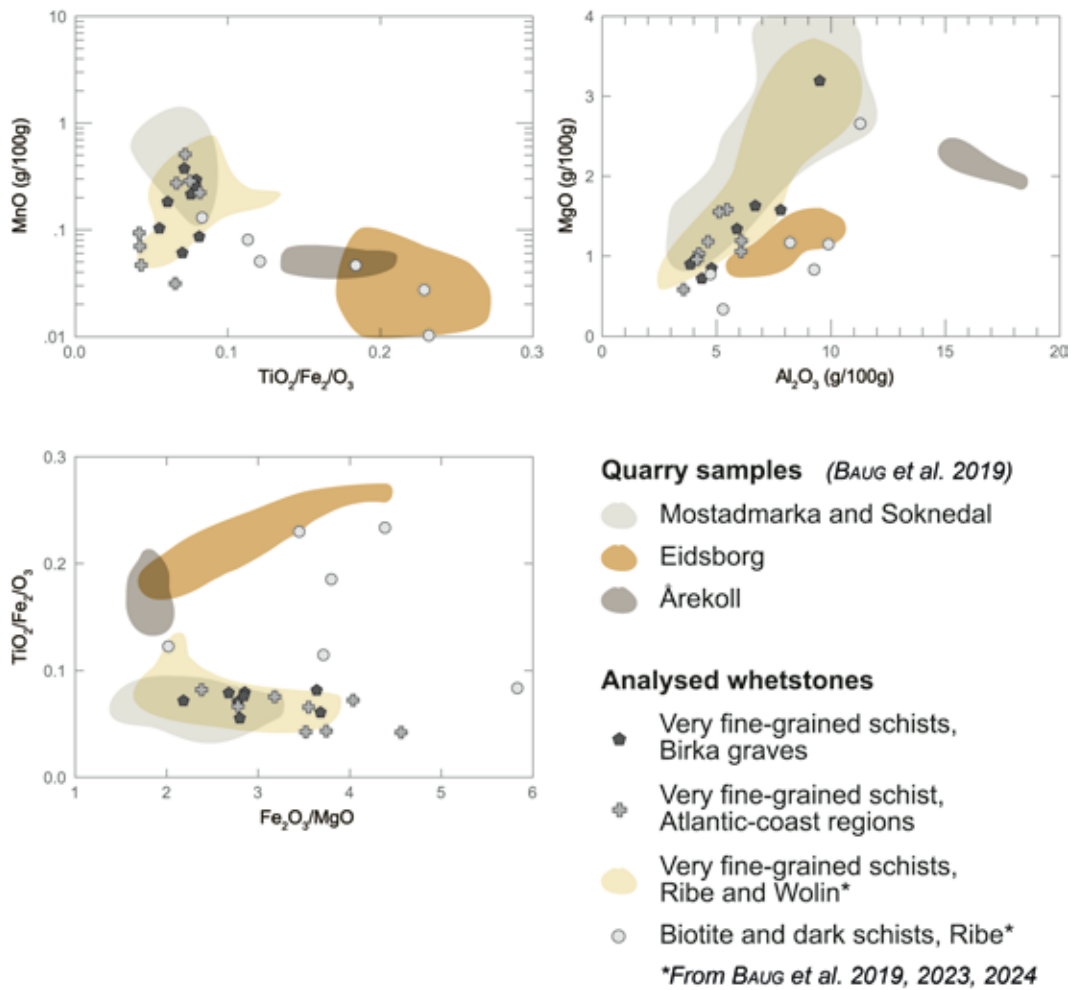


Fig. 4. Chemical data from analyses of selected whetstones from graves in Birka (N=7) and Atlantic-coast regions (N=9). These data are plotted against data from analyses of rock samples from quarries in present-day Norway (Mostadmarka, Soknedal, Eidsborg, and Årekoll – see Figure 2), and against data from analyses of Mostadmarka whetstones retrieved in Ribe and Wolin. For comparison, data from Ribe whetstones of unknown origins are plotted (biotite and dark schists).

the more mechanically resilient parts, and the latter material will therefore be overrepresented among the finds. This is suggested by the chemical data, where the average concentration of SiO_2 is 76.6% among the quarry samples and 83.7% among the finds. The concentration of SiO_2 generally correlates with the concentration of quartz, a hard mineral which is the most important abrasive within the whetstone. Another possible source of bias would be steel deposits on the whetstones brought on by wear. This would affect both the magnesium-iron and the iron-titanium ratio. While the $\text{MgO}/\text{Fe}_2\text{O}_3$ is slightly higher amongst the whetstones compared to quarry samples, no such disturbance is seen in the $\text{TiO}_2/\text{Fe}_2\text{O}_3$ -data (Fig. 4). We conclude therefore that surface contamination is an insignificant source of bias.

The Mostadmarka rocks have formed in a fairly specific environment giving a chemical signature that is very hard to replicate within other types of rocks. While it is not impossible to

Date AD	Graves	Whetstones	Mostadmarka	Possible Mostadmarka	Unknown origin	Certain and possible Mostadmarka
710–760/70	4	5	1	3	1	80%
760/70–800	7	7	3	4	0	100%
800–850	11	15	8	5	2	87%
850–900	12	13	9	3	1	92%
900–950	6	7	6	1	0	100%
950–1000	13	15	9	4	2	87%
Total	53	62	36	20	6	90%

Tab. 1. Provenance and chronological distribution of whetstones from graves in Atlantic-coast regions.

find similar rocks elsewhere in Europe, the Mostadmarka area is, to our knowledge, the only region where historic production of whetstones has been documented on this type of rock. As in Baug et al., we therefore conclude that the finds that are visually comparable to the Mostadmarka rocks, are in fact from the Mostadmarka area³⁰.

Results: archaeology

Whetstones in Atlantic-coast regions

Of the 62 whetstones from 53 grave assemblages in these regions, 56 (90 %) were quarried in Mostadmarka, possible Mostadmarka stones included, whereas only six whetstones have an unknown origin (*Tab. 1*). There is thus a clear dominance of whetstones from Mostadmarka. They first appear in the period 710–760/770, and thereafter continuously until the turn of the millennium (*Tab. 2*). In each of the sub-periods, they make out 80 % or more of whetstones included in grave furnishings in these regions.

Whetstones from Eidsborg quarries are not present in any of the grave assemblages analysed here. However, they were evidently used in these regions; Heid Gjøstein Resi has identified Eidsborg whetstones in eight grave assemblages there³¹. These assemblages did not meet the criteria for defining the corpus analysed here (*p. 121*).

