SEARCHING FOR HUMAN-DOG CONTEXTS IN 4 MESOLITHIC CAVE & ROCKSHELTERS IN THE WEST-NORWEGIAN LANDSCAPE

WITH A MAIN FOCUS ON THE VISTE CAVE AND EXAMPLES FROM 3 ADDITIONAL ROCKSHELTERS

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Abstract

Hundebein kan bidra til vår tolkning av hvordan menneskene sameksisterte med dyr i fortiden, hvor og når de levde sammen med hundene og hundens verdi. Det er noen begrensninger når det kommer til å forstå hva hundene betydde for menneskene som levde for så mange år siden, og det er nettopp det at bevismaterialet kan tolkes på mange ulike måter, og vi har ikke alltid like mye funn å gå etter i det arkeologiske materialet som vi skulle ønske at vi hadde. Hunden er lokalisert ved alle lokalitetene nevnt i denne avhandlingen, Vistehulen, Kvernvikhelleren, Skipshelleren og Geitalemen. Samt ved mange flere bosetninger fra den mesolittiske perioden i Norge og Skandinavia. Og de har blitt behandlet på ulike måter i form av ritualer og i grav kontekst som ved sparsomme funn fra boplasser og avfallshauger. Denne avhandlingen fokuserer på hundens emosjonelle verdi for menneskene i Mesolitikum og hva vi kan tolke ut ifra funnene basert på publiserte og upubliserte utgravingsrapporter. Funnene fra lokalitetene indikerer at det har vært to spesifikke hunderaser i Mesolitikum, *Canis familiaris palustris* og *Canis familiaris inostranzewi,* hvorav disse utgjorde nokså ulike størrelser i forhold til hverandre. Hundebeinene i seg selv ga ikke overraskende resultat da mange av disse var enkle deler eller nokså fragmenterte, relativt spredt rundt boplass områdene. Omsider så tyder enkelte funn fra Vistehulen tegn til symbolbruk og kan delvis tolkes dithen basert på enkelte beinfunn, samt bruken av oker.

Acknowledgements

I have for a long time been interested in the dogs importance for humans in a prehistorical archaeological context, and I am grateful that I got the opportunity to immerse into these theme for my master thesis.

First and foremost, I would like to extend a big thank you to my MA-advisor Ramona Harrison- for sharing her enormous knowledge and helping me through tough times giving me guidance in the research for this dissertation.

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Line Syversbråten

“Sometimes it is easier to find out about human migrations and settlements by studying the dogs and not the people” …— Pat Shipman, 2021, s. 17-18

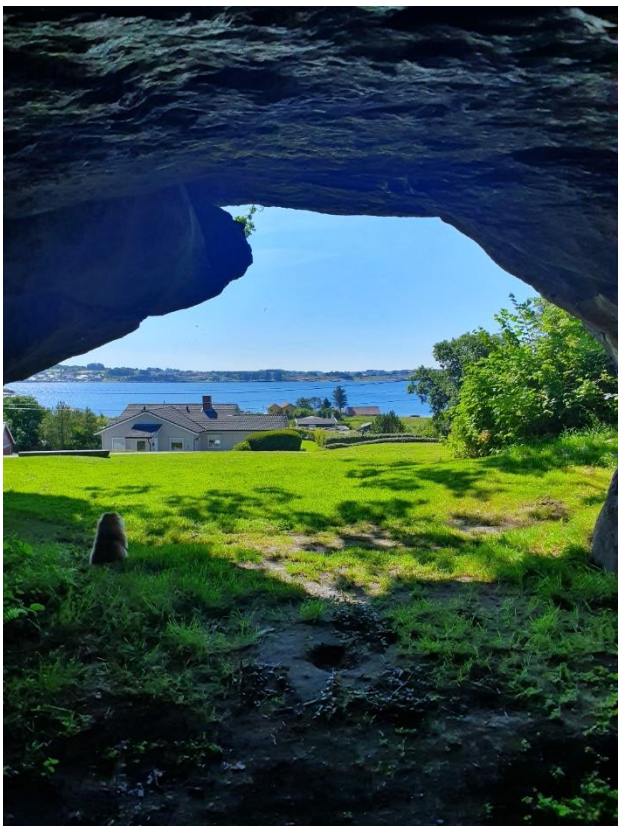


Figure 1. Caption from inside Vistehulen the summer of 2022. Photo: private

Contents

List of figures

List of tables

CHAPTER 1. SEARCHING FOR HUMAN-DOG CONTEXTS IN 4 MESOLITHIC CAVE & ROCKSHELTERS IN THE WEST NORWEGIAN LANDSCAPE

1.1 Introduction

In the western Norwegian landscape, we find evidence of settlements in the Mesolithic period (9,500-4000 Cal BC) that can be viewed as important human places of residence. Here we find patterns of how the mesolithic people lived and what they ate as well as the diversity of tools they had, in addition to techniques within tool making.

Hunting and gathering were the way of life for human individuals for several thousand of years and provided guidelines for community organization and settlement patterns (Dommasnes, 2006, p. 29). The findings from the various sites indicate that access to nature's raw materials has been a decisive factor regarding the settlements' location (Dommasnes, 2006, p. 29), and the main impression is that the oldest Mesolithic people lived in small, mobile groups with no permanent abode, later becoming somewhat more sedentary (Dommasnes, 2006, p. 29). At the various sites, we can see that the same settlements have been used repeatedly for thousands of years. In many ways, humans used to be closer to nature than we are today because they were significantly more dependent on it in order to survive (Dommasnes, 2006, p. 29-30). Many of these settlements researched in this thesis are assumed to be both seasonal and permanent as some groups moved or changed residential environments, and in many cases, also likely eventually returned back to the settlements due to better conditions (Bergsvik & David, 2015, p. 194).

Accompany in the settlements was presumably the dog, our oldest known non-human friend (Bethke & Burtt, 2020, p. 9), and our prehistoric ancestors must, in many ways, at some point in time, have realized that the wolf was a valuable resource to have on or by the settlement (it can also be seen as a symbiotic phenomenon). It may have started with some people adopting wolf puppies, the so-called "wolf puppy adoption" theory (Zeder, 2012, p. 239). This impression is plausible, and a common theory for archaeologists today, and widely accepted (Morey, 2010, p. 75, Fagan, 2015, p. 28, Perri, 2017, p. 1, Morey, 2015, p. 426, Galibert et al., 2011, p. 191, Zedda et al., 2006, p. 319, Shipman, 2021, p. 42) as well as varying theories as“ the commensal pathway scenario” that wolf on this basis eventually evolved into the dog we know today must have originated from a meaningful relationship with the humans at some time during the prehistorical times. Presumably, wolves and humans are generally remarkably compatible with each other's hierarchical and social structure, especially regarding pack

complexity, family structures, and communication systems (Morey, 2010, p. 76). The convenience of the wolf/dog's presence and companionship, and desire for more efficient hunting and guarding was probably an essential element for the hunter-gatherer people, but gradually, it formed and developed into the inseparable bond we see between humans and dogs over thousands of years until today.

Palaeo-Anthropologist and associate at the Pennsylvania State University Pat Shipman quoted in her book about our oldest companions: “Sometimes it is easier to find out about human migrations and settlements by studying the dogs and not the people” …— (Pat Shipman, 2021, p. 17-18). The quote depicts that studying archaeological evidence of dogs could provide us with some information about human groups existing in prehistorical times. By overlocking elements in the past human- animal relationship, there is a high probability of missing out on fundamental key factors (Shipman, 2021, p. 17-18).

Pat Shipman portrays an important point here, namely that bones are an important source of information and knowledge related to human activity at prehistoric settlements and localities. The osteological material has contributed to a unique insight into the settlement patterns of hunter-gatherer sites as well as an insight into prehistoric climates and landscapes due to the analytical qualities of the bones (Faltinsen, 2018, p. 1).

The thesis will mainly have a two-part focus: part one: the sites (1). Skipshelleren, (2). Kvernvikhelleren and (3). Geitalemen are used as comparative sites next to the main site (4). Vistehulen. Part two: the sites will be investigated to find out more about dog bone remains (archaeofauna) as potential indicators for human-dog relations.

In archaeological and historical context, Vistehulen has emerged as an important site from Norway's Stone Age, especially in terms of the research potential of the relatively rich osteological material and the collection of species that turn out to have existed in the area.

Vistehulen was first excavated by Tor Helliesen and A. W. Brøgger in 1907 (and continued in 1910), and the first monograph appeared in 1908 (Brøgger, 1908) where Helliesen and Brøgger describe the flora and fauna environment, animal remains as well as artefact material and the human skeleton, later called "Vistegutten" (Visteboy), which were directly dated to 7420±150 BP (5727-5558 cal BC) (Bergsvik & Storvik, 2012, p. 31). The main investigations and empirical basis of Vistehulen are based on Tor Helliesen (1908) and Harald Egenæs Lund's (1939,1941) final reports from the excavations. During the excavation in 1908, Professor Herluf Winge determined the osteological material, Professor H. H. Gran determined the flora, and G.

Guldberg determined the human remains (Brøgger, 1908). However, it would take some time before the following investigations occurred, which took place in 1939 and 1941 by Harald Egenæs Lund, this is further revealed in (Lund 1951), and the osteological material from this excavation was determined by zoologist Magnus Degerbøl and reproduced in the same report (Lund, 1951. p. 130-135). The excavated artefact material was later chronologically reviewed by Egil Mikkelsen in (1970).

The first excavations and the report from 1908 describe the cultural layers in a general context, and the main focus was on artefact material (Brøgger, 1908). The cultural layers description is explained in rather vague features and little detail compared to the later report from Lund (1951). Brøgger does not distinguish between the layers as Lund does but instead arranges the cultural layers into artificial layers that he describes as cultural layers I and II (Brøgger, 1908, p. 7). In 1910 Brøgger published an article in Naturen nr. 11 (1910) that further dealt with Vistehulen and its timeframe as well as the layer characterisation. Here Brøgger estimates a dating around tape's time "7350-7250 yr BP" (Prøsch-Danielsen, 2006, p. 85) (Brøgger, 1910, p. 346). The cave was only partially excavated during the first surveys by T. Helliesen, and A. W. Brøgger, and the remaining parts of the cave remained until 1939 for further excavations.

Vistehulen and Skipshelleren have had a significant impact on archaeology on the basis of position and phases of use, and the fact is that Vistehulen was inhabited over longer phases over several thousand years as earlier stated. Both Vistehulen and Skipshelleren mentioned in this thesis are remarkably well-documented sites (Bøe, 1934, Brøgger, 1908, Brøgger, 1910, Lund, 1951). Kvernevikhelleren and Geitalemen are, on the other hand, examples of sites that are not as well documented (Hougen, 1920, Helliesen, 1901, Gjessing, 1920). However, documentation for posterity is of particular interest and importance for archaeology and the legacy that the past brings of knowledge that can be used in a later research context. Since neither Kvernevikhelleren nor Geitalemen are as well documented nor as well-descriptive as Vistehulen and Skipshelleren, these have a good basis for comparison for how the excavation method was carried out in the early 1900s when it came to bone material, flora and fauna. The literature at the various sites is mainly presented in this thesis by Vistehulen, Helliesen (Brøgger 1908 and 1910, Lund, 1951), Skipshelleren (Bøe, 1934, Olsen, 1976), Kvernevikhelleren (Gjessing, 1920, Helliesen 1901, Lund, 1951), and Geitalemen based on (Hougen, 1920). These sites are good study cases to investigate the question of human-dog interaction and whether it is possible to make assumptions about the nature of their relationship.

The archaeological material from Vistehulen consists of various lithic artefact types, such as ground and pecked greenstone adzes, cores, scrapers, burins, knives, microliths, and flakes of flint and other lithic raw materials. Bone tools were also found, such as slotted bone points, fishhooks, harpoons, awls, and pendants. The rich osteological material is dominated by the terrestrial species wild boar and elk (Bergsvik & storvik, 2012, p. 31), indicating that this was maybe the main subject of hunt regarding the mammal species. Knut Andreas Bergsvik, professor in archaeology at the University of Bergen mentions that the vast majority of mammals are quite "puzzling", considering the location of the site being so near the coastal area (Bergsvik & Storvik, 2012, p. 31). Even if the marine species assemblage is more prominent than the mammal occurrence in Vistehulen could potentially be due to the methods of collection and preservation of the cave in the time before its discovery when the farm owner used the shell masses as fertilizer for his fields. Skipshelleren carried more mammals than marine species, suggesting that fishing was less extensive at the Skipshelleren site (Olsen, 1992, p. 188).

1.2 Thesis Questions

The overall goal of this thesis is to shed light on the relationship between humans and dogs in the West-Norwegian landscape during the Mesolithic period, which is characterized as the Old Stone Age in Nordic archaeology that spanned a time scale of approximately 5,500 years (between 9,500-4,000 cal BC) (Hagen, Solberg, 2021, Bergsvik & Storvik, 2012, p. 23), based on the published literature from the overall excavations 1, 2, 3 and 4.

One elemental aspect for researching dogs from Mesolithic sites such as in Vistehulen, Skipshelleren, Kvernevikhelleren and Geitalemen is that these dog bones have not previously been used to ask the questions posed in this thesis, namely their possible indications on the human-dog bond, and the nature of the emotions between these two species.

Can we, for instance, find traces of how the dog affected the human community in Vistehulen, Skipshelleren, Kvernvikhelleren and Geitalemen? Could the bone material show signs of butchering or gnawing marks caused by humans or animals? Can this again be a sign of whether humans had eaten the dog or not at the site based only on reviewing the literature? "Or are the chewing marks a secondary result of, for example, the fact that bones were left in the settlement when humans were not present and became a food source for other animals like wolfs and dogs? It is well-known that wolfs and dogs leave chewing marks on bones (Reitz & Wing, 2008, p. 134) (or that it could be possibly other carnivores living near the settlement site)?" In addition,

can we see any kind of rituals/symbolism related to burials if there, in fact, were burials related to Vistehulen or the other sites? This relates to how the interaction and relationship could have been between humans and dogs, and what significance the dog had for the people during the Mesolithic period. These questions are important in the context of the overarching research question: *Can we interpret human-animal relations based on the literature on dog bones from Mesolithic contexts at specific West Norwegian settlement sites?* In order to further answer this, it is necessary to go deeper into different aspects of the sites and in different contexts, which give rise to several specific questions that I will try to answer continuously through the thesis:

1. Is it possible to indicate an emotional bond between humans and dogs? For example, is there any indication that they received preferential treatment over other animals?

2. When we look at the various sites, can we see a common pattern regarding dog finds?

3. By looking at the dog bones in Vistehulen, can we find interesting aspects of their position in a stratigraphical context?

4. Based on the evidence from Vistehulen we know that the dog was present, but do we know how early?

1.3 Geographical And Chronological Delimitation

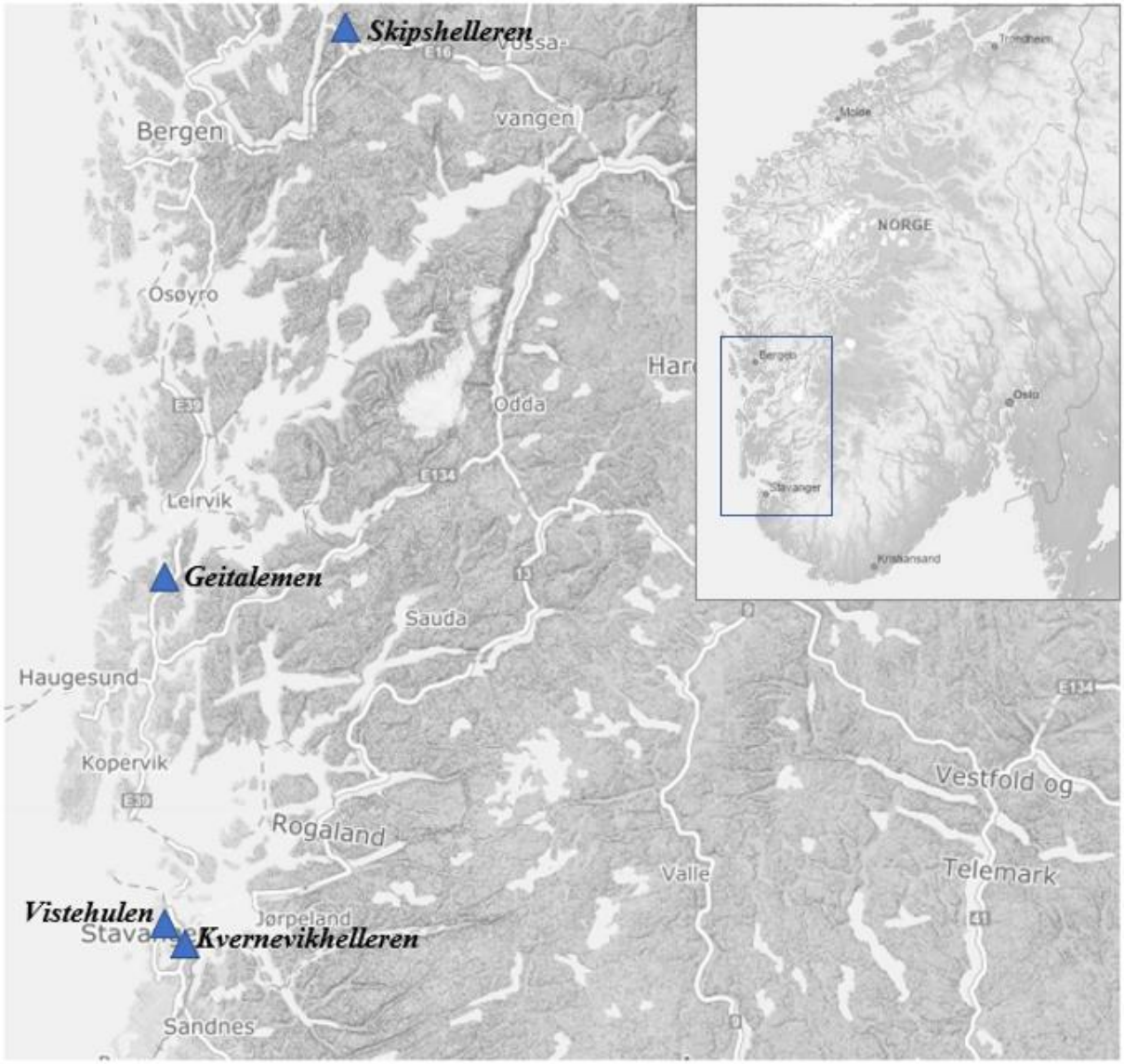


Figure 2. © Kartverket. Situation map of western Norway and the location of the sites. 1. Vistehulen (cave), Randaberg, Rogaland county. 2. Kvernevikhelleren (rockshelter), Randaberg, Rogaland county. 3. Geitalemen (rockshelter), Sveio, Vestland county. 4. Skipshelleren (rockshelter), Straume, Vaksdal county

As visible from the map of Norway, the focus of this thesis is limited to Western Norway and as many of the oldest Stone Age settlements are located in coastal areas due to several different reasons. Such as access to food and resources, as well as the then ongoing retreat of ice after the last great ice age that covered the Scandinavian continent, unveiling gradually more habitable areas to inhabit (Bjerck, 2017, p. 281).

As earlier stated, Vistehulen is one of the oldest known Stone Age settlements in Norway and has been a unique find for our understanding of how these people existed in Norway during the prehistoric period. The documentation obtained from A. W. Brøgger and H. E. Lund is more detailed and described *maybe* compared to other archaeological finds from the 1900s. In many

ways, Lund was ahead of his time when he arranged the cultural horizons in chronological order at such a detailed level and gave the contextual drawings a systematic understanding of where the osteological material, as well as the artefacts, could be located in the various cultural horizons and layers.

The settlement site of Vistehulen is located in a coastal area near Randaberg municipality in Rogaland county, approximately 10 kilometres northwest of Stavanger. Nearby is Visteviga at the mouth of Hafrsfjorden (Lund, 1951, p. 5), and the cave faces south and has a sheltered position between protruding vertical rock walls. The cave housed a habitable area of approximately 100 m² total (Lund, 1951, p. 116). The cave had several phases of use, tracing settlement from the Mesolithic (dating from 9,500-4000 Cal BC) through the Iron Age (in some places). The Mesolithic settlement layers are those focused upon here. Those include strata I-II (III: with certain elements). In addition, the layers in the settlement contain a secondary layer that is not presumed to be from the Mesolithic period but somewhat mixed layers from previous excavation.

Skipshelleren is a rockshelter located on Straume in Vaksdal municipality (Vestland county), and the rockshelter faces north-west direction. This site contains the richest osteological material out of my chosen sites, as well as fragments. The site is also regarded to have been occupied in several use phases, from the time of the Mesolithic up to the Iron Age, based on finds and datings (Bergsvik & Hufthammer, 2020, p. 436, Bergsvik & Storvik, 2012, p. 26). The cultural horizons spanned from layers 1-7 were 6 and 7th layer represented the oldest phase of activity in the rockshelter (Bøe, 1934, p. 19). Several uncorrelated units regarding the osteological material from this site were later analyzed in a master thesis by T. Faltinsen regarding the fish bones (Faltinsen, 2018).

Kvernevikhelleren, lies in Randaberg municipality, and the settlement that is assumed to be in relation to the rockshelter is located next to Hålandsvannet, and faces a southern direction. These sites are not especially depicted in many reports but are two of many finds from prehistoric settlements in the Randaberg area. Here, I focus on the Kvernevikheller and the excavated osteological material when this site is regarded as from the same period as Vistehulen. This site mainly contained marine species in the form of molluscs and some animal species as dog (Helliesen, 1901, p. 57-59).

The Geitalemen site goes in the same category as Kvernevikhelleren, with mostly finds from marine species. And are one of these comparable sites (like Kvernevikhelleren) that are little depicted in literature. While Kvernvikhelleren was reported in 1901 and 1920 by Helliesen and

Gjessing, Geitalemen was reported by Hougen in 1920. Geitalemen is located in Drangevågen, right next to the farm Førde at Vikebygd S, Sveio municipality, and the rockshelter faces an easterly direction (Hougen, 1920, p. 3).

1.4 Source Criticism

When working with data from old excavations and relying on specialist reports from almost a hundred years back, certain factors need to be kept in mind: error factor (which is always a problem) and changes in the discipline (both excavation and zooarchaeology)

It is important to note that there may be errors in the species analysis since it has been a long time since these were species-determined. How important was this in the early 1900s in ensuring species identification? This is quite an essential topic. This could be crucial in forming an idea of what period we are dealing with—which animals were present at that time, or what animals were present at a time we though it was in fact not, as well as what they ate, therefore it is vital to have in mind that the archaeological methods changed remarkably after the half of the 1900 hundreds (from 1960 and so on) (Bergsvik et al., 2021, p. 36). Since the first excavations took place in the nineteenth century, and the last ones were only relatively recent. The excavations methods therefore varied significantly, from a random collection of finds to detailed stratigraphic control and sieving of the deposits (Bergsvik & Storvik, 2012, p. 32).

According to Hein Bjerck, the research at the beginning of the 1900th more directly focused on artefacts rather than organic refuse, and the documentation and collection of this material was relatively not up to today`s standards (at various sites). There are also many problems with stratigraphic units and chronological correlation of these, and for the most part, the excavated soil was not screened during these excavation processes, which means a possible increase in the underrepresentation of the smallest and most fragile components (Bjerck, 2007, p. 9).

In the case of stratigraphic descriptions from the Litterature (Lund, 1951, p. 162-163), the challenge was to understand what Lund meant in his description of the cultural layers based on his accounts in Lund 1951. It is presumably not an absolute correctness in the original drawings to make a perfect example of were the dog bones were placed in Lund's understanding, but it is my own interpretation of how the dog bones were situated in stratigraphical context based on these accounts (see method chapter). Nevertheless, the work made from this excavation and the documentation afterwards is extraordinary and should be greatly respected in the field of archaeology.

1.5 Division of chapters

Chapter 1: Introduction of the main subject of the thesis followed by thesis questions and geographical overview and delimitation. For this thesis, I have intentionally chosen to call the different sites by their Norwegian names on a coherent and consisted basis. The reason is simply that there is no need to translate the specific names of the sites.

Chapter 2: In this chapter, I will present research history from Geitalemen, Kvernevikhelleren, Skipshelleren and Vistehulen as well as coinciding elements from the various sites. There will also be a focus on the natural history background and how the topography of the Vistehulen could have looked like in its oldest use phase.

Chapter 3: This chapter presents the theoretical approach related to zooarchaeological theories.

Chapter 4: presents the methodological approach for the thesis and the work through the search for answers related to dog bones from the sites. There is also a presentation on the stratigraphic work sheet used to illustrate the datings and dog bones located in layer context.

Chapter 5: This chapter presents the empirical material from the sites with the main focus on Vistehulen, but also introduces the various dog finds from Geitalemen, Kvernvikhelleren and Skipshelleren to further place the finds in the context of Vistehulen. There will be a section about the excavation carried out by Lund where his methods and interpretations of the cave's stratigraphy are emphasized.

Chapter 6: in this chapter, I will go through the osteological material from Vistehulen and discuss the main finds of dog bones at Vistehulen. For comparison reasons, there will also be a section on some known mesolithic sites related to ritualistic burials and other sites from a later time period. The main focus here is to see if it is possible to link the findings from the Vistehulen in a ritualistic direction in the form of either special treatment when they were alive or in a funeral context. I will try to shed light on what they did in Vistehulen when groups of people in the Mesolithic settled it and then try to highlight different features that can indicate an emotional bond between dogs and humans.

Chapter 7: in this chapter, I will present my conclusion and the aim for extended research in the further osteological analysis of dog bones from Vistehulen.

CHAPTER 2. RESEARCH HISTORY

2.1 Introduction

The west-Norwegian landscape provided a various habitual environment in the mesolithic, with relatively rich fauna and flora to exploit by human groups after the last ice age dominated the Scandinavian peninsula. This chapter will present research history related to sites where dog bones were excavated during the 1900 th century, dating back to Norway's Mesolithic period.

While Vistehulen is my main focus, I will also introduce Skipshelleren, Kvernevikhelleren and Geitalemen research history. In order to further relate this to Vistehulen as its primary site of research, I will first describe the natural environment around the sites and general information about these excavations. As part of the research is to be able to point out whether there are common features of the various sites when it comes to dog bones.

2.2 Vistehulen

Figure 3. Situational picture of Vistehulen as it appears in the summer of 2022. The originally large rock in front of the cave is no longer seen in today's photos as it has been removed. Photo: private

2.2.1 Site location and chronology

Vistehulen (Vistehola, Vistehålå, Svarthålå) was initially called by the inhabitants of Randaberg "Svarthålå" because it seemed so dark and mysterious, but after the first archaeological investigations, the cave was eventually called Vistehulen in Norwegian (Bang-Andersen, 1983, p. 3). The cave is located on a sheltered island in an archipelago (Viste bay, "Visteviken"), and on the north side is the farm Viste in Randaberg municipality, Rogaland (Bergsvik & David, 2015, p. 193), and is the first scientific excavation of a Mesolithic cave in Norway (Bergsvik & Storvik, 2012, p. 24). Vistebukta is an open, small cove that cuts into the low landscape north of the mouth of Hafrsfjorden. The archipelago just outside shelters well from the sea; southwest of this archipelago is the flat island of Rott. Until the turn of the century, this island had some of the southernmost marine birding sites in the country (Lund, 1951, p. 5). Just west of Viste Bay is the smaller but higher island Håstein. According to Lund, this island in ancient times must have been a significant habitat for birds and sea creatures (Lund, 1951, p. 5). The cave is located just west of the northeast corner of Viste Bay. In 1951, it appeared that the distance to the then shoreline just south of the cave was 250 meters, and the cave opening was about 16-17 meters above sea level. From the sea, the terrain rose slightly up to the cave opening with a steeper sloping hill, which could be measured at about 11 meters above sea level from here and up to the cave, the terrain rose rather slightly so that it formed an even small surface in front of the cave itself. Just west of the cave were the remains of a beach embankment at about 12 meters above sea level.

Furthermore, above the cave were remains of another beach embankment at about 25 meters above sea level. This embankment was probably formed in glacial times (Lund, 1951, p. 5). From this area, the terrain rose steadily up to the Viste farms that were located at the very edge of the area, about 30-35 meters above sea level (Lund, 1951, p. 5). It is described that the cave must have been formed by the sea when it was high, but when is not known for sure – but it is believed that it was formed after the last ice age of the meltwater (Lund, 1951, p. 5).

The cave is located at the foot of the east-west mountain wall and is 2-5 meters high. As Lund describes, somewhat less vegetation grows around the cave. Otherwise, the landscape is stripped of trees except for some newer tree planting in the heart of Viste Bay by the time he observed it. Vistehulen itself is secluded and well-hidden by forward-leaning mountain ranges, and it goes about 8-9 meters straight into solid rock. The cave opening width is 5.5 meters but narrows inward to about Three meters wide at the bottom of the cave. The height in the innermost parts of the cave was about 1.5 meters when the excavations in 1939 took place, but

probably closer to a man`s height in the oldest settlement phase due to the level of the floor (Lund, 1951, p. 7). Above the cave opening was a larger rock that Lund believes has probably been blown loose by the sea, which shielded the cave and made it an excellent place to stay for a long time by maybe building structures around it. In front of the cave opening, a small, sheltered surface is glimpsed between vertical rock walls, and the surface is only exposed to southerly winds and weather. Fireplaces and traces of cultural layers testify that this area has been used as a possible place to live, and the waste pile itself reached approx 14 meters out from the bottom of the cave and was up to 5-6 meters out in front of the cave opening itself and the droplet fall (Lund, 1951, p. 7).

