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The megaliths of Bohuslän in a south Scandinavian context

Dolmen Lyse 165 in Bohuslän and dolmen at Stenvad Jutland (photo author)

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1 Abstract

The transformation from a hunter/gatherer population to a farming society in southern Scandinavia is a process of only 300-400 years, primarily from around 4000 BC to around 3700 BC. Farming is then established in most of southern Scandinavia.

In Denmark and Scania there is a continuous development of grave monuments starting from flat graves and peaking with very large passage graves. The primary steps are plank cists, changing to stone cists, followed by different versions of dolmens and then the passage grave. Another important construction is the early type of enclosure, used for special events at long intervals. In Bohuslän and Falbygden the initial types of graves and the enclosures are not present, or maybe not yet found.

There are close to one hundred megaliths along the west coast of Sweden, with a high concentration to the islands Orust and Tjörn together with the area north of Orust. 29 megaliths are on Orust. There are in total 33 identified passage graves and 50 dolmens, a few are undefined.

The architecture of dolmens and passage graves is principally the same all-over southern Scandinavia, but the appearance is quite different due to the local availability of stones. In Denmark and Scania, the megaliths are built of stones left by the ice age, mainly rounded stones. In Bohuslän the material is flat stones from the cliff sides, split by the ice age and in Falbygden the material is primarily sedimentary stone slabs.

The essay discusses the relation between the megaliths in Bohuslän and the other areas, especially Jutland. It has been stated from the early archaeologists to the recent, that Bohuslän is related to Jutland, the so-called Kattegat connection. It is argued that the empirical evidence for a stronger relation between Bohuslän and Jutland compared to the other areas is weak. There are some artefacts and some architectural designs which may be influenced from Jutland, but it seems that the influence could have come from other areas as well.

The view of the time sequence of dolmens and passage graves differ between Denmark and Sweden. In Denmark the archaeologists describe a sequence of dolmens followed by a sequence of passage graves, with an overlap of the later dolmens and the early passage graves. In Sweden the view is that dolmens and passage graves were built mostly during the same period, with the dolmens starting slightly earlier. This discrepancy is explored using the most reliable C14 data which has been presented for dolmens and passage graves in Denmark and Sweden. The data is limited and consequently the conclusions have uncertainties. A complication in analysing C14 data for the megalith period is that there is a plateau in the calibration curve during the most important period, giving an almost 300 years uncertainty. An analysis of the data shows that the dolmens are built during this plateau phase and some of them with a probability that it was before this period. No dolmen seems to be built after the plateau. For the passage graves it is the other way around. Passage graves are built during the plateau, some are built after and none before. It is argued that this implies that the dolmens in southern Scandinavia primarily are built before the passage graves with an undefined overlap in the plateau period.

Keywords: Neolithic, southern Scandinavia, dolmen, passage grave, C14, Bohuslän

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2 Preface

My interest in megaliths started some years ago when I began to spend my summers on Orust. During my Archaeological studies I have written several short essays about the megaliths on Orust and Bohuslän. This work is an attempt to expand the scope of my previous work and compare Bohuslän to the other megalith regions in southern Scandinavia, especially Jutland. I have tried to cover research from both old and new sources and combine the results. Some of the older material can be disregarded since the conclusions have been proven wrong, but there are also many older papers and books which give valuable information. And there are some very beautiful books with hand-coloured drawings. Later research, especially C14 data is central in the understanding of the building periods. C14 results are complicated, firstly because it is often difficult to know what is measured and secondly evaluating the calibrated data is a complex process. I have tried to understand what the data actually tell us. The method used to build a development sequence before C14 was pottery styles and ornamentation. The two methods are complementary and should be used together.

Even if this essay is now completed, it leads to new questions, which I would like to handle in later work.

I would like to thank Dr Bettina Schulz Paulsson for valuable comments and interesting discussions.

3 Introduktion

The aim of the thesis is to try to set the megaliths in Bohuslän in a time frame and a geographical context.

The megalithic graves in Bohuslän are in several aspects different from the two other major groups in Sweden: Scania and Falbygden. In Bohuslän there are for example more dolmens in relation to passage graves compared to the other areas (Falbygden has very few dolmens) and the passage graves are smaller (Sjögren 2011). The availability and "formation" of stones is different. The general agreement among researchers has for a long time been that the megalith tradition in Bohuslän is related to eastern Jutland, in the so-called Kattegat group. The other two larger areas in Sweden are seen as related to eastern Denmark (for example Sjögren 2003, Bagge 1934, Frödin 1913). The megaliths in Sweden outside the west coast are primarily in limestone (sediment) areas.

There are indications for a relation between Jutland and the Swedish west coast. The conclusions are primarily based on early research on pottery and the rather short distance across Kattegat (Bagge 1934). The argumentation, presented by several researchers, for the conclusion that the megalith tradition came to Bohuslän primarily from Jutland is presented in the research history and discussed further in the Kattegat chapter.

The focus of this thesis has been to collect all available information on the megaliths in Bohuslän, from the late 19th century to the most recent research, and relate to the other areas, primarily Jutland. Research from Denmark and Bohuslän is combined to try to find new relations. This includes new scientific data (C14, pXRF, DNA when available). The data of this type from Bohuslän is highly limited, but data and conclusions from other areas can be used to form a general understanding of the period. It is reasonable to expect that Bohuslän follows the general trends from the area(s) were there are contacts. The intention is to try to either strengthen the Kattegat theory by finding new indications or conclude that the combined data do not give specific support for a strong relation. It is important to note that even if the indications of relations across Kattegat are weak, there may still have been rather frequent relations. It may be difficult to distinguish these relations from the general development in the Funnel beaker culture (or TRB culture from the German word TRichterBecher).

The present understanding of the building sequence of dolmens and passage graves differ in Denmark (Jutland) and Sweden (Gebauer 2020:217). In Denmark there is a detailed chronological sequence of megalith constructions (partly overlapping) where different types of dolmens are mainly built before the passage graves. It is based on C14 data and studies of ceramics and tools. Some of the C14 results are from birch bark in the constructions. (Ebbesen 2011, Dehn&Hansen 2012). This sequence presented by Danish researchers will be discussed. In Sweden, the conclusion is that dolmens and passage graves are built in parallel, where dolmens may have started slightly earlier (Sjögren 2011b, Blank et al. 2020). This is based on C14 data from several megaliths in Falbygden, Östergötland, Scania, Öland and Gotland. Blank et al. (2020) is the most recent presentation of available, and critically analysed, C14 data.

Due to different soil types in Bohuslän, compared to Scania and Falbygden, there is only one C14 dating from a passage grave in Bohuslän and none from the dolmens. It is thus presently not possible to make an absolute dating of the dolmens and passage graves in Bohuslän.

Anticipating that there is a Kattegat group and that the farmers maybe also originally came to Bohuslän from Jutland, this could mean that there was connections between the two areas (maybe even kinship). Bohuslän and Jutland should then reasonably well follow each other in the sequential development of the megalith designs. The two areas are geographically quite different and the stone material to be used is of different nature. Consequently, the designs will not be exact, and there will be local inventions, but the overall design would have much in common. Given this close relation, it may

be possible to follow the sequence of a parallel development in the two areas. The challenge is to find these similarities separated from the general trends.

4 Research question:

Can influences from Jutland be identified and used to make it credible that Bohuslän and Jutland have a common development process during the megalithic grave period?

Is Bohuslän following the same timeframe?

How do these two areas relate to other areas in the northern TRB culture?

4.1 Limitations

Ideally, the same collection and analysis of research regarding the megaliths should have been carried out for all regions that possibly could have influenced Bohuslän, including Falbygden and Scania. This work must be limited to detailed investigations of Bohuslän and comparing to primarily Jutland and Denmark. The other areas are only briefly described to give a more complete picture and, in some cases, to substantiate the conclusions.

Monuments and artefacts are discussed, not the societies that built them and the rituals involved.

All available and reliable C14 data for southern Scandinavia is used. This is important to place Bohuslän in a context, especially since only one C14 date is available for Bohuslän. There are more C14 data, but since they are not published, they are not included.

Due to the closure of the Göteborgs stadsmuseum archive and the fact that it will remain closed for 3 more years, it has not been possible to access the diaries and other documents that could have given a more detailed insight into the early excavations.

Another obvious limitation is that no excavations or lab analysis of artefacts could be included.

5 Theoretical framework

Our knowledge of the megaliths in Bohuslän, as well as the other major megalith areas, consists of a wide spectrum of (very) incomplete data. This is a basic fact which influences both theories and methodologies to be used. Statistical methods, as an example, are often problematic to use due to too limited data.

Using specific groups of artefacts or scientific data, for example architecture, typology of pottery or C14 to draw conclusions on relations between areas and the building sequences of the megaliths will not be enough to understand the development. To be able to use the different incomplete datasets it is important to view them as an interdependent group of subsets, often referred to as the theory of assemblages (Fowler 2013, Lucas 2017). The term assemblage has been used differently over the years. It was originally used for objects made of the same material (for example pottery) or a group of objects with topological or stylistic similarities. The theory of assemblages has developed into a more holistic theory where an assemblage may be a chronological phase, a cave or as in this case a megalithic grave (or several graves) (Hamilakis and Jones 2017).

Each dataset tells us something about the grave and can also say something about possible relations to graves in the vicinity and other areas. A dataset, for example pottery and the theory of typology and seriation gives one basis for conclusions. Construction methods of the grave and for example position in the landscape adds more information on relations between areas, which may either strengthen or contradict the first conclusion. C14 dating and other natural science methods, where available, are important (and to a higher degree objective) sources of information. All these entities and their interrelations are parts of the assemblage. The regions will be compared at an assemblage level.

Construction methods, often related to as the Chaîne opératoire theory (Delage 2017, referring to Leroi- Gourhan), is an important tool in this thesis. The megaliths are built according to certain principles, and these changed over time. The principles relate both to functionality (for example open or closed) and technology. To build a structure that stands for thousands of years requires well developed techniques and skills, it must have been a learning process. Are there specific methods to construct the megalith that can be identified and compared between graves and regions, and that maybe also have changed over time? Below, in the methodology chapter, are some examples of possible Chaîne opératoire techniques that may be used to understand relations between areas.

Individual details must be studied, but the overall construction, the architecture, is equally important. Given the differences in geography and available material, the constructions will be different, even if the purpose is to make a similar construction. It is like the Plato "ideal forms" theory. The megalith builders have an image (which differs in time) of what to build, but must use available material and topology, as well as other resources, for example manpower. The result will be different, but it is one possible implementation of the "ideal form".

Imagine a farmer, maybe an immigrant, coming to visit Orust from Jutland. He describes a new type of grave, what we today would call a dolmen. He describes the orthostats and the capstone, and mound and maybe kerbstones. He describes a general model of a dolmen, not a drawing, but an ideal construction. He also adds the most important part, something we cannot see and most probably will never understand, and that is the reason why the construction must be like this, the purpose and the rites related to the grave. The farmers on Orust are convinced that they must build graves according to the new rites. They use their own material and construction methods, maybe with some help or strong influence from people from another region. The dolmens on Orust will fulfil the requirements of the "ideal form", but they will be influenced by some regional construction ideas, and they are locally adapted to the available stones and maybe local construction inventions.

An important source of information are the many documents from early excavations, describing the megaliths. A corner stone in the theory of text analysis is the hermeneutic circle, or rather spiral. It is a fruitful way of thinking, we need to move from details to the holistic view and back again, in a learning process. This way of thinking is related to iteration, to step by step use new insights to reach a better understanding. By reading texts from earlier periods with the knowledge we have today, it may be possible to find new "data" in the old texts.

Finally, it is important to keep in mind that individual expressions in a construction, position etc, that we today may perceive as rites or general practises, may simply have been implemented for practical reasons or by coincidence.

6 Methodology

The above presented theoretical background is used as a guideline for the methodology or in this case methodologies to be used in the analysis of available data. The research question is complex, and several methodological approaches are necessary. A methodology may also be used to understand which "missing" data would help the most in improving the results. This can then be used to search for more data (focus on specific items) or to propose new projects and excavations.

Several graves have been excavated in the late 19th and early 20th century. By analysing the texts of reports, diaries, and letters, it may be possible to find new information. Drawings, diagrams, site plans etc may reveal information to archaeologist of today, given new knowledge about certain artefacts or relations. An important example is Arvid Enqvist who wrote a detailed diary during the excavations on Orust and Tjörn (unfortunately not available as a source for this work due to the closure of the museum). An example could be birch bark between the slabs of the dry-stone walling. Archaeologists

were, at the time, not aware of the technique to put birch bark or chalk mass (less probable in Bohuslän) between the slabs as a design element, sealing or possibly as chock absorbent and may therefore not discuss that. But they are discussing the slabs of the dry-stone walls and maybe there is a note on something they found between the slabs.

Several specific construction methods are described in Danish literature (Hansen 1993, Eriksen 2016, Dehn 2000). A few examples which may be used as examples of possible indications of connections between areas are:

- The technique to use split stones and insert them symmetrically in the grave has been used in some graves in Denmark. Can this or similar signs of symmetry be found in other regions, and is it used during specific periods?
- Keep the passage graves dry was important and different methods were used to achieve this in Denmark. There is an interesting example of an unusual similarity in the building process in the Birkehöj passage grave on western Jutland and the Örenäs passage grave in Scania. They both use pebbles as outside filling material instead of crushed flint, which is the normal filling in these areas (Dehn 2015:1063). This is only one case and may be a coincidence. Are there other specific techniques which may show relations?
- The keystone (a stone between the passage and the chamber to distribute the wight of the cap stone) is in many passage graves in Denmark an important building technique to improve the stability of the construction. How has this been handled in Bohuslän?

Some graves in Denmark use very similar techniques also in details. It has been suggested that they were built by professional builders (Dehn 2000:215). Are there graves in Bohuslän which have similarities in detail, also showing that they were built by the same constructor?

In some long barrows in Denmark, the excavations have revealed a building sequence of the included burials. This is an important method to the understanding of the development sequence for megalith architecture. There are a few long dolmens in Bohuslän which may reveal new information when studied in the light of the Danish excavations.

Research from later or partly parallel cultures can support findings from the studied period, especially the Pitted Ware culture (PWC), which has been studied recently (Klassen 2020).

Even though there is only one megalith with C14 data in Bohuslän, studies of other areas must be used as a framework for conclusions on Bohuslän. The use of C14 data to draw conclusions on the year of construction is complicated both from the reliability of the sample as well as the interpretation of the result. The C14 method is discussed and applied to compare the regions.

A method to possibly identify development of new grave architectures is that graves are often built in pairs or in local groups. This may indicate a general development sequence and thereby also show a time sequence of new megalith architectures.

Finally, personal visits to more than half of the megaliths in Bohuslän and several of the most impressive megaliths on Jutland has given a better understanding of the constructions.

7 Research history

7.1 The Swedish west coast

The impressive megalith constructions in Bohuslän, as in other places, have attracted attention for thousands of years. People have discussed what they are and for what purpose they were built. From later centuries there are written descriptions and explanations, the first are rather fanciful. In Bohuslän the term “altare” (altar) is used for the dolmens, and the idea was that they were used for offerings in

the pre-historic era. It was thought giants had built them and used them as sacrificial altars. In Danish the term “jättestue”, the giants house, is still used.

The priest Johan Oedman (1682-1749) was the earliest author to describe some of the megaliths in Bohuslän. He had no real understanding of what they were or when they were built. He believed that heathens had used them as altars (Oedman 1746:244). Emanuel Holmberg was another priest who wrote about the megaliths during the mid-19th century. He describes a few of the megaliths in some detail and, of special importance, the megalith Bokenäs 24, which has since been destroyed (Holmberg 1843).

Archaeological excavations and reporting started in large scale in the second half of the 19thcentury. Sweden was becoming an industrialised country with higher standard of living. There was an increased interest in the history of Sweden, fuelled by a nationalistic mode. Ekhoff led a project to describe all the prehistoric monuments, settlements, and prehistoric findings in Bohuslän. It was a huge task which took decades. Emil Ekhoff wrote several chapters in “Bidrag till kännedom om Göteborg och Bohusläns historia”, where most of the megaliths are described (Ekhoff 1879, 1884, 1887). Several of his colleagues, for example Gabriel Gustafson, Otto Frödin and Gustaf Hallström also contributed. They sometimes also described how they restored them. It was normal to “rebuild” according to the ideas they had on dolmen and passage grave architecture (Gustafson 1888). During this extensive campaign all megaliths were registered on a map, and they were either described shortly or excavated (partly or completely). Ekhoff reported Svenneby 137, Valla 27, Valla 50, Stenkyrka 222. Frödin reported Skee 173, Lur 43 and Tanum 579. Gustafson reported Tossene 210, Bokenäs 43 and Bokenäs 77. The focus of theses excavations were artefacts of the chamber, the passage, and the area in front of the passage. There was no special interest in the mound or construction details.

Oscar Montelius, arguably still the most well-known of all Swedish Archaeologists, included Bohuslän in his work “Orienten och Europa”. He argues that the megalith tradition emanated in the middle east, then spread through the Mediterranean and following the Atlantic coast finally reached Scandinavia. At that time and for many years, it was debated whether the megalith tradition came from one origin or started in several places (Montelius 1905). He was partly right, but the starting point was much closer, in northwestern France (Schulz Paulsson 2010,2017,2019).

The excavations in Bohuslän continued in the beginning of the 20th century. Vilhelm Ekman together with Arvid Enqvist described all the megaliths on Orust and Tjörn, where a large part of the megaliths along the west coast are located. They excavated several and did some restorations. Absolute dating was not possible at the time, they talk about “döstid” (the period of the dolmens) and “gånggriftstid” (the period of the passage graves). It was known that the seashore had been higher and by assuming that the settlements had been close to the shoreline, they could follow the evolution of the different stages of the Mesolithic, the Neolithic etc. Their measurements of the land uplift, based on this, were rather accurate. Their excavations were published by Enqvist in his dissertation a few years later (Enqvist 1922). They excavated Röra 39b, Tegneby 28, Tegneby 54, Tegneby 111, Stala 81, Stala 86 and Valla 15. The dissertation contains a description of the layout of the megaliths and a list of artefacts. The methodology in theses excavations is fairly similar to the Ekhoff era. The focus is on the chamber and the artefacts in the chamber. But they do also extend the excavation to some of the area around the mound.

Generally, there are much fewer artefacts in the dolmens than in the passage graves. And in the dolmens as well as in the passage graves there have been secondary burials, making it difficult to use the artefacts as a means for dating of the graves. Researchers have tried to use the architecture of the dolmens and passage graves, and all the intermediate forms, to make a development sequence. In Bohuslän there is almost no C14 data to be used for confirmation of the datings.

There were early discussions regarding connections between Bohuslän and Jutland. Otto Frödin wrote a chapter in the book presented to Oscar Montelius on his 70th birthday, where he focuses om the connections, and for example describes similarities in axe design during the Single Grave Culture (SGC). He concludes that axes found in Bohuslän originate in Jutland and not from the east coast which could have been expected but rather from the southwest coast (Frödin 1913:54).

Axel Bagge did a systematic analysis of all the then known shards from the megalith excavations on the west coast. The result is discussed below (Bagge 1934). He also did comprehensive research on the ceramics from the megaliths in Scania. This work was to a large extent together with Lilly Kaelas. Kaelas later became the head of the archaeological museum in Gothenburg. She did not take direct part in excavations but wrote papers on the Neolithic in Bohuslän (Kaelas 1953,1961, 1981).

Only a few megaliths have been excavated on the Swedish west coast during the last decades. They are Säve 57 (Drottning hackas grav) north of Göteborg in 1978, Jörlanda 120 south of Stenungsund in 1964, Lyse 7 in Sjöbol north of Lysekil in 1971, Skredsvik 154 (Gullmarbergsdösen) north of Uddevalla in 1989. Modern methods and analyses were used in theses excavations and the reports are comprehensive. Another important difference is that in addition to the graves, also the mounds have been excavated, which gives more information on construction methods.

Few, if any, researchers have focused on the megaliths in Bohuslän in recent years. The megaliths are usually only part of surveys of all the Swedish megaliths, where the focus is on other areas or subjects.

All megaliths in Sweden are listed and described (schematically) in a dissertation by Lars Blomqvist (Blomqvist 1989). He has compiled extensive information on the megaliths and personally visited all of them, made drawings on those that had not been excavated or described before. Most of the dissertation is focusing on Falbygden, but the list of all the megaliths with a short description is very valuable as a first understanding of the type, size etc of the megaliths in Bohuslän. Blomqvist is using the architecture and specific elements of the construction to draw conclusions on the building sequence and relations between the different areas. Based on these observations he supports the Kattegat relation and suggests that relations to Falbygden and Scania are less important. Blomqvist is, in the footsteps of Montelius, using typological seriation to get a development scenario for the megaliths of Bohuslän.

Karl-Göran Sjögren gives a description of the Neolithic society and the megalith builders in his dissertation. This work is also primarily focusing on the Falbygden area (Sjögren 2003). Sjögren has during many years written a substantial number of papers on the Swedish and south Scandinavian Neolithic. In recent years the focus has been on the new Scientific methods making it possible to follow for example migrations and mobility as well as the existence of the first known occurrence of plague through aDNA (Rascovan et al. 2019).

Malou Blank is working with modern technologies and primarily the Falbygden area to try understanding the life of the people of the Neolithic and Early Bronze Age. Her dissertation includes a paper which takes a broader view of the temporal development of the burial sequence in the dolmens, passage graves as well as gallery graves, based on all the available C14 data. Unfortunately, there is only one passage grave from Bohuslän with C14 data. Still, this research gives an important framework for the understanding of Bohuslän.

7.2 Denmark with focus on Jutland

The research history in Denmark follows the same trends as in Sweden, but there is a major difference. The megaliths, and especially the dolmens have become something of a national symbol. The reason behind this difference can probably be found in the need for Denmark to find a national identity after humiliating experiences in the beginning of the 19th century, Denmark lost its fleet in a battle with England and the country went bankrupt 1813. There are also many more megaliths in Denmark than in

Sweden and due to the landscape, they are often visible at a distance. Many artists at the time painted romanticised pictures of landscapes with dolmens (Eriksen and Andersen, 2016).

The first overview of the Danish prehistory where the megaliths are discussed was written in 1843 by Jens Jacob Worsaae. He was an archaeologist and a disciple to the most famous Danish archaeologist Christian Thomsen. Towards the end of the 19th century a survey of all the ancient monuments started, where of course the megaliths were an important part. Sophus Müller published a 714-page book where many dolmens and passage graves were described (Müller 1897).

A nowadays very (economically) valuable and beautiful book, mainly consisting of paintings, was published in 1868 by Andreas Peter Madsen. He was a painter and archaeologist.

Several books were published during the first half of the 20th century describing the prehistory of Denmark. One more should be mentioned, Oldtids Mindesmaerker by Hans Kjaer. He took part in several excavations, which makes him a reliable source for the understanding the megaliths (Kjaer 1925).

In the 1950th all ancient monuments of importance were revisited by archaeologists to decide which should be protected. It was a kind of continuation of the district surveys completed in 1934. This one was completed in 1957 and became the beginning of the present database "Fund og Forntidsminder".

Denmark had several important archaeologists in the mid-20th century who contributed to the understanding of the megaliths, for example Knut Thorvildsen, Hakon Berg and Poul Kjaerum. One of the more well-known Danish archaeologists in recent years is Klaus Ebbesen, mainly because he is a productive publisher of books and frequent lecturer. His book "Danmarks Megalitgrave", a comprehensive catalogue of data, is a must for someone who wants to get insight in the megaliths of Denmark (Ebbesen 2011).

The Danish dolmens and passage graves are often (much) larger and in a better condition than the Swedish. Some of them have also become tourist attractions to a much higher degree. Consequently, it is important to make them safe to enter (The Swedish megaliths are usually filled with stones instead of making them safe to enter). This led to a large restoration project during the 1980s. From these restoration (and excavation) projects emanated facts on the construction which are valuable for the understanding of the megalith building process and development over time.

Svend Hansen was the director of restaurations at Skov- og Naturstyrelsens kulturhistoriske avdelning for many years. He took part in many restorations and acquired a very unusual understanding of the construction principles and craftsmanship needed to build megaliths. He has published several papers and a book where he summarises his findings (Hansen 1993). The book is only dealing with passage graves, due to that the restorations were primarily performed on them. Another book is only dealing with dolmens, "Stendysser arkitektur och function" (Eriksen and Andersen, 2016). This book is also a part of a Danish debate on the hight of dolmen mounds. Some researchers argue that all dolmens had mounds, while this book argues that this is not the case. The restauration of the Tustrup round dolmen is used as one of the examples. Tustrup is one of the more visited places since there are three megaliths of different architecture and a so-called cult house. The round dolmen has been reconstructed with a mound that fills the area completely between the high kerbstones and the dolmen.

Iversen suggested in his dissertation that the division of MN into shorter periods, which has been used for a long time in southern Scandinavia, should be omitted (Iversen 2015). The reason is that the periods Troldebjerg, Klintebacke, Ferslev, Blandebjerg, Bumdsö-Lindö and St Valby are overlapping and not in the same absolute dates in different geographical areas. He suggests a division in Early Middle Neolithic and Late Middle Neolithc with the division at 2850 cal BC. This is the approximate start of the Single Grave culture on Jutland.

7.3 The Kattegat connection

Relations across the Kattegat Sea have been referred to by several researchers. The sea is an obvious connection route. Up to rather recent times, the sea has been the fastest way to travel. The distance between north-eastern Jutland and the Swedish west coast was not a problem to cross at the time. We know for example that they also travelled to Gotland and across the English Channel. The water as a primary route between areas also explains why the Falbygden area seems to have closer connections to southern Halland and NW Scandia than to Bohuslän. The rivers in Halland connects via lakes to the area south of Falbygden. Especially if one has a load to carry, the waterways following these rivers are to prefer.

The connections across Kattegat were already observed and discussed by the early researchers in the field. Frödin (1913) is one of the first to investigate not only influences from Jutland to Sweden, but also possible import of goods. He believes, based on research by Sophus Müller, that the influences and import of goods came from the southwestern part of Jutland (Frödin 1913:54). He also concludes that there are no relations to Scania and the eastern island of Denmark since there are no artefacts connecting the areas are found in Halland. If the import would have come from Scania, then there should have been similar design of tools etc in Halland. Even if the same designs are found in Scania and on Jutland, Frödin concludes that the influence, as well as possibly import, is from Jutland.

