



Mesolithic burials – Rites, symbols and social
organisation of early postglacial communities
Mesolithische Bestattungen – Riten, Symbole und soziale
Organisation früher postglazialer Gemeinschaften

International Conference
Halle (Saale), Germany, 18th–21st September 2013

Edited by Judith M. Grünberg, Bernhard Gramsch,
Lars Larsson, Jörg Orschiedt and Harald Meller



Tagungen des
Landesmuseums für Vorgeschichte Halle
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Judith M. Grünberg,
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Early Mesolithic burials from Bohuslän, western Sweden

Karl-Göran Sjögren and Torbjörn Ahlström

Zusammenfassung

Frühmesolithische Gräber von Bohuslän, Westschweden

In diesem Artikel beschreiben wir die menschlichen Skelett-funde aus Muschelbänken in Bohuslän, Westschweden, mit Schwerpunkt auf zwei kürzlich datierte Funde aus Österöd und Skibevall. Das Skelett von Österöd in Mittelbohuslän wurde schon im Jahr 1903 von Arbeitern in einer Muschelbank gefunden, ist aber erst im Jahr 1933 von Johan Alin wieder entdeckt worden. Das Skelett ist auf ein Alter von 8003–7721 cal BC datiert worden, womit das Skelett eines der ältesten bekannten aus Skandinavien ist. Die osteologischen Bestim-mungen zeigen, dass es sich um die Skelettreste einer alten Frau von mindestens 60, vermutlich sogar 84–88 Jahren handelt. Ihre Körpergröße wird auf ca. 170 cm geschätzt. Obgleich nur fragmentarisch erhalten, sind Knochen von allen Kör-per-teilen vorhanden, so dass der Leichnam sehr wahrscheinlich vollständig beerdigt worden ist. Wir interpretieren den Fund als Bestattung, möglicherweise in sitzender Haltung. Der Skibevall Fund hat eine sehr ähnliche Geschichte, obgleich er schon im Jahr 1832 gefunden worden ist. Heute sind nur noch die Calvariumreste vorhanden, die kürzlich in das frühe Mesolithikum datiert worden sind, nur ein paar Hundert Jahre später als Österöd.

Wir vermuten ein hohes Maß an Variabilität in den meso-lithischen Bestattungssitten, ebenso in der Ernährung, basie-rend auf einer leider begrenzten Zahl an vorliegenden stabi-len Isotopenwerten [für mesolithische Individuen]. Wir fügen einen aktualisierten Überblick über die schwedischen Funde menschlicher Skelettreste an.

Introduction

In this paper we will present two recently dated Early Meso-lithic skeletal finds from the province of Bohuslän on the west coast of Sweden. However, we want to start by giving an overview of Swedish Mesolithic skeletal remains in general. In the Appendix, we have listed the sites presently known to us. The list comprises 37 sites, one of which (Hästefjorden) is uncertain as regards species determination. Compared to earlier overviews this is a considerable growth of the mate-rial. Newell et al. (1979) list nine sites, and Grönberg (2000) the same number. The Stångenäs find, listed by both, has now been dated to the Iron Age, see Appendix.

From this compilation, it is clear that human Mesolithic remains occur in a variety of contexts; inhumation burials, cremations, depositions in water, as submarine finds, and as scattered fragments on settlement sites. Except for a few

Summary

In this paper we describe human skeletal finds from shell banks in Bohuslän, western Sweden, focussing on two recently dated finds from Österöd and Skibevall. The skeleton from Österöd in central Bohuslän was originally found in 1903 by diggers in a shell bank, but was only recovered in 1933 by Johan Alin. The skeleton has been dated to 8003–7721 cal BC, making the skeleton one of the oldest known from Scandinavia. Osteological determinations show that the bones are from a woman of old age, at least 60 and probably 84–88 years old. Her stature can be estimated to about 170 cm. Although the bones are fragmented, all body parts are represented, and the body was most probably intact when interred. We interpret the find as a grave, possibly in a sitting position. The Skibevall find has a very similar history, although found much earlier, in 1832. Today only the calvarium remains, recently dated to the Early Mesolithic, only a few hundred years later than Österöd.

We suggest a high degree of variability in Mesolithic mor-tuary practices, as well as in diet, based on the unfortunately limited number of stable isotope values available. We also include an updated survey of Swedish finds of human skeletal remains.

notable exceptions such as Skateholm, Motala and Stora Förvar, the number of individuals is limited to one or just a few on each site. In several cases, burials occur within or adjacent to settlement sites, but there are also examples such as Kams where no Mesolithic settlement is known from the surrounding area.

Looking at the distribution map (Fig. 1), three regions stand out: the Baltic islands Öland and Gotland, Scania, and Bohuslän. It is clear that this distribution is largely conditioned by geology, since Gotland and Öland as well as large parts of Scania are made up of limestone, while most of the Swedish mainland consists of acidic rocks such as Precambrian granites and gneisses. Bohuslän is some-what different, since the skeletal finds here are located on large natural shell banks forming pockets of favourable preservation conditions in a landscape dominated by Pre-cambrian rocks.

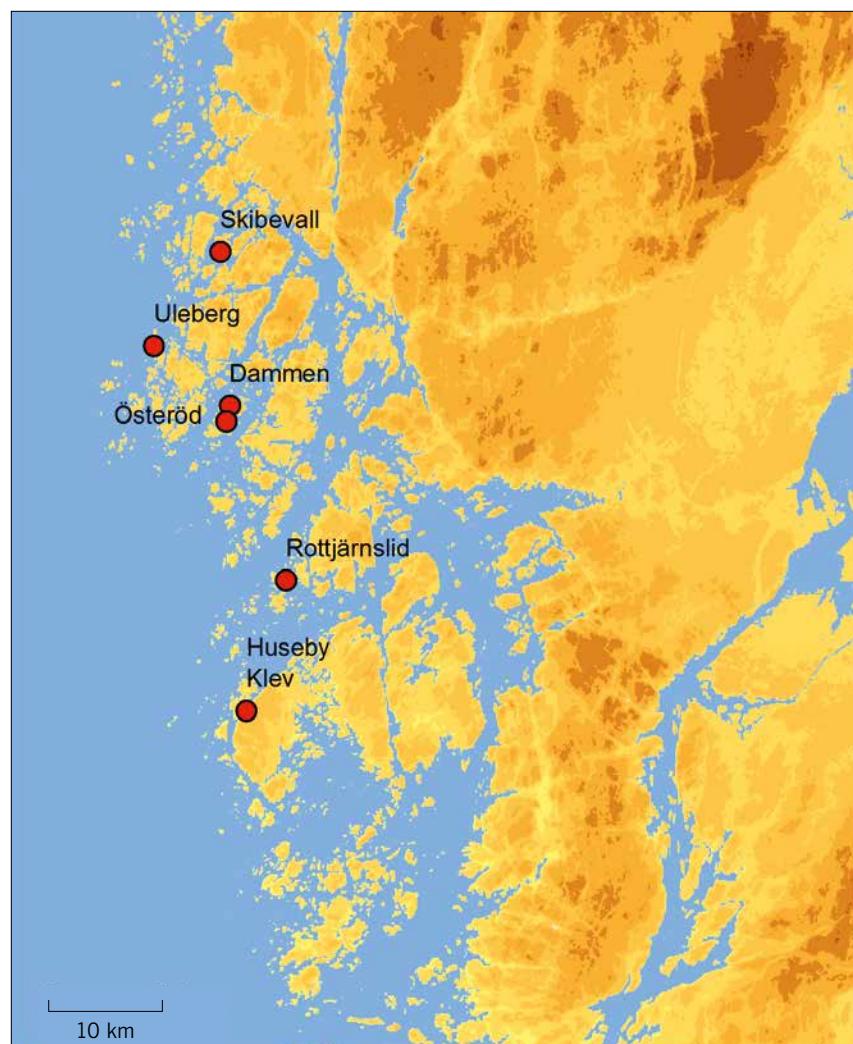


Fig. 1 Map of Swedish sites with Mesolithic human remains.

The bedrock of Bohuslän consists of Precambrian granites and related rock types. These rocks are cut by numerous fissures, forming roughly NE-SW and N-S valleys. Since the rocks have been polished by land ice and all land below the marine limit (100–180 m a.s.l. according to the specific location) has been washed by the sea, most of the rocks are bare and sediments are confined to the valley bottoms. This also means that there is a complex and rich archipelago outside the mainland, forming a varied environment where fish, seals and small whale have been abundant. The barren rocks above water on the other hand give little opportunity for hunting or gathering, except in the form of bird hunting or egg collection.

The shell banks are also a characteristic of the landscape. They were formed during the late glacial and early postglacial periods, and can be found even at very high levels above the present sea. In some places, notably the sites at Kuröd and Bräcke near Uddevalla, they can form impressive deposits more than 10 m thick. The shell banks are made up of mussel shells of many species, but they also contain fish, seal and whale bones, and in some cases also terrestrial animals such as bear, elk, etc. They have therefore been studied by geologists and zoologists for a long time (Sjögren 2014). They have also been exploited extensively for use as chicken fodder and as fertiliser since the early 19th century, and most of the human bone finds have come to light during such work.

Fig. 2 Map of sites in central Bohuslän with human remains, with a reconstructed shoreline at 9000 BP uncal.



Human bone finds in Bohuslän

From the province of Bohuslän, more than 30 sites with human remains are presently known. These cover all prehistoric periods, and also include finds from medieval and later times.

Seven of these sites may be dated to the Mesolithic either through direct dating, stratigraphy or find association (see Appendix). As can be seen in the distribution map (Fig. 2) most of them come from the outer parts of the Mesolithic archipelago, and are concentrated in the central part of Bohuslän. Only one find, from Sandarna in Göteborg city, is from a more southerly and also somewhat more inland location in the inner part of the archipelago. Two of these finds, from Österöd and Skibevall, have recently been dated to the Mesolithic and will be presented here in detail.

Österöd

Find history

The Österöd find has a remarkable, more than a century old history. It was recovered by Johan Alin and Axel Stene in 1933, but had already been found 30 years earlier during

extraction of shell gravel for chicken fodder. The finder, Karl Ahl, had collected the bones and reburied them in a small shell heap nearby. Alin first visited the site in 1927, and then returned in 1933 to collect as many bones as possible. Alin handed the finds to the Archaeological Museum of Gothenburg (GAM 46274).

In the late 1940s, Åke Fredsjö became interested in the bones, as he was working on his thesis on the Mesolithic of west Sweden (Fredsjö 1953). Among other things, he contacted the mother of the then deceased finder, Karl Ahl, to try to clear up a misunderstanding about the find location. It had been confused with the location of the so-called Stångenäs cranium about 1 km further north. According to Fredsjö's investigation the site was »approximately 50 m WSW of the hamlet of Ljungby«. He also tried to achieve an anthropological study of the skeleton, and therefore contacted Carl-Herman Hjortsjö at the Anatomical Department in Lund, who promised to carry out such a study. The bones were sent to Lund in January 1949, but the investigation never took place. They were left in the Anatomical Department's collections and later transferred to LUHM's store at Gastelyckan.