Vistehulen: Askeladden description:	Cave
Askeladden ID:	5237
Site characteristics:	settlement-activity area
County:	Rogaland
Municipality:	Randaberg (1127)
Farm name:	Viste
Responsible organisation:	Archaeological museum
Registration method:	Visual surface method/registration
Properties:	58/1 - RAUSTEIN , 58/10 - AUTHEIM , 58/12 - SØRNES , 58/13 - SOLHEIM , 58/15 - SKUMVÆR , 58/17 - LYNGSTUA , 59/4 - VISTE , 59/11 - VISTE , 59/14 - VISTE , 59/59 - KIRKEHAGEN
Described:	1. cave (Vistehola). Opening facing south. Clearly marked, clearly in the terrain. The inner part of the cave is ungrown, and the outer part of the cave and the ground outside are grass-grown. The inner part of the cave is a horizontal pothole. H: 2.7 m., W: 5.5 m., Depth: 6 m. Where the cave widens, and above it, is a shelter of at least 5 x 4 m. that makes up the roof of the outer part of the cave. The droplet drop is oriented east-west. H: 3.7 m., W: 9.5 m., Depth: 4.5 m. The roof of the inner cave forms the floor of an overlying shelter, where the shelter above the outer part of the cave forms a wall in the southwest. The floor consists of hard-hit soil without vegetation and rocks. The droplet is oriented east-west. H: 2 1/4 m., B: 7 m., Depth: 4

	m.The opening between the east wall of the rock and the shelter that forms a wall in the south is 2 m. Between the shelter and the floor of the cave, there is an opening down to the separation between the inner and outer parts of the cave. The hole is 1 X 1.3 m. The remaining part of the hole is bricked again by flat rocks. The slopes are 0.5 x 1.5 - 2.5 m. Immediately east of the rock and on a rock ledge, a natural extension of the floor of the rock is formed. The mountain shelf is bounded by steep cliffs in the south and west and by steep mountain slopes north. On the mountain shelf, there are loose stone slabs with D: up to 2 m. L: east-west 14 m., north-south 9 m.2. According to Helliesen, there is said to have been a burial mound in the area. Egenæs-Lund says that it should have been lying abruptly above the cave. The mound is said to have been levelled before 1900. At the east-edge of the mound, there is said to have been a small burial chamber with burnt bones.

Table 1. Askeladden description on Vistehulen

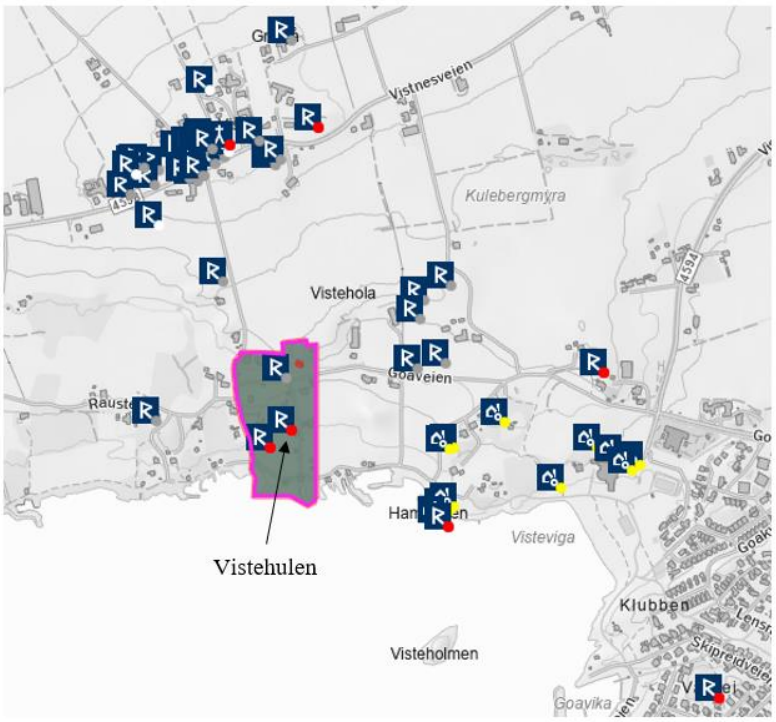


Figure 4. Map showing Vistehulen. Obtained from Askeladden

2.2.2 General excavation information

After the excavations in 1939 and 1941, Lund divided the different layers of the Vistehulen into strata I, II and III (with a corresponding secondary layer). These layers contained the digging layers, which consisted of 1-6, sometimes even 7, 8 and 9. The oldest phase of the settlement is numbered with excavation layers (6) from the bottom, representing the youngest on the top layer (1). Roman numerals indicate sections in the surface layers, (more specifically, squares

seen from above). There are several places where cultural layers merge, which seem to be from previous excavations. This may also indicate uncertain correlations of where the dog remains were initially placed (Lund, 1951, p. 163). Lund believed that the upper shell-bearing layer (cultural layer III) could only have been deposited at the settlement in the Iron Age, and the lower part suggests the Bronze Age because of the decorated clay pots placed in some of the layers, although these were of a highly fragmented nature (Lund,1951, p. 87). However, by Lund's understanding, the cultural layer I and II were dated to parts of the Neolithic (Norwegian term mentioned in Lund: older "Ganggravstid" and later "Dyssetid") because several axes were believed to belong to this period (Lund, 1951, p. 89). More recently, these cultural layers have been dated to strata I: 7300-6450 (from routes 5, 6 and 8), strata II: 7050-5660 (from routes 2, 3 and 5), and strata III: 6450-5800 (from route 3), these measurements were calibrated with the accuracy of *Oxcal v3, 10* (Bergsvik & David, 2015, p. 195, Bergsvik, 2015, p. 6). Thus, according to Bergsvik and David, the mentioned layers I-II originates from the Mesolithic period in Norway, and layer III carried Mesolithic elements (Bergsvik & David, 2015, p. 195, “Bergsvik, e.g. pers. comm”).

2.2.3 Archaeofaunal material

The arcaeofaunal material from Vistehulen was somewhat vast in species occurrence, as well as the Skipsheller site; it contained 11 marine species, 36 birds, and 23 mammals. The total amount of fragments were: marine species: 1,650, birds: 278, and mammals: 921. However, the bone artefacts from Vistehulen did not have the same preservation conditions as, for instance, Skipshelleren, as most of the excavations consisted of digging outside the drip fall, so according to Olsen (1992), the number of bones and bone artefacts must have been vaster than initially assumed (Olsen, 1992, p. 24). Later was the bone artefacts from Vistehulen estimated to an amount of 178 by Mikkelsen, (while the stone artefacts were estimated to 3,430) (Olsen, 1992, p. 158).

2.2.4 Summarizing part

The cave was investigated in October 1907 by conservator Tor Helliesen and Lars Tjøtta and later excavated by Helliesen and Brøgger (reviewed in Brøgger 1908) and was mainly dedicated to the eastern part of the cave, leaving areas to be discovered for later research. This research was further carried out and initiated by Lund in 1939 and continued until 1941 when the rest of the cave was considered to be investigated. Approximately 100 m² inside the cave and outdoor area were examined (Lund, 1951, p. 9-17). Lund based his investigations on Brøgger's earlier excavation reports and observations. The dates are, therefore, mainly based on archaeological

material (Mikkelsen, 1970, p. 6-7). The descriptions of the cultural layers, as well as the flora and fauna material are here very well depicted and precise in relation to the first investigations, Lund divides the cultural layers into chronological order. The artefact material is also in great focus here, it gave considerable knowledge of which possible cultural groups settled in the cave based on typological features. The osteological material in this investigation was determined by zoologist Magnus Degerbøl (Lund, 1951), and some species received more attention and detail than others.

2.3 Geitalemen

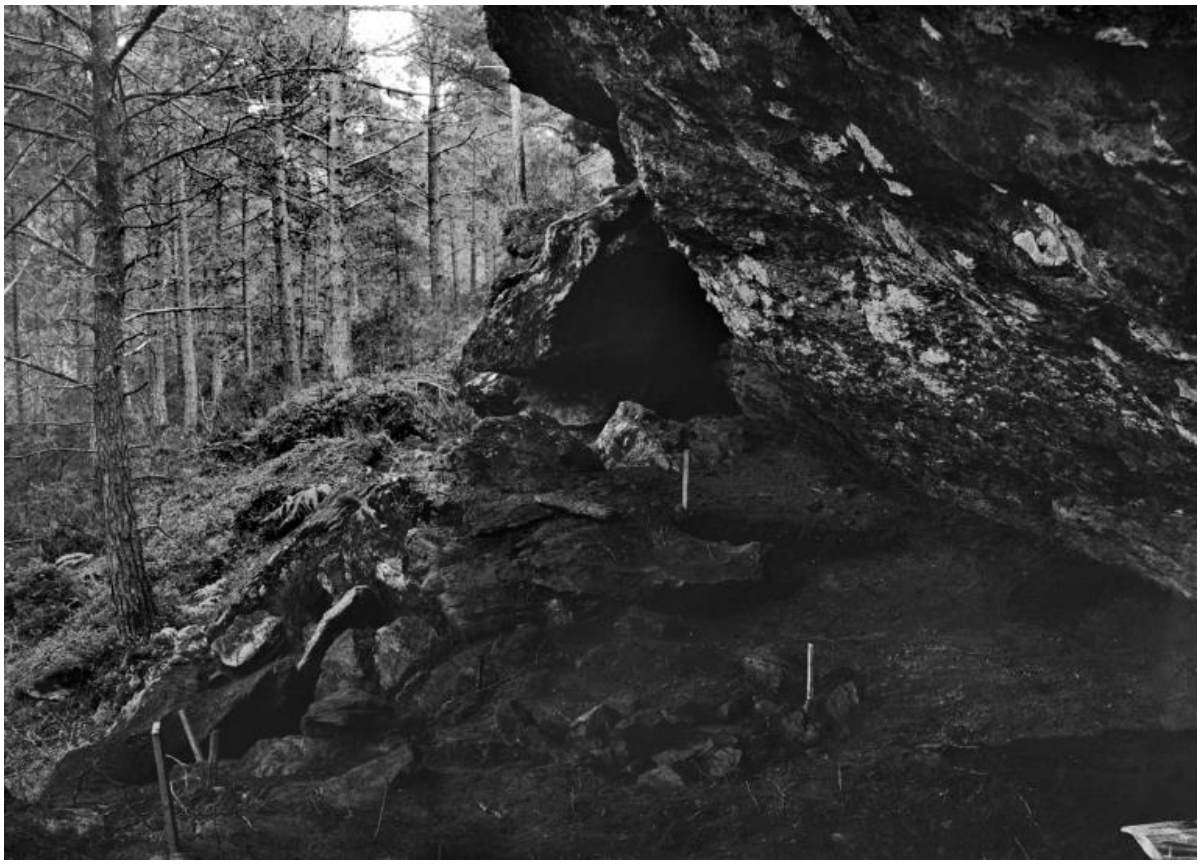


Figure 5. Picture of Geitalemen, this site bears many similarities to Kvernevikhelleren in appearance. Photo: University of Bergen, fotobasen. Obtained from Digitalmuseum

2.3.1 Site location and chronology

Geitalemen was discovered in 1918 by K. Sydnæs and K. Kristensen when they collected samples from the area based on previous knowledge of finds from Stone Age settlements at rockshelters around the country (Hougen, 1920, p. 3), and they recognized Stone Age lithic technology when they found a worked fragment of quartz, which they sent to Bergen Museum along with charred wood and snail houses for analysis. There were, in other means, reasons to think that this was a Stone Age settlement that once occupied this site. In August, two years later, Geitalemen was further examined by Bjørn Hougen and O. Espevoll, together with stud.

J. Jensen from Bergen Museum (Hougen, 1920, p. 3). And it is this report on which I base my interpretations.

The site is located on the west side of the valley Drangevågen, right next to the farm Førde at Vikebygd S. The rockshelters location starts about 140 meters from the valley and has an approximate length of 40 meters (Hougen, 1920, p. 3). The hillside shows a north-south direction, and the rock shelter faces an easterly direction. The valley on the west side covers 300 meters and leads out to a rising swamp area, and the flora was covered by a large pine forest with sparse wood vegetation (Hougen, 1920, p. 3). The southern part of the rock shelf was small and low and did not provide much shelter compared to Vistehulen and Kvernevikhelleren. But then comes a section where the entire opening is filled with large fallen rocks, only with a rather narrow gap between these and the rock wall (Hougen, 1920, p.3). The largest part, the rock face here, is 3.5 meters wide. From here, the mountain slopes very much outwards, which resulted in the fact that there was considerably more shelter from wind and weather on this particular part. The hill below was almost horizontal and had a height of 13.75-13.90 meters over sea, while the distance from the valley was about 150 meters. This is where the settlement was located, while further north the mountain wall narrows and becomes more spacious again. The terrain here is somewhat uneven, as in the southern parts (Hougen, 1920, p. 3).

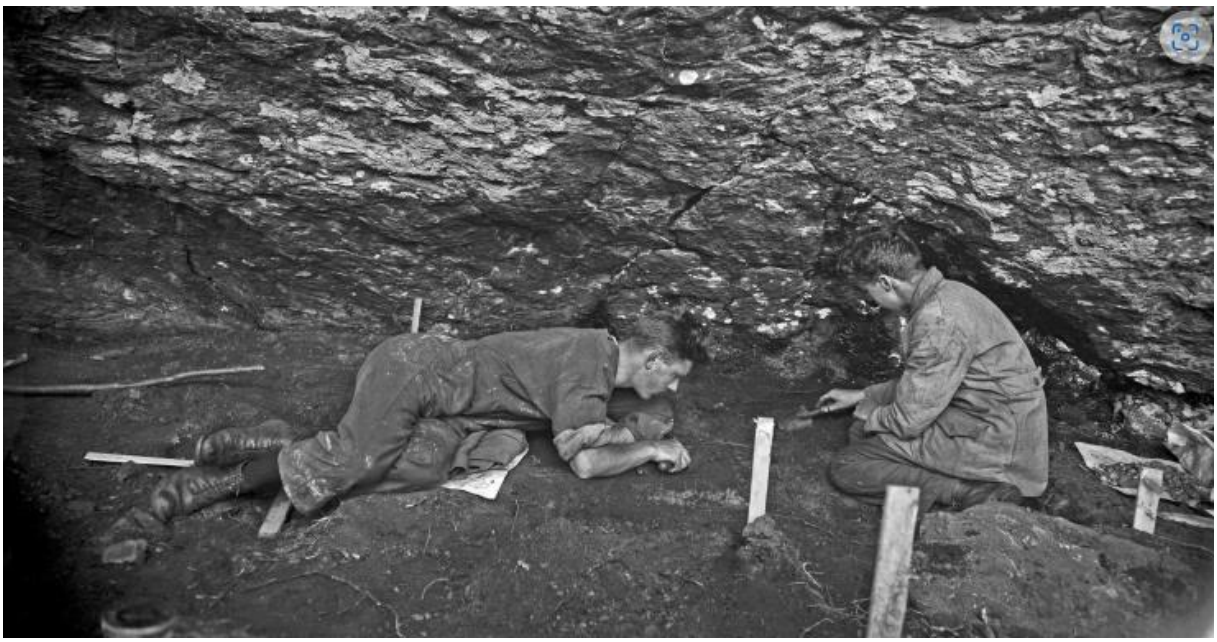


Figure 6. Geitalemen during the excavation. Obtained from Grind

Askeladden description:	Rockshelter
Askeladden ID:	106016-1
Site characteristics:	settlement-activity area
County:	Vestland
Municipality:	Sveio (4612)
Farm name:	Førde
Described:	"Geitalemen", rockshelter. Barely 14 meters above sea level. Is 40 m long, but the settlement itself is only 8 m long, 3 m high, and the rockshelter is here 3.5 m deep from the drop fall. A new wall divides the floor in two. Excavation 1920 (Bjørn Hougen), 26 m2, B7196. Three fire pits were found heavily crushed and mostly inside the wall. The rockshelter lies 140 m up from Drangsvågen on the western side of a narrow valley in the middle of a spruce plant field.
Finds:	Bone needles, oar quartz arrows, two flint scrapers, greenstone axes, pumice, flint spots, oar quartz spots, some flint, some quartz, slate, stone waste, clay pots, bones of m. a. sheep, pork, dog and deer, but mostly not of birds and fish (B7196).

Table 2. Askeladden description of Geitalemen

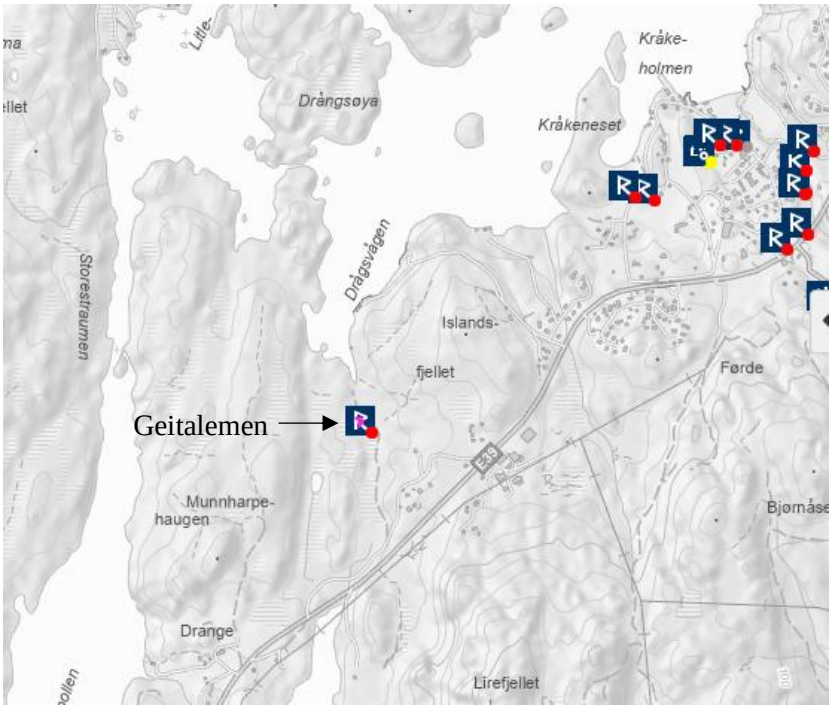


Figure 7. Map showing Geitalemen. Obtained from Askeladden

2.3.2 General excavation information

Hougen mentioned that it was perhaps a case of only a small part of the rock that could involve a settlement from the Stone Age, and after sampling several sections of the shelter (However, there were no data recovered from some of the samples) (Hougen, 1920, p. 4). The route division of the rock shelter is covered from A-E and, A routes indicating the area that lies outside adequate protection from the rock- wall structure. They are located on the slope down to the valley side, where the slope gently grades for the first few meters. The valley side is otherwise steep, while the transition between the plateau and the valley side is marked with larger and smaller boulders (Hougen, 1920, p. 4). The excavation started in the A7-A8 routes, where it was dug all the way to the mountain, which was about three metres wide. From there, they extended the search to the south and northerly direction. About 26 m² were excavated, meaning almost the entire settlement. In the south, the cultural layer ended entirely in the D5-E5 routes, and in the north, the rock extends a little further than it was excavated (Hougen, 1920, p. 4). The squares indicating B consisted of 5-10 cm of humus layers, and in the deeper layers, there were only a couple of centimetres of dark brown soil layer above the cultural layer. This layer was temporarily so thin that it could easily be swept away. Hougen mentions that originally, the rock shelter may have often been used to dry peat and that this top dark brown layer may be a residual result of this. Inside the rock, there were also no traces of vegetation on the surface (Hougen, 1920, p. 4).

The A routes are not to be considered part of the settlement in the original sense. Apparently, the earth here had many similarities with the dark masses of the cultural layer, and there were some individual pieces of flint and quartz, but the whole thing bore the marks of being out of the cultural layer rather than the original deposit (Hougen, 1920, p. 6). From the B routes, the cultural layers start, although some entangled gravel emerged undisturbed. This indicates that the transition between hummus and cultural layers was uneven and thus difficult to detect. Below the surface, about 5 cm deep, a small piece of iron was extracted from the cultural layer, and this shows that there were somewhat uncertain contexts across the layer in the first part (Hougen, 1920, p. 6). It was not until the inner parts of B that the layer became utterly typical. In the C squares, it reached its most significant thickness of about 30 cm measured through a hearth in route C7 and then further narrowed again in the D panes, while the innermost part of the shelter was only a few cm thick. The bottom of the rock consisted of yellow-brown gravel, probably formed by the weathering of the same rock as the shelter (Hougen, 1920, p. 6). In total, three fireplaces were discovered at the settlement. They were all of the simplest kind, cut down as about 2 cm deep depressions in the bottom layer and completely filled with charcoal and stone. In the southern part, there were only rocks in one half and dense coal layers in the other. Professor Dr. Hagem analysed the charcoal samples, and one sample from a fireplace was analyzed to birch species. The southernmost was covered with 10-12 cm of cultural layer, with charcoal samples identified as pine species (Hougen, 1920, p. 6).

The number of artefacts was sparse, both for complete tools as for waste residues and also for bone material. The artefact material varied between the squares and increased considerably further inside the rockshelter. The rockshelter was interpreted as a settlement where one possibly stayed only seasonal during certain seasons (Hougen, 1920, p. 10).

2.3.3 Archaeofaunal material

Brinkman, who analyzed the archaeofauna found the bone materials modest in quantity and fragmented. Sometimes Stone Age settlements were considered rich regarding artefact material and archaeofauna, but this was not the case at Geitalemen (Hougen, 1920, p. 10-12). The site consisted of some mammal species such as deer, sheep, pig, dog, otter and beaver. There were, however, only two small fragments of bird. The site mainly consisted of other marine species like Molluscs, beach snails, Oyster shells, albus shells, crockle and mussels. Only half of a middle-sized angular bone (or vertebrae as this characterisation from literature is unspecific on the terms) from an underdetermined fish was excavated (see appendix on Geitalemen

osteological assemblage for more information about the overall species assemblage and descriptions).

2.4 Kvernevikhelleren

Figure 8. Location of Kvernevikhelleren, picture shows the appearance of the rockshelter in the summer of 2022. Photo: private

2.4.1 Site location and chronology

Kvernevikhelleren (Hetland pgd) is located in Randaberg municipality, Rogaland, and the archaeological investigations of Kvernevikhelleren and an associated settlement structure located at Kvernevik, Håland pgd, both belonging to farm number 60/6 were investigated by Tor Helliesen and Helge Gjessing. Later depicted in "*oldtidslevninger i Hetland aar 1900",* og "*Stavanger museum aarshefte vol. 11".* The osteological material was determined by zoologist Herluf Winge (Helliesen, 1901, p. 59), and the geological conditions were assessed by P. A. Øyen (Gjessing, 1920, p. 145). Tor Helliesen's accounts of Kvernevikhelleren are fairly briefly described and do not contain much detail about the cultural layers, and there is also no archaeological excavation report, nor any that could be provided by Stavanger Museum upon contact. Therefore, it is not possible here to work with well-delineated stratigraphic contexts.

Askeladden description:	Rockshelter
Askeladden ID:	15047-1
Site characteristics:	settlement-activity area
County:	Rogaland
Municipality:	Randaberg (1127)
Farm name:	Vestre Goa
Registration method:	Visual registration method
Properties:	60/6- KVERNVIKEN
Described:	Rockshelter. The opening faces south. Clearly marked, clearly in the terrain. The rock is made up of one room, partly overgrown with moss, grass and small shrubs. Fallen stone covers the floor. From the outer wall of the rock, there is a wall six m. in the west direction, with an opening in the middle, then cracks towards north for 3 m. Both on the outside and inside of the wall are stones from the sometimes very rough wall. The wall is up to 2.5 m. high and 1 m. wide. Rockshelter; B: e-w 9m., Depth: up to 4 m., H: 3 m.

Table 3. Askeladden description of Kvernevikhelleren

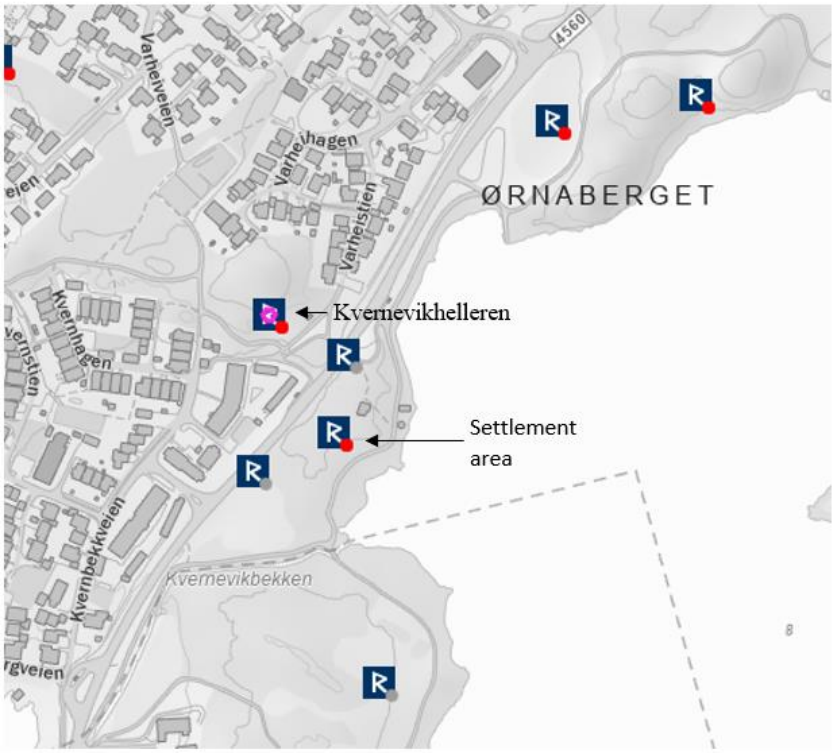


Figure 9. Map overview of the locality Kvernevik (modified from Askeladden.ra). Marked on the map are Kvernevikhelleren (Hetland pgd.) And the associated settlement (Håland pgd. Is seen closest to Hålandsvannet). The map also shows an overview of associated local areas. With help from Randaberg municipality, I was able to place both localities in one and the same context. Both localities belong to gnr. 60/6. Askeladden.ra.no. Endre Aske at Randaberg municipality assisted me by "pers. comm"

2.4.2 General excavation information

Helliesen describes in 1901 that a waste pile had been found on the north side that separates Hålandsvannet from Kvernvik. It was located under a forward-leaning rock face about 325 meters north of the shift between Randaberg and Haalands pgd, and was about 18 meters above sea level. The waste pile begins about 5 meters from the rock face and is located under a thin layer of about 4 cm of brown soil layer. They were now 9 meters in transverse measure and 30 cm thick in the rockshelter (Helliesen, 1901, p. 59). Herluf Winge determined the animal bones here, and the waste heap itself consisted mainly of oyster shells (*Ostrea edulis*), and a species of beachsnail (*Littorina littorea*) as well as some cockles (*Cardium edule*) and elbow shells (*Patella vulgate*). Among the shells were carbonaceous soil and some coal residues, including hazel and nutshell, as well as bone remains from various animal species scattered around (Helliesen, 1901, p. 59). The rock shelter has most likely provided good protection against weather and wind mostly from the northern parts.

Helliesen became aware of Kvernevikhelleren by farmer B. S. A. Vistnes as early as 1899, and Helliesen believed that this could be one of the oldest Stone Age localities we had here in

Norway similar to the Vistehulen (Lund, 1951, p. 8). The rock shelter is described by Helliesen as an original waste deposit, like the Danish Kjøkkenmødding[1] from Jutland, among others. Depending on the artefact material, these bear many similarities and probably coincide during the same period (Helliesen, 1901, p. 59-60). Furthermore, in Gjessing (1920), there are some disagreements about the settlement's dating when Øyen made an analysis based on mollusc fauna, topography and geological fauna description related to the shoreline around the locality. Øyen describes the settlement as ascending solid rock mountain which, in a southerly direction, forms a slight protrusion of a strongly curved and folded rock. This has a length from the southeast side of about ten meters, protruding about three meters out and three meters above the ground. The shelter's opening was facing south, and the rockshelter wall formed a room that was probably nice to stay in. The height of the settlement above sea level measured the Island at 18.6, and the tapes level here was approximately measured at 13.4 meters, adding that humans probably settled here for proximity to the water and resources (Gjessing, 1920, p. 146). The geological conditions at Jæren were later investigated by Dr. K. O. Bjørlykke, who, at crucial points, came up with different results than Øyen. He points out that when it comes to fauna, one can hardly draw definite conclusions about the state of the ocean during the formation of shell masses. Bjørlykke also believes that it can be assumed that the settlement has a much later origin than first thought (Gjessing, 1920, p. 147). In addition, the artefacts appeared uncharacteristic as they were in very poor condition and fragmented and thus could not be dated on this basis. At the same time, according to Øyen, there were remains of pigs and that these bones originally date from the oldest time in the settlement, which means that it is not so old and thus date back to when humans started farming in the Neolithic period and thus does not coincide with finds from the Danish kjøkkenmødding. However, it is doubtful whether pig bones actually belong to the original part of the settlement, and in accordance with the findings of the kjøkkenmødding, the settlement at Kvernevik will most likely coincide with mesolithic sites according to Gjessing with elements of mixed layers (Gjessing, 1920, p. 147).

In 1914, a settlement was also found at Kvernevik (Håland pgd. G. no. 60/6), the neighbouring farm to Kvernevik in Hetland. It was farm owner Bertel Vistnes who was very interested in archaeology and had previously assisted with understanding the Stone Age at Randaberg. Helge Gjessing investigated the place. The site is located just east of the farm, just down towards Hålandsvannet. The extent in the south-north direction has probably been gone towards

[1] In Denmark, sites with shell deposits were referred to as “kitchen deposits” and were seen as cultural deposits rather than natural deposits (Balme & Paterson, 2009, p. 318).

100 meters, while the width in the direction of the small hill has hardly exceeded 6-10 meters. Especially at the northern end, a lot of flint waste was found (Gjessing, 1920, p. 143-144). There were also remains of several fire-affected stones, some bone remains, and some shells were also found here. However, whether these belong to the original cultural layer seems to be questionable, as shell sand was added a short time ago, and the site had been exposed to the plough. In addition to the previously mentioned flint waste, a 10.2 cm long butthaled axe was found, dotted and tilted at the edge, three more axes of the Vespestad type, and an axe with a flat underside, a chisel with a transverse edge and a rectangular cross-section, four yarn-type arrowheads and two small scrapers, one with a touch of shaft. The height of the settlement above sea level was not possible to measure at that time (Gjessing, 1920, p. 143-144), but as the place was not close to the sea, but at Hålandsvannet where the sea once flowed in, the site had a threshold of about 6 meters when the place was in use, the settlement was in other words 3-4 meters above the water level at Hålandsvannet (Prøsch-Danielsen, 2006, p. 48). Today, the level is around 10 meters above this with a threshold of seven meters above sea level, according to Lisbeth Prøsch-Danielsen, professor at the Museum of Archaeology in Stavanger as it has risen over the past hundred years with a dam (Lisbeth Prøsch-Danieldsen, pers. comm, 26.04.2022). Artefacts from the site were heavily water rolled and patinated, implying that the site must have been stirred by the tape transgression (Prøsch-Danielsen, 2006, p. 48).

