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In Search of Cloudstones? The Contribution of Charismatic Rocks Towards an Understanding of Mesolithic and Neolithic Communities in the Montane Regions of South Norway

By ASTRID J. NYLAND[1]

This paper discusses whether a consideration of the capacity of rocks to affect humans in terms of their charisma or object-agency can aid in understanding identified variation in patterns of lithic procurement, distribution, and use. Lithic assemblages at sites dating to both the Late Mesolithic and Early Neolithic in two separate areas of the central mountain plateau in southern Norway demonstrate use of locally available rock. Their use contrasts with that of flint which could only be sourced at the coast. While the use of flint in regions with a restricted range of available and suitable rock types is understandable, the presence of flint in regions rich in flint alternatives is more puzzling. In order to understand the choices and actions of prehistoric communities we must consider other factors, such as a sensorial exploration of the ability of raw materials to affect humans, together with the diverging ontological perspectives that shape human–material relations and the social situations of practice. This paper argues that, in addition to their straightforward utility, lithic raw materials had socially situated object-agency and inherent characteristics of charisma and that these exerted powerful influences on human choice, perception, and preference.

Keywords: Quartz crystal, quartzites, lithic procurement, Mesolithic, Neolithic, object-agency, charisma, social practice

In Mesolithic and Neolithic Norway people were predominantly coastal hunter-gatherer-fishers. However, the existence of quarries and settlement sites in the mountains also provides evidence of extensive seasonal exploitation of mountain resources. The active utilisation of several landscape zones highlights some interesting questions for our deeper understanding of these periods. One question that links the two zones relates to the use of lithic raw materials. On the one hand, the mountains contain plenty of accessible sources of local rock including high-quality quartz crystal and fine-grained, sometimes micro-crystalline, quartzites. On the other hand, flint – a purely coastal resource – dominates at the coastal sites throughout the Stone Age in Norway. In Norway, flint is drift waste, deposited along the shore by icebergs and ice rivers at the end of the last Weichselian Ice Age (eg, Johansen 1955) but it was transported into the mountain region over distances that sometimes covered more than 200 km. While the use of flint in regions with a restricted range of locally available and suitable rock types is understandable, what made communities bring flint into montane regions that were rich in alternatives?

In order to understand this phenomenon, an exploration is required into identified patterns of rock use as indications of object-agency and the ability of rocks to influence human practices. Arguments presented here are supported by results from the investigation of the composition of lithic assemblages at 58 sites in two case study areas in the mountain region of South Norway. Identified tendencies and patterns in the use of rock indirectly point to preferred practices of lithic procurement across the Mesolithic–Neolithic transition around 4000 BC. It is important to note that, especially in the western part of South Norway, the transition between the Mesolithic and Neolithic is not an agricultural transition in a European sense

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(cf. Nyland 2019a). There were some changes in lithic blade technology, stone adze morphology, and a minute, but incipient pottery production in the Early Neolithic but botanical evidence places the transition to agricultural after 2300 BC (Hjelle *et al.* 2018), that is, in the Late Neolithic and Bronze Age. From the Late Mesolithic to the Late Neolithic (*c.* 6000–2300 BC), coastal semi-mobile settlements with a mobility pattern involving seasonal hunting expeditions into the montane areas dominated.

As will be exemplified, earlier research emphasised the invested endeavour required to procure rock as a means to distinguish between the significance of various rock types. Although provenance and distance travelled is part of the argument, in this paper these are not the most important attributes. Instead of classifying rock into categories of local or exotic, crediting social significance to the latter, variations in lithic raw materials between regions are taken as signs of varied attitudes to, engagement with, and embedded sentiments ascribed to, rock and place itself. The agency of rock and its ability to affect people, hence its charisma, could have been anchored in the landscape zone of procurement (coast or mountain) or in its associations with different groups of people. Furthermore, with the word 'cloudstone' in the title, a reference to the art/poetry/archaeology book *Stoneworks* by Mark Edmonds and Rose Ferraby (2013), I also hint at the importance of even more subtle aspects of rock that are often 'lost in translation' in an academic text. The intangible and culturally dependent meaning of rock is an element that empowered rock too. Before presenting the case studies and results used to tie such claims to archaeological material, I commence by outlining the theoretical perspectives that fuel these interpretations.

THE AGENCY OF ROCK: CHARISMA OR ESSENCE?

Meaning is contextually and socially dependent, fluid, and multi-layered, but also formed and framed by ontological perspective or orientation. Thus, aiming to understand what rock meant to people in past societies, beyond its pragmatic qualities for tool production, is a major challenge for archaeologists. Ethnographically one can find examples of lithic procurement sites, quarries or outcrops, being regarded as arenas for communication and interaction with certain powers or spirits by some historic hunter-gatherer societies (cf. Robinson 2004, 97). Certain rock deposits have been perceived as places of ancestral presence, linking land, mythical characters or spirits, and people (eg, Taçon 1991; Hampton 1999; Dean 2010). Rock procured from such a socially significant place can thus embed value, empowering the objects made from it. Ethnographic or anthropological examples from around the world demonstrate how objects and rock have been ascribed specific qualities, sometimes being regarded and valued as living entities themselves (Dean 2010; Pétrequin & Pétrequin 2011).

Endeavours have also been made to move beyond the perhaps arbitrary symbolic meaning of rocks. Instead, human–material encounters and engagement are considered in an attempt to elucidate how materials, things – rock – affect human practices as a result of their embedded and often non-quantifiable qualities. In the 1960s, Max Weber (1968) characterised the features, activities, symbols, and personalities of people holding positions in religious or political institutions as 'charismatic'. The socially situated and acknowledged charisma aided in turn the legitimation and consolidation of authority. Since then, charismatic qualities have been extended to objects in an attempt to explain how objects affect human emotions, memories, and associations. Worn objects can thus be considered as extended parts of the wearer's body, a type of 'social skin'; they can be powerful and charismatic sources of expressed religious identity, for example (eg, Nødseth 2018). In cognitive psychology objects have similarly been acknowledged as contagions: that is, objects embedding qualities that affect the identity or status of the owners (Newman & Smith 2016). In the 1990s, as one increasingly acknowledged that objects could embed the qualities of humans, theories of object-agency developed (Gell 1992; 1998). Gell (1998, 17–21) pointed out that agency is relational, existing in the relationship between people and things. Hence, owning, using, or wearing an object which is recognised as significant can legitimise authority or a person or place's enigmatic power or social significance. Thus, although originally perceived as a human quality, charisma can be transferred between people and things and be embedded by objects.

This recognition of the autonomy and status of things increased in the 2000s. Any worldly object, animate or inanimate, can be ascribed the ability to act, to have goals, and the power to influence people and society (Olsen 2003, 89; Boivin 2004b; Gosden 2005, 196). Related arguments emphasising the capacities of objects to both emotionally and influentially affect humans, regarding objects as bodies capable of influencing and moving people, is part of post-anthropocentric debates (eg, Harris & Sørensen 2010; Hamilakis 2013). Hence, objects can have the ability to arouse awe and to appeal to people's aesthetic senses. Still, their impact also depends on things having a form, style, or origin that is recognised and acknowledged by the surrounding community. As pertains in this paper, to better understand the particularities of the procurement and use of certain rock types, I consider whether they could have possessed or been endowed with intangible qualities.

Our understanding of identified patterns of lithic distribution and exploitation may be inhibited by our Western European perspectives, if practices were initiated and anchored in an ontological perspective diverging from our Western one. An example of a diverging ontology can be found within the pre-Columbian and Amerindian communities. To them, the quality of light infused morality, represented life, and energised the world (Saunders 1999, 246). Light, bright colours and lustre indicated the presence of supernatural beings. Moreover, materials that Western European researchers regard as elementally different, such as metals, shells, pearls, wood, or rock that shone and shimmered would, for the pre-Colombians, be regarded as essentially the same, yet 'actively transformational in appearance and spiritual essence' (Saunders 2004, 136). Hence, the main quality of a raw material could be its transformability (Gosden 2005, 209; Conneller 2011, 93), that is, different substances, such as different rock types, may when transformed take on or realise forms and qualities which transgress Western classifications and boundaries between types (Conneller 2011). This more fluid and relational perspective on the qualities of the bodies of the world – its objects, people, animals, etc – has also been advocated by Eduardo Viveiros de Castro (2012, 125). Referring to Amerindian ontologies, he argues that understanding *what* things are is a matter of phenomenological perspective, in the sense that 'body and soul, just like nature and culture, do not correspond to substantives, self-subsistent entities or ontological provinces'.