Fredsjö is also the only one to mention the find in archaeological literature (Fredsjö 1953, 159). In a note to his thesis he discusses possible Mesolithic burials from western Sweden,

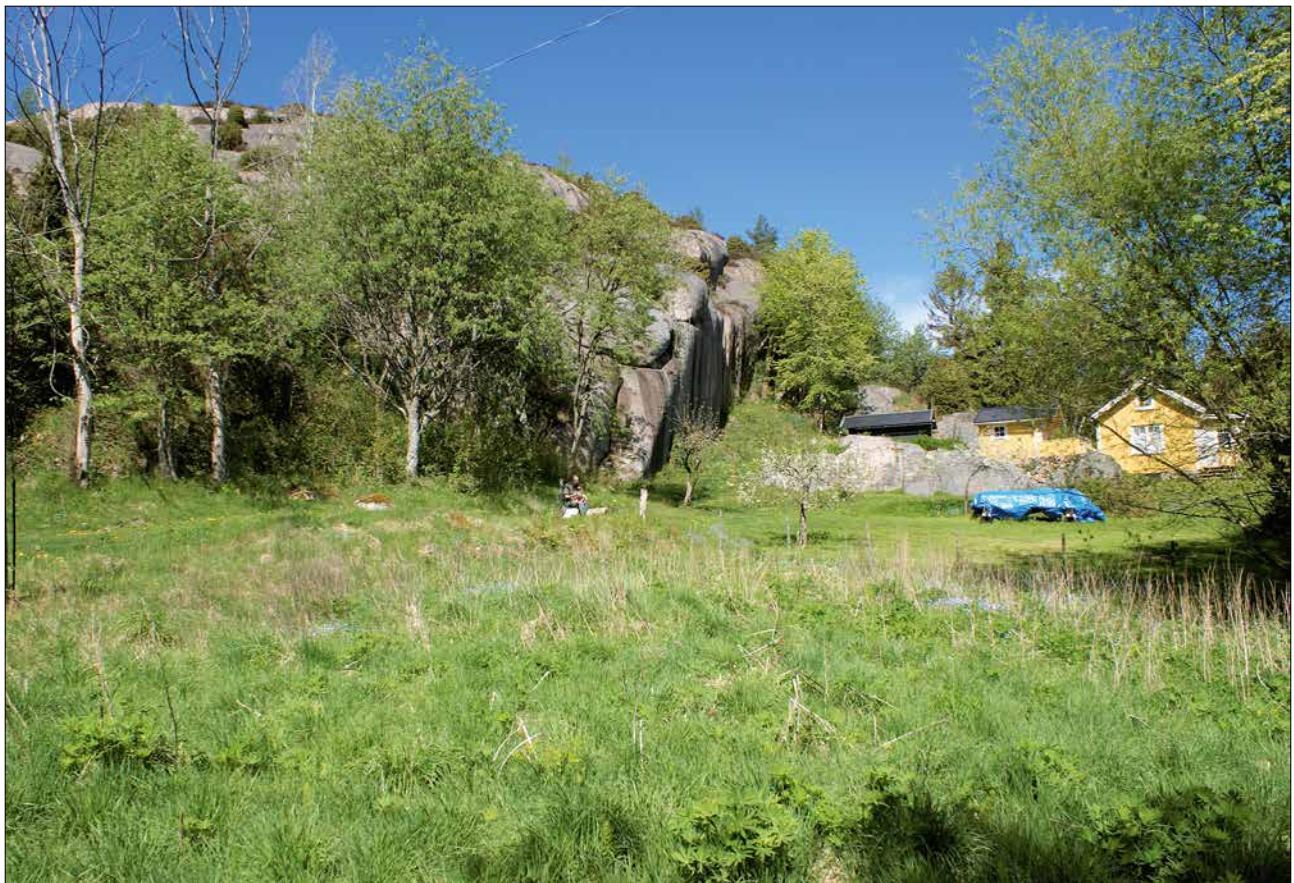


Fig. 3 The Österöd site in spring 2008, from the south. The house in the background is the hamlet Ljungby. The skeleton was found near the left fruit tree.

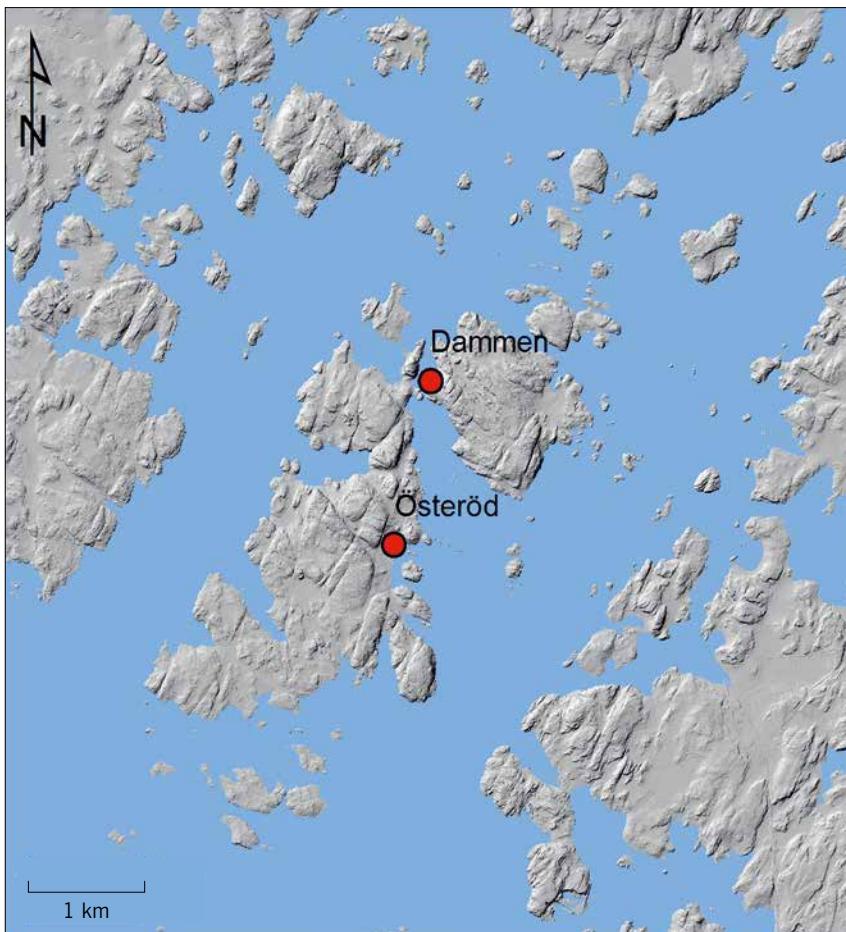
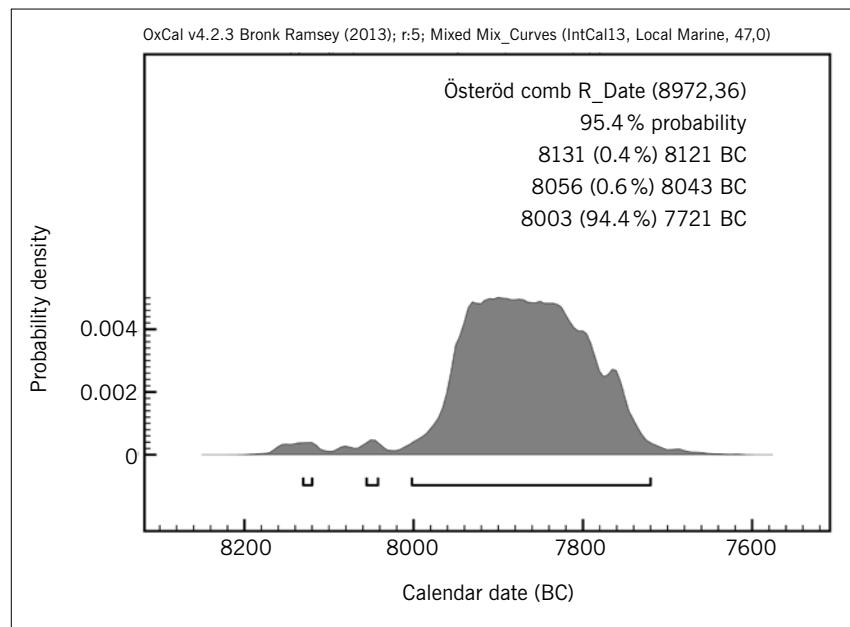


Fig. 4 Reconstruction of the landscape around Österöd at a sea level 40 m above the present.

Fig. 5 Calibration of the combined date from Österöd (OxCAL v4.2).



and he mentions Österöd and Skibevall as potential examples of burials in sitting hocker position, and compares them with finds from Lummelunda (Kams), Barum and Uleberg.

At the Göteborg Museum an attempt was made in the 1980s to track down the bones, but without success; they were regarded as lost. However, they were noted by Leif Jansson in connection with his work on the Stångenäs cranium in the 1990s. In connection with investigations of strontium isotopes in human bones they were noted again in 2007 by Torbjörn Ahlström, and they have now been returned to the Göteborg City Museum. A Swedish account of the find was published in 2009 (Ahlström/Sjögren 2009).

Find circumstances

Our knowledge of the context and circumstances of the find rests on Alin's interview with Karl Ahl, almost 30 years after the actual find, and his investigation of the find site. According to Alin, the finder described the circumstances as follows: »In 1903, by the north edge of the bank, next to the steep rock wall, which delimits the shell bank to the north, a human skeleton in a standing position was found 0.5 m below the surface, completely covered by shells, and surrounded by a thin, dark, fat stripe.«

The site (ancient monument 413:2 in Bro parish) at the hamlet of Ljungby at Österöd is, according to Alin's report, a late glacial shell bank, and the level of the find was measured by him to 54.2 m above present sea level. From the descriptions of Alin and Fredsjö, the location can be pinpointed fairly closely (Fig. 3–4).

The shell bank was once quite extensive and filled a fissure valley in a NW-SE direction, although it has now mostly

been dug away. Place names like Skäldalen and Skälebacken also indicate occurrences of shell banks. The human bones were found at the edge of the shell bank, just south of a steep rock wall (Fig. 3).

On the slope adjacent to and south-east of the skeleton find, worked flint has been found over a rather large area. Whether this settlement, ancient monument 413:1 in Bro parish, may be contemporary with the skeleton, cannot be determined.

Dating

Two ^{14}C datings have been made on the Österöd skeleton, both on teeth: 9025 ± 65 BP, $\delta^{13}\text{C} -18\text{‰}$ (Lu-7269) and 8950 ± 42 BP, $\delta^{13}\text{C} -17.23\text{‰}$, $\delta^{15}\text{N} 14.17\text{‰}$ (UBA-14094). Since there are two dates from the same individual, they may be combined, resulting in the combined date 8972 ± 36 BP.

Values for marine reservoir correction are available in the Chrono and Fairbanks databases¹. The mean reservoir value for five measurements in Bohuslän is 250 years, range 182–344. This is somewhat lower than the standard value for the Atlantic, which is usually set at 400 years. It is also lower than measurements for the Jutland coast and the Limfjord area in Denmark. This may also be expressed as a ΔR value, to be used in calibration. For central Bohuslän, the mean ΔR of five measurements is 75.

Using the Belfast value for $\delta^{13}\text{C}$ to estimate marine input, we arrive at 47% marine protein input assuming a linear model between -21 and -12‰ . Calibrating the combined date with these parameters leads to the reservoir corrected date of 8131–7721 cal BC, 2σ although most probably in the range 8003–7721 cal BC (Fig. 5).