The area may have been larger than expected as we also see a locality marked in the middle of the road between Hetland pgd and Håland pgd (figure 9). for a new route for fv. 409, Randaberg. Testing was conducted in 1983, and the main survey in 1984 at 6, Goa, bnr. 60, Bnr. 6 and 29 by Marianne Moen at the Museum of Archaeology. The section was located in a cultivated pasture on a northeast-facing slope down towards Hålandsvannet, 300-350 meters northeast of the farm building (mill) – and 25 m² was examined. The registration is reported in the Stone Age at Randaberg, from Haug ok Heiðni no. 3, 1984. Furthermore, in connection with the transport corridor west of county road 409, Rogaland County Municipality carried out registrations in the area of the locality Håland pgd in 2015. Findings were made over 27 positive tests. Since some of the samples were located about 3 meters from the site, the geometry was changed to include the positive test. The section now covers the entire height between Hålandsvannet and county road 409 and consists of several smaller terraces between 7-12 meters above sea level. The findings indicate dating in the transition from the late Mesolithic/Early Neolithic period. The site may have connected with the rockshelter and additional settlement. In other words, they have several common features in terms of the

typology of objects (Askeladden.ra, loc. 24407-1). The sites may be contiguous as the area may have been a favourite place of residence in the Mesolithic, possibly suggesting several settlements in the Randaberg area in connection with each other.

As part of the research for this thesis, an investigative visit to Randaberg was made in the summer of 2022 with the purpose of locating the sites. After an extensive search of the accessible areas, Kvernevikhelleren could be seen, but the place of the settlement I could not locate. There is a small pedestrian road that leads to the water edge, potentially in the area where the Mesolithic settlement once was. However, due to the higher shore line, this settlement, in context, is potentially younger than the kvernevik rockshelter.

Figure 10. Picture is obtained from Google maps and shows where the Rockshelter and settlement are located in the Kvernevik area, Randaberg

2.4.3 Archaeofaunal material

The archaeofaunal material from Kvernevikhelleren consisted mainly of marine species such as oyster shells, heart mussels, and albus shells, and with two fragments from cod. Some bird species were also represented. Evidence of mammals from the site consisted of dog, otter, seel, deer and parts of a human cranium (see appendix on the Kvernevik osteological assemblage).

2.5 Skipshelleren

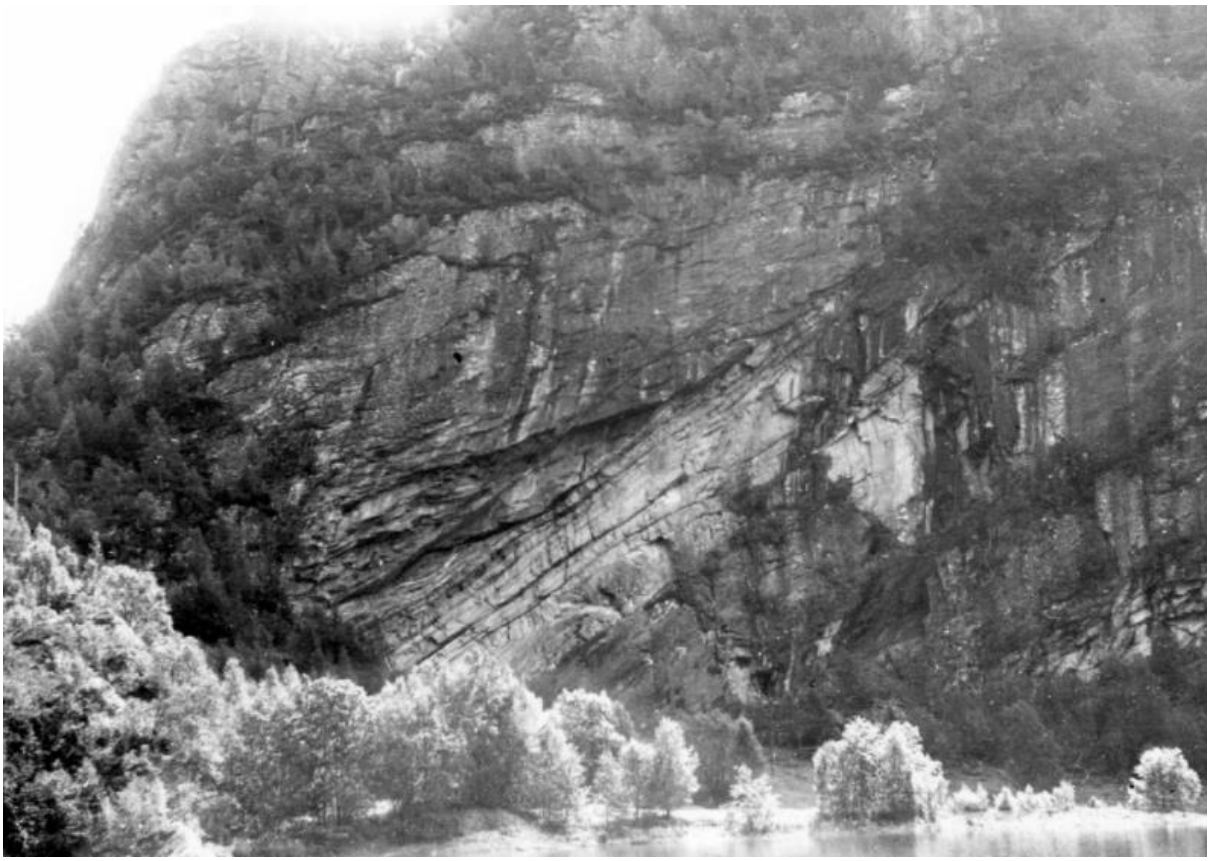


Figure 11. Situation picture of Skipshelleren at Buvik. Photo: Per Sæbø, Norsk folkemuseum. 1952. Obtained from Digitalmuseum

2.5.1 Site location and chronology

In 1929, Bergen Museum received a letter from O. K. Dyvik, and Anders Dæmring stating that the former had found coal residues, bones and shells under a rock shelter on the farm Straume, just opposite from Stamnes in the north of Vestland county. Dæmring also sent a box with the respective finds of bones, shells and coal soil, and this was of great interest to, among others, Johs Bøe, who had already made systematic investigations of settlements in caves and rockshelters in the Bergen area previously to this (Bøe, 1934, p. 9). The investigations on Skipshelleren by Johs Bøe started in August 1930 and lasted for about ten days with the help of the then-student Kristen Lindøe, and plans were made to send out extra researchers for the excavation as the area was very extensive. In 1931, the museum's research fund granted a special grant and then sent in five assistants to help with the excavation of the surface, students: Oddveig Bodahl, Edvard Bull, Per Fett and Eva Nissen Meyer. In addition, professors Haakon Shetelig and August Brinkmann paid short visits during the excavation. This investigation lasted about four weeks in July (Bøe, 1934, p. 9).

The bay at Skipshelleren is located in the outback, faces northwest, and is thus relatively protected from all kinds of weather because of its inland location. It was mainly the west wind and the northwest wind that took, but this also lost much power from the ground below when the mountain vault was high. The dimension of the rock shelf is described as very impressive as the area within the fall had an elliptical shape with a length of about 30 meters and a maximum width of fifteen meters from the roof drop to the rock wall bottom (Bøe, 1934, p. 10-11). Between Straumegårdene and the mountain where Skipshelleren is located, Austestraumen flows. In its time, the main river of Voss was also located here, and most of the traffic went along this river. However, the rock shelter should have its name because it was a nice place to set up its ships in winter (in Norwegian, "Skip" means "ship"), but whether this is the case is not known with certainty, but it is reasonable to believe (Bøe, 1934, p. 10-11). Skipshelleren had several use phases from cultural horizons 1-7, it was estimated a timespan from the old mesolithic up to the iron age (Bøe, 1934). However, calibrations done by Oxcal v4.3.2 (calibrated BC) referred from Olsen, 1976, Rosvold, 2013 and Hufthammer 2010 on several culture layers determined cultural layer 11 (route H9): undetermined bone 5209-4691, Layer 11 (route L9): undetermined bone 5297-4839, layer 14 (Route H9): undetermined bone 5474-4848, layer 11 (route H8): Deer 5362-5072, layer 9 (route J7): Deer 5543-5342, layer 12 (route H9): Otolith 5473-5326, layer 12 (route E9): Otolith 5626-5491 and layer 3 (route A7): Otolith 5473-5326 (Faltinsen, 2018, p. 37).

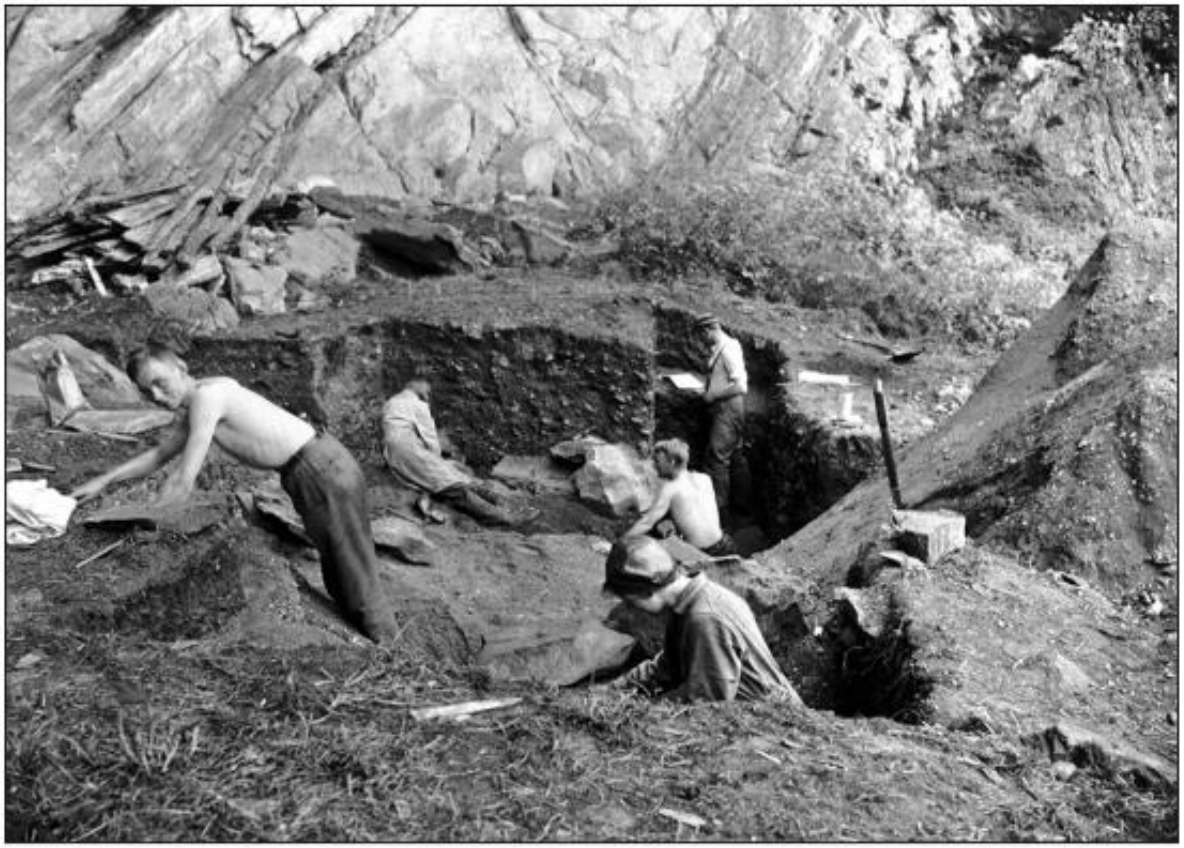


Figure 12. Skipshelleren during the excavations in 1931. Photo: Johs. Bøe, copyright Bergen Museum. Obtained from Bergsvik & Storvik, 2012, p. 28

Askeladden description:	Rockshelter
Askeladden ID:	15917
Site characteristics:	settlement-activity area
County:	Vestland
Municipality:	Vaksdal (4628)
Farm name:	Straume
Responsible organisation:	University museum of Bergen
Registration method:	Visual surface registration
Properties:	49/4 - STRØMME , 49/70
Described:	Skipshelleren faces north-west. The rock wall that forms the rock room is decisively layered, and the layer is strongly tilted. The rock is very bright and free of vegetation compared to the mountainsides in the vicinity. The wall of the

	rockshelter is well curved. The form on the overhang makes the wall together with the droplet, form an oval. The rock floor is relatively even after the excavated mass of the archaeological investigations has been returned. The floor is 30 m long, and the largest distance from the rock wall to the droplet drop is about 17 m. The lower part of the rock wall rises steeply, wides the trap wall off and makes a ledge.

Table 4. Askeladden description of Skipshelleren

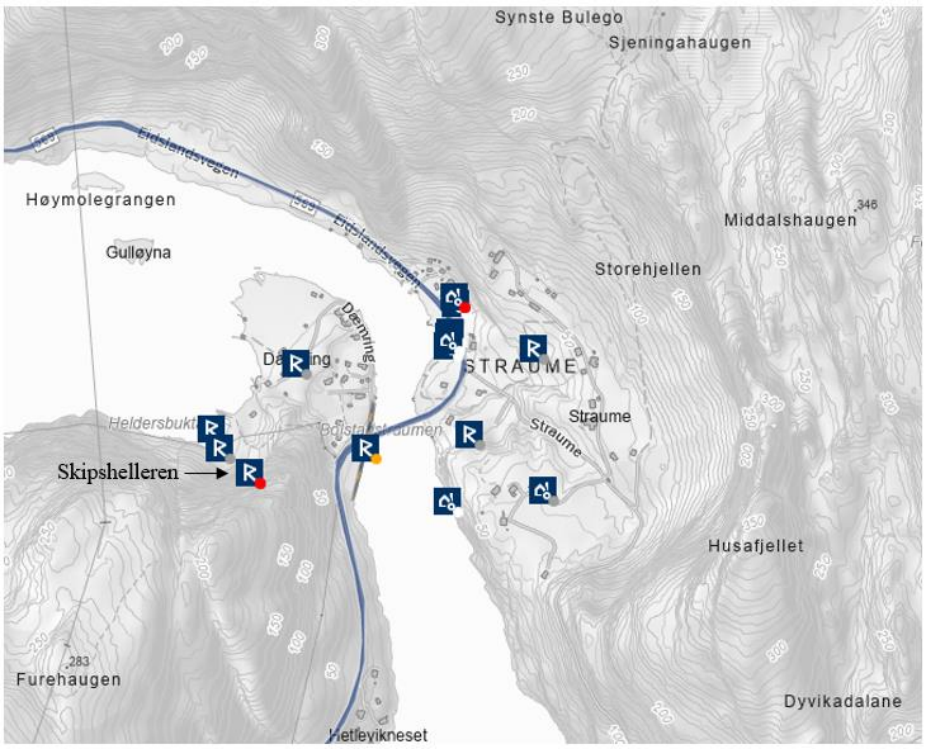


Figure 13. Map showing Skipshelleren. Obtained from Askeladden

2.5.2 General excavation information

When Bøe and Lindøe excavated the site in 1931, they divided the site into square meters, where the excavation started approximately in the middle of the rock shelter and further towards the drip area. The routes were also extended further during the excavation period. The excavation had a remarkable well stratigraphic control for its time, similar to the Vistehulen, where in the beginning, they started digging mechanically in layers that were about 10 cm in dept for eventually excavating stratigraphically (Faltinsen, 2018, p. 8). It was identified seven cultural horizons in the rock shelter, where horizon 6 and 7 represents the oldest activity phase in the rock shelter (Faltinsen, 2018, p. 8). On the other hand, the osteological material was

examined and prepared by Haakon Olsen at the Zoological Museum in Bergen in 1976 in collaboration with the archaeologist Svein Indrelid (Faltinsen, 2018, p. 9). The skeletal remains were not counted and determined until decades later when August Brinkmann was assigned this work from the beginning, but Brinkmann did not have the opportunity to do so at the time when he was encumbered with other things. The assignment was further delegated to Olsen, who worked as a research fellow in 1944. The determination of the material, on the other hand, that was excavated from Skipshelleren did not get started until several years later, when this was an unknown area to him, and it was not until Olsen interpreted himself as competent that the bone material was being considered and that this work would prove to be more extensive than initially assumed. The results from his research were depicted in his unpublished doctoral thesis from Skipshelleren, and the thesis was not further published until 1976 (Olsen, 1976, p. 3).

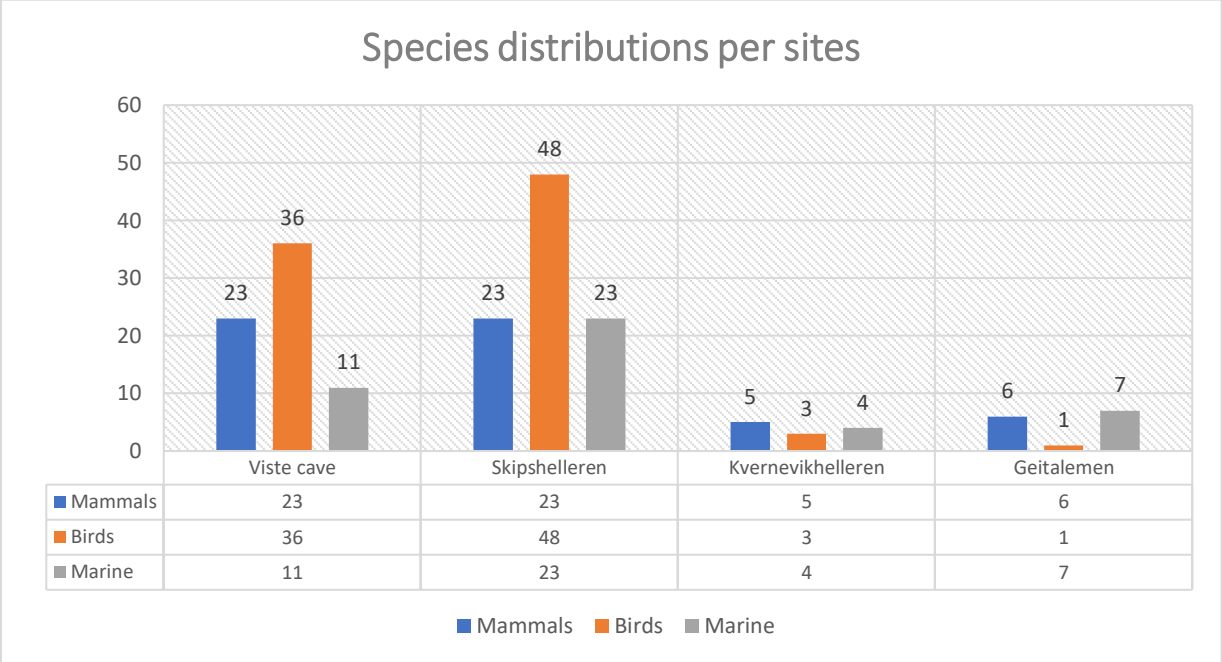
2.5.3 Archaeofaunal material

Skipshelleren sites could be one of the vastest archaeological sites concerning osteological species occurrence from the Mesolithic in a Norwegian context. The dog bones were distributed from cultural layers 1-7 (Olsen, 1976, p. 46). Bone artefacts 403 (Olsen, 1992, p. 158). It is an important and interesting site with an undoubtedly large assemblage of fish species and bone fragments (see appendix on the Skipsheller species occurrence for further knowledge of this vast bone assemblage). Skipshelleren had a mammal occurrence of 23 species, 23 species of birds and 48 species of marine species.

2.5.4 Identified species occurrence from the various sites

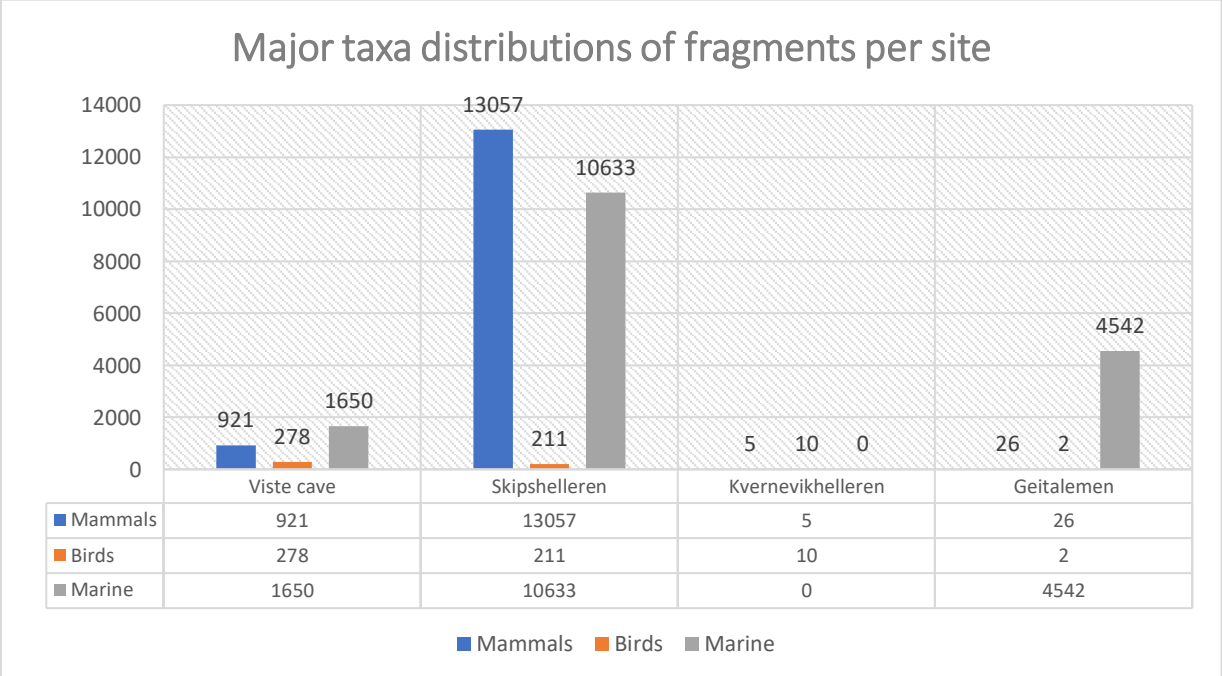
Vistehulen had an occurrence of mammals of 23 species, 16 marine species and 36 bird species (Lund, 1951). It is crucial to specify that although the bone material from Vistehulen is quite significant in size, it is not to the same extent considering that most of the bone material is without a defined number and very fragmented in relation to the Skipsheller site where the bone material was significantly larger, Although here as well, the bone material was highly fragmented. Of which Skipshelleren had an accumulation of 23 mammals, 23 marine species and 48 bird species (Olsen 1976), Kvernevikhelleren had only five species of mammals, four marine species and three bird species (Helliesen 1901). Lastly, Geitalemen had six mammals, six marine species and only one undetermined bird species (Hougen 1920). The last two mentioned consequently had a significantly smaller species collection than Vistehulen and Skipshelleren, but equally important. Comparing different localities is of great importance for possible parallel features of Stone Age communities in Norway. In this way, one can see, for

example, whether groups have had relatively close contact with each other, not only in Norway but also across country borders (see appendix for complete species list).



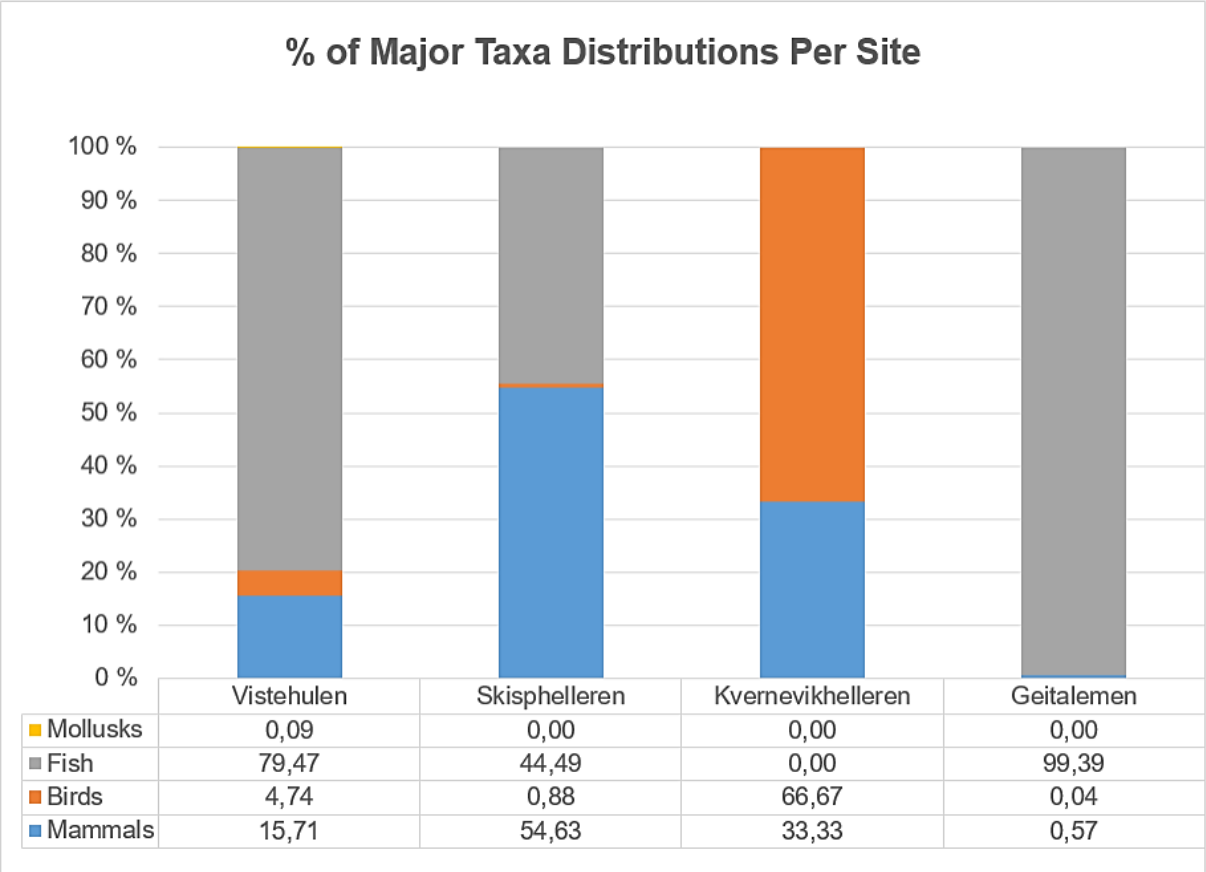
	Viste cave	Skipshelleren	Kvernevikhelleren	Geitalemen
Mammals	23	23	5	6
Birds	36	48	3	1
Marine	11	23	4	7

Table 5. The table shows the species occurrence in the sites. Vistehulen and the Skipsheller sites are localities with the most species occurrence in general, and the diagram illustrates species composition in relation to each other to form a picture of how many species were found at the given localities. All marine species are taken into account



	Viste cave	Skipshelleren	Kvernevikhelleren	Geitalemen
Mammals	921	13057	5	26
Birds	278	211	10	2
Marine	1650	10633	0	4542

Table 6. The diagram depicts the number of fragments found in the sites. Kvernevikhelleren is an exception by the absence of a specific osteological report on the molluscs. There is only a consensus that most of the site contained marine species



	Vistehulen	Skisphelleren	Kvernevikhelleren	Geitalemen
Mollusks	0,09	0,00	0,00	0,00
Fish	79,47	44,49	0,00	99,39
Birds	4,74	0,88	66,67	0,04
Mammals	15,71	54,63	33,33	0,57

Figure 14. Major taxa distribution per site in percentage

During the Mesolithic, it was important to get access to food by hunting or fishing, and all the sites carried many different species and other marine groups, such as shells and mussels. Especially Kvernevikhelleren contained a lot of molluscs, such as oyster shells and heart mussels, that included most of the site, suggesting that there was a vast consumption of these species compared to birds and mammals. This is quite puzzling when considering its location, Kvernevikhelleren does not locate far from Vistehulen, and it is also situated next to the water of Håland (Hålandsvannet). Maybe indicating where the marine species came from in the first place. Next to Kvernevikhelleren, Geitalemen bear much resemblance as the site also consisted of a vast and dominated marine accumulation, primarily molluscs and beach snails also here. Geitalemens location is neither far from the water shoreline as most sites from the Mesolithic period as the settlements were directly situated to the resources the sea had to offer as well as the various mammal species on land. There is also the possibility that these sites could be the result of some kind of waste mound. It is evidence from all the sites that they ate and deposited their waste on the same floor as they possibly were sleeping on. The waste pile could, in many places, also have been deposited there at a later stage when the site was not in use.

Skipshelleren is the only site in this thesis with a mammal fragment occurrence larger than the marine assemblage. Large quantities of deer bones were mostly collected, predominating over the other mammal species in the rockshelter. This suggests that they caught a lot of deer and that this was a favourite meal. It also says something about the rich fauna in the area then (see Bøe 1934).

According to Faltinsen (2018), The osteological material for Skipshelleren had mainly identified three species that are specially referred to as seasonal indicators, salmon, mackerel and bluefin tuna, in addition to other species that can also provide insight into the time of year when the rockshelters was in use. Therefore, it has most likely been fished in spring/summer and autumn/late winter in Skipshelleren (Faltinsen, 2018, p. 68).

2.6 Setting the scene and landscape context in the Mesolithic

"The Scandinavian landscape is formed by glacial erosion and deposition during the various ice age of the Pleistocene..." (Bjerck, 2007, p. 6).