Examples from around the world can inform how different raw materials can be imbued with sacredness by virtue of their origin at locations conceived of as spiritually or ritually significant, such as a specific mountain. This can also mean origin in a wider sense, such as mountains in general. In the case of the pre-Colombians described by Saunders, the powerful energy of light was converted into solid objects, a transformative process that empowered or reinforced these objects with mythic identity. The empowered objects then merged with the owner, legitimising their social position or power (Saunders 1999, 246). Consequently, and in light of the outlined discussion of object-agency, transformation can make objects or, indeed, lithic raw materials charismatic. The challenge, though, is to anchor any claims of such intangible, fluid, and differentiated meaning of rock in the archaeological material. Based on the examination of lithic quarries, rock deposits, and lithic assemblages at open-air sites in two case study areas in South Norway, I will attempt to do just that.

USING ROCK IN MONTANE AREAS – TWO CASE STUDIES

The case studies are compiled from archaeological reports on surveyed and excavated hunting camps in two case study areas in the mountains of western South Norway. Both include rock quarries and seasonal, short-term camp sites located around lakes and rivers. Surveyed and excavated lithic materials from these sites, stored at the university museums in Bergen, Oslo, and Stavanger, have partly been re-examined. The museum catalogues, available online[1] have also been consulted.

In this paper, I focus on the activity in the Late Mesolithic and Early/Middle Neolithic, yet many of the sites demonstrate activity in later prehistoric periods too. The material in both case studies concurs with general typological trends in western South Norway. Most relevant here is how, in the Late Mesolithic, the dominating technology is microblade production on single platform conical or bipolar cores. From the Early Neolithic blades are struck from cylindrical cores. Around 4000 BC characteristic transverse and tanged points occur, while tanged points continued to the end of the Middle Neolithic becoming more elaborate and curated with time. The latter is allegedly a cultural impulse from south Scandinavian Battle Axe Cultures, whereas, in the Early Neolithic, ground slate technology is thought to have been introduced to South Norway from northern Norway. Hence, during this period, the regions include and respond to external impulses but the predominantly hunter-gatherer-fisher semi-mobile society continues into the Late Neolithic.

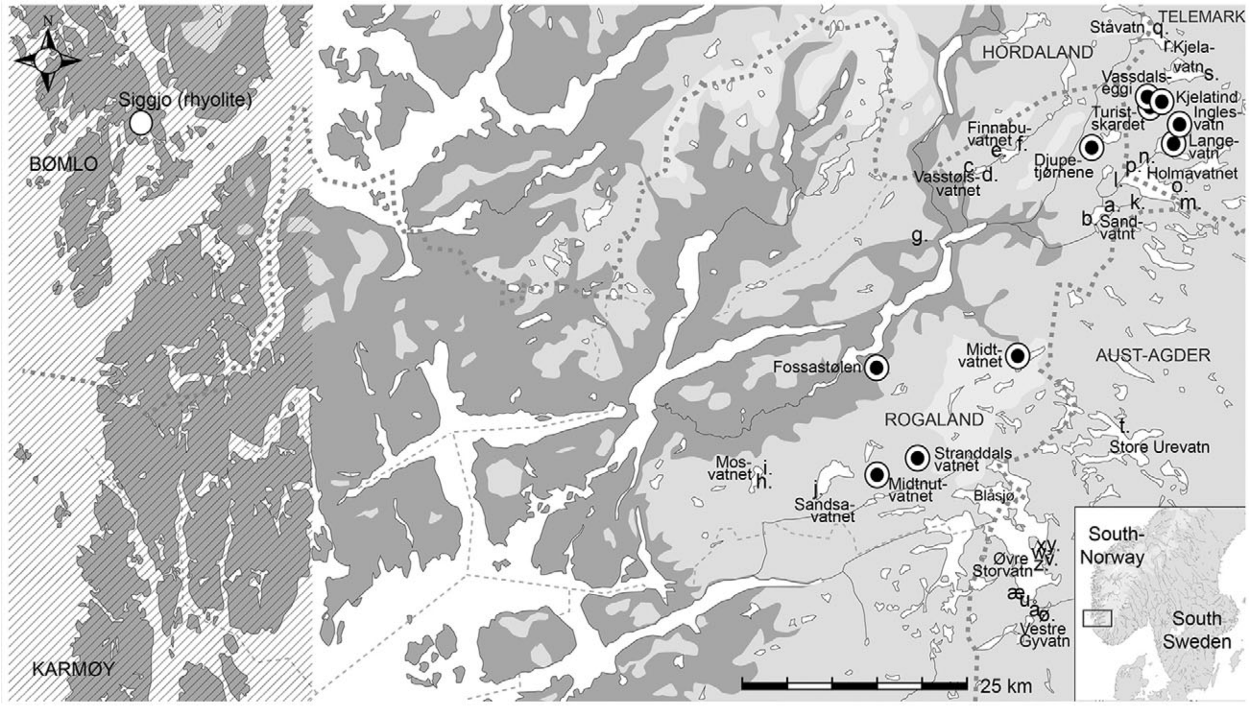

Fig. 1.
Map illustrating the large sources of quartz crystal within the case study areas and examined sites referred to in Table 1 (illustration: Astrid J. Nyland)

The use of quartz crystal in the mountainous regions of Rogaland County

The first case study covers an area of about 600 km^2 in the mountainous interior of south-west Norway in the counties of Rogaland, Aust-Agder, and Telemark. The area is about 100 km east of the coastal zone that was relatively densely settled during both the Mesolithic and Neolithic. Steep valleys and lakes cut across the terrain of mostly treeless mountains with peaks between 1000 m and 1400 m asl. Compared to other regions, the variety of rock types suitable for tool production is low, with the bedrock consisting mostly of gneiss and phyllite. There is, however, one exception: large surface deposits of quartz with sizeable quartz crystals (colloquially known as rock crystals).

In the 1960s and '70s, large scale archaeological surveys were initiated in response to massive hydropower developments in this region. Consequently, prehistoric activity in parts of the montane region was thoroughly charted and resulted in archaeological excavations of the most exposed sites (eg, Odner 1962; 1963; Bang-Andersen 1975; 1983; 2008). During these surveys, six large sources of quartz crystal were also recorded (Bang-Andersen 1975) (Fig. 1).

The quartz crystal sources comprise large, scattered blocks as well as broad, visible veins in the bedrock (Fig. 2). The search for crystals has left blocks smashed into smaller pieces and there are hollows from quarrying to access the pure rock crystal prisms embedded in cavities in the rock. The sources are not protected sites. Consequently, many of the signs of quarrying also stem from visits and crystal extraction in both historic and modern times as established hiking routes pass by the sites. There is evidence in the region of crystals being used for making beads in the Viking Age (Myhre 2005). Thus, it is difficult – if not impossible – to distinguish prehistoric from recent debris. In order to date and evaluate a potential exploitation of the sources and utilisation during the Stone Age, the lithic assemblages at 29 recorded sites in the vicinity of the sources were examined instead (Table 1, see also Fig. 1). The sites are dated based on chronological

Fig. 2.
The site comprises smashed quartz after the extraction of crystals embedded in cavities in a broad vein of quartz in the bedrock (photo: Astrid J. Nyland)

indicators in the lithic assemblages, especially points and blade technology. Quantified variation in rock composition in the assemblages indicates preferences in rock types and procurement strategies, for example, whether or not it was solely the local sources of rock that were exploited. Not all the examined sites are scientifically excavated, some comprise collected surface-exposed material only. Nevertheless, together they give an impression of which rock types were used in the mountains, compared to the coastal zone.

The glacial withdrawal in this region is said to have concluded at the onset of the Middle Mesolithic (Blystad & Selsing 1988). The oldest sites in the case study area date back to this period (Sites i, w and possibly æ). The majority of sites date to the end of the Late Mesolithic and the Early Neolithic. In the Late Mesolithic microblades are made of both flint and quartz crystals. Nine sites (u–å) have been radiocarbon dated (see Bang-Andersen 2008, 94–5, 136–9). At the coast and in the mountains sites demonstrate that quartz crystals were part of the known 'lithic landscape' from the Early Mesolithic (9500 BC onwards) into the Bronze Age (1700–400 BC) (eg, Bang-Andersen 2003; 2012; Skjelstad 2011). In this case study area the investigations demonstrate that flint and quartz crystal dominate as raw materials for tool production in the mountains at least from 5000 BC to 2700 BC.

