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## The scent of sandstone – exploring a TRB material

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A large, moss-covered rock formation in a rural landscape under a clear blue sky. The rock is the central focus, with a smaller rock in the foreground and a wooden fence in the background. The sky is a clear, pale blue.

# **NEOLITHIC DIVERSITIES**

**Perspectives from  
a conference in  
Lund, Sweden**

**Edited by**

**Kristian Brink**

**Susan Hydén**

**Kristina Jennbert**

**Lars Larsson**

**Deborah Olausson**



The members of the conference “What’s New in the Neolithic”, May 2013. Photo by Kristina Jennbert.

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# Neolithic Diversities

Perspectives from a conference in Lund, Sweden

Editors:

Kristian Brink, Susan Hydén,  
Kristina Jennbert, Lars Larsson & Deborah Olausson

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Cover photo: The dolmen at Hofterup, western Scania. Photo by Kristina Jennbert 2012

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# Preface

In the study of the distant human past, certain events and periods have come to represent decisive passages from one human state to another. From a global perspective, the characteristic feature of the last ten thousand years is that people in different parts of the world, and at different points in time, started to grow plants and domesticate animals. The rise and dissemination of agriculture were crucial factors for the continued existence of humankind on earth. The incipient agriculture is often regarded as the very beginning of human *culture*, as it has traditionally been perceived in western historiography, that is, as control over nature and the “cultivation” of intellectual abilities.

As a result of the increasing national and international interest in the northern European Neolithic (4000–2000 BC), combined with large-scale archaeological excavations which helped to nuance and modify the picture of the period, senior researchers and research students formed a Neolithic group in 2010. The Department of Archaeology and Ancient History at Lund University served as the base, but the group also included collaborators from Linnaeus University and Södertörn University, and from the Southern Contract Archaeology Division of the National Heritage Board in Lund and Sydsvensk Arkeologi in Malmö and Kristianstad.

Meetings and excursions in the following two years resulted in the holding of an interna-

tional conference in Lund in May 2013 entitled “What’s New in the Neolithic”. Invitations to this conference were sent to two dozen prominent Neolithic scholars from northern and central Europe.

The conference was a great success, with presentations and discussions of different aspects of innovative research on the Neolithic. The members of the Neolithic group took an active part in the discussions following the presentations.

It was decided before the conference that the papers would be published. The members of the Neolithic group also had the opportunity to contribute current research to this publication.

After the conference an editorial group was set up, consisting of Dr Kristian Brink, PhD student Susan Hydén, Professor Kristina Jennbert, Professor Lars Larsson and Professor Deborah Olausson.

A grant was received from Riksbankens Jubileumsfond for the meetings and excursions of the Neolithic group 2010–2013. We would like to thank The Royal Swedish Academy of Letters, History and Antiquities and Berit Wallenbergs Stiftelse for grants which enabled us to hold the conference “What’s New in the Neolithic”. Grants from The Royal Swedish Academy of Letters, History and Antiquities, and Stiftelsen Elisabeth Rausing’s Minnesfond financed the layout and printing of this publication.



### III. PERSPECTIVES ON MATERIAL CULTURE

# The scent of sandstone – exploring a TRB material

*Susan Hydén*

## Abstract

The aim of this article is to briefly explore how quartz-rich sandstone might have been perceived by TRB societies. Using the senses as a point of departure, it discusses how sandstone was selected for grinding stones and for dry walling in megaliths, emphasizing the significance of the visual as well as the mechanical properties of the material. The article also acknowledges the complexity of the way in which the material was perceived. The significance of sandstone was shaped by context, implying that a changing context altered its significance. Ultimately, this study is a call for taking materials seriously by exploring them in a more nuanced way. Analogies, for example, can be very useful – not as proof, but as a way of raising questions and scenting the diversity of the Neolithic.