Enqvist summarizes his view of the Jutland-Bohuslän relations as "Och så som de arkeologiska fynden nu visa, synes en koncentrering av förbindelserna Jylland-Bohuslän speciellt till Orust-Tjörn området ha många skäl för sig" (Enqvist 1922:53). (The archaeological artefacts seem to show, that it is reasonable to believe that the focal point of relations Jutland-Bohuslän was in the Orust-Tjörn area. Translation by author). Enqvist did his archaeological work on these islands, so that may have influenced his conclusions, but there is undoubtedly a large concentration of settlement and graves in the area. He points at the need to import flint as well as stylistic similarities (without being very specific) with Denmark. The Fredsgaard type axe in one of the graves is referred to as a Danish influence.

The indication of relations across Kattegat is largely based on comparisons of the pottery styles and their development over time. The most essential work on sherds from megaliths in Bohuslän was made by Axel Bagge and most other researchers are referring to this work (Bagge 1934). Kaelas expands the work by Bagge to include the other megalith areas of Sweden and compares to Denmark. She makes a general comment on similarities between northern Jutland and Bohuslän without specific references to artefacts. A more substantial observation is that the gradual development of new pottery styles after the early MN in southern Denmark and Scania cannot be found in Bohuslän and northern Jutland. It is especially referred to the "tooth stamp" style, which is found in Scania and the Danish isles, but not in Bohuslän and northern Jutland. There are no typical high quality TRB sherds found in the megalith graves after the middle of MN in Bohuslän and northern Jutland. Kaelas also comments that the relation probably ended earlier, since there are local differences in design on Jutland and Bohuslän before the disappearing "megalith pottery" (Kaelas 1953:28, Bagge 1934:252). A possible explanation to the end of megalith pottery on Jutland, suggested by Kaelas and others, is that the battle axe/single grave culture has taken over in the area (Iversen 2015). The development on Jutland seems to also change the culture in Bohuslän.

The architecture of the dolmens in the SW Scandinavia and northern Germany was compared by Aner and later extended by Kaelas. They concluded that the "polygonal" dolmens in Bohuslän have counterparts in primarily Djursland and NW Funen (Aner 1963, Kaelas 1984). A design detail in a few of the passage graves in Bohuslän which also exist in Jutland, as well as in England, is that the kerbstones are drawn in towards the passage, forming an area in front of the passage (Bagge 1934, Montelius 1905).

Rydbeck is sometimes used as a reference for the connection between Bohuslän and Jutland. He is discussing possible migration from England to Jutland and then to Bohuslän (Rudbeck 1928:81).

Blomqvist compares details from dolmens and passage graves in the three main areas in Sweden, and points at some building techniques which differ in Bohuslän. Only Bohuslän has the triangular opening, and the placing of threshold stones is different. No chamber in Bohuslän has sections in the chambers and there are not so called "passage stones", a stone placed in the wall directly opposite to the passage. The passage stones never enter the chamber ("gångtapp"). He also concludes that influences come from England and Jutland, referring primarily to earlier researchers, not by comparisons of the megalith architecture (Blomqvist1989:136).

8 Introduction and background

8.1 The route(s) to Scandinavia

The farmers entered the Aegean from the Middle East around 8500 years ago. Farming expanded north and had reached Hungary 6000 years cal BC. In parallel, the farming culture followed the northern shores of the Mediterranean and reached southern France 5700-5600 cal BP. This route expanded north and reached for example the Paris basin around 5200 cal BC. The central path continued north to central Poland and the north European loess plain. Around 5000 cal BC it had reached Ukraine and at the same period spread to the west where the two colonising arms met in northern France. There is evidence for this "reunion" in mtDNA from a site at Gurgy Les Noisats (Rivollat et al. 2015). This reunion of the two branches may be the start of the monumental burials in Normandy, NW France. EN in this area shows a remarkable concentration of megalithic monuments, a culture which spread north and resulted in the (much later) boom in megalith constructions in southern Scandinavia (Shennan 2018:137-142).

Using large numbers of C14 data as a proxy for farming activity and population shows that after the introduction of farming there was first a fast increase and then after hundreds of years a decrease of population. The demographic expansion and retraction differ in different parts of Europe but is to a large degree following the introduction of farming (Shennan et al. 2013). As an example, the Paris basin has an increasing population from ca 5000 cal BC (see fig 8.1). The increase continues to ca 4000 cal BC followed by a rather abrupt decrease and then continuing slow decrease to 2000 cal BC (the end of the calculation). The result is presented in relation to a "null-model" of long-term growth (an exponential generalised linear model). (Shennan et al. 2013:4).

The colonization followed a sort of "leap-frog" pattern where small groups travelled a distance to establish a new settlement, whereafter the area was occupied by more and more settlements. The expansion had to be fuelled by continuously increasing population. After some time one or more groups continued to a new area. In general, the colonisation is thought to be a consequence of fast demographic growth due to better living circumstances and thereby higher survival of children, the Neolithic Demographic Transition (Boucqet-Appel 2012).

When the expansion reached northern Europe followed almost a millennium when the farmers did not continue further north or to the British islands. There were also earlier interruptions in the colonisation of new territories which are complicated to explain. In those cases, it was shorter but noticeable stops. When farming came to the Aegean it spread to the northern edge of the Aegan and stopped there for 300-400 years. Then after a rather fast expansion further north it was again a halt at the Transylvanian mountains. Then, after 400-500 years, the colonisation resumed.

The farming culture is now called the Linear Band Culture from the distinctive patterns on the pottery (usually LBK after the German naming *Linerarbandkeramik).* LBK reached northern Germany and the English Channel by approximately 5000 cal BC. The LBK did not expand further to new

territories. The reasons behind why they did not continue further north or cross the channel is still debated. Part of the answer is probably due to the internal development of the subsistence as well as the social development in the LBK groups (Shennan 2018:79-81).

8.2 A thousand years pause

It has been estimated that in the 51st century BC there could have been 15.000 farming households with a population of more than 100.000 in western central Europe. This is due to a very fast population growth over a few centuries in the area. The settlements are, with a few exceptions in the outskirts, only placed in Loess landscapes. Around 5000 cal BC there is a sharp decrease in population in central Germany and the Rhineland area. Other areas, like southern Germany, northern France and parts of Poland does not show he same abrupt decline. There are clear signs of violence (even massacres) and the number of enclosures rise to a peak around 5000 cal BC. Another sign of change is that long distance exchange of goods (lithic raw material) also declines (Shennan 2018:92-105). The reasons behind this development are not clear. It may be overexploitation which leads to social unrest or other changes in the society. A society in a state of almost collapse do not expand, so this could be an explanation to the stand still. On the other hand, if the problem is overexploitation, expansion to new areas could have been a solution. This was perhaps not possible due to a different landscape, soil, and seasons with shorter summers, which they would have had to adapt to.

Around 4400 cal BC a new culture emerges in the eastern part of France, the Michelsberg culture. These farmers expand both internally to new "non-Loess" areas, as well as to new areas both north and south. By 4000 cal BC the Michelsberg culture had reached central Germany and all the way up to the borders of Scandinavia. Why this happens is not fully understood. The farming methods seems to have changed. The settlements are more sparsely distributed and there were large areas of secondary forest indicating a slash and burn agriculture. Another possible reason is the increased use of naked cereals, which saves a lot of time since de-husking is no longer needed. The amount of manpower to produce food decreases and land with lower production capacity can be used (Shennan 2018:143-147; Zimmermann 2009). There is an interesting discussion regarding increasing admixture with hunter gatherers in the Michelsbergs culture, which may be another factor (Beau 2017).

A reason which has been proposed as a hindrance for the expansion to Scandinavia is that the Ertebölle groups somehow manage to preclude the expansion, the "Mesolithic population effect" (Boucqet-Appel 2012:543), that is, a strong resistance from the Mesolithic foragers in the northern parts of Europe. It has been suggested that the fast climatic improvement starting around 4000 cal BC could have reduced the oyster population which in turn should have weakened the forager groups and open for the farmers expansion. But recent research does not support the hypothesis of reduced aquatic resources, even though the increased water temperature led to widespread hypoxia (drastically reduced levels of oxygen) (Warden et al. 2017:4-5).

What seems probable is that the fast increase in temperature improved the conditions for farming (see fig 8.1). The temperature increased almost 2 degrees from around 4000 cal BC to a peak around 500 years later, whereafter a slow decrease in temperature begins. The temperature increase coincides with the fast establishment of farming in southern Scandinavia. But the climate change may not have been the only reason.

After the process had started it proceeded fast, and farming was established in most of southern Scandinavia around 3700 cal BC. The fast colonisation shows that it must have been a substantial number of small groups that found their way into the new territories. It is reasonable to believe that this expansion followed the same patterns as have been seen along the Mediterranean, the Atlantic west coast and in central Europe. Small groups moved a longer distance and established a new settlement which grew and filled the area around with new settlements, then the pattern repeats. If this "leapfrog" colonisation into new areas proceeds with rather long "jumps" and there is fast population grows, this can explain the fast colonization of southern Scandinavia (Shennan 2018:89). The farmers

were “land based” and did not have extensive knowledge of the sea, still they obviously moved to the Danish islands as well as islands like Gotland and Bornholm. The sea was not an obstacle. It has also been noticed that the initial settlements were close to the seashore and most of the megaliths are close to the sea (with the notable exception of Falbygden). The sea became a natural and fast way to travel.

When the megalith “building explosion” started, farming was well established in Scandinavia. There must have been close connections between the areas since new influences spread fast.

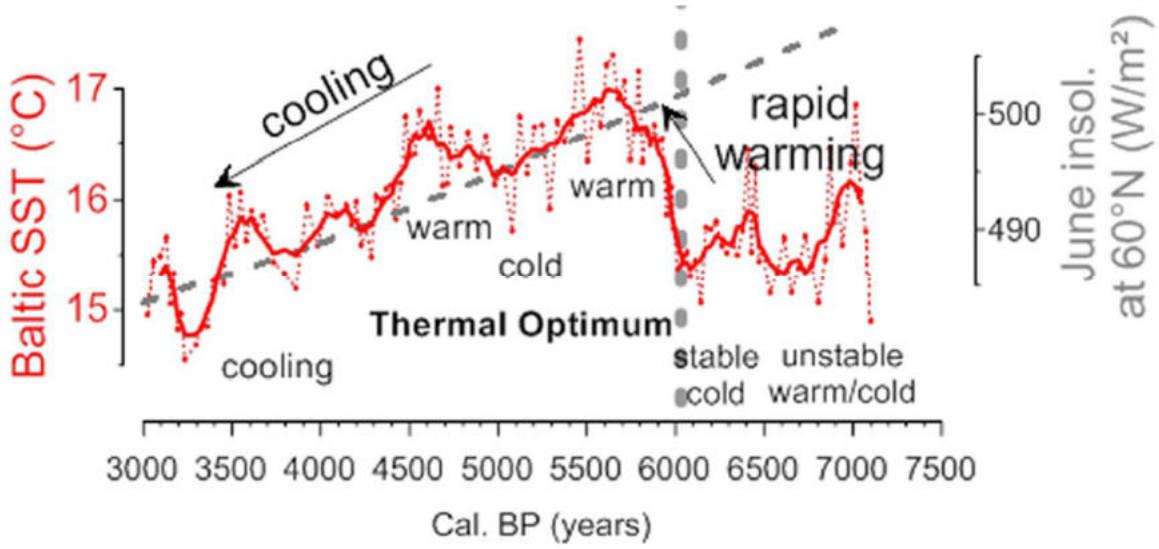


Fig 8.1. Sea Surface Temperature in the Baltic Sea. From ca 4000 cal BC there is a fast increase in temperature and thereafter a slow decline over the coming 2000 years (Warden et al. 2017:5).

8.3 The first signs of farming in southern Scandinavia and gradual expansion

From ca 4400 cal BC there are indications of at least contacts between the Neolitic farmers and southern Scandinavia (Gron & Sörensen 2018:959). TRB material culture appears in the form of for example short necked funnel beakers and point butted flint axes in present day Denmark and Scania. And there are impressions of cultivated grains in Ertebölle ceramics (ibid:968). There is evidence that the foragers switched to a more sedentary life towards the end of the Mesolithic. Several late Mesolithic settlements in Scania, for example Tågerup, Skateholm and Löddesborg have been interpreted as year-round settlements. With the rich supply of food at the coasts, they may have found it possible to stay at the same place. There are in some cases also cemeteries close by, and a social differentiation can possibly be identified. At the cemeteries there are poles and huts, maybe related to rituals, it has similarities to the first EN burial areas (Andersson et al. 2004:155; Arthursson 2016:3).

Evidence of farming is frequent from ca 4000 cal BC, where farmers and foragers often are living in the same areas. There are few humans remains dated to Early Neolithic, but there are for example two individuals from two rather close costal sites in Denmark, Sejerö and Dragsholm, showing an interesting result. Using δN15 isotope analysis it could be shown that the former has a marine diet and the latter a terrestrial diet, indicating that the two persons had a different way of life even though they were living in approximately the same area (Fisher et al. 2007). Starting from 3800 cal BC there are more indications of a terrestrial diet and a change in settlements to more inland locations. A study of findings of point butted axes shows that the farmers preferred inland locations with easily workable soils (Sörensen 2014). Another study, using strontium analysis, shows that cattle were moved over considerable distances (Gron et al. 2016).

Farming expanded, but the foragers continued to live in the same areas. It is debated in what extent they interacted. There are settlements where there is a continuity from Mesolithic to EN Ia. The Neolithic culture seems to take over in these settlements. There are other Ertebölle settlements continuing in parallel with Neolithic settlements.

The farming settlement sites are initially located along the coasts but are gradually moving more inland. At the same time there are so-called hunting stations, small, maybe temporary, settlements. It is possible that the farmers commuted between these or that the foragers occupied the hunting stations and interacted with the farmers. The presence of, at least partly, similar material culture and faunal material can explain both (Gron & Sörensen 2018:964-966).

The initial farming settlements typically consisted of one or two houses or huts. It is supposed that it was an (extended) family living there. There are also examples of two or three houses where more than one family may have lived. The houses were often of the so called Mossby type. It is a two-ailed house with rounded gables and straight, or slightly convex, long walls. The size varies from 9-18m in length and typically 5-6m in width. Mossby type houses are found in Scania, Jutland, Zealand, and Bornholm. There are also areas with several houses with ritual areas and burials in EN I (Andersson et al. 2004:189).

Early Neolithic burial rites initially have similarities with the Mesolithic but change over time. In the final part of the Mesolithic there are rather complex cemeteries with inhumation graves and a few cremations together with what is supposed to be cult houses (small buildings). Standing poles, single or in groups, indicate rites in relation to the burials. In the same area are later sometimes EN long barrows built, including one or two inhumations.

The transition to a farming society (or colonization by the farmers) was a rather fast process. During EN I, between 4000 to 3700 cal BC, a few hundred years, southern Scandinavia changed from a hunter gatherer society to a primarily farming society (Andersson et al. 2016:80; Sörensen 2014; Andersen 2011:144).

During the following centuries the settlements grew larger, more and more of the forests were burned down to be used as pastures. Pollen analysis shows the changes in the landscape. There is now more birch and hazel, trees and bushes which need a more open landscape. There is also evidence of coal from fires, probably slash and burn farming (Andersen 2011:144).

It is generally difficult to find the earliest EN houses at excavations. The problem is discussed in "Strategi for yngre stenalders aerkeologiske undersökelser" from Slots og Kulturstyrelsen in Denmark. Many of the very early houses have probably been missed in excavations. Bohuslän may be an example of this problem. There are many settlements where flint tools production have been found, but almost never remains of houses. And when excavating the megaliths in the recent decades, has there been enough focus on possible houses or huts?

8.4 Earthen Long barrows

Earthen long barrows are found all over northern Europe, from the UK and Netherlands to Poland and from northern Germany to southern Scandinavia, primarily Denmark. They are closely related to the TRB culture. The graves are found in several concentrations relating to the regional TRB groups. There are more than 500 barrows registered in the whole area (Midgley 1985). There are around 225 earthen long barrows in the UK, mainly in England (Ashbee 1970). As with the megaliths, it is reasonable to believe that this is only a fraction of the original number.

Comparison of the earthen long barrows in the different regions show both similarities and differences (Midgley 1985). The different regions are excavated in different degrees which makes comparisons difficult. A common denominator is that they are predominantly placed in sand/clay morainic soils, thus related to the farming areas. In several places they are close together forming cemeteries, the

barrows were an important part of the TRB society. They have different architectures across northern Europe, but the similarities show that they belong to the same tradition. The regional groups develop "variations on a theme". The variations are seen in the architecture and may also reflect regional differences in rituals.

The size of the barrows differs also within a region. In NE Europe (Poland) the typical length is between 60-80m long, but there are some exceptionally long, up to 120m. In central northern Europe the barrows are shorter, typically 25-45m. The lengths in England vary mainly in the interval 30-60m. In Denmark there are fewer long barrows compared to the other areas. They vary from 14 to 85m, but the majority is shorter than 60m.

There are three main forms of barrows, rectangular, trapezoidal, and elongated triangular. The triangular can only be found in NE Europe. The other forms are found all over the area. The mound consists of sand, earth, stones, and is usually enclosed by boulders (kerbstones). It is in rare cases made of timber, primarily in Denmark. The stones are often carefully chosen to be of similar size and placed in straight lines. There are also constructions where the stones are placed according to size from larger to smaller. In some cases, entrances to the barrow have been identified but, in some cases, it could as well have been an opening during the building process, which was later closed when finishing the monument. The openings are usually in one end (in the trapezoidal case in the broad end). In Denmark, Scania, and England there are evidence of a façade in on end of the barrow (Madsen 1979, Larsson 2002, Ashbee 1970).

The long barrows are sometimes segmented by transverse stone walls or in Denmark sometimes by timber. Graves are placed in these compartments. Midgley notes that the first grave is not in the first compartment, but in the second. There is some evidence, from for example Mecklenburg, that the compartments may have been used for different rituals (Midgley 1985:146). This may be a coincidence and not a real phenomenon.

The burials are sometimes directly on stone pavements (there may have been a coffin). In some cases, remains of a wooden cist can be found. The probable existence of a cist is usually only noted because the stones that initially supported the planks are standing in a straight line. There are stone constructions of different designs, forming an enclosure around the grave. In the rare cases where skeletons remain in the grave, they are both articulated and disarticulated.

Apart from wooden constructions in the barrow related to the graves, there are a few barrows where remains of (what can be understood as) a timber house is located both inside and outside of the barrows. Constructions outside the barrow have been found in the eastern part, in connection to an entrance. Such buildings are reported from Poland (Midgley 1985:149), England (Ashbee 1970) and from Denmark (Andersen 2011). Buildings under the mound are found in several places. They are identified by postholes under the barrow, where the pits show a pattern from a house. In several places it is obvious that these buildings have burnt. This can be interpreted as a deliberate burning and destruction of a house before the burial and building of the barrow (Ashbee 1970).

The Neolithic long barrows were used for several hundred years in southern Scandinavia, from ca 3900 cal BC to ca 3500 cal BC (or maybe a little longer). Excavations at two long barrows in Scania (Jättegraven and Örnakullsdösen) show the long use of the monuments (as well as the complexity in dating the different stages). The C14 dating of the palisade timber (oak) at Jättegraven was 4250-3930 cal BC. This is most probably due to the "old wood effect", the oaks may have been several hundred years old when cut down. In the same part of the palisade was ceramics of "Virum" style found, a style dated to ca 3500 cal BC in Denmark. Combining the results from both long barrows, the archaeologists concluded that the barrows were built in the early part of EN and were used until the first dolmens were erected. The depositions, primarily at the eastern end, seem to indicate that there were ceremonies especially at the start and end of the period, maybe at a kind of initiation of the

monument and the final use, whereafter the society continued with the ceremonies at the dolmens (Larsson 2002:147-171).

Large wooden poles are often placed in the eastern gables of the long barrows and sometimes there are smaller poles along the sides. Also here are small buildings which may be part of the cult. Later in EN are larger long barrows built, consisting of stone and soil (Andersson et al. 2016). A version of this is the so called Barkaer- structures (from the first excavated site) in the form of elongated rectangular or trapezoid barrows, with a perimeter often fenced with planks or diches, had low mounds or were flat. Theses barrows often had a high wooden façade in the eastern end, which was burned down. These graves, in the first phase of the Early Neolithic, are often developed over a long period which may lead to a long dolmen, with sometimes more than one dolmen or passage grave added. Several of these have been excavated. One example is the Troelstrup long barrow north of Viborg. The excavation revealed that there were five graves, two plank cists and three dolmen chambers (in line). The long barrow started as a ditch enclosed, slightly trapezoid Barkaer structure, 28m long and 10-12m wide with a façade in the east. It was extended twice towards the east to be able to include the dolmens. The final length is 59m (Kjaerum 1977). There are long mounds of very different lengths and with most of the time only one dolmen, but it may, as in the above case, be up to five graves. Most of the long mounds are not excavated, so it is not known what they may conceal.

8.5 Enclosures

When an excavation in Sarup 1971 found what later became known as the Sarup Enclosure, it was the first enclosure revealed in southern Scandinavia. Since then, many more have been found and a few more have been excavated. It has improved the understanding of the early phase of the neolithic society in Scandinavia. Enclosures have been known in western Europe since 1882, when the first was found in Peu-Richard in western France. Two years later the enclosure at Michelsberg was found, followed by Knap Hill in England. It was here that the causeways dividing the ditches were found, which has since then given these structures the name causewayed enclosures. Around a thousand sites are now known from southern Portugal to southern Scandinavia, from Ireland to Poland (Andersen 2015).

The area of an enclosure varies a lot but is often between 1-6 ha. Much larger enclosures are known, for example the Michelsberg site in Urmitz, Germany which is 120 ha. The interior contains no houses or other structures apart from pits and sometimes remains of activities in a small part of the interior. The enclosure is surrounded by ditches, often two in parallel and palisades. The causeways, short distances between ditches, varies from a few cm up to 20m. The palisades are an important feature but can be built in many ways. It can be posts with 1m distance, posts placed in a trench which may be 1m deep or closely set posts. There are also examples of parallel palisades. The sites seem to be used during a rather short period and with very long intervals (decades or more). This has been identified at the excavations of the ditches. The ditches have been opened and at least sometimes closed rather quickly. Then after a long period, the same ditches are re-opened. How they knew where the ditches had been so many years before is not understood. The findings in the enclosures are limited and primarily found in pits, ditches, and trenches. It is primarily shards and bones (very seldom complete bodies). Shards from the same deliberately crashed pot have often been found in different places. Bones can either be parts of a skeleton, where flesh remained at burial, or “old” bones which had been taken to the enclosure to be reburied. Fragments of the same bone, for example a skull, was placed in different places in a ditch (Andersen 2015; Evans & Hodder 2006:253-55).

The enclosures were temporary ceremonial sites for rituals including human bones, bones from cattle and other materials. Given the large efforts to build, at least some of the enclosures, it must have included a large group of people and considerable planning. Enclosures are often not distant from each other, typically 5 km.

The Sarup area on Funen, Denmark, is an unusually extensive excavation and probably the most well-known enclosures in Scandinavia. Sarup is located on low flat land, partly surrounded by water (a small promontory), islands and hills. The excavated part is about 6 ha and includes two enclosures. In the area surrounding the enclosures are several (mostly destroyed) megalith monuments, houses, pits etc. The oldest enclosure Sarup I, an elongated area of ca 8 ha, is dated to 3400 cal BC (the Fuchsberg period). It consists of a palisade of split oak trunks, fenced smaller enclosures outside the palisade, a fenced entrance passage and two parallel rows of ditch systems. The palisade was placed in a ca 1m deep trench and was followed 580m by the excavators. Almost in the middle of the palisade was a 1,6m wide entrance. Outside the palisade were smaller fenced areas. These were of different forms for example 6x7m and 7x20m. Outside these areas were first a ditch that followed and included the smaller fenced areas and outside this ditch a second ditch which is described as “a string of beads”, a series of ditches ca 15m long and 4m wide with a varying depth from 0,2m to 1m.

The importance of the site can be understood by the number of trunks used. There are some 1300 planks (split trunks), each estimated to be 4-5m long and weighing altogether more than 300 tons, in the palisade and a further ca 2100 planks in the outer fences. To dig the trenches and the ditches some 2000 tons of earth had to be moved and there are also indications that the whole areas was stripped from topsoil which is another 1300 tons of soil. Building the enclosure and ditches is an extensive work which would have taken a long time and included a lot of people (Andersen 2011).

About 200 years later, in the Klintebacken period, a second enclosure (Sarup II) was built adjacent to the first. This enclosure is smaller, and the palisade is not as impressive. The ditches are here on the inside of the fence. Since the area is smaller, it was possible to excavate the whole area, ca 3ha. As in other places the ditches had been opened and filled several times. There were pits with fragmented pots. In one of the trenches, 4 postholes were found in a square. In two of these holes remains of a young woman were found. It was only parts of a skeleton and the bones had been burnt at high temperature.

About 5km from the two Sarup enclosures has another enclosure (Sarup gamle skole) been partly excavated. This enclosure is from the same period as Sarup I (Andersen 2011, 2019).

In the Sarup area are remains of ca 125 megalithic monuments of which 30 are (in groups) within 1 km from the enclosures.

Close to the enclosures is Strandby Skovhave. It is a complex of graves which during excavation revealed a sequential development interesting for the understanding of the different stages of megalith building architectures. The oldest part is a rectangular post-built small enclosure, or fenced area, probably a Barkaer structure, with a row of head size stones in the middle. Almost at the same time, a small rectangular dolmen was built, and it was surrounded by a low circular mound without kerbstones. In the next phase the post-built fence is framed by large stones with the gaps filled with dry walling. In the centre is a dolmen with a polygonal chamber built. It has now become a long dolmen. Then a large dolmen (2,7x2,8m) without kerbstones is built beside the long dolmen. Thereafter is a dolmen with a passage built on the other side of the long dolmen. Finally, a passage grave is built with a round dolmen, which is later extended to a long earthen mound incorporating the initial small rectangular dolmen (Eriksen and Andersen 2016:258-263). It is a complicated set of developments, but it may show how the different architectures became the right structure for the time and thereby also give indications of the general development of architectures over time.