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TABLE 1: THE RESULTS FROM THE EXAMINATION OF RAW MATERIAL VARIATION AT 29 SITES IN CASE STUDY AREA 1

Map id.	*Mus. no.*	*Site, lake (county)*	*Summarised rock types: Total finds (identified types)*	*Date*	*Late Mesolithic*			*Early & Middle Neolithic*				
					qc	*f*	*q*	*qc*	*f*	*q*	*s*	*r*
a	S8981	Sandvassbukt, Sandvatn/ Gravetjørn (R)	12 (8 qc; 4 f)	(Meso.?)	X	x						
b	S8977	Sandvassholmen, Sandvatn (R)	14 (11 f; 3 s)	Neo.					X		x	
c	S8983	Vasstølen I, Vasstølvatn (R)	377 (357 qc, 19 f; 1 q) (+ Iron Age material)	*IA*	?	?						
d	S8984	Kvinarebekken, Vasstølvatn (R)	1601 (1600 qc; 1 f)	(Meso.?)	X	x						
e	S8988	Kvannemofoss, Finnabuvatn (R)	250 (248 qc; 1 f, 1 q)	(Meso.?)	X	x	x					
f	S8982	Vassbotn, Finnabuvatn (R)	326 (96 qc; 154 f; 55 q; 15 r; 3 s; 3 o)	Meso/*Neo*	x	x		X	X	x	x	x
g	S9012	Indre Grubbedalstjødn (R)	18 (16 qc; 2 q)	(Meso.?)	X		x					
h	S9620	Lok. 35 Mosstøl, Mosvatnet (R)	91 (86 qc; 5 f)	*(+ IA)*				x	x			
	S9938	Lok. 35 Mosstøl, Mosvatnet (R)	415 (408 qc; 7 f)	*(+ IA)*	x	x		x	x			
i	S9934	Lok. 7 Herabakka, Mosvatnet (R)	710 (36 qc; 672 f)	Meso.	x	X						
	S9935		1189 (20 qc; 1115 f; 49 q; 5 o)	Neo.				x	X			
j	S9624	Haugastøl, Sandsavatnet (stray find) (R)	1 (1 f)	Neo.					x			
	S9939		1 (1 f)	Neo.					x			
k	S9625	Pytten, Holmavatn (R)	217 (165 qc; 27 f; 40 s)	Neo.	?	?		X	x		X	
l	S13907	Naustdalen (stray find), Holmavatn (R)	1 (1 f)	(Neo?)					x			
	S14014		9 (9 f)	(Neo?)					x			
m	C31966	Holmevasskilen, Kivik, Holmavatn (T)	2947 (2132 qc; 351 f; 460 s; 4 o)	Neo.				X	X		X	
	C31348		65 (62 qc; 3 f)	Stone Age	?	?		?	?			
	C31547		51 (16 qc; 26 f; 1 o; 8 s) + 1045 kg (700 g qc; 45 g f; 300 g s)	Neo.				X	X	x	x	
n	C31337	Haukelids hytte, Vivik, Holmavatn (T)	140 (138 qc, 2 f)	Stone Age	?	?		?	?			
	C31338		62 (26 qc; 36 f; 3 s) + 400 g debitage (275 g qc; 125 g f)	Neo.	x	x		X	X		x	
	C31347		86 (27 qc; 49 f; 10 s) + 1,9 kg (1.2 kg qc; 300 g f; 400 g s)	Meso/*Neo*	x	x		X	X		X	
	C31545		11 (6 f; 5 qc) + 50 g (rock type not defined)	Stone Age?	?	?		?	?			
o	C31350	Bamsebu, Holmavatn (T)	8 (8 qc)	(?)	?							
	C31548	Bamsebu, tuft 2, Holmavatn (T)	13 (12 qc; 1 f) + *c.* 625 g qc	Meso.	X	x						
p	C31546	Holmevasshytta, Holmavatn (T)	92 (88 qc; 11 f; 1 q; 1 o) + 1.4 kg 'mostly' qc, 'some' f	Meso.	X	x			?			
	-		2 (1 f: 1 qc)	Stone Age?	?	?		?	?			

(Continued)

TABLE 1: (Continued)

Map id.	*Mus. no.*	*Site, lake (county)*	*Summarised rock types: Total finds (identified types)*	*Date*	*Late Mesolithic*			*Early & Middle Neolithic*				
					qc	*f*	*q*	*qc*	*f*	*q*	*s*	*r*
q	C29947	Gautesnes, Ståvatn (T)	8 (8 qc)	Stone Age	?			?				
r	C29946	Ståvatn (T)	6 (6 f)	Stone Age		?			?			
s	C29979	Nordre Sandvika, Kjelavatn (T)	3 (1 q; 2 f) + 70 g flint	Neo. ?					X		x	
	C29980		5 (1 qc; 4 f)	Stone Age	?	?		?	?			
	C29994		11 (1 qc?; 10 f) + *c.* 30 g (11 g qc?; 20 g f,)	Stone Age	?	?		?	?			
t	C34725	Urar 4, Store Urevatn (AA)	560 (465 qc; 95 f)	Meso.	X	x						
u	C34802	Lok.12, Øvre Storvatnet (AA)	257 (10 qc; 247 f)	L. Meso. C^{14}	x	X						
	C35051		19 (19 f)	L. Meso. C^{14}		x						
v	C34803	Lok.17, Øvre Storvatnet (AA)	339 (34 qc; 302 f; 1 s; 2 other)	L. Meso. C^{14}	x	X					?	
	C34804		149 (6 qc; 143 f)	L. Meso. C^{14}	x	X						
	C35052		440 (54 qc; 347 f; 31 s; 8 other)	*L. Meso/Neo* C^{14}	x	X		x	X	x	x	
	C35053		920 (2 qc; 886 f; 4 q; 28 other (quartz))	L. Meso. C^{14}	x	X	x					
w	C34805	Lok.147, Øvre Storvatnet (AA)	94 (32 qc; 62 f)	L. Meso. C^{14}	x	X						
	C35055		36 (11 qc; 24 f; 1 q)	L. Meso. C^{14}	x	X	x					
x	C34806	Lok.148 Hovassåna, Øvre Storvatnet (AA)	1 (1 f)	L. Meso. C^{14}		x						
	C35056		6 (6 f)	L. Meso. C^{14}		x						
y	C34807	Lok.150 Hovassåna, Øvre Storvatnet (AA)	3 (3 f)	L. Meso. C^{14}		x						
	C35057		141 (139 f; 2 other)	L. Meso. C^{14}		X						
z	C35059	Lok.183, Øvre Storvatnet (AA)	48 (5 qc; 42 f; 1q)	L. Meso. C^{14}	X	X	x					
æ	C35058	Lok.182, Øvre Storvatnet (AA)	394 (256 qc; 127 flint; 11q)	L. Meso. C^{14}	X	X	x					
ø	C34809	Lok.145, Vestre Gyvatnet (AA)	18 (1 qc; 17 f)	Stone Age	?	?		?	?			
	C35054		403 (3 qc; 400 f)	L. Meso. C^{14}	x	X						
å	C34810	Lok.146, Vestre Gyvatnet (AA)	355 (341 qc; 13 f; 1q)	L. Meso. C^{14}	X	x						

The letters in column 1 correspond to the map in Fig. 1. The rock types found are: quartz crystal (qc), flint (f), quartzite (q), rhyolite (r) and slate (s). Small x indicates use and large X the period where the rock types dominates in the assemblage. Mus. no is the assemblage's identification number in the stored collections at the Museum of Archaeology, UiS (S. no) and the Museum of Cultural History in Oslo, UiO, (C. no) (see also endnote 1). The sites are located in the counties of Rogaland (R), Hordaland (H), Aust-Agder (AA), and Telemark (T).

Some sites are evidential used repeatedly, demonstrating material that is from two (or more) periods. In the date column *italic* indicates the dominant period; parenthesis indicates the most likely date, where more precise dating is not possible.

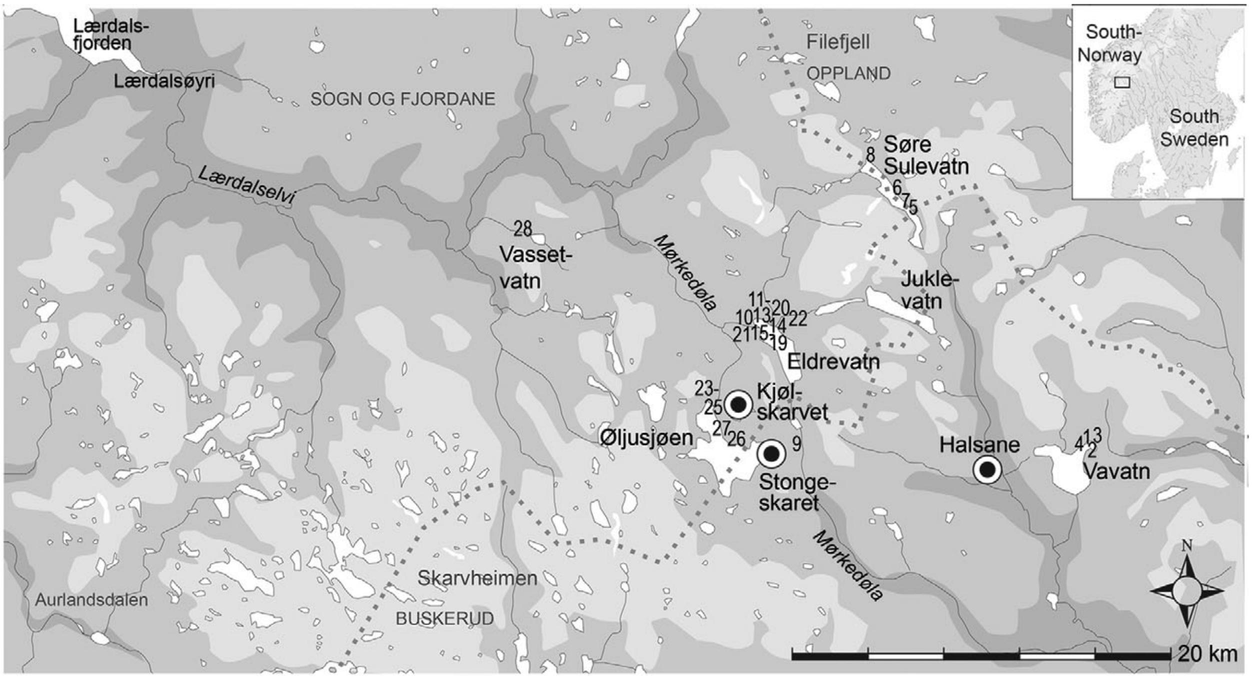

Fig. 3.
Map of the three definite quartzite quarries and the location of examined sites referred to in Table 2 (illustration: Astrid J. Nyland)