Certain and possible Mostadmarka whetstones occur in all three regions prior to 760/770 (*Tab. 3; Fig. 5*). In every period, Trøndelag has the higher number of finds, probably a result of this region being the more densely settled. In some sub-periods, Mostadmarka whetstones are missing from graves in Helgeland and in Nordmøre and Romsdal (*Tab. 3*). This is likely a result of the low number of graves from these regions.

³⁰ BAUG et al. 2019; 2023; 2024.

³¹ RESI 1987, fig. 1.

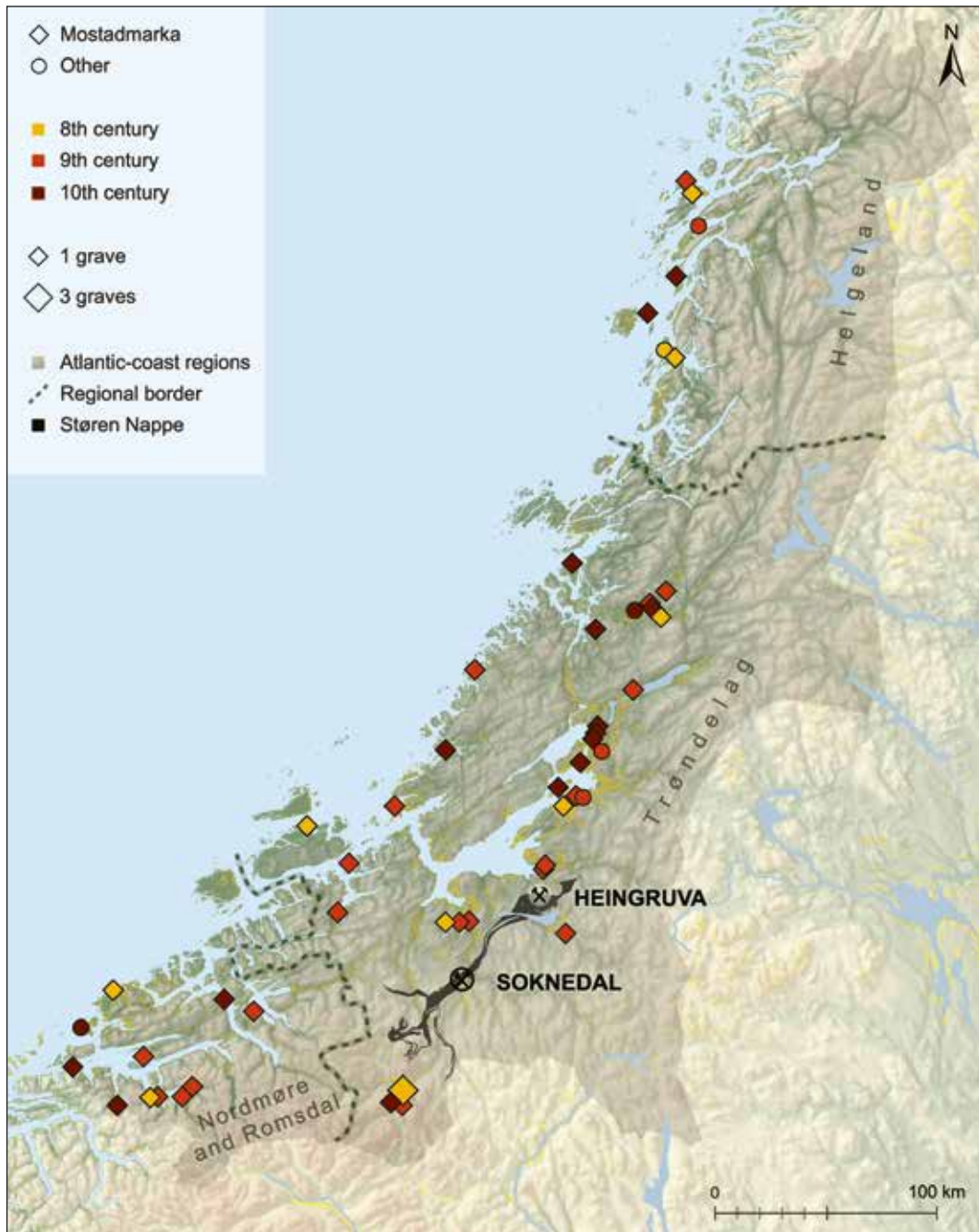


Fig. 5. Atlantic-coast regions. Provenance and dating of whetstones in 8th–10th century graves that may be dated within a century or less. The locations of the Heingruva and Soknedal quarries in the geological formation Støren Nappe are indicated. This formation is a minor section in the Caledonian Nappe sequence, which covers most of the western Scandinavian Peninsula (BAUG et al. 2019, 49 fig. 2).

Date AD								Total
8 th century	710–760/70	4 80%						11 of 12 92%
	760/70–800		7 100%					
9 th century	800–850			13 87%				25 of 28 89%
	850–900				12 92%			
10 th century	900–950					7 100%		20 of 22 91%
	950–1000						13 87%	

Tab. 2. Chronological distribution of definite and possible Mostadmarka whetstones and their percentage of the total number of whetstones in each period in question in Atlantic-coast regions.

Date AD	Trøndelag	Helgeland	Nordmøre Romsdal
710–760/70	2	1	1
760/70–800	5	2	
800–850	6	1	4
850–900	9	1	1
900–950	6		
950–1000	9		4
Total	37	5	10

Tab. 3. Geographic distribution of Mostadmarka whetstones from graves in Atlantic-coast regions.

Whetstones in Baltic-coast regions

A total of 62 whetstones from 62 graves in Baltic-coast regions have been investigated (*Tab. 4*). Two whetstones are identified as stemming from Mostadmarka, ten possibly originate there. Together, these twelve whetstones make out 19 % of the 62, whereas one of the remaining 50 whetstones is possibly from Eidsborg and the rest are various sedimentary rocks, mostly variants of sand- and siltstones. For example, this dominance is evident in whetstones retrieved from graves and settlement in Helgö³².

None of the eleven whetstones that predate 710 originated in Mostadmarka, while nine occur in assemblages that postdate 710 (*Tab. 4*; *Fig. 6*). This accords well with the other data indicating that quarrying in Mostadmarka started in the first or second decade of the

³² KRESTEN 2008.