¹ <http://www.chrono.qub.ac.uk> and <http://radiocarbon.ldeo.columbia.edu/research/resage.htm>.

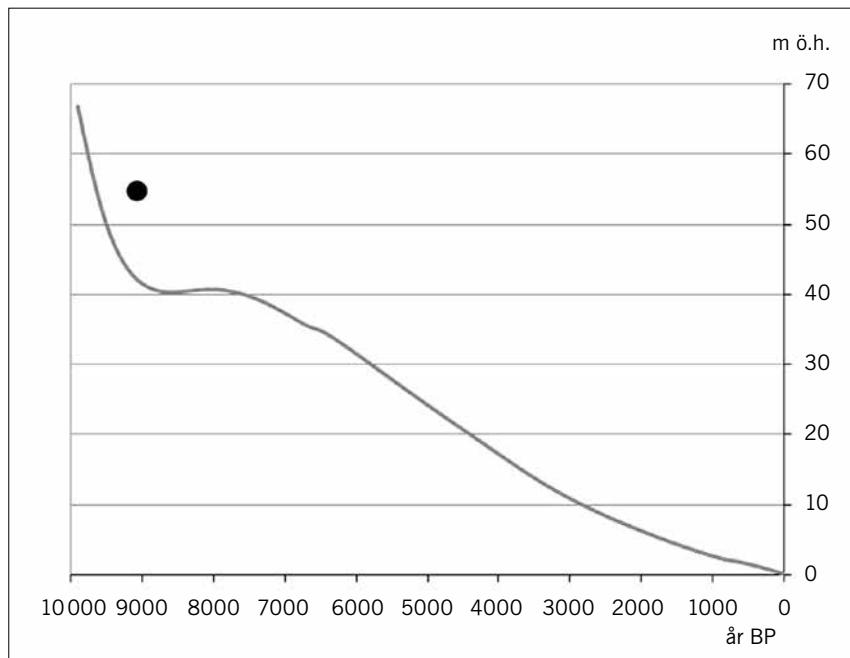


Fig. 6 Shoreline displacement curve for the Österöd area. The Österöd skeleton has been plotted in.

Sea level and environment

Comparing the find level with a shoreline curve for the area constructed by Tore Pässe, SGU, it turns out that the level of the skeleton, 54 m a.s.l., is about 12–14 m above the contemporary sea level at about 9000 BP (Fig. 6). This confirms Alin's assumption that the bones were not deposited by natural agents in sea water, but were dug into the shell bank. The existence of a pit in which the body had been placed is also supported by the darker soil closest to the bones. The most likely interpretation is that this is in fact an Early Mesolithic inhumation grave. The lack of artefacts is not a decisive counterargument, as they may well have escaped the attention of the diggers, or the body was not accompanied by artefacts in the first place.

Figures 2 and 4 show a reconstruction of the landscape around the site at 9000 BP. Figure 2 also displays other human bone finds from central Bohuslän. It should be noted that only Huseby klev is contemporary with Österöd, while the other sites are younger.

At this time, Österöd was located on a small island in the outer part of the archipelago. The island was about 4 km × 1.5 km wide and at this time mainly consisted of bare rock, with only minor sediment pockets. Subsistence in such an environment must have been almost entirely dependent on the sea. This also applies to Huseby klev, although this site is situated on a larger island. Similar conclusions can also be drawn as regards the younger sites with human bones; Dammen, Rottjärnslid and Uleberg. Only the Sandarna settlement in Gothenburg is somewhat different, with a more retracted position in the archipelago.

Seen on a more detailed scale, the grave is situated in a well-protected location on the eastern side of the island (Fig. 4). To the North and to the West the site is protected by mountains. To the south-east is a slope with sandy soil down to the Mesolithic beach, about 150 m away. On this slope is the possible settlement area. At a sea level about 40 m a.s.l.,

a protected inlet is formed to the south, which would have been a good landing site, with access to both shallow and deep water fishing, as well as to communication routes towards the mainland. The narrow valley west of the site leads to another good landing site on the western side of the island.

The Österöd skeleton

The Österöd find is severely fragmented, but we have identified bones from all parts of the skeleton, right and left-sided bones, hand and foot bones, *et cetera*. No duplication of bone elements has been demonstrated. Thus, we conclude that we are dealing with the skeleton of one individual that was initially complete (Fig. 7). The bones are chalky, reflecting the diagenetic conditions offered by the lime-rich local environment supplied by the shell bank. Mollusc shells, with high calcium carbonate content, produce alkaline microenvironments favourable for the preservation of bone in an otherwise acidic bedrock of granites, which is prevalent in Bohuslän.

The biological sex of Mesolithic skeletons has often been assessed on the basis of archaeological findings that, *sensu stricto*, are irrelevant to the question posed, such as artefacts (cf. the Barum/Bäckaskog find in Hansen 1941), or modern expectations regarding the physiology of Mesolithic foragers such as stature (cf. the Koelbjerg find in Bröste/Fischer-Møller 1943). As notable differences between males and females are present in the pelvic bone, we proceed with a description of the pelvic morphology present in the Österöd find (Tab. 1), followed by the cranial morphology (Tab. 2). Six out of seven pelvic traits indicate the female sex, only one trait suggests the male sex. The secondary sexual characters of the skull shows a predominance of female traits, but also noted are characteristics that are between male and female forms (indifferent) as well as a trait of the male form.

Based on these findings, the Österöd specimen is determined as a female.

Age at death was determined on the basis of the pubic symphysis and the facies auricularis of the pelvic bone. The appearance of the pubic symphysis corresponds to stage VI (Suchey et al. 1986; Katz/Suchey 1986). In the reference population, this phase corresponds to a mean age of 60 years, ranging from 42–87 years. Buckberry and Chamberlain (2002) have further developed the Lovejoy et al. (1985) method for age assessment of the facies auricularis. The Österöd find corresponds to phase VII (Buckberry/Chamberlain 2002). In the reference population, this corresponds to an average age of 72.25 years, with a span in ages from 53–92 years. Both the pubic symphysis and the facies auricularis exhibits advanced degeneration, suggesting old age. Due to the fragmentary nature of the find, neither suture closure nor dental attrition can be used for ageing.

To assess the age of the Österöd find we need to eliminate bias inherent in the unnatural age distributions of reference populations (Boquet-Appel/Masset 1982). Following the Rostock Manifesto, we use Bayesian estimation to determine the age at death for the Österöd find (Hoppa/Vaupel 2002; Chamberlain 2000). This is based on mortality data from parish registers of nomadic Sami populations from Lapland, over the period AD 1790–1890 (Wahlund 1932). The mortality data from the parish registers reflects natural mortality and we recognise the »bathtub« pattern with increasing hazards of death associated with the childhood years and advanced age, with a relatively low risk of death in between (Fig. 8). Using the hazards from historic Sami populations and weighting them against the fact that skeletal change suggests an advanced age, her estimated mean age at death is 84 years (*pubic symphysis*) and 88 years (*facies auricularis*), respectively.

The stature of the Österöd woman is difficult to estimate due to the fragmentary nature of the find. None of the long bones was intact. However, large parts of the right tibia were preserved and the distance between the *malleolus medialis*



Fig. 7 The cranium of the Österöd woman.

and the *tibial tuberosity* is 350 mm. Jacobs (1992) has developed a method for estimating the bone lengths based on the fragmented material. The length from the *tibial tuberosity* to the proximal tibia joint was 23 mm (range 17–28 mm), implying that the tibia should have been 373 mm long (367–378). According to Sjøvold (1990), this would correspond to a stature of 170 cm (168.1 to 171.7 cm). Her stature may be perceived as remarkably tall when the average body length of Mesolithic women from Skateholm is 153 cm (Ahlström 1997). However, one should consider that Skateholm is about 3000 years younger than the Österöd specimen. From Olenij Ostrov in Karelia, which is 1500 years younger than Österöd, the average body length of the buried women was estimated to be 163 cm (Formicola/Gianneccini 1999).

Sexual dimorphism, pelvic bone

Character	Österöd
<i>Sulcus preauricularis</i>	Deep, well defined (♀)
<i>Incisura ischiadica major</i>	Very open (♀)
<i>Angulus subpubicus</i>	Wide (♀)
<i>Arcus composé</i>	Double (♀)
<i>Arcus ventralis</i>	Present (♀)
<i>Subpubic concavity</i>	Present (♀)
<i>Medial ramus ridge</i>	Not present (♂)

Tab. 1 Pelvic morphology and sex indications in the Österöd skeleton.

Sexual dimorphism, cranium

Character	Österöd
<i>Glabella</i>	Feminine (♀)
<i>Processus mastoideus</i>	Indifferent (?)
<i>Planum nuchale</i>	Feminine (♀)
<i>Arcus superciliaris</i>	Feminine (♀)
<i>Protuberantia occipitalis externa</i>	Hyperfeminine (♀)
<i>Crista supramastoidea</i>	Masculine (♂)
<i>Margo supraorbitalis</i>	Indifferent (?)

Tab. 2 Skull morphology and sex indications in the Österöd skeleton.

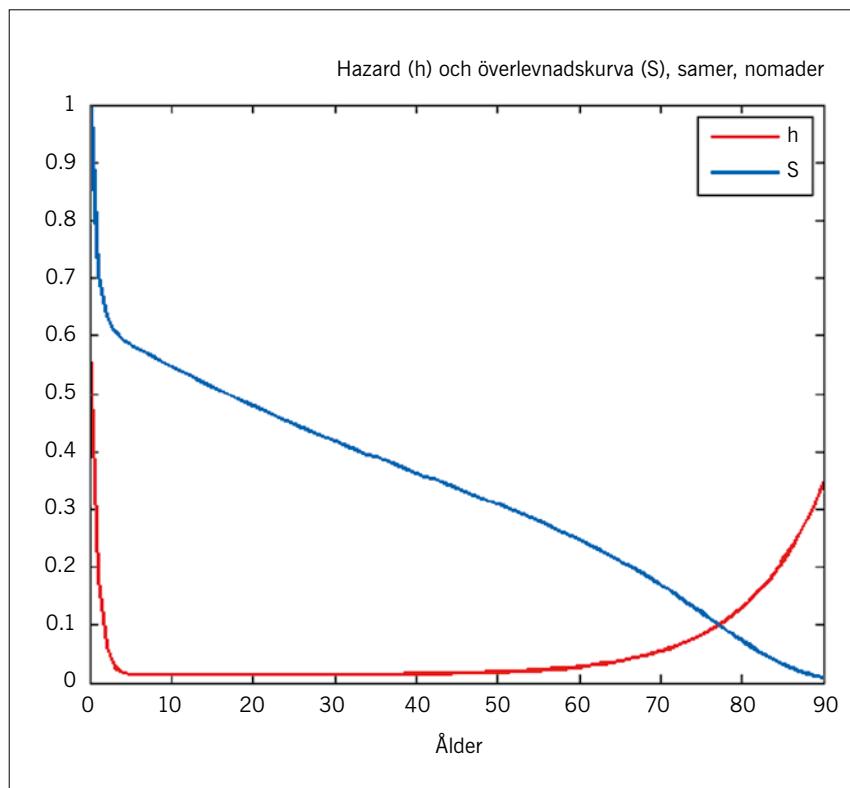


Fig. 8 Mortality hazards (h , red) and survival function (S , blue) based on Saami parish registers.