Scandinavia's prehistory begins more than 13,000 years ago at the end of a series of ice ages when the landscape underwent dramatic changes of a warmer climate that resulted in the ice melting (Price, 2015, p. 11), and this last great ice age started about 115,000 years ago and was called the Weichselian ice age (115,000-10,000 BP) (Hufthammer, 2001). When the ice melted, sea levels rose mostly along coastal areas and not as significantly in the inland areas (Price, 2015, p. 14-15). The period called Younger Dryas (12,800-11,600 Cal. Years BP) (Mangerud, 2021, p. 4) was a geological epoch involving climate change that began around 12,800 years ago with a tremendously changing climate up to 11,000, and the ice melting started its full force approximately around 11, 600 years ago in among others parts of eastern Norway (Damlien, 2021, p. 18). According to Pierce et al. Is it most likely caused by a relatively large water supply from the North Atlantics (a theory called Atlantic Meridional Overturning Circulation, AMOC) resulting in a reduction of northward heat transport. The intensity of the AMOC regulates to a large extent, the heat transport from the tropics to higher latitudes and has played an important role in abrupt deglacial climate changes. During the younger dryas cold interval, a southward shift of the Gulf stream (North Atlantic Current system) resulted in a decrease of the overturning intensity and caused a widespread cooling in the North Atlantic region. The abrupt warming followed by the YD has been associated with a rapid acceleration of the AMOC after centuries of reduced intensity. However, there is still a limited understanding of the parameters driving

the change in the overturning intensity and the rate at which these events have occurred (Pierce et al. 2013, s. 2)

The world underwent a major upheaval that possibly included flooding of varying degrees. Most likely followed by more than 1,000 years of cold temperatures, life on Earth changed fundamentally by this event and animals such as mammoths went extinct in this process. We went from the cold period of the Pleistocene to the warmer period Holocene after the YD-Holocene transition (Brauer, 2008, p. 520). Norway was no exception to the upheaval of climate change, and probably parts of prehistoric land created between Yorkshire and Denmark, also called Doggerland (a lost landscape), were heavily flooded.

Furthermore, the Mesolithic period in Scandinavia falls into geological terms such as preboreal, boreal and Atlantic (Price, 2015, p. 65). It is the Atlantic period the Vistehulen most likely falls under, which consisted of a generally warmer average temperature in summer (about 2 degrees) above the current level, and to some extent, also warmer winters (Rosvold et al., 2013, p. 5, Faltinsen, 2018, p. 21). Climate played a particularly large role for the people who settled here, with a warmer changing climate that went from tundra landscapes to birch, pine and hazel and to the more deciduous forests such as elm and oak over a period of about 2,500 years throughout the Atlantic period (Price, 2015, p. 65).

During the first part of the Holocene (warm period), about 6500 BC, the glacier melted on the North American continent, resulting in a significant import of water into the oceans, which contributed to the sea level rising considerably faster than the land masses (Faltinsen, 2018, p. 20). Transgression (8000-6500 Cal. BC Bergsvik & David, 2015, p. 192) hit the coast and affected the shoreline considerably, but inside the fjords, the land rose faster than the sea. During the period 8000—4000 cal BC, the shorelines along the coastline were generally between 5 and 15m above today's levels, depending on local geological conditions (Bergsvik & Storvik, 2012, p. 34). As mentioned earlier, the fjords were therefore less affected by transgression than along the coast, and the area around Skipshelleren had a relatively stable sea level between 9000-7500 BP (Faltinsen, 2018, p. 20). This was not the case at Vistehulen and Kvernevikhelleren, which were affected by the tapes' transgression to a greater extent. The sea level for these sites was about 3-5 meters from the settlement itself, indicating that the people who lived there had the water's edge just a stone's throw away. The impact of the Tapes transgression was mainly the result of rising sea levels (eustasy) and movements of the Earth due to postglacial retraction (glacial isostasy) (Fjeldskaar, 2020, p. 5), this meant that some

parts were more affected than others and at the time the Vistehulen was in use, the sea level stretched approximately about 12 meters above the current nowadays level, which is about 17.

According to David Simpson, a researcher at the University Museum of Bergen, there are variations in the cultural landscape when it comes to the shorelines from the coastal areas to the hinterland based on the transgression (David Simpson, e.g. “pers. comm 23.09.2022”, 25.09.2022). And the sea level at Kvernevikhelleren, among others, was about 3-4 metres since Jæren underwent the transgression at that time, and here it is important to note that the water's edge was higher the further east one got due to a more substantial isostatic uplift (Prøsch-Danielsen, 2006, p. 12).

Figure 15. ©Kartverket. The picture illustrates the sea level at the oldest use phase at the Vistehulen (orange marking) when the shoreline was 12 meters above the current shoreline. Kvernevikhelleren is also marked with a yellow triangle to show its location in relation to Vistehulen. The presentation is reconstructed and illustrated by David Simpson, with permission for use. For accuracy reasons, the images are divided into sections from a distance of 2x3 kilometres

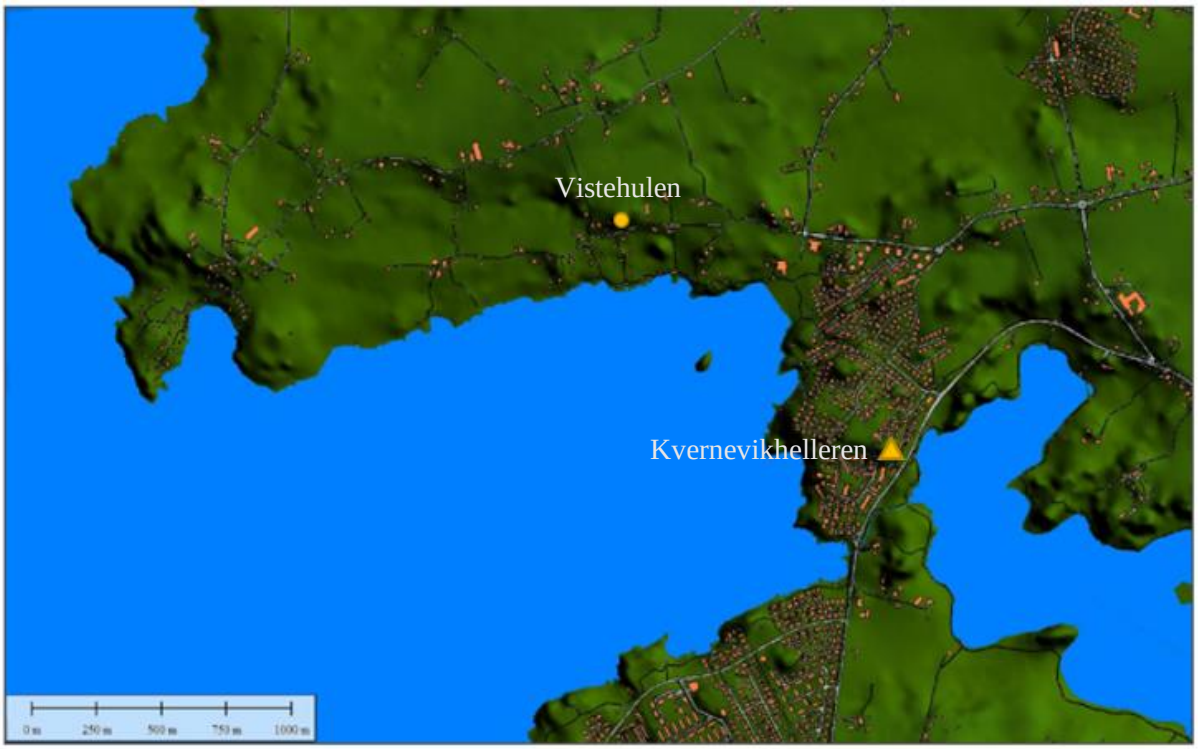


Figure 16. ©Kartverket. Vistehulen (marked in yellow) is today illustrated with buildings and infrastructures. At present, the Vistehulen is located about 16-17 meters above sea level. Kvernevikhelleren is marked with a yellow triangle to show its location in relation to the Vistehulen. The presentation is reconstructed and illustrated by David Simpson, with permission for use

Vistehulen and Kvernevikhelleren were fairly close to each other, whereas Kvernevikhelleren is marked with a yellow triangle in the illustrations above. During the Mesolithic period, when Vistehulen was in use, it may have been a favourite landscape with access to the sea on most sides, with coves extending inland towards areas that are now underwater. It was perhaps also precisely this that made the people choose to settle here for periods of time, but it is also reasonable to believe that Vistehulen may have been a fairly weather-heavy place at times with the relatively flat terrain in the surrounding area and the sea so close from several sides. The excavations revealed that the people most likely used the large rock situated just outside the cave opening that had fallen from the cave during the deglaciation to shelter themself from weather and wind by building structures surrounding this heavy rock that was estimated to be around 3-4 meters long and 1,2 meter wide (Lund, 1951, p. 10).

2.7 Seasonal activity

West Norwegian mesolithic finds are usually found in connection with "settlements" of various kinds. Settlements can be large or small, with or without traces of structures, used once or over hundreds of years, most likely many times by the same groups of people, Bergsvik & Storvik, 2012, p. 34), and is rarely visible on the surface (Dommasnes, 2006, p. 28).

A prevalent view of Mesolithic sites is that they were short-term residential sites for family groups (Bjerck, 2017, p. 281) or field camps for small crews on hunting expeditions, but also other functions have been discussed. Some caves are thought to have been arenas for social aggregations, in which feasting, exchange and other between-group activities took place. Considerable variations in lithic raw-material use indicate such activities, the findings of special artefacts or the results of conspicuous food consumption (Bergsvik & Storvik, 2012, p. 22). In regards to this evidence, there have clearly been many use phases of caves and rockshelters. According to Bergsvik, caves and rockshelters are "natural places" from a cosmological viewpoint. They offer natural entrances to other worlds: to the worlds of ancestors, gods or other beings (Bergsvik & Storvik, 2012, p. 23). In Norway, caves and rockshelters have been used by people from the Mesolithic until the present times, and about 150 caves and 500 rockshelters have traces of prehistoric human use (Bergsvik & Storvik, 2012, p. 23). A large portion of these are found in Western Norway: in the counties of Rogaland, Vestland, Sogn og Fjordane, and Sunnmøre. There was mostly seasonal activity in Vistehulen in its use phase. Before that, as indicated by Bergsvik, Western Norway was inhabited about 1500 years earlier than 8000 cal BC (as the earliest sites dates) (Bergsvik & Storvik, 2012, p. 32). This is perhaps due to or related to a flexible or opportunistic fully nomadic settlement system and mobility pattern in the earliest migration phase (Bergsvik & Storvik, 2012, p. 33) as the first 1500 years after the ice age it is discussed if the groups even lived in caves and rockshelters in the western area, but rather open air settlements (Bergsvik, 2012, Bjerck, 2007).

According to Dommasnes, the Stone Age people of Western Norway were relatively stable human beings, and here we mean stable by the elements archaeology has explored, namely how they positioned themselves in terms of technology and industries (Dommasnes, 2006, p. 29). It is not meant as stability in the sense that there was an absolute standstill. On the contrary, the oldest part of the Stone Age was relatively stable, while there was a considerable shift in the emergence of the Agricultural Stone Age (agricultural Stone Age, or Neolithic, started about 10,000 years ago when plants and animals were first domesticated in the Middle East—in the fertile area between the Euphrates and the Tigris, from there knowledge spread to the north and west) when land and plants began to cultivate in addition to animal husbandry (Dommasnes, 2006, p. 29-33).

In many sites, we see seasonal activities, for instance, in Skipshelleren, Kotedalen and Vistehulen. Lund mentions that the relevance of the osteological material can tell us that there is evidence of seasonal activities due to finds of various bird species in Vistehulen (Lund, 1951,

p. 96). However, for the most part, it is assumed that the site was most likely used as hunting residents on a year-round basis by the osteological material of several other species and not a basic residence of settlement, yet, this can be interpreted by some. Vistehulen could have been occupied by 3-4 small family groups or 15-20 individuals, as Bang-Andersen suggested in his paper (1983), and therefore also be a year-round settlement for these groups over more extended periods (Bang-Andersen, 1983, p. 17).

By Kvernevikhelleren being situated so close to Vistehulen it is possible that this site also served a purpose for the human groups using the caves and rockshelters in western Norway by switching living spaces according to hunting and fishing activities or several families structuring their environments relatively close to each other.

CHAPTER 3. INTRO TO THEORETICAL APPROACH

One element of zooarchaeology is trying to understand the symbiotic connection within human society regarding animals, about how some animals were included and others not— and especially why this happened. In addition, it is an important aspect of interpreting the social systems that include human behaviour associated with other individuals (Reitz, & Wing, 2008, p. 25-26). Thus, the main purpose of my zooarchaeological approach to this material is to reflect about the interactions between humans and animals and the consequences of this relationship for both humans, animals and the surrounding environment.

Furthermore, social zooarchaeology represents a basic anthropological principle that studies human and animal relationships (Ruscillo, 2011, p. 1). Zooarchaeology also often works interdisciplinary or often combines different disciplines, such as geology and biology, through its search for an elemental understanding of the prehistory (Reitz & Wing, 2008, p. 11).

Most animal habitats result from complex human behaviour related to resources and the environment (Reitz & Wing, 2008, p. 6). "Purpose: (1) to understand, through time and place by the biology and ecology of animals (2) to understand the structures and functions of human behaviour"... (Reitz & Wing, 2008, p. 10). In this respect, the dog finds from Mesolithic sites in Norway are interesting to explore because it is relatively little studied. Of course, we know that the dogs were here based on the finds and that it is our oldest domesticated animal (Holdt & Driscoll, 2017, p. 23). However, beyond this, the dog is often interpreted as a practical object that helped simplify past human culture's everyday lives, and the fact that zooarchaeology's overall goal is to shed light on the impact animals had on humans in prehistorical societies gives this a good basis (Reitz & Wing, 2008, p. 6), but the question of whether the dog had a more important role in terms of emotional attachments are somewhat underrepresented— if it is even possible to detect in the archaeological material.

Furthermore, when studying archaeological material, it is crucial to consider the taphonomic processes that affect the bone material. This is included in everything from humans to prey, and in this case of dogs, from conservation, slaughter, abrasion, exposure to rodents, weather and wind to excavation methodology, identification and analysis (Reitz & Wing, 2008, p. 117-118, O'Connor, 2012, p. 19-24).

This taphonomic history of a faunal assemblage is a crucial issue to address here, which are the processes and alterations the deposits undergo before, during and after burial or thrown to the settlement floor (Reitz & Wing, 2008, p. 118). According to Reitz and Wing (2008) the remains

of all the animals used or eaten by people living at the site will not be recovered from the site because either their remains were discarded beyond the excavated portion of the site or their remains did not survive deposition (Reitz & Wing, 2008, p. 118).

The deposited assemblage contains the durable remains of animals either intentionally buried, thrown on a refuse heap, or lost at the site. The initial refuse is subject to change even when the site is inhabited (Reitz & Wing, 2008, p. 118). While the site is occupied, active areas of the site are maybe cleaned, and activities move from one place to another within the site. Foot traffic across the site crushes some of the refuse. The plant and animal refuse attract scavengers and maybe commensal animals. Other animals as foxes and wolfs living around the site, may gnaw and feast on the remaining bones. These processes change the composition and condition of the deposited assemblage as well as climatic conditions such as alternating periods of dry and wet, cold and hot weather (Reitz & Wing, 2008, p. 118-120). Both losses and additions must be recognized in order to distinguish them from refuse disposal by people and, by extension, the animals that were a part of their daily lives (Reitz & Wing, p. 118).

In addition to bone refuse being somewhat mobile at a site in location and context, other first-order changes are modifications on the bones at the site, and it is likely that this will occur. For example, a single specimen may be fragmented during butchering, burned during cooking, gnawed by carnivores and rodents attracted to freshly discarded refuse (as earlier mentioned), trampled on or even broken during excavation (Reitz & Wing, 2008, p. 124). This first-order change is called the biotic process, which is associated with plants and animals. Scavengers are attracted to any edible remnants adhering to refuse, whether discarded on the ground or buried (Reitz & Wing, 2008, p. 134). Whether it is intentional or accidental by, for example, other animals such as carnivores and rodents, several of the dog bones in this study show signs of alteration marks, which may indicate that the bones have been exposed for a certain period of time that maybe made them vulnerable to gnawing by other animals, in addition, this can likely be a sign that slaughter has taken place.

However, Mesolithic settlement sites could also often indicate the prehistoric practice of burials, which could be seen earthbound, burned or cremated. In some graves, individuals could be buried richly in the sense of grave goods, as well as animals laid into the ground next to them associated with ritualistic events. In a later chapter, I will discuss the meaning of ritualistic acts and the definition of burials in the Mesolithic regarding dog finds and other animals discovered in Vistehulen that could appear to be intentionally laid down for possible ritualistic events.

CHAPTER 4. METHODOLOGICAL APPROACH

The empirical basis for this thesis is based on available literature from the first excavations (published and unpublished), which means that I have not done an independent analysis of the dog bones myself. Ideally, I would have done a hands-on analysis of the archaeofaunal materials to look for possible indicators of butchering or gnawing marks, but this was not possible, so I needed to rely on the data from the available literature instead of "hands-on research". There is a factor that the analysis of this faunal material would be beyond the scope of a MA and rather qualify for a PhD project due to the possible vast assemblage I would encounter. Fortunately, the literature of Brøgger (1908) and Lund (1951) gives me a reasonable basis to interpret the excavated bone material from Vistehulen as well as for the early excavations and the focus archaeologists had in the early 1900s in Norway as well as the osteological material from Vistehulen.

In short, I will shed light on what the dog bones may have been exposed to based on available data. A distinction is made between the processes that affect the bones before they end up in the earth and those that affect the bones underground (O'Connor, 2012, p. 19-20). Since it is assumed here that the dogs lived in the settlements, it is conceivable that the bones show some kind of alterations for various reasons. Furthermore, I will investigate by taphonomy and available information from zooarchaeological analysis.

The thesis also features various presentations in the form of digital figures, images and tables to put the findings in context (context association). This is important to form a picture of how the cave and the rocks' construction and excavation process took place as well as provide an understanding of how the sites were visually located in the landscape and where the dog bones were located in the different layers horizons. The illustration of Vistehulen is partly modified based on the original drawings from (Lund, 1951). This is an attempt to review and reorganize the original stratigraphic drawings from Lund (1951) into a wider understanding of where the various layers were placed in the context described in the literature. Moreover, there will be presented illustrations on this matter as well as illustrations of Vistehulen location to its natural environment in its oldest use phase based on the description of the shoreline (figure 15 and 16). However, here there are some elements that are important to remark and according to David Simpson and Justin Kimball, senior engineer (DigDok) at the cultural history museum in Oslo (e.g. "pers. comm Friday 23.09.2022, 25.09.2022"), there exist quite large margins of error concerning sea level and land elevation after the last ice age due to variations. David Simpson was a great help when he had the opportunity to help me with the landscape reconstructions on

Jæren. In order to measure an accurate area, it had to be limited to a distance of 2x3 kilometres since the period after the melting of the ice resulted in both increased water level and land height due to climate change. For example, the sea level in the Oslo fjord is much more stable compared to the West coast of Norway. In the Oslo fjord, there is also no need to account for the degree of tilt (David Simpson & Justin Kimball, e.g. "pers. comm. 23.09.2022, 25.09.2022"). The illustrations have been prepared using the ratios reproduced in the literature and are thus not reserved for any facet of what the given area of Jæren actually looked like but rather an attempt to reproduce and illustrate what it may have looked like during the settlement's oldest active period.

4.1 Stratigraphic visualisations of the divided layers in Vistehulen

The cultural horizons are numbered from 1-6 (and in some places, 7, 8 and 9) (Lund, 1951, p. 11-12). There is a certain complexity to Lund's original drawings of the longitudinal section of the cave when aiming to situate and establish the dog bones in the different cultural horizons and layers. Which I am attempting to place them in the correct order using Lund's original drawings from 1951. The reason for organising this is simply because it will give a greater understanding of were the dog bones were placed in the cave's stratigraphy according to the dated material reproduced in Bergsvik & David (2015) and Rosvold et al. (2013), as well as Lund's understanding of the cultural horizons (1951).

However, when studying the layer context in the cave based on Lund's drawings and perception, it is in my view, not possible to remake a perfect and complete modernised illustration of these as Lund probably would have agreed on. The ambition was to correlate the cultural layers into the original profile picture of the settlement to make an exact location where the bones were found from the above layers(1) to the bottom layers(6). In my attempt at this, I made several illustrations and in all my attempts on this were relatively unsuccessful regarding absolute correlation to the layer descriptions. The layers could not have been situated in the cave exactly as he drew it. This suggests that Lund's drawings do not correlate to each other or that there is on such a small scale that it becomes challenging to make a re-illustration of this perfectly. It is possible that the drawings on the excavated layers make perfect sense if you had first-hand knowledge of the cave's stratigraphy by studying it as Brøgger and Lund did. However, understanding what he meant based on his published material is somewhat tricky. It is important to remember that Lund made incredibly well-documented drawings of the cave's stratigraphy. By knowing this, Lund's work is valuable and respectful in all areas. Making such detailed descriptions of the layer contexts, artefacts, and bone material is challenging even today. We

have to remember that the archaeological methods were very different during the early 1900th and that elements that we maybe take for granted today were a lot of work. As for instance, travelling to the sites, clothing, tools to remove earth and excavating and pictures. In Vistehulen (also from the Skipsheller site), it is well-documented pictures, and this was not common at that time. It was especially not common that the excavators were in front of the camera, but in these pictures, they most certainly are (Anne Karin Hufthammer, e.g. «pers.comm.»). At this time in archaeology, stratigraphy was in main focus. This makes the documentation of the Viste excavations extraordinary as we get a unique vision of the archaeologist during their fieldwork. To further illude my methods by attempting to correlate the graphical overview Lund made, I have illustrated this into the drawings and descriptions of the settlement layers (Figures 17 and 18).

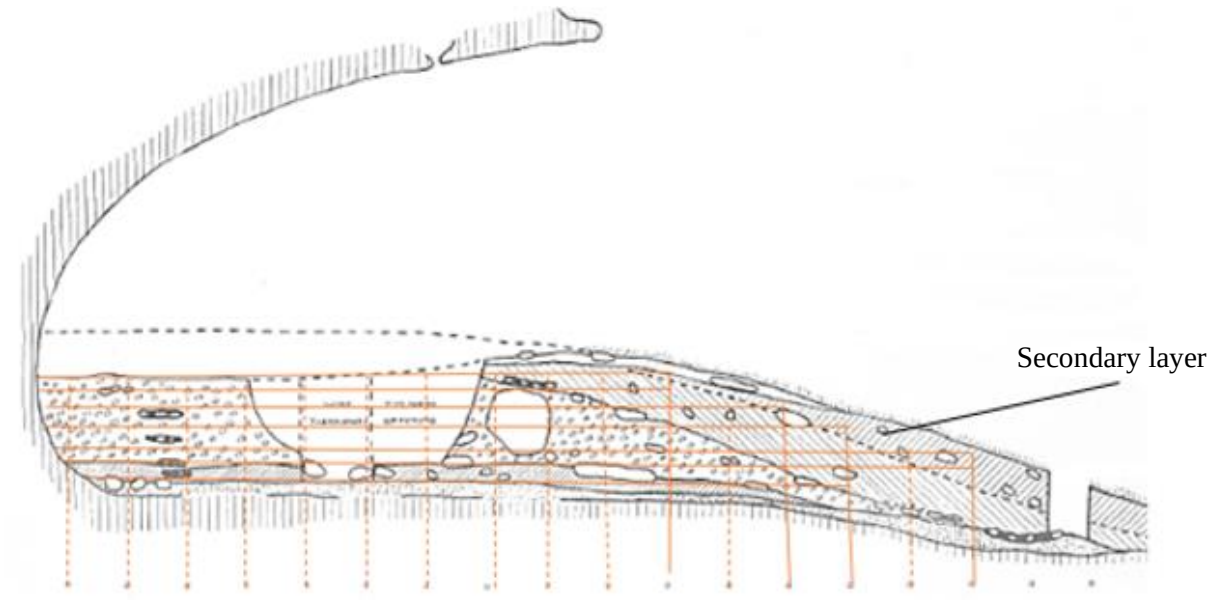


Figure 17. "Work sheet example" obtained from Lunds original drawings, copied and outlined to illustrate my interpretation of the context of the cultural layers

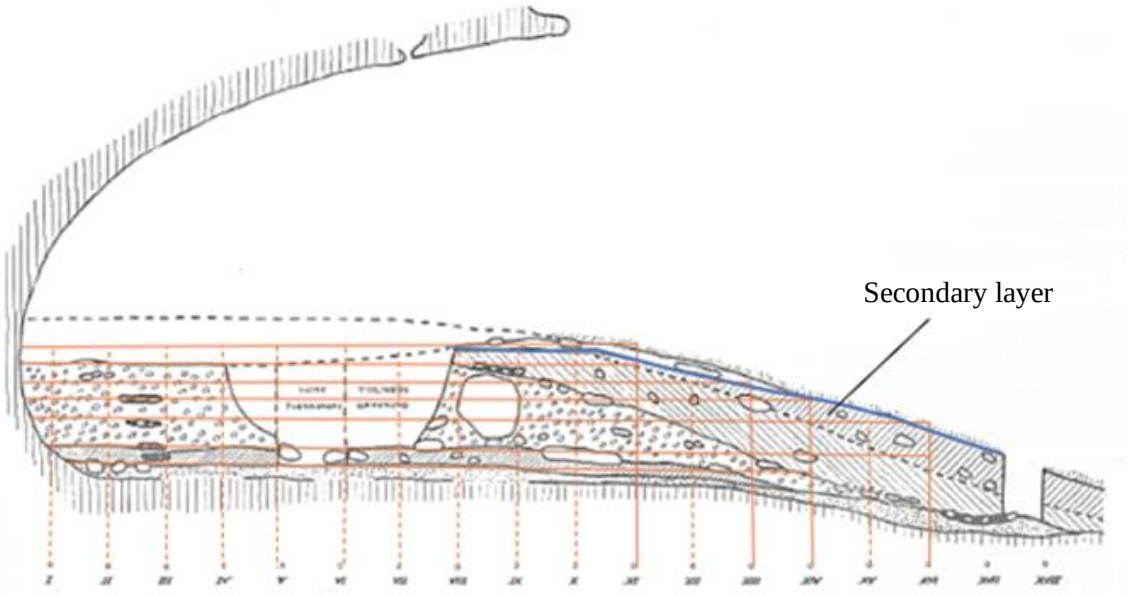


Figure 18. «Work sheet example», illustrates different interpretations of the height of the layer 1

By looking at picture 1, we see how the layers lay according to Lund. However, this does not make the excavation of the secondary layers as in the original drawing of the graphical overview. The illustration situates the cultural layers too far downward for it to be correct. In picture 2, I have made an illustration of artificial layers that relatively fit the depicted areas in the graphical overview according to Lund's original drawings. Here we see that the line of the original surface goes beyond the cultural horizon III, so this does slightly not correlate with the depiction of these layers, even if this relatively fits with the digging of the secondary layers on top of the settlement as well as the others. So to determine the dated layers in the cave and the outside area, I have made further artificial routes that, in my view, can be relatively correct according to the original illustrations of Lund using the starting point just above the removed cultural layers (as indicated in picture 2) as I interpret are also indicated in the illustrations of Lund and are used as a base for my illustrations in this thesis.

CHAPTER 5. DATA CHAPTER

5.1 Introduction

This chapter is predominantly focused on Vistehulens archaeology and zooarchaeology. First, information on the stratigraphic contexts will be presented. Then I will attempt to shed light on Tor Helliesen, A. W. Brøgger and H. E. Lund's explanation of the cultural layers and the further interpretation of these in 1907-1910 and 1939 and 1941. Vistehulen has mainly been investigated at two different times from the early to the first half of the 1900s, and much may have been lost in these excavations partly due to time and excavation methods. Therefore it is important to keep this in mind that it has most likely been a richer osteological material than we assume. Furthermore, the dog osteological material and fragments will be assessed at the various sites. First, I will describe the osteological material of dog bones from Geitalemen, Kvernevikhelleren and Skipshelleren to further put these into context to the Vistehulens dog osteological material. Here the purpose is to find similarities and differences in this material and to shed light on the position of the dog bones in Vistehulen based on illustrations. Initially showing a figure describing the bones arrangement in a mammal body to further illude the understanding of which bones that were excavated from the sites.

5.2 Vistehulen, discovery, Excavation and dated material

The cave was first mentioned by the geologist P. A. Øyen, who in 1900 undertook a small test excavation without results, but after the landowner had driven mass from the cave beyond his fields, a neighbour became aware of flint objects, charcoal and burnt animal bones among the shells and soil masses from the cave (Brøgger, 1908, p. 5, Bang-Andersen, 1983, p. 4). Together with the owner, Lars Tjøtta undertook a superficial examination of the cave (Lund, 1951, p. 8). Stavanger Museum was then summoned, and in October 1907, conservator Tor Helliesen and Lars Tjøtta conducted a small survey in the eastern part of the cave without outstanding results, but Flint and bone tools revealed that the cave was probably an old settlement. Later that year, archaeologist A. W. Brøgger undertook a more extensive excavation with good results, and the investigations continued in 1910. Through Tor Helliesen and Brøgger's investigations in 1910, relatively large parts of the settlement area inside and outside the cave opening were searched to the bottom with the exception of the inner part of the cave (approx. 15m^2), which was preserved for later investigations as this area could not be examined

under the conditions at the time (Brøgger, 1908:5, Gjessing, 1920:148, Bang-Andersen, 1983:4).

Figure 19. Excavated area in Vistehulen from the surveys in 1907 with Tor Helliesen depicted excavating part of the cross.trench section. Photo: Arkeologisk museum. Universitetet i Stavanger. Obtained from: Digitalmuseum

The excavations revealed a wastepile up to 60 cm deep with a thin shellless layer at the bottom and a thick layer of beach snail at the top. Encapsulated in the cultural layer, in addition to a number of artefacts of bones, horns, flint and stone, meal waste was also preserved in the form of unburned and burnt mammals, birds and fish bones. According to Bang-Andersen, those who once lived there must have disposed of their waste on the same floor where they lived, worked, ate and slept (Bang-Andersen, 1983:4).

When Brøgger examined the cave in 1907 together with Helliesen, a report on the character of Vistehulen was later published in Stavanger Museum's yearbook for 1908, where they describe the cultural layers in vague features and not very comprehensive (Brøgger, 1908, p. 5). It is further stated in the report that the focus on the artefact material, the known human skeleton and the focus on the animal and plant material were particularly significant. The findings made by animals from the cave are presented fairly accurately and in extensive features, but more central is the interest in which animal species did not exist in the area initially. The number of

species in the cave is almost unique concerning the number of fragment finds, it tells a lot about which species lived and coexisted in the Norwegian fauna at the given time, but Brøgger does not reproduce the number of fragments or bone finds in relation to the species (Brøgger, 1908, p. 9- 25).