Another set of graves, in three groups, is Damsbo (fig 8.2). The southern group consists of a long barrow, two small dolmens and a small passage grave. The middle has a long barrow, two dolmens and passage grave. To the north is a long barrow. The middle long barrow was placed on top of a house which had been burned down. There were plough marks on top of the burned down house (Andersen 2018).

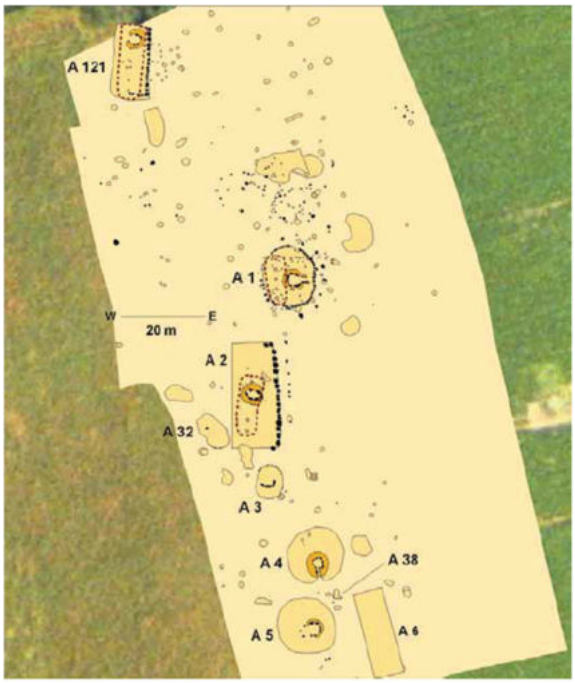


Fig 8.2. Damsbo. Three groups of megaliths (Andersen 2011).

Within the Sarup area is a third complex of graves (Sarup gamle skole). Here is a long trapezoidal palisade fenced area with a dolmen inside. There are two dolmens without mounds, two round mounds with pear-shaped passage graves, a passage grave (T-shaped) with round mound and a long mound with two pear-shaped passage graves. The T-shaped passage grave had two floors, a lower with flat stones and 0,1m above a floor with rounded stones (Andersen 2011). It is unusual with two floors and even more interesting is that there were human bones on the lower floor (reference to C14 data on these bones has not been found).

The large number of megaliths in connection to the enclosures add to the understanding of the area. The enclosures were used several times with long intervals. The megaliths are also built over a long period and maybe new megaliths were built at the same time as the enclosure was used? Since it is possible to follow the development on the site, the excavation gives an important understanding of the development of new megalith architectures.

Lönt is an area close to the Haderslev fjord in south-eastern Jutland. Lönt has a lot in common with Sarup. Around 150 megaliths have been recorded in the area and there are two enclosures, the Lönt enclosure and the Langelandsvej enclosure. A cluster of 11 megaliths have been excavated and they show an interesting pattern of development (fig 8.3). The cluster has four subgroups. The north group and the middle group consist of two dolmens and a passage grave. The southern group is a long dolmen including two dolmens and two passage graves of different styles (one is a “stordysse”). The fourth is a single passage grave placed centrally in a long mound. The megaliths are dated primarily based on the deposited pottery and partly based on that a few mounds are partly overlapping, showing a building sequence. There are no published C14 data. The megaliths are believed to be built from EN II to MNA Ib (Gebauer 2016).

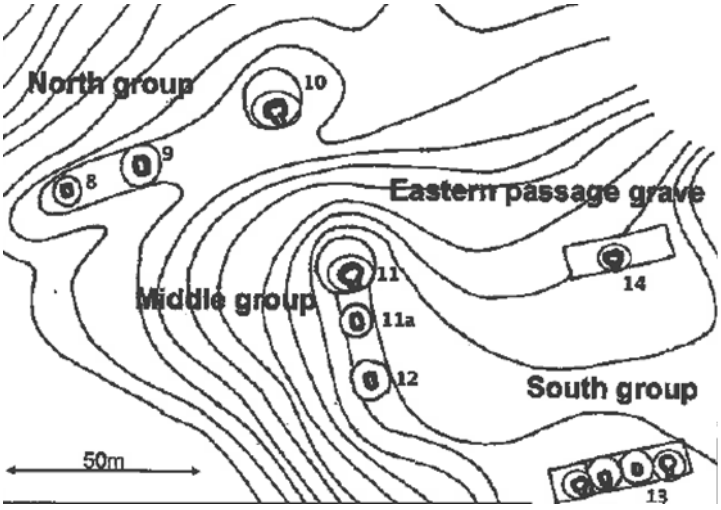


Fig 8.3. The four cluster in Lönt. From Gebauer 2016.

The first graves are two dolmens in the north group and a dolmen in the middle group (EN II), followed by a dolmen in the middle group and a dolmen in the southern group (MN Ia). The second dolmen in the southern group is either MN Ia or Ib. Finally, during MNA Ib, a passage grave is built in both the northern and central groups. In the southern group is a "stordysse" and a passage grave built. The "stordysse" passage graves are regarded as an earlier construction, so this one may be built before the other. The isolated passage grave is from the same period. It is not possible to get absolute dating, but the development over time can be followed. The architecture develops from closed dolmens to passage graves with possibly some intermediate stages.

Megaliths are frequently built in small groups. In the groups presented above, they are part of a megalithic landscape with many megaliths. A well-known site on Djursland, Tustrup, is a more isolated group, even if Djursland has a high concentration of megaliths. The group consists of a polygonal dolmen, a pear formed passage grave (stordysse), a passage grave and a cult house. There is no C14 dating for the graves, so the building order is based on pottery. The dolmen is regarded as the oldest, based on the beakers in the depositions at the grave. The design of the pottery including the pedestal bowls at the small passage grave deviates in several respects from the other graves. The cult house has been dated with samples from wooden planks in the walls. The date is 3340-2900 cal BC and supposed to be coeval with the largest passage grave. Pedestal bowls and spoons (ladles) are placed at all four monuments. Interestingly, the number of pedestal bowls are very high at the cult house and only a few at the passage grave. The dolmen and small passage grave had few pedestal bowls, but more than the passage grave. A possible conclusion may be that when the cult house was built, the ceremonies were moved to the house instead of the passage grave (Gebauer 2020).

Another complex example of an enclosure is Döserygg, close to Malmö in Scania, southern Sweden. Döserygg was used for several centuries from around 3900 cal BC. The area was bordered by sea and wetlands at the time. It contains many monumental constructions and was from 3600-3500 cal BC surrounded by a palisade of timber poles, an enclosure, which was later complemented with standing stones. What makes Döserygg special is that there seems to be a road along the palisade. Roads close by the enclosures has also been found on Djursland (Klassen 2014). There were more than 20 megalithic monuments built during the period of use. The dolmens are destroyed but can be identified by a rectangular paving of small stones and impressions from the orthostates and kerbstones. The mounds were 15-22 m long and 6-10m wide. In one case there are two chambers, which is very unusual in Scania, but rather common in parts of Denmark. People did not live in the area; it was ceremonial place. (Andersson et al 2016:57-61, Andersson & Wallebom 2013:115-140, Arthursson et al. 2016:6-7)

An area which has been studied for a long time is Djursland on eastern Jutland. It is an area with many megaliths as well as several enclosures. Klassen (2014) has made a study of the known and "possible" enclosures in the area. It shows that there is a series of enclosures along the coast, with a distance of around 4 km between them and at typically 500-1000m from the coast (sometimes up to 3-4 km). The enclosures are often difficult to date, since the earliest constructions usually leave very few traces that can be dated. But the conclusion is that the first enclosures were built in EN I (around 3700 cal BC)

and that building of enclosures continued to at least 3200 cal BC. The majority were built and used in the 3500-3200 period. This is the time when most of the megalithic graves were erected. Some of the enclosures show evidence of settlements, but these are from later periods than the construction of the enclosure.

Enclosures were built during a long period in Europe, and by the Mickelsberg farmers. It is interesting to note that the Scandinavian farmers, originating from the south and therefore aware of the enclosures, seem not start to erect enclosures until ca 3700 cal BC. They were aware of the enclosures and their purpose (which we do not fully understand) but did not build them. Maybe the groups were too small in the beginning, and it must be a certain number of people in a group to be able to erect them. It took some 300 years to reach that size of the societies.

The Danish, Swedish and northern German enclosures are built at densely populated coastal areas (and only there). They are also often built at river crossings. It is debated if the enclosures were in central or at border positions of a territory (if there were territories). Klassen leans toward the conclusion that they are located at border positions at important waterways (Klassen 2014:156).

8.6 Pottery

Pottery from EN and the beginning of MN is of high quality and includes a rich variety of vessel shapes and decoration. TRB pottery has characteristics which gives a base for analysis of the use of the vessels, chronology, and symbolism. A problem for the researchers is that very few of the findings are from closed graves. In the case of settlement sites, votive sites as well as megalithic graves, it is usually not possible to determine if the pots were placed there at the same time or in which order.

The EN pottery has five pot forms: the funnel-necked beaker, the low bowl, the clay disc, the lugged flask and the collared flask. During EN the funnel-necked beaker is without comparison the most common pot shape. At the transition from neck to body, some funnel-necked beakers have small lugs. These lugs are so small that the purpose must have been to hang the pot in a string. The beakers were often used as cocking utensils, there is sometimes charred organic material on the inside. They have also been exposed to high temperatures. The low bowl in different sizes has a round base and was probably used for serving or eating food. The flat circular disc normally had a diameter of around 20 cm. It was most probably used for baking. They were heated in a fire and then used to bake thin bread. The lugged flask and jar had very narrow necks, showing that they must have been used for liquids. The lugs are applied at the lower part of the vessel, probably because the strings were drawn under the base to reduce the weight on the lugs. The collared flasks are smaller and probably used as a personal item strapped at a belt. The Scandinavian pottery in EN is closely related to the Michelsberg culture and the funnel-necked storage vessels has similarities to the EBK pot (Nielsen 1984, Malmer 2002).

The pottery reaches its highest quality and aesthetic level in the beginning of MN. After this, there is a decline both in stylistic variation and technical quality. There are some local differences, but the similarities are much larger. In an investigation where ceramics from two local areas in Scania were compared, the only difference that could be found was that the one of the groups had marked impressions of tooth stamps at the outlines of triangles and bands (Malmer 2002:61). At larger distances there are more differences, but the conformity is dominant.

The MNA pottery is predominantly found in the following forms: The beaker, the bowl, the open bowl, the pedestal bowl, the clay ladle, the lidded hanging vessel, the clay disc, and the storage vessel. The beakers change so that the funnel is not so dominant. The beakers are made in two forms, with or without a brim. Beakers with a brim is usually also decorated on the brim. The bowl has a wider opening in relation to the hight compared to the beaker. The pedestal bowl is a special type of pottery predominantly found at graves. This form of vessel is stylistically different from the others. It is also found in the SE and central Europe. In Sweden and Denmark, the usual ornamentation is large, hatched rhomboids, but other ornaments exist. The clay ladle is usually only found together with the

pedestal bowl. They sometimes have matching decoration with the pedestal bowl (Kjaerum 1955). The circular ladle usually has a hollow where it is anticipated that a wooden handle was fitted. The lidded vessel is supposed to be used hanging and since it does not have a flat bottom. The clay disc has the same form and functionality as in EN. The storage vessel is used for cooking and storage and is common in different forms over a long period. During the St Vallby phase (MN V), it is the most common pottery. The more sophisticated vessels are almost non-existent at the final phase of MN (Midgley 1992:166). The decoration is mostly a row of pits at the mouth or shoulder.

It has been noted that some stylistic regional division appears during MN II-IV. It is suggested that this is due to the standardized forms and ornaments losing their symbolic function and ritual context. This reduced interest in the symbolic (standardized) dimension which gradually led to a loss of varied forms and ornaments and all that remains are cooking and storage vessels in MN V (Malmer 2002:60).

8.7 Axes

Axes are much rarer finds in or outside graves than pottery. But since the form of the axes change over time, they are important for dating and possibly for the identification of relations between regions. For a detailed discussion on flint axes see Malmer (2002).

During EN there are still flake axes similar to the type used by the EBK. The two new styles are point-butted and the thin-butted axes made of flint. There are axes made of rock used in parallel with the flint axes. As can be expected, the axes made of rock are more common the longer the distance is to the areas where flint is found.

Flint axes are almost never found at settlements. There are fragments of polished axes at settlements, probably from the remaking of destroyed axes. The finds are either stray finds, usually on arable land, or in hoards, often in wetlands. It is often concluded that the stray finds are axes which have been lost. Given the investment to make a polished axe, it is more probable that also these stray finds are sacrifices. If an axe was dropped it would probably have been recovered again. The hoards usually include new axes, never new and used axes in the same hoard. Both point-butted and thin-butted axes are sometimes found in the same hoard, indicating that they were uses during the same period. The point-butted axe is supposed to be an earlier form (Malmer 2002:30).

During MN there are more shapes of axes. The point-butted and thin-butted axes are still in use. New forms are thick-butted and thin-bladed. All these shapes are divided into several subgroups. The development over time shows a gradual technological development to sturdier and more specialized and versatile axes.

Findings of axes of the later shapes are not as common as the earlier versions. This may have different reasons. One, of course, could be that there were fewer made, but it seems that fewer have survived because they were not deposited as offerings in the same degree as before (Malmer 2002:62).

A new creation from the early part of MN is the double battle axe. The replacement of the polygonal battle axe with this new shape, without any intermediate forms is probably due to some change in the ideology or culture. The double battle axe is also found in GRK and it has a large geographical spread. There are two main types of double battle axes in Sweden. The oldest version, where the butt and the edge are only slightly convex and the shaft-hole is placed close to the middle of the axe, is called a Fredsgård axe. It was first found in a passage grave at Fredsgård on Zealand. The other common shape is perceived as more elegant with a more convex form.

8.8 Amber

A very frequent artefact from the megalithic graves are amber beads of different shapes. Amber was used during the Mesolithic but is in this period rare and exotic. It was also used primarily in its original form. In the transition to the Neolithic, it was a radical change both in the shaping of amber and in the use. In the first part of the EN, amber is used as ornamentation with many beads on a string

to form necklaces. Theses necklaces have been found in hoards, sometimes together with axes and pottery (Becker 1947).

In the late EN and MN, amber is an important part of the rituals at megalithic graves. In this new phase there is a large variation in shapes, even though a few standard forms are predominant. Two common shapes are miniature forms of double-edged battle axes and clubs. Other common forms are bobbins, pendants, and plates. There are also unique forms which do not copy known real objects. The amber beads are often regarded as personal objects placed together with the dead person, they are usually only found in the chamber, sometimes in the passage. Almost never outside the grave. This reinforces the idea that it is a personal belonging, maybe part of the clothing, following the person to the "next world". Towards the end of the Neolithic and into the BA, the symbolic use of amber change and it becomes a commodity which is used for exchange of goods (Axelsson & Strinnholm: 2013, Malmer 2002:67).

9 Demography

How did the population develop during the Neolithic? A direct method to try to estimate this would be to estimate the number of settlements in each period together with an estimate of how many persons which typically lived in a house. In most areas the settlements have not been identified or excavated and this is hence difficult. A method to measure the *relative* population or farming activity, and thereby follow increase and decrease of population, is to use sum-calibrated probabilities of radiometric measurements as a proxy for demographic developments. The method is based on the collection of all available C14 results from excavations on settlements, single graves, megaliths, enclosures, depots etc. The frequency per period is used as a proxy for the activity (number of people) during the period. Given that the excavations are reasonably equally distributed in time (for the periods of interest) and that the C14 data are reliable, it will show the "activity" in the society. Plotting the number of C14 data along the time-axis for each period can then be used as a proxy for population. There are several factors that must be carefully evaluated (the method has been criticized, see for example Torfing 2015). For example, there may be an interest in a certain area or period, which gives a lot of C14 results from this geographical area or time interval. By combining C14 results from an excavation into one result, this problem is reduced. Another problem that must be compensated for is the loss of DNA material over time. It will otherwise give an overestimation of younger periods.

A way to check the validity of the method and to calibrate the results is to use pollen from a plant related to farming as another proxy for activity. A plant which can be used is Black fighter (*Plantago Lanceolata*), since it thrives in open landscapes. A comparison between the two estimates shows that human impact on pollen from Black fighter clearly has a synchronous relation to the C14 sum-calibrated probabilities (Hinz et al. 2012).

The method has been used to estimate activity in the northern and western TRB cultures for the period 4200-2800 BC. The area was divided into several regions corresponding to more local TRB stylistic groups. As a background a comparison between the Paris basin and Scania (fig 9.1) is shown. It is a general pattern that there is a fast increase of population at the start of the neolithization and then after some time a decrease. The increase and the following decrease is more accentuated in Jutland (Shennan 2013).

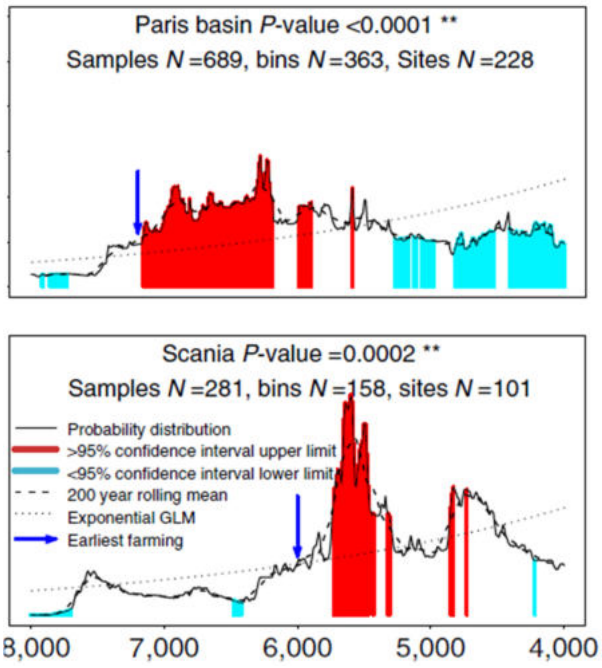
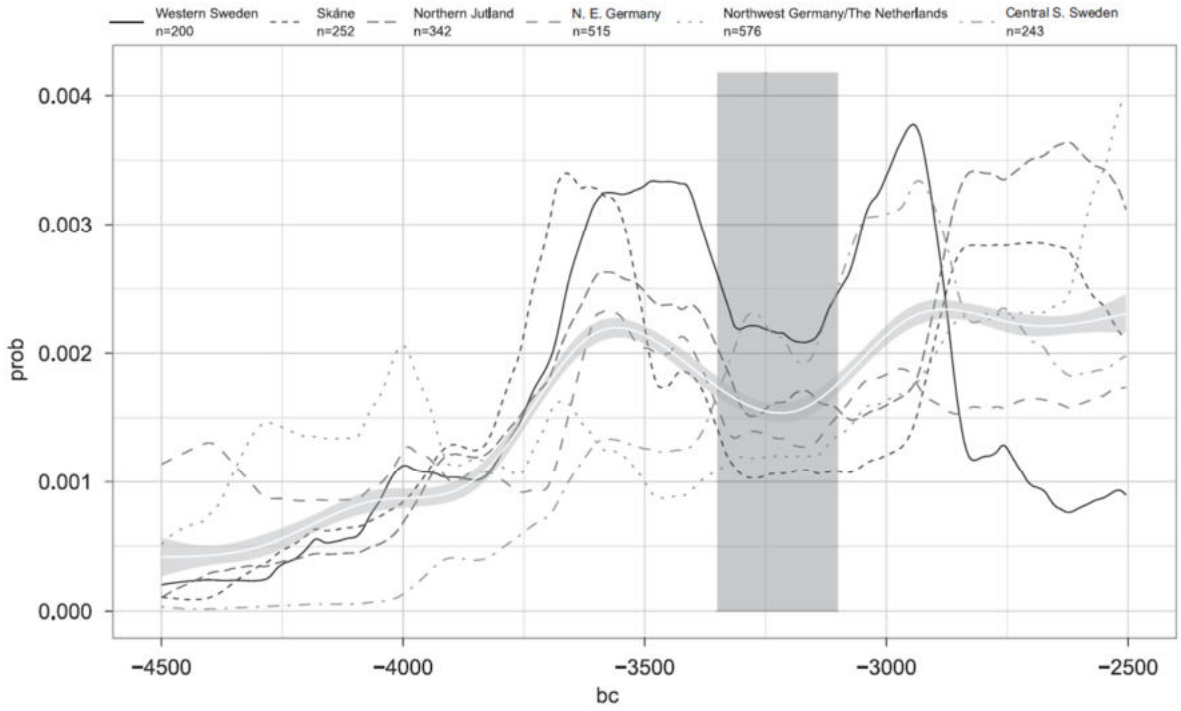


Figure 9.1. Comparison of demographic data for the Parsis basin (top) and Scania. Both diagrams show the increase after the start of the neolithization and the subsequent decrease. (Shennan 2013:4).

In a study made by Hinz et al. (2012), southern Scandinavia was divided into connecting subregions. The areas are: Northern Germany together with southern Jutland, Northern Jutland, Western Sweden (mainly Bohuslän), the Danish islands, Scania and Bornholm, Central southern Sweden (Falbygden), eastern Sweden, and the Swedish Baltic isles. The C14 sum-calibrated probabilities show primarily similarities, but also some important differences.



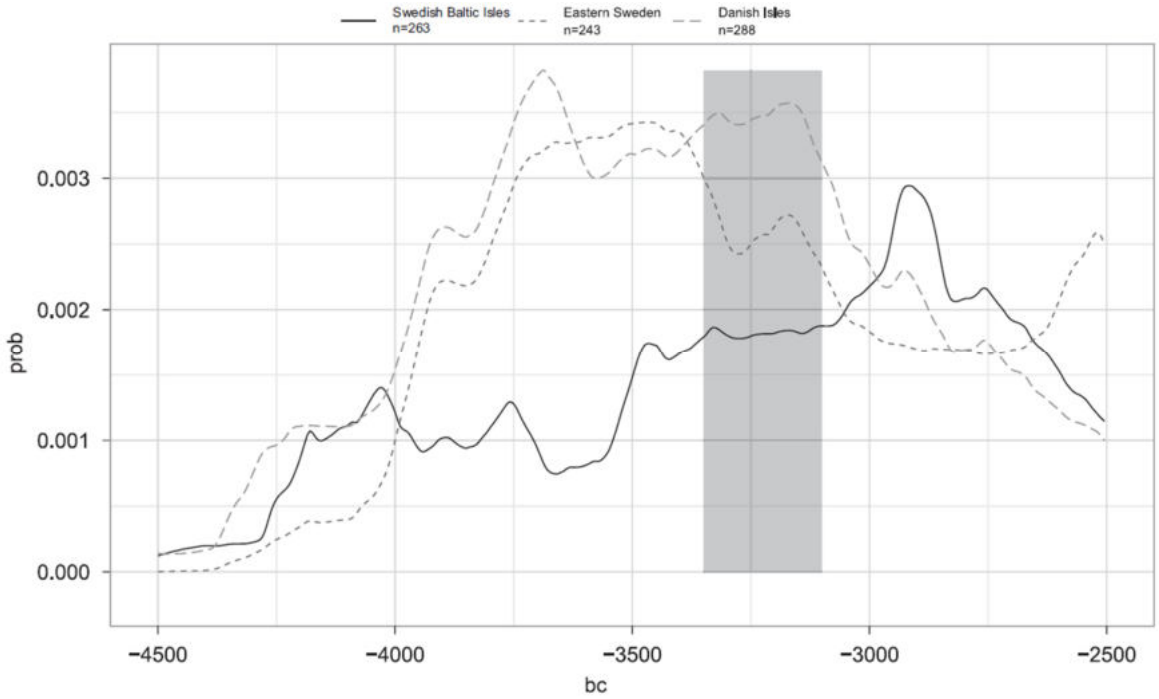


Fig 9.2. Sum-calibrated probabilities indicating population before, during and after the peak of the megalith building period. For detailed description of the background data see Hinz et al. (2013). There is a lack of data before 4200 cal BC and after 2700 cal BC, so these parts are not reliable.

The C14 (proxy) data shows that four regions in the upper graph follow a similar pattern with small differences. The activity starts slowly before 4000 cal BC and increases sharply at ca 3700 cal BC. The peak continues until ca 3300 cal BC in northern Jutland and western Sweden, but decreases earlier in Scandia, ca 3500 cal BC. NE Germany follows the same pattern. Two areas stand out as different. North-western Germany including southern Jutland (as well as the Netherlands) increase earlier and do not have the sharp increases and decreases. Southern central Sweden (Falbygden) increases at the same time as the other areas and reaches a top, whereafter the curve continues up instead of decreasing as the other areas do. The four areas with almost similar peaks also decrease to a minimum around 3350 cal BC. Then there is a second top, but where some areas are delayed. In this second top, Jutland has a delay of some 200 years compared to Bohuslän.

Two of the areas in the lower graph are very different compared to the others. The Danish isles and eastern Sweden start to expand earlier and continue with a longer peak. The Danish isles, called the "TRB heartland" by Iversen (2015), is early colonized by the farmers and the culture continues longer than in the other areas. The single grave culture arrived late to the Danish isles (Hinz et al. 2012:3335-3337).

In most of the graphs there are fast increases and decreases in population. When the farmers move to new areas they expand in that area, this can be followed during the different stages in the colonizing of Europe. But why is there a decrease after some time?

The reason for the declines is debated. Hinz (2015) states that climatic changes may have triggered the decline, but that several reasons then strengthened the downturn. Shennan et al, (2013) on the other hand, tested the hypothesis that it is correlated to changes in climate, there is a slow decrease of the temperature from ca 3500 cal BC, but found no correlation. Other suggestions are that the farming was taken to unsustainable levels resulting in lower harvests or simply to rapid population growth. Confrontations with forage groups has also been suggested (Downey, Haas & Shennan 2016, Rascovan et al. 2019:295).