Palaeopathological conditions, most probably reflecting the advanced age of the specimen, are manifested by entesophytes (mineralised muscle insertions) at the Achilles tendon, disc degeneration of the cervical spine (osteochondrosis), osteoarthritis of the right scaphoid, osteochondritis dissecans in the head of the right talus, periostitis in distal fibulae as well as vessel imprints in the diaphysis of the femora. An interesting palaeopathological feature is vestiges suggesting osteitis pubis in the pubic bone. A similar condition is present in the Barum find (Ahlström 2013). Previously, these changes were interpreted as parturition scars, but have been revised as markers of general physical strain.

Skibevall

Find history

This find has in many respects a similar history to Österöd, although it was made about 70 years earlier. The skeleton was discovered during shell gravel extraction about 1832, and was collected in 1842 by Axel Emanuel Holmberg, who visited the site and interviewed the workers. Holmberg was a newly appointed priest on the island of Tjörn, but more interested in history and antiquities than in theology. He was in close contact with Professor Sven Nilsson in Lund, to

whom he sent the find as well as the Stångenäs cranium he found a year later. The find was mentioned briefly by Nilsson at the conference of natural scientists in Oslo 1844 (Nilsson 1847, 12 note), and by Holmberg in his survey of the history of Bohuslän Holmberg (1843, 119).

In a letter to Nilsson dated 1st March 1843, Holmberg gives a rather detailed description of the find circumstances (Nilsson's archive, Lund university library):

»I hear that Mr Professor, through the Priest Ekström², has received a short notice about a skeleton retrieved by me from a shell sand bank, concerning which I feel obliged to relate more detail. During my travel last summer, I heard by chance that a skeleton, standing upright in a shell sand bank, had been found about 10 years ago in the grounds of the farm Svenungsön in Qville parish. I therefore went there, and had occasion to talk to the same persons who found the skeleton. They assured me that they had found the skeleton in upright standing position, at a depth of circa 3 ells³, measured from the soil surface to the cranium, and said that they had not noticed any disturbance in the surrounding shell layers, but instead that the shells closest to the skeleton had a darker colour than the others. The skeleton had, immediately after the find, been covered by stones, but was excavated by me. The cranium was then found to be crushed and only the upper part could be retrieved, which I also took with me and left with the priest Ekström. It is quite thick, and seems to have been long and narrow over the crown. According to the farm-

² Carl Ulrik Ekström, priest on Tjörn and Holmbergs superior. He was a dedicated natural scientist, who published several works on the zoology of fishes and birds,

mainly in eastern Sweden. Together with Anders Retzius, he was inspector for the Museum of Natural History in Stockholm.

³ About 1.8 m.

ers, it is not uncommon to find human bones in the shell sand banks in Bohuslän⁴.«

The location of the find was later given as Skibevall (Skibevall) which is a hamlet on the lands of Svennungsön. The location can at present not be pinpointed more exactly, however.

The cranium was described by Fürst (1925, 280) and mentioned by Nyman (1944) and Lidén (1948, 92). Lidén makes a comparison with the Barum grave and suggests Skibevall as an example of a Mesolithic grave in sitting position. Fredsjö (1953, 159) is of the same opinion.

In connection with the investigation of the Österöd skeleton, we tried to locate this skull, as well as two other skulls from Bohuslän sent to Nilsson by Holmberg and Ekström in the 1840s. In total four skulls from Bohuslän were sent to Nilsson according to Fürst 1925. They could however not be located. Only in 2012 did they come to light in the store of the Lund university historical museum at Gastelyckan.

Dating

All the three human crania that were rediscovered in 2012 were sent for dating. Only the Skibevall cranium gave a Mesolithic date: 8437 ± 56 BP, $\delta^{13}\text{C} -16.29\text{‰}$, $\delta^{15}\text{N} 15.50\text{‰}$ (UBA-23145). The other two skulls were dated to the Early Iron Age and to medieval times⁵.

Calibration of the Skibevall date gives the interval 7587–7359 cal BC, 2σ without correction for the reservoir effect. Using the same parameters as for Österöd together with an estimate of 59 % marine protein input, we get a reservoir corrected date of 7365–7058 cal BC, 2σ , i.e. a shift of c. 300 years.

Environment

As the exact location of the skeleton find is not known, there is some uncertainty regarding the elevation. The farm houses at Skibevall are situated at c. 47 m a.s.l., and it can be assumed that the elevation of the skeleton find is in the range 45–55 m a.s.l. As the site is not so far from Österöd, the shore displacement should be quite similar, although with a 1–2 m shift upwards. This places the find well above the contemporary sea level, as in the case of Österöd.

Assuming a contemporary shore level at c. 40 m a.s.l., the surroundings of the site can be reconstructed (Fig. 9). The location is very similar to Österöd. The site is on the southern side of a small, rocky island, c. 1 km × 1 km in extent, in

the outer parts of the archipelago. The probable location is a south-facing slope, protected to the west, north and east by mountains. At 40 m a.s.l., a small bay with a suitable landing site is formed. At present, no indications of a settlement are known from the immediate surroundings, although this could well be due to lack of fieldwork at the site.

The Skibevall calvarium

According to the account given by Holmberg, the skeleton seems to have been complete when found, but only part of a skull was retrieved by him. The Skibevall specimen consists of the frontal bone, with associated parts of the orbits and glabella, as well as portions of both parietal bones (Fig. 10). The rounded margo supraorbitalis, combined with the voluminous glabella, suggests the male sex. The advanced obliteration of the coronal suture indicates an adult age, > 40 years.

Mesolithic diet in Bohuslän

Few determinations of collagen $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ have yet been made. Only nine samples have been analysed for $\delta^{13}\text{C}$ and eight for $\delta^{15}\text{N}$ so far (Fig. 11), including the Late Mesolithic/Early Neolithic find from Evensås (Ahlström/Sjögren 2009). Therefore only tentative conclusions can be drawn.

Looking first at the $\delta^{13}\text{C}$ values, most of them date to the Early Mesolithic. For this period, the striking thing is the high variation in $\delta^{13}\text{C}$ values, ranging from the high values at Huseby klev to the rather moderate values at Skibevall and Österöd. This should indicate a considerable variability in the importance of marine protein relative to terrestrial.

The variability in diet stands in contrast to the similarity of the find locations, which are all dominated by the marine environment, as noted above. The variability in diet therefore suggests variation either in life history or in extent of seasonal movements.

For the individuals exhibiting highly marine protein input, it may be suggested that the seasonal round would have been rather limited, confined to the coastal area. For the individuals with moderate marine protein input, there may be several explanations. Using the perhaps oversimplified linear model, the amount of marine protein was estimated at 59 % at Skibevall and 47 % at Österöd, see above. Irrespective of the exact proportions, this would suggest a substantial proportion of terrestrial protein, which could not have been available in the surroundings of the find sites. Either, they

⁴ Jag hör att Hr Professorn genom Prosten Ekström fått en kort underrättelse om ett af mig ur en skälsandsbank upptaget skelett, för hvilket jag anser mig skyldig att närmare redogöra. Under min resa förliden sommar fick jag händelsevis höra att ett skelett, stående uppstått i en skälsandsbank påträffats för ca 10 år sedan på gården Svennungsön i Quille pastorat ägor. Jag för derföre dit, och lyckades få tala vid samma personer, som påträffat skelettet. De försäkrade sig hafva funnit det i en uppstående ställning, på

ett djup af circa 3 alnar, räknade från jordytan till craniet, samt sade sig icke förmärkt någon rubbnings uti de omgivande skallagerna, men väl att skalen närmast skeletet haft en mörkare färg än de andra. Skeletet hade genast efter det, det blifvit funnet, blifvit rösadt, men uppgräfdes af mig. Craniet befanns då sönderslaget och endast dess öfver delen fanns reda på, hvilken jag ock medtogs samt lemnade Prosten Ekström. Det är betydligt tjockt, samt tyckes ha varit långt och smalt öfver hjessan. Enligt allmogens be-

rättelser lär det icke vara så ovanligt att påträffa människoben i skälsandsbankarna i Bohuslän.

⁵ A skull marked »Holmberg 1845«, from an unknown locality in Bohuslän, was dated to 642 ± 44 BP (UBA-23146). Another skull, possibly from Tjörn, had a note »Skänkt af prosten Ekström genom professor Sven Nilsson d. 9/8 44 från Bohuslän i Snäckbank. En half mil från Hafvet.« This skull was dated to 1892 ± 37 BP (UBA-23147).

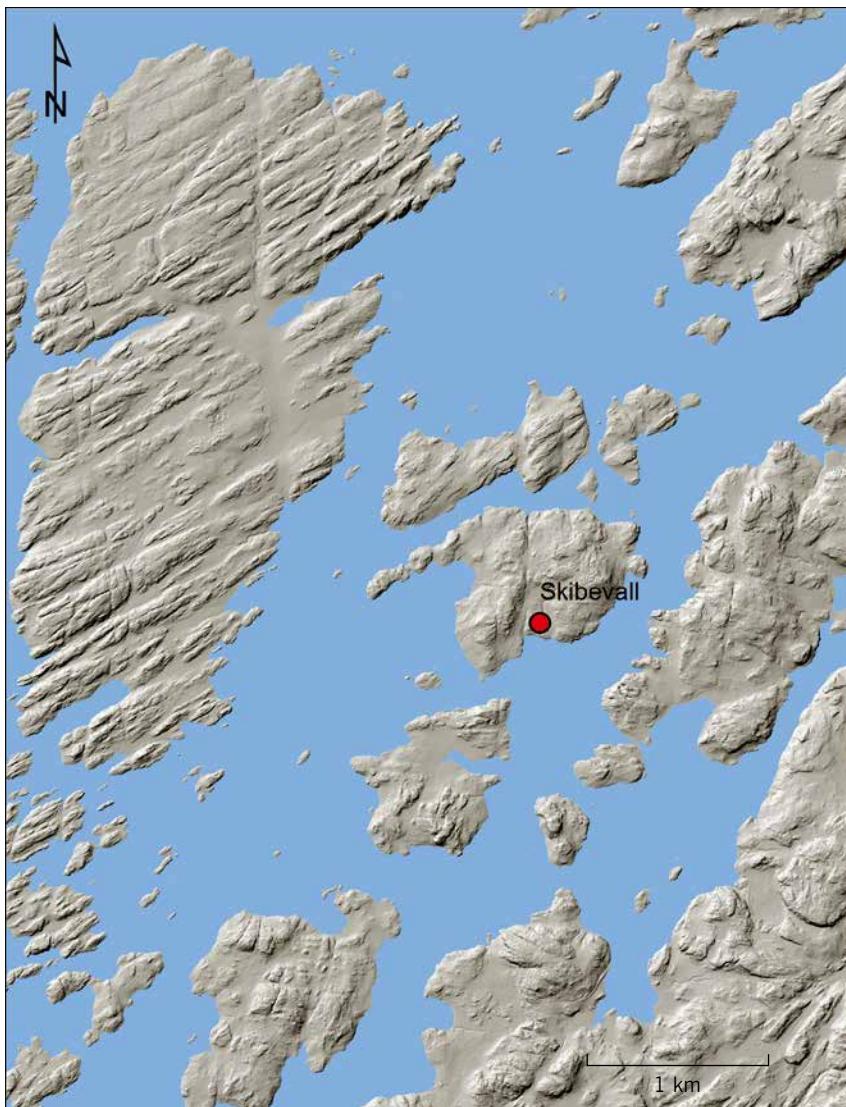


Fig. 9 Reconstruction of the landscape around Skibevall at a sea level 40 m above the present.

have spent part of the year in the inner part of the archipelago or on the mainland, or they may have moved during the later parts of their life from an inland area and only recently changed their diet to one dominated by marine food.