The research by Brøgger in 1910 took place as follows, and this time the west side of the settlement (in front of the cave opening was examined, an area approx. 18 m large) (Lund, 1951, p. 8-9). H. Shetelig and E. Lange joined him for about a month during this excavation (Brøgger, 1910-1911, p. 335). And when the investigation ended, it appeared that the entire western part of the settlement in front of the cave opening had been examined, and inside the cave, it was then believed that most of it had been searched or driven away. As a result, the terrain was virtually closed with secondary soil layers and shell masses so that the cave would regain its original appearance (Lund, 1951, p. 8-9).

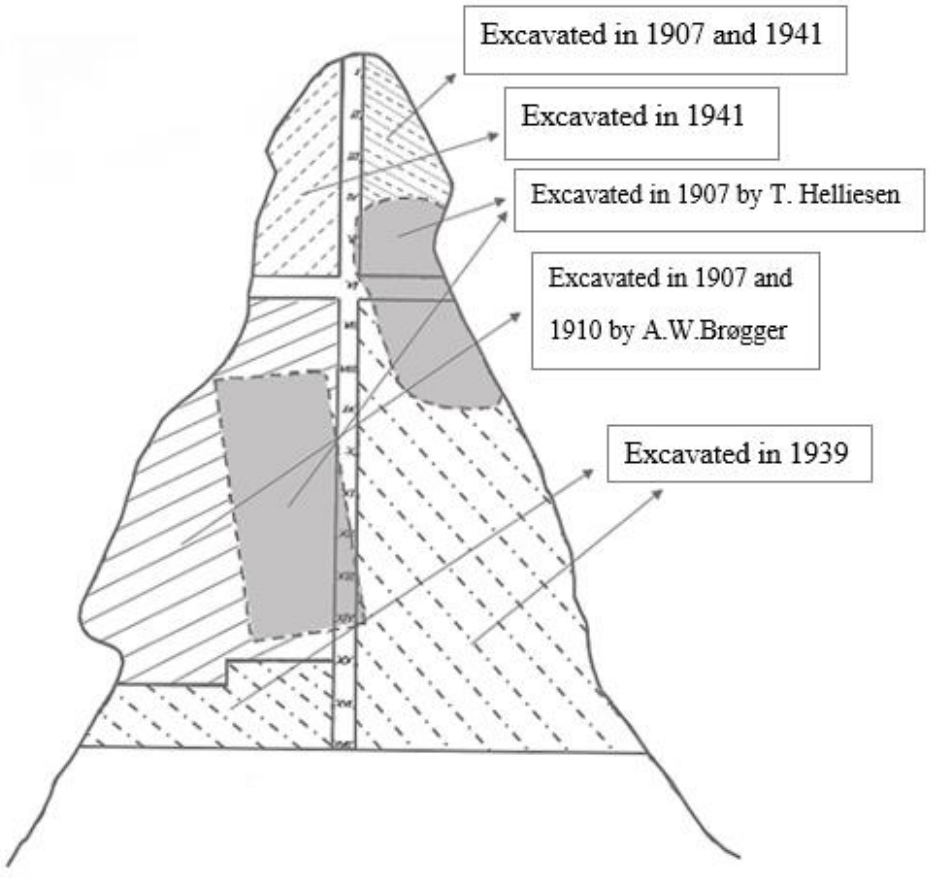


Figure 20. Illustration of where and when the various sections was excavated in the cave. Obtained and modified from Lund, 1951, p. 161

In the later and more thorough surveys by Harald Egenæs Lund in 1939, the excavation occurred with a 0.5-meter wide trench formed through the settlement area in a south-north

direction. The trench was opened partly to divert moisture and partly to distinguish between older and younger excavation sites. The main ditch was 16 metres long and did not collapse together with the ditch Tor Helliesen also had opened in 1907 (Lund, 1951, p. 9). When the ditch was formed into the cave, it turned out that there were untouched cultural layers in the inner part of the cave that had not been excavated during Brøgger investigations. An inner transverse trench was therefore opened about 6 metres from the bottom of the cave. And 16 meters from the bottom of the cave, an outer transverse ditch was opened in the entire width of the site. There were no traces of cultural layers in the outer transverse ditch, and under a 0.5-metre thick layer of soil either fell on the bedrock or fine springsand (Lund, 1951, p. 9). About the middle of the outer cross-ditch was a larger earthen rock that in the southern half had traces of red paint, possibly ochre residues that could be a sign that someone has tried to draw or illustrate something. However, the paint was temporarily so weak that it more or less disappeared in the sunlight. The residues were less than one m², and it was impossible to depicter specific characters or figures according to Lund (Lund, 1951, p. 9).

The area between the outer transverse wall and the cave base was divided into squares of 1 m² and divided into letters and Roman numerals (Lund, 1951, p. 9), oriented according to the southwest corner of the squares. It was excavated in layer horizons that were about 10 cm thick or thicker (up to 20 cm). Each of the excavation layers was parallel to the surface of the cultural layers encountered in the waste heap. They were numbered from top to bottom except for the cultural layers that were numbered from the bottom up in the waste pile (or named in special features). The entire area between the outer transverse trench and the cave floor was 125 m² in total. However, clear and distinct cultural layers have only been about 100 m², as the two outer route rows had no particular traces of cultural layers (Lund, 1951, p. 10). The waste pile was virtually intact after the excavations in 1907. Harald Egenæs Lund's investigations were characterised by more extensive investigations and accurate division of the stratigraphic layers inside and outside the cave, and the focus was mainly on the artefacts and the natural historical conditions. However, the flora and faunal material were also of great interest and depicted in great detail (Lund, 1951, p. 10).

Strata I	This layer consisted of a vast quantity of bones. No shells were seen here.
Strata II	This layer consisted of a small number of bones but was especially rich with shells as this layer is regarded as the main shell layer. However, there were more bones in the lower part of this layer.
Strata III	This layer consisted mostly of some artefacts and was partly uncorrelated. It was not especially many traces of bones.
Secondary layer	This layer consisted of mixed layers of the excavations of 1907 and 1910 and is then regarded as a layer that consists of uncorrelated units.

Table 7. Table overview of the different layers in Vistehulen

The investigations in 1939 revealed a cultural layer of the first part (cultural layer I) consisting of light feathered sand and above this sand layer was an approximately 30 cm thick, dark culture layer consisting of greasy, densely packed weathering soil rich in bone remains. This layer had no shells (Lund, 1951, p. 11). Cultural layer II consisted of approx—50 cm compact shell layer. There was some weathering soil between the shells, but it was significantly smaller than in the underlying cultural layer. There were also some bone remains here, but not in as large a quantity as in cultural layer I. At the lower edge of the shell layer, there were traces of a broken shell horizon of varying thickness that could be up to 3-5 cm thick (Lund, 1951, p. 11). In this part, where shells were abundant, beach snails and albus mussels predominated, but there were also several oyster shells and mussels (Lund, 1951, p. 11). There were many larger and smaller beach rocks scattered in the cultural layers, and the largest was about 20-30 cm long, and the smallest was often only a few cm in cross-section. In front of the cave opening, the shell layer was steadily reduced in thickness, and initially, the shell layer must have formed a compact pile of shells and weathering soil, of which it was mainly inside the cave itself (Lund, 1951, p. 11).

Furthermore, there was a cultural layer about 30 cm thick without special traces of shells, and bone remains in cultural layer III. Through the cultural layer, several artefacts, simple clay vessels, were later found, otherwise consisting mainly of weathering soil and a number of larger and smaller stones. Here there was also a secondary layer that was 15-20 cm thick, this layer consisted of mixed finds from different times. There were in other words, remains of piles of shells and soil from the surveys in 1907 and 1910 in this mixed secondary layer (Lund, 1951, p. 11).

The cultural layers of the cave testify not only to what objects and weapons the people in Vistehulen had but also to what they ate daily. The food was cooked or fried in stone fireplaces. Layer upon layer of fish and animal bones, shells, nutshells, coal and fireplaces piled up on the floor. In the lower layers, which include both the Older and younger stone age, bones of 70 species of animals have been found. About half of them are birds, a third are mammals, and the rest are different species of fish (Bang-Andersen, 1983, p. 10). After the excavations in 1939 and 1941, the terrain inside and outside the cave was filled in and regained its mark from before the excavations in 1907 were carried out when the inner and outer parts of the cave were then seen as completely searched and investigated (Lund, 1951, p. 17).

In the years after the excavation in 1910, Vistehulen remained without further investigations until 1939 for systematic excavations as earlier stated, until when archaeologists Harald Egenæs Lund and Guttorm Gjessing, respectively, began investigations of what was left of the settlement (Bergsvik, 2012:13-16). It was with great interest that the excavations in 1939 and 1941 showed that the waste pile was deeper than first thought (Bang-Andersen, 1983. p. 3-5). In 1907, 1910, 1939-1941, when Tor Helliesen, Brøgger and Lund excavated the cave, a total area of 125 m² was excavated, and in the stratigraphic layers where bone objects were discovered, the layers were dated to 7300-6,450 cal. BP. (8040 ± 100- 7850 ± 120 BP) in layers I, 7050- 4750 cal. f.Kr. (7810 ± 70- 6270 ± 170 BP) in layers II and 6450- 5800 cal. BC (7260 ± 160 BP) in layer III of a number of recent radiocarbon measurements reproduced in (Bergsvik & David, 2015, p. 193-195). The overview visualizes the dated material and OxCal measurements of these layers as well as were the dated layers positioned at the longitudinal section through the cave (see figure 29).

Lab nr.	Site	Ex. Unit	Ex. Layer	Stratigraphic layer	Material	14C Age BP	Cal. BC age range 2s
T-2943	Vistehulen	III F	8	Strata I	Animal bone	8040±100	7300-6650
T-2668	Vistehulen	XI H	6	Strata I	Animal bone	7780±130	7050-6400
T-2664	Vistehulen	III I	5	Strata I	Animal bone	7850±120	7050-6450
T-2873	Vistehulen	II H	5	Strata II	Animal bone	7810±70	7050-6450
T-2872	Vistehulen	II H	3	Strata II	Animal bone	7620±130	6850-6200
T-2665	Vistehulen	IX K	5	Strata II	Animal bone	6270±170	5550-4750
T-2941	Vistehulen	II F	2	Strata II	Animal bone	6940±90	6000-5660
T-3351	Vistehulen	I VI-I VII		Uncertain	Human bone	7120±150*	6350-5700
T-2666	Vistehulen	X H	3	Strata III	Animal bone	7260±160	6450-5800

*Table 8. The table shows dates from various excavated layers in Vistehulen. The table is obtained from Bergsvik & David, 2015, p. 195, Bergsvik, 2015, p. 6. The calibrations were performed with OxCal v3, 10. *Marine reservoir correction performed (300±50BP). The table is modified for this thesis*

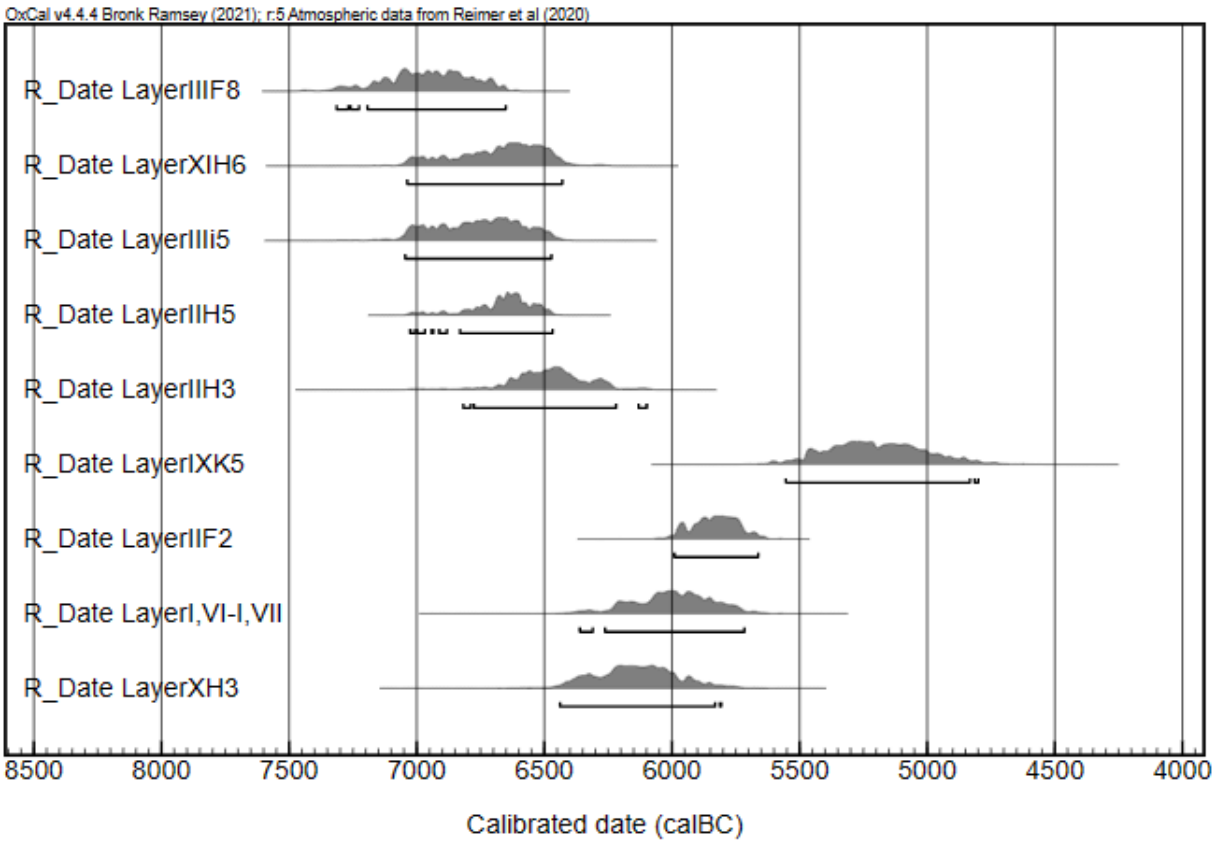


Figure 21. OxCal measurments were made from the table 2, and presented in OxCal v4.4.4 illustration. More of these calibrations of individual layers are presented in appendix. Bronk Ramsey 2021: Ramsey, B., 2021. C. Bronk Ramsey, OxCal 4.4

Lab nr.	Site	Ex. Unit	Ex. Layer	Stratigraphic layer	Age in 14c yr BP	Cal. BP	Species sample
TUa-5949	Vistehulen	IX K	6	Strata I	6710±70	7569±109	*Cervus elaphus*
TUa-5944	Vistehulen	III F	9	Strata I	7820±50	8609±155	*Alces alces*
TUa-5942	Vistehulen	IV H	2	Strata II	7315±60	8153±153	*Alces alces*
TUa-5946	Vistehulen	X K	3	Strata II	6405±50	7342±84	*Alces alces*
TUa-5947	Vistehulen	XIII K	3	Strata II	7250±45	8074±94	*Alces alces*
TUa-5948	Vistehulen	IX K	3	Strata II	6630±45	7507±69	*Alces alces*
TUa-5950	Vistehulen	XII I	4	Strata II	7830±60	8711±261	*Alces alces*
TUa-5951	Vistehulen	XII K	3	Strata II	8050±60	8893±233	*Alces alces*
TUa-5952	Vistehulen	XIV K	2	Strata II	6175±50	7093±149	*Cervus elaphus*

Table 9. Several datings from Vistehulen, Obtained and modified from Rosvold et al. 2013, p. 4

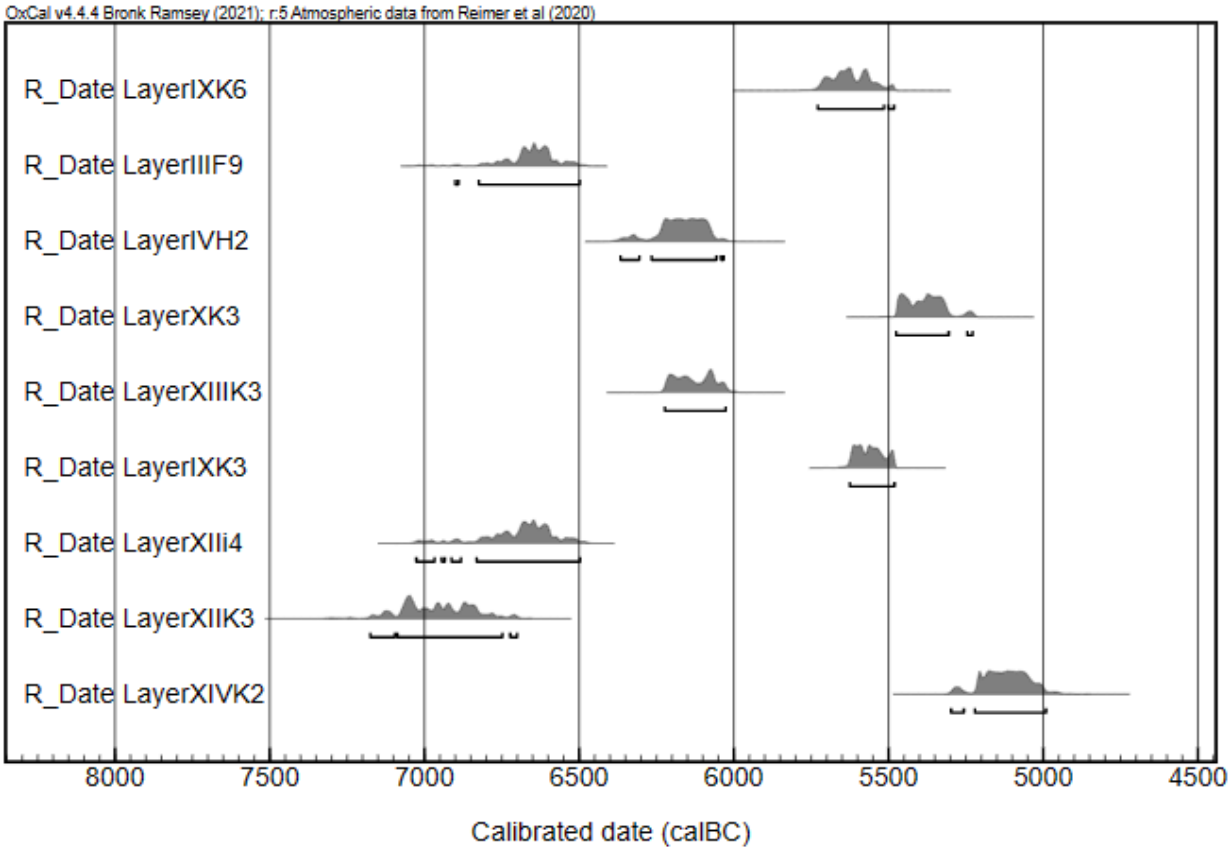


Figure 22. Additional calibrations with OxCal v4.4.4 made from table 3. Bronk Ramsey 2021: Ramsey, B., 2021. C. Bronk Ramsey, OxCal 4.4

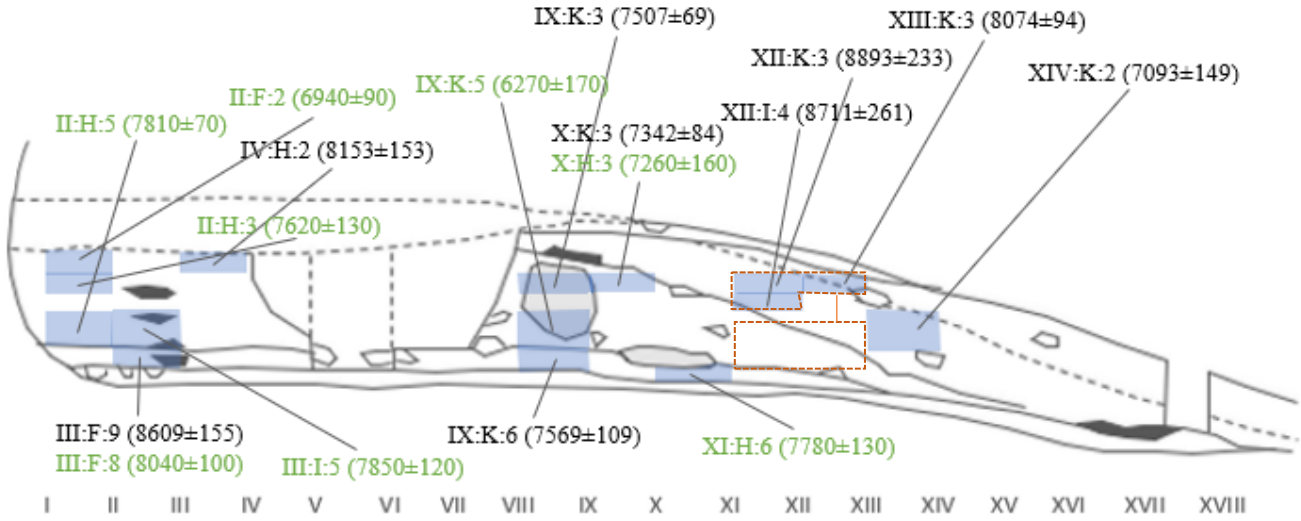


Figure 23. The dated layers put into context. The datings are marked 14c age BP: Bergsvik & David (green), and Cal.BP: Rosvold et al (black). Red markings show were uncorrelated units were found. Obtained and modified from Bergsvik & David, 2015, Rosvold et al. 2013 and Lunds original drawings of the longitudinal section of Vistehulen

Figure showing the dated layers in the context of the cave, the layered horizon 1 is not dated and does not show in the illustration above (figure 23). Some dated layers are situated in uncorrelated units and are shown by an example by the layers XII:K:3, XII:I:4 and XIII:K:3 were these layers are actually located further down than the layer horizons indicate.

5.3 Osteological material of dog remains

5.3.1 Vistehulen

Osteological material from Vistehulen is quite large and contains several bone finds from the following excavated layers: 3 mandibulae with condyle (IV,H:3, picture. 21), 3 separate lower canines (X,H:4, XIII,I:4, VIII,L:1). Additional lower canine (I,H:5) large size: 22,5mm x 7,7mm x 8,3mm (see complete measurements in appendix), canine (XI,1:6) small size: 19mm x 6,6mm x 7,6mm, one separate condyle (II,H:3) large size without measurements. Lower mandibula (III,F:1). Lower end of the scapula (XI,K:6). Upper end of humerus (I,H:3) size: from side to side 11mm while largest width of distal part: 30mm. Two lower joints of the humerus (XI,I:3,25). Ulna (I,H:2) most likely belonged to the same individual as the humerus from the field I,H:3. Part of radius (VIII,H:6). Part of the pelvis (IX. I-K, large size). Upper half-part of a femur (IV,F:4, large size). Two lower ends of the femur (XII,M:3, XIII,H:2). One

tibia from (XIII,I:2). Middle part of the tibia (II-I,G:3), possibly gnawed by dogs or other type of animal. Lower part of do (tibia) (V,F:4). One lower part of the fibula (III,H:5, large size). Two calcaneus bones (I,H:2, XI,D:5). Two astragalus bones (I-II,G(?), XIV,I:2). Several metatarsals and metacarpals from following fields: (II,H:4), (IV,F:4), (I-II,G(?), (IV,H:2), (IV,I:3), (V,F:5), (VIII,H:6), (IV,H:4), (XI,K:4), (XI,K:4), IV,I:3), (III,F:3), (XIII,L:2), (XI,H:1), (II,F:3), (XI,K:4), (XI,K:4), (XI,K:4), (XI,K:4 15). Atlas (22). Epistrophaeus (XII,L:3). Cervical vertebrae nr. 3 (X,I:5). Cervical vertebrae nr. 5 (X,I:6). Lumbar vertebrae (XII,H:2). And additional lumbar vertebrae from the field (IV,I:3) (Lund, 1951, p. 60). From the following mandibular could only a few of them be estimated by measurements (Lund, 1951, p. 60-61). Figure 24 presents the dog bones that were excavated.

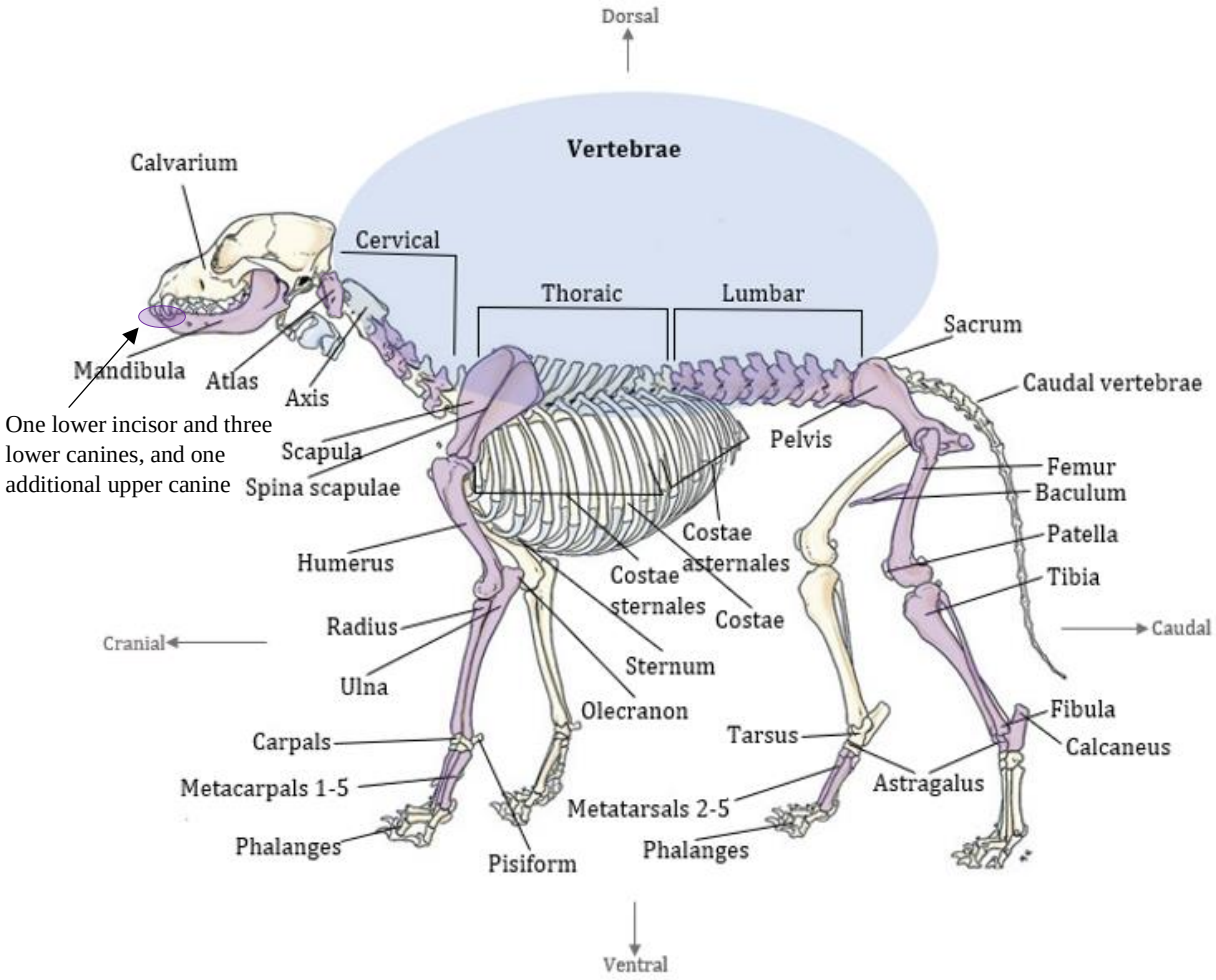


Figure 24. Skeleton of a male dog, left lateral view. The skeleton illustration is partly modified to fit this paper and obtained from the website: Veterian key (WordPress theme by UFO themes). The illustration is made with a general dog skeleton from Veterian key mixed with O`Connor, 2012, p. 9, textbook of veterinary anatomy, and specific information from Anne Birgitte Gotfredsen PostDoc at the University of Copenhagen on the terminology

5.3.2 Geitalemen

Inside the rockshelter, only a single canine tooth was excavated, interpreted as originating from a medium-sized dog breed. In total, the bone material was excavated in the cultural layers deep inside the rock, and roughly 300 fragments were counted here in total from various animals (Hougen, 1920, p. 11). The same applies to artefacts and molluscs, which increased considerably from the C routes and inwards towards the rock wall and were most prominent at the bottom of the rock wall. However, Brinkmann comments that this dog's canine size has been somewhat larger than the previously known Stone Age dog *CFP* (Hougen, 1920, p. 11). My basis for using the Geitalemen site is that it contains bone from a dog assumably larger in size than the CFP (see section 5.5 for an explanation of the CFP and CFI) type and that this should be recognized and maybe further studied.

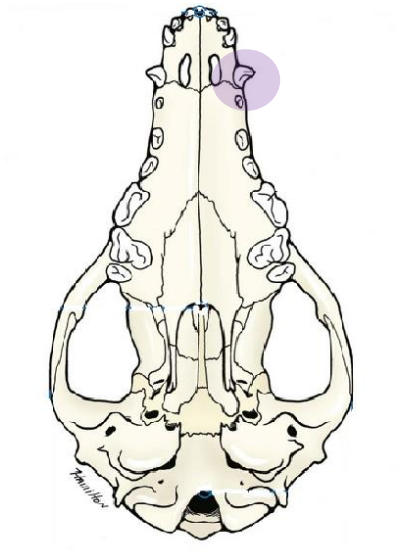


Figure 25. Ventral view of dog cranium showing the excavated canine tooth retrieved from Geitalemen. Illustration obtained and modified from Veterian key

5.3.3 Kvernevikhelleren

Besides the overall vast assemblage of marine species as well as various finds from other birds and mammals is the excavation of a dog bone, and the dog finds from Kvernevikhelleren are represented by an upper end of a known size elbow bone (ulna) from the CFP type, known from Danish settlements from the Stone Age (Helliesen, 1901, p. 59). Unfortunately, no measurements are available to compare with known Mesolithic dogs from the same period. However, it is based on zoologist Herluf Winges observations that it is most likely this type of spitz breed from the Kvernevik locality as in the well-known Danish stone age sites.