The aDNA technology gives new possibilities to understand infectious diseases in the population. Early outbreakes of plague could be a possible explanation, at least as one factor in the seemingly quite abrupt decreases in population. Plague has been detected in aDNA from a passage grave in Falbygden in southern central Sweden (Frälsegården gånggrift). The aDNA including the Yersinia pestis DNA is from an approximately 20-year-old woman. In the same grave is a same age male who also most probably was infected by plague. Both burials are contemporary at ca 2900 cal BC. From the other individuals in the same grave, it was not possible to detect Y. pestis. Analysis of nearby foragers from the PWC culture did not show any sign of Y. pestis. This is several hundred years later than the decrease discussed above, but there may of course have been earlier outbreaks not yet detected. Epidemics in more densely populated villages with close connection to animals have been proposed as an explanation for multiple burials and declines of population, but this is a very noticeable example that it did exist (Rascovan et al. 2019). The presently earliest known example of plague is a forager in Latvia dated to 4000 cal BC. The strain represents an older independent lineage compared to the above Frälsegården strain. It is suggested that this strain was less transmissible and virulent than later strains. This is because the man was buried according to normal conditions for the time and other contemporary buried individuals did not have the infection. Later strains of plague kill people within days and is very virulent (Susat et al. 2021). Plague existed during the Neolithic, but we do not know if it was the cause or part of the cause for the Neolithic decline. There are contacts between the different areas, so the delay in reduction of the population in for example the Danish isles speaks against plague as an explanation. The downturn would have been more simultaneous.

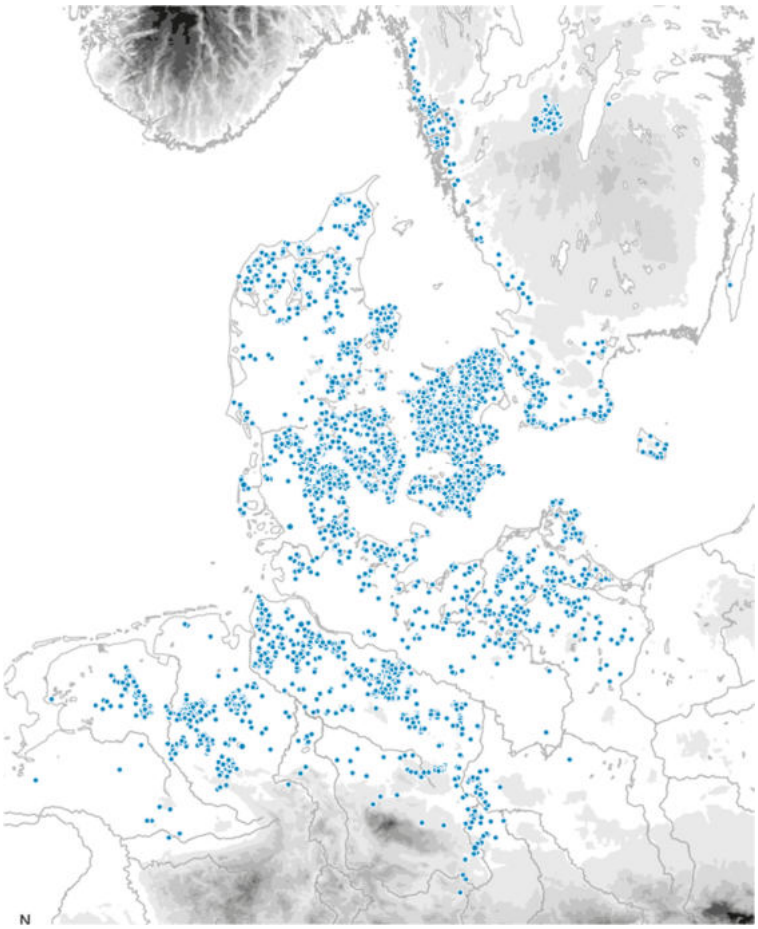


Fig 9.3. The megalith sites in central northern Europe and southern Scandinavia (Fritsch 2010)

10 Description of the megaliths in Bohuslän

The west coast area is here defined as Bohuslän together with the northern part of Halland and the Norwegian coast north of Bohuslän. The southern part of Halland is usually regarded as related to the Scandia group (Kaelas 1953). There are 86 megaliths in Bohuslän, 5 in northern Halland and 5 in Norway (Blomqvist 1989). The short coastline with the islands Tjörn and Orust together with ca 20 km north of Orust have more than 60 megaliths. North and south of this central part of Bohuslän the megaliths are spread along the coast, sometimes in groups of two or three within a shorter distance. Orust and especially Tegneby, the central arable land on the island surrounded by low mountain ridges, has a substantially higher concentration. There are 16 megaliths around this flat farming area and another 13 on the island, it is about 1/3 of all megaliths on the west coast.

There are in total close to 50 dolmens and 33 passage graves on the west coast, the remaining are difficult to define. On Orust there are 14 dolmens and 6 passage graves (the others are undefined), almost the same relation between dolmens and passage graves as in the entire area. This trend is the same along the coast with the exception of the island Tjörn, where there are 3 dolmens and 5 passage graves. 3300 BC when the seashore was about 20 m higher than today, Tjörn was an archipelago with much less arable land than today. The land rise at the time was about 0,5m per 100 years (Påsse&Andersson 2005).

Larger groups of graves and enclosures are not known from the west coast.

Megaliths which have been excavated, are well described or are of interest for other reasons are presented in this chapter. The others are listed in appendixes. Appendix I gives short descriptions of those not included in the text and Appendix II is a catalogue of all with some important data. Several of the graves are destroyed or partly destroyed. In these cases, the remaining parts are described with conclusions regarding the probable architecture. For a detailed description of exact size of chambers and passages etc. see Blomqvist (1989).

The stone material is different in Bohuslän compared to the other areas. The appearance of the graves and to some extent design solutions are therefore different. Flat stones of all sizes are easy to find along the cliffs where the ice age has “sliced” the hill sides. These flat stones must have been easier to transport and use as orthostats and capstones compared to the rounded stones used in Denmark and Scania. Despite this advantage, the dolmens and passage graves are on average smaller in Bohuslän. A few are larger, but still small in comparison to the other areas. The farmers in Falbygden had the same or an even larger advantage with the limestone and sandstone slabs. In that area the passage graves are considerably larger. Looking at the main megalith areas today all except Bohuslän, are prosperous farming districts. Bohuslän is an area with small farms and more known for the fishing industry. Did the farming at the time not give enough resources to build larger megaliths? Or are there other reasons for the smaller constructions? They were aware of other megalith constructions; some construction details are the same and the overall design is the same.

An important aspect is if a dolmen is of an open or closed construction. The builders of dolmens on the west coast used a different technique to make an opening than the Danish builders. But we may anticipate that it is for the same reason. While the Danish dolmens in type II have one lower orthostat to make an opening, the builders at the west coast found another way to produce the same result. They cut of a part of one of the stones (or used stones that already had the right form) to produce a triangular opening at the base. This method to produce an opening is not easily done with the massive, rounded stones left by the ice age, but is an elegant way to solve the need to have an opening using the flatter stones available in Bohuslän. It is sometimes difficult to decide if there is an opening, in those cases it is important to investigate this further, since a closed dolmen possibly may give a clue to the age. Blomqvist (1989:26-28) defines 9 dolmens as square without the triangular opening. They are evenly distributed along the coast. Many of these are in a very bad state and difficult to evaluate.

Ekhoff questions if the triangular opening is large enough to move a body into the chamber, for example in relation to Bottna 141 (Ekhoff 1879:128-132). The openings are not large, but if the filling is taken away in the short passage, as low as possible, I believe it is possible to get a body through.

The distinction between high or low, meaning that the stones are "laying down" or "standing up" (type II or III), is more difficult to determine with the type of stones available in Bohuslän, but there are differences in hight. If it is polygonal, type IV, is easily decided when the dolmen is in reasonably good status. If the dolmens with 4 and 5 orthostates are an architectural decision or depending on the availability of stones in the vicinity can be debated, but availability of stones is not usually a problem along the coast of Bohuslän, so it may be more reasonable to anticipate that it is a question of design, especially if the dolmen is relatively large. Since the orthostats seldom have exactly the same width, the square chambers are not perfect squares.

The mounds are today not reaching the capstone as it is often supposed to have done. The construction of the mound is debated in Denmark. It is generally agreed that the capstone has been visible in Denmark. The capstones are most of the time very spectacular and it would have been a "waste of time" to move these enormous blocks if they then were hidden in the mound. But it is also argued that some dolmens did not have a mound or that it was very low, consisting of a stone layer (Eriksen and Andersen 2016). Where the mounds in Bohuslän have been carefully excavated (only in the more recent excavations), they consist of larger stones in a first layer, sometimes arranged to clearly stabilise the orthostats and then smaller stones on top of this (Säve 57, Jörlanda 120, Tossene 211). If the mound on top of these lower layers consisted of earth and gravel it will have disappeared during the millennia.

The mounds are usually not excavated in the early excavations or at least not well reported but will be described in general terms. If there is a modern excavation, the mound is discussed in detail.

There are a few long dolmens in Bohuslän. As the name indicates, it is a dolmen with a mound that is rectangular or elongated with slightly rounded ends. The dolmen is in one end in all the long mounds in Bohuslän. One of these mounds (Säve 57) has been excavated and did not have any other hidden graves or constructions.

In Scania, as in Denmark, some long dolmens have revealed earlier constructions. Örnakulldösen, as described above as an example, showed remains of a long barrow and at least two earlier graves and possible signs of a line of posts in the eastern end (Sjöström & Pihl 2002:47-76). Is any of the long dolmens in Bohuslän also including earlier constructions or is it a copy of the Danish long dolmens more as an architectural feature?

The source of the information is given for each grave. The name of each grave follows the registration in RAÄ Fornsök.

Definitions:

- Capstone: The stones forming the roof of the chamber and passage.
- Chamber: The room forming the grave.
- Doorframe: Two thin stones placed opposite to each other, between orthostats in the passage to form a doorframe.
- Drywalling. Stone slabs put on top of each other to fill the space between the orthostats.
- Dolmen type I to type V. Se chapter "Denmark".
- Kerbstone: a stone standing at the border of the mound. These stones may be small round or tall flat stones.
- Keystone: A stone used to distribute the weight of the capstone of the chamber to the orthostats beside the entrance. As well as holding theses orthostats in place.
- Long dolmen: a dolmen with an elongated, usually rectangular, mound.

- Mound: The heap of usually stones (of different sizes) and gravel surrounding the megalith.
- Orthostat: The walls stones of the chamber and passage.
- Passage: Stones forming the entrance to the grave. It can be only two orthostats without a capstone or a several meter long passage with capstones. The passage is in this case usually narrower in the beginning.
- Polygonal dolmen: A dolmen with more than 4 orthostats forming a rounded, not rectangular.
- Threshold: an elongated stone placed in the floor of the passage, as a "threshold". The thresholds may be placed in the beginning, in the middle or at the entrance to the chamber, or at all three places.
- Triangular opening. An entrance to the grave between two orthostats. The orthostats have been formed (or chosen with the right form) so that when leaning towards each other, they are forming a triangle with the orthostats and the floor as the sides of the triangle.

Säve 57. Dolmen (long dolmen) with rectangular chamber, a capstone (fallen into the chamber) and a pair of passage stones. Rectangular mound with kerbstones. The dolmen was located towards one end of the mound. The grave was excavated in 1978 by Ulf Hultberg from the Archaeological Museum Göteborg and moved.

Fig 10.1. Säve 57 after initial removal of the turf (from excavation report).

The chamber is rectangular with 6 orthostats which are "standing up" with the heaviest part at the bottom. The orthostats are not connected, there is around 0,1m distance filled with drywalling. The passage consists of two stones "laying down", at one of the short sides. There is one thin stone in the short side of the entrance, making the entrance to the chamber ca 1m high and 0,3m wide. There are 2 threshold stones in the passage and one more located in the chamber.

The chamber had been plundered, the floor shuffled around, but the excavators found a pit under the sand which they supposed was contemporary with the grave. The excavators suggested it could have been a pit intended for a stone, but that the constructors moved the orthostat to a new position (it was close to an orthostat). Pits in the chamber have also been found in Denmark and the Danish excavators assume that it could have been pits used for a post used in the construction.

Between the flagstones in the drywalling, both in the chamber and the kerbstones, was a thin layer of sand to stabilize the construction. An interesting finding is that there was pollen from sphagnum

(vitmossa) in the sandy layer between two flagstones. They did unfortunately only take one sample between flagstones (between two kerbstones). If sphagnum would have been found between more flagstones (and in the chamber), it could have been a construction method like the birch bark used in Denmark. Since it was between the kerbstones, it probably was together with the sand.

The mound was packed with stones in two well defined layers. Both layers consisted of stones in sizes 0,2-0,5m, but mostly 0,3-0,4m. Below the two layers of stones, close to the orthostats was a ring of rectangular stones (0,5-0,8m long and 0,2-0,4m wide and thick). The 0,1-0,2m distance between the ring and the orthostats was smaller stones placed. It seems to be a support structure, a kind of inner kerbstone layer.

The artefacts in the chamber are from LN and not from the time of the construction. A few sherds with cord impressions (tvärsnoddsteknik) outside the mound could be contemporary with the grave.

Charcoal samples from the layer under the mound and one sample from the chamber was C14 dated. The sample from the chamber is from LN. Two of the other samples which had lowest standard deviation gave approximately the same dating 3528-3008 cal BC and 3634-3094 cal BC. The charcoal samples are from a 0.05m layer of charcoal which covered an area of 5x6m under the mound. The excavator concludes that there must have been a fire at the place before the construction of the grave. It could have been just before the building of the dolmen as a part of the ceremonies or earlier remains of slash and burn farming. The position of the grave is rather close to the sea at the time, so this is not a typical farming area.

Jörlanda 120. Excavated and removed. Dolmen, almost quadratic, where one stone is fallen. One stone remains of a passage. Round mound with kerbstones. The dolmen was excavated in 1964 by L. Eriksson.

The chamber had 4 “standing” stones, close together and drywalling in the gaps. The originally 20-22 kerbstones are also standing stones with drywalling. The chamber had been plundered. There was a lot of shards, burned bones and fragments of charcoal. Charcoal was found under the flagstones in the passage. Charcoal was also found in three areas (0,35x0,4m) on the original ground under the stone layers in the mound (compare to Säve 57). The charcoal has not been dated.

The mound is constructed with two layers of 0,5-0,75m large stones mixed with gravel. The excavator calls it a “second set of kerbstones”, but in this case hidden in the mound. On top of theses stones is a layer of gravel mixed with quarts.

Outside of one of the kerbstones, close to the passage, were several shards belonging to a MN Funnel beaker found (fig 11.1). The other artefacts were from later periods.

Stenkyrka 222. Passage grave with round chamber, capstone, and a long passage. No kerbstones. There are indications of at least one threshold stone and doorframes. The passage was excavated by Ekhoff (Ekhoff 1882:311). The findings were small fragments of bone, flint, and shards.

Valla 98. “Gullhögen”. Passage grave with a small, rounded chamber (2m diameter,7 orthostats with partly well preserved dry-walling) and two long passage stones. Enqvist states that there had not been a capstone on the passage. There are threshold stones at the chamber entrance, in the middle of the passage and at the entrance. The opening to the chamber is triangular. Round mound (10-11m diameter) with kerbstones. The kerbstones at the entrance are slightly drawn in towards the passage stones. It resembles a ”stordysse” in Danish terminology. The floor of the chamber had, from top, ca 0,6m gravel with artefacts from later burial(s), then a 0,2m layer of yellow sand. Below the sand a floor of flat stones which continued in the passage. The original ground was 1,15m from the top.

Directly outside the entrance was a large flat stone under which there were several shards which have been dated to MN I. At one side of the chamber floor directly above the stone layer were a round

“battle axe” made of porphyry, a 30x35mm amber slice with a hole and an axe formed amber pearl and 2 ring formed amber pearls (Enqvist 1922:79-83). This type of round battle axe is known from several passage graves in Jutland (Nordman 1918).

Valla 50. Passage grave with a small, round chamber (8 orthostats and one remaining capstones). Passage with one remaining capstone. Round mound ca 10m diameter, no kerbstones. Outside the opening is a large flat stone on the ground. The floor of the chamber consists of (from top) 0,3m gravel, a layer of charcoal, 0,3m gravel and then a layer of flat stones. The orthostats are supported by smaller stones at the bottom.

The opening between the passage and the chamber is unusual. It seems to be a kind of keystone together with doorframes and a threshold stone, giving a small very exact rectangular opening of 0,4x0,65m.

Findings in the passage are parts of a thick butted axe, charcoal, an amber pearl (ring formed) and shards. In the chamber were two amber pearls and charcoal found. (Enqvist 1922:83-86, Ekhoff 1882:306).

Valla 27. Passage grave with rectangular chamber and a displaces capstone. No kerbstones. Ekhoff 1882:305. Findings from the passage close to the chamber are shards, charcoal, and a piece of hazel nutshell.

Valla 15. Dolmen with almost quadratic chamber, 4 orthostats (restored). Triangular entrance and a pair of low passage stones. The floor of the chamber had 0,5-0,6m filling of yellow sand. No findings. (Enqvist 1922:86-87).

Klövedal 1. Dolmen with almost quadratic chamber, 4 orthostats. No capstone. No visible passage stones. Round mound with high kerbstones. Enqvist 1922:85-86, Ekhoff 1882:299).

Långelanda 89. Long dolmen with remains of a dolmen and some of the kerbstones.

Stala 86. Dolmen with 5 orthostats (one missing), almost quadratic with caps tone. A pair of passage stones, triangular opening. There are two closely (0,1m) placed threshold stones. Round mound with fairly high kerbstones (only few remain). The findings are from secondary burials. The chamber floor was destroyed by a secondary burial, but there were remains of a layer of yellow sand and below the sand a floor of small flat stones. The sand filling continued ca 0,3m below the stone floor. The stone floor continued in the passage. Interesting to note is that under the original floor in the passage was a thick (up to 0,2m) layer of charcoal. No findings from the first burial, apart from possibly a flint arrowhead (Enqvist 1922:73-76, Ekhoff 1884:166).

Fig 10.2 “Hagadösen”. This famous dolmen shows a typical dolmen in Bohuslän. One of the passage stones remain in front of the dolmen. The triangular opening is unusually large and has probably been widened at the top. Photo by author.

Stala 81. “Hagadösen”. Dolmen with 4 orthostats, almost quadratic, with capstone. A pair of passage stones. Triangular opening with 3 threshold stones at the entrance to the chamber. Another threshold stone at the end of the passage. Round, low mound with stone packing and low, round kerbstones.

There is also a larger quadratic mound with some remaining small, rounded kerbstones. Ekhoff shows a long mound on both sides of the round mound and Enqvist only on one side. The gravel in the chamber was mixed with quartz. Under this layer a layer of yellow sand. In the chamber was a pit sealed with a flat stone. The pit was empty. Under the pit another flat stone which covered a layer of probably charcoal. There was no floor of flat stones in the chamber, only stray stones, which together with the pit shows a secondary burial. The passage had a floor of flat stones. The findings in the grave are from secondary burials (Enqvist 1922:72, Ekhoff 1884:163).

Tegneby 146. Passage grave with rectangular chamber (4x2,5m). The capstone is broken and fallen into the chamber. The passage is long, 4,5m. There are stones outside the back of the chamber and a 0,6m opening in the chamber which could indicate that it has been a small additional chamber, see drawing in Ekhoff. These small antechambers are not known in Bohuslän but exist in Denmark. An excavation to try to identify if it is an extra chamber would be of interest. No kerbstones (Ekhoff 1884:168).

Tegneby 111. Passage grave with rounded chamber (2,5m diameter), one capstone and a long passage. The chamber had, from the top, gravel and earth (0,2m), yellow sand 0,3m and then a layer of rounded small stones. Excavated 1915. Findings amber pearls and shards outside the passage. Excavated 1915, partly restored (Enqvist 1922:65, Ekhoff 1884:170).

Tegneby 54. Passage grave with rounded chamber (or maybe a bit square with the entrance in the corner, ca 2m diameter).The original capstone is split into two/three parts. The floor had a 0,6m mixed filling of sand and small stones on top of a layer of small flat stones. Short passage with a triangular entrance to the chamber and a threshold stone at the beginning. Outside the entrance were a lot of sherds (especially under a flat stone). In the chamber was for example an axe of Fredgaards type and an amber pearl. Outside the entrance were sherds of a pedestal bowl (reconstructed) and two spoons. Excavated 1915 (Bagge 1934, Enqvist 1922:54-58).

Tegneby 28. Leby. Passage grave with rectangular chamber (5x2,5m). One of the largest in Bohuslän. Two remaining capstones on the chamber and three capstones on the passage. The mound is 18m in diameter and ca 2,5m high. There are indications of low kerbstones.

The passage is not exactly perpendicular to the chamber. This is very unusual. It must have been constructed that way for some reason. Maybe because of practical reasons, there was a large stone under the surface making it impossible to set the side stones of the passage in the ground where it should have been? Or did they want the passage in a specific angel and after having built the chamber, they realised it was slightly misplaced? There are a few passage graves in Denmark with the passage at an angle, for example at Mariager, Randers (Fr.nr. 17132).

The chamber was filled up to 0,5-0,75m under the ceiling. The layer was around 1m thick. It was a mix of gravel, earth, sand, and small stones. There is no mention of a floor. The dry walling in the chamber has a couple of specific solutions. In two openings are rounded stones used and in one larger opening is a standing triangular stone used in the middle and then the dry walling is put in place. A similar solution can be found in Denmark for example at the passage graves in Örby on Samsö and Dalby on NW Funen (Andersen 1993:55). Another construction detail is also resembling Danish graves. Outside the orthostats are flat stones are used to further seal the grave. Similar sealings were also found between the capstones. The passage has three closely placed threshold stones at the entrance and a doorframe with a threshold in the entrance to the chamber. The upper doorframe stone is placed on top of the first pair of passage stones and on this stone is both the first capstone in the passage and one of the capstones on the chamber resting. This is a keystone principle also found in Denmark. Very few findings, an amber pearl, and small shards (Bagge 1934). As in other excavations at the time, there is no interest in the mound. Excavated 1915 (Enqvist 1922:59-65, Ekhoff 1884:172).

Morlanda 267. Dolmen of undefined architecture with kerbstones. Ekhoff describes 4 stones which may have been the orthostats of the chamber and two misplaced stones which may have been the passage. There were 17 low, (up to 0,9m) flat kerbstones and a large (1,8x1,5m) capstone(?), when Ekhoff visited the site, not there anymore. Very close to Morlanda 266 (Ekhoff 1884:159).

Morlanda 266. Long dolmen with rounded chamber (5 orthostats, ca 2m diameter) and a large capstone (broken). One remaining stone in the passage. The chamber is in one end of the mound with the opening vertical to the mound. The mound is 17-18m long and 6-7m wide. Ekhoff counts to 20 standing high kerbstones, the highest over 2m, and one laying down (Ekhoff 1884:156-159). Are there development stages in this grave?

Röra 39b. Dolmen with square chamber (ca 1,5x1,5m). No capstone. A pair of low passage stones. Mound (ca 6m diameter) with high, flat kerbstones. There were 9 remaining kerbstones at the excavation 1916, and it should originally have been 12. Triangular opening. The chamber was filled with gravel mixed with quartz. Below was a floor of larger flat stones, ca 0,15m below the level of the floor in the passage. Under the floor was yellow sand. Findings in the chamber, sherds, and a flint knife. The knife was stuck into the dry walling (Enqvist 1919:145).

Röra 39a. Passage grave with rounded chamber (7 orthostats, 2 missing, up to 3,5m in diameter). Capstones on the side? No visible passage, but there is a (triangular?) opening in SE which may indicate a passage. There may be passage stones there still covered by the mound. Ekhoff defines the grave as a dolmen but states that the stones are standing straight, not leaning inwards as in dolmens. He concludes that it is a dolmen based on that there is no passage. It resembles a passage grave of the common rounded type in Bohuslän (Enqvist 1922:70, Ekhoff 1884:154).

Bokenäs 43. Passage grave with rectangular (irregular) chamber. The purpose has not been to make the chamber exactly rectangular. Three capstones on the chamber and two on the passage (a third missing). The passage is not centred on long side. There are two doorframes, one in the entrance to the passage and one in the entrance to the chamber. The threshold stone is a bit out in the passage which could be a way to support a door. The inner capstone of the passage rests on the lintel (upper part of the doorframe 0,25x0,16m) and the middle capstone of the chamber rests on this capstone. Especially the passage with doorframe arrangements shows that the builders were technically skilled.

Mound with low kerbstones which are drawn inwards to the passage. In this area is a large “threshold stone”, slightly higher than the floor. There were very few findings, flint, amber pearls, and sherds. One very simple pot was reconstructed. Excavated 1887 (Ekhoff 1887:320-323, Gustavsson 1888). This is one of the most well-preserved passage graves in Bohuslän, but only the capstones can be seen.

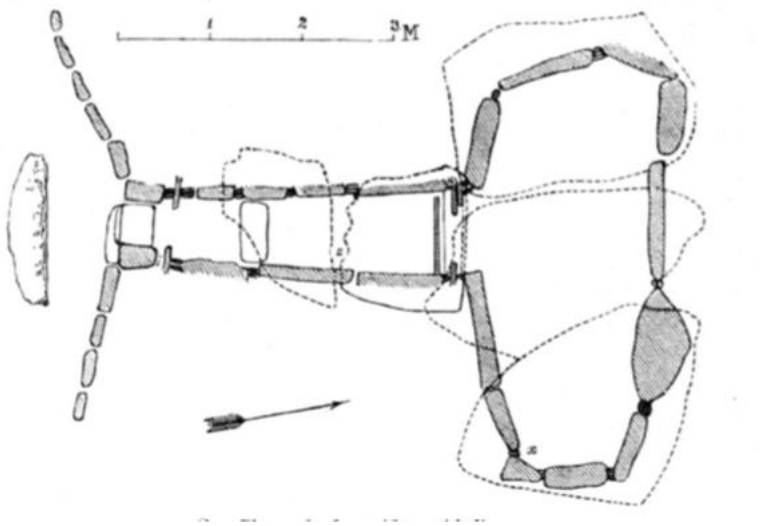


Fig 10.3. Bokenäs 43. From (Gustafsson 1888).