Which of these possibilities is more likely cannot be determined on present evidence, but further analysis involving strontium, sulphur or oxygen isotopes could perhaps shed some light on this.

Faunal remains are scarce at the Mesolithic settlements in Bohuslän. For the Early Mesolithic, only the site of Huseby klev on Orust has given a substantial collection of animal and fish bones. Although no detailed analysis has been published, it seems that subsistence at this site was oriented towards marine hunting and fishing (Jonsson 2005). Seals and small whales are abundant, as well as a variety of fish. Bird hunting is indicated by a large number of marine fowl species. Terrestrial mammals are also at hand, however, and it is difficult at present to assess the relation between marine and terrestrial animals precisely. In sum, the faunal material seems to agree well with the indications from stable isotopes at this site.

For the Middle and Late Mesolithic only a very few stable isotope values are at hand. Nothing can be said about

dietary variability or chronological trends for these periods, but it is remarkable that the $\delta^{13}\text{C}$ value is actually lower than expected for the individual from Uleberg, considering the location of the find site.

As for $\delta^{13}\text{C}$, most of the $\delta^{15}\text{N}$ values are from Early Mesolithic samples. In Figure 12, $\delta^{13}\text{C}$ is plotted against $\delta^{15}\text{N}$ for eight samples. For comparison, three samples from the skull found at the inland site of Hanaskede in Västergötland are also included (see Appendix). Most of the Mesolithic individuals from Bohuslän included in this plot cluster at a $\delta^{15}\text{N}$ of c. 14–16‰. This suggests protein sources at a quite high trophic level, and is consistent with a high proportion of marine protein. In contrast, the levels at Hanaskede are lower, regarding both $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$. If the analysed individuals are representative, this may suggest that the geographical scale of human movement, seasonal or other, does not extend to central Västergötland. However, this is only an indication, based on a very small number of analysed individuals.

It is also interesting to note that the individual from Evensås, dated to the Mesolithic/Neolithic transition, has in fact one of the clearest marine signatures and the highest $\delta^{15}\text{N}$ value.

Fig. 10 The calvarium from Skibevall.



Summing up

Perhaps the most notable feature of the finds in Bohuslän, as well as the other Swedish finds listed in the Appendix, is the variability in practices involving human skeletal remains. Mesolithic human bones are present not only in what can be interpreted as burials, but also in other contexts. A common occurrence when preservation conditions are favourable is that scattered skeletal fragments are found along with other settlement material. Such finds have been made at Huseby klev, Rottjärnslid and Sandarna. The interpretation of these finds is not entirely clear, they could for example be dam-

aged burials, but might also be dead bodies which have been handled differently from those who were placed in graves. A third type of context is depositions in lakes or other wetlands. These are not yet known from Bohuslän, but have been found in Västergötland, Östergötland and Skåne.

What seems increasingly clear is the complexity of Mesolithic ways of treating the dead. The primary inhumation burial of entire bodies is probably most common, or at least the most visible burial practice, viewed on a European scale. These, however, can be designed in a number of ways. Extended supine position, reclining and seated hocker seem to coexist in many areas.

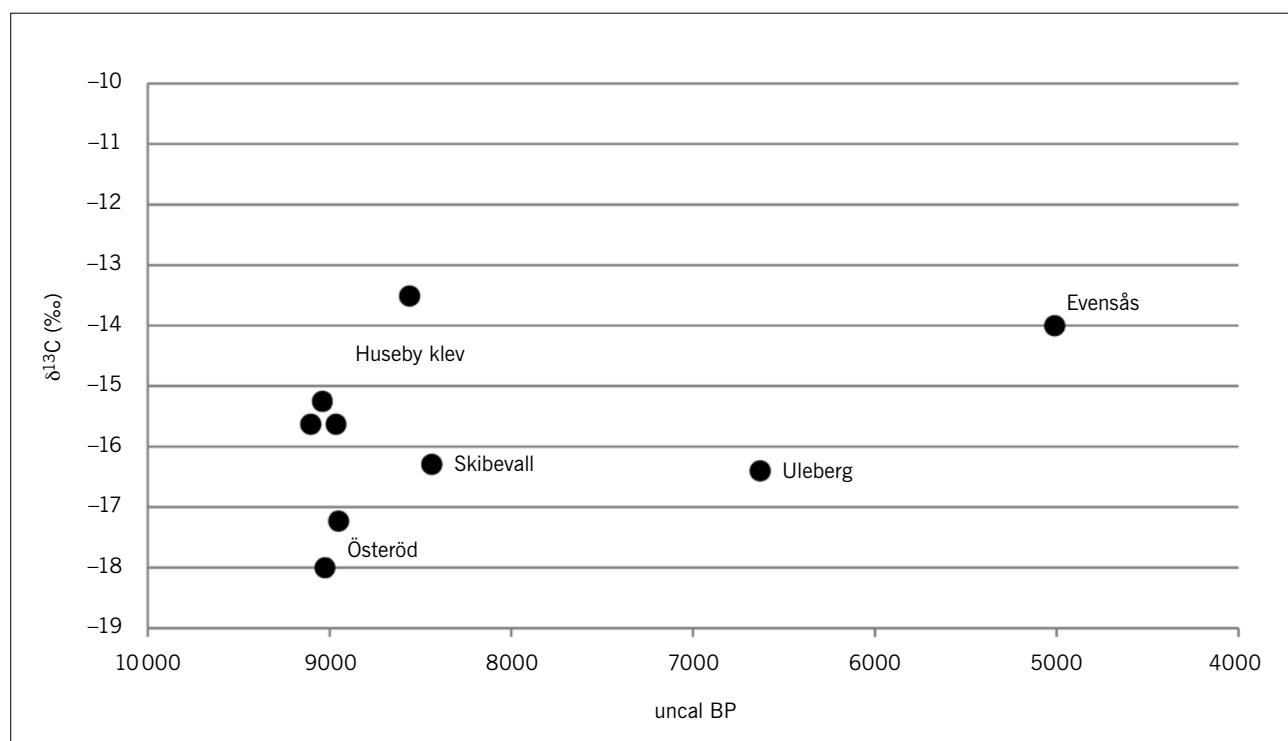


Fig. 11 $\delta^{13}\text{C}$ values on human bones from Bohuslän, dated to the Mesolithic.

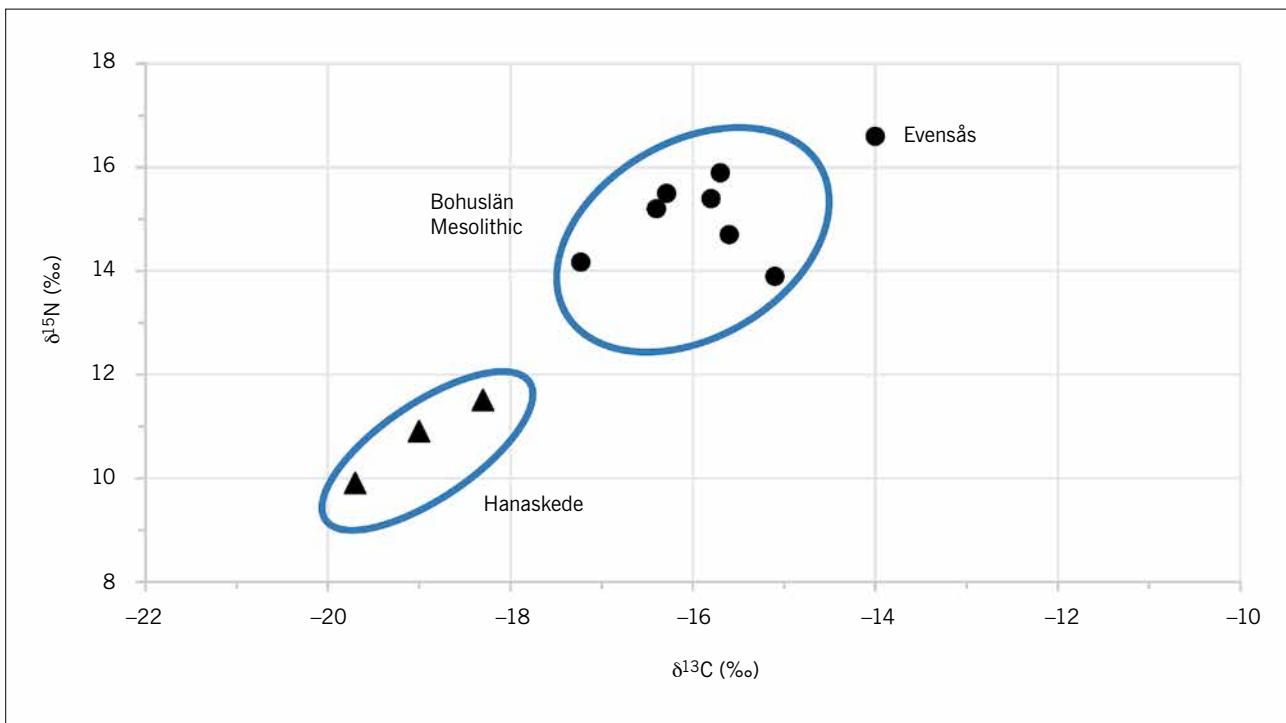


Fig. 12 $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values on human bones from Bohuslän and Västergötland, dated to the Mesolithic.

In addition, secondary burial practices in the form of cremations are now documented already from the Early Mesolithic period, not just in Sweden and Denmark, but in large parts of Western Europe (Grünberg 2000). Cremation seems to be practised in parallel with inhumations, sometimes in a single grave. Complexity is increased further if we consider collective burial practices such as have been suggested for a couple of Belgian sites from the Early Mesolithic (Cauwe 2001). The contrast between Mesolithic and Neolithic burial practices therefore now appears much less clear than just a decade ago.

Variety in the treatment of human remains is paralleled by variation in diet, as shown above. Although marine protein is significant in all the individuals analysed, terrestrial protein makes up a considerable proportion in some individuals. In contrast, the environments around the find sites are quite similar, consisting of a highly marine archipelago. The

variation in diet probably reflects variation in settlement patterns, seasonal cycles, and individual mobility.

The finds from Österöd and Skibevall add new pieces to this puzzle. Further investigation of these and other west Swedish human finds may hopefully help to clarify some of the many questions that remain regarding the way Mesolithic communities treated their dead.

Acknowledgements

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Source of figures

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|---|---|----------|---|
| 1 | K.-G. Sjögren | 6 | according to Tore Pässe, SGU |
| 2 | K.-G. Sjögren; shoreline reconstruction by Tore Pässe, SGU | 7–8 | T. Ahlström |
| 3 | T. Ahlström | 9 | K.-G. Sjögren; elevation data from the Swedish mapping agency |
| 4 | K.-G. Sjögren; elevation data from the Swedish mapping agency | 10 | T. Ahlström |
| 5 | authors | 11–12 | authors; data from appendix |
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Appendix:

Mesolithic human bone finds from Sweden

1. Sunnansund, Ysane 93, Blekinge, grave

Excavated by Blekinge museum 2012, several human bone fragments
(Adam Boethius, pers. comm.).