The exploitation of quartzites in the mountains of Lærdal–Hemsedal

The second case study is located in the mountains of Lærdal and Hemsedal, in Sogn og Fjordane, Oppland, and Buskerud Counties. The study area is approximately 1000 km^2, above the present tree line, with lakes and rivers cutting across the rocky landscape and peaks around 1200–1400 m asl. The area constitutes a watershed between the valleys of inland eastern Norway and the inner fjord regions of western Norway. There are broad glaciated valleys to the east and steep river valleys to the west. As in the previous case study, most sites were discovered and charted during intense surveys associated with hydro-power developments in the 1960–70s (eg, Espedal 1965a; 1965b; Martens 1965; Johansen 1967; 1978).

During the surveys, several exploited outcrops and boulders of quartzite were observed, including three definite quartzite quarries (Fig. 3). The quartzite in this area is particularly fine-grained, pure, and dense, splitting almost like flint (colloquially called 'Lærdal quartzite' in Norwegian Stone Age archaeology).

The largest quarry is Kjølskarvet. It comprises two main focal points of quarried crags and outcrops (Sites I & II), separated by about 500 m (Espedal 1965a; Johansen 1967; 1968). Surrounding Sites I and II, and Lake Øljusjøen, there are numerous exploited quartzite erratics and outcrops but also workshop and camp sites (Fig. 4). This area thus constitutes the largest known mountainous extraction site of quartzite in Norway. The extent and thickness of the waste layers, the many workshops, and the surrounding sites imply that at least 100 m^3 quartzite has been quarried in the area (Nyland 2016a).

A smaller quarry, Stongeskaret, lies 3–4 km north-east of Kjølskarvet and just south-east of Lake Øljusjøen (Fig. 3). The quality and colour of the quartzite extracted is similar to that from Kjølskarvet but it is a much smaller quarry; the estimated extraction is only around 6 m^3 (Nyland 2016a). About 12 km south-east of Kjølskarvet and Stongeskaret a third quarry, Halsane, is located on a protruding mountain ridge. Here, an outcrop of white, translucent cryptocrystalline quartzite was quarried. The volume of extraction is estimated to be a minimum of *c.* 10 m^3 (Nyland 2016a).

Neither charcoal nor other organic materials have been discovered at any of the three quarries. Fire was most likely not used as a quarrying technique

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Fig. 4.
Surrounding the quartzite quarry comprising Kjølskarvet site I & II are numerous exploited erratics and debitage from initial reduction of blanks (photo: Astrid J. Nyland)

at these sites since large and sudden temperature fluctuations could have destroyed too much of the silica-rich rock in the process. Hammering and wedging were probably the more common techniques (Nyland 2016a). Cone-shaped scars from direct hammering were identified at most of the exposed outcrops as were flake scars and 'steps' in the rock from loosened disc-shaped blanks (Ballin 2008; Nyland 2016a). Because of the lack of organic material there are no direct radiocarbon dates from the quarries. The quarrying activity is therefore dated typologically and technologically by artefacts in the waste piles as well as at camp sites in their vicinity, some which are radiocarbon dated (eg, Gjerland 1980; Ballin 1998; Matsumoto & Uleberg 2002; Uleberg 2003; Årskog & Åstveit 2014a; 2014b; 2014c). Based on this, it is clear that the quarries were in use seasonally from the 8th millennium BC to the pre-Roman Iron Age (Nyland 2016a).

As in the Rogaland area the lithic raw material composition at sites within the demarcated study area have been identified and quantified (Table 2; Fig. 3). The number of examined finds per site in the 1960s varies. In the archaeological reports, the selected material is referred to as being 'from representative excavation units', and only *c*. 10% of the collected material from many of the sites was catalogued. The rest was weighed and an estimate of the various rock types given (eg, Espedal 1965a; 1965b; Johansen 1978; Ballin 1998; Table 2, column 4). Despite the variation in the number of finds and the degree of excavation of the selected sites, the material still sufficiently demonstrates a tendency in the dominant lithic procurement practice. Several of the sites have been re-examined since the 1960s (Ballin 1998; Matsumoto & Uleberg 2002; Uleberg 2003; Nyland 2016a) and recent excavations complement the earlier information and work (eg, Sites 20–22 in Table 2, excavated in 2012–2014 with reports that provide complete find lists, as well as radiocarbon dates (Årskog & Åstveit 2014a; 2014b; 2014c).

As expected, raw material from the three quarries dominates at the examined sites in the vicinity of each of them. However, it is also evident that a multitude of

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TABLE 2: LITHIC RAW MATERIAL COMPOSITION AT 29 SITES IN CASE STUDY AREA 2

Map id.	*Mus. no.*	*Site, Lake (County)*	*Summarised rock types: Total finds (identified types)*	*Date*	*Late Mesolithic*				*Early & Middle Neolithic*				
					qc	*f*	*q*	*o*	*qc*	*f*	*q*	*s*	*o*
1	C52772	Vavatnet 5, Vavatn (B)	58 (52 q; 6 f)	(L. Meso.?)		x	X						
2	C52777	Vavatnet 10, Vavatn (B)	63 (48 q; 6 f; 9 qc)	(L. Meso.?)	x	x	X	?					
3	C52774, C52785, C52798	Vavatnet 7/ Vabuleino VII/ Fausko 2, Vavatn (B)	191 (142 q; 44 f; 5 qc)	Also L. Neo./ BA?	?	x	X		?	x	X		
4	C52596, C52788, C52796, C52799	Vavatnet 14/ Vabuleino XXI/ He65/ Steinbu lok. 1, Vavatn (B)	327 (297 q; 19 f; 10 qc; 1 s)	L. Meso./E. Neo.	x	x	X		?	x	X	x	
5	B12178	Kyrkjenosi II, Søre Sulevatn (O)	28 (4f; 19 qc) + 3.2 kg debitage >10% of finds catalogued	(L. Meso.?)	x	x	X						
6	B11856	Sulemarki IV, Søre Sulevatn (O)	226 (205 q; 3 f; 18 qc)	L. Meso./ Neo.?	x	x	X	x					
7	B12180	Sulemarki VII, Søre Sulevatn (O)	70 (23 f; 40 qc; 7 o) +12,213 g debitage unsorted	(C^{14})	X	X	x						
8	Lacking	Søre Sule II, Søre Sulevatn (O)	236 (181 q; 8 f; 12 qc; 8 s; 27 o) (information in report)	E.(?) Neo.					x	x	X	x	x
9	C38839	Steinsbustølen (Mørkedøla river) (B)	18,056 (18,033 q; 23 f)	E. Neo.						x	X		
10	B11716, B11978	Mørkedøla I, Eldrevatn (S&F)	1098 (1048 q; 40 f; 2 qc; 4 s; 4 other) + 20 kg debitage (*c.* 99% q; 1% f, s & qc). >10% of finds catalogued	L. Meso./ Neo.	x	x	X		x	x	X	x	
11	B11985, B12824	Ulvehaugen I, Eldrevatn (S&F)	135 (128 q; 7 f)	(L. Meso.?)		x	X						
12	B11979	Ulvehaugen III, Eldrevatn (S&F)	1358 (1357 q; 1 f) + 118 kg debitage (*c.* 99% q; 1% f & qc). >10% of finds catalogued	L. Meso./E. Neo.		x	X		x	x	X	x	
13	B11980	Ulvehaugen V, Eldrevatn (S&F)	525 (502 q; 11 f; 11 qc; 1s) + 70 kg debitage (*c.* 99% q; 1% f and qc). >10% of finds catalogued	L. Meso./E. Neo.	x	x	X		x	x	X	x	
14	B11982	Jukleåni, Eldrevatn (S&F)	583 (415 q; 38 f; 130 qc) + 45 kg debitage (*c.* 99% q; 1 % qc & f). >10% of finds catalogued	*Meso.*/Neo.	X	x	X			?	?		
15	B12175, B12171	Osen II, Eldrevatn (S&F)	15 kg debitage (*c.* 95% q; 1 % f & qc). >10% of finds catalogued	(L. Meso.?)	x	x	X						
16	B11989	Osen III, Eldrevatn (S&F)	123 (99 q; 5 f; 4 qc; 15 o). >10% of finds catalogued	(L. Meso.?)	x	x	X						
17	B12170; B12821	Glitreøyni I, Eldrevatn (S&F)	4.6 kg (98% q; 2 % f & qc)	L. Meso. (C^{14})	x	x	X						