Bokenäs 77. Passage grave with rounded (oval) chamber. Two capstones (split stone). Two remaining passage stones. There is no floor in the chamber or passage, only clay. There is a destroyed doorframe and threshold at the entrance to the chamber. No remaining kerbstones, but traces of some stones. Few findings, flint, sherds, and two amber pearls. Two pots were reconstructed and are from later periods (Ekhoff 1887:314-320).

Skredsvik 154. "Gulmarsbergsdösen", Dolmen with rounded chamber, probably five orthostats, at least one orthostat missing. Possibly one passage stone. Mound filled with stones.

This dolmen was excavated by Hallström in 1913 and then a second time 1985-89 (the wrong dolmen was chosen by mistake, the intension was to excavate the other dolmen in the same area, which had not been excavated by Hallström). Charcoal was found, but not dated. May be difficult to decide exact origin of the charcoal due to earlier excavation (Ortman 2008, Ekhoff 1887:308-309).

Lyse 7. Passage grave with rounded chamber (6 orthostats, one capstone, 1,8m diameter) The passage had two 2,5m long wall stones and two capstones. The inner capstone was supporting the capstone of the chamber (keystone arrangement). There were doorframes at the entrance to the passage and at the entrance to the chamber. Outside the passage was a 1m flat stone on the ground. In the chamber was a layer of gravel clearly disturbed and under that a floor of small flat stones which continued out in the passage. The mound (15m diameter) was built of stones and had a thickness of 0,7m at the chamber orthostats.

A construction detail of interest is a thin stone, 0,9m long and 0,2m thick, which was set just inside the southern orthostat and just below the floor flat stones.

Under the stone packing was a 7m long and 0,1m thick charcoal layer (width unknown). No C14 published. The pits for the orthostats were dug through this layer.

Most of the findings were from the Late Neolithic (or later), but 5 shards of a MN vessel and two other shards was found outside the passage (more details in Jonsäter 1975 and Bagge 1934).

Excavated, removed, and rebuilt at Preemraf in 1971 (Jonsäter 1975)

Brastad 91. Passage grave with elliptical chamber (3,6x1,6m) and a large capstone (ca 5x3m). The passage is ca 4,7m and there is a demolished doorframe at the entrance to the chamber. The opening between the passage and the chamber is unusually small and triangular. In NW is an unusual solution with rounded stone. If this is an original stone, it may be like some graves in Denmark where the chamber has been closed with a final stone after the positioning of the capstone. It has been suggested that it is because the builders wanted another entrance to the chamber until everything was finished (Hansen 1993:45). The entrance to the chamber is unusually small which may have been a reason for the extra opening. The passage was partly excavated without any findings (Ekhoff 1886:447-449).

Tossene 211. Dolmen excavated and removed 1985 by Bertil Nordquist. The grave was partly destroyed but the form could be reconstructed. The chamber had 4 orthostats and one remaining passage stone. There is a threshold stone at the entrance. The excavator calls the dolmen "polygonal". Three stones form part of a square and the fourth is pointing a bit out from the square, at the opening. It is probably a square dolmen where the orthostats did not completely fit? One orthostat has been formed to make a triangular opening. The mound was partly destroyed, had a diameter of 5m and rounded kerbstones (0,4-0,5m).

The chamber floor was partly destroyed as in many dolmens, but the remaining floor shows two distinct floor levels, both with 0,1-0,3m flat stones. The passage also had 2 levels, but here the upper layer was

made of larger stones (0,3-0,5m). Four amber pearls were found in the chamber. A child´s tooth was found between the two layers. C14 analysis of charcoal in the chamber gave dates from the Iron Age.

The mound had larger stones in the bottom (0,3-0,4m) and smaller stones and gravel in a layer on top of the larger stones. The report does not mention any specific construction details in the mound apart from the large stones which probably was a stabilization of the orthostats. The report does not mention charcoal under the mound (Nordquist 1985).

Tossene 210. Passage grave with oval (irregular) chamber (7 orthostats, and originally one large capstone, now broken, 2,5x1,5m). 3,5m long passage. The orthostats have been pushed out of the original place, but it seems obvious that the passage was not perpendicular to the chamber.

Fig 10.4. Tossene 210. Photo by author.

The grave was excavated by Gustafson 1884 and then restored by Niklasson in 1940. This grave is exceptional in Bohuslän since both chamber and passage was filled with shell-mixed sand. It contained human remains and animal bones. The bones were mixed with the shell-mixed sand and in complete disorder. The passage was covered by a large capstone, still in place. Gustafsson comments that it seems plausible that the chamber had not been accessed, meaning that the disorder and packing of the bones was made at the closing of the grave. He also concludes that bones from the same individual was put in different places (chamber and passage). A lot of flint flakes and debris were documented next to the grave. Burials from about 13 individuals were recovered (Inventory no: SHM 7532). The MNI of the remaining human bone material was later estimated to six (Ahlström 2009: 82). Two of the individuals were dated to the MN, 3486-2895 cal BC, 95.4% (Ekhoff 1884:442-44, Niklasson 1940, Blanc 2020)

(The remaining individuals are being C14 dated as this thesis is written, personal communication)

$^{87}Sr/^{86}Sr$ from three individuals showed ratios which do not agree with the local baseline (Klassen 2020; Sjögren et al. 2009).

Bottna 141. Long dolmen with square (partly rounded) chamber (5 orthostats, 1,7m) and a large capstone (3x2,3m). Standing high kerbstones. The chamber is almost central in the mound. The chamber is regarded as closed by Ekhoff, but one of the orthostats (the eastern) is lower than the others, forming an opening. Ekhoff suggests that this is the entrance. That would in that case be a similar type of opening as Danish Type II dolmens. But there is also a low triangular opening towards the south, so it may be more reasonable that one of the orthostats has sunken and that it is a typical dolmen with triangular opening. No visible passage stones. The long mound is built of stones (Ekhoff 1879:128-132).

Kville 338. Dolmen of unknown architecture. There are remains of round kerbstones. The grave is built in a “shell-gravel” bank, which could be interesting for possible recovery of bones (Ekhoff 1879:124).

Fig 10.5. Kville 338. The grave is ruined by collection of shell gravel. Photo by author.

11 Artefacts

11.1 Pottery

The aesthetic and technical quality of pottery is gradually improving from EN to MNA and then degrading. The TRB pottery during MNA is regarded as the best ceramics in prehistoric Scandinavia (Malmer 2002).

A complete description of all pottery shards found in megaliths in Bohuslän was published in 1934 (Bagge 1934). Pottery from later excavations include Jörlanda 120, Lyse 7 and Säve 57. The findings are only from passage graves, with possibly single findings from dolmens originating from the initial burial. The most important findings are presented below.

The excavation at Valla 98 produced around 30 shards from a funnel beaker with 23-25 cm neck diameter of typical MN pottery. The patterns on the sherds are mainly double row “waves” or angles on the inside at the top and vertical lines at the neck on the outside. Valla 50 did not give many shards, but three small shards seem to come from the same pedestal bowl. The pattern is tightly crossing lines and waves. The shards are too small to give any understanding of the form of the complete pattern. The shards were found outside the passage.

Säve 57, a long dolmen, did not have many shards from the megalith period. The chamber had a few shards from a later period. Outside the passage were fragments of a funnel beaker with “snörornering” and vertical lines.

Jörlanda 120 had shards both inside the chamber and outside around the mound. Only 76 shards close to the entrance are from the megalith period. It could be combined to a funnel beaker of a traditional form with wave patterns at the top and vertical lines at the body.

Fig 11.1. Reconstructed funnel beaker from Jörlanda 120. Göteborgs stadsmuseum.

Tegneby 54 had an unusually large number of shards for Bohuslän. A couple of shards were found in the chamber, some were found in the mound, but most were found under a flat stone in front of the passage and probably saved because of that. In total some 250 shards. Some of the shards are from funnel beakers with cord impressions, vertical lines and horizontal double waves. The most interesting finds are several pedestal bowls and two spoons. One of the pedestal bows could be reconstructed since as much as 75 shards from this item were found. The diameter of the bowl is 32 cm. The pattern is large, hatched rhomboids on the outside. The inside has no patterns. There were fragments of at least five more pedestal bowls.

Fragments from two spoons could be reconstructed. The spoons are large with a diameter of 20 and 12,5 cm respectively. There were also fragments from a small cup without ornaments, ca 22 mm high.

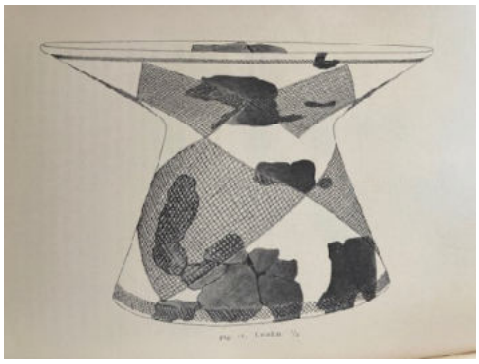


Fig 11.2. Reconstruction of pedestal bowl from Tegneby 54. The shards shown represent only part of what was found (Bagge 1934).

The passage grave in Leby, Tegneby 28, is an impressive megalith with a large rectangular chamber. Most of the shards (more than 200 in total) are here found in the chamber and passage. The shards show varying patterns. There are the usual wave patterns, crossing lines and vertical lines. There are some shards where pits have been imprinted on the inside which forms bulges on the outside. Some shards have imprints or pits and a few also with whipped cord patterns. The shards with pits are similar to shards found on Jutland (Müller 2018, Bagge 1934:239). Bagge comments that the shards represent several designs from a longer period.

Tegneby 111 had few findings, all at the passage entrance. Almost all the shards are from a pedestal bowl with similar patterns as the item shown in the figure above.

Röra 39b is a dolmen where a single shard was found from the megalith period. The shard is made of a rather coarse material and has 5 horizontal cord impression.

Bokenäs 43 is one of the largest and most elegantly designed megaliths in Bohuslän. All shards were found outside the entrance to the passage. Bagge concludes that most of the shards represents coarser and not very well-made pottery. Two shards are from a pedestal bowl of high quality, it has the typical checker pattern filled with tight crossing lines. There are also shards from a pedestal bowl of low quality. A possible conclusion is that the pottery of low quality is later than the high-quality pottery (Bagge 1934).

Lyse 7 had less than 20 shards outside the passage. Five could be combined to a small beaker with partly lines made with furchenstich technique. This technique is only known from Bokenäs 43 (on a small rather rough shard) and Skee 173, in Bohuslän. It is known from Skandia in a few cases and in Denmark (Müller 1918, figs 108, 115).

Skee 173 is a passage grave with the kerbstones drawn in towards the passage as at Bokenäs 43. There are shards from two pedestal bowls of which one could be reconstructed (fig 11.3). The other is represented by fewer shards but seems to be of a similar type as the one found in Tegneby 54. The well-preserved pedestal bowl has a pattern which is unique for Bohuslän. The pattern is made in Furchenstich technique.

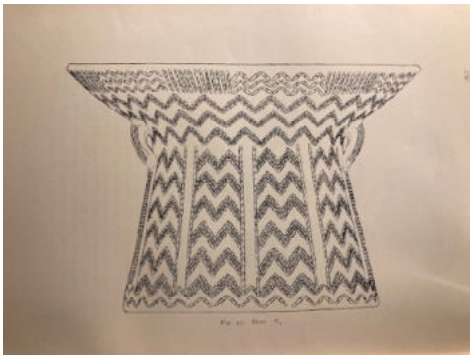


Fig 11.3. Reconstruction of pedestal bowl from Skee 173 (Bagge 1934).

Pedestal bowls and spoons are associated with ceremonies at passage graves. The form of the pedestaled bowl stands out as clearly different from the other TRB pottery and may relate to influences from central Europe (Malmer 2002:59). The pedestal bowl from Tegneby 54 has a pattern which is common in Bohuslän. The Skee 173 item is unique regarding the pattern while the inscription technique is common in southern Scandinavia. There is a fraction of the lowest part of a pedestal bowl found at the Rörby settlement, Tossene, which may have the same pattern (Kaelas 1953:16). The Skee pedestal bowl has stylistic similarities to the surface covering and graceful decorations of the Klintebacken style in Djursland (Kaelas 1953:26). The Tegneby 54 pedestal bowl also seems to have influences from Jutland, but the pattern with filled squares or rhomboids is also found in Scania and southern Denmark. The Scandian pedestal bowls generally have a more varied set of patterns than those from Bohuslän (Malmer 2002, Kaelas 1953:27). A pedestal bowl from Mogenstrup, Randers in northern Jutland described by Müller (1918:33) has the same pattern as Tegneby 54, with large (but smaller) hatched squares. This item also has a pattern on the inside of the rim as is seen in Scandia.

Fig 11.4. Pedestal Bowl from Mogenstrup, Randers Amt. (Müller 1918). Drawing made by Bodil Müller.

The shard with pits on the inside giving bulges on the outside (Tegneby 28) is interesting since it is seen as a late style. Müller (2018:56) presents a pot from the Gundestrup passage grave in northern central Jutland which shows how these bulges probably were used instead of a handle, maybe to simplify the production of pots. This pot is not ornamented.

Apart from stylistic influences across Kattegat there may have been transfer of pottery, as gifts or maybe as containers of food. To try to find shards which have been transported over the sea, shards from TRB and PWC contexts on the Swedish west coast and Jutish east coast have been analysed with modern technologies (pXRF, ICP-MA /ES and thin-section analyses). The result shows that almost all the shards have been produced locally or at least regionally. There are indications that a one shard from a pointed bottom vessel found at Kirial Bro, Djursland could have been transported across the sea. Pointed bottom vessels are very unusual in the area and the pXRF analysis shows similarities to southern Halland, where also pointed bottoms are more common (Brorson, Blank & Fridén 2018). The thin-section analysis shows that the production techniques are the same for the TRB pottery in all the regions. A fine clay is used, and it is tempered with crushed sieved granite or quartz. To find a shard which has been transported across Kattegat is extremely difficult since it must have been very few such pots in relation to the locally produced.

Some of the shards indicate that they have been produced at another site than the place where they were excavated, but not taken across the sea. One shard from Bokenäs 43 stands out in relation to the other shards from the area and is not produced locally. It could possibly have been transported to Bokenäs from southern Halland.

12 Falbygden

The megaliths of Falbygden have attracted attention for many reasons. There are an exceptional number of graves in a rather small area and almost all are passage graves. Many are unusually large and constructed primarily with limestone and sandstone slabs. But for modern research the most important reason is that due to the calcerous ground, bones are preserved unusually well.

Of the more than 600 dolmens and passage graves found in Sweden, 253 passage graves and 4 dolmens are in Falbygden, in an area not larger than 50x30 km (Blank 2021:21). The 4 dolmens have been discussed back and forth. In the dissertation by Sjögren some 20 years ago, only one dolmen and one possible dolmen was listed (Sjögren 2003:81). This is of course because the definition of what a dolmen is may differ and can be difficult to distinguish from gallery graves. The megaliths defined as dolmens in Falbygden are quite different from the typical dolmen of Bohuslän.

The passage graves in Falbygden have an appearance and architecture which is strongly influenced by the local building material, as in the other megalith areas. The slabs are limestone, sandstone and sometimes diabase. Limestone and sandstone slabs are excellent for walls and capstones, since they split into large laminas when cut from the ground. Compared to building a passage grave with rounded stones left from the ice age as in Denmark or from the stones found at the west coast, it is easier to build large chambers.

Blomqvist (1989) has collected layout drawings of many of the megaliths in Sweden. The 35 drawings of passage graves from Falbygden illustrates the overall differences in relation to the two other major Swedish areas as well as Denmark. Almost all the passage graves have elongated chambers and long passages. Very few have rounded ends of the chambers. The typical length of a passage grave chamber in Scania and Denmark is 2-3m, while the length in Falbygden is typically 5-7m (Ebbesen 2007). The few megaliths defined as dolmens do not resemble the dolmens in other areas. Falbygden differs from other areas in that there seem not to be a development (apart from the few megaliths defined as dolmens) from small dolmens to large passage graves. It seems as if the idea of a megalith grave was a passage grave with a large square chamber from the beginning.

The calcerous ground preserves bones to a much higher degree than in most other areas. This has given an unusual possibility to date the graves, or rather the bones in the graves. The dating of the dolmens and passage graves (as well as gallery graves) has been thoroughly discussed by Blank et al. (2020) in a paper given the very descriptive name “Old bones or early graves”. It is a well-known fact that there are secondary burials in the megaliths, as well as there have been old bones moved to new graves. The present view is that the majority of the burials in the megalithic graves are successive inhumations of whole bodies. But the moving around of bones cannot be excluded, which makes it very complicated to date graves based on the bones. It must be “proven without doubt” that the bones are from the original burial. In the referred study the bones have been chosen very critically, to reduce the risk of including other bones than the first burial. The study includes dolmens from Gotland (1) and Falbygden (4), passage graves from Bohuslän (1), Öland (1), Scania (6) and Falbygden (11). There are often several samples from each grave combined into one interval. The data below is from Blanc et al. (2020) Appendix 2.

Apart from choosing bones from the first burial it is also of interest to know if it is a dolmen or a passage grave. This is sometimes difficult, especially when the graves are partly destroyed. A dolmen can have different architectures as described above for the Danish dolmen classification. A given “need” according to the TRB culture can be articulated in different ways in different areas given the different material available. This makes it especially difficult in Falbygden, since only a few have been classified as dolmens and they do not represent a “standard set”. The dolmens have been classified in different ways by researchers over the years. They are described in some detail below. The four graves which in this study are defined as dolmens are: Tiarp 26:1 (Backagården), Falköping Västra 7:1 (Nedre kapellgården), Kinneved 21:1 (Slutarp) and Gökhem 164:1 (Frälsegården).

Backagården was partly restored in 1929 and then excavated and restored 2014 (Henriksson 2016). The chamber is 3,1x1m. The excavation 2014 revealed a slab dividing the chamber so that a small “antechamber” was formed. The grave did not have any findings, but when one of the long sides was removed, some small bones were found. One of these bones, a human rib bone, was dated to 3520-3355 cal BC (95,4%). Henriksson defined the grave as a gallery grave. Blanc et al. (2020) defines the

grave as a dolmen, primarily because it is a closed chamber with the side slabs leaning slightly inwards as is common for dolmens. According to the 1929 restoration there was a mound, which was restored then. It is a problematic grave to define. And the bone was found under a slab, making it difficult to know where it comes from. It may have ended up there during the 1929 restoration.

Nedre Kapellgården was excavated and restored 1959. It is a pentagonal 2-2,5m chamber with an opening towards the east. The chamber contained several disarticulated skeletons. The excavator defined it as a passage grave where the passage was destroyed. The reason was that the chamber had several niches. Sjögren (2003) redefined it as a dolmen due to similarities with dolmens in Bohuslän. Five individuals have been dated to 3506-2581 cal BC (95,4%).

Slutarp was excavated and restored 1910. It is a 1,1x2,2m chamber constructed by 4 slightly inward leaning slabs. There are extra slabs in the chamber, dividing the space. The eastern gable was low, like a threshold. One large capstone. The grave is defined as a dolmen. It contained many individuals. Bones have been dated twice. First five individuals were dated to 3501-2934 cal BC (95,4%) and one more was later dated to 3492-3103 cal BC (95,4%).

Frälsegården was excavated and removed 1934. The documentation is incomplete, but it seems to have been a 2x1m chamber in a cairn. It is defined as a dolmen. The chamber contained a skeleton of one individual in contracted position, dated 3335-2931 cal BC (95,4%).
Valtorp 2:1 is a passage grave with a 9x2m chamber and an 8m passage. It was completely excavated in 1962. The chamber was divided into small compartments. The MNI is set to 128. 24 individuals have been recently dated in the interval 3517-2627 cal BC (95,4%). A closer look at the data shows that only one individual of the 24 has a date before 3365 BC.
Karleby 105:1 was partly excavated in 2005. The chamber is 10x2m with a 5m passage. Three individuals have been dated to the interval 2905-2031 cal BC (95,4%).
Karleby 59:1 was excavated by Montelius and Retzelius. Bones were found in layers and in the passage was double floors. At the time skulls was of major interest, so 39 skulls in the chamber and 24 in the passage was taken care of. Three have been dated to MN, 3338-2910 cal BC (95,4%).

Karleby 57:1 was also excavated by Mongtelius and Retzelius. It is a passage grave 6x2,5m with an asymmetrically placed passage of 7m. They estimated that some 80 individuals were found. Two have been dated to 3330-2916 cal BC (95,4%).
Falköping stad 3:1 have been excavated several times. The chamber is 5,6x2,5m in a large mound of 24m in diameter. At least 26 individuals have been recovered. 8individuals have been dated to 3500-2672 cal BC (95,4%).
Falköping stad 28:1 was excavated partly in 1928. The chamber is 7,5x1,6 and the passage 7m. Three individuals have been dated, one to 3322-2902 and two in 2892- 2577 cal BC (95,4%).
Falköping östra 1:1 was excavated in 2008. The chamber was 8x2,5m with an 8m passage, which was partly rebuilt to a gallery grave. Two individuals in the chamber were dated to 3091-2881 cal BC (95,4%).
Luttra 16:1was excavated already in 1863. The chamber is 4,5x2,3m. 9 skulls were taken care of. Two of the skulls are dated to 3496-2914 cal BC (95,4%), the others were LN/EBA.
Gökhem 94:1 was completely destroyed and ploughed over when it was excavated in 1999-2001. The chamber, which had several niches, was 9x2m and the passage was 10m. A bone layer (or several) was found were at least 51 individuals were identified. Of these has 12 been dated to the interval 3330-2631 cal BC (95,4%).
Gökhem 17:1 is a rather small passage grave with a 2,7x1m chamber and a 4m passage which was excavated in 1987. At least 9 individuals from several periods were found. Two individuals have been dated to 3344-2903 cal BC (95,4%).
Gökhem 31:1 was excavated in 1987-89. It is a passage grave with an 8x2,5m chamber and 6,5m passage. A tooth from the entrance cairn has been dated to 3011-2679 cal BC (95,4%).

The eleven passage graves usually have bones from several individuals. The individuals from the same period are combined to one interval, which widens the interval. In the list individuals outside the EN and MN are not included. All intervals except three includes the ca 3365-3000 BC plateau in the calibration curve. The other three have intervals starting around 3000 BC.

13 Scania

The megaliths in Scania have a similar appearance as the Danish megaliths. They are primarily built by stone material from the ice age. Blomqvist (1989) describes 44 dolmens and 55 passage graves in the area. The graves with dated human bones are described below. There are C14 data from human bones only from passage graves in Scania (Blanc, Sjögren & Storå 2020). Also here are the LN and dates outside the period of interest not included. Some intervals include more than one individual.

Löderup 29:1, 3019-2580 cal BC. There were two floors. Three individuals were found, two on the lower floor and one in a pit under the lowest floor. All three with almost identical interval.
Löderup 18:1, 3496-2761 cal BC, 2 individuals, one from pit under floor, one from pit outside chamber
Ingelstorp 10:1, 2894-2496 cal BC, Passage grave with almost round chamber and niches. One individual.
Ö Tomarp 4:1, 3019-1530 cal BC, Passage grave with rectangular chamber and niches. Remains of several burials. Bones from two MN individuals were dated.
Fjälkinge 12:1, 3500-3018, Passage grave with MNI 24. Two individuals have been combined.
Skepparslöv 10:1, 3264-2917, Passage grave which have been rebuilt to a gallery grave. The original TRB layer is well defined. The MN individuals were combined.

14 Östergötland, Öland and Gotland

There is one dolmen in Östergötland. Öland has a passage grave with preserved bones. Gotland has a dolmen with preserved bones. These places are in the outskirts compared to the major Scandinavian areas and represents small colonies.

Västra Tollstad 12:1, Östergötland. It is a destroyed dolmen with bones from the Mesolitic to the Iron Age. 9 individuals have been included in the study. Two have earlier dates than the others (EN/MN). Seven are in the interval 3368-2876. Combining all nine gives 3627-2876.
Tofta 14:3, Gotland. 3501-1887. It is a large rectangular dolmen 3x1,5m. The dolmen contained 16 adults and 15 children, 20 are included in the study (Blanc, Sjögren & Storå 2020). The grave seems to have been used for a long period.
Resmo 85:1, Öland. This passage grave had at least 56 individuals. 29 were included in the study. They represent a large time span 3499-941.

15 Summary of C14 data for Bohuslän, Falbygden, Scania, Öland, Gotland and Östergötland

The diagrams (fig 15.1-15.2) show calibrated data for all the above dolmens and passage graves plus the only megalith with preserved bones in Bohuslän (Tossene 210).

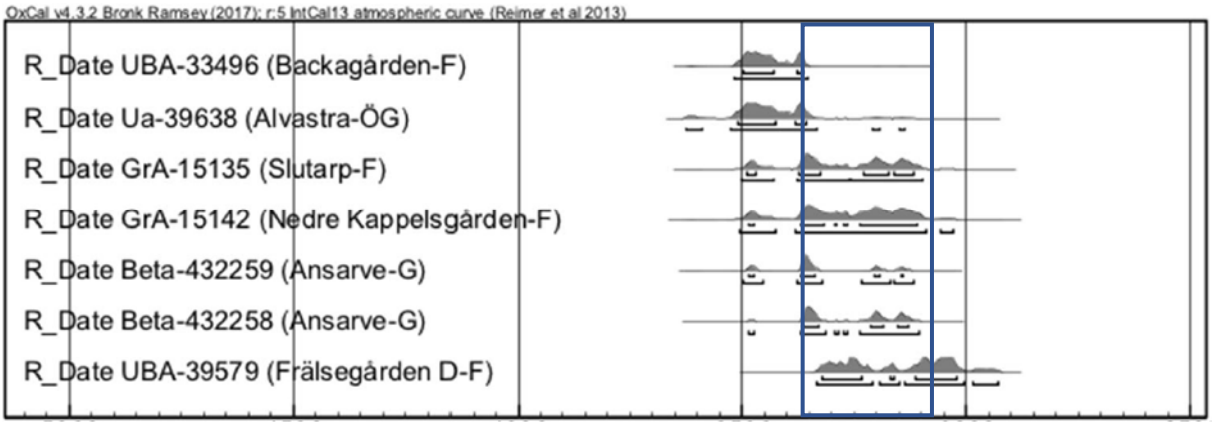


Fig 15.1. Calibrated C14 for the described dolmens in Falbygden, Östergötland and Gotland (Blanc et al. 2020). The plateau 3365-3090 BC (se fig 18.1) is marked by a rectangle.