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## Introduction

WHEN VISITING THE vicinity of Höör in central Scania in 1819, Professor Sven Nilsson was told that Scanian quarrymen were known for the ability to recognize sandstone by using their sense of smell. In the search for suitable rock material for querns, they thrust thin, pointed levers into the ground. When hitting rock, experienced quarrymen could distinguish between sandstone and gneiss by smelling the tip of the bar. They could also make an estimation of the size of the boulders they came across by listening to the sound the bar made when hitting the stones (Nilsson 1983, p. 65). Scanian sandstone was not only used as raw material for quern stones during medieval and historical times. It was also an important building material, the cathedral in Lund being a renowned example. But the significance of sandstone during another era of monumentality is seldom discussed, despite its frequent uses

for grinding stones and as building material. Whether or not the scent of sandstone or the sound of the blocks was significant during the early Neolithic is indeed hard to tell, although senses such as touch, feel, smell, sound and sight are part of any craftsperson's skills (Kuijpers 2012, p. 137). But such analogies open one's mind and encourage us to raise questions that would otherwise not have been asked, due to our unfamiliarity with premodern working skills. Using the senses as a point of departure we can perhaps "scent" something out about how this material was perceived.

## Scanian quartz-rich sandstone

Geologically speaking, there is no such thing as Scanian quartz-rich sandstone, but, rather, many different types of sandstone. In some parts of Scania there are still sandstone formations that are quarried. Another source is the vast areas of moraine containing pieces of

sandstones brought by the ice sheet and hence not local in a geological sense. One aspect that these quartz-rich sandstones have in common is a reddish colour, although they sometimes show a more greyish or even whitish hue. Geologists refer to one group as arkoses, which is a type of sandstone containing a high degree of the mineral feldspar. The feldspar contributes to the red colour, but some Scanian sandstones are coloured by iron oxide, or a combination of the two (Johansson 2013).

Though not qualifying as such, some sandstones look very much like homogeneous quartzites. There is also a large variation in the size of quartz and feldspars grains. What causes the colour or other geological specifics of the sandstone is not important from an archaeological point of view, however. Irrespective of its composition or formation, many of these quartz-rich sandstones are easily recognizable, mainly due to the combination of their colour and the often homogeneous, sometimes layered matrix of small quartz grains that makes them rather easy to break along their planes (Johansson 2013). To avoid burdening the text in this study, quartz-rich sandstone will be referred to simply as “sandstone” from now on, although it is not a homogeneous group geologically speaking.

## A retrospective view

Prehistoric megalith builders used many different types of rock to build their monuments. In the southeastern part of Scania, for example, numerous rock types have been documented, which seem to have been found in the vicinity of the tombs (e.g. Strömberg 1971 pp. 210 ff.). Among these rock types, the selection of red sandstone for dry walling in megaliths has been noted in many cases, although other rock types, especially lamellar or easily cloven stones, were also used (Fig. 1; Strömberg 1971, p. 210; Hårdh & Bergström 1988, pp. 46 ff.; Tilley 1996; Ebbesen 2011, pp. 259, 265). The walls

of the chambers, passages and/or kerbstones are often sealed with a dry wall consisting of smaller stones that are stacked on top of each other, although the use of the word dry wall is unfortunate as there is evidence of the use of mortar (Ebbesen 2011, p. 265). Dry walling is often associated with passage graves, but was also used in dolmens (Jacobsson 1986, p. 92; Brink & Hammarstrand Dehman 2013, p. 47). The reason for the selection of sandstone may have been the natural cleavability of this rock type, which was expedient for megalith builders who wanted thin stone plates to use. On the other hand, investigations in Denmark, Sweden, north Germany, northern Netherlands and northwestern France have raised the suggestion that the red colour of the building materials may have been significant (Strömberg 1968, p. 165; Hårdh & Bergström 1988, p. 49; Tilley 1996; Scarre 2004, pp. 199 f.; Midgley 2008, p. 156; van Gijn & Raemaekers 2014).

The geological history of an area is reflected in the choice of stone for building material. Among the passage graves in the megalith-dense region of Västergötland, Sweden, for example, the use of flat pieces of red and grey limestone as construction material has been noted (Axelsson & Jankavs 2013). The red limestone is softer and dissolves more easily than the grey limestone. This means that the red stones stick together more easily, which could have been a desirable property for megalith builders who wanted material that had the ability to seal the chamber and keep it dry. On the other hand, the red stones were often placed in ways that made the red colour stand out (Axelsson & Jankavs 2013, pp. 136 ff.). An investigation of a specific type of red sandstone (Kågeröd sandstone) used for the dry walling in passage graves in western Scania is another example of how both the colour and the mechanical properties of the sandstone seem to have been important (Hårdh & Bergström 1988, p. 49).