2. Dammens Bro 195, Bohuslän, cremation grave

The site of the famous Stångäns cranium was investigated in the 1990s by Kindgren, Jonsson and Schaller Åhrberg. The site contained an extensive Early Mesolithic settlement, partly located on a glacial shell bank. A concentration of cremated human bones within a few square metres suggests a disturbed cremation grave. The cremated bones were dated to 8340 ± 40 BP (GrA-14295), while a sample from the Stångäns cranium was dated to the Iron Age, 2280 ± 140 BP (Ua-1893).

Kindgren 1991; 1995; Schaller Åhrberg et al. 1996; Kindgren/Schaller Åhrberg 1999; Schaller Åhrberg 2007.

3. Huseby klev, Morlanda 89, Bohuslän, settlement find

Scattered occurrences of human bone fragments and teeth at a Mesolithic settlement site, investigated 1992–1994 (Nordqvist 2005). No detailed osteological analysis has been published, but the teeth were described by Alexandersen (2005). The human bones were at least three teeth and four to five other bone fragments, among which a femur from a young person. The dates and the isotope values are difficult to correlate, unfortunately.

Datings on human bone (Nordqvist 2000):

Lab. no.	Radiocarbon age (BP)	$\delta^{13}\text{C}_{\text{AMS}}$ (‰)	Context
Ua-6411	9105 ± 100	-15.63	Deep pit
Ua-6210	9040 ± 80	-15.25	Deep pit
Ua-6407	8965 ± 75	-15.63	Deep pit
Ua-6409	8560 ± 75	-13.51	The tent

Eriksson 2003 measured $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ on four bone pieces:

Lab. no.	Element	$\delta^{13}\text{C}$ (‰)	$\delta^{15}\text{N}$ (‰)	Context
HUS02	Maxilla	-15.6	14.7	Deep pit
HUS04	Cranium	-15.8	15.4	Deep pit
HUS05	Femur	-15.1	13.9	Deep pit
HUS03	Cranium	-15.7	15.9	The tent

Eriksson 2003; Alexandersen 2005; Jonsson 2005; Nordqvist 2000; 2005.

4. Rottjärnslid, Dragsmark 36, Bohuslän, settlement find

Two human cranial fragments, partly burned, were found together with animal and fish bones in a Late Mesolithic kitchen midden. Excavated by Johan Alin 1934 and Nils Niklasson 1945. The human bones have not been dated. Alin 1935; 1955 nr 895; Newell et al. 1979.

5. Sandarna, Göteborg 15, Bohuslän, settlement find

Fragment of left tibia, found in square A13 among settlement finds of Middle Mesolithic date (Sandarna Culture). The tibia has not been dated but was found in a cultural layer overlaid by transgression sediments. Alin et al. 1934.

6. Skibevall, Bottna, Bohuslän, grave

Human skeleton, found during shell gravel digging c. 1832. See description above.

7. Uleberg, Tossene 280, Bohuslän, grave

Double grave with partly preserved skeletons of two individuals, a male and a probable female, both young adults. They seem to have been buried in sitting hocker position. The grave was discovered in 1929 by the local school teacher, Edvin Sjöfält, and the site was investigated by Niklasson in 1929, 1932 and 1942. The bones were investigated by Carl-Magnus Fürst in 1929.

Two ^{14}C -dates have been made on the bones: 6890 ± 100 BP (St-2440, GAM dat nr 19) and 6630 ± 75 BP $\delta^{13}\text{C} -17.3$ ‰ (Ua-7838). Stable isotope determinations on collagen were performed by Eriksson 2003: $\delta^{13}\text{C} -16.4$ ‰, $\delta^{15}\text{N} 15.2$ ‰. It is unclear which of the individuals was analysed. Gbg inv nr 173, GAM 45677.

Niklasson 1932; Fredsjö 1953; Wigforss 1968; Newell et al. 1979; Nordqvist 2000; Eriksson 2003.

8. Österöd, Bro 413:2, Bohuslän, grave

Human skeleton, found during shell gravel extraction in 1903. See description above.

9. Hästefjorden, Frändafors 127, Dalsland, settlement find?

Human fibula (?), found in postglacial clay c. 2.4 m (8 feet) below the surface together with elk, swan and lynx bones, many of which were worked, and a harpoon made of elk bone. The find was made in 1868 during digging for a canal. The find was reported by the geologist Axel Erdmann. The bones were determined by Kinberg. His determination of the human bone was disputed by von Düben, who considered it to be a bear bone. The bones were lost in 1874, but the harpoon was pollen dated to the Boreal by Thomasson 1937. The find association makes a Mesolithic date likely. In 1959, a bone fish hook was found at approximately the same spot. The stratigraphy was investigated by Larsen 1925 and Thomassen 1937. An attempt to locate the find spot with machine trenches by Nordqvist in 2001 was unsuccessful (Bengt Nordqvist, pers. comm.). Kinberg 1870; Sidenbladh 1870; Sarauw 1919; Larsen 1927; Thomasson 1937; Rex Svensson 1988.

10. Gisslause, Lärbro 413, Gotland, settlement find

Excavated by Munthe and Hansson in 1929. Fourteen human bones were reported by Lindqvist/Possnert (1997, 39) among seal and fish bones found in a settlement layer transgressed by the Littorina Sea.

Munthe/Hansson 1930; Lindqvist/Possnert 1997.

11. Kams, Lummelunda 81, Gotland, grave

Remains of three individuals were found during gravel extraction in 1939 and 1947. The graves were investigated by Mårten Stenberger in 1939 and Greta Arwidsson in 1947. Two of the graves were of adult males, the third an adult woman. The males had been buried in upright sitting position while the female grave was too disturbed to allow any conclusion.

Bones from the female have been dated to 8050 ± 75 BP (Lu 1983).

Arwidsson 1949; Gejvall 1949; Larsson 1982; 2004; Lindqvist/Possnert 1999.

12. Stora Bjers, Stenkyrka 30, Gotland, grave

The grave was found during excavation of a Bronze Age site in 1953 and excavated by Greta Arwidsson the same year. It consisted of a shallow pit with the skeleton lying in a crouched position. Part of a slotted bone point was embedded in the pelvis. The skeleton has been determined by Gejvall as a male, middle aged adult. A molar was dated to 7970 ± 80 BP (Ua-10426), $\delta^{13}\text{C} -17.8\text{‰}$.

Arwidsson 1979; Newell et al. 1979; Larsson 1982; 2004; Lindqvist/Possnert 1999.

13. Stora Förvar, Eksta 138, Gotland, settlement find

At the cave Stora Förvar on the small island of Stora Karlsö near Gotland, a Stone Age settlement was excavated by Lars Kolmodin and Hjalmar Stolpe 1888–1893. The 3–4 m thick layers spanned both the Mesolithic and the Neolithic. Among the c. 16 000 seal bones in the preceramic levels of section G in the cave (G8–G11), 50 human bones representing at least nine to ten persons have been identified by Lindqvist. Of these, three were children, two to four adolescents and three adults.

Direct dating of ten human bones has been performed (Lindqvist/Possnert 1999), summarised below:

Lab. no.	Radio-carbon age (BP)	SD	$\delta^{13}\text{C}$ (‰)	Con-text	Sex	Age	Ind. no.
Ua-3132	8555	135	-19.2	G10	M	Juv.	4
Ua-3789	8340	100	-18.9	G8	M	Juv./ad.	4
Ua-2918	8270	75	-19.2	G11	M	Juv./ad.	4
Ua-13554	8360	95	-18.9	G10	M?	Ad.?	4
Ua-13555	8380	85	-18.1	G9	M	Juv./ad.	5?

Ua-13407	8260	95	-18.4	G10	-	Inf. II	2
Ua-3788	8220	95	-18	G10	-	Inf. I	1
Ua-13406	7830	90	-17.7	G10	F?	Inf. II	3
Ua-2930	7440	85	-17.7	G8	F	Ad.	8
Ua-3130	5500	95	-16.3	G7	M	Ad.	10

Lindqvist/Possnert 1997; 1999.

14. Svalings, Gothem 202, Gotland, settlement find

Fragment of a human cranium found during geological survey by the geologist A. Olsson in 1911, in a cultural layer overlaid by Littorina Sea transgression sediments. Grey seal bones were also found in the same layer. Not directly dated. Munthe et al. 1928; Munthe/Hansson 1930.

15. Abekås I, Abekås 19, Skåne, grave

Bronze Age mound, excavated by Folke Hansen in 1922. The mound had a sequence of 16 graves with at least 24 individuals, dating from the Late Neolithic to the Early Bronze Age. However, grave 10, and inhumation grave of a c. 10-year-old child with no associated grave goods, was dated to the Late Mesolithic, 5871 ± 33 BP (OxA-29034, previously unpublished).

Hansen 1938.

16. Ageröd I:HC, Munkarp 4:3, Skåne, settlement find

Five scattered human bones belonging to adult persons were found in a Mesolithic settlement layer during excavations by Althin in 1946–1949 and Larsson in 1972–1974. The bones have not been directly dated. ^{13}C and ^{15}N was measured on all five bones by Eriksson.

Althin 1954; Newell et al. 1979, 32; Larsson et al. 1981; Eriksson 2003.

17. Arlöv I, Burlöv 65, Skåne, settlement find

Two human bones, a skull fragment and a phalanx, were found during excavations by Salomonsson in 1962, in a stratigraphically sealed Mesolithic settlement layer. The finds in the layer suggest a late Kongemose date. The human bones have not been directly dated.

Salomonsson 1970; Newell et al. 1979; Larsson et al. 1981.

18. Bäckaskog, Kiaby 21, Skåne, grave

Investigated by Folke Hansen 1939. Skeleton of a woman, 40–50 years old, found in a sitting hocker position. Dated to 6075 ± 90 BP (St-6188) and 7895 ± 75 BP (Ua-10667). Hansen 1941; Rydbeck 1945; Gejvall 1970; Sten et al. 2000; Ahlström 2013.

19. Malmö harbour, Skåne, submarine find

Human femur of a subadult, found in marine clay in the harbour of Malmö during dredging in 1958. The femur has been dated recently to 8149 ± 42 BP (UBA-23148), $\delta^{13}\text{C} -17.08\text{‰}$, $\delta^{15}\text{N} 9.60\text{‰}$ and C/N 3.12.

Not previously published.

20. Måkläppen, Skanör, Skåne, submarine finds

Several human bones washed up on the shores of the Fästerbo reef. At Måkläppen, a human femur was found and dated to 7100 ± 50 BP (LuS-6148). In the same region, a human skull was found, dated to 6095 ± 50 BP (LuS-6533), $\delta^{13}\text{C} -15.3\text{‰}$. A human humerus has been found at the northern reef in Skanör, and dated to 6305 ± 50 BP.

Larsson/Brost 2011.

21. Rinkaby, Rinkaby 56, Skåne

Double grave, investigated by Kristianstads museum 2005. In a shallow pit, $1.8 \text{ m} \times 1.1 \text{ m}$, a concentration of fragmented human bones from two individuals was found. The excavator suggested that the bones had been intentionally crushed. A human bone was ^{14}C dated to 5505 ± 48 BP (lab. no. not published).