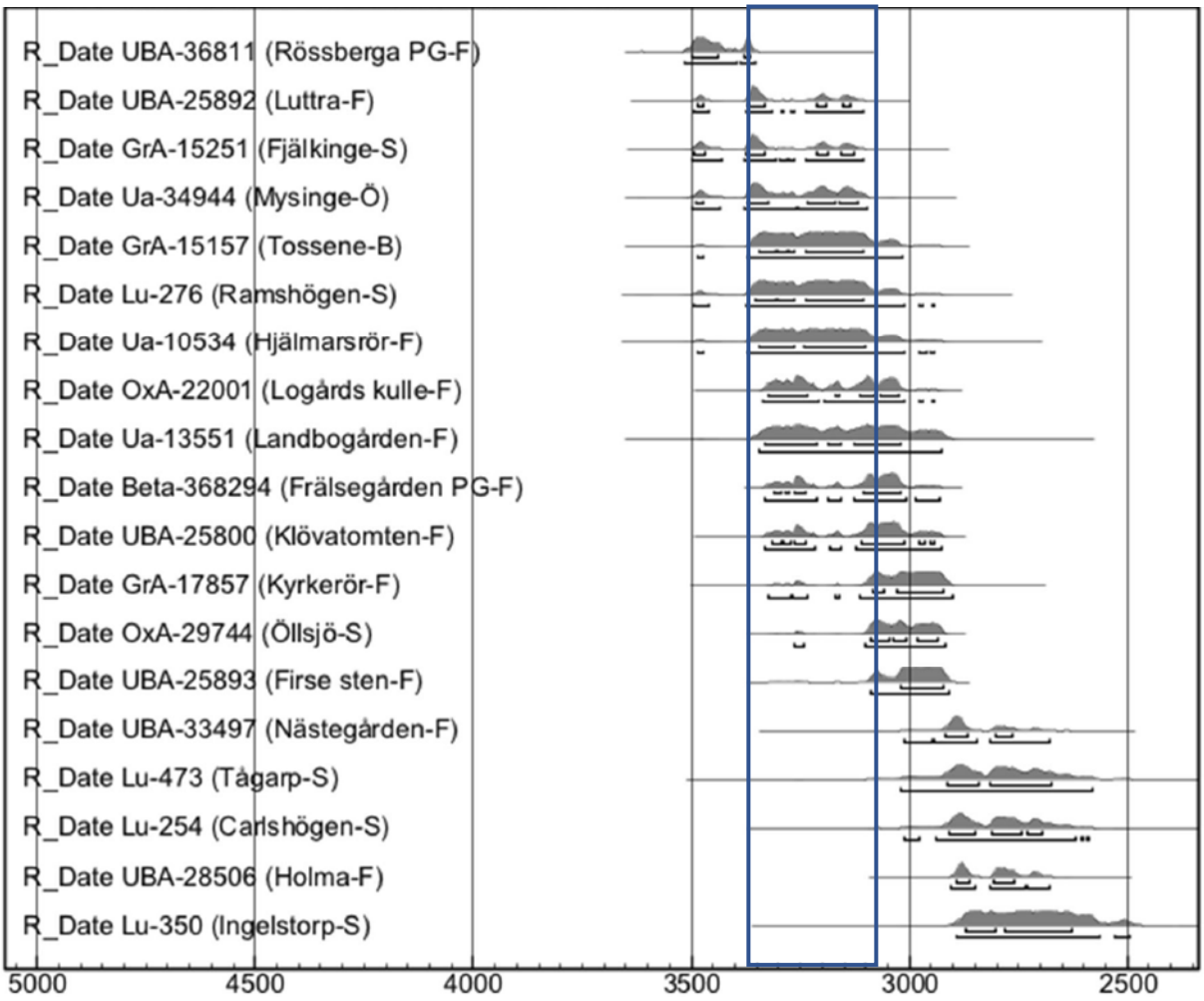


Fig 15.2. Calibrated C14 for the described passage graves in Falbygden, Scania, Öland and Bohuslän (Blanc al. 2020). The plateau 3365-3090 BC (see fig 19.1) is marked by a rectangle. The lower five passage graves are falling into another problematic part of the calibration curve.

Many of the graves would statistically have been built sometime during the plateau interval indicated by the blue rectangles, and during these ca 300 years it is not possible to know when. A few dolmens are clearly before the plateau and some passage graves after the plateau (where there are other

plateaus, which may lead to a misinterpretation regarding how long the building of passage graves continues). The statistical distribution is difficult to interpret. For example, the dolmen Frälsegården has approximately the same probability to have been built sometime in the interval ca 3150-3000 as in the interval ca 3350-3200.

16 Denmark

In the early stage of the Neolitic, from ca 3900 cal BC, there are primarily flat graves, in some cases with an earthen (low) long barrow. The elongated structures, sometimes trapezoid in form, are developing gradually.

The early earthen graves in Denmark have a large variability and can be divided into several different types depending on for example the timber structures. Three main structures can be identified Konens Höj, Troelstrup and a regular coffin.

Konens höj barrows have solid gables at each end of the floor. The gables are probably triangular built of timber deeply set into a stone packing. The timber seems to be formed into rectangular planks. There are examples where the timber is exchanged to large triangular stones. The planks on the sides are supposed to be leaning against the gables, giving the structure the form of a “tent”. The gables are solid, so the entrance must have been through the side. In many cases there is evidence that the structure was deliberately destroyed. In most cases by fire, but there are also situations where it seems that the planks were removed. The plank structure is self-supporting so stones, apart from the small stones supporting the planks in the holes, are not needed. This makes it difficult to find and identify the graves.

The Troelstrup barrows can be of slightly different constructions. It is always a long rectangular grave with the entrance at one end and there is some sort of passage in front of the entrance. The walls are constructed either with stone or planks. There are no traces of postholes, so the planks were self-supporting. The roof was flat, made of planks. There is a special version, called Lindebjerg, where there is a horseshoe bedding trench. The Troelstrup type graves have often been destroyed by fire.

The third type is a regular coffin constructed of planks on all sides and a top cover.

Most of the earthen long barrows found in Denmark are on Jutland. The barrows are most of the time destroyed (by farming), but there are a few cases where the barrow seems to be intact, for example the Rude barrow south of Aarhus. The hight of the barrow is here 0,7-1m. The form of the barrow is usually rectangular, but sometimes trapezoidal. In almost all excavated long barrows a façade is found in one end of the barrow. In some cases, the barrows are completely fenced or enclosed by a plank palisade. As with the graves, the façade seems to have been burnt. Outside the façade are pots, sometimes not broken, but under burned layers. There are often 2-3 up to 5 earthen graves in a barrow. The graves are placed centrally.

Rows of poles have been found along the barrows and sometimes transverse, dividing the barrow. In some cases, there are pits under the grave. Together this is regarded as poles for a house, maybe a mortuary house. These more complex barrows are often named “Barkaer” structures from the first site where it was discovered in the Djursland area.

All versions of earthen barrows may contain several bodies in each grave. In the few cases where the bodies can be identified, the skeletons are undisturbed and fully articulated. This could indicate that the burials are made at the same time (Madsen 1979).

The barrows presented above contain a wooden plank structure, sometimes also including supporting stones. Barrows have often been extended over time. The plank construction is then sometimes continued with a stone cist. The stone cists are built of thinner stones compared to the dolmens and are completely underground. Stone cists and plank-cists are at least partly built at the same time. There

seems not to be any significant difference between the wooden structures and the stone cist. Both are under ground and locked. The stone cist (dyssekiste in Danish) is regarded as a pre-stage to the first dolmens. The development from a wooden plank-built cist, with often a low earthen mound surrounded partly by a wooden fence or posts, to a long dolmen with a chamber is following a pattern in western and northern Europe (Schulz Paulsson 2017, Eriksen and Andersen 2011:99-114, Arthursson 2016, Kristensen 2019:40-46).

The Dolmen is the most common megalithic grave in Denmark. There are in total 3.216 registered. Most of them are in Zealand (1.229), especially in the north western part, and in Jutland (1.517), with the majority in the northern part centred in the Djursland area (Ebbesen 2011:168). The dolmens are divided into architectures or typology by the Danish archaeologists. The appearance of Danish, as well as the dolmens of Scania, are depending largely on the availability of stones in the area. The stones are almost always rounded since they were formed during the ice-age. The stones chosen usually have a flat side which is turned towards the chamber. In some cases, a stone is split (by natural forces), giving a perfectly flat side. Both parts are used in the chamber, so-called, twin-stones.

The simplest form of dolmen (type I) consists of four large stones arranged to form a square or a rectangle, covered by one capstone. The orthostats are leaning slightly inwards to stabilise the construction. The orthostats are placed as close to each other as possible, but still there may be gaps and they are usually filled with dry-walling, flagstones packed on top of each other. It is completely closed when the capstone is put in place. Type I also includes closed dolmens which may have more than four stones, but still small. To enter the grave, the capstone must be removed.

Type II dolmens are like type I, with the difference that one orthostat is lower than the others, forming an “entrance”. The understanding of this architecture is that it simplified to get into the grave, the capstone did not have to be removed.

Type III dolmens are generally larger, both in floor area and hight. The orthostats in type III dolmens are used “standing up”, using the longest sides, and there are frequently more stones on the long sides. To get a larger floor they are often also tilting more inwards. As in type II there is an opening, and this opening is sometimes marked by a pair of passage stones (without capstone).

Type IV dolmens are usually larger than the type III and they are polygonal (pentagonal, octagonal or rhomboid, round) and have two or more passage stones indicating the entrance. The passage stones do not have capstones and they do not reach all we way out to the kerbstones (if there are kerbstones).

In Denmark the passage graves have historically been divided into “stordysser” (“big dolmens”, sometimes the term extended dolmens is used) and passage graves. Stordysser is a special type of passage grave. It is a passage grave since the passage reaches out to the kerbstones and the passage has capstones, but the form of the chamber is elongated round, or “pear” formed, with the entrance in the pointed end of the chamber. It is often regarded as an intermediate form to the “proper” passage graves. There are in total 163 passage graves defined as “stordysser”. This type of passage grave is most frequent in the SE part of Denmark. There are almost no passage graves with this form in northern Jutland (Ebbesen 2011:205). Small, rounded chambers are present on Jutland (Hansen 1993:134-136) and Funen (ibid:93-94).

The passage graves (jättedysser) have many different forms and sizes, but they are generally higher and larger, it is sometimes possible to stand upright in the chamber. In the typical passage grave the chamber has a rectangular, or almost rectangular form. The passage starts in the middle of a long side and is perpendicular to the long side. The passage is long, lower than the chamber and usually lower in the beginning. There are also doors, or remains of doors, in the form of doorframes and thresholds. The passage graves are usually, initially from Montelius, divided into round (often small), elliptical and rectangular. The large rectangular are supposed to be the latest construction. There are in total 650 registered passage graves (excluding “stordysser”) in Denmark. They are especially common in

Zealand (325) and in Jutland (228). On Jutland most are in the Ålborg and Viborg area, the central to north-eastern part. The building of passage graves seems to have started slightly earlier in this area than in the rest of Denmark (Ebbesen 2011:215).

The megalithic long mound/long dolmen (including all the variants) is by far the most common mound type in Early Neolithic. The long dolmens are earlier than the round dolmens but continues into MN I. There are more than two thousand long dolmens in Denmark, with a concentration on Zealand and to some extent also in eastern central Jutland. The length of the mounds varies a lot, from as short as 5m up to more than 150m. The typical length is between 10-30m. The long mounds on Jutland are on average larger, but also very varying. The round mounds (dolmens) are generally later with the majority in MN I. The diameter of the mounds is typically 7-15m, but there are smaller and larger mounds. Dolmens with a round mound can be found all over Denmark, but the concentration is largest in the Djursland area and further inland in Randers Amt (Ebbesen 2011:157-64).

The different types of megaliths in Denmark generally have similar architectures in all areas. There are differences in frequency of some features between the areas, but there is almost no feature which is only found in one area. Some features are locally much more frequent, for example on an island. For example, on Samsö the chambers of passage graves tend to be “pointed oval”. The design on Langeland often has an asymmetric passage. This is also found on the west coast of Lolland, maybe an example of that the sea is the natural connection.

Differences between areas presented below are from Hansen (1993) and Ebbesen (2011).

- The type III dolmen is most common in NW Zealand and northern Jutland. 2/3 of all type III in these areas are long dolmens.
- The polygonal type IV dolmen is most common in NW Zealand and eastern Jutland, with the majority on Djursland.
- Dolmens are usually not placed on hill tops or in valleys in Denmark. They are in between (Eriksen & Andersen 2014:165).
- Jutland generally has many different designs of the passage grave chamber. One more common in Jutland than in other areas is a rectangular chamber with rounded ends.
- Niches, formed by placing one orthostates outside the others so that it becomes a niche between the two neighbouring orthostats, is most common in northern Jutland and northern Zeeland.
- Antechambers is characteristic for northern Jutland, with 25 passage graves including antechambers, while the rest of Denmark has only 4.
- Several of the later passage graves have kerbstones which are rounded in towards the passage, giving a place (for ceremonies?) in front of the opening. This is especially frequent on Jutland.
- Passage graves in Denmark and Scania do usually have keystones. A feature which is more common on Jutland is a construction where the orthostates at the entrance is higher than the others and are wedged between the roof stones. This locks the orthostates, the roof stone of the chamber and the first roof stone of the passage. Another more common feature on Jutland is that the keystone at the same time is the first stone in the passage and takes wight from the ceiling and at the same time keeps the distance between the corner stones in the opening. The keystone must in these cases be slightly triangular. There are sometimes two keystones on top of each other.
- On Jutland it is common that the orthostats are placed so that they are leaning on each other, one after the other. This may show the order in which they are set in place.
- The flat stones of the dry walling are usually horizontal. But in some dry walls in Jutland the stones are tilted and then also partly outside.

16.1 C14 dating for Denmark

The established Danish view of the time intervals of interest can be divided into three main periods. The "Barkaer structures" or long mounds period (3750-3450), the dolmen period (3450-3250) and the passage grave period (3250-3150). This is of course not exact, and the periods are overlapping. This means that the later dolmens and passage graves are built at the same time. The type I and II are primarily built in EN, while the types III and IV are built in MN Ia, the larger polygonal dolmens continue into MN Ib. The passage graves are built in MN Ia and MN Ib. The larger and longer passage graves are only built during MN Ib (Eriksen and Andersen 2016:50-53, Ebbesen 2011).

The periods are based on both analysis of artefacts and C14 datings. Looking at only the available C14 data to understand the absolute time frames gives a basis for analysis and comparison to other areas.

Shultz Paulsson (2010) presents 17 C14 datings from long mounds. Nine of the dates are from before the construction of the grave (settlement layers under the grave, pits etc), which can be used as an indication of an earliest start date. The latest of these dates from before the construction is Konens Höj 3654-3511 cal BC 95,4%. Eight C14 dates are from the graves and are representative of the period of construction of long mounds. The period for construction of all these graves combined is 3652-3387 cal BC 95,4%. The samples are from coal in the graves and one bone from within a grave. The number of graves is low, but the dates are all in the same period which could be seen as at least a good indication of the long mound or Barkaer period. More data is needed to draw reliable conclusions. Notable is that the period based on the available C14 data here is around 100 years later than what was presented above. The length of the long mound (Barkaer) period is the same, ca 300 years.

There are few C14 results published from dolmens in Denmark. More data is to be published soon (Sjögren & Fischer in press). Schulz Paulsson (2010) has made a critical analysis of the published data. A bone depot at Klokkehöj (Funen) has four bones dated to the period 3370-3100 cal BC. A bone from Trekoner dolmen is dated to 3365-3022 cal BC 95,4%. Two coal samples from the long dolmen Vroude Hede are dated to 3630-2941 cal BC 95,4% and 3645-3101 cal BC 95,4% respectively. Other samples are from before the construction. Kjellbäcksgård, a pit outside the grave (3645-2930 cal BC 95,4%) and under an orthostat (3786-3098 cal BC 95,4%). From an unknown context at Ölstyckke 3704-3116 cal BC 95,4%. The few samples which can be connected to the building, or first use of the grave, are all in the plateau with a small tendency towards earlier dates. Another indication that the dolmens are from the earlier part of the plateau is a study made on small islands south of Funen, where EN artefacts were found in 22 out of 201 megaliths (Skaarup 1985). The few available C14 dates indicate a later start of the dolmen period than presented above. But again, it is too few samples to draw any reliable conclusions.

The C14 dates presented above are reasonably well connected to the initial construction or use from the megalith period in Denmark. There are 8 C14 dates from Danish passage graves that without doubt are contemporary with the construction. They are from the birch bark found between the drywalling slabs. The C14 samples from Birch bark show that 7 of the 8 passage graves were built primarily in the period 3300-3100 cal BC (the plateau) with a clear tendency that three can be later (all on Zealand). One has a very small probability of being earlier. One of the samples, from Zealand, gives a later date (3019-2876 cal BC, 95,4%). It is only one grave, but it may indicate that the construction of passage graves continued longer there. The TRB culture continued longer in eastern Denmark (Egfjord 2021:2, Iversen 2015). Given that these graves are representative and according to the authors they are not of any unusual type (three are a bit larger than average) (Dehn and Hansen 2012), the C14 samples from birch bark represent a longer time frame, when including the Zealand grave, for construction of passage graves than the main period presented above and often referred to. But the construction period on Jutland seems to be short.

Fig 16. Birch bark between the stone slabs in the drywalling (Dehn 2012).

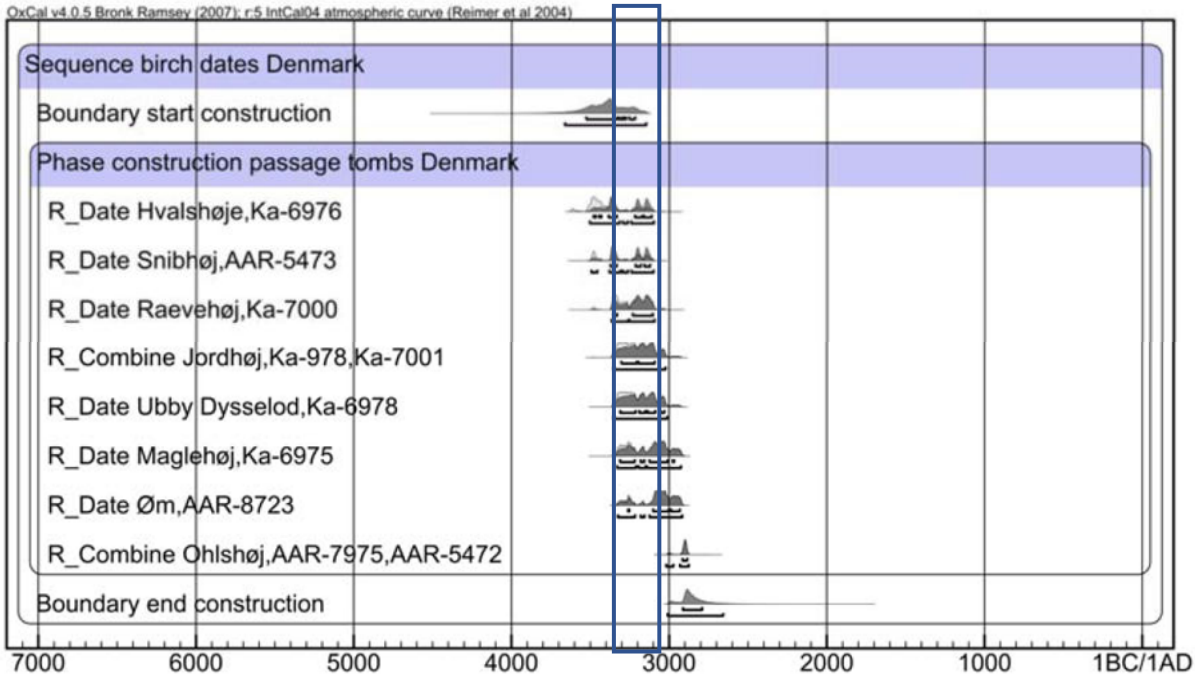


Fig 16.2. Calibrated data for the 8 passage graves with birch bark in the dry walling. (Schulz Paulsson 2010). The plateau 3365-3090 is market with a blue rectangle (see chapter on dating).

The estimated number of passage graves in Denmark, before destruction of most of them during the last few hundred years, is estimated to some 40.000. During the most intense period it must have been more than one "inauguration" of a new grave per week. Or did they build them at the same time every year or with longer intervals for specific celebrations? It must have been a big event when they were finalised. People discussed and admired the different architectures and construction methods. Hansen

(1993) has seen the construction of several megaliths in detail during restorations and he believes that some have the same builder. Maybe experts travelling around to do the constructions together with the local people.

The CONTACT project was focused on the PWC culture on western Sweden and eastern Jutland. A pit (A47) at Kainsbakke, the largest known PWC settlement in Denmark, gave several C14 dates from both TRB and PWC in (partly disturbed) stratigraphic layers which made it possible to use Bayesian methods for dating (Philipsen, Iversen & Klassen 2020). A pit used by a TRB group was later opened by PWC people. The stratigraphic order was then partly disturbed, but the order of use could be identified. The pit is a part of a reused ditch from a cause-wayed structure where three more pits are included. The lowest layer is from the late EN, ca 3400 cal BC. The conclusion is that the TRB activities ended at ca 3100 or at 3000 at the latest. As stated by the authors, the plateau in the calibration curve makes it difficult, the dates can be closer to 3300 cal BC. This is from a settlement and only one pit, but it is an interesting indication on the possible final stage of the TRB on Djursland.

17 Northern Germany

There are many megaliths in the northern part of Germany, primarily in the states Mecklenburg-Vorpommern and Schleswig-Holstein. As in Denmark and Scania most of the graves have been destroyed by farming. It is estimated that only some 10% of the graves are still to some degree preserved. Reports from Rügen show that 236 monuments were known in 1829 and today there are 56 preserved. In Niedersachsen only 13 graves remain of 236 reported in 1846 (Ross 1992; Schuldt 1972). Graves were of course also destroyed in earlier years. Sprockhoff (1965,1967, 1975) reported almost 1000 graves in total in northern Germany.

Dolmens (in German “Uhrdolmen”) are evenly distributed across the area. The passage graves are rarer, with a distribution primarily in Mecklenburg. Chamberless long barrows are mainly found in SW Mecklenburg and the neighbouring part of SE Holstein.

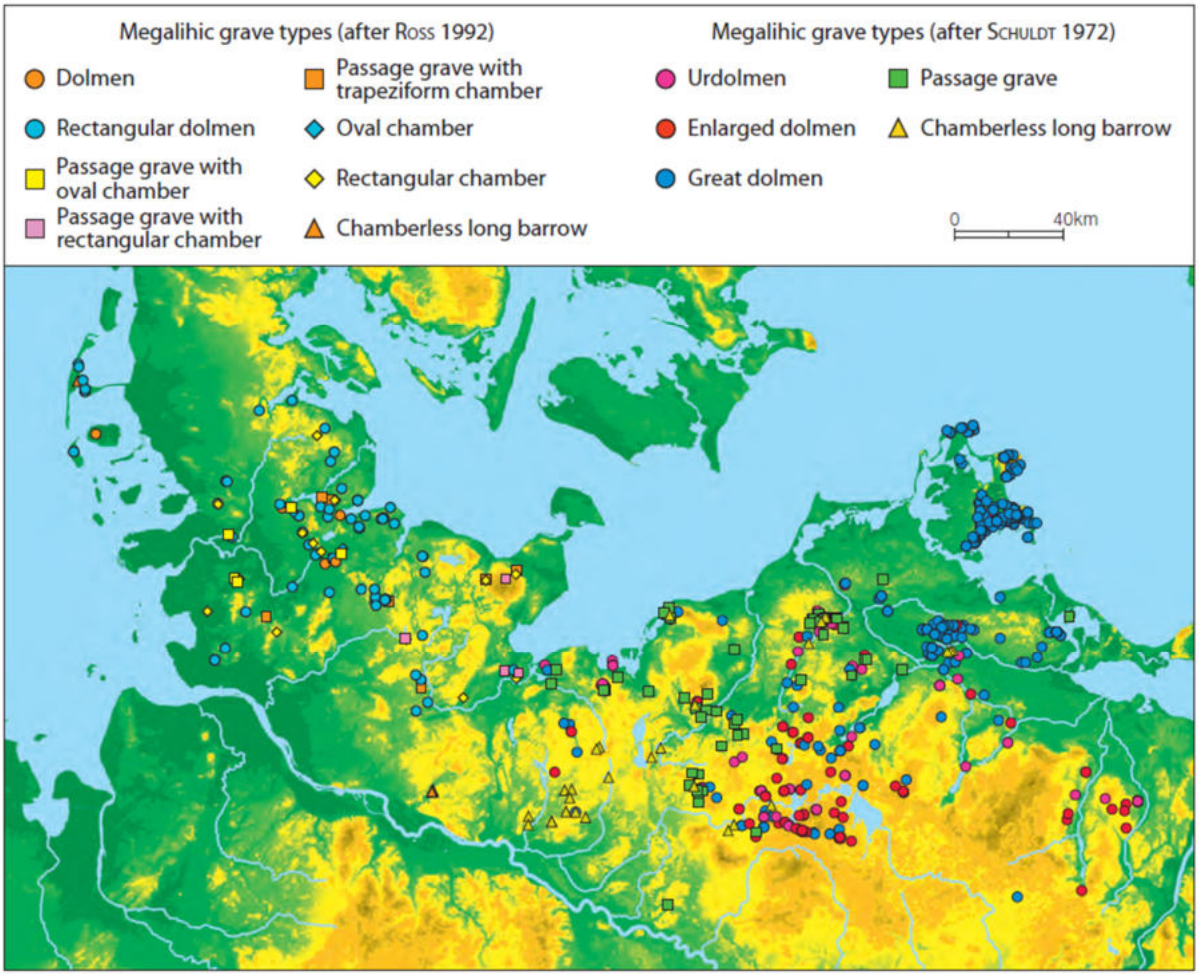


Fig 17.1. Distribution of graves according to Ross (1992) and Schuldt (1972). Note that they use partly different classifications.