If such qualities made sandstone a sought-



Fig. 1. A dry stone wall in the Hallebrøndshøj passage grave on Bornholm, Denmark. Photo: Svend Illum Hansen.

after building material in Scania, the high quartz content made it a useful material for tools as well. According to Rapp (2002, p. 223), quartz was the most common abrasive throughout the ancient world, and rock types with high quartz content are generally suitable for grinding and abrading (e.g. van Gijn & Houkes 2006). In southern Scandinavia, quartz-rich sandstone was often selected for grinding stones (Fig. 2). These tools are easy to recognize, not only because of the rock type itself, but also because of the smooth polish that the worn use surfaces exhibit, which sometimes have striations visible to the naked eye.

Flaking is often used to shape the sides of the artefacts but it is often hard to tell whether flaking and/or percussion were applied to shape the use surfaces as well, since they usually are heavily worn. The bottoms of the artefacts are often unaltered but can exhibit a worn appearance, and sometimes the artefacts display two use surfaces, often situated on opposite sides. These grinding stones are most often fragmented which makes it difficult to estimate the original size of these artefacts. They are occasionally found, sometimes in large numbers, on sites from the Mesolithic period and have been associated with ground stone axes (Jensen 2001, p. 112; Schaller-Åhrberg 2006, p. 43). They are a comparatively common find at TRB sites as well, dating from a time when Stone Age people ground axes made of flint as well. The appearance of the heavily worn use surfaces is often interpreted as being caused by the grinding and polishing of, for example, axes (van Gijn & Houkes 2006, p. 178; Johansson 2006, p. 116; Schaller Åhrberg 2006). Experimental archaeology has proven such stones to be suitable for grinding e.g. flint axes with water,

sometimes together with sand, as an effective lubricant (Olausson 1983, p. 62; Madsen 1984, p. 52; Hahn 1991, p. 284). These circumstances combined mean that they are often interpreted as axe grinding stones, but it may be mentioned that this assumption is under reevaluation and needs to be problematized (Hydén, ongoing PhD project). Although the function of these artefacts is not the topic of this article, it may be noted that the term *grinding stone* is used here in a generic way, i.e. without indicating *what* have been ground using these tools. Nevertheless, this type of artefact has not attracted much attention in archaeological research (Hamon



Fig. 2. Some examples of fragmented grinding stones from the Early Neolithic site of Almhov in southern Sweden. Photo: Susan Hydén.

2006, p. 333; Schaller Åhrberg 2006, p. 44). Thus, an investigation of grinding stones made of sandstone can contribute to an understanding of how this material was perceived, as well as shedding light on a type of tool that is often overlooked or taken for granted.

### Thinking material

Despite notable exceptions, much of the last decades' focus on material culture and materiality has been criticized for producing research based on theoretical perspectives, but with surprisingly little attention paid to the *physical material* itself (e.g. Olsen 2003; Hurcombe 2007; Ingold 2007; Conneller 2011). One reason may lie implicit in our modern concept of "raw material", or as Ingold (2007, p. 9) elo-

quently puts it: "materials appear to vanish, swallowed up by the very objects to which they have given birth. That is why we commonly describe materials as "raw" but never "cooked" – for by the time they have congealed into objects they have already disappeared." Viewed from this perspective, it is better to talk about "material" rather than "raw material".

In recent years, however, research which acknowledges that material is *not* a formless substrate without any significance until it is transformed into a finished artefact form seems to be emerging (e.g. Boivin & Owoc 2004; Conneller 2011). At the same time it is somewhat ironic that archaeological research seldom focuses on stone as a material, despite the fact that a whole period is named after it. Stone as a catchall term in archaeology is rather unwieldy

as it conveys the fact that it comprises many rock types with very different properties (Conneller 2011, p. 82). Different rock types may very well have been thought of as different kinds of material in the past, materials that were used to grind, smooth, abrade, polish, saw, bore, crush, shape and sharpen, among other things. It was used for a vast variety of purposes, from making tools, structures and petroglyphs, to tempering of pottery, processing animal and vegetable products, pigments, clays and other materials (Adams 2002). Flint is an exception as it clearly is the most studied material in the rock and mineral group in southern Scandinavia, to such extent that it can be considered the norm (cf. Alexandersson 2007, p. 35). One reason for this research lacuna concerning sandstone grinding stones may be that they do not display any obvious typological features. Moreover, the production and maintenance does not produce much waste material to facilitate technological studies, and the flakes and other by-products that do occur are seldom retrieved from Scanian archaeological excavations. Pecking and grinding techniques may also have been involved in the process, but they do not leave any macroscopically visible by-products, apart from manufacturing tools involved in the process (Olausson 1998, p. 133). All these factors contribute to the tendency to interpret these grinding stones in strictly functional terms. They represent the idea of a ready-made tool used to shape other tools, a fact that does not encourage any further interpretations.