Pettersson 2005.

22. Segebro, Malmö 10, Skåne, settlement find

Human tarsal bone found in stratigraphically sealed Mesolithic settlement layer. Artefacts in the layer suggest a Kongemose date. Not directly dated. Excavated by Kallin 1936, Salomonsson 1960 and Larsson 1976.

Newell et al. 1979; Larsson et al. 1981.

23. Skateholm I, Tullstorp 22, Skåne, graves and settlement

Cemetery and settlement, investigated 1980–1984 by Lars Larsson. Sixty-five graves were investigated, including inhumations, cremations and dog burials. Ertebølle Culture. Charcoal and collagen dates from four graves range 6180–6240 BP. Larsson 1988; 2004; Grünberg 2000.

24. Skateholm II, Tullstorp 23, Skåne, graves and settlement

Cemetery and settlement, investigated 1982–1984 by Lars Larsson. Twenty-two graves were documented, including inhumations, cremations and dog burials. Late Kongemose – Early Ertebølle Culture. No direct dates on the bones.

Larsson 1988; 2004; Grünberg 2000.

25. Skateholm III, Tullstorp 17, Skåne, graves

Partly destroyed cemetery. One grave was investigated by Hansen 1932. Ertebølle Culture. The grave has been dated to 5850 ± 90 BP (Lu-2156).

Larsson 1988; 2004; Grünberg 2000.

26. Store Mosse, Skåne, wetland find

Skeleton of a juvenile, probably a female, found during peat digging in 1954. Pollen dated to the Boreal period by Nilsson. Attempts at ^{14}C dating at the Belfast laboratory in 2012 failed due to low collagen.

Nilsson et al. 1979.

27. Tågerup, Saxtorp 3, Skåne, graves and settlement finds

At a large settlement complex from the Kongemose and Ertebølle periods, at least six graves were also found. Preservation in the graves was poor, and the bones could not be dated directly. Charcoal dates and artefacts in the graves suggest Kongemose and Ertebølle datings. Bones were determined by Ahlström (2001). The bodies were laid out in supine position, in some cases with red colouring.

In the waterlogged refuse layers below the actual settlement area, abundant flint waste was found together with animal bones and wooden artefacts. Among them were 13 scattered human bones, some of them burnt, from the Kongemose and Ertebølle layers. A skull fragment and a femur from the Kongemose layer were dated to 7480 ± 80 BP, $\delta^{13}\text{C} -20.5\text{‰}$ (Ua-9941) and 7415 ± 80 BP, $\delta^{13}\text{C} -21.1\text{‰}$ (Ua-25197), respectively.

Ahlström 2001; Kjällqvist 2001.

28. Bredgården, Marbäck 115, Västergötland, wetland find

Skeleton of a 45–60-year-old male, found in 1994 during drainage work. The skeleton was excavated by Leif Jonsson in 1994. It was buried at ca 1.2 m depth in a gyttja layer and has been deposited in open water in a small lake. A ^{14}C dating gave the result 8645 ± 95 BP, $\delta^{13}\text{C} -19.35\text{‰}$ (Ua-6629). A detailed description of the find has been published by Borrmann et al. 1996.

29. Hanaskede, Skär, Västergötland, wetland find

An isolated human skull was found during digging in a small kettle hole in 1990. The skull was from an adult male, c. 40 years old. The skull has been dated to 8835 ± 90 BP (Ua-10295). Three samples were analysed for stable isotopes (Eriksson 2003):

Lab. no.	$\delta^{13}\text{C}$ (‰)	$\delta^{15}\text{N}$ (‰)	Element
HAN01	-18.3	11.5	M2 tooth
HAN02	-19	10.9	M1 tooth
HAN03	-19.7	9.9	Skull bone

Vretemark 1996; Eriksson 2003.

30. Alby, Hulterstad 114, Öland, grave

Large Mesolithic and Neolithic settlement complex, excavated 1970–1972 by Königsson. The site contained several Iron Age graves, but also the grave of a c. 30-year-old male, buried in a crouched position (grave 25).

The skeleton has been dated on a tooth to 5200 ± 150 BP (Ua-1713) and on a bone to 5260 ± 70 BP (Ua-2333). Isotope determinations have been made by Lidén on tooth and bone samples.

Mateer 1979; Königsson et al. 1993; Lidén et al. 2004; Papmehl-Dufay 2006; Eriksson et al. 2008.

31. Köpingsvik, Köping 215, Öland, grave/settlement find?

Isolated mandible from an adult, found on a large complex of mainly Middle Neolithic graves and settlement. It is not possible to determine whether the mandible belongs to a disturbed grave or not.

The mandible was dated to 5580 ± 60 BP (Ua-32180). Diet isotopes were measured by Eriksson et al. 2008 on four samples from the M1–M3 teeth and from the mandible:

M1 $\delta^{13}\text{C} -14.9\text{‰}$, $\delta^{15}\text{N} 16.0\text{‰}$;

M2 $\delta^{13}\text{C} -14.7\text{‰}$, $\delta^{15}\text{N} 16.1\text{‰}$;

M₃ $\delta^{13}\text{C}$ -13.7 ‰, $\delta^{15}\text{N}$ 17.2 ‰;
 Mand $\delta^{13}\text{C}$ -14.8 ‰, $\delta^{15}\text{N}$ 16.0 ‰.
 Papmehl-Dufay 2006; Eriksson et al. 2008.

32. Övra Vannborga, Köping 189:2, Öland, grave

On a Late Iron Age settlement site, excavated 1991 by Kalmar länsmuseum, two inhumation graves were found, one Mesolithic and one from the Iron Age. The Mesolithic grave (A1662) was a shallow pit, 1.1 m × 0.8 m, with red colouring. The partly disturbed skeleton lay in a crouched position with the head to the south. Near the pelvis, 18 seal tooth beads, an amber bead and a flint blade were found.

Datings: 8075 ± 65 BP, $\delta^{13}\text{C}$ -17.6 ‰ (Ua-37207); tibia 8030 ± 55 BP, $\delta^{13}\text{C}$ -18.8 ‰ (Ua-36823).
 Papmehl-Dufay 2006; Petersson et al. 2009.

33. Alvastra, Västra Tollstad 12, Östergötland (dolmen)

Among the bones from a Neolithic dolmen were noted several bones from a heavily built older male, more than 60 years old. Four dates from this person puts him in the Mesolithic: 7115 ± 155 BP (tibia, Ua-12502), 7495 ± 65 BP (humerus, Ua-14624), 7525 ± 135 BP (Ua-16634) and 7088 ± 62 BP (mandible, Ua-38179).

The dolmen was excavated in 1918 by Frödin and in the 1980s by Janzon. The Mesolithic skeleton was described by Wilhelmsson and Ahlström 2009. Although the dating may be trusted, there is some doubt about the provenance, and the skeleton may in fact have been found at some other loca-

tion in the Alvastra area. ^{13}C and ^{15}N was measured on the mandible and an M₂ tooth by Fornander 2011. Janzon 2009; Wilhelmsson/Ahlström 2009; Fornander 2011.

34. Holmen, Svanshals 132, Östergötland, grave

Human cranial fragment from an adult, found together with antler artefacts during surface collection, in a patch of red-coloured soil. The cranial fragment has been dated to 6800 ± 90 BP, $\delta^{13}\text{C}$ -17.6 ‰ (Ua-12944), and the antler artefacts have given similar dates.

Browall 1999; 2003.

35. Hånger, Källstad 6, Östergötland, grave?

Cranial fragment from an adult, surface collected in 1980. The fragment has been dated to 5860 ± 75 BP, $\delta^{13}\text{C}$ -17.93 ‰ (Ua-12945).

Browall 1999.

36. Kanaljorden, Motala, Östergötland, wetland find

Deposition of human and animal bones on a stone platform in a small pond on the northern side of Motala stream. Cf. Hallgren/Fornander in the present volume.

37. Verkstadsvägen, Motala 173, Östergötland, graves

Large settlement complex on the southern side of Motala stream. On the outskirts of the settlement, at least 12 Mesolithic burials were excavated in 2012–2013.

Cf. Gummesson/Molin in the present volume.

Programme of the international conference on »Mesolithic burials – Rites, symbols and social organisation of early postglacial communities«, Halle (Saale), 18th–21st September 2013

Wednesday, 18 September 2013

8:00–14:00

Registration/Poster installation/Coffee

10:00 Opening session

Welcome words from Harald Meller,
State Archaeologist and Director of the State Office
for Heritage Management and Archaeology
Saxony-Anhalt, Director of the State Museum of
Prehistory Halle (Saale)

Session Chair: Berit V. Eriksen, Schleswig (DE)

10:10 Judith M. Grünberg, Halle/Saale (DE):
Introduction to the conference topic

10:30 Christoper Meiklejohn & Jeff Babb,
Winnipeg (CA):
A chrono-geographic look at Mesolithic
burials: an initial study

11:00 Glen H. Doran, Tallahassee (US):
Florida's window on the past – bog burials

11:30 Ruth Struwe, Bernau (DE) & Birgit Scheps-
Bretschneider, Leipzig (DE):
Ethnological records on the treatment of corpses
preceding disposal of Australia's sub-recent
indigenes

12:00 Discussion

12:10 Lunch Break

Session Chair: Pablo Arias, Santander (ES)

13:30 Bernhard Gramsch, Potsdam (DE):
The Mesolithic burials of northeastern Germany –
synopsis and new aspects

14:00 Maha Ismail-Weber, Wünsdorf (DE):
A burial at the edge of the Oderbruch (state of
Brandenburg) – description and discussion of a
possible Mesolithic grave

14:30 Ruth Bollongino, Mainz (DE), Jan Heinemeier, Aarhus
(DK), Bettina Jungklaus, Berlin (DE), Andreas Kotula,
Greifswald (DE) & Thomas Terberger, Hannover (DE):
New information on the multiple burial site of Groß
Fredenwalde, Brandenburg

15:00 Marcus Stecher, Mainz (DE), Judith M. Grünberg,
Halle/Saale (DE) & Kurt W. Alt, Mainz (DE):
The Mesolithic burials of the Middle Elbe-Saale
region

15:30 Leendert P. Louwe Kooijmans, Eerbeek (NL):
Human bones amidst refuse in the Late Mesolithic –
the Hardinxveld case, the Netherlands

16:00 Discussion

16:10 Group photograph of the participants in front of the
main entrance of the »State Museum of Prehistory«

16:30 Poster session

17:30 Special tour through the permanent exhibition of the
State Museum of Prehistory guided by Bernd Zich,
head of the department »State Museum«, and
Judith M. Grünberg

19:00 »Icebreaker Party« at the State Museum of Prehistory
(lecture room) with small buffet. Film by E. Brinch
Petersen, København (DK):
»Digging Mesolithic Burials: Henriksholm-Bøgebakken
1975 – Strøby Egede 1986 – Gøngehusvej 7, 1990«

Thursday, 19 September 2013

Session Chair: Christoper Meiklejohn, Winnipeg (CA)

8:30 Rick Schulting, Oxford (GB):
Holes in the world: the use of caves for burial in the
Mesolithic

9:00 Erik Brinch Petersen, København (DK):
Afterlife in the Mesolithic – from inhumation,
cremation and exhumation to discard into oblivion

9:30 Berit V. Eriksen, Schleswig (DE):
Grave matters in Southern Scandinavia. Mortuary practice and ritual behaviour of the Maglemose people