17.1 Building sequence of grave monuments and absolute dating, Flintbek LA3

It is very unusual with stratigraphic sequences where several layers can be C14 dated. A barrow in the Flintbek region gave the possibility to use Bayesian statistics to produce dates with high accuracy for the successive stages of the building process (Mischka 2011a, 2011b). Barrows with development in many stages are often giving important evidence of the sequence of the grave architectures as well as dating. Flintbek is one of the best examples of this. The development can be divided into seven phases. The monument is best known for the cart marks, one of the oldest know today, but the ability to date all the stages is at least as important.

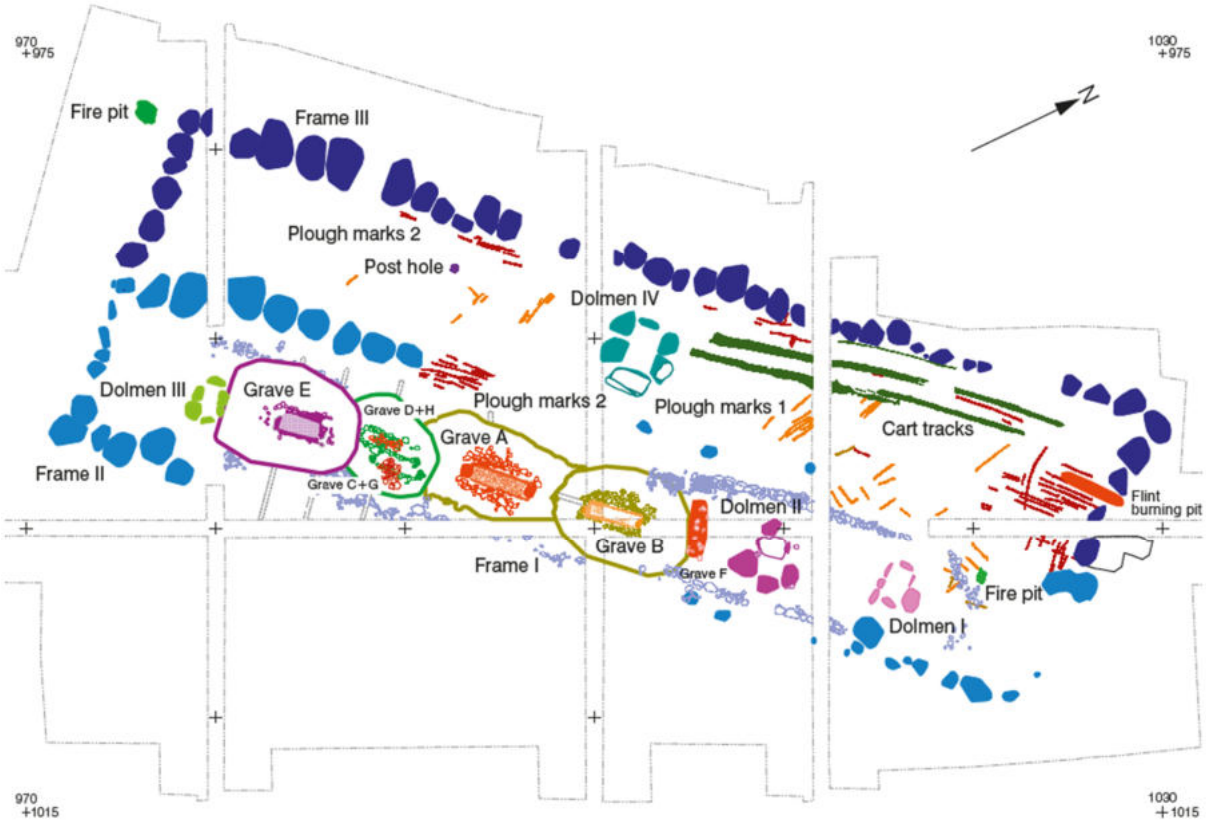


Fig 17.2. Flintbek LA3. The barrow with the included developments in different colours (Mischka 2011b).

The first grave (A) is a plank built grave with an oval shaped tumulus which was built from two ditches along the sides of the grave. This is a grave of the so-called Konens Höj type (Madsen 1979). The second grave is of the same type (B). It can be seen from the tumulus which slightly covers the first tumulus that it is built after A. The next phase is Graves C and D, close together like a double grave, and build above A. The grave pits are slightly concave, indicating that it was wooden coffins. Thereafter grave E is built, another grave of Konens höj type. It is partly built on top of C and D. This grave differs from the other in that burned flint is used as a floor. The graves are now together forming a low barrow. At this stage, two graves (G and H) are built on top of C and D.

Then the first megalithic graves are built, two dolmens I and II, following along the same line as the other graves. In both dolmens there had been a fire above a central pit before the orthostats were erected. The orthostats were placed in pits and supported by packing stones. The openings between the orthostats were closed by dry walling. The capstones were gone. The border of the barrow was covered by small stones.

A non-megalithic grave (F) was put between the two dolmens and the earlier graves. It is not clear if it is built before or after the dolmens.

A third dolmen (dolmen III) is added in the other end of the long barrow and the whole mound is now fenced with large kerbstones. The floor was covered by burnt flint and there was charcoal.

Finally, dolmen IV is built besides the long barrow and the complete installation of graves is fenced by kerbstones. Some of the stones in the new border seem to have been taken from the earlier part and moved out. The sequence of grave building shows how the idea of a grave changed over time. There is no passage grave yet.

During the excavation several C14 datings could be made. Dolmens I, II and IV had bone fragments preserved. Dolmen II had at least three individuals, one adult, one child and probably an old person. There were in total 32 C14 datings, primarily on charcoal from the grave constructions or fillings. The charcoal was from short lived species such as hazel, so there is no problem with the old wood effect. Graves A, B, D, E, and dolmens I-IV were dated. Dolmen II and IV with bones.

As always, it is a problem to decide if a sample is contemporary with the grave. Given the sequence, this problem can be reduced. A sample which does not fit into the sequence can be questioned. The time intervals are earlier than most of the samples from Sweden, meaning that they are not in the plateau part of the calibration curve. The curve is "N shaped" in the actual interval, so this would still be a problem, had it not been for the sequence of the samples. Since the samples can be ordered, Bayesian statistics can be used to choose the right part of the curve as shown in fig 17.3. For a thorough discussion on the choice of samples and the use of Bayesian statistics see Mischka (2011b).

The result from the Bayesian calculation shows that the entire span from grave A to dolmen IV is ca 140 years, between ca 3500-3360 cal BC. If dolmen IV is not included, the period is only ca 100 years, ending at ca 3400 cal BC. At Flintbek, the change of burial customs from plank-built coffins to dolmens is around the middle of the century 3500-3400 cal BC. Flintbek is not far from southern Jutland and the Danish islands, indicating that first dolmens probably are constructed there at approximately the same time.

The main reason making it possible to get this exact dating is the form of the curve at this period and that the ambiguities of the curve can be eliminated with the stratigraphic information. Unfortunately, even with stratigraphic information in the plateau 3360-3090, it will be more difficult to get the same type of exact dating due to the form of the curve, with several low "waves" within the plateau.

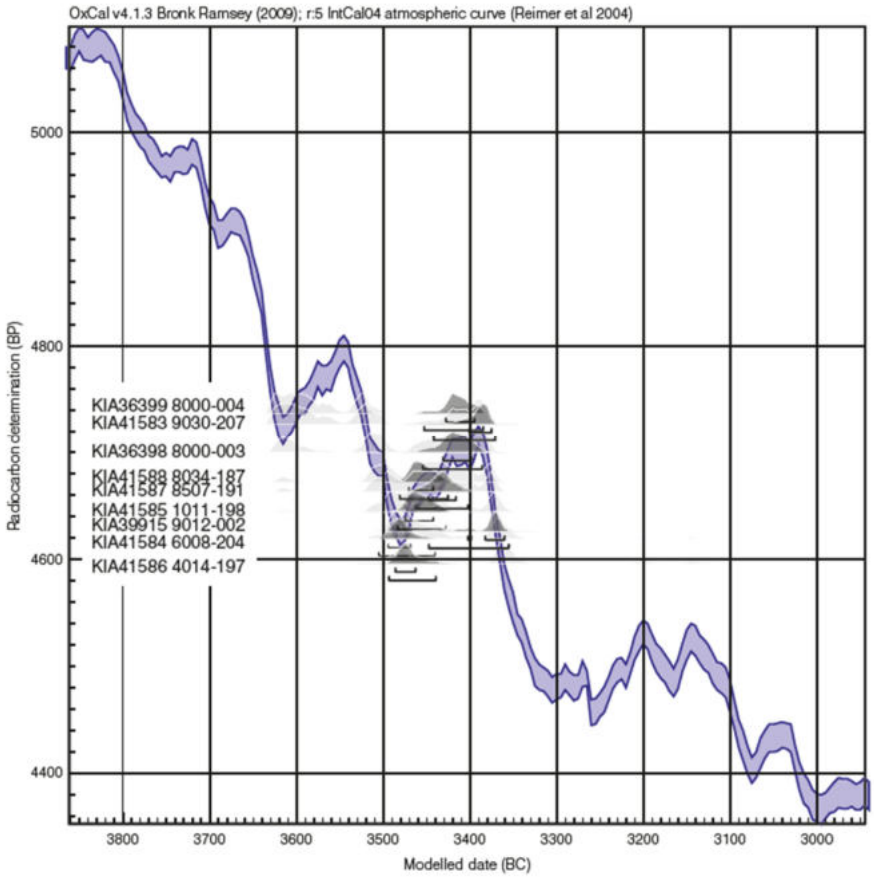


Fig 17.3. Calibrated C14 results for 8 samples. Bayesian statistics based on the stratigraphic sequences. The parts of the calibrated data which can be neglected through Bayesian statistics is shown in light grey.

18 Architecture and construction principles

There must have been a common understanding of the necessary features of a megalithic grave related to rites, as well as general architectural design. These requirements changed over time. This "ideal form" made local adaptions using the available material and resources possible.

To analyse possible influences from Jutland to Bohuslän regarding megalith design, the gradual development of new architectures on Jutland can be compared to the megaliths in Bohuslän. The comparison is made both at the "architecture" level as well as construction details (Chaîne opératoire theory).

The earliest graves of Barkaer or Konens höj type have not been found in Bohuslän (yet). The Danish dolmen types (functionality) compared to dolmens in Bohuslän can be summarized as follows:

Type I is a closed dolmen, usually with four orthostats. There may be more than four stones and it can be slightly rectangular. The orthostats are leaning slightly inward to make the construction more stable. To enter the dolmen after final construction, the capstone must be removed. It is generally accepted that the capstone was visible above the mound. There are very few clearly defined closed dolmens in Bohuslän. It is often difficult to decide if it is closed or if there is an opening between the orthostats since they often are displaced from the original position. Possible examples of closed dolmens are Skee 272 (maybe a long dolmen) and Lyse 192.

Type II is a dolmen with similar construction as Type I, with the difference that one of the orthostats is lower, forming an opening. From a functional point of view this is the same as the triangular opening

found on many dolmens in Bohuslän. To form a triangular opening with the rounded stones available on Jutland would have been very difficult. The triangular opening is a technically better alternative since the four stones still can support each other. The thinner stones used in Bohuslän can more easily be formed (or chosen) to make a triangular opening. Dolmens with a triangular opening and no passage stones are very unusual, maybe represented by Bottna 141.

Type III is larger with more orthostats, "standing up" to get a higher ceiling and the orthostats are often leaning more inwards to produce a larger floor. There may be a pair of low passage stones, indicating the entrance. Stones of all sizes are easily available in most parts of Bohuslän, so the concept of a standing stone is not applicable. A larger area can be obtained with wider orthostats instead of adding extra orthostats to increase size. Dolmens are of different sizes and hights, it is difficult to define the "threshold" between type II and type III in Bohuslän, unless there are passage stones. Possible examples Röra 39b, Stala 81, Valla 15

Type IV is also a large dolmen, but the chamber is polygonal (at least five orthostats). There are two or sometimes four passage stones (not reaching the kerbstones). All dolmens with more than four stones are often seen as polygonal, but that is debatable. There are dolmens with five orthostats which are almost quadratic, since one wall is made of two orthostats, sometimes with the triangular opening between these two smaller stones. Examples of this type of dolmen which probably is a type III are: Lur 43, Stala 86 and Långelanda 60. Examples of polygonal dolmens are: Lyse 165 and Morlanda 266.

Many dolmens cannot be categorized, they are in different stages of decay. If the builders of a dolmen with four orthostats or a dolmen with five orthostats, both with a rectangular opening, regarded them as functionally or architecturally different is impossible to know. Size may have given status; it seems to be an eternal quality.

The passage graves have many sizes and forms of chambers as well as lengths of the passage. The pear formed "stordysse" may be represented by Lyse 7, Tegneby 54 and Stenkyrka 222, but most of the small dolmens are round in Bohuslän. There are large oval chambers both in Jutland (and other parts of Denmark) and Bohuslän. The "final form" with a large rectangular chamber sometimes with a mound which goes inward at the passage, forming an area in front of the entrance, is more common on Jutland than in other parts of Denmark and is also found in Bohuslän, for example Bokenäs 43.

It is thus possible to follow a potentially similar development of megaliths in Bohuslän and Jutland. Jutland follows to a large degree the other parts of Denmark.

18.1 Keystone solutions

Keystones are used in passage graves to distribute the weight of the (middle) chamber capstone positioned at the passage, so that the capstone should not fall into the chamber or push the orthostates sideways or towards the passage. The problem is often handled in different ways in Bohuslän and in Denmark/Scania. The capstones in Bohuslän are not as heavy as they are in the areas with the rounded stones from the ice age, reducing the need to handle the weight from the capstone.

There are primarily three ways to handle the keystone function in Bohuslän. Many passage graves seem not have any keystone construction; the capstone is resting on the two orthostats on each side of the opening. Some passage graves have a triangular opening like many dolmens, which leaves no opening between the orthostats at the entrance and there is no need for a keystone. In passages with larger openings to the chamber, it is sometimes a keystone construction where the capstone of the chamber rests on a keystone or capstone of the two innermost stones of the passage. This distributes the weight between the two orthostats at the opening and the two innermost stones of the passage. Bokenäs 43 is an example of this solution.

18.2 Birch bark or chalk between the dry walling slabs

Birch bark has been found in between the slabs in the dry walling in 8 passage graves in Denmark, primarily on Jutland. In other cases, there is crushed chalk (Hansen 1993:63). The reason for the use of material between the slabs is not understood. Both chalk and birch bark are white, so it may be design. The floor is often covered with burned flint in Denmark and crunched quartz on Bohuslän. So, white is important. Another possibility is that it is used for sealing.

There are no reports of birch bark or chalk between slabs in Bohuslän. Birch bark is only preserved if the chamber is well sealed and preserved. Chalk would have been preserved, but it is not easily available in Bohuslän. Did they not use any seal in Bohuslän or is it lost or maybe not observed? In one of the modern excavations, Säve 57, there was sand between the flagstones and in the sand was pollen from sphagnum. Sphagnum is green in nature, but white when dried.

18.3 Charcoal areas under the mounds.

In later excavations, where the mounds have been carefully excavated, there is an area with charcoal under the mound in three cases (Säve 57, Jörlanda 120 and Lyse 7), only Säve 57 has been dated. The excavator of Tossene 211 did not mention charcoal under the mound in the report. The charcoal layers are rather thick indicating that a lot of wood had been burned. It can be remains of slash and burn, but the megaliths in Bohuslän are usually not placed in fields. It may therefore be connected to rites in relation to the building of the grave. In that case the C14 dating is of importance. At least it gives an earliest date for construction.

18.4 Plough marks under the mounds

Plough marks have been reported from excavations in Denmark and Germany, for example in Sarup, and Flintbek. There are no reports of this from excavations in Bohuslän. The megaliths in Bohuslän are almost always placed on hillsides (flat areas), not on the top and not in the arable land. This is the main reason why it is anticipated that very few graves are destroyed. This may also be a reason to expect that plough marks will not be found under the mounds.

18.5 Arrangements to secure that the chambers are waterproof

Hansen (1993) reports very elaborate constructions to make the chamber waterproof. This is for example a reason for the preservation of birch bark in a few passage graves. Bokenäs 43 could possibly have some of these arrangements, but it needs further investigations.

18.6 Antechambers

Antechambers are more common on Jutland than in other parts of Denmark. There are no identified antechamber in Bohuslän. Tegneby 146 is collapsed but there are indications of an opening in the back wall and stones which may have constituted an antechamber. An excavation could probably determine this.

18.7 Niches in the floor

Niches in the floor have not been found in any passage grave in Bohuslän (Blomqvist 1989). Both Falbygden and Scania have niches in passage graves. The same type of niches is also found in several passage graves all over Denmark (Hansen 1993:36).

18.8 Triangular opening

The triangular opening it not known from any megaliths in Scandinavia apart from the west coast. Is this only a local invention to make an opening or are there influences from more distant places? England? There is a triangular opening between the chamber and the antechamber in the passage grave in Tustrup (Kjaerum 1955). This is a single occurrence and is probably a “practical” arrangement at this construction. Otherwise, it could be a transfer of technique from Bohuslän to Jutland.

18.9 Extra layer of stones to increase hight

Some passage graves in Denmark have an extra layer of stones on top of the orthostats to increase hight. This is not found in Bohuslän and Falbygden. The stones in these areas are flat and the needed hight is achieved with one orthostat.

18.10 Locking stone

In some passage graves in Denmark a small orthostat has been set in place as the last stone in the passage grave chamber, outside the other orthostats. It is believed that it was important to have an extra opening during the construction, not only the passage ((Hansen 1993:45). Brastad 91, described above, is possibly an example from Bohuslän.

(A type of locking of chamber orthostats is found primarily on Jutland and in Bohuslän. The orthostats are placed in order leaning on each other. It may be a rather intuitive method to strengthen the construction and do not have to be an influence.)

18.11 Capstones on dolmens

The capstones of the dolmens were visible above the mound. This is indicated by the efforts to find capstones that "stand out". In Bohuslän they are often much larger than the chamber. In Denmark they are huge, high, and often rounded. In both Bohuslän and Denmark the capstones are chosen to be remarkable and clearly seen.

Polskaer stenhus on Djursland, probably the most well-known, and the largest dolmen in Denmark, is an example of a rather thin stone, but still impressive. The reason is that it is one half of a stone, where the other part is used as a capstone on a nearby dolmen.

18.12 Long dolmens

There are few long dolmens in Bohuslän (Träslöv 37, Säve 57, Långelanda 89, Morlanda 266, Bottna 141 and Hogdal 111). Stala 81 has possibly a second row of small kerbstones indicating a long mound. The long dolmens are located along the coast with no specific concentration. Morlanda 266 and Bottna 141 are impressive five orthostat dolmens with high kerbstones. Träslöv 37 and Hogdal 111 are probably square dolmens. Säve 57, the only excavated long dolmen has a rectangular chamber with two passage stones. The kerbstones are high.

If Bohuslän would follow the Danish development, the long dolmens should be earlier than the round dolmens. It is not possible to determine if this is the case. The dolmens in these long mounds are of different architectures.

Morlanda 266 is interesting since it is very close to a dolmen in a round mound (Morlanda 267). The very destroyed Långelanda 89 is also close to an almost completely destroyed dolmen.

18.13 Floors

The floors are in both areas made of flat stones. On top of the floor is often burned flint in Jutland and crushed quarts in Bohuslän.

18.14 Pits in the chamber which have been refilled.

In some passage graves there are pits under the floor. It is obvious that the pit was filled before the stones in the floor was laid. There are no artefacts in the pit, and it is often full of small stones. This may indicate the use of a post in the chamber during the construction (Hansen 1993:39).

19 The C14 dating technique

The observations made here and in the "Discussion and conclusions" chapter are based on C14 data presented above. New C14 data is produced continuously. New data, especially if it is possible to use stratigraphic information with Bayesian statistics, may change the conclusions.

The sequence and dating of megaliths presented in recent Danish publications as well as conclusions regarding construction periods of the Swedish megaliths have been described above. At a general level these two descriptions are not coherent. So, either the periods where the megaliths architectures were built in Denmark and Sweden do not coincide or there must be changes made in the understanding of the building periods to align the regions, or perhaps a mix of both.

C14 is the only possibility to set absolute dates (apart from dendrochronology, a rare possibility), while pottery is giving relative dates or sequences, based on excavations where the periods can be followed stratigraphically. Grouping of pottery into periods is a well-developed part of archaeology. The general development is described and agreed (for example Becker 1947), but the lengths of stylistic periods are difficult to know, local and regional variations lead to problems. Combining the methods is used to get a better understanding.

Apart from that C14 does not give an exact date, but an interval, it is often not possible to know if a sample is contemporary with the construction of the grave. If it is charcoal, it may be from a fire much before or much after the construction. If it is bones, it may be from a later burial or bones that have been reburied, coming from an individual that died maybe hundreds of years earlier. It is seen in for example the enclosures that bones have been reburied as part of the ceremonies. Could it be possible that bones were moved from a dolmen when a new passage grave was built, as a connection to the relatives? There could have been ossuaries, with bones from several generations back, which were used in rites. To use bones for dating of megaliths it must be reasonably well demonstrated that it is a primary burial, contemporary with the construction. At larger excavations with several graves, houses and other remains together with C14 data, it is in rare cases possible to define the building sequence of the different parts and then, combined with C14 data reduce the uncertainties and thus both get the sequence of for example grave architectures together with pottery styles and a shorter time interval, as the examples from Flintbek, Sarup and Lönt shows.

A problem which is not possible to avoid is the plateaus in the calibration curve. One plateau is at ca 4200 to 3800 BC which is before the focus of this essay. Another is at ca 3300 to 3000 BC (fig 19.1), which is at the centre of the study and finally at ca 2900 to 2600, at the end of the discussed period. In some more detail, the calibration curve is especially troublesome in the interval ca 3365-3090. Without stratigraphic data it is not possible to place a C14 date more adequately than somewhere in that period. The following period ca 3100-2930 is also problematic. Low standard deviation of the uncalibrated data gives a possibility in some parts of the curve to identify a shorter period for a sample. More precise measures of C14 (low standard deviations) and/or stratigraphic data could make it possible to distinguish between the two plateaus (ca 3365-3090 and ca 3100-2930) shown in figure.

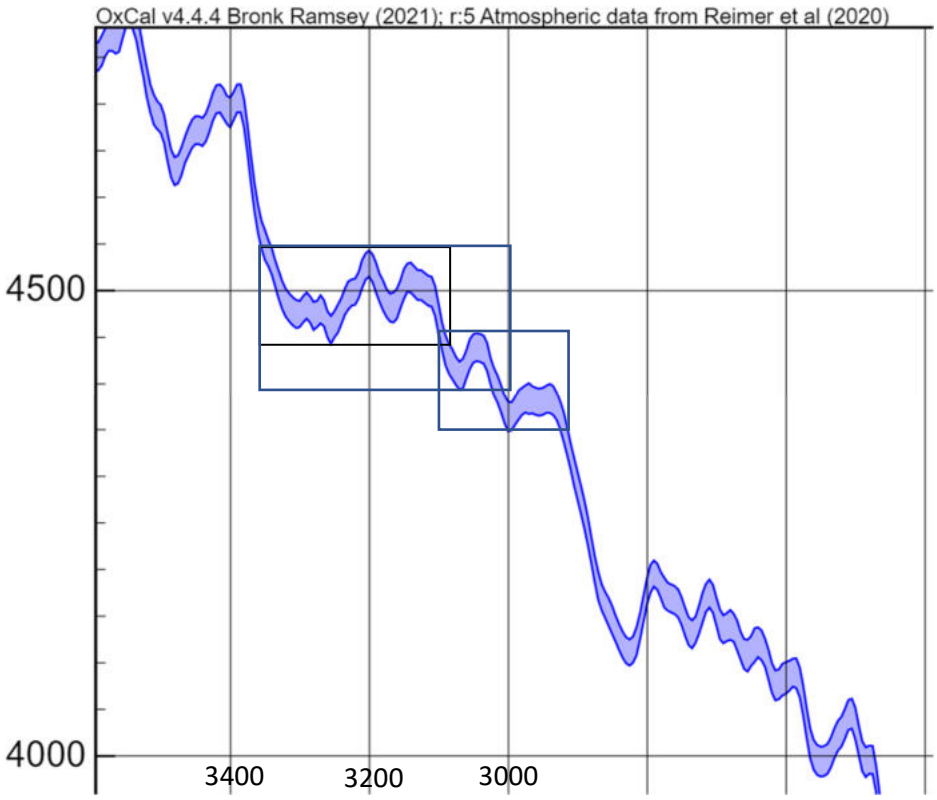


Fig 19.1. Calibration curve from 3600 BC to 2400 BC. The interval ca 3365 BC to ca 3090 BC is a plateau where the dating is ambiguous. This plateau of ambiguity is often extended to 3000 BC, or it may be seen as two plateaus, the second ca 3100-2930 BC. In this region there are no unambiguous dates unless there is stratigraphic information.

The ambiguities and complexities of the calibration curve must be considered to be able to further understand the results of the C14 data presented for the regions above. The ca 3365-3090 interval is a "dark age" where there are no possibilities to distinguish more details without input of stratigraphic data, a very rare possibility. The following period (ca 3100-2930 BC) may be distinguished from the previous with very good data, but it includes ambiguities.

The dolmens in Sweden (fig 15.1) are primarily within the plateau, with the exceptions of Backagården and Alvastra which are earlier. Frälsegården has approximately the same probability for the interval ca 3150-3000 BC as for the interval ca 3350-3200 BC. It is a high probability that the dolmen is from the plateau period, but since it is a possibility for a late dolmen or late burial, it should be further analysed. The number of samples is so low that it is difficult to draw conclusions regarding the individual areas. The charcoal from Säve 57 has about the same probability distribution as Backagården and Alvastra but cannot be connected to the building phase.