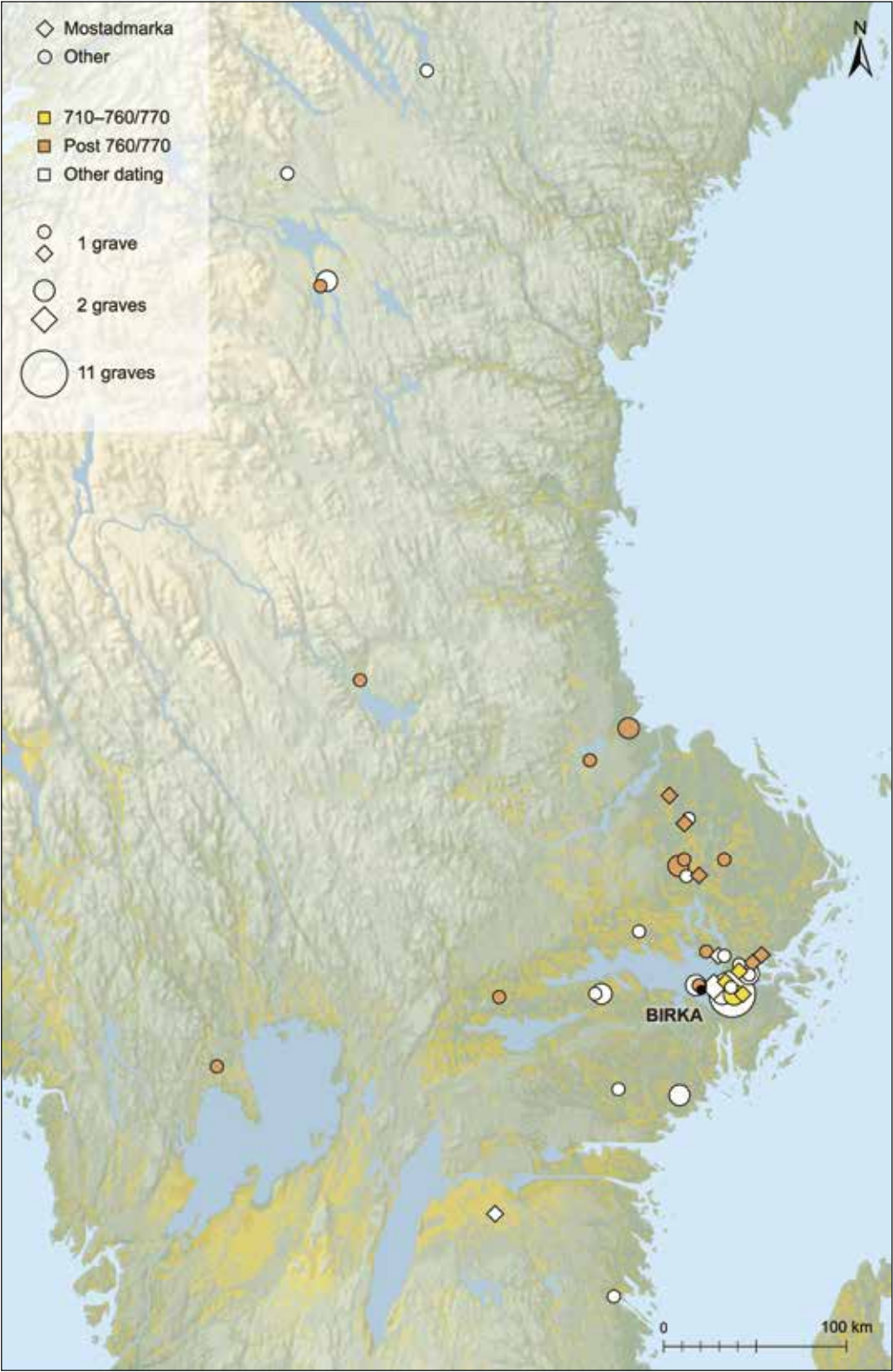


Fig. 6. Baltic-coast regions. Provenance of whetstones in selected 5th to mid-11th century graves, Birka excluded.

Date AD	Graves	Whetstones	Mostad-marka	Possible Mostad-marka	Eidsborg	Unknown origin	Certain and possible Mostadmarka
400–760/70	1	1				1	
550–710	11	11				11	
550–760/70	5	5				5	
625–760/70	4	4				4	
710–760/70	5	5		3		2	60%
760/70–850	3	3	2			1	67%
760/70–1050	4	4		2		2	50%
800–900	1	1		1			100%
850–950	10	10			1	9	
550–1050	15	15		3		12	20%
Not dated	3	3		1		2	33%
Total	62	62	2	10	1	49	19%

Tab. 4. Provenance and chronological distribution of whetstones from graves in Baltic-coast regions. Rows that span more than a century are shaded; they contain 43 whetstones that are left out in *Table 7*.

Date AD		Total			
8 th century	710–760	3 60%			3 of 5 66%
	760–850		2 67%		
9 th century	800–900			1 100%	3 of 14 21%
					0 0%
10 th century	850–950				
Total					6 of 19 32%

Tab. 5. Excerpt from *Table 4* of the 6 definite and possible Mostadmarka whetstones in Baltic-coast regions that may be dated within a century or less; their percentage of the total number of whetstones in each period is indicated.

8th century (*pp.* 124; 132). Four Mostadmarka whetstones were among the 18 in assemblages that cannot be dated with relevant precision.

In *Figure 6*, the respective distributions of whetstones dated 710–760/770 and post 760/770 are distinguished from those which are not dated with relevant precision. In these two portions of the corpus, there are three (60 % of five) and five (28 % of 18) Mostadmarka stones. These eight Mostadmarka whetstones make out 35 % of the 23 8th–9th century whetstones (*Tab. 4*). Of the 23, 19 whetstones may be assigned to period of a century or less, of which six (32 %) originate in Mostadmarka (*Tab. 5*).

The chronological precision is poor in this corpus and the number of whetstones that may be dated to the period when quarrying happened in Mostadmarka is quite restricted. Still, the distribution seems to form a distinct pattern. Except for one in Östergötland, Mostadmarka whetstones in both chronological groupings cluster in Uppland and the eastern Mälaren valley. Of the post-710 whetstones there, Mostadmarka whetstones make out 50 % (eight of 16).

Whetstones in Birka graves and settlement

Of the 137 whetstones from 115 Birka graves, 113 (82 %) originate in Mostadmarka, possible Mostadmarka stones included (*Tab. 6*). Of the 137, 80 whetstones may be dated within a century or less, 59 (74 %) of which originate in Mostadmarka (*Tab. 7*). No Eidsborg whetstones have been identified in this corpus, but a small number has been found in the Birka settlement (*Tab. 8*).