(Continued)

TABLE 2: (Continued)

Map id.	*Mus. no.*	*Site, Lake (County)*	*Summarised rock types: Total finds (identified types)*	*Date*	*Late Mesolithic*				*Early & Middle Neolithic*				
					qc	*f*	*q*	*o*	*qc*	*f*	*q*	*s*	*o*
18	B12172; B12822	Glitreøyni II, Eldrevatn (S&F)	2.5 kg (99% q; 1 % f and qc)	M. & L. Meso. (C^{14})	x	x	X						
19	B11983	Glitreøyni III, Eldrevatn (S&F)	178 (154 q; 5 f; 19 qc) + 5.3 kg debitage (*c.* 99% q; 1% qc). >10% of finds catalogued	L. Meso.	x	x	X						
20	B16764	Lok. 6 Eldrevatn (S&F)	6363 (6327 q; 29 f; 7 qc)	L. Meso.-Neo.- BA (C^{14})	x	x	X		x	x	X		
21	B17084	Lok. 1 Smui, Eldrevatn (S&F)	9764 (9369 q; 57qc+285 quartz; 55 f; 3s; 2 o)	L. Meso.-Neo.-IA (C^{14})	x	x	X	x		x	X	x	x
22	B16880	Lok A, Jukleåni, Eldrevatn (S&F)	347 (340 q; 4 f; 3 o)	L. Meso./Neo.		?	?			x	X		x
23	described in report	Rock shelter, Kjøldalen, Øljusjøen (S&F)	243 (240 q; 3 o?)	Stone Age			?	?					
24	B11981	Kjølåni V, Øljusjøen (S&F)	414 (401 q; 11 f; 2 s) + 20 kg debitage (*c.* 99% q; 1% f). >10% of finds catalogued	Meso./Neo., & L. Neo./EBA						x	X		
25	B11718	Kjølåni III, Øljusjøen (S&F)	85 (39 q; 45 f; 1 qc) + 5 kg debitage (*c.* 99% q; 1% f). >10% of finds catalogued	L. Meso.	x	X	X						
26	B11988	Kjølskarvet S, Øljusjøen (S&F)	48 (48 q)	(Meso.?)			?						
27	B12174	Sundet II, Øljusjøen (S&F)	1351 (1302 q; 41 f; 1 qc; 7 other) + 37 kg debitage (*c.* 99% q; 1% f, qc & o)	L. Meso. (C^{14})	x	x	X	x					
28	B12177	Bringa I, Øljusjøen (S&F)	19 (18 q; 1 f; 1 qc) + 5.6 kg debitage (*c.* 99% q; >1% f & qc(?))	EBA?			?						

The numbers in column one correspond to the map in Fig. 3. The different rock types found are: quartz crystal (qc), flint (f), quartzite (q), slate (s) and other (o). Small x indicates use and large X the period where the rock types dominate in the assemblage. Mus. no is the assemblage's identification number in the stored collections at the University Museum of Bergen, UiB (B. no) and the Museum of Cultural History in Oslo, UiO, (C. no) (see also endnote 1). The sites are located in the counties of Hordaland (H), Sogn og Fjordane (S&F), Oppland (O), and Buskerud (B).
Some sites are evidential used repeatedly, demonstrating material that is from two (or more) periods. In the date column *italic* indicates the dominant period; parenthesis indicates the most likely date, where more precise dating is not possible.

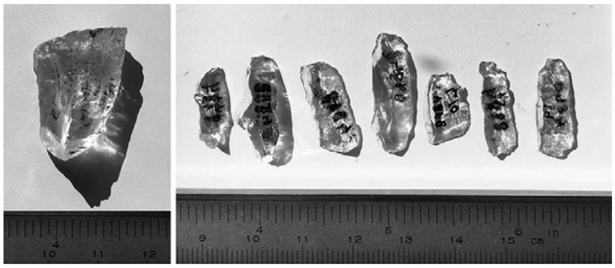

Fig. 5.
Crystal clear rock was targeted. Late Mesolithic type conical core and microblades (photo: Astrid J. Nyland)

quartzite sources have been utilised, even at sites close to the quarries. At Lok.1 Smiu (No. 21 on the map), the excavators noticed rock collected at sources found within a radius of around 15 km (Årskog & Åstveit 2014c). In sum, the case study shows regular quarrying combined with an opportunistic exploitation of outcrops and erratics scattered across the terrain. In addition, people sporadically used quartz crystal and slate in the Early Neolithic. Another common tendency in both the Mesolithic and Neolithic is that flint was used at most of the sites. From the study area, it is 200 km or more to the nearest source of flint at the coast demonstrating that flint was transported rather far into an area abundant in quartzites.

DISTRIBUTION AS INDICATORS OF PREFERENCES IN THE CASE STUDY AREAS

Based on the production waste at the examined sites in the Rogaland case study, there seems to have been a deliberate targeting of the purest quartz and crystals (Fig. 5). Nevertheless, despite domination at some of the sites, the frequency is relatively low. The character of use is not compatible with intense and regular quarrying (cf. Nyland 2016a). Instead, hunters seem to have collected rock crystals from any source they encountered.

It is hard to determine the exact origin of the quartz crystals. Attempts to determine the provenance of quartz crystal distribution can be thwarted by the fact that these comprise a chemically homogeneous mineral consisting of silicon and oxygen and so provide poor objects for geochemical provenance investigations. Their crystal structure also disturbs the use of non-intrusive portable X-ray fluorescence spectrometers, which measure trace elements through light reflection. Hence, testing the same crystal twice to get the same result might prove difficult since light can be defracted differently if the x-ray hits at only a slightly different spot or angle. There are promising results from testing quartz using laser ablation inductively coupled mass spectrometry (LA-IPC-MS; Müller 2008) but this has not been tested on the crystals examined for this study.

Considering the use of quartz crystal and flint in a wider perspective, flint is clearly the preferred rock type at the coast (Fig. 6). Beach flint is, as the name implies, collected along beaches, but from the Middle Mesolithic quarrying became an established practice too, intensifying around 4000 BC (cf. Nyland 2016a; 2016b). Contact between the landscape zones is evident through people bringing flint to the mountains but very few other rock types are demonstrably transported between the zones. One exception is slate where, often, complete or fragmentary tools are found at mountain sites, but little production waste. Another is the particular rhyolite found at Site e. This is an igneous fine-grained rock, dark bluish-grey with characteristic white zig-zag lines. It was quarried atop Mt Siggjo, a low mountain on a coastal island, from the onset of the Early to the first half of the Middle Neolithic. Previous distribution studies demonstrate it making up to 90% of lithics at coastal sites close to the quarry (Alsaker 1987; Bergsvik 2006). It was also distributed up to 200 km north and south along the coast. However, it is only infrequently found further afield at mountain sites. It is recorded at only eight sites on the Hardangervidda plateau and never as more than a handful of pieces at each site (eg, Indrelid 1994; Nyland 2016b). In the Rogaland study area, it was only found at a single site (e), where a handful of black, fine-grained quartzite fragments was also found. A similar looking rock has been found at