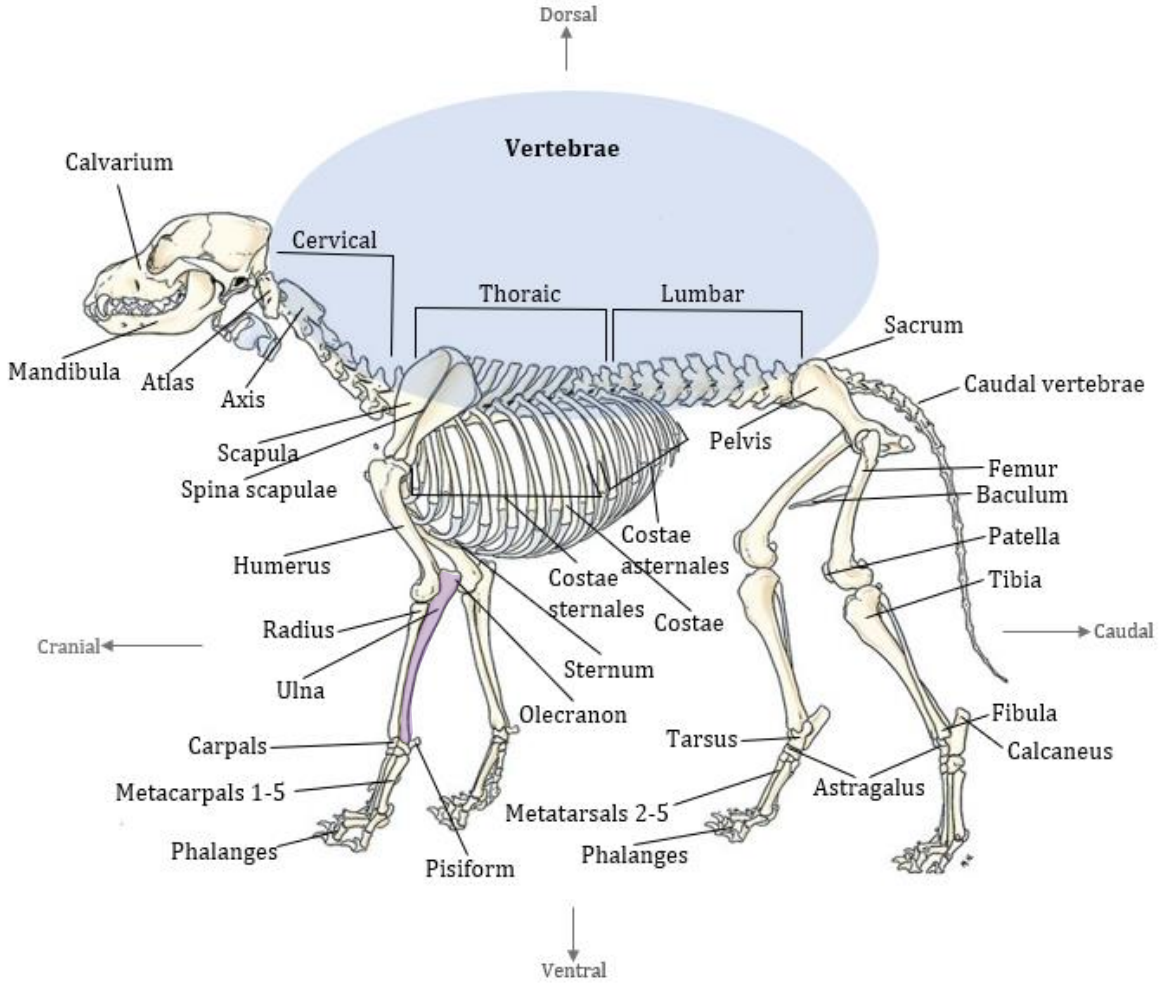


Figure 26. Male dog skeleton, left lateral view showing the excavated bone retrieved from Kvernevikhelleren. Illustration are obtained and modified from Veterian key

5.3.4 Skipshelleren

From Skipshelleren, CFP type is also described, and all bone finds appear from cultural horizon F the cultural layers on the other hand, vary somewhat from 1-7, and there are temporarily few finds from the oldest parts (to be more specific: (1: F 1), (1: F 2/3), (1: F 3), (2: F 4/5), (4: F 5), (1: F 5/6), (8: F 6), (2: F?), approx. Four fragments, where one possibly lies in an overlapping cultural layer. The bone material consists of fragments of varying degrees, and about 20 fragments of dogs were excavated, 2 of which are uncertain to which layer context belongs (Olsen, 1976, p. 1-2 and 41). These fragment finds were situated in the layers by numbers: layer 1 (1 fragment), 2/3 (1), 3 (1), 4/5 (2), 5 (4), 5/6 (1), 6 (8), and two fragments that are uncertain (Olsen, 1976, p. 43). Olsen did not go through the osteological material of dog bones like Lund did in Vistehulen. Instead, he bases the osteological assemblage of the amount in percentage on the overall species occurrence as well as the various animal species. However, Olsen especially

highlights the occurrence of fjord seal and moose as important in his paper, and there is no mention of what bone parts that were excavated from the dog from Skipshelleren in (Olsen, 1976). However, the total number of bones and fragments consisted of marine species 10,633, birds: 211, and mammals: 13,057 (Olsen, 1976, p. 131).

After quite an extensive search, the detailed information about the osteological material from Skipshelleren proved not to be retrievable and can not give me a basis for placing the dog bones in an illustration picture when there is no depiction of which bone parts that were excavated from the site in Olsen (1976).

5.4 "The Mesolithic dog"

The findings from the sites, breed-characteristics are all described as a type of spitz-like dog that lived many thousands of years ago, which is now an extinct breed. The breed is referred to as the taxonomic label *Canis familiaris palustris* (in this thesis abbreviated as CFP) and is mentioned extensively in older literature and depicted as a relatively small-sized spitz-like canid that existed in the Stone Age. In recent literature, this taxonomic labelling also seems to have disappeared (Darcy Morey, PhD in Anthropological Archaeology at Radford University, pers. Comm 15 October 2022, Anne Birgitte Gotfredsen, PhD, research consultant at the Zoological Museum Copenhagen & Kim Aaris Sørensen, pers. Comm 26 October 2022). The term drops in temporarily after the mid-1900s, in my understanding, and is then referred to as "turf dog" or "peat moss dog" (Norwegian terms: torvhund og torvmosehund). The turf dog is especially known from dog finds from the Bronze and Iron Ages (Gräslund, 2002, p. 1, 167). The CFP type and turf dog can probably be the predecessor of today's Norwegian elkhound and husky breed as the breed characteristic consisted of spitz with a resilient, athletic physique that was very suitable for hunting and tolerated a lot. In addition, it was then robust with an excellent thermal coat, well shod for Scandinavian conditions.

Figure 27. The dog in the photo illustrates a Husky, a well-known spitz dog in modern society. The prehistoric dog may have been closely similar to this breed. Picture obtained from Shipman, 2021, p. 40

However, the dog bones from Geitalemen are interpreted to be somewhat larger than the well-known CFP, and only a single canine of medium size was found. Hougen does not explicitly mention CFP here but denotes the find as *Canis familiaris*, i.e. interpreted as the well-known domestic dog (possibly indicating *Canis familiaris inostranzewi,* a larger and more robust species. Abbreviated as CFI) (Hougen, 1920, p. 10). Where the rest of the missing bone material is not mentioned, nor in what route the tooth was excavated. The same applies to Kvernevihelleren, where there is also no source in which part of the dog bones was discovered, nor is there an exact layering, only the term for a so-called waste deposit where both artefact material and bones and shell pulp have been excavated in the same way as the Danish kjøkkenmødding. From Kvernevikhelleren, an upper end of an ulna was found, in accordance with the size of the above breed CFP. While Skipshelleren carried a total of 20 fragments of dog, how many dogs there were at the site originally is not mentioned, but Olsen depicts that the dog bones were found from layer seven upwards (Olsen, 1976, p. 34). A total of about 68,140 larger fragment finds of mammals were found here, but most of them were severely crushed, of which 13,060 were determined. It is reasonable to imagine that the source of error here varies somewhat as many fragments were left undetermined and could easily have been vaster in regards to dog finds (Olsen, 1976, p. 42). Olsen reports that at Skipshelleren, eight fragments of dogs were found at cultural layer six and, to some extent seven, dating from the same settlement period, similar to Vistehulens with the same structural division, and here about 15 fragment finds were counted in 1907, and 47 in 1939 and 1941 (Olsen, 1976, p. 126). In total, it was decided to have been four dogs at Vistehulen when the settlement was in use. This is not very much thinking that Vistehulen was settled for thousands of years, this also applies to the other comparable sites— were there is no extensive amount of dog individuals. The soil masses during the excavations at Vistehulen were not water sieved, and this probably caused a significant loss of the quantity of the bone material, especially when it comes to fish bones, among other small fragments that were most likely underrepresented, and could have played a role on a broader understanding of the total species assemblage.

Lund showed a great interest in the dog bones as he took the time to measure several bones from the site to compare with modern Samoyed. Many dental findings clearly indicated a

species larger than this modern dog breed CFP, as well as bones from the astragalus and calcaneus region (Lund, 1951, p. 61,62). Possibly indicating Brinkmanns earlier assumption about two dog species existing at that time, also beside the mentioned CFP, there was possibly also the CFI type that was assumed to be more robust in size (Lund, 1951, p. 62). Surely this dog species is little described in recent literature as well as the CFP type.

This is especially indicated by the findings at the lower mandibula branch as shown below (Figure 28) at a stronger mandible than in modern-day dogs. As well as the width of two distal astragalus measures to 12,7 and 13mm, while the Samojed measures to 11,4mm. The largest length of parts of two tarsus bones measures to 40 an 35mm, while the Samojed measure approximately to 33,5mm. According to Lund, a proximal width of a tibia measured from side to side was about 30mm, while according to the Samojed, this would be about 27mm (Lund, 1951, p. 62). According to Aaris-Sørensen three different sizes of these dogs were indicated, at shoulder height, male dogs measured to 55-60, 50-55, 45-50 cm (Aaris-Sørensen, 1989, p. 162). However, the measurements of the scapula region from Vistehulen are not reproduced in the literature and do not provide me with these shoulder measurements but are an indication on the size of the CFP and CFI type (Lund, 1951, p. 62). Furthermore, it was known that the dog accompanied the Maglemosian culture in their hunts from stone age findings from Denmark (Aaris-Sørensen, 1989, p. 157). However, Mikkelsen mentions in his paper that the Maglemosian culture was also situated in Norway, only based on individual findings. These indications could suggest that the dogs initially came from migrating groups of people in the Scandinavian continent (Mikkelsen, 1970, p. 8-9).

Since the dog is considered one of the first domesticated animals, it seems that humans saw it as an opportunity to have it around, at the settlement or hunting. Perhaps first as guard dogs and later to help them through the hunt. There is a possibility that humans, to some extent, observed the wolf's hunting and strategic abilities on, among other things, food debris around the settlement and the settlement area made people believe that they would gain an advantage and later tried to take them in as a resource. An interesting question to address is whether the early separation between wolf and dog was the result of selective human-like influence or whether it was the result of natural selection as a result of environmental influences. According to Shipman, the transition from wolf to dog may probably not have been a conscious choice but closer to the result of a random and interest-based event resulting in the dog being domesticated and evolving a relationship with humans, later accompanied them around the world (Shipman, 2021, p. 75).

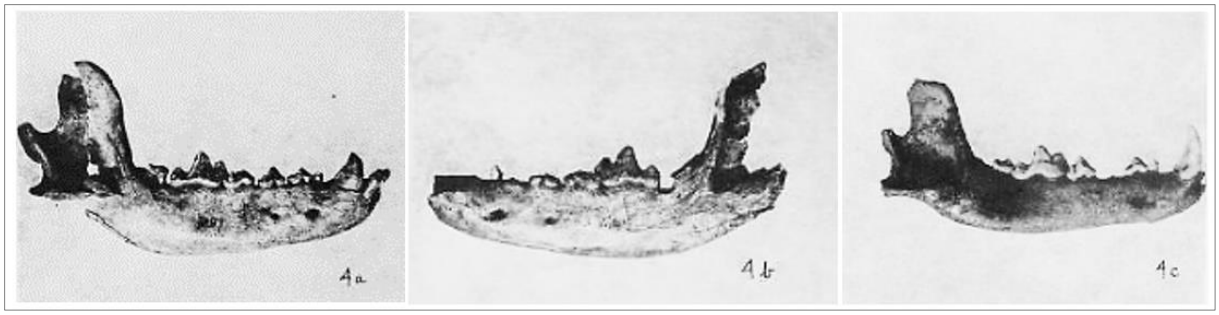


Figure 28. The picture shows three lower mandibles excavated from Vistehulen. 4c is the same size as a Samojed breed and is regarded as a smaller species CFP, while CFI is considered larger, and mandibles 4a and 4b could be a representation of the CFI individual. The first two mandibles are considerably more robust than those from a Samojed breed, indicating that a larger dog species have been present at Vistehulen. Photo: U. Møhl-Hansen. Obtained from Lund, 1951, p. 158

CHAPTER 6. DISCUSSION AND MAIN QUESTION

6.1 Introduction

In this chapter, I will present the dog bones in a dated context and their position in the different layers organized in illustrations based on Lund's drawings from Vistehulen. These demonstrations will give a more specific picture of how the dog bones relate to one another as well as other bones and datings from the Viste settlement. These bone parts have never been put in a stratigraphic context like this before and could give a new element to our understanding of the excavated dog bones from Vistehulen.

Furthermore, there will be brief presentations of Mesolithic sites from different areas to compare various practices of ritualistic acts. To further relate this to the dog finds from Vistehulen, I am searching for similarities in how or why the dog(s) got buried and even if it was some evidence of pre-Christian ritualistic procedures due to the outcome of the individual's death in the relevant Mesolithic examples as well as the sites from a later perspective mentioned to compare the mortuary practice thousands of years later. This chapter's overall focus will be on a discussion on how the people at Vistehulen co-existed with dogs and the meaning of this relationship.

6.2 Dog bones and correlations of units

Brøgger mentions in 1908 that it was excavated in about four dog skeletons from Vistehulen, only remainings in terms of bones and fragments (Brøgger 1908, p. 11). And dog bones were placed both inside and outside the cave and placed from upper layer II as well as the caves outside area. However, between the routes H-N had the largest concentration of bones that did not include caves inside. Here is an exception of the caves inside area regarding the dog bones as non of these bones were located in stratum I— only the caves outside in this layer consisted of several dog bones, from: VIII-XIII were many parts were uncorrelated (Lund, 1951, p. 16).

Correlated units	Uncorrelated units
I:H:2 I:H:3 I:H:5 IV:H:2 IV:H:3 IV:I:3 IV:F:4 IV:H:4 V:F:4 V:F:5 VIII:H:6 X:I:5 X:I:6	II:H:3 II:H:4 III:H:5 VIII:L:1 XI:I:6 XI:K:6 II:F:3 III:F:1 III:F:3 X:H:4 XI:K:4 XI:I:3 XI:H:1 X:D:5 XII:M:3 XII:H:2 XIII:I:4 XIII:H:2 XIII:I:2 XIII:L:2 XIII:H:2 XIV:I:2

Table 10. List of correlated and uncorrelated units containing dog bones from Vistehulen

Some bones were placed in the merged layers (XVI-XI) dated to the time frame between 7300-5660 Cal BC. However, horses (*Equus caballus*) and cows (*Bos taurus*) were placed in the upper squares XII, M:2 and IV, F:1, which may indicate that the top layers are more mixed than first thought. It is known that these animals are a representation of Neolithic development in farming and animal husbandry (Lund, 1951, p. 77). In other words, it is perhaps possible that the top stratum of cultural layer II in some places dates from the Neolithic, Bronze Age or the Younger Iron Age or is thus an uncertain layer compared to which I have no knowledge of whether the dog bones themselves have ever been dated (Lund, 1951, p. 53). Furthermore, all the bones were severely broken or fragmented, and the soil was not sieved during the excavations, resulting in bones as fish bones being somewhat underrepresented.

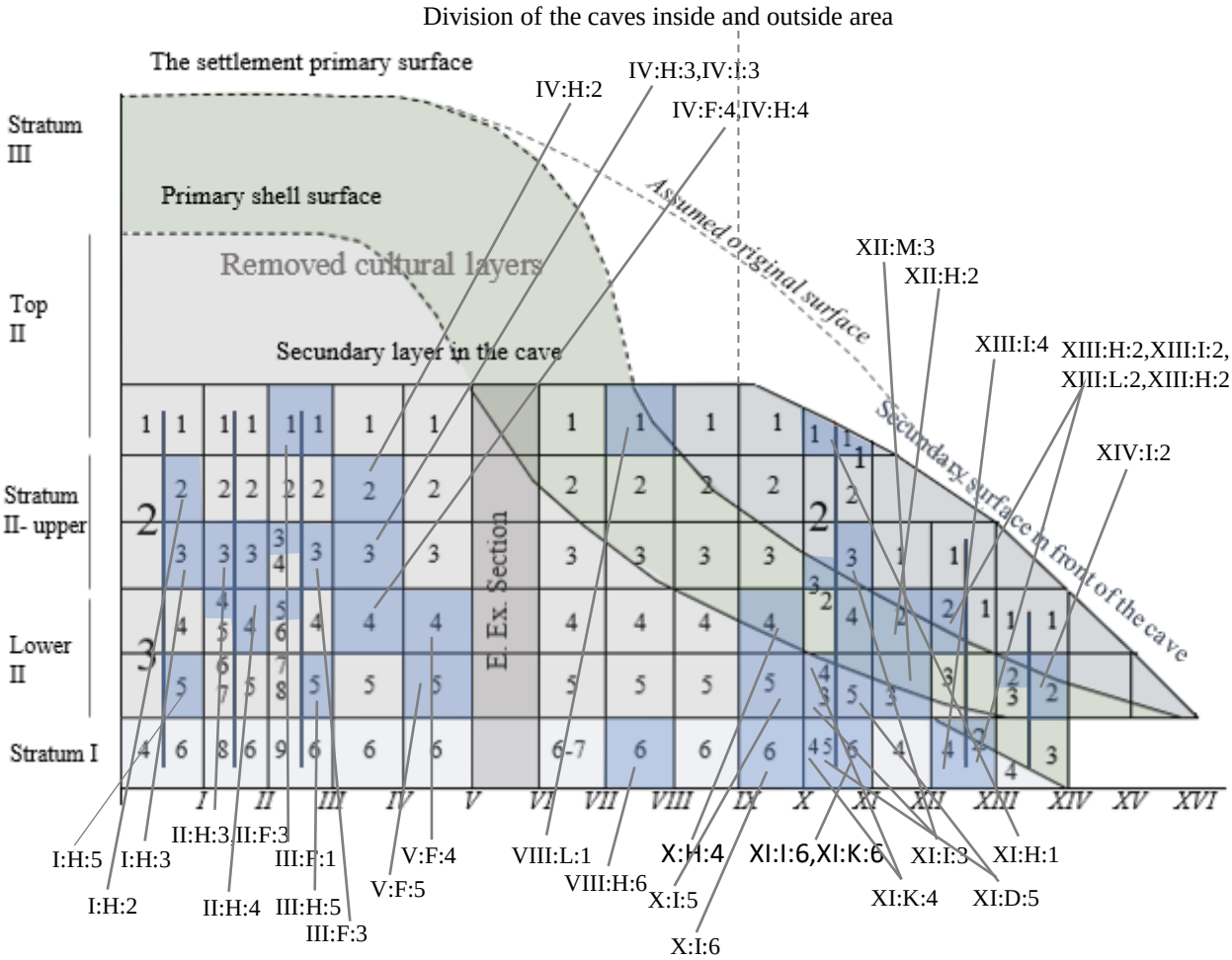


Figure 29. Overview of which layers dog bones were found seen from a vertical perspective. The outlined fields is showned to get a better understanding of the layers that correlate with one another. Modified from Lunds original drawings

The dog bones from layer IIIF at excavation layer eight correlate together with 5 and 7, of which five consist of dog bone fragments. According to Lund, this layer is structured as layer horizon II and is supposed to be a younger phase of the settlement, but here joins as part of the oldest settlement as this section dates to 7,300-6650 Cal BP. However, as this layer has uncorrelated units, uncertainty is raised as to whether this mixed layer could be interpreted as part of the oldest settlement phase rather a layer with mixed phases. A dog bone located in IIIH consisted of a lower part of the fibula and was of relatively large size. However, at excavation layer five at IIH one also sees uncorrelated units that go together with intermediate layer 5/7, at this excavation layer, there are no finds of dog bones from division 5, but at digging layers 3 and 4 from the innermost part of the cave, there is seen bones from dog. Digging layer 5, on the other hand, indicates a dating of 7050-6450 Cal. BP. Digging layer IIH (3) was found in this particular unit, believed to be from layer horizon II's upper part. And is located in the middle part of the caves vertical line. The layer dates to 6,850-6,200 Cal. BP and consisted of the cobble of the ascending branch of condyles. In XH (3), there are no finds of dog bones, but this third digging layer dates to 6000-5660 Cal. BP, which differs from the layer at the bottom of the cave which dates to 6850-6200 Cal. BP Among other things, dog bones in the form of cervical vertebrae were found in mixed layer XI (6), indicating the oldest layers of the cave, this unit dating to 7050-6400 Cal. BP (Lund, 1951, p. 162, Bergsvik & David, 2015, p. 195), representing canine bones from the oldest active use phase.

A *Baculum* (dog penis bone) has been found at excavation layer II-I G(2), but precisely where is not accounted for since it was used in tool making, which makes placing the baculum artefact in the cultural layer difficult (Lund, 1951, p. 140). However, Degerbøl points out that many of the sharpened tools belong to parts of bones of various species, which have first been marrow slit and then used for suitable tools (Lund, 1951, p. 140). Yet, Olsen mentions that all the documented bone artefacts most likely are from the period between 8000-7000 BP (Olsen, 1992, p. 166) and that most of the bones tools were excavated from layer II and some from layer I (Olsen, 1992, p. 161) so by indications on were the bone artefacts were excavated, the baculum bone could potentially be from one of these layers. The total number of bone artefacts from the stratigraphic layers I and II are 177, compared to Skipshelleren who had 233 in layers 6/7 (Olsen, 1992, p. 168). So there is a difference in the total amount of bone artefacts in the various sites. Yet, the exact number of tools made from animal bones from Kvernevikhelleren and Geitalemen i do not possess in lack of detailed excavation reports (Olsen, 1992, p. 168)

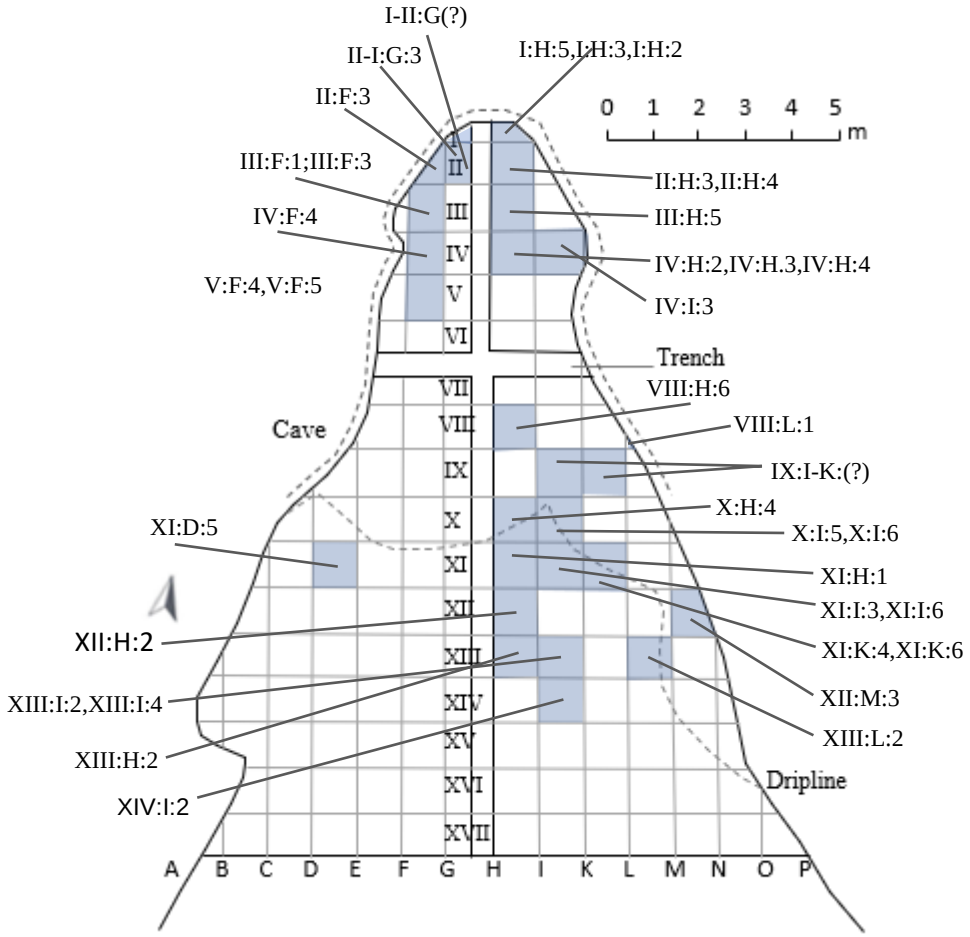


Figure 30. The blue markings show were the dog bones were excavated, seen from an above perspective. Modified from Lunds original drawings

The cat is also represented in Vistehulen, in layer horizons II F:6, II F:7 and II H:4, of which there are several bone finds of the *metatarsal, epiphysis, metacarpus*, *tibia* and *calcaneus* of several relatively young individuals. Here it is not possible to distinguish whether these individuals belong to the domestic or the wild cat, but are presented in Lund as the wildcat and were not known from the first excavation by Brøgger (Lund, 1951, p. 58-59). In the particular layers it is defined as the oldest layers of the cave, and the bones were found at the bottom of the cave (layer 6) like many of the dog bones (yet, from the routes V-I from the oldest layers 6-9 in the inner part of the cave were cat was found are no finds of dog bones), and here it must be mentioned that the cat was in many sites represented at Stone Age sites around Scandinavia. However, whether they are as old as Vistehulen's oldest phase of use may be questionable, as the layer horizons at II F 6 and II F 7 are uncorrelated units in that they are somewhere mixed

with layer 4 (Lund, 1951, p. 163). The cat and other carnivores, such as foxes and wolves, could represent or propose a possible alteration to the dog bones already lying in the settlement.

Finds from cow bovids are found in layer horizon XII M (2), which refers to the upper part of digging layer II. These layers also partially merge with layer 3 in some places, and only a single part of a tooth is found. When it comes to findings from horses, the horse is represented in layer horizon IV F (1), which is defined as the youngest layer in the cave in the separation between the top part of the digging layer II and the primary unit of the mollusc layer. The bone found from the cow was excavated quite far into the inner part of the cave, while the horse lay towards the cave's entrance, quite far in the rock (Lund, 1951, p. 77, 163). The closest I can get to a dating of excavation layer 2 is at II F(2) 6000-5660 Cal. BC Age range 2s (Bergsvik & David, 2015, p. 195). Indicating this particular layer one is from the Neolithic period when people started with agriculture.

However, Brøgger and Lund structured the cultural layers in different ways. When Brøgger surveyed the area in 1907 and 1910, only minimal parts of the cave's area were reviewed, and thus, not the exact stratigraphic conditions were adjusted as Lund did in his surveys in 1939 g 1941 (Brøgger, 1908, Lund, 1951). On the other hand, Lund's descriptions of the layer's origins a somewhat wrong due to the lack of absolute dating methods (14c) and were left somewhat guessing from the archaeological artefact materials from known prehistoric settlements and stratigraphic context, consequently resulting in somewhat incorrect datings. As stratum I and II are most certainly from the mesolithic period in Norway, while the stratum III are somewhat mixed layers containing mesolithic elements as flint artefacts well as from a younger context (Olsen, 1992, p. 166, Bergsvik, e.g. “pers. comm, 18.11.2022”). Suggesting that Lund was relatively and partly mistaken in his dating of the cave's stratigraphy and finds when Vistehulens oldest use phase was older than first assumed.

From the dated layer IV:H:2 it was excavated several metacarpal and metatarsal bones from dog that was dated to 8153±153 BP, which is situated from the top layers that indicate that the below layers that contain dog bones are either older or not correlated to the units. Which in this context, makes them younger because that these units are in fact, one of the excavated Layers that are correlated. By the relatively correct stratigraphic illustrations from Vistehulen. There is a little deviation in my view from the situated layers since it is close enough to determine that they are situated near or very close to my interpretation. So to conclude, the dog bones from Vistehulen suggest that they originated from the latest use phase of the settlement and that the human individuals living here definitively were companioned by dogs from its beginning phase

since there are several bone finds from the bottom layers that are correlated to its units. Suggesting origin from 7569±109 Cal BP by dated excavated layer IX:H:6 next to correlated dog bone VIII:H:6.

From the four dogs that were excavated from the settlement. Herluf Winge mentions that some bones have visible cut marks, which may indicate that the dogs were being slaughtered (Brøgger, 1908, p. 12). These marks were visible on two of the lower mandibula, one scapula, one radius, and one bone from the metatarsal region. Exactly how these marks looked like is not described in detail. However, it is likely that they could have been eaten at some point, but since very few of the bones (with the exception of dogs) showed burned traits, it may not be what these bones are indicating initially (Brøgger, 1908, p. 13). It is highly possible that the bones were gnawed on by other animals that lived in the area then instead of as a food source for the human individuals occupying this site.