Date AD	Graves	Whetstones	Mostadmarka	Possible Mostadmarka	Unknown origin	Certain and possible Mostadmarka
700–800	1	1	1	0	0	100%
760/70–800	1	1	0	1	0	100%
760/70–900	1	1	1	0	0	100%
800–850	5	5	3	1	1	80%
800–900	1	1	1	0	0	100%
800–950	1	1	0	1	0	100%
850–900	2	2	1	1	0	100%
850–1000	2	2	2	0	0	100%
900–950	10	10	7	1	2	80%
900–1000	25	32	22	3	7	78%
925–1000	6	7	5	0	2	71%
950–1000	18	21	12	0	9	57%
775–1000	42	53	45	5	3	94%
Total	115	137	100	13	24	82%

Tab. 6. Provenance and chronological distribution of whetstones from Birka graves. Rows that span more than a century are shaded; they contain 57 whetstones that are left out in *Table 7*.

Date AD										Total
8 th century	700–775	1	1							2 of 2 100%
	775–800	100%	100%							
9 th century	800–825			4						7 of 8 88%
	825–850			80%	1					
	850–875				100%	2				
	875–900					100%				
10 th century	900–925					8				50 of 70 71%
	925–950					80%	25			
	950–975						90%	5		
	975–1000							71%	12	
Total										59 of 80 74%

Tab. 7. Excerpt from *Table 6* of the 69 definite and possible Mostadmarka whetstones in Birka that may be dated within a century or less; their percentage of the total number of whetstones in each period is indicated.

Whetstones	Mostadmarka	Possible Mostadmarka	Eidsborg	Possible Eidsborg	Unknown origin	Certain and possible Mostadmarka
357	193	92	7	3	62	80%

Tab. 8. Provenance of whetstones from the Birka settlement, the ‘Black Earth’.

Both of the whetstones in 8th century grave assemblages originate in Mostadmarka, and of the eight whetstones in 9th century grave assemblages, seven (88 %) were quarried there. The percentage of Mostadmarka stones dropped somewhat in the 10th century, when 50 (71 %) of the 70 whetstones were definitely or possibly quarried in Mostadmarka (*Tab. 7*). Although the number of whetstones from the 8th–9th centuries is low, it seems reasonable to conclude that at any time since the town was established and until its demise in the late 10th century, Mostadmarka whetstones made out the vast majority of the whetstones that were included in Birka grave assemblages.

These figures correspond well to the proportion of Mostadmarka whetstones among the 357 whetstones from the Birka settlement deposits; 285 (80 %) of them originate in Mostadmarka, possible identifications included (*Tab. 8*). Only ten (3 %) of the investigated whetstones from the settlement can be identified as coming from Eidsborg, possible identifications included (*Tab. 8*). The low percentage allows for the possibility that they arrived in Birka as the personal possessions of travellers, not as traded items.

	8 th century % (N)	9 th century % (N)	10 th century % (N)	Total % (N)
Atlantic-region graves	92% (12)	89% (28)	91% (22)	90% (62)
Birka graves	100% (2)	88% (8)	71% (70)	74% (80)
Baltic-region graves	66% (5)	21% (14)		32% (19)
Ribe, Posthustorvet	52% (122)	54% (97)		53% (219)
Ribe, ASR 9	48% (106)	59% (245)		56% (351)
Wolin Harbour			78% (177)	78% (177)

Tab. 9. The percentage of securely identified and possible Mostadmarka whetstones of the total number (N) in each of the six whetstone corpora that have been analysed since the first sourcing of stones to Mostadmarka. For Ribe, the cut-off between the 8th and 9th centuries is AD 790. In addition to the evidence published here, figures are extracted from the following sources: Ribe, Posthustorvet: BAUG et al. 2023, tab. 7,3; Ribe, ASR 9: BAUG et al. 2019, 62 tab. 6; Wolin Harbour: BAUG et al. 2024, 54 tab. 1.

The close correspondence between percentages of Mostadmarka whetstones in Birka graves (82 %) and settlement (80 %) suggests that grave assemblages indeed reflect actual whetstone use. Therefore, it seems reasonable to infer that their percentages in Atlantic-coast graves (*Tab. 1–2*) reflect them being used to corresponding extents there. The evidence from Baltic-region graves is less clear due to the limited number of graves and the poor chronological resolution in that corpus. Thus, that evidence mainly serves to verify that Mostadmarka were available in those regions from the period 710–760/770 and into the 9th century.

Whetstone distribution: extent and chronology

Summing up the above, it is quite striking that in all 8th–10th century whetstone corpora that have undergone geological analyses since the first sourcing of Mostadmarka stones, these stones make out the majority³³. The only exception is post-760 whetstones in Baltic-region graves (*Tab. 9*). While numbers in this latter corpus are low, their high 710–760 percentage (66 %) suggests that there was no slow start in whetstone trade to the Baltic regions. Also, they make out 50 % (eight of 16) of post-710 whetstones in Uppland, the only region with an adequate number of dated whetstone graves.

Therefore, the evidence published here suggest that through the 8th–10th centuries, Mostadmarka whetstones were traded to all surveyed parts of Scandinavia and in the 10th century also to Wolin on the southern Baltic coast. Except for the Baltic-coast regions other than Uppland, Mostadmarka quarries were the major suppliers to all the 8th–10th century communities listed in *Table 9*. Eidsborg whetstones saw a more restricted distribution. From large-scale quarrying started there in the early 800s and through the 10th century, Eidsborg whetstones appear to have been traded predominantly to Ribe, Kaupang, and Hedeby³⁴.

In the following, aiming to trace trajectories in production and trade of Mostadmarka whetstones, their chronological and spatial distribution is discussed in more detail, century

³³ BAUG et al. 2019.

³⁴ BAUG et al. 2019, 63–64 note 10.

by century. The chronological resolution and the dates of phases differ somewhat between the various corpora and when relevant, such variations are taken heed of. The higher resolution is found in the 8th–9th century Ribe evidence, which therefore forms the backbone of discussions of these two centuries.

The 8th century: Atlantic- and Baltic-coast regions, Ribe, and Birka

Of the five corpora that include 8th century whetstones, only those from the Atlantic-coast and Baltic-coast regions and the two from Ribe include whetstones securely dated prior to 760 (*Tabs 1–2; 4–5*)³⁵. Two neighbouring excavation sites in Ribe are sufficiently well analysed, dated, and published to be included here: Posthuset (also termed ASR 9 and Post Office)³⁶, and Posthustorvet (also termed SJM 3)³⁷.