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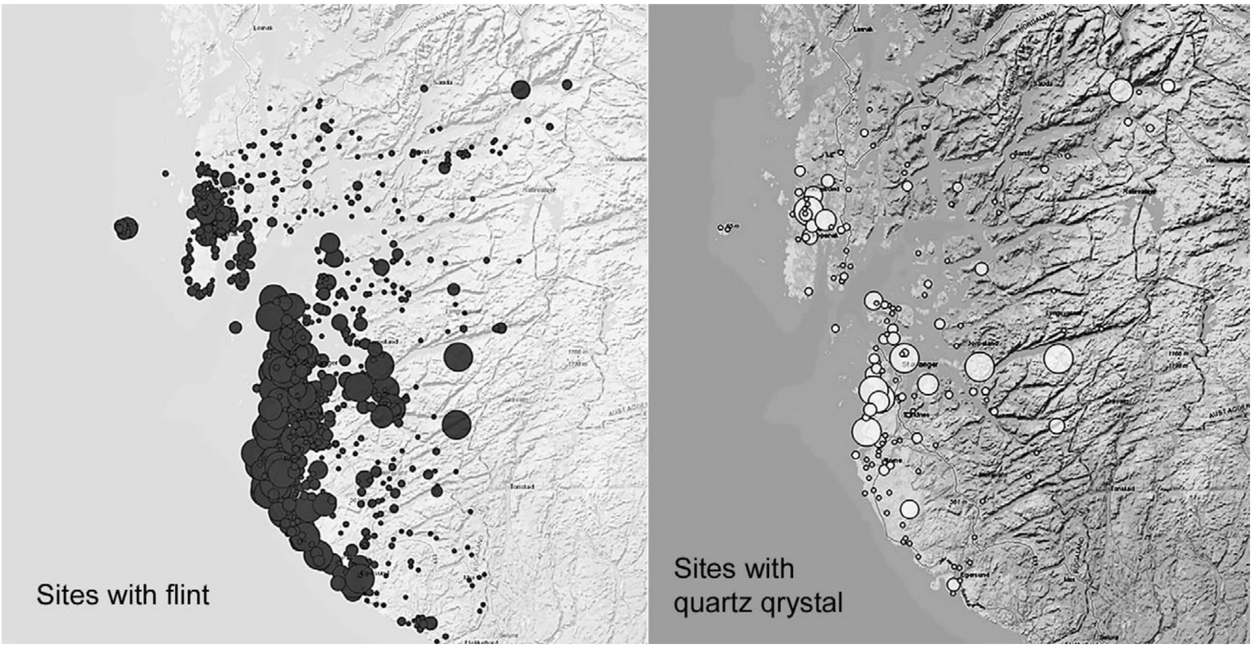

Fig. 6.
Illustrating the dominance of settlements at the coast vs the mountains during the Stone Age in Rogaland, as well as the dominance of flint use vs quartz crystal. Case study one is in the upper right corner. Circle sizes range from small (1) to large (>10) sites per circle (maps by Krister Scheie Eilertsen)

contemporary Early Neolithic coastal sites (eg, Eilertsen 2009; 2010), pointing to this quartzite most likely originating at the coast too.

In the Lærdal–Hemsedal case study further north, the situation is both different and similar. Quartzite is not brought from the coast to the mountain, nor is mylonite commonly used on the coast. Instead, in the mountains, there is a wide internal distribution of the greenish quartzite known from Kjølskarvet and Stongeskaret at sites across a wide area. However, provenancing quartzite securely is also challenging. There are similar looking greenish, fine-grained quartzite surfaces in several places within this part of the montane region (eg, Sjøvold & Martens 1971; Gustafson 1983; Nyland 2016a). There is also great internal colour variation at the quarries Kjølskarvet and Stongeskaret, the quartzite ranging from vivid green in various shades to white, as well as coloured banding/stripes. This makes distribution studies based on visual identification challenging. Provenance studies based on geochemical or mineralogical composition analysis may also be difficult since most quartzites are made of nearly pure silica (eg, Pitblado *et al.* 2013). Some variation in geochemical composition between the quartzite sources is still detectable however, as shown in a pilot test utilising XRF on glass tablets (Table 3).[2] The test did not aim to describe the geochemical signature of the whole deposit but shows variations in trace elements between identical-looking green quartzites from Stongeskaret. It also demonstrates internal variation in samples of white and green quartzite within the large Kjølskarvet quarry. In a study from the late 1970s the geochemical content of green quartzite flakes found at two Late Mesolithic and Early/Middle Neolithic coastal sites, Flatøy III and Ramsvikneset, south of the mouth of the Sognefjord, were compared with samples from the Kjølskarvet quarry using XRF. They were found to be a probable match (Bakka 1976; Bjørgo 1981). One may question the validity of limited provenance studies but, if valid, this strengthens the interpretation of a western coastal population seasonally or sporadically visiting the mountains. The fact that there is so little green quartzite at the coast is nevertheless puzzling.

Despite not being able to pinpoint the exact origin of the quartz crystal or green quartzite, movement of

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TABLE 3: RESULTS OF XRF ANALYSES OF VISUALLY DIFFERENT ROCK SAMPLES FROM THE KJØLSKARVET AND STONGESKARET QUARRIES

Trace elements (ppm)	*LLQ (mg/kg = ppm)*	*Stongeskaret*[1]	*Kjølskarvet I*[2]	*Kjølskarvet II*[3]
Ba, barium	10	11	42	< 10
Cr, chromium	4	11.3	18.3	< 4
Cu, copper	2	11.8	17.3	11.9
Ga, gallium	1	3.1	2.2	1.3
Nb, niobium	1	22.2	1.9	1.6
Ni, nickel	2	4.4	4.3	3.5
Rb, rubidium	1	1.3	3.7	1.4
Sr, strontium	1	101	62.2	16.7
V, vanadium	5	6.7	5.9	< 5
Y, yttrium	1	1.6	< 1	< 1
Zn, zinc	1	9.8	9.4	8.1
Zr, zirconium	1	15	9.3	2.8

[1]quartzite quarry ID155736 (green); [2]quartzite quarry II ID114851-I (green); [3]quartzite quarry II ID114851-II (white)
Measurements undertaken by the Geological Survey of Norway (NGU) on 25 April 2013 (on request of the author)

certain rock types into other areas implies relations between people and landscapes. Also, in the Lærdal–Hemsedal case study, the beach flint used at mountain sites implies movement between the mountainous and the coastal regions. The composition of raw materials and their use leave a lingering impression that there was a desire or preference for specific types of rock. Only certain rock types were in use in each region, whereas a selected few were used in both. Was this due to knapping properties or was there something else affecting choices and traditions?

HOW TO DETERMINE THE VALUE OF ROCK?

Both case study areas were evidently in continual use in the Late Mesolithic and Early/Middle Neolithic. Thus, one would expect that members of the societies concerned knew of the availability of lithic resources in each area. Nevertheless, flint was transported 200 km or more into the Lærdal–Hemsedal area where quartzite was easily available (Fig. 3) and half that distance into an area with available quartz crystals in Rogaland (Fig. 1). In both areas most of the distance could be travelled by boat on the fjords. Safe journeys would be weather dependant and the final part of the journey would nevertheless be a steep climb up to around 1300 m asl. It makes sense to bring raw material for tools into areas where there is otherwise little available suitable rock but why did people bring it into areas where rock was sufficient for their needs? As discussed earlier, ethnographic work suggests that rock procurement may have been structured or initiated based on spiritual ideas, knowledge, or stories embedded in the land and local traditions. The composition and frequency of certain rock types at sites can thus signpost the influence of aspects beyond pragmatics and optimal resource exploitation.

A common approach in archaeological research has been to ascribe value to rock based on its provenance, availability, or the degree of human endeavour required to procure or transport it across vast distances. Focusing on provenance, rock found beyond the region where it naturally occurs is often categorised as *exotic* as opposed to locally available rock (eg, Olausson 1983; Gould & Saggers 1985; Taffinder 1998; Bergsvik 2002; Eriksen 2002). Hence, exotic rock indicates long-distance mobility or bartering and is most often considered prestigious and valuable. An exceptional example of long-distance distribution demonstrating this is the spread of jadeitites from the Alps more than 1000 km across Europe in the Early Neolithic. Jadeitite was made into everyday artefacts but also into highly polished axeheads and disc-rings – interpreted as prestige objects – and transported across Western Europe (Sheridan *et al.* 2019). In the case study areas on the west coast of Norway, neither beach flint, quartz crystals, nor quartzite are normally considered as prestigious. The artefacts discussed are those commonly found at the hunter-gatherer-fisher sites across South Norway. What then, determines the raw material composition or indeed preferences for certain rock types? Is it distance from origin that determined social significance, making it desirable and costly?

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Comparing studies where lithic variation and production waste at settlement sites are assessed, it becomes apparent that using distance to define rock as exotic or local is highly relative and a matter of perspective. For example, in the dry deserts of central Australia rock was considered local when it originated within a radius of 40 km from a site, while rock from beyond this limit was considered exotic (Gould 1978, 262; Gould & Saggers 1985, 119). In a northern European context, lithics from within a site's predefined catchment area have been defined as local when occurring within the annual territory <10 km, as regional when occurring 10–50 km away, and as exotic when coming from beyond 50 km (Eriksen 2002, 31). In western Portugal the distance from specific sites to known sources of rock found at a collection of sites has been classified by Aubry *et al.* (2012, 535, table 3) into three categories: long distance (later characterised as exotic) at 130–298 km/21–31 hours' walk); intermediate (89–106 km/14–15 hours); and local. In the case studies in South Norway, presented here, people carried coastal flint pebbles and cores of other rock types into the mountains up to 200 km and perhaps even further. But, when found in the mountain regions of Norway, flint in particular is normally regarded as neither exotic nor extraordinary in archaeological interpretations. However, at one site in Rogaland the coastal beach flint is supplied in the form of a deliberate re-use of ground flint axes imported from South Scandinavia. This is identified by flint flakes with traces of grinding on their dorsal side from at least two mountain sites (Sites m and n). Flint from South Scandinavia is generally of better quality than beach flint and the size of the beach pebbles made them unsuited for producing axes of the type imported from the south. It has also been common to regard the imported flint tools as having added social value because of their association with farming cultures such as the Funnel Beaker and Battle Axe Cultures (eg, Bergsvik 2006; Nyland 2016b). We can question whether it was the axe itself or flint as a raw material that had meaning – and how we should interpret their deliberate destruction or transformation. It is clear that evaluations of distance and interpretation of value are contextually dependent and relational, not only today but also probably so in prehistory.