According to O`Connor, as a part of the taphonomic record, marks on bones are of essential interest. Marks from species like dogs and cats do not select bones for gnawing at random, some elements are very clearly favoured, notably any with a high proportion of cancellous bone (O`Connor, 2000, p. 48), especially if major muscle attachments mean that there is some remaining attached tissue left on it. In bovids, the proximal en of the humerus fulfils these criteria and is a common site of gnawing. Dogs tend to crunch and repeatedly chew at a bone, producing areas of overlapping tooth marks (O`Connor, 2000, p. 48). Individually, the tooth-marks tend to be relatively shallow and rather wide— craters rather than punctures and may be associated with broad grooves, where teeth have dragged across the surface of the bone (O`Connor, 2000, p. 48). The pattern of gnawing damage caused by different species can be distinctive, for example, are cats less inclined or physically equipped to chew bones. But leave tooth marks where the bone has been picked up and moved around, typically do the tooth marks show marks of being narrow and deep (O`Connor, 2000, p. 48). Rats, however, leave very distinctive tooth-marks were a rat will typically work its way along the edges of a bone in a very systematic manner, leaving rows of tooth-marks which, on close examination, clearly reflect the paired, chisel-like front teeth typical of a rodent (O`Connor, 2000, p. 48). The tooth-marks shown on the middle part of the tibia from excavation routes II-I, G (3) are one of those bone areas that may have contained attached tissues to feed on (Lund, 1951, p. 60) exactly how these marks are defined does not appear in Lund (1951). But according to O`Connor, would this be one of the main places on the osteological material that would be gnawed on by dogs/wolves— or other carnivores (O`Connor, 2000, p. 48).

6.3 Ritualistic activities and symbolic meaning in Vistehulen

Mesolithic skeletons have been found among others in a Norwegian context in Grønehelleren and in Vistehulen. The Visteboy was found in the inner part of the cave in a sitting position (in the shell midden, layer II) (Denham, 2016, p. 24). There were also found fragments of three articular bones from the finger and toes as well as a metatarsal bone in the cultural deposits (Storvik, 2011, p.37, Schülke, 2022, 136). This could indicate primary and secondary burials; these burials may either have taken place at the same time that the sites were used as residential sites, or they may have happened during separate events. Brøgger suggests that the human skeleton could easily represent a burial at the settlement site (Brøgger, 1908, p. 29), But according to Bergsvik, this cannot be determined based on the site reports (Bergsvik & Storvik, 2012, p. 36, Denham, 2016, p. 24). However, it could potentially be interpreted as settlement burials due to the complete skeleton, but determining if there is a ritualistic meaning behind this burial is not possible to say (Bergsvik & Storvik, 2012, p. 36, Denham, 2016, p. 24). Helliesen also mentions a small levelled round grave mound that was supposed to be on the hill above the cave, where there was a small burial chamber with burnt bones that could not be dated at the time.[2] (Lund, 1951, p. 8).

The dog bones in Vistehulen apparently show no signs of rituals around funerals, they are fairly scattered and partly fragmented and partly complete in some places. There are no intact dog corpses that hint of having been laid down in special ways. The only thing that can be mentioned in this connection is that the location of the human skeleton was located in the part of the cave (IV-(?):4) where several dog bones were also found, and nowhere in the literature are these bound in the same context so it must be ruled out that these have been laid down in the same context. With the exception of layer II:H:3 where a large portion of the condyle was found dating to 6850-6200 cal. BC (7620±130), where the human skeleton was dated at a greater variation of 6350-5700 cal. BC (7120±150) dated to 5727-5558 cal BP, but it might as well be within the same closure period. In any case, this is a bit of a thin basis for putting this in context based solely on this finding, even if these layers are somewhat mixed.

Lund highlights some elements that may indicate ritualistic approaches, including the location of the large stone in front of the cave opening with visual traces of red paint (ochre residue) as a sign of the use of magic. This stone may have served a purpose in ritualistic sacrificial acts and was located in a south-north direction, and is drawn in conjunction with the ochre lump and

[2] Source: Lund, 1951, p. 8. Refered by Lund: Tor Helliesen: Oldtidslevninger etc. 1898, p. 67, nr. 12.

marten skeleton found at the inner part of the cave (main shell layer). Moreover, in the layer with the ochre lump, most ashes were found from the entire cave, and this must be taken into account here considering that the nearest hearth was not found closer than in Route XI, a total of 7 fields further away. This could apparently indicate that these elements have been moved at some point (Lund, 1951, p. 114, 161).

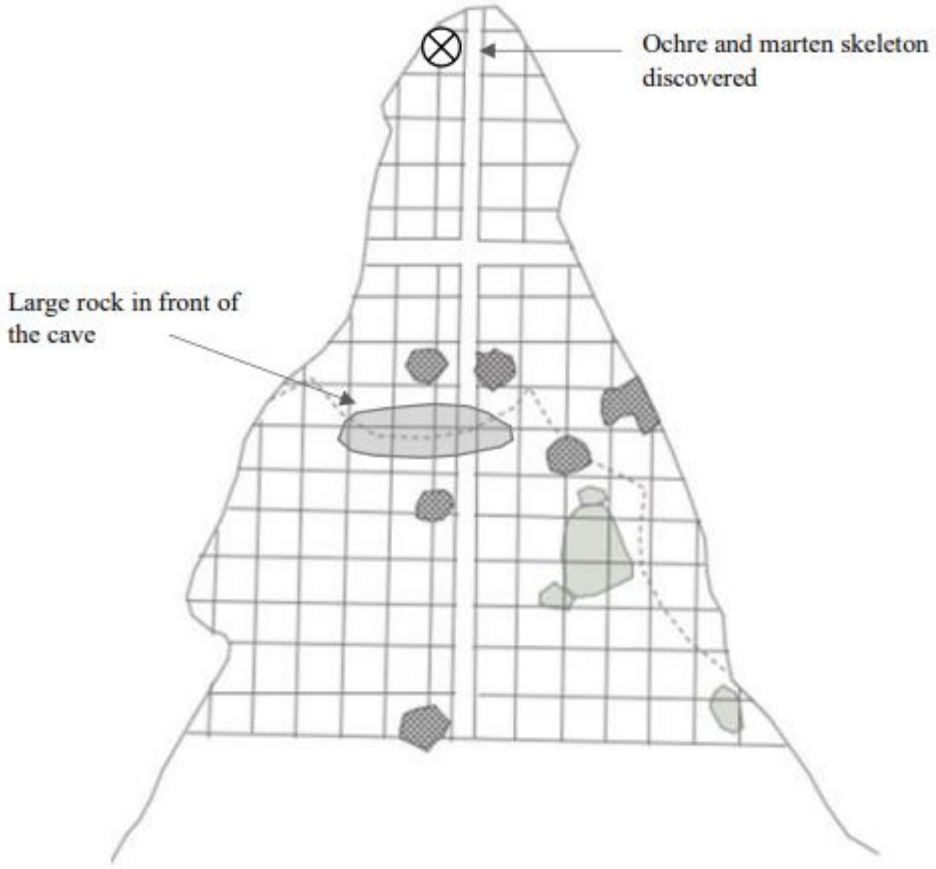


Figure 31. Illustrated picture of were the ochre and marten skeleton was obtained from the cave

In connection, some dog bones were found in the area around and under the rock in front of the cave opening at intersections X and XI. Whether this may be in relation to rituals related to what Lund refers to is uncertain. There is also no evidence that these bones have been marked with, for example, ochre or other kinds of symbolic meaning as engraving. However, most of the bones from the bear were found near the ochre in the inner part of the cave. The bear remains also was missing the essential canines—Lund interpreted this as a possible making of symbolic amulets of some kind (Lund, 1951, p. 113) since it is known from stone age sites in among others Sweeden that the bear was a vital object of ritualistic events and sacrifices (Denham, 2016, p. 15) as well as from cremation burials from the Iron Age when the bear was seen as an

important symbolic being (Mansrud, 2004, p. 80). This animal could in many ways have been interpreted as symbolic for the hunter-gatherers by its robust appearance and forceful nature from an early stage. Nevertheless, by the dog not being present with burn marks or ochre, it could suggest that the dog did not include in the sacrifices of animals and was seen or had become a part of the human "identity" in the form that excluded them from this form of events proposing an emotional bond between them. According to Brøgger several other bones were seen with bite marks, assumably by dogs (Brøgger, 1908. p. 13). This could support the indication of the dog being a part of the settlement and human identity due to the fact that the dogs at the site could have been eating the remainings of the food produced by the human individuals living at the settlement. Suggesting a sharing mentality or some sort of «pack» behaviour.

6.4 Dog burial- an aspect of definition and meaning

"Animal burials are typified by skeletal completeness, they are often associated with human burials of important architectural features at the site..." (Reitz & Wing, 2008, p. 121).
There is no definitive agreement on what constitutes a dog grave (Perri, 2017, p. 2). Funerals in the Mesolithic could differ from place to place, many were earthbound, and many were burned or cremated. In some graves, there were grave goods, and in others, they did not appear. Wealthy or affluent burial sites possibly indicated important people or animals or had animals that mattered to them (Morey & Jeger, 2022, p. 1).

Why were dogs buried together with humans? Perhaps they were considered family. Sometimes it is well-known in modern times (Morey & Jeger, 2022, p. 1) or as a ritual practice. It has been debated what dog burials are, and some of the traits can be defined as isolated: full articulation, no deposition, can be grouped into collective dog burial areas. Associated: one or more dogs with human interment(s), component: can be partially articulated, sometimes with other animals, beyond any collective dog burial(s). Elementary: individual skeletal element(s) in humans with human interment(s), and last, appropriate: miscellaneous deposition, apparent absence of care as in waste disposal (Morey & Jeger, 2022, p. 2). Generally, burial means being something of a symbolic act, but this has been problematic due to the diversity of remains repeatedly labelled as dog graves in an archaeological context (Morey & Jeger, 2022, p. 1). Morey proposes here that what can be defined as a "real" dog burial should contain "isolated deposition," such cases consist of the complete or mostly complete articulated skeleton of a dog deliberately placed in a prepared facility. This consists of an element of care and attention often seen in human funerals (Morey & Jeger, 2022, p. 1). The animals buried in a burial context can

be interpreted as both ritual processes and as shamanic elements in pre-Christian religious practice (Mansrud, 2004, p. 32). In Scandinavia, the dog appeared at sites already at the end of the Pleistocene (Price, 2015, p. 22) and therefore was a part of several Mesolithic settlements later on (Price, 2015, p. 65). At Vistehulen, there are no complete skeletons for the most part, except for a whole marten skeleton lying with its head facing the cave opening (roughly in the middle of the shell-bearing layer I-G) (Lund, 1951, p. 16). Lund depicts this individual to have been struck in the head when marks on the head are the only injuries that this skeleton shows, presumably indicating an extraction of the brain (Lund, 1951, p. 64). There is, however, no evidence from Vistehulen that dog skeleton has been complete and positioned like this, and it is uncertain if the remains of the marten are a result of a ritualistic or an act of preferential treatment by the humans. There can only be made interpretations of this, but it could indicate a ritualistic act on this individual based on this find. So, we know that there are, in fact, complete skeletons from the cave that could or could not have had a symbolic meaning by the way it was positioned and intact, but this element is uncertain, and it could clearly indicate higher-meaning actions that could also have included dogs.

6.4.1 Bonn-Oberkassen, Germany

The dog remains from Bonn-Oberkassel was discovered in a quarry in 1914 as bones belonging to one individual apparently representing a complete skeleton originally (Morey & jeger, 2022, p. 2). Several bones were lost due to the collection methods at the time, as well as the destruction of the tomb even before it was recognized as an important burial site. It consisted of a double grave of a man aged 35-50 years and a woman in her mid-20s. The analysis of the dog consisted of a single mandible fragment and was determined morphologically as a dog (Morey & Jeger, 2022, p. 2). This dog did not grow very old as it died from unknown factors. The estimated age was around 27 weeks (six and a half to seven months of age). However, systematic analysis of pathological indicators showed that the animal apparently spent a significant part of its short life afflicted with a disease, most likely canine distemper (Morey & Jeger, 2022, p. 3, Janssen et al. 2018, 134). Later, this has somehow been interpreted as ritualistic as the dog could have had a "supernatural role". We can only speculate how it died. The disease could indicate that the dog needed care and attention from humans, and perhaps this was the reason for the burial itself (Morey & Jeger, 2022, p. 3). If the dog was killed on purpose, there might be different aspects for this reason. The disease was most likely painful in one way or another, and as a result of which, he was relieved from this pain (Morey, 2022, p. 3). This young individual depicts an early affectionate relationship between humans and dogs since the only possible way

for this dog to survive depended on humans to care for him. By the humans carrying for him means that he was not viewed as a resource in the settlement and could only suggest an emotional bond to this animal individual and therefore represents one of the earliest known cases of purely emotional-driven human-dog interaction (Janssens et al. 2018, p. 14).

6.4.2 Skateholm, Sweden

Skateholm consists of three densely distributed Mesolithic settlements in coastal southern Sweden, beginning from 8000 BP (Morey & Jeger, 2022, p. 4). Where to is of the greatest concern regarding dog finds, Skateholm I (7,200-6,800 BP) and Skateholm II (7,600-7,400 BP). Each is associated with its own cemetery area (Morey & Jeger, 2022, p. 4). The dog could have been killed just to accompany people to funerals. One burial describes a female placed in a sitting position and a dog, presumed killed and thrown into the burial pit during the fill-in process (Morey & Jeger, 2022, p. 4). Eight individual dog graves and 2-3 possible burials were discovered with humans in Skateholm I, and two individual dog burials with three human-dog burials in Skateholm II, and many were articulated (i.e. they acted as complete skeletons and had deposited grave goods) (Trømborg, 2006, p. 12-13). A dog grave was possibly of particular importance as this is perhaps the richest of them. Here, a dog was buried with a crown-deer antler along its back, three flint knives at the hip, and a relatively unique ornamented T-hammer lying on its chest. Another grave also contained a dog with flint rejection and ochre scattered around the burial site (Trømborg, 2006, p. 12-13, Conneller, 2013, p. 366). Some argue that since Skateholm I-II and Gøngehusvej (see below) had a significant population of young women, often with rich grave goods (Conneller, 2013, p. 360) (and also food waste was present in the filling of some of the graves), who could have been people who died in childbirth. And that it may be precisely this concern that lives are terminated prematurely under traumatic circumstances or in a dangerous liminal phase (referring to the rites of passage) that gained these individuals' access to these cemeteries (Conneller, 2013, p. 360). Skateholm II contained single, double and multiple graves. People who were buried extended, squatted or seated, intact or disarticulated, and could be human, dog or absent (Conneller, 2013, p. 361). The Skateholm area is considered to be a place where sacrifices occurred (Larsson, 1990, p. 285).

6.4.3 Gøngehusvej 7, Vedbæk fjord, Denmark

This place contained several infant graves, where the dead children were buried on wooden boards or boards and lowered into pits adjacent to the dwellings of people's settlements. Some of the burials had ornamented animal bones, such as teeth from deer and artefact material

(Jensen, 2013, p. 117). One grave contained a newborn infant on a wooden board. Next to him was a piece of flint knife and an axe, which potentially testified that this infant was a boy (Jensen, 2013, p. 118). Another grave contained two children, apparently boys, also buried with knives and axes. Next to it was a grave consisting of a girl with grave goods consisting of a metatarsal bone and a deer mandible – this grave, in another sense, had no knives or axes (Jensen, 2013, p. 118). Another fire pit with five people was found. There were two adults in their 20s, perhaps of different sexes, a teenager, a 5-year-old and an infant. It is uncertain where they were cremated or burned together or separately. Next to this was also a grave with a well-preserved dog skeleton, which was determined to be from a spitz-like species known from several finds in Scandinavia (Jensen, 2013, p. 118). This grave is interpreted as a "real" dog grave. The last grave on the settlement had room for an adult and a child, a woman in her 40′s (about 150 cm tall) buried with a 3-year-old child. Plenty of ochres lay strewn around the dead, and they were abundantly supplied with grave goods. In addition, the woman's torso was covered by deerskin (Jensen, 2013, p. 118). The perception of this place as a birthing hut, where pregnant individuals are secluded as they approach birth because they are seen as either polluting or powerful, is depicted in Conneller 2013 (Conneller, 2013, p. 359). Both Skateholm and Vedbækfjorden are seen as places that have a ritual significance with many different theories, which I will not go into further detail on this point (Conneller, 2013, p. 363-367). However, the dog was a common animal in Danish Mesolithic, especially in the era of Maglemosian culture (Jensen, 2013, p. 67). Later places that are somewhat distinguished in this context that are depicted as ritualistic and where ritual practice occurred are at Hedelisker, north of Aarhus, Denmark, from the Bronze Age. This place was especially brutal, with no less than 13 dogs tied to large stones. Alongside these animals were human bones and offerings (Jensen, 2013, p. 644).

The dog burial from Bonn-Oberkassel presents a burial where a dog was interpreted as a symbolic object that potentially followed the human individuals in death, indicated by a mandible, but likely a dog that has been integrated as a complete skeleton. Possible suggesting the dog as an important being to these humans, maybe also receiving preferential treatment. In the case of Skateholm there is a possible factor of the dogs being killed and accompanying humans in death for symbolic meaning and sacrifices, also being laid down with artefacts and ochre implying the ritualistic acts. Gøngehusvej also represents a site where ochre was a part of the graves, as Vistehulen indicates. Ochre and ochre residue could simply suggest ritualistic acts in Vistehulen. However, there are not many similarities between the sites mentioned and

Vistehulen regarding the burials, as we see no traces of articulated dog skeletons, only bones and fragments. There are located burned bones that are from undetermined animal species (Lund, 1951, p. 14) around the fireplaces in Vistehulen and the burial mound above the cave, and this mound find could propose potentially ritualistic events or burials. There is also the aspect that the dog remains could have been buried at different places, in their own funeral sites instead of being deposited in the settlements although there are not excavated any separate burial mounds carrying only dog remains from the area around Visehulen.

6.5 Is it possible to indicate an emotional bond between humans and dogs based on the available literature? For example, is there any indication that they received preferential treatment over other animals?

Vistehulen represents human-dog relationship that possibly cannot be clearly shown in the findings. In order to estimate this to some extent, there must have been clear signs of ritualistic acts aimed or intended at the dogs. We do not know whether it may have been the case that they were given any preferential treatment when it came to their death due to their role as a supernatural being as for instance shown in sites like Bon-Oberkassel, Skateholm and Gøngehusvej. We do not know precisely what the dog meant to humans and whether they showed this in any way at the time of death or in the aftermath of it other than *not* being a part of ritualistic actions as earlier mentioned as we do not possess a mirror into the past Mesolithic societies. There is a vast amount of time between when these individuals died until archaeologists discovered the site and began their investigations, and it is nearly impossible to make any conclusion about the questions posed here as long as we do not see the needed indicators in what is left behind in the osteological material.

However, the indications of butchering marks could on some dog bones suggest that these dogs have been eaten at some point, yet it is uncertain if the bones actually represent butchering by humans, and could as easily have been animal impact, as human, as the dog bones have not been thoroughly analysed in newer times.

6.6 When we look at the various sites, can we see a common pattern regarding dog finds?

The sites indicate several similarities concerning the detected dog bones, especially in the species characteristics. It is clearly a sign that the dominant dog type has typically been the smaller breed CFP, but some findings suggest that there have either been larger examples of

CFP or that this type represents CFI, as Lund mentions of Brinkmann's understanding of Danish Stone Age finds. It is most likely that there were different types of dogs in Scandinavia during the Mesolithic period, but that interest in investigation and understanding of these has not been relevant in previous research. Vistehulen, Skipshelleren and Kvernevikhelleren show that CFP has been prominent here, while the findings from Geitalemen and some finds from Vistehulen show that these bone examples represent larger individuals. Here it is worth noting that the comparison of the bone findings is made by today's Samoyed dogs, as these dogs bear anatomical similarities according to Brinkmann (Lund,1951).

There are no signs of intentional burials on the dogs from the four different sites as all the sites only contain dogs in the form of single bones and fragments. There are several more bones collected from Vistehulen and Skipshelleren than Kvernevikhelleren and Geitalemen suggesting that Geitalemen and Kvernevikhelleren maybe been a short-term residental place for individuals to settle in during certain periods of the year.

It is a puzzling factor that all the bones from the different sites are heavily or somewhat broken. Suggesting that ritualistic burials were not that common in Western Norway during the Mesolithic period regarding dogs as it was in other Scandinavian sites from the same time.

CHAPTER 7. MESOLITHIC NORWAY— A CONCLUSION

Dog bones can contribute to our interpretation of how humans coexisted with animals in the past, where and when they lived with dogs and the value dogs possibly had. Nevertheless, there are some limitations when it comes to understanding what the dogs meant to the people who lived so many years ago, as the evidence can be interpreted in many different ways, by various people, and we do not always have as many finds to go by in the archaeological material as we wish we had. The dog was excavated from all the sites mentioned in this thesis and at many more settlements from the Mesolithic period in Norway and Scandinavia. And they have been treated in various ways in the form of rituals and in grave contexts such as by rich grave goods as well as sparse finds.

The main focus and questions in this dissertation were to look into what we could interpret from the dog finds from the sites, and initially, I started with an interest in Vistehulen and Kvernevikhelleren as they carried bone remains from dogs and that the sites were situated fairly close to each other, with little or no knowledge of what I would be able to find in terms of evidence. I have considered the indications of burial, rituals, symbolism, stratigraphic context and the osteological material referred to in the literature for answering my questions in this thesis and following are my interpretations of these finds.

There is not a large number of dogs that coexisted with humans at the different sites, and this is quite hard to interpret why this is so, but it is not like that all the remains are preserved in the settlement contexts. When taking into account that so little from the mesolithic period in Norway is preserved, we probably do not get the complete picture of how frequent the dogs were in the Stavanger area during the Mesolithic period, or in Norway for that fact.

We can interpret human-dog relations from the different sites as stated earlier when it comes to the osteological material, traces of symbolism and ritualistic events from the settlement. However, there seem to be no indications of ritualistic actions nor ritualistic mortuary practices of the dog in the sites in conventional terms, as earlier mentioned by primary or secondary burials. Here it is important to highlight that with the exception of the ocher painting, the marten skeleton, and the human individual from Vistehulen (a boy about 14-16 years old, found in the waste layer) proposing a representation of ritualism and fully articulated skeletons that suggests that rituals related to burials have in fact taken place in Vistehulen, but not on the dog bones. Furthermore, there is no evidence or interpretation of the human individual carrying grave goods with him in his afterlife nor being accompanied by animals such as dogs from the literature. There is only his appearance in the inner part of the cave, possibly left there alone

(Bergsvik & David, 2015, p. 195). But that does not mean that the dog did not have an emotional value for the humans of the prehistoric societies anyway. I propose that maybe dogs were buried in other places than the settlement site, and therefore are absent from the excavated material from the various settlement sites from the Mesolithic period in Norway.

There is also the aspect of whether dogs have been eaten at the Viste settlement. The reports (1908,1951) do not elaborate that the marks seen on the dog bones explicitly originate from human impact based on osteological investigations. Yet it is referred to in the reports as butchering marks. However, by the absence of a complete assessment of the dog bones in newer times, it is hard to determine if these marks even represent human impact— rather than from a secondary animal feasting on the dog remains after its death. The marks could easily be from several other animals, since we do not get more specific and detailed information about the typology of the markings. In the absence of a thorough analysis of these bone marks characteristics, we can only assume that they could originate from both human and animal impact. This is a fundamental difference because by the dogs being exposed to other animals, and not humans, there is more evidence of the dog as a companion than just a practical individual Mesolithic people co-existed with, and used for practical and functional purposes.

There are also a few elements to consider regarding humans using dogs as a meat source, and that is the relatively rich fauna on the West-Norwegian coast containing various species distribution which would suggest no need for butchering dogs at the settlement unless there were times with few resources available to hunt. Another possibility is that the dog died by natural causes, and the humans ate the remains afterwards. If we assume that the humans were the source of marks on the bones, there would be a sign of tool impact on the bones themself and this is not explained in the reports from Brøgger and Lund, which is quite rare.

The dogs and dog bones bear no special traits of special treatment other than possibly not being eaten. The sparse indications of the dog being eaten suggests that these individuals were not a meal in that sense, and if they were not, that could indicate some kind of important being than other animals did and could in fact have an emotional value for the humans.

Furthermore, it is shown by this thesis that making a new and more detailed version of the dog bone's location in the excavated layers is complex and reserves assumptions and interpretations of the individual person— and, therefore, any interpretations made cannot be “correct” without first-hand knowledge of the stratigraphy. However, it is fair to say that the deviation cannot be far from accurate, and this foundation complies relatively well in its visualisation of the layers

and could therefore contribute to additional details to Lund's original drawings of Vistehulen and its stratigraphy.

I have already discussed some of the important aspects of the human-dog relationship during the Mesolithic in the thesis. However, the companionship between humans and dogs goes far beyond just practical terminology. There is an aspect of emotional meaning and value. Humans are emotional beings, and it is likely that they wanted this companionship with other beings as well, considering that past human cultures were closer to nature than we are in today's society.

I think it is inferior to attribute to the people who lived thousands of years ago the attitude that everything should be so practically justified in order for things to turn out the way they were. Archaeology often talks about which theories are the basis for the research and what should contribute to the various results. Yet, we share the same biological foundation as the humans of prehistorical times and it is likely that people felt very strongly for the dog as we do in today's society.

7.1 Extended research

Vistehulen has been described in many articles over the years, where the focus has shifted from settlement structure, artefact material, and osteological material to environmental and resource use. In this context, there is a lack of more research on dog findings in Norway from the Stone Age and how the dog affected the humans that existed several thousand years ago. From the cave it was excavated several bones and fragments from a total of four dogs, also mentioned as the CFP type but with a relatively more robust appearance, which was common in the prehistoric dog breeds (Lund, 1951, p. 61-62). Unfortunately, the research on this dog breed is little or no described in great detail, as one of my interests is of what types of dogs we had in the prehistorical context it would be interesting to have a greater understanding and knowledge of our essential canine companion.

In the research for this master's dissertation, I have reviewed the published and unpublished literature of the four sites mentioned in this paper. However, to further extend the research on dog bones from Vistehulen it would be interesting to date and analyse the dog bones themself and not only lean on written documents but hands-on research from what is left of the dog remains, without that opportunity it becomes somewhat limited and independent on what other people highlights and put into importance.

When only studying the literary material, This method thus has its weaknesses as I was not visually given the opportunity to observe the findings in their entirety nor control the given

measurements in the literature based on the size characteristics of the dog types. Here it would be interesting to see if these were of relative similarity and thus conclude whether the dogs could belong to the same species from several places since there will be presented various dog finds from both the Stone Age to the Iron Age. The importance of a comprehensive picture of the dog and humans is central here, and it is with this that I want to portray how humans coexisted with the dogs while at the same time striving to give a more clear picture of the prehistoric dog we know so little about.

When dating bones, depending on the animals you are dating there are different variations to consider that could give interesting results as for instance a further study on the canine dental markers could establish what the dogs explicitly ate at the site and possibly give rise to new questions about the dog's importance for humans in the Stone Age.

8. LIST OF LITERATURE

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9. APPENDIX

Appendix 9.1 Vistehulen: species catalogue

The animal bones are determined by Herluf Winge, Copenhagen. Fauna determination by Professor H. H. Gran. Further determination of the human skeleton was prepared by Professor G. Guldberg. The catalogue of the animal bones is based on A.W. Brøgger's accounts of Vistefunnet, "Stavanger Museum's aarbok for 1907, 18. (1908)" & Sveinung Bang-Andersen, "Svarthålå på Viste— en boplass gjennom 6000 år", published by the Museum of Archaeology in Stavanger (1983). The animal bones (total of fragments) from the table coincide with the surveys from 1907, 1939 and 1941, and are modified from Brøgger (1908) and Lund (1951), as well as fragment catalogue retrieved from the archive at the faculty of math- and natural science (accessed by Anne Karin Hufthammer) marked: Vistehulen 1939-1941 J.S 412.