In the 705–725 phase in Posthuset (phase B), two (33 %) of the six whetstones originated in Mostadmarka and of the four in Posthustorvet (710–730, phases F4–F5), one (25 %) is sourced to Mostadmarka. The low pre-725/730 numbers – a total of ten whetstones deposited over two decades – accords well with the very low overall find frequency in these phases, likely a reflection of low levels of activity in the town³⁸.

It is perhaps not accidental that percentages of Mostadmarka stones are on the same level in the subsequent 725/730–760 phases. In Posthuset (phase C, 725–760) the numbers are twelve (36 %) of 33, and in Posthustorvet (phases F6–F8, 730–760) they are six (27 %) of 22. In sum, the 18 Mostadmarka whetstones from the period 725/730–760 made out 33 % of the total of 55, which seems too many to write them off as having arrived in Ribe as the personal possession of travellers. More likely, they arrived as commodities to be traded there in this period, probably also in the preceding couple of decades.

In the period 760–790 (phases D–E in Posthuset and F9 in Posthustorvet), 37 (32 %) of 67 whetstones in Posthuset and 57 (59 %) of 96 in Posthustorvet originated from Mostadmarka, in sum, 94 (44 %) of 213. Clearly, the whetstone-deposition frequency was higher in this period. While an average of 1.7 whetstones were deposited annually 725/730–760, an average of seven were deposited each year 760–790. The quadrupling of the whetstone-deposition rate aligns well with Pieterjan Decker's figures for the percentage of whetstones in the total corpus of artefacts in each of the excavation phases. In the 730–760 period, whetstones made out some 0.1–0.2 % of the total number of finds, while in the period 760–790, they made out 1.0 %³⁹.

Thus, the quadrupling from around 760 of the average annual whetstone deposition rate and the corresponding 5–10 times increase in their proportion of all finds was thus not only a result of an increased activity level in Ribe, but was also an actual increase in the use of whetstones in the town. What may have caused this change? While the everyday use of whetstones in each household for sharpening knives, scissors, needles, etc. is unlikely to have changed much, alterations in the composition of crafts and artisanship in the town might have increased whetting. Some types of production use pointed and edged tools more than others, and in the Posthustorvet evidence, Baug et al.'s collating of whetstone finds and evidence of crafts and artisanal production identified such regularities⁴⁰. Several such changes may have contributed

³⁵ BAUG et al. 2019; 2023.

³⁶ FEVEILE/JENSEN 2000; FEVEILE 2006.

³⁷ SINDBÆK 2022; 2023b.

³⁸ DECKERS 2022, fig. 6,1.

³⁹ DECKERS 2022, fig. 6,5.

⁴⁰ BAUG et al. 2023, 108–111.

to increased whetting, and it seems safe to assume that the decrease around 760 in glass-bead production and the parallel increase in bone and antler crafts was one of them⁴¹.

The massive increase in the whetstone deposition rate and in their percentage of the finds also suggests that whetstones became increasingly available from the 760s onwards. As suggested by the increase in the percentage of Mostadmarka whetstones from 33 % in Posthustorvet phases F6–F8 to 44 % in phase F9, much of this post-760 increase in whetstone availability was a result of them arriving in much greater numbers from Mostadmarka, probably in the hundreds annually, at least⁴². Some of the whetstones brought to Ribe were traded out of town but as of now, there is not sufficient evidence to assess the shifting volumes of that trade. Clearly, out-of-town trade will have led to more whetstones arriving in Ribe than suggested by the figures in *Table 9*.

It seems fair to conclude that Mostadmarka whetstones were used regularly in Ribe since 725/730, and their presence before that is also well evidenced. The quantities suggest that since the town's earliest years, they were brought to be traded. The high number of 'blue-period' Ribe millefiori beads (710–760) retrieved from graves in Trøndelag and neighbouring regions on the Atlantic coast supports the conclusion that agents based there were engaged in regular trade of whetstones and other commodities in Ribe in that period⁴³.

Throughout the period of whetstone trade to Ribe, Mostadmarka whetstones were also distributed to Atlantic-coast regions. Of the five whetstones interred prior to 760/770 in graves in the Atlantic-coast regions, four (80 %) had been quarried in Mostadmarka, and all seven (100 %) in the 760/770–800 period originated there (*Tabs 1–2; 9*). Apparently, Mostadmarka quarries supplied whetstones in sufficient quantities to satisfy the need for them there.

In parallel, Mostadmarka whetstones were also traded across the mountain ridge to Baltic-coast regions. The number of whetstones that can be securely dated to the period 710–760 is low, however (*Tabs 4–5; 9*), and the high percentage should not be taken to indicate other than whetstones from Mostadmarka being traded to the Mälaren valley before Birka came into being. These whetstones also appear to have been readily available in Birka from the start.

While the cluster around Birka of post-760/770 Mostadmarka whetstones may be a result of them having been obtained in Birka by people living in the rural vicinity, the pre-760/770 cluster suggests that also prior to the establishment of the town, many eastbound sledges that left Trøndelag were headed for the Mälaren valley (*Fig. 6*). Although numbers are low, these patterns seem sufficiently clear to suggest that the establishment of Birka did not alter the pattern of long-distance trade from Trøndelag that had been established in the early-mid-8th century or before.

The 9th–10th centuries: Atlantic- and Baltic-coast regions, Ribe, Birka, and Wolin

Over the period AD 790–900, phases F10–F14 in Posthustorvet, the percentage of whetstones in that corpus decreased gradually from 1.0 % in the preceding phase F9 (760–90) to 0.3 % in phase F14 (880–900)⁴⁴. Apparently, whetstone consumption in the plot excavated at Posthustorvet decreased quite significantly around the turn to the 9th century and stayed low throughout.

⁴¹ QVISTGAARD / SINDBÆK 2023; SINDBÆK 2023a.

⁴² BAUG et al. 2019, 64.

⁴³ MAIXNER 2021.

⁴⁴ DECKERS 2022, fig. 6,5.

The decline in whetting appears to have been less severe in the neighbouring Posthuset. When whetstones from that excavation are added to the Posthustorvet evidence, a total of 342 whetstones date from the period 790–900 (*Tab. 9*), which gives an annual average deposition rate of 3.1 whetstones. When considering that the post-850 deposits in Posthuset had been truncated, the average annual whetstone deposition rate 790–900 must have been somewhat higher, perhaps around half of the 760–790 peak of seven whetstones deposited annually.