Besides measured distances to quarries, specific attributes of the lithic debitage have also been considered decisive in determining whether rock should be characterised as local or not. During a large excavation project of inland Mesolithic and Neolithic sites in south-east Norway (Damlien 2010, 64–5) rock was classified as either local, semi-local, or exotic, based on the amount of primary and secondary flakes in the lithic assemblages. A dominance of primary flakes arguably provides an indication of local origin with rocks having been picked up and initially shaped on the spot. When no primary flakes were found the cores, preforms, blades, or complete tools were assumed to have been transported to the site after initial shaping at other places, the raw material thereby being semi-local from sources not necessarily too far away. Only rock geologically unavailable in this region, the county of Hedmark, was deemed exotic. In this example distance travelled was also seen as a primary attribute that embued rock with significance.

However, this type of categorisation encounters potential problems too. In terms of the occurrence of primary flakes and cortex, different types of rock could require different treatment before transportation. In the Rogaland study a relatively high proportion of the flint flakes and fragments at sites examined displayed areas of cortex. At some, flakes from up to 11 different nodules could be identified (Bang-Andersen 2008, 85). Perhaps the raw material kept better as pebbles or blocks? Size of the required blank for specific tools could also have been an influential factor in how much initial reduction was needed before transportation. Socio-cultural codes as to where one could perform initial preparation is yet another factor which could have influenced the degree of initial knapping being done on site (Nyland 2016a). For example, during the Middle and Late Mesolithic in western Norway, the initial transformation of blanks into adze preforms was often separated from both quarries and settlements and undertaken at dedicated workshop sites (Olsen & Alsaker 1984), whereas the final completion of the adzes took place at settlement sites.

In order to define a particular rock as valuable, quantification has indicated the uniqueness of certain rock types at sites or in demarcated areas. Archaeological researchers are inclined to determine the most commonly used rock types, such as flint, rhyolite, or recycled stone axes, as markers of identity. In contrast, infrequently found rock types are considered rare. Certain rock types are autochthonous, meaning that they are geologically available only in specific areas or regions. Rare and exotic rock has thus been linked to notions of value or cost, linking again back to the presumed expense and effort made to procure it, such as travelling long distances (eg, Olausson 1983; Gould and Saggers 1985; Taffinder 1998; Bergsvik 2002; Eriksen 2002). Hence, interpretations of the value of specific rocks vary with the distance removed from the source. However, considering the case studies described above, and the mobility of Late Mesolithic and Early Neolithic communities, how do we regard rock that is 'rare' for only parts of the year? In mountainous contexts, the Siggjo rhyolite in the Rogaland study area is, strictly speaking, rare but where it originated (at the coast about 100 km away), the source provided the area with unlimited amounts of it. Its distribution has been used to support discussions of the existence of ethnic groups, tribes, and territoriality on the west coast (Bergsvik 2006; 2011; Nyland 2016b; 2019a). Considering how, in the Lærdal–Hemsedal study area, flint was brought more than 200 km to the mountains, surely this material should be considered 'rare', perhaps even costly? The montane quartzite dominated as a raw material within the mountain plains but was rare at the coast. Hence, definitions of rare, costly, or exotic rock are also dependent on context as well as experienced and interpreted relations. Perhaps distance removed should not be regarded as the most important aspect.

Another issue to consider is whether our modern definition of distance is compatible with that of a prehistoric mobile or semi-sedentary groups. Perhaps was it the concept of a journey – no matter how long – that made rock socially significant (eg, Taçon 1991; Boivin 2004a)? In areas where quarrying had become entangled in social systems and traditions over time, the practice of quarrying rock could, itself, have been key. Those quarrying loosened rock from a site where the activities of their ancestors were clear and present reinforced social knowledge and relations with each other by maintaining the shared social practice or tradition, as well as relations with the land and ancestors (Nyland 2016b; 2019a). Through quarrying and the meaning associated with the source or site, rock could have gained social value, significance, or, indeed, charisma.

In the case studies presented above there is a tendency for formal tools (points) to be primarily made of flint, whereas flint, quartz crystal, and quartzites were used interchangeably to make more expedient tools such as knives and scrapers. The excavators of site Lok. 1 Smiu (No. 21 in Table 2) noted that flint was more exhaustively exploited than the locally available quartzite (Årskog & Åstveit 2014c). The ground slate points represent the only other lithic technology at the sites but were arguably brought into the mountains ready-made. Thus, except for these, there does not seem to be a rock type exclusively preserved for specific flake and blade tools. Indeed, even presumed prestigious objects, such as ground flint axes imported from South Scandinavia, were transformed into everyday blade and flake tools in the Rogaland region. This does not necessarily mean that these kinds of tools were of less value (cf. Nyland 2016b). Instead we might consider that making everyday tools out of presumed prestigious artefacts could indicate value being linked to transformability, that is, the fact that certain rock could cross categories as well as landscape zones. The Incas, for example, regarded rocks as living beings, ontologically on the same level as humans and animals, and as having transubstantial essence. Thus, significance was independent of form (cf. Dean 2010, 5). To understand the use of rock an alternative approach is to move beyond quantification, distance, or predefined categories of value.

HUMAN–ROCK RELATIONS

Following on from the discussion above, we can suggest that the identified patterns of how people used and procured rock should also be considered as demonstrations of ascribed qualities, aspects of social value, or diverging ontological perspectives.

The mountain region in western Norway is a very different landscapes to the coast where people lived for the majority of the year during the later Mesolithic and earlier Neolithic. In the mountains there is an abundance of specific resources but sudden changes of weather and temperature would have made it a risky and hazardous territory to venture into in search of resources. The weather can be acutely felt and fog or clouds often cover peaks and the wider terrain. The rocky landscape has little vegetation, openly revealing geological formations or layers of rocks in different colours. In Rogaland, quartz crystal deposits can be seen from afar, gleaming white in an otherwise barren landscape in shades of grey (Fig. 7). To find good raw material sources required specific local knowledge, as demonstrated by the fact that the quartz crystal sources were largely reported by local hunters and hikers, not by surveying archaeologists (Bang-Andersen 1975). To this landscape, people

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Fig. 7.
The clouds touch the earth in the mornings in the mountains. Blocks of quartz are scattered and smashed by people searching for crystals (photo: Astrid J. Nyland)

transported flint – their familiar rock of choice for most of the year.

Landscapes have been considered social products created by the actions of people (Gosden 1994, 81). The loosening of rock from a source is a very tangible action, leaving visible and persisting scars. The quarries may have functioned as nodal points in montane landscapes, as predictable and much-used sources of rock, as in Lærdal–Hemsedal. In Britain, researchers have also considered the striking features of landscapes and scenery as explanations for why certain quarries were utilised again and again (Bradley & Watson 2019, 151–6). However, this does not offer insight into the use of rock that was not necessarily quarried but perhaps randomly collected. Limited exploitation does not necessarily equal limited importance, the collection of crystal might have been a special-purpose trip made when visiting the mountains in search of what I have termed 'cloudstones' (see above).

A quartz crystal prism appears in quartz in its ready-made geometrical form; it catches the light and can reflect a rainbow of colours. It is not uncommon to find unused prisms at Stone Age sites in the mountains close to the sources (Such as site d and h; Table 1) but one also finds them at coastal sites.[3] Whether these are unused raw material or crystals collected for other reasons is hard to determine. The value of quartz crystals may have been anchored in their association with water, snow, or indeed the landscapes in which they were found, for example where clouds touch the mountains in the morning. In turn, through human engagement and interaction, these potent crystals could become tools that retained their charismatic qualities. In both Mesolithic and Neolithic lithic assemblages one can observe tools, cores, blades, and flakes with and without flat or angular prism sides. Hence, it may not be relevant whether the crystals are worked or not, their value, and perhaps social significance, had already been established. Off course,

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specific meaning could have changed over time, but the best indication of people finding quartz crystal socially or spiritually important is then perhaps the persistent and widespread use.