10:00 Discussion

10:10 Coffee Break

Session Chair: Erik Brinch Petersen, København (DK)

10:30 Ole Lass Jensen, Hørsholm (DK):
Inhumations and cremations from the Late Mesolithic site of Nivå 10, Eastern Denmark

11:00 Esben Kannegaard, Randers (DK):
The early Ertebølle ochre graves from the location Nederst in eastern Jutland

11:30 Christian Bender Koch, København (DK), Erik Brinch Petersen, København (DK) & Esben Kannegaard, Randers (DK):
A material science perspective on ochre from Mesolithic graves

12:00 Discussion

12:10 Lunch Break

Session Chair: Zofia Sulgostowska, Warszawa (PL)

13:30 Lars Larsson, Lund (SE):
Perspectives on the Skateholm burial grounds

14:00 Torbjörn Ahlström, Lund (SE) & Karl-Göran Sjögren, Göteborg (SE):
Early Mesolithic burials from Bohuslän, Western Sweden

14:30 Fredrik Hallgren & Elin Fornander, Västerås (SE):
Skulls on stakes and skulls in water. Mesolithic mortuary rituals at Kanaljorden, Motala, Sweden, 7000 BP

15:00 Fredrik Molin, Linköping (SE) & Sara Gummesson, Stockholm (SE):
How to settle the dead – burials on the Mesolithic settlement Motala, Sweden

15:30 Discussion

15:40 Coffee Break

Session Chair: Leendert P. Louwe Kooijmans, Eerbeek (NL)

16:00 Zofia Sulgostowska, Warszawa (PL):
New data concerning Mesolithic burials from Polish territory

16:30 Witold Gumiński & Karolina Bugajska, Warszawa (PL):
Exception as a rule. Diversified burial rite at Dudka and Szczepanki (Masuria, NE-Poland)

17:00 Karolina Bugajska & Witold Gumiński, Warszawa (PL):
How many steps to heaven? Loose human bones and secondary burials at Dudka and Szczepanki, Masuria (NE-Poland)

17:30 Adomas Butrimas & Marius Iršėnas, Vilnius (LT):
New data on the Donkainis and Spiginas (West Lithuania) Mesolithic cemeteries

18:00 Discussion

19:30 Public evening talk
Bernhard Gramsch, Potsdam (DE):
Hunters 10,000 years ago – excavations near Friesack in the Marchia of Brandenburg
Jäger vor 10.000 Jahren – Ausgrabungen bei Friesack in der Mark Brandenburg

(afterwards social evening in a restaurant)

Friday, 20 September 2013

Session Chair: Margherita Mussi, Roma (IT)

8:30 Ilga Zagorska, Riga (LV):
Mesolithic burials traditions in Latvia, Eastern Baltic

9:00 Gunta Zariņa, Rīga (LV) & Kathleen Faccia, London (GB):
Some aspects of Mesolithic population of Latvia

9:30 Valdis Berzīņš, Rīga (LV), Ute Brinker, Schwerin (DE), Harald Lübke, Schleswig (DE), John Meadows, Kiel (DE) & Ilga Zagorska, Rīga (LV):
The human burials of Rīnukalns, Latvia – new investigations to clarify an old research dispute

10:00 Discussion

10:10 Coffee Break

Session Chair: Ilga Zagorska, Rīga (LV)

- 10:30 Rimantas Jankauskas, Vilnius (LT):
Skeletal markers of activities and social status in Lithuanian and Latvian Mesolithic-Neolithic population
- 11:00 Mari Törv, Tartu (EE)/Schleswig (DE):
Body as evidence: tracing hunter-gatherer (c. 5200–3000 cal BC) burial practices in present-day Estonia
- 11:30 Kristiina Mannermaa, Helsinki (FI):
Interpretation of meanings of animals in prehistoric hunter-gatherer burials in the North – multiple lines of evidence approach
- 12:00 Discussion

12:10 Lunch Break

Session Chair: Jörg Orschiedt, Berlin (DE)

- 13:30 Éva David, Nanterre (FR):
Late Mesolithic social organisation from Téviec (Morbihan, France) burials grounds
- 14:00 Patrice Courtaud, Talence (FR), Hans C. Petersen, Odense (DK), Aurélie Zemour, Nice (FR), Franck Leandri, Ajaccio (FR) & Joseph Cesari, Ajaccio (FR):
The Mesolithic burial of Campu Stefanu (Corsica, France)
- 14:30 Pablo Arias, Santander (ES):
Grave goods in the Mesolithic of southern Europe

15:00 Discussion

15:10 Coffee Break

Session Chair: Lars Larsson, Lund (SE)

- 15:30 Juan F. Gibaja, Barcelona (ES), Javier Fernandez, Tarragona (ES), Maria Eulalia Subira, Barcelona (ES), Eva Fernandez, Liverpool (GB), Xavier Terradas, Barcelona (ES), Cristina Gamba, Dublin (IE) & Jose Aparicio, Valencia (ES):
Lecture around the Mesolithic necropolis of El Collado (Alicant, Spain)
- 16:00 Mary Jackes & David Lubell, Waterloo (CA):
Muge Mesolithic burials, a synthesis on mortuary archaeology
- 16:30 Rita Peyroteo Stjerna, Uppsala (SE):
Roots of death: funerary rituals and the shell middens of SW Atlantic Europe (Tagus and Sado valleys, Portugal)

- 17:00 Nuno Bicho, Faro (PT), Cláudia Umbelino, Coimbra (PT), Célia Gonçalves, Faro (PT), Olívia Figueiredo, Faro (PT), Telmo Pereira, Faro (PT), João Cascalheira, Faro (PT), João Marreiros, Faro (PT) & T. Douglas Price, Madison (US):
Human burials in the Mesolithic of Muge and the origins of social differentiation: the case of Cabeço da Amoreira, Portugal

- 17:30 Olívia Figueiredo, Faro (PT), Cláudia Umbelino, Coimbra (PT) & Nuno Bicho, Faro (PT):
Mortuary variability at Moita do Sebastião & Cabeço da Amoreira (Muge, central Portugal)

18:00 Discussion

19:30 Social evening in a restaurant with buffet

Saturday, 21 September 2013**Session Chair: Patrice Courtaud, Talence (FR)**

- 8:30 Federica Fontana, Ferrara (IT), Antonio Guerreschi, Ferrara (IT), Stefano Bertola, Innsbruck (AT), François Briois, Toulouse (FR), Cristina Cilli, Torino (IT), Emanuela Cristiani, Cambridge (GB), Valentina Gazzoni, Mantova (IT), Giacomo Giacobini, Torino (IT), Gwenaëlle Goude, Aix-en-Provence (FR), Estelle Herrscher, Aix-en-Provence (FR) & Sara Ziggotti, Villafranca Padovana (IT):
The Castelnovan burial of Mondeval de Sora (San Vito di Cadore, BL, Italy): evidence for changes in the social organisation of Late Mesolithic hunter-gatherers in north-eastern Italy

- 9:00 Margherita Mussi, Roma (IT), Rita T. Melis, Cagliari (IT) & Roberto Macchiarelli, Paris/Poitiers (FR):
Mesolithic burials at S'Omú e S'Orku (SOMK) on the south-western coast of Sardinia

- 9:30 Adina Boroneanț, Bucharest (RO) & Clive Bonsall, Edinburgh (GB):
Icoana revisited

10:00 Discussion

10:10 Coffee Break

Session Chair: Mary Jackes, Waterloo (CA)

- 10:30 Jörg Orschiedt, Berlin (DE):
Bodies, bits and pieces: Late Palaeolithic and Early Mesolithic burials in Europe
- 11:00 Søren A. Sørensen, Køge (DK):
Loose human bones from Late Mesolithic sites in Denmark

11:30 Amy Gray Jones, Chester (GB):
 »Loose« human bone in the Mesolithic – isolated
 or integrated?

12:00 Discussion

12:10 Lunch Break

Session Chair: Clive Bonsall, Edinburgh (GB)

13:30 Emily Hellewell & Nicky Milner, York (GB):
 Analyses of the placement of disarticulated human
 remains in stone age shell middens in Europe

14:00 Johan Jelsma, Zuidhorn (NL):
 Social and spatial differences at Port au Choix:
 the mortuary analysis of a Maritime Archaic
 Indian cemetery at Newfoundland, Canada

14:30 Liv Nilsson Stutz, Atlanta (US):
 Testing the tribal hypothesis. An attempt to use
 anthropological theory to reconstruct Mesolithic
 cosmology and social organization from treatment
 of the dead

15:00 Discussion

15:10 Coffee Break

Session Chair: Liv Nilsson Stutz, Atlanta (US)

15:30 Peter Vang Petersen, København (DK):
 Papooses in the Mesolithic? – A reinterpretation of
 tooth and snail shell pendants from Bøgebakken,
 burial 8 and other Mesolithic burials

16:00 Judith M. Grünberg, Halle/Saale (DE):
 Remains of the Mesolithic mortuary rituals of upright
 seated individuals in Central Germany

16:30 Mary Jackes & David Lubell, Waterloo (CA):
 Capsian mortuary practices at Site 12
 (Aïn Berriche), Aïn Beïda region, eastern Algeria

17:00 Final Discussion

17:30 Lars Larsson, Lund (SE):
 Summary of the conference and conclusions

18:00 End of the meeting

Poster Presentations

1 Marja Ahola & Kristiina Mannermaa, Helsinki (FI):
 Vantaa Jönsas – a Mesolithic burial ground?

2 Birgit Gehlen, Köln (DE):
 Mesolithic heritage in Neolithic burials

3 Mario Küßner, Weimar (DE):
 A child's grave from the rock shelter Fuchskirche I
 near Allendorf (Thuringia, Germany)

4 Jörg Orschiedt, Berlin (DE) & Claus-Joachim Kind,
 Esslingen (DE):
 Mesolithic human remains from Southern Germany

5 Svetlana V. Oshibkina, Moscow (RU):
 Mesolithic cemeteries in the north of Eastern Europe

6 Torsten Schunke, Halle/Saale (DE) &
 Mario Küßner, Weimar (DE):
 Mesolithic cremation burial and camp in Coswig,
 Wittenberg District, Central Germany

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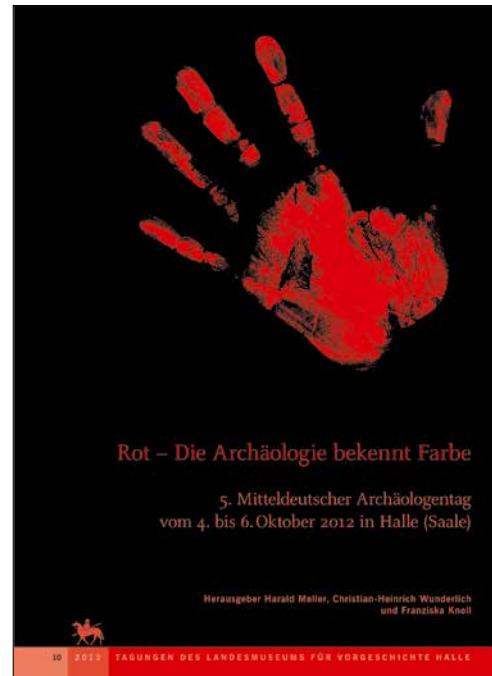
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