Of the 342 whetstones from the period 790–900, 196 (57 %) had been quarried in Mostadmarka (*Tab. 9*), a somewhat higher proportion than in the 760–90 phase (44 %). Clearly, Mostadmarka continued to be the main whetstone supplier to households, artisans, and craftsmen in Ribe. However, although the share of Mostadmarka whetstones rose by about 1/3, the average numbers deposited annually decreased, suggesting that trade in whetstones and other commodities from the Atlantic coast of the Scandinavian Peninsula to Ribe maintained a high level, albeit apparently somewhat lower than in the preceding phase.

Quarries in Mostadmarka appear to have continued to be the dominant supplier to Ribe, Birka, Kaupang, and Hedeby, and to the three Atlantic-coast regions, through the 9th–10th centuries, and to 10th century Wollin. The number of post-850 whetstones in the Baltic-coast regions is too low to assess the trade from Trøndelag, but they appear to have arrived via Birka, where Mostadmarka quarries was the main supplier in the 10th century.

Discussion and conclusions

From autarkic to industrial commodity production?

The above results provide a quite unequivocal answer to the first set of questions posed in the introduction. There does not seem to have been an initial autarkic phase in whetstone quarrying prior to the industrial commodity production; it was directed at intraregional, inter-regional, and long-distance trade from the start. This result resonates with B. Rundberget's conclusion on the iron-blooming industry in eastern Hedmark⁴⁵. He did not find an autarkic phase but identified the gradual expansion of commodity production since the 600s, booming from the late-10th century onwards. Conversely, Irmelin Martens found that in Telemark, autarkic iron blooming since the late 6th century was transformed to large-scale commodity production in the 10th century⁴⁶.

In the initial study of the soapstone-vessel industry, Arne Skjølsvold hypothesised that some quarries saw occasional household production while others were industrial sites⁴⁷. From analysing the distribution of vessels in Viking Age Hordaland and sourcing them to specific quarries in the region, Gitte Hansen et al. confirmed A. Skjølsvold's hypothesis and added chronological detail⁴⁸. Both the numerous quarries that supplied their local area and the small number of quarries from where vessels were traded over the whole region were in use in the 9th–10th centuries.

Neither Hansen et al. nor Skjølsvold had the data necessary to assess interregional or long-distance trade in soapstone vessels. Baug produced such data, however, when sourcing soapstone items retrieved in Kaupang⁴⁹. While there were no quarries in the Vestfold region, where

⁴⁵ RUNDBERGET 2017.

⁴⁶ MARTENS 1988.

⁴⁷ SKJØLSVOLD 1961.

⁴⁸ HANSEN et al. 2017, 287; 290.

⁴⁹ BAUG 2011.

Kaupang is located, quarries abound in Østfold, Romerike, and Agder (all Norway), 100 km and more as the crow flies from Kaupang (*Fig. 2*)⁵⁰. Baug's ICP-MS sourcing of vessel shards demonstrates that the vast majority, possibly all, vessel shards retrieved in Kaupang came from one and the same quarry, probably in one of the three mentioned regions. Other types of soapstone items, however – sinkers, loomweights, moulds, tuyères, and spindle whorls – appear to have come from a variety of quarries.

In Kaupang, soapstone vessels were not found in the earliest deposits but occurred from the 810s onwards⁵¹, while they appeared in Ribe only after 860⁵². This half-century gap between the start of vessel-trade to Kaupang and Ribe, respectively, does not seem to be a result of lack of contact, which was frequent in that period, but is more likely to reflect customer preferences or developments within the soapstone-vessel industry⁵³.

In conclusion, in the Scandinavian Peninsula, a development from autarkic to industrial production does not appear to have been common in the three lines of production discussed here. I. Martens, a pioneer in iron-blooming research, has identified that development, and some scholars have since concluded likewise⁵⁴. However, compared to Rundberget's enormous body of data, Martens and others obtained their results from a very small number of sites and datings. Therefore, Rundberget's conclusion that iron production was industrial from the start – proto-industrial, in his terminology – seems the more robust.

Most clearly in the soapstone-vessel industry, autarkic and industrial production have been practiced in parallel on separate sites. The split between industrial and autarkic quarries was likely a result of the organisers of the former having the exclusive rights to their quarry. The single huge quarry in Mostadmarka and several small ones in the same geological formation may well fit such a pattern.

Industries and trade routes

To address the initial questions concerning the Viking Age economy, both the scope of evidence and the timeframe need to be extended. Two issues are singled out for discussion here, on the one side the character of rural production and the distances over which products were traded, and on the other the role of towns.

Archaeological, literary, and documentary evidence suggest that since the 3rd century AD, goods from Scandinavia's two northernmost Atlantic regions settled by Germanic-speaking people, Trøndelag and Hålogaland, were brought to southern markets on the sheltered sailing route along the west-Scandinavian coast, the Norvegr⁵⁵. The coastland, taiga, and tundra of these regions and further north and east, were the sources of a multitude of luxuries and necessities, like furs, down, tusk, hides, antler, rope, and oil from game like whale, seal, walrus, reindeer, bear, wolverine, marten, and otter. Many of these goods were likely produced by Sámi hunters who traded them to Norsemen for luxuries and necessities, like glass beads and iron items. Since the 2nd century, Norsemen in Trøndelag had undertaken iron blooming on an industrial scale. Production output reached a maximum of some 80 tonnes annually in the late 3rd century and dropping gradually thereafter until it ended in the 6th century. Much of this

⁵⁰ BAUG 2011, 331 fig. 12,20.

⁵¹ BAUG 2011, 333–334.

⁵² Corrected from “after c. 800” in FEVEILE/JENSEN 2000, 20, by SINDBÆK/BARFOD 2023, 91.

⁵³ SKRE 2011b.

⁵⁴ E. g., NARMO 1997.

⁵⁵ SKRE 2018; ØSTMO 2020; SKRE 2025, 354–382.

iron was likely added into the assorted cargoes of Arctic luxuries and commodities headed for long-distance purchasers, some of them along the Norvegr and to the Skagerrak coastlands and beyond, others on the southern North Sea coasts⁵⁶.

While much of this produce is likely to have been traded to buyers overseas, some cargoes were, since the 4th century, sledged across the mountain ridge to Medelpad on the Baltic coast⁵⁷. When southern North Sea markets dwindled in the 6th century⁵⁸, trade along that overland route appears to have increased. In recent papers, Andreas Hennius et al. conclude that in the period AD 550–1050, some of the gaming pieces included in grave furnishings in Baltic-coast regions and islands were made of bone from the North Atlantic right whale, *Eubalaena glacialis*⁵⁹. This whale was hunted on the northern Atlantic coast of the Scandinavian Peninsula, likely by the Sámi, who also extracted oil from the whales' blubber and surely produced other commodities from whales, too. In the decades around 550, these gaming pieces occurred in elite graves in the Mälaren valley, and from the late 6th century and continuing into the early 11th century, they were included in more average grave furnishings from Jämtland in the north to Småland in the south as well as in the Baltic islands Gotland and Åland.