Figure 32. © Kartverket. Vistehulen and surrounding areas

Species occurrence of the represented marine species (11 amount in total)

Species name	Species name (Norwegian)	Species name (latin)	Amount of fragments found
Conger	Havål	*Conger conger (Linnaeus, 1758)*	14
Cod	Torsk	*Gadus morrhua (Linné, 1758)*	1415
Pollack	Lyr	*Pollachius pollachius (Linnaeus, 1758)*	14
Haddock	Hyse, Kolje	*Melanogrammus aeglefinus (Linnaeus, 1758)*	2
Tusk	Brosme. Lund maybe determend this to be halibut	*Brosmius brosme (Ascanius, 1772) Hippoglossus hippoglossus*	3
Cuckoo wrasse	Blåstål	*Labrus mixtus (Linné, 1758)*	1
Ballan wrasse	Berggylt	*Labrus berggylta (Ascanius, 1767)*	27
Ling	Lange	*Molva molva*	59
Coalfish	Sei	*Pollachius virens*	107
Hake	Lysing	*Merluccius merluccius; (Linnaeus, 1758)*	7
Catfish	Gråsteinbit	*Anarhichas lupus; (Linnaeus, 1758)*	2
	Sum		**Ca. 1650**
	Determined		**1050**
	Species undeterminable		**3010**

	Sum fish		**4660**
	Final sum		**5810**

Species occurrence of represented bird species (36 amount in total)

Species name	Species name (Norwegian)	Species name (latin)	Amount of fragments
Eurasian teal	Krikkand	*Anas creeca (Linné, 1758)*	1
Mallard	Stokkand	*Anas platyrhynchos (Linné, 1758)*	1
Whooper swan	Sangsvane	*Cygnus cygnus (Linnaeus, 1758)*	ca. 4
Common Scoter	Svartand	*Melanitta nigra (linnaeus, 1758)*	1
Velvet scoter	Sjøorre	*Melanitta fusca (Linnaeus, 1758)*	7
Common eider	Ærfugl	*Somateria mollissima (Linnaeus, 1758)*	2
Read-breasted merganser	Siland	*Mergus serrator (Linnaeus, 1758)*	3
Bean goose	Sædgås	*Anser fabalis (Latham, 1787)*	2
Western capercaillie	Tiur (storfugl)	*Tetrao urogallus (Linné, 1758)*	8
Black-necked grebe	Svarthalsdykker	*Podicipes nigricollis (Brehm, 1831)*	1
Red-necked grebe	Gråstrupedykker	*Podicipes grisegena (Boddaert, 1783)*	4
Great crested grebe	Toppdykker	*Podicipes cristatus (Linnaeus, 1783)*	1
Black-throated loon	Storlom	*Gavia arctica (Linnaeus, 1783)*	1
Common gull	Fiskemåke	*Larus canus (Linné, 1758)*	6
European herring gull	Gråmåke	*Larus argentatus*	14

		(Pantoppidan, 1763)	
Great black-backed gull	Svartbak	*Larus marinus (Linné, 1758)*	5
Common murre	Lomvi	*Uria aalge (Pontoppidan, 1763)*	72
Razorbill	Alke	*Alca torda (Linné,1758)*	ca. 7
Great auk	Geirfugl	*Pinguins impennis (Linnaeus, 1758)*	ca. 64
Atlantic puffin	Lundefugl	*Fratercula arctica (Linnaeus, 1758)*	9
Great cormorant	Storskarv	*Phalaecrocorax carbo (Linnaeus, 1758)*	18
European shag	Toppskarv	*Phalacrocorax aristotelis (Linnaeus, 1758)*	10
Northern gannet	Havsule	*Morus bassanus (Linnaeus, 1758)*	6
White-tailed eagle	Havørn	*Haliaetus albicilla*	10
Golden eagle	Kongeørn	*Aquila chrysaetos (Linnaeus, 1758)*	1
Tawny owl	Kattugle	*Strix aluco (Linné, 1758)*	3
Snowy owl	Snøugle	*Bubo scandiacus (Linnaeus, 1758)*	1
Crow	Kråke	*Corvus cornix (Linné, 1758)*	2
Raven	Ravn	*Corvus corax, (Linné, 1758)*	2
Long-tailed duck	Havelle, Isand	*Clangula hyemalis (Linnaeus, 1758)*	2
Northern fulmar	Havhest	*Fulmarus glacialis (Linnaeus, 1758)*	3
Rough-legged buzzard	Fjellvåk	*Buteo lagopus (Pontoppidan, 1763)*	2

Northern goshawk	Hønsehauk	*Accipiter gentilis (Linnaeus, 1758)*	1
Common buzzard	Musvåk	*Bueto buteo (Linnaeus, 1758)*	1
Common starling	Stær	*Sturnus vulgaris (Linné, 1758)*	1
Blackbird	Svarttrost	*Tardus merula (Linné, 1758)*	4
	Sum determined		**Ca. 278**

Species occurrence of represented mammals (23 amount in total)

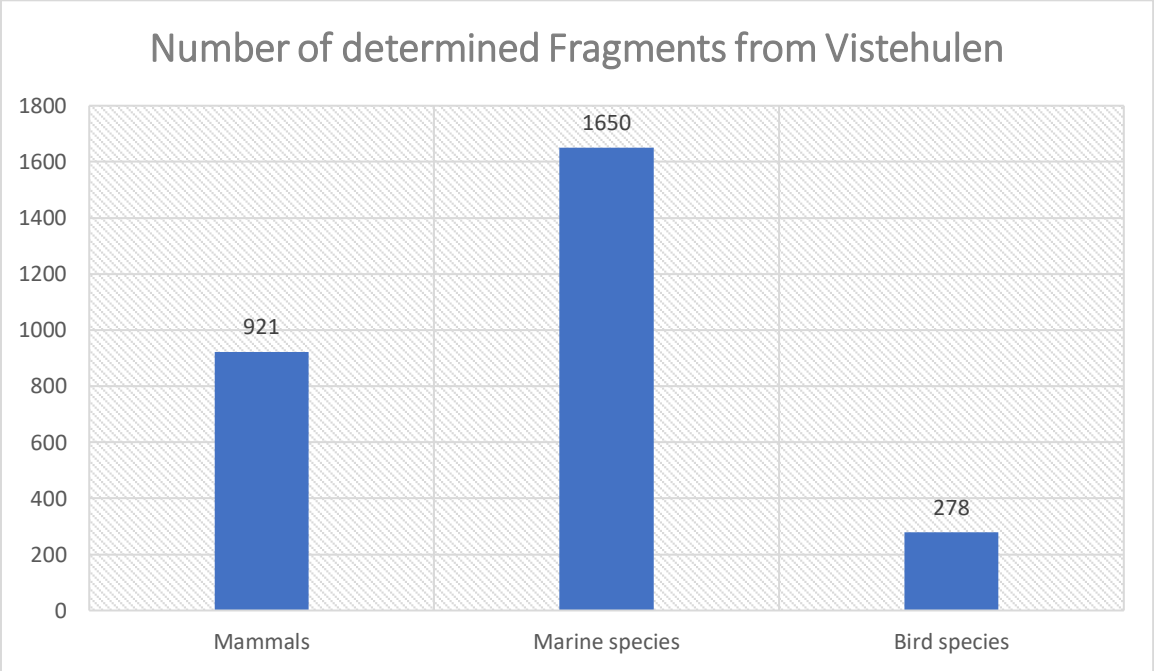
Species name	Species name (Norwegian)	Species name (latin)	Findings	Amount of fragments
Hedgehog	Pinnsvin (Piggsvin)	*Erinaceus europaeus (Linné, 1758)*	Lower jaw with a single tooth	1
European Vole	Vånd (også kalt jordrotte eller vannrotte)	*Arvicola ampihibius (Linné, 1758)*	Front tooth	1
Beaver	Bever	*Castor fiber (Linné, 1758)*	Part of: elbow bone, skinnebein	2
Squirrel	Ekorn	*Sciurus vulgaris (Linné, 1758)*	Parts of: upper and lower front teeth, skinnebein	21
Lynx	Gaupe	*Lynx lynx (Linnaeus, 1758)*	Middle hand bone (the fifth part without the lower end)	1
Fox	Rev	*Vulpes vulpes (Linnaeus, 1758)*	Parts of: lower jaw, predatory tooth and knutetann, upper arm without joint-ends, skinnebein	11
Domestic dog	Tam hund	*Canis lupus familiaris (stemmer med målene til C. familiaris palusris fra samme tid i Danmark)*	Many bones of the skeleton of a total of 4 dogs. However, there is an confusion from the 1939-1941 report on exact number of metapodials. So the number of fragments from Vistecave is possible around 70 (Sean Dexter Denham, pers.com, 17.01.2023).	47. 4, (number of fragment finds in 1907: c. 15, in 1939 and 1941: 47 (Olsen, 1976, p. 126)
Bear	Bjørn	*Ursus arctos (Linné, 1758)*	Third midfoot bone, two finger joints	30

Marten	Mår	*Martes martes (Linnaeus, 1758)*	Parts of: lower jaws, canines, coil bones, elbow bones, thigh bones, midfoot bones	41
Polecat	Ilder	*Mustela putorius (Linné, 1758)*	Left lower jaw(incomplete)	3
Otter	Oter	Lutra lutra (Linnaeus, 1758)	Parts of: lower jaws, skull, vertebra, upper arm, elbow bone, middle back bone, thigh bone, foot, midfoot bone	75
Harp seal	Grønlandssel	*Pagophilius groenlandicus (Erxleben, 1777)*	Temporal bone(complete)	4
Grey seal	Gråsel (Havert)	*Halichoerus grypus (Fabricius, 1791)*	Many bones of all parts of the skeleton, including young and old.	108
Deer	Hjort	*Cervus elaphus (Linné, 1758)*	Teeth and bones of old and young individuals, including horns	17
Moose	Elg	*Alces alces (Linnaeus, 1758)*	Considerable amount of teeth and bones of young and old individuals, including horns	91
Pig	Svin (changed by Lund from *Sus scrofa ferus)*	*Sus scrofa*	The main content. Teeth and bones in quantity, females and males, both old and young individuals.	451
Common porpoise	Nise	*Phocoena phocoena (Linnaeus, 1758)*	A pair of fractures of the face, parts of a vertebra	ca. 3
Badger	Grevling	*Meles meles (Linnaeus, 1758)*	Undefined	1
Hare	Hare	*Lepus timidus (Linné, 1758)*	Undefined	1
Horse	Hest	*Equus caballus*	Undefined	2
Cow	Ku	*Bos tourus domesticus*	Undefined	2
Cat	Villkatt	*Felis silvestris (Schreber, 1777)*	Undefined	7
Human	Menneske	*Homo sapiens*		1
	Sum determined			**Ca. 921**

Molluscs (5 amount in total)

Species name	Species name (Norwegian)	Species name (latin)	Amount	Excavated layer
Beach snail	Storstrandsnegl	*Littorina littorea*	Large parts of the layer	Cultural layer II
Albus shell	Albuskjell	*Pattela vulgata*	Large parts of the layer	Cultural layer II
Oyster shell	Østers	*Ostrea edulis*	Relatively large parts of the layer	Cultural layer II
Mussels	Blåskjell	*Mytilus edulis*	Relatively large parts of the layer	Cultural layer II
Heart mussels	Hjertemusling	*Cardium edulis*	Relatively large parts of the layer	Cultural layer II

Total amount of species found in Vistehulen ca. 75.



The diagram does not take into account the occurrence of mollusc assemblage when this is not defined in number. The overview of the determined bone fragments most likely does not represent the complete fragment occurrence of Vistehulen taking into account the excavation methods in the early 1900th as well as the removed layers from an early point during the discovery of the cave.

Osteological material from dog excavated at Vistehulen

Material	Excavation layer and stratum	Measurments
Three pieces of the mandibular branch	IV.H:3; IV.H:3. two of these mandibular appear to be cohesive.	Possible 160mm and ca. 145mm.
Three lower canines (predatory teeth)	X.H:4; XIII. I:4; VIII. L:1	18,3 x 7,3 (7,6), 19,1 x 7,0 (7,3), 19,5 x 7,3 (8,0)
One lower front tooth (incisor)	I.H: 5. Relative big size	Length 22,5mm and width 7,7mm from root to end about 8,3mm
One Canine (Predatory tooth)	XI.I:6, Small size	19mm in length, while the width measures to appr. 6,6 and 7,6mm.
Part of condyle	II. H: 3, large	
The lower edge of the lower jaw	III. F:1	
The lower part of the shoulder blade (scapula)	XI.K:6	
The upper arm (humerus)	I.H:3	Measures from the middle of side to side appr. 11mm, largest width of distal 30mm
Two lower joints of the upper arm	XI.I:3	
Elbow bone (ulna)	I.H:2, undoubtedly belonging to the upper arm (I.H:3)	
Coil bone (radius)	VIII.H:6	
Part of pelvis	IX.I-K (?), large	
Half part of a femur	IV.F:4, large	
Two lower ends of the femur	XII.M:3; XIII.H:2	
Tibia	XIII.I:2	Measured from side to side 30mm (“Samojed measures to appr. 27mm”)
The middle part of the tibia	II-I. G:3, appears to be gnawed on by dogs	
The lower part of (?)	V.F:4	
The lower part of the leg bone (fibula)	III.H:5, large	
Two heel bone (calcaneus)	I.H:2; XI.D:5	
Two astragali bone	I-II. G (?); XIV.I:2	
Several metacarpals and metatarsal bones from the following fields	II.H:4; IV.F:4; I-II. G(?); IV.H:2; IV.I:3; V.F:5; VIII.H:6; IV.H:4; XI.K:4; XI.K:4; IV.I:3; III.F:3; XIII.L:2; XI.H:1; II.F:3, XI.K:4; XI.K:4; XI.K:4 15	

Ring vortex (atlas); epistrophaeus	XII.H:2	
Cervical vertebrae	X.I:5; X.I:6	
Lumbar vertebrae	XII.H:2; IV.I:3. Large	

Appendix 9.2 Kvernevikhelleren: species catalogue

Bone remains (determined by cand. mag. Herluf Winge, København) The catalogue are reffering to Tor Helliesens, oldtidslevninger: Stavanger museums årshefte for 1900. Vol. 11. 1901. Dreyers bogtrykkeri.

Figure 33. © Kartverket. Kvernevikhelleren and surrounding areas

Species occurrence of represented marine and molluscs (4 amount in total)

Species name	Species name (Norwegian)	Species name (latin)	Amount
Oyster	Østers	*Ostreidae*	Most parts of the excavated area
Heart mussels	Hjertemusling	*Cardiidae*	Most part of the excavated area
Albus shells	Albuskjell	*Patella vulgata (Linné, 1758)*	undefined
Cod	Torsk	*Gadus morrhua (Linné, 1758)*	
Sum			**Undefined**

Species occurrence of represented bird species (3 amount in total)

Species name	Species name (Norwegian)	Species name (latin)	Amount of fragments
Great black-backed gull	Svartbak	*Larus marinus (Linné, 1758)*	1

Common murre	Lomvi	*Uria aalge (Pontoppidan, 1763)*	2, 1
Great auk	Geirfugl	*Pinguins impennis (Linnaeus, 1758)*	deler, ca 6
	Sum		**Ca. 10**

Species occurrence represented mammals (5 amount in total)

Species name	Species name (Norwegian)	Species name (latin)	Amount of fragments
Domestic dog	Tam hund	*Canis lupus familiaris (muligens Canis familiaris palustris)*	1
Otter	Oter	*Lutra lutra (Linnaeus, 1758)*	1
Grey seal	Gråsel (Havert)	*Halichoerus grypus (Fabricius, 1791)*	1
Deer	Hjort	*Cervus elaphus (Linné, 1758)*	2
Human	Menneske	*Homo sapiens (Linné, 1758)*	deler
	Sum		**Ca. 5**

Appendix 9.3. Skipshelleren: species catalogue

[Skipshelleren : osteologisk materiale - Nasjonalbiblioteket (nb.no)]

The catalogue refferes to Haakon Olsens accounts on Skipshelleren, osteologisk materiale, zoologisk museum. 1976.

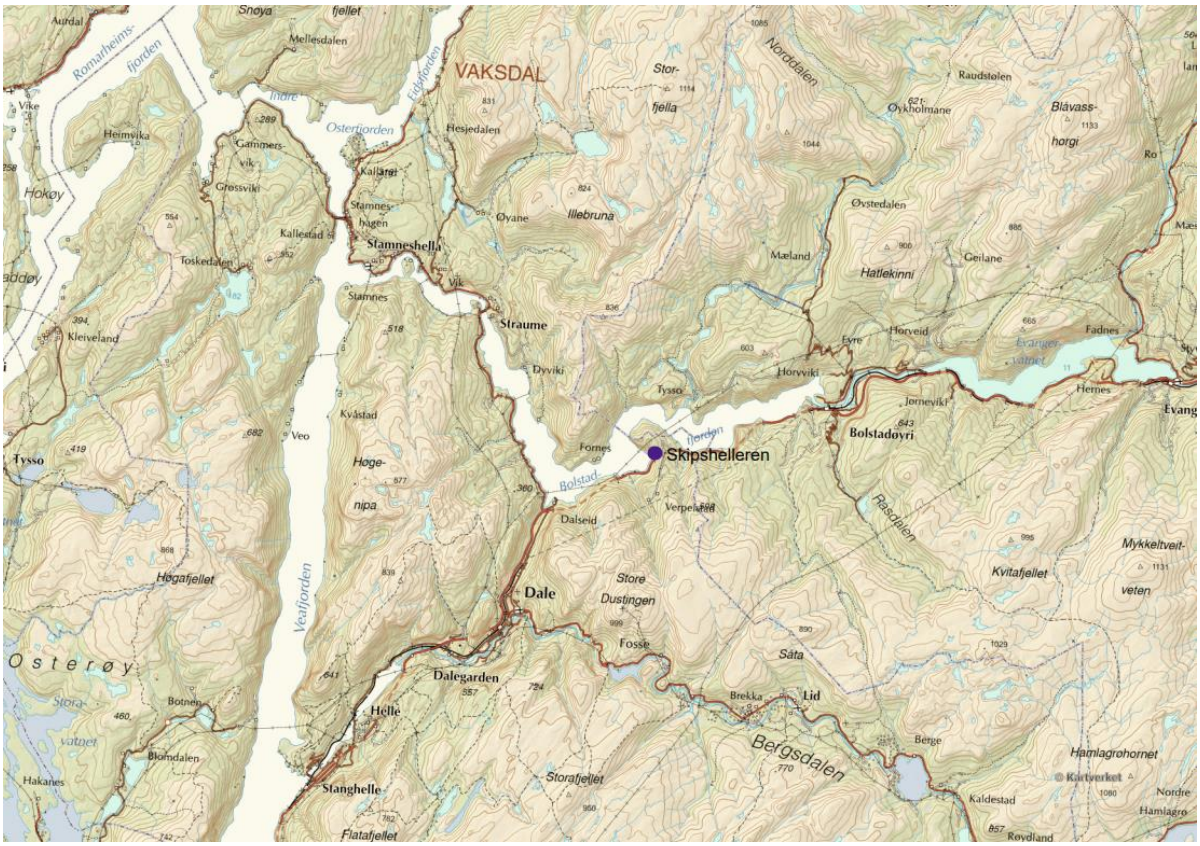


Figure 34. © Kartverket. Overview of Skipshelleren and nearby areas, Vaksdal municipality

Species occurrence of represented marine species (23 amount in total)

Species name	Species name (Norwegian)	Species name (latin)	Amount of fragments
Coalfish	Sei	*Pollachius virens (Linnaeus, 1758)*	5235
Cod	Torsk	*Gadus morhua (Linné, 1758)*	2796
Pollack	Lyr	*Pollachius pollachius (Linnaeus, 1758)*	1171
Ling	Lange	*Molva molva (Linnaeus, 1758)*	722
Haddock	Hyse	*Melanogrammus aeglefinus (Linnaeus, 1758)*	238
Tusk	Brosme	*Brosme brosme (Ascanius, 1772)*	58
Hake	Lysing	*Merluccius merluccius (Linnaeus, 1758)*	10

Blueling	Blålange	*Molva dypterygia (Pennant, 1784)*	1
Whiting	Hvitting	*Merlangius merlangus (Linnaeus, 1758)*	1
Tadpole fish	Paddetorsk	*Raniceps raninus (Linnaeus, 1758)*	1
Roundnose grenadier	Skolest	*Coryphaenoides rupestris (Gunnerus, (1765)*	1
Mackerel	Makrell	*Scomber scombrus (Linné, 1758)*	31
Northern bluefin tuna	Makrellstørje	*Thunnus thynnus (Linnaeusm 1758)*	6
Atlantic halibut	Kveite	*Hippoglossus hippoglossus (Linnaeus, 1758)*	1
Plaice	Rødspette	*Pleuronectes platessa (Linné, 1758)*	5
Flounder	Skrubbe	*Platichthys flesus (Linnaeus, 1758)*	3
Megrim	Glassvar	*Lepidorhombus whiffiagonis (Walbaum, 1792)*	1
Eel	Ål	*Anguilla anguilla (Linnaeus, 1758)*	1
Atlantic salmon and Trout	Laks og Ørret	*Salmo salar (Linné, 1758), Salmo trutta (Linné, 1758)*	296
Catfish	Gråsteinbit	*Anarhichas lupus (Linné, 1758)*	1
Cuckoo Wrasse	Blåstål	*Labrus mixtus (Linné, 1758)*	4
Spurdog	Pigghå	*Squalus acanthias (Linné, 1758)*	50
	Sum		**10,633**

Species occurrence of represented bird species (48 amount in total)

Species name	Species name (Norwegian)	Species name (latin)	Amount of fragments
Western Capercaillie	Storfugl	*Tetrao urogallus (Linné, 1758)*	27
Black grouse	Orrfugl	*Lyrurus tetrix (Linnaeus, 1758)*	17
Willow ptarmigan	Lirype	*Lagopus lagopus (Linnaeus, 1758)*	14

Rock ptarmigan	Fjellrype	*Lagopus muta (Montin, 1781)*	6
Read-breasted merganser	Siland	*Mergus serrator (Linné, 1758)*	34
Common merganser	Laksand	*Mergus merganser (Linné, 1758)*	6
Smew	Lappfiskand	*Mergallus albellus (Linnaeus, 1758)*	1
Mallard	Stokkand	*Anas platyrhynchos (Linné, 1758)*	6
Eurasian teal	Krikkand	*Anas crecca (Linné, 1758)*	7
Northern shoveler	Skjeand	*Spatula clypeata (Linnaeus, 1758)*	1
Greater scaup	Bergand	*Aythya marila (Linnaeus, 1758)*	1
Common goldeneye	Kvinand	*Bucephala clangula (Linnaeus, 1758)*	6
Long-tailed duck	Havelle	*Clangula hyemalis (Linnaeus, 1758)*	5
Velvet scoter	Sjøorre	*Melanitta fusca (Linnaeus, 1758)*	3
Common scoter	Svartand	*Melanitta nigra (Linnaeus, 1758)*	11
Common shelduck	Gravand	*Tadorna tadorna (Linnaeus, 1758)*	1
Greylag goose	Grågås	*Anser anser (Linnaeus, 1758)*	3
Bean goose	Sædgås	*Anser fabalis (Latham, 1787)*	1
Whooper swan	Sangsvane	*Cygnus cygnus (Linnaeus, 1758)*	1
European herring gull	Gråmåke	*Larus argentatus (Pontoppidan, 1763)*	2
Great black-backed gull	Svartbak	*Larus marinus (Linné, 1758)*	1
Common gull	Fiskemåke	*Larus canus (Linné, 1758)*	1
Iceland gull	Grønlandsmåke	*Larus glaucoides (meyer, 1822)*	1
Razorbill	Alke	*Alca torda (Linné, 1758)*	1
European shag	Toppskarv	*Phalacrocorax aristotelis (Linnaeus, 1758)*	1

Great cormorant	Storskarv	*Phalacrocorax carbo (Linnaeus, 1758)*	6
Black-throated loon	Storlom	*Gavia arctica (Linnaeus, 1758)*	2
Red-throated loon	Smålom	*Gavia stellata (Pontoppidan, 1763)*	2
Common wood pigeon	Ringdue	*Columba palumbus (Linné, 1758)*	6
Eurasian curlew	Storspove	*Numenius arquata (Linnaeus, 1758)*	1
European golden plover	Heilo	*Pluvialis apricaria (Linnaeus, 1758)*	1
White-backed woodpecker	Hvitryggspett	*Dendrocopos leucotos (Bechstein, 1802)*	1
Great spotted woodpecker	Flaggspett	*Dendrocopos major (Linnaeus, 1758)*	1
Common cuckoo	Gjøk	*Cuculus canorus (Linné, 1758)*	2
Corn crake	Åkerrikse	*Crex crex (Linnaeus, 1758)*	1
Crow	Kråke	*Corvus cornix (Linné, 1758)*	1
White-tailed eagle	Havørn	*Haliaeetus albicilla (Linnaeus, 1758)*	2
Rough-legged buzzard	Fjellvåk	*Buteo lagopus (Pontoppidan, 1763)*	1
Eurasian sparrowhawk	Spurvehauk	*Accipiter nisus (Linnaeus, 1758)*	1
Merlin	Dvergfalk	*Falco columbarius (Linné, 1758)*	3
Tawny owl	Kattugle	*Strix aluco (Linné, 1758)*	1
Black guillemot	Teist	*Cepphus grylle (Linnaeus, 1758)*	1
Common murre	Lomvi	*Uria aalge (Pontoppidan, 1763)*	2
Great auk	Geirfugl	*Pinguinus impennis (Linnaeus, 1758)*	1
Fieldfare	Gråtrost	*Turdus pilaris (Linné, 1758)*	5
Blackbird	Svarttrost	*Turdus merula (Linné, 1758)*	5

Redwing	Rødvingetrost	*Turdus iliacus (Linné, 1758)*	3
Song thrush	Måltrost	*Turdus philomelos (Brehm, 1831)*	4
	Sum		**211**

Species occurrence of represented mammals (23 amount in total)

Species name	Species name (Norwegian)	Species name (latin)	Amount of fragments
Reindeer	Rein	*Rangifer tarandus (Linnaeus, 1758)*	3
Moose	Elg	*Alces alces (Linnaeus, 1758)*	176
Wolf	Ulv	*Canis lupus (Linné, 1758)*	8
Domestic dog	Tam hund	*Canis lupus familiaris*	20 (2 fragmenter knyttes det usikkerhet rundt hvilke lag disse tilhører)
Fox	Rev	*Vulpes vulpes Linnaeus, 1758)*	1
Lynx	Gaupe	*Lynx lynx (Linnaeus, 1758)*	5
Bear	Bjørn	*Ursus arctos (Linné, 1758)*	321
Otter	Oter	*Lutra lutra (Linnaeus, 1758)*	275
Marten	Mår	*Martes martes (Linnaeus, 1758)*	162
Weasel/Ermine/Stoat	Røyskatt	*Mustela erminea (Linné, 1758)*	3
Snow weasel	Snømus	*Mustela nivalis (Linné, 1758)*	1
Beaver	Bever	*Castor fiber (Linné, 1758)*	17
Hare	Hare	*Lepus timidus (Linné, 1758)*	33
Squirrel	Ekorn	*Sciurus vulgaris (Linné, 1758)*	29
Field mouse	Småskogmus	*Apodemus sylvaticus (Linnaeus, 1758)*	3
European vole	Vånd (også kalt jordrotte eller vannrotte)	*Arvicola amphibius (Linnaeus, 1758)*	3
White-sided dolphin	Kvitskjeving	*Lagenorhynchus acutus (Gray, 1828)*	3

Deer	Hjort	*Cervus elaphus (linné, 1758)*	8707
Cattle	Storfe	*Bos taurus*	304
Sheep or Goat	Sau evt. geit	*Ovis aries, Capra hircus*	922
Horse	Hest	*Equus caballus*	18
Pig	Svin	*Sus scrofa domesticus*	745
Harbour seal	Fjordsel (steinkobbe)	*Phoca vitulina (Linné, 1758)*	1298
	Sum		**13,057**

Appendix 9.4. Gjeitalemen: species catalogue.

Species occurrence of represented mammals, birds and marine species (8 amount in total). The table is refering to Bjørn Hougen (1923) Bergens museums aarbok (1920-21), avhandlinger og aarsberetning, p. 10.

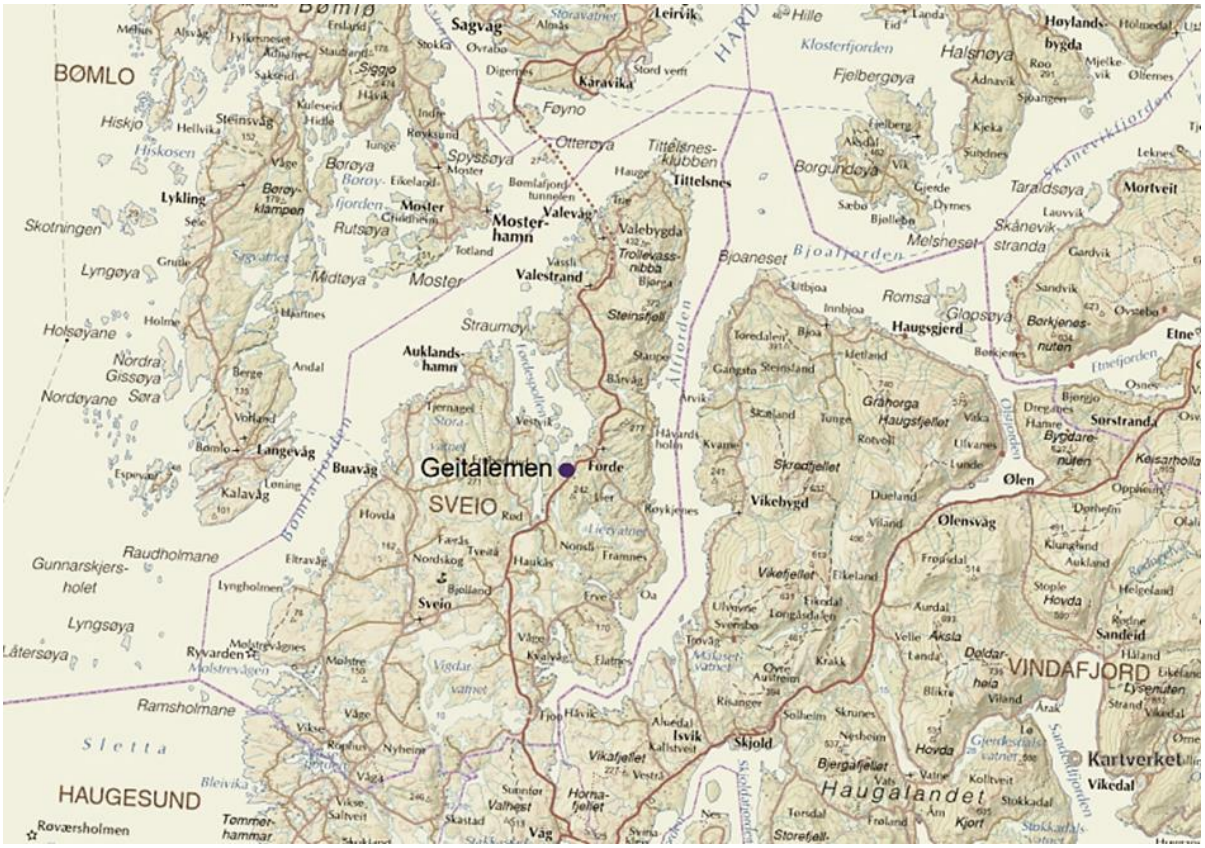


Figure 35. © Kartverket. Geitalemen and surrounding areas

Species occurrence of mammals, marine and birds (8 amount in total)

Artsnavn	Artsnavn (latin)	Funn	Antall i fragmenter	remarks
Deer	*Cervus elaphus (Linné, 1758)*	Mandible, teeth, radius, ulna, tibia, metatarsals, carpale, centrotarsale, phalanges, scapula	17+ several small fragments	
Sheep		Metacarpals, metatarsals, phalanges, teeth	5	
Pig	*Sus scrofa*	Tooth,	1	Hougen states that the tooth resembles one of a wild boar, but reject this when thinking this animal did not

				exist in the Norwegian fauna at that time.
Domestic Dog		Tooth	1	
Otter	*Lutra lutra*	Radius	1	
Beaver	*Castor fiber*	Ulna	1	
Birds (undetermined species)			2	2 small fragments
Fish (undetermined species)			½	½ middle size vortex
Sum			Ca. 28 ½	

Hougen remarks that the osteological material from this site were more heavily fragmented than other Stone Age settlements in Norway, and from the species assemblage listet above there is possible underrepresented individuals.

Molluscs (5 amount in total)

Molluscs			Ca. 3500	
Beach snail			Ca. 1000	
Oysterhells and Albus shells			Undefined	
Cockle			40	E8
Mussels			Heavily dissolved supplement- only one or two could be gathered.	
Sum			Ca. 4542	

Table of amount of fragments found in the various sites

Lokalitet	Marine	Birds	Mammals	Amount:
Skipshelleren	10.633	211	13.057	23,901
Vistehulen	1650	278	921	2,849
Kvernevikhelleren	Most of the occurrences of the site are undefined amounts.	10	5	15+
Geitalemen	Ca. 4542	2	28	4,572