But just as sandstone was deliberately sought out for dry walling, this material was intentionally selected to be used as grinding tools. And quite possibly, there was a similar tension between the mechanical properties and visual qualities, as seems to have been the case when sandstone was selected as a building material. Studying the colours associated with rocks is often forgotten, partly because many rock types sometimes resemble each other after being

exposed to the weather and other natural processes (Lynch 1998; Jones 1999). In addition, subtle tonal patterns such as natural differences in shade are not that obvious for us today as they would have been in earlier societies where the palette of colours was restricted (Hurcombe 2007, p. 539 f.). There is a rich flora of research that emphasizes the importance of incorporating colour and other aspects of the sensory realm into the interpretations of prehistoric societies (e.g. Jones & MacGregor 2002; Fahlander & Kjellström 2010; Day 2013). The scope of this article does not allow for an extended discussion of the theoretical background and methodological implications of sensory archaeologies. But by posing the question whether colour or other sensory aspects could be part of the way grinding stones were perceived, new ways of understanding a tool that is often overlooked or taken for granted can be gained. But neither typologies nor function-based terminologies are very helpful when exploring this issue. Focusing on the artefacts' life histories, however, has proven fruitful when studying ground stone artefacts in general (Hydén 2009; 2011; 2014). So what can the life histories of grinding stones tell us about the sensory aspects of sandstone? As a basis for this brief discussion, the grinding stones from the site of Almhov will be used. Almhov was an Early Neolithic burial and gathering place situated outside present-day Malmö, and grinding stones were the most common type of ground stone artefacts found at the site. Almhov is introduced by Rudebeck & Macheridis in this volume and will for that reason not be presented in more detail here (see also Gidlöf 2009; Rudebeck 2010; Hydén 2014).

## Visibility

Studying sandstone in relation to the life histories of grinding stones raises a number of questions about procurement strategies and storage. The investigation of the grinding stones from

Almhov showed that they are made of sandstone nodules. Patches of weathered surfaces caused by natural forces can often be identified despite their fragmentary character, which indicates that the material did not originate from solid rock (Hydén 2014, p. 253). The moraine that surrounds Almhov is a possible source, although the stones could have been transported a greater distance. The study made of the Kågeröd sandstone mentioned previously suggests that the material used as dry walling in passage graves was quarried. The large amounts of lamellar stones that were used in combination with their sharp-edged form makes it conceivable that they were brought from an outcrop along a river in the area. The distribution of these red stones in the megaliths points to the existence of a relationship between two areas where megalithic graves were erected in western Scania and the sandstone could have been transported by water (Hårdh & Bergström 1988, pp. 41 ff.). A different procurement strategy must be attributed to the grinding stones found at Almhov. Although the preferred quartz-rich sandstone nodules may originate from the moraine, such stones were hardly lying around everywhere. Firstly, the nodules need to have a certain size. Secondly, many of these stones were to some extent formed by flaking in order to shape the sides, indicating that a certain form was desirable. At the same time, this shaping seems to be done only partly and could also be part in the maintenance of the tools in order to prevent the use surface from becoming too hollow. Nevertheless, the shape of the original, “natural” nodule was utilized to a great extent, thus showing that there was an interest in letting nature act as a designer (cf. Conneller 2011). The question is how the sandstone was collected; if the nodules were actively searched for or if they were picked up for future use when an opportunity presented itself. Both ways are of course possible, and irrespective of procurement strategy, looking

at the landscape in southern Scania it is easy to forget how it must have looked like during the Neolithic period. Walking the arable lands of today, it is easy to find stones on the newly ploughed fields. But tilling the soil must also have provided opportunities to gather stones during the Neolithic, although the need for clearance of stones was perhaps not that important in small-scale farming (cf. Olausson 1983, p. 69). Keeping animals is also a way of exposing stones due to trampling and grubbing. In addition, people must also have come across stones during the clearance and digging for pits and megalithic structures at burial and gathering places such as Almhov. There is also the possibility that people brought sandstone nodules or finished grinding stones to Almhov from other places. The pottery found at Almhov, for example, was not made of local clay (Gidlöf 2009, p. 111). The sandstone flakes found at Almhov are negligible, suggesting that the artefacts were formed and curated at another place. This may, on the other hand, be a source-critical problem, as such production waste can be rather scarce and difficult to identify and was not a prioritized aspect in the excavation plan.