For sure, gaming pieces is merely one of the commodities that were traded on the east–west route between the Atlantic and Baltic coasts, they just happen to be the one that has been preserved and can be provenanced. Trøndelag iron does not appear to have been added to these cargoes – iron-billet types retrieved there suggest that Baltic-coast regions bloomed their own⁶⁰. But the evidence presented here demonstrate that when whetstone quarrying started in the early 8th century, that commodity was included in the sledge loads.

The same pattern pertains to the southbound sea route. The start of the eastbound whetstone trade coincided with them being added to freights from Hålogaland and Trøndelag along the Norvegr and into the North Sea, as evidenced by finds of Mostadmarka whetstones in 705–730 Ribe deposits – Northern reindeer-antler combs were included too⁶¹. As noted, Northern commodities had been transported to the southern North Sea coasts from the 3rd to the mid-6th centuries, but trade declined thereafter⁶². Of the northbound goods that came in exchange through the 7th century, glass vessels, weaponry, and glass beads have been preserved in the archaeological record⁶³.

The first conclusion, then, is that the distribution of Mostadmarka whetstones to Baltic-coast regions and to Ribe as soon as quarrying started in the early decades of the 8th century was a result of them being added to long-distance cargoes that at that time had been transported along these routes for centuries. When Birka was established, that destination was added to already well-established routes to the Mälaren valley. Trade along the Skagerrak coast to Kaupang and further on through Kattegat to Hedeby cannot be evidenced before the two towns were established around 800, but it may have come about as an extension to the well-established southbound route.

Therefore, the second conclusion: The emergence of towns does not appear to have led to new trade routes being taken up or of commodity production becoming industrial – both phenomena were there already. Rather, towns obtained commodities from well-established production lines by tapping into trade routes that were already ongoing. Likely, the emergence

⁵⁶ SKRE 2025, 329–353.

⁵⁷ SLOMANN 1950.

⁵⁸ WICKHAM 1998; NÄSMAN 2000.

⁵⁹ HENNIUS et al. 2018; 2023.

⁶⁰ SKRE 2025, 339–347.

⁶¹ QVISTGAARD/SINDBÆK 2023, 313–315.

⁶² SKRE 2025, 309–316; 540–542.

⁶³ VINSRYGG 1979; NÄSMAN 1998; NØRGÅRD JØRGENSEN 1999.

of urban markets led to increases in volumes produced and traded, at least in Ribe's heyday 760–790. Also, the emergence of towns may have inspired the taking up of new lines of commodity production, for instance, of soapstone vessels shortly after 800. But the very phenomenon, industrial commodity production, was practiced in a fully rural Scandinavia for some six centuries, from the 2nd and until Ribe was established in the early 8th century, and indeed thereafter.

Industries, towns, and the Viking Age economy

Perhaps surprisingly, the two seemingly opposed views sketched in the introduction – R. Hodges' and Hedeager's on the one side and Ch. Wickham's on the other – have a definite overlap. It concerns towns – they call them *emporia* – where Wickham built Hodges' understanding of them into the very foundation of his understanding of the early medieval economy.

Initially, Hodges argued that towns were established by kings to gain control over long-distance luxury trade and thus secure their role as givers of the most prestigious gifts⁶⁴. In the second edition of the book, he added that they were pivotal in the transformation of a gift economy to a commodity economy⁶⁵. The first of these views was taken up by Wickham, they were primarily hubs in “the international luxury trade”, he posited⁶⁶, “funnels for the channeling of relatively rare prestige goods to a restricted group of people around the kings”⁶⁷. This trade was not a very significant part of the economy, however; he regarded it as “socio-politically significant, rather than important enough to characterise or affect an *economic system*”⁶⁸. The production of agricultural and artisanal goods, e. g., of pottery, which were traded in local and regional commercial networks, was more important in the economic system as a whole, Wickham asserted.

Wickham has explored that system in a series of subsequent publications⁶⁹, maintaining throughout that it was feudal in nature, “based on the exploitative relations of production between peasants, that is to say subsistence cultivators, and lords”⁷⁰. What trade there was, be it long-distance urban or regional and interregional rural trade, did not have systemic repercussions.

These various perspectives on the early medieval economy are somewhat hard to square with the Scandinavian evidence on industrial commodity production and trade in the 2nd–10th centuries presented here, which allows the following three points to be made.

Firstly, there is no indication that solely prestige goods were traded long distances, nor that long-distance trade was solely urban. In the 2nd–7th centuries, iron bloomed in Trøndelag was likely traded to regions along the Scandinavian Peninsula's Atlantic coast, distances of up to 750 km. Iron produced in Jämtland was traded south to the Mälaren regions, and most of that bloomed in Småland was carried to Öland and Östergötland, distances of up to 550 km⁷¹. Turning to the route across the Scandinavian Peninsula from Trøndelag, the only items known to have been carried there in the 4th–mid-6th centuries were copper-alloy vessels produced in Gaul (Westland cauldrons) to Medelpad⁷². The mid-6th century adding of whalebone gaming pieces to these freights appears to correspond with a rerouting of that trade to the Mälaren

⁶⁴ HODGES 1982.

⁶⁵ HODGES 1989b.

⁶⁶ WICKHAM 1998, 283.

⁶⁷ WICKHAM 2000, 352.

⁶⁸ WICKHAM 1998, 283; also in 2000, 351–352.

⁶⁹ WICKHAM 2005; 2008; 2015; 2021; 2023.

⁷⁰ WICKHAM 2021, 9.

⁷¹ SKRE 2025, 342–345.

⁷² SLOMANN 1950; HAUKEN 2005, 62.

valley. From the early 8th century onwards, Mostadmarka whetstones were included in these long-distance freights, both overland to the Mälaren valley and southwards across the North Sea and Skagerrak.

Secondly, there is no indication that the Scandinavian towns of the 8th–10th centuries saw little but trade in prestige-goods brought there by visiting merchants and glass beads, brooches, etc. produced by artisans on site. Low-cost utensils from rural production, like whetstones, were traded there, too, and some of these products arrived through long-distance trade.