In Finland, in a similar manner to the pre-Colombians, the light-capturing qualities of crystals are argued as imbuing the use of quartz with cosmological significance (Mökkönen *et al.* 2017). Emphasis is given to the fact that crystals were extracted from underground cavities inside granite and quartz has been suggested by some authors to be central in narratives of the creation of cultural identity relevant to the process of Neolithisation (Mökkönen *et al.* 2017). Considering and acknowledging aspects of rock that was used every day, beyond its mechanical properties for knapping (be it quartz crystal or beach flint), can offer a shift in focus for archaeological interpretations. Moreover, and side-stepping our Western bias, acknowledging the possibility of past ontological perspectives affecting practices is vital if we are to gain a broader insight into patterns of use and procurement of lithic raw materials.

FINAL REMARKS

Although we cannot necessarily fully understand what an object meant to its producer and/or user, through identifying varying patterns in use some insights can be gained into the effect that objects had on people (Gosden 2005, 199). If we interpret the varying distribution patterns in a purely pragmatic way the varying sources may indicate an embedded procurement strategy, as described by Binford (1979). That is, hunters would collect rock whenever needed and when opportunity came along during the execution of a subsistence task. As one of Binford's informants said: 'Only a fool comes home empty handed' (Binford 1979, 259). Binford argued that only in extreme situations would one set out 'for the express and exclusive purpose of obtaining raw material'. The present study could be said to correspond with this to some degree. In the Norwegian Late Mesolithic and Early Neolithic it seems that 'only a fool' left the coast for the mountains without flint – hunters arrived in the mountains with one set of tools and supplemented them with local rocks as needed during repeated hunting trips in the course of a seasonal stay. However, acknowledging the fact that rocks could affect people in more esoteric ways offers a new angle for exploring past communities in order to explain sometimes puzzling distribution patterns.

Lithic tools and production waste are more than traces of specific past activities discernible as hunting, fishing or gathering, long or short occupation, or snapshots evidencing mobility patterns. They are assemblages and collections of knowledge, social memories, and identity. Lithic assemblages express knowledge of resources in the mountains, of rewarding routes or passages to follow, of people knowing when to visit a certain landscape in order to ensure their safe return to the coast. They also comprise technological knowledge of how to find, collect, quarry, and knap a variety of rock types. Specific rock types, such as rhyolite or flint available as ground axes, were probably associated with groups of people from specific regions (eg, Nyland 2016b) and stones can be regarded as important because of magical or mythological associations (eg, Taçon 1991). Such qualities cannot necessarily be empirically grounded but to gain a fuller understanding of people's lives in the past, archaeological studies must also include explorations of multi-sensorial aspects of the mineral world (cf. Boivin 2004b; Conneller 2011). More often than not such aspects of rock are lost when transformed into archaeological reports: properties are presented before qualities and the objective surpasses the subjective (Nyland 2019b). Nevertheless, when the agency or influence of elusive and intangible qualities on human practices is acknowledged, this can offer new explanations of patterns demonstrating the use of specific rock types in certain areas beyond availability and pragmatics. The way humans meet and engage with the mineral world, bundling together memories, knowledge, and experience to make sense of it, has been described elsewhere as a process of appropriation; that is, rock is 'thought-thickened' through engagement that in turn imbues it with meaning (Ferguson 2009, 183; Ferraby 2015, 15). Hence, fleeting qualities such as beauty, light, or embedded spiritual sentiments can aid us in understanding past practices and human–rock relations.

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NOTES

1. The museum numbers (Mus. No.) listed in Tables 1 and 2 are identification numbers for the collected lithics from each site. These are searchable in an online database: http://www.unimus.no/arkeologi/forskning/index.php

2. The tested tablets were produced by melting 0.6 g quartzite mixed with 4.2 g lithiumtetraborat (Li2B4O7).

3. Examples of sites with complete quartz crystals: Hellevik Lok. 3b, Karmøy (S12206; Late Mesolithic–Early Neolithic); Sakkastad, Haugesund (S13254, Late Mesolithic–Early Neolithic); Jåsund, Sola (S12761, Middle Neolithic).

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RÉSUMÉ

Ala recherche des pierres de nuage? Contribution des rochers charismatiques à la compréhension des coumunautés mésolithiques et néolithiques des régions montagneuses du sud de la Norvège, de Astrid J. Nyland

Cet article discute la question de savoir si une considération de la capacité des rochers à affecter les humains en termes de leur charisme ou objet agence peut aider dans la compréhension de variations identifiées dans les schémas de procurement, de distribution et d'utilisation lithiques. Les assemblages lithiques sur deux sites séparés datant à la fois du Mésolithique final et du début du Néolithique dans deux zones du plateau montagneux central de la Norvège du sud mettent en évidence l'utilisation de roches disponibles localement. Leur usage est en constraste avec celui du silex qu'on ne pouvait se procurer que sur la côte. Tandis que l'utilisation du silex dans les régions avec une gamme limitée de types de roches disponibles et appropriées est compréhensible, la présence de silex dans les régions riches en alternatives au silex est plus troublante. De manière à comprendre les choix et les actions des communautés préhistoriques nous devons prendre en considération d'autres facteurs tels

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qu'une exploration sensorielle de l'abilité des des matières premières à affecter les humains ainsi que les perspectives ontologiques divergentes qui donnent forme aux relations humains-matériaux et les situations sociales de pratiques Cet article argumente qu'en plus de leur utilité immédiate, les matières pemières lithiques avaient ddu-objet-agence situé ssocialement et des caractéristiques inhérentes de charisme et que celles-ci exerçaient de puissantes influences sur les choix,la perception et les préférences humaines.

ZUSAMMENFASSUNG

Auf der Suche nach Wolkensteinen? Der Beitrag charismatischer Felsen zur Erforschung mesolithischer und neolithischer Gemeinschaften in der Gebirgsregion von Südnorwegen, von Astrid J. Nyland

Dieser Beitrag diskutiert, ob eine Erörterung der Fähigkeiten von Gesteinen, auf Menschen durch ihr Charisma oder durch ihre Objekt-agency einzuwirken, zu einem Verständnis bekannter Unterschiede in der Art der Gewinnung, Verbreitung und Nutzung von Gesteinen beitragen kann. Anhand von lithischem Material von zwei Fundplätzen zweier getrennter Regionen des zentralen Gebirgsplateaus in Südnorwegen, die jeweils ins späte Mesolithikum und frühe Neolithikum datieren, lässt sich die Nutzung lokal verfügbarer Gesteine aufzeigen. Ihre Nutzung kontrastiert mit jener von Feuerstein, der nur an der Küste gewonnen werden konnte. Während die Nutzung von Feuerstein in Regionen mit begrenzter Auswahl an verfügbaren und brauchbaren Gesteinstypen nachvollziehbar ist, ist das Vorhandensein von Feuerstein in Regionen mit großer Auswahl an Alternativen zu diesem Material überraschend. Um die Entscheidungen und Handlungen prähistorischer Gemeinschaften zu verstehen, müssen wir andere Faktoren in Betracht ziehen, wie eine sensorische Erkundung der Fähigkeit der Rohmaterialien Menschen zu beeinflussen, und ebenso die divergierenden ontologischen Perspektiven, die Mensch-Material-Beziehungen bestimmen, und die soziale Situierung von Praktiken. Dieser Beitrag spricht sich dafür aus, dass lithische Rohmaterialien neben ihrer unmittelbaren Nützlichkeit auch eine sozial situierte Objekt-agency und inhärente Merkmale von Charisma besaßen, und dass diese starken Einfluss nahmen auf menschliche Entscheidungen, Wahrnehmungen und Vorlieben.

RESUMEN

¿En busca de las cloudstones? *La contribución de las rocas carismáticas a la comprensión de las comunidades Mesolíticas y Neolíticas en las regiones montanas del sur de Noruega*, por Astrid J. Nyland.

En este artículo se discute si la capacidad de las rocas para afectar a los humanos en términos de carisma o de acción-objeto puede ayudar a comprender la variación identificada en los patrones de abastecimiento, distribución y uso del material lítico. Los conjuntos líticos procedentes de dos yacimientos arqueológicos datados en el Mesolítico Final y en el Neolítico Antiguo en dos áreas separadas de la cadena montañosa central en el sur de Noruega demuestran el uso de las rocas disponibles en el entorno local. Su uso contrasta con el del sílex, que sólo puede obtenerse en la zona de costa. Aunque el uso del sílex sigue unas pautas comprensibles en regiones donde la disponibilidad y aptitud de rocas es restringida, su aprovechamiento en regiones ricas en otras rocas alternativas es más desconcertante. Para comprender las elecciones y acciones de las comunidades prehistóricas es necesario considerar otros factores, como la exploración sensorial de la capacidad que tienen las materias primas de influir en los humanos, junto con las perspectivas ontológicamente divergentes que modelan las relaciones humano-materia y las situaciones sociales en que se llevan a la práctica. Este artículo sostiene que, además de su utilidad directa, las materias primas líticas asientan socialmente tanto la relación acción-objeto como su inherente carácter carismático, y que ambos ejercen una poderosa influencia en la selección, la percepción y las preferencias humanas.