Even if the material could have been procured in many different ways, the red colour could very well have been part of it. Red sandstone plates are in fact something that many archaeologists look out for during fieldwork, as they may be an indication of a megalithic environment. This is not to suggest that colour was the only way of recognizing sandstone during prehistory, and other types of red stones were also collected, e.g. red granite, which was used to temper pottery. Also worth noting is the large numbers of pits, which are typically found on TRB sites. Both artefacts and unmodified stones are generally found in these pits, and Almhov is no exception. Investigations of the composition of these stones to see whether they are random or not could provide a basis for a

discussion of rock type selection and if there are pits that could have been used for storage (cf. Schneider 1996 p. 306).

Exploring the life histories of the grinding stones from Almhov in relation to context can provide clues as to whether colour was significant at the end of their use lives as well. The fragmented grinding stones were put into the dolmens, at the facades of the long barrows as well as inside the burials. The tools must have been deposited, displayed and arranged in various ways, and their significance was shaped and reshaped by these different and changing contexts. A large corpus of research material with well-preserved and detailed documented contexts would be required for a wider discussion. This is not the case here, but some aspects can briefly be touched upon. The red, flat Kågeröd sandstones used for dry walling contrasted in a conspicuously way than the larger slabs in the passage graves. Due to the bad preservation of the monuments at Almhov, the placement of the grinding stones cannot be discussed in detail. Still, they were put into these monuments, and even if they hardly worked as dry walling material, the colour of these tools would still have had a visual effect. A connection between the overall use of red building stones and the frequent use of red ochre in or close to the megaliths has been suggested (Strömberg 1971, pp. 324 ff.; Hårdh & Bergström 1988, p. 49). An interesting parallel is an investigation of fragmented sandstone tools found on a Neolithic site in the Netherlands. These tools, used as querns, were intentionally broken and rubbed with ochre (Verbaas & van Gijn 2007). Again, the main thread seems to be the red colour, and even if not all sandstone grinding stones from Almhov are distinctly red, there is the possibility that they once were covered with ochre. The almost glossy appearance of the use surfaces is another visual characteristic, not to mention another most striking feature. All grinding stones at Almhov are fragmented

and the visibility of these clearly broken tools could represent the social practice of fragmentation (Hydén 2014).

But warnings about concluding too quickly that some sort of colour symbolism or the like was significant, thus privileging vision over the other senses or other aspects, have been made (Scarre 2004, pp. 199 f.). Stone is also seen as a material that embodies the significance of place, an idea that can be interpreted in many ways (e.g. Scarre 2004; Conneller 2011, pp. 77 ff.). Although this kind of interpretation is often connected to monuments it must also be a possibility for nodules used for artefacts and found in a moraine to signify a place. People visiting a large burial and gathering place such as Almhov are likely to have come from different places and may have brought the stones. But the grinding stones could also have gained significance through their use, e.g. representing the communal work of building the monuments at Almhov (Hydén 2014, p. 255). Even materials used in what are considered mundane tasks were bound up with people's understandings of the world (Conneller 2011, p. 77).

### To conclude – the significance of sandstone

The aim of this short article was to briefly explore how quartz-rich sandstone might have been perceived by TRB societies, which led to a discussion about colour and visibility. The significance of artefacts is shaped by context, and changing the context alters the significance, which allows for different interpretations in which different material qualities can be part. Both the mechanical properties and the sensory qualities of a material are examples of what can be important in different ways in different situations. The possible tension between stone as something permanent (the monuments) and something that was destroyed and perhaps abandoned (the artefacts) is something



that could be explored further. Ultimately, this study is a call for a problematization of different kinds of archaeological methods, concepts and hierarchies. It is concluded, for example, that stone can be many materials, that material is not that “raw” and that the moraine could be looked upon as a harvesting field where colour was important for localizing material of Natures design.

To conclude, modern quarrymen in Scania used scent and sound while quarrying for sandstone, an observation that led to a discussion of the sensory aspects of sandstone during the earlier part of the Neolithic. As such, analogies can be very useful – not as proof, but as a way of raising questions and scent the diversity of the Neolithic.

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## Additional sources

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