The third point is that rural production modes and distribution patterns appear not to have changed much through the period discussed here. The stability in these lines of production is evidenced in blooming technologies and plant layouts; they differed between regions but were consistent within each region for hundreds of years. Shapes of whalebone gaming pieces hardly changed over their five centuries of production, and they continued to reach Baltic-coast regions throughout that period. Thus, stability, continuity, and consistency pertain to industrial production of necessities like iron, low-cost utensils like whetstones, production of lower-end luxuries like gaming pieces, as well as to the trading of such produce within and between rural regions separated by up to 2000 km. These robustly organised undertakings do not appear to have been influenced much by the establishment of towns.

While the first two points are quite firmly based in the evidence presented here, the third cannot really be made beyond the utterly few products that have survived well in the archaeological record and may be provenanced. And even for those, reliable estimates of traded volumes cannot be produced – except for certain regions' iron production (*p.* 119). Those data suggest that there were considerable fluctuations in produced and traded volumes through each commodity's production periods. Even more significantly: only brief glimpses can be caught of the vast majority of traded goods (examples *pp.* 118; 135); they may be mentioned briefly in written evidence, now and then fortunate preservation conditions allow materials like textiles and furs to be preserved, and rare traces of production sites are occasionally identified by chance. In addition to variations in produced and traded volumes, production modes and distribution patterns of these goods may have followed trajectories that deviate from those evidenced here.

Still, it seems fair to conclude that as far as may be ascertained from the production and trade of commodities discussed here, and indeed from the continued practising in the 3rd–10th centuries of the industrial commodity-production mode, no profound changes occurred in Scandinavia's socioeconomic formation in this period.

However, the lens of industrial commodity production offers a quite limited view of the socioeconomic formation; pivotal components remain out of sight – societal hierarchies and patterns of landholding, for instance. Still, this view appears to identify weaknesses in both of the perspectives on the early medieval economy sketched at the start of this paper and discussed further above. It accords well, however, with perspectives suggested by John Moreland in two penetrating contributions⁷³. The many changes in the 8th century, he stated, “forces us to abandon the idea that the *emporía* were *the* foci of economic development”⁷⁴. Regarding forms of exchange, he noted that there is⁷⁵: “...no such thing as gift economies and commodity economies [...]. Within all historical economies there were a range of exchange mechanisms. The task of the archaeologist and historian is to discover what these were and to reconstruct the particular way in which they articulated”.

⁷³ MORELAND 2000a; 2000b.

⁷⁵ MORELAND 2000a, 32.

⁷⁴ MORELAND 2000b, 102, *his italics*.

The widespread tendency among scholars to let exchange mechanisms define the economy has, J. Moreland continued, “grossly neglected consideration of the realm of production”⁷⁶. On the question of socioeconomic systems, feudal or other, Moreland stated that “we destroy the distinctiveness of economic processes in the eighth century by the imposition of evolutionary and developmental models”⁷⁷.

Indeed, the evidence on industrial commodity production and multi-range trade presented here calls for a fuller reconsideration of the Viking Age economy along the lines suggested by Moreland some 25 years ago.

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⁷⁶ MORELAND 2000a, 32.

⁷⁷ MORELAND 2000b, 69.

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Abstract: Viking Age economics: implications of industrial commodity production

This paper argues that from the start in the early AD 700s, the quarrying of whetstones in Mostadmarka, Trøndelag, present-day Norway, was industrial, and distribution was regional, interregional, and long-distance. By collating evidence on whetstones and other non-luxury products, industrial production and multi-range distribution may be identified since the early 1st millennium AD. These findings question widespread notions of a transition from autarkic to industrial production and of the prevalence of prestige goods in long-distance trade. Instead, certain lines of rural production of non-luxury raw materials and utensils appear to have been industrial from the start, and since the AD 200s, such products were included in short- and long-distance freights. This evidence challenges established theories of early medieval economic systems and the economic significance of urbanisation, calling for nuanced approaches that seek to identify coexisting disparate modes of production and exchange.

Zusammenfassung: Wirtschaft in der Wikingerzeit: Auswirkungen der industriellen Warenproduktion

In diesem Artikel wird dafür argumentiert, dass der Abbau von Wetzsteinen in Mostadmarka, Trøndelag, im heutigen Norwegen, von seinem Beginn im frühen 8. Jahrhundert n. Chr. an einen industriellen Charakter hatte, und dass der Vertrieb regional, interregional und über große Entfernungen hinweg erfolgte. Durch die Zusammenstellung von Belegen zu Wetzsteinen und anderen Nicht-Luxusgütern lassen sich industrielle Produktion und ein weitreichender Vertrieb seit Beginn des ersten Jahrtausends n. Chr. nachweisen. Diese Erkenntnisse stellen die weit verbreitete Vorstellung eines Übergangs von autarker zu industrieller Produktion und der Vorherrschaft von Prestigegütern im Fernhandel in Frage. Stattdessen scheinen bestimmte Bereiche der ländlichen Produktion von Alltagsgütern und Rohstoffen von Anfang an industrielle Züge gehabt zu haben, und seit dem 3. Jahrhundert n. Chr. wurden solche Produkte über kurze und weite Strecken transportiert und gehandelt. Diese Erkenntnisse stellen etablierte Theorien über frühmittelalterliche Wirtschaftssysteme und die wirtschaftliche Bedeutung der Urbanisierung in Frage und erfordern differenzierte Ansätze, welche darauf abzielen, koexistierende unterschiedliche Produktions- und Austauschformen zu identifizieren.

Résumé : L'économie à l'époque viking : effets de la production industrielle de marchandises

Dans cet article il est argumenté que l'extraction de pierres à aiguiser à Mostadmarka, dans l'actuelle province norvégienne de Trøndelag, était de caractère industriel dès ses origines au début du VIII^e siècle après J.-C., et que la distribution était régionale, interrégionale et à longue distance. En rassemblant les données sur les pierres à aiguiser et d'autres produits de caractère non luxueux, on arrive à identifier la nature industrielle de leur production ainsi que l'ampleur de leur distribution à partir du début du premier millénaire de notre ère. Ce constat remet en question la notion répandue d'une phase de transition entre une production autosuffisante et celle à une échelle industrielle, mais aussi l'idée de la prédominance de biens de prestige dans le commerce à longue distance. À l'inverse, certains secteurs de la production rurale de biens courants et de matières premières semblent avoir été de caractère industriel dès le début. À partir du III^e siècle après J.-C., ces produits semblent avoir été échangés et sur de courtes et de longues distances. Ces indications viennent à défier les conceptions établies concernant les systèmes économiques du début du Moyen Âge et l'importance économique de l'urbanisation à cette époque. Elles exigent des approches plus nuancées visant à identifier la coexistence de différentes formes de production et d'échange.

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