The probability distributions for about half of the passage graves in Sweden (fig 15.2) are within the plateau and for the other half partly or completely after the plateau. One grave, Rössberga (Valtorp 2:1), is substantially earlier than the others. It should be noted that only one individual out of the 24 C14 samples from that grave is dated to before 3365 (Blank et al. 2020, appendix). This sample is a tooth and may come from an earlier grave (or is a mistake), it should be investigated if possible. The five passage graves showing the youngest dates are within another part of the curve with ambiguities (ca 2900-2600 BC). A possible conclusion is that the passage graves are built mainly towards the end of the plateau and into the early part of the 2900-2600 BC plateau.

If the Danish data is examined in the same way, it shows that the few available dates for dolmens are within the plateau, and one has an earlier start. The passage graves are within the plateau with a

tendency to later dates. A possible conclusion from this data is that also for Denmark the dolmens are clustered towards the beginning of the plateau and the passage graves towards the end of the plateau. The transition period is within the plateau and cannot be given by C14 data alone.

More C14 datings are needed to strengthen the results, but the plateau will always make it impossible to distinguish transitions during these years.

The excavation at Flintbek is important for this study primarily for two reasons. It gives an absolute date for the transition from plank-built graves to dolmens in that area and this transition seems to approximately coincide with the start of dolmens in southern Scandinavia. It shows that the period for this transition is short, eight non-megalithic graves followed by four dolmens are built during a period of 140 years.

A final note on the presentation of C14 data. When intervals are given, for example (3517-2627) cal BC (95,4%), it gives a false feeling of accuracy (with single years precision). It can perhaps be interpreted as if it is more probable that the true date is somewhere in the middle of the period, or that it is equally probable for all the dates in the period. Plotting of the probability distribution is often used instead and presents a much better picture of the uncertainties. But the probability curve must be interpreted, especially where there are plateaus. The use of standard deviations to capture a level of certainty is primarily used for normal distributions and is then giving intuitively understandable data. For the curves given after calibration, often more resembling a "disturbed" rectangular distribution, the standard deviation principle is less informative. The 95,4% probability can for example sometimes be divided into two periods. When, as in this case, the interval also contains a plateau, it may hide clusters, which are impossible to detect.

20 The Kattegat connection revisited

Since one substantial argument for the Kattegat connection has been the establishment of the Single Grave culture on Jutland, leading to the ending of the high quality TRB pottery in Jutland as well as in Bohuslän, it is of interest to incorporate the latest research in this area. The beginning of the Single Grave culture in Jutland is set to 2900-2800 cal BC (Hübner 2005:660-4), based on the first graves. The ending of the Funnel Beaker culture in Jutland, and consequently the overlap, has been more difficult to establish. The last phase of the TRB culture in Denmark, Store Vallby, is now set to 3000-2600 cal BC for eastern and northern Jutland, based on several C14 datings and a dendrochronological exact date for the beginning (Iversen 2015:22). This shows that there is a considerable overlap between the end of TRB and the Single Grave culture. The Single Grave culture represents a cultural shift with clearing of large areas for pasture and the typical battle axes, often found in (male) graves. It has been debated if the SGC is due to immigration of groups from the south or an adaption of the local groups. New results from studies of genes from SGC graves show that there is (at least partly) an immigration (Egfjord 2015). Since they lived in parallel for at least 200 years, it would have influenced the TRB groups on Jutland and maybe then also the relations to Bohuslän. The Single Grave culture has a stronger presence on the western and central parts of Jutland than on the eastern part, for example Djursland.

The Pitted Ware culture was expanding from eastern Sweden to the west coast of Sweden and eastern Jutland towards the end of the 4th millennium BC. The recent CONTACT project has increased the knowledge of the PWC in Djursland. The conclusion is that the first signs of the PWC is around 3100 BC (in Ginnerup) and continued for some 400 years in for example Kainsbakke (Phillipsen et al 2020:275)

The final Funnel Beaker phase of the early 3rd millennium BC is characterised by the St. Valby pottery style as well as the thick-butted flint axes. Store Vallby pottery is clearly different from the previous more elegant styles. It has a thick and coarsely tempered ware, and a much simpler ornamentation. It represents a break with the earlier Funnel Beaker pottery tradition, a kind of degeneration phase. This

may be due to contacts and incorporation of new material cultures. Approximately at the same time as the St. Valby pottery developed, Pitted Ware artefacts appeared in Southern Scandinavia.

Bokenäs 43 is a passage grave which probably represent a later stage of the megalith tradition. It is interesting to note that outside this grave was pottery of coarser material found together with earlier type pottery. This may indicate the transition to the final stage of the TRB culture in one of the last megalithic graves in Bohuslän.

In a recent extensive study (Brorsson et al. 2018) it was investigated if there are pots (shards) in Bohuslän or Jutland which have been transported across Kattegat. Shards from PWC settlements, TRB settlements and TRB graves were used in the study. A total of 524 potshards were analysed using pXRF, ICP and thin sections. The result shows that most of the pottery was locally produced, but there were a few cases which could have been regionally exchanged. Two vessels could have crossed Kattegat. A PWC shard from Halland (Trönninge) showed similarities to TRB pottery from the Aarhus region. A PWC pointed vessel from Kirial Bro did not resemble the other local shards and the style is more like PWC pottery from southern Halland (as well as from the Höjvang site). It is of course not a high chance to find shards which have been transported across Kattegat, given the large number of locally produced pottery compared to the few pots that could have been taken over in small boats. Finding shards which have been transported across Kattegat would be a strong proof of the connection between the areas.

21 Discussion and conclusions

The objective of this essay is to place the megaliths in Bohuslän in a “time and space” context. To do this it is necessary to understand the emergence and development of the megalith phenomenon in the surrounding areas and especially in the areas from where the influences came. An attempt is made to place Bohuslän in that context.

The task is extensive, especially when it comes to collection of information. Focus had to be on Bohuslän, while limited and especially important research is included from the other areas. A collection and review of both historical and new research on the megaliths in Bohuslän, related to the context of the other major megalith areas in the northern TRB group has not been done in recent years. Analysis and apprehension of how the available C14 data can be interpreted is crucial to the “time” part of the conclusions. To place the megaliths in Bohuslän in a geographical context requires analysis of a substantial set of artefacts and megalith constructions in the surrounding areas. Differentiation between the general TRB development in southern Scandinavia and local designs or changes which may have influenced neighbouring regions is complicated.

Farmers colonized southern Scandinavia in 300-400 years from around 4000 BC. There are signs of farming before this and the foragers may have started limited cultivation, but the change from a primarily hunter gatherer society to a primarily farming society was rather short. To be able to achieve this it was probably a “leapfrog” strategy. Small groups moved a longer distance to find a new place with good arable land and thrived there. After some time, another group continued to the next place etc. These groups did probably continue to have rather close relations, they were relatives. The TRB culture is rather homogeneous, with minor local variations, which shows that there are continuing close contacts within the whole group. Some of these new colonisations developed into large regions, where Falbygden is a good example. Others did not grow because the conditions were not good enough, for example Gotland.

One group (or more) came to the west coast of Sweden. The conditions differ from most other TRB areas in southern Scandinavia, it is not a sedimentary landscape. Today the arable land in Scandia is 52%, while the arable land in Bohuslän in only 19% (Malmer 2002:27). Still, they decided it was a

good place to stay and develop their society. They may have come from the south along the coast or from Jutland over the sea. Given the concentration of megaliths on Orust, this may have been the first area that developed into a larger society. From the northern tip of Jutland to Orust is a long distance in a small boat, but it is approximately the same distance as to Gotland or Bornholm, and probably not too difficult to cross.

Grave design changed gradually. The development of new grave designs can be followed in places like Flintbek, Sarup, Lönt, Döserygg and in Barkaer in Djursland as described above. The changes seem to be fairly coeval or at least not with more than decades (not centuries) difference between areas. Flintbek in northern Germany seems to start building dolmens approximately at the same time as southern Scandinavia.

Bohuslän does not have the initial grave architectures of Barkaer type or enclosures which are seen in Denmark and Scania. Are they not found yet or did the groups living in Bohuslän not have the resources to build monuments at this early stage? There are a few (difficult to classify) dolmens of the earliest type I dolmens. When dolmens and later passage graves are built, they are generally smaller than in the other areas, maybe indicating that it was not possible to assemble enough resources to build larger monuments. In many parts of Bohuslän it is not a problem to find suitable stone slabs to build larger graves, so it is not due to lack of material.

Almost at the same time, a period of intense construction of megalithic graves starts. The grave architectures change over time, but again the new architectures are spread across southern Scandinavia rather fast. In most areas in southern Scandinavia and northern Germany, only a small fraction remains, but the remaining monuments show how impressive the constructions are and the enormous effort it was to build them.

The general architecture of dolmens and passage graves is the same in southern Scandinavia. There are differences partly depending stone material and partly depending on local preferences. To understand how surrounding areas influenced Bohuslän, it must be understood how the other areas differed from each other. Differences between Jutland and eastern Denmark as well as Scandia are especially important to be able to see how these areas may have influenced Bohuslän.

As discussed above there are no construction details which only exist in one area, but some features are more common or dominant in an area. This means that a discussion on influence from an area must be based on statistics rather than following a specific feature from one area to another area. The most distinguishing features in Jutland compared to Bohuslän are:

- The high concentration of polygonal dolmens in Djursland and NW Zealand, which is also found in Bohuslän has been seen as supporting the Kattegat relation.
- Type III dolmens (the larger version of type II) is also most common in NW Zealand and on Djursland. They are usually long dolmens (2/3). There are few long dolmens in Bohuslän and they are of different architectures.
- Rounded ends of passage grave chambers are more common on northern Jutland. There are several examples of this in Bohuslän, it is more common than the rectangular form. Many passage graves have almost round small chambers in Bohuslän (Blomqvist 1989:230-251).
- On Jutland it is more common that the later passage graves have kerbstones which are rounded in towards the passage. There are a few in Bohuslän.
- Niches and antechambers are characteristic for northern Jutland. These features do not exist in Bohuslän.

Note that the distance from Djursland to Bohuslän is almost the same as from western Scandia or northern Zealand to Bohuslän.

It is of interest to compare demographic data between regions, this may reveal a common development in the societies. The use of sum-calibrated probabilities of radiometric measurements as a proxy for demographic developments should be used with caution, but the similarity in trends in several places add credibility to the results.

Jutland and Bohuslän follow the same pattern with a peak before and decrease during the megalith building period. The peak in Bohuslän around 2900 BC is much weaker in Jutland. The Danish islands stand out since there is no decrease during the most intense megalith building period, and notably Scandia does not follow the Danish isles (fig 9.2).

The curve for Falbygden is interesting. The activity is low in the beginning and the first peak and decrease do not exist. Then the activity increases and has a peak at the same time as Bohuslän, ca 2900 BC. Is this related to the almost non-existence of dolmens in Falbygden?

The curves show a rather coherent start of the increase of activity. NW Germany and the Netherlands seems to start earlier and Falbygden later. Why is there a decrease at the beginning of the megalith building period in most areas? Or is it the other way around. Is the decrease in population, for example caused by a lethal disease, the reason for the building of megaliths?

The architectural development can be followed in some well excavated groups of monuments. The larger trends can also be followed by C14 datings. The number of well-defined C14 data from megaliths are not large enough to give a complete understanding of the relation between the different architectures and areas within southern Scandinavia. The plateau(s) in the calibration curve will always be a hindrance to a complete understanding. But the plateaus are not periods of "no change", the number of built dolmens and passage graves is not the same every year during the ca 300 years of the ca 3365-3090 plateau. A clue to an understanding of the plateau years is to look at the periods before and after. As discussed above there are clear indications that dolmens are built during the plateau with statistically high probability that some are being built before the plateau. The Passage graves are also built mainly in the plateau with a high probability that some are built after the plateau. A reasonable conclusion is that most of the dolmens are built in the beginning of the plateau and most of the passage graves are built in the latter part of the plateau. It cannot be proven, but an equal spread of dolmen and passage grave building within the plateau is unlikely. Why should building of passage graves start exactly at the beginning of the plateau and building of dolmens end at the end of the plateau? When the change is taking place within the plateau years, and how long the transition is, cannot be concluded from these data. Flintbek shows that a transition can be fast.

Comparing C14 data from Denmark and the different parts of Sweden shows similar results. There is nothing that contradicts the conclusion that the development of first dolmens and then passage graves with an overlapping period to a large degree is parallel in southern Scandinavia. There may be (and probably is) minor differences between the areas, but today the number of C14 data are too few to be able to identify these differences with confidence.

If the periods are of approximately of the same length as stated by Danish researchers, it would give the main periods for dolmens to ca 3400-3150 BC and for the passage graves to ca 3150-2900 BC. The transition is within the plateau (here set to the middle of the plateau) and cannot be given by C14 data alone. As stated before, there is an overlap between the periods and some dolmens are built before 3400 BC and passage graves are built after 2900 BC. Theses intervals differ from the intervals given by some Danish references (Eriksen and Andersen 2016:50-53, Ebbesen 2011).

The only C14 date for Bohuslän, the passage grave Tossene 210, is within the plateau with a small probability for a later date. This coincides with other passage graves in the surrounding areas. It is only one grave, but it does not give reason to believe that Bohuslän follows a different development than the other parts of southern Scandinavia.

Since it is observed that the final part of the pottery style related to TRB is not found on Jutland or in Bohuslän, it is of interest to analyse the data based on the assumption that building of passage graves ended earlier on Jutland and Bohuslän than in other areas. Or, since there are so few graves, if anything is pointing in a direction against this assumption. For Sweden, all the late dates are for graves from Falbygden and Scandia. In Denmark the three latest passage graves are from the eastern part. The limited data does not discard the conclusion that TRB ended earlier on Jutland and in Bohuslän.

It is often stated (Sjögren, Blomqvist, Iversen, Kaelas, Bagge) that Bohuslän had contacts with and was influenced, for example in pottery design, by northern Jutland. There are usually only references to earlier work, and in those texts, there are few or no examples showing similarities, which cannot be found in other parts of Denmark or Scandia. It is therefore of interest to follow the references and understand how the proposition is supported by empirical evidence. Frödin (2013), one of these early researchers and probably the most influential in the establishment of the "Kattegat connection", is one of very few who writes particularly on the relations between Jutland and Bohuslän. He is convinced that the contacts are between Jutland and Bohuslän, not between Scania and the eastern part of Denmark. He invokes some examples, but it is also including a type of circular proof, in that he concludes that since the relations are between Jutland and Bohuslän the artefact must come from Jutland, even if it is also found in eastern Denmark. An example:

> "…der zwar auch im östlichen Dänemark vorkommt, aber mit Hinsicht auf die direkten lebhaften Verbindungen, welche augenscheinlich zwischen Bohuslän und der jütländischen Halbinsel stattgefunden haben, liegt es am nächsten anzunehmen, das auch die Keule von Tanum aus Jütland importiert worden ist." (Frödin 1913:60). (…it is also found in eastern Denmark, but with the knowledge of the apparently direct lively connections between Bohuslän and the Jutish peninsula, it is almost accepted, that also the club found in Tanum is imported from Jutland.).

Bagge is probably the researcher most often given as reference for the Jutish influence. In the referred chapter he is commenting on the pedestal bowl from Tegneby 54 and compares to the Mogenstrup pedestal bowl (figs 11.2 and 11.4), which have similarities. But in his concluding remarks he writes:

> "…hur gestaltade sig under dös och gånggriftstidens långa skede sambandet mellan dessa geografiska grupper inom den nordiska megalitkulturens kärnområde: Jylland, danska öarna, Skåne, Sydhalland, Bohuslän, Falbygden. För diskussionen om dessa frågor räcker emellertid ej enbart gravmaterialet till… (Bagge 1934:253). (…how the relation between the geographical areas in the Nordic main megalith areas was related: Jutland, Danish islands, Skandia, southern Halland, Bohuslän, Falbygden. To discuss this question, the findings from the graves are not sufficient…).

I understand his statement as if he leaves the conclusions regarding relations between the TRB areas as an open question.

Kaelas gives an overview of the relative dating and relations between the megaliths in southern Scandinavia (Kaelas 1953). She discusses the pedestal bowl from Skee and concludes that "furchenstich" technique is common on northern Jutland in the relevant period, for example at Klintebakken. But she also relates to the same type of rather rough "furchenstich" technique on pottery from Scania and generally in southern Scandinavia. Kaelas states that:

> "Det har på god typologiska grunder antagits, att Bohuslän har fått sin megalitkultur under MN från norra Jylland" (Kaelas 1953:28). (It has, on reliable typological reasons, been suggested that Bohuslän received the megalith culture from northern Jutland). To this statement she refers to Rydbeck (1928, p. 91. The referred page in not correct, it should be p. 81). Rydbeck does not refer to any empirical data, it is only a general discussion, including ideas on immigration from England based on skull measurements.

There is very little empirical evidence for a specific relation between Jutland and Bohuslän. Similarities in some of the pottery design may be found, but it is important to, at the same time, compare to the other regions. Specific influences in megalith architecture are difficult to find. It is a "statistic" discussion. The existence of polygonal dolmens in NW Zealand, Djursland may show an influence from Zealand to Djursland and then to Bohuslän. But the distance from Zealand to Bohuslän is not much longer than the distance from Djursland.

But it is still reasonable to believe that there were (close) contacts between Bohuslän and Jutland. The relations between Bohuslän and the other areas may be a continuation of the initial colonization. Did the first farmers come via Jutland or along the coast from Scania or Zealand? So, the clues should perhaps be searched for in the earliest possible settlements? Scania, eastern Denmark and Falbygden are not that far away, they probably had relations, in different degrees, to these areas as well. It is only a few hundred years from the farmers arrival to Bohuslän and the megalith period. If they arrived from Jutland, it is possible that they continued to have closer relations to this area than to the other. But since the contacts seem to be frequent all over the TRB area, it is difficult to find out. Maybe it will be possible to find DNA proof for a kinship in the future.

22 Suggested future work

It would be valuable to investigate the mounds more. Especially it would be interesting to excavate the mounds of long dolmens to understand why a few are elongated. Is it only design or is there something more in the mound, an earlier grave?

It has been shown at several places that dolmens were built at the same position as a house. It is extremely difficult to detect the postholes of these houses. In the more recent excavations in Bohuslän there has been charcoal under the mound. Could this be remains from a house or some other type of construction made before the funeral? There are charcoal from two mounds which has not been dated. This could give further information on the earliest date for these graves or if it can be concluded that they are not built on arable land, possibly a dating of the graves.

Given that almost all the megaliths in Bohuslän have been excavated around 100 years ago, a lot of information was lost. Can we improve the results by re-excavating a grave using modern archaeology, although a lot is destroyed? The mounds are usually not excavated.

The pedestal bowls and ladles are important attributes in ceremonies at graves. They have a significant form and patterns. A large number of pedestal bowl have been found in Bohuslän, Jutland and Scandia and could be an important possibility to detect influences. The pedestal bowl found Tegneby 54, with a pattern of large rhombus, have similarities with pedestal bowls in both Scandia and Jutland. An investigation of details on more bowls and ladles could possibly reveal influences between regions. The pedestal bowl found at Skee 173 stands out as unique and could be important to try to understand how it came to the grave. It could give clues to important relations.

There are unfortunately few EN and MN settlements excavated in Bohuslän. Analysis of the earliest available material could be interesting to see if there are similarities with Scania and or Jutland. It may give a clue to how the first farmers came to Bohuslän.

A deeper investigation of the final phase of TRB in Bohuslän and Jutland may give more insights in the relation.

It is anticipated that the contacts were between Bohuslän and eastern Jutland. Were there contacts also to (or mainly to) the western part of Jutland? Compare to the Thy relationship with Bohuslän (Kristiansen 2018). The sea streams around Jutland!

Bone s from wild animals (bear and elk) which seems to come from Sweden has been found in PWC settlements (Price, T., D., Klassen, L. & Sjögren, K-G. 2021).

Excavations from Djursland show that enclosures are built primarily at waterways. The enclosure idea must have been known to the Bohuslän farmers. Did they do anything similar? Suggestion of places Långelanda (86,89 and 106) and Morlanda (266 and 267). Both are in narrow water passages (Klassen 2014).

23 Sammanfattning

I södra Skandinavien sker en övergång från ett jägar- och samlarsamhälle till ett huvudsakligen jordbrukssamhälle under 300–400 år från ca 4000 till ca 3700 fvt. Under denna period etableras jordbruket i stora delar av södra Skandinavien. Det finns spår av jordbruk och en förändring mot ett mera bofast levnadssätt i jägar- samlarsamhället några hundra år tidigare, men den stora förändringen kommer i samband med att bönder koloniserar från söder.

I Danmark och Skåne sker en kontinuerlig förändring och utveckling av gravarnas utformning, från jordgravar till en klimax i de stora gånggrifterna. De huvudsakliga gravformerna är plank-kistor under jord. Plankorna ersätts gradvis med stenar. Därefter följer olika varianter av dösar, vilka följs av gånggrifter. En annan viktig konstruktion är ”inhägnaderna”, som används vid speciella tillfällen med långa intervall. På några platser, tex Sarup på Fyn, finns flera inhägnader tillsammans med ett stort antal gravar som byggts under en lång period. I Bohuslän och Falbygden finns inte de första gravtyperna eller inhägnaderna, eller så har de inte hittats än.

Det finns närmare hundra megalitgravar utmed den svenska västkusten, med en hög koncentration på Orust och Tjörn tillsammans med ett område lite norr om Orust. 29 megalitgravar finns på Orust. Av det totala antalet är 33 gånggrifter och 50 är dösar samt några som inte kan identifieras.

Arkitekturen för dösar och gånggrifter är i stort densamma i hela södra Skandinavien. Men de ser trots det mycket olika ut, beroende på den lokala tillgängligheten på sten. I Danmark och Skåne byggs megaliterna av stenar som lämnats efter istiden, oftast rundade stenar. I Bohuslän är byggnadsmaterialet från rasbranterna där istiden splittrat berget till flata block. I Falbygden är blocken huvudsakligen sedimentära.

Uppsatsen behandlar förhållandet mellan megaliterna i Bohuslän och de andra områdena, främst Jylland. Det har varit en uppfattning från de tidiga arkeologerna till dagen, att Bohuslän har en speciellt nära relation till Jylland, den s.k. Kattegattgruppen. Argumentationen för denna relation undersöks. Slutsatsen är att det empiriska underlaget för att det är en starkare relation mellan Bohuslän och Jylland, jämfört med de andra regionerna, är svagt. Det finns enstaka föremål och påverkan på megalitkonstruktionerna som kan vara influenser från Jylland, men de kan också eventuellt komma från andra områden. Det är svårt att hitta attribut som bara finns på Jylland och Bohuslän. En total genomgång av alla relevanta utgrävningar inklusive de senaste skulle kunna ge ny kunskap. De tidiga arkeologerna hade ett begränsat urval.

Uppfattningen om tiden för byggnation av dösar och gånggrifter skiljer sig något mellan Danmark och Sverige. Danska arkeologer beskriver en tidssekvens av dösar följd av en sekvens av gånggrifter, med ett överlapp mellan sena dösar och tidiga gånggrifter. I Sverige anses dösar och gånggrifter i huvudsak byggts parallellt, med en lite tidigare start för dösar. Skillnaden i uppfattning undersöks med den mest tillförlitliga C14 data som finns i Sverige och Danmark. Det är en begränsad mängd data och följaktligen blir det osäkerhet i resultaten. En svårighet vid analys av C14 data för megalitperioden är att kalibreringskurvan har en platå för den mest intressanta tiden, vilket ger 300 år av osäkerhet. Analys av data visar att dösarna byggts huvudsakligen under platåperioden, men att några har en sannolikhet att vara byggda tidigare, men inga efter platån. För gånggrifterna gäller det omvända, många är byggda under platån, flera efter, men ingen före. Det ger en trolig slutsats att dösar i huvudsak är byggda före gånggrifterna, med en odefinierad övergångsperiod under platån.

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Appendix I

Träslöv 37
A dolmen with probably 4 stones in a square, one stone is missing. The capstone is missing. Rectangular mound with kerbstones. Type I (or Type II). Lindälv 1967:49.
Träslöv 29
A dolmen with probably 4 stones in a square, one stone is missing. One capstone. Round mound with kerbstones. Lindälv 1967:47.
Veddige 24
Passage grave with slightly rounded chamber. One capstone remains. The passage is not centred (to the right of the middle). No kerbstones. Blomqvist 1989:28.
Fjärås 41a
Passage grave with rectangular chamber and passage. No capstones. No kerbstones. Lindälv 1967:56.
Fjärås 41b
Passage grave with rectangular chamber, without remains of passage. One capstone. No kerbstones. *
Lindälv 1967:56.
Björlanda 190
Passage grave with probably rectangular chamber (one short side seems offset which makes the side rounded). Destroyed passage. No kerbstones. Blomqvist 1989:85.

Torsby 116
Rectangular dolmen with capstone. Collapsed.

Stenkyrka 110
Passage grave with rectangular chamber with two capstones and passage. No kerbstones. Not excavated.

Stenkyrka 22
Passage grave with rectangular chamber and one remaining displaced capstone.
No passage remaining. No kerbstones. Not excavated.

Långelanda 106
Only one stone remains.

Långelanda 89
Few stones remain.

Långelanda 86
Megalith of undefined architecture.

Långelanda 60
Dolmen with 5 stones, rounded and one passage stone. Two remaining kerbstones Blomqvist 1989:246).

Tegneby 168
Dolmen with only two remaining stones. Mound.

Tegneby 166
Dolmen (remains of) with possibly kerbstones.

Tegneby 136
Megalith of undefined architecture.

Tegneby 131
Passage grave with rectangular chamber (ca2x4m) and a huge capstone which covers the chamber.
Partly destroyed passage (ca 4m). (Ekhoff 1884:174)

Tegneby 117
Passage grave with (probably) rectangular chamber. Blomqvist 1989:244.

Tegneby 103
Megalith of undefined architecture. Probably a dolmen.

Tegneby 84
Megalith of undefined architecture.

Tegneby 55
Megalith of undefined architecture. Probably a dolmen, based on the mound.

Tegneby 33
Megalith of undefined architecture.

Tegneby 18
Megalith of undefined architecture.

Morlanda 327
Dolmen with kerbstones. Undefined architecture.

Morlanda 346
Megalith of undefined architecture

Morlanda 70
Dolmen (probably) of undefined architecture.

Morlanda 69
Dolmen (probably) of undefined architecture.

Bokenäs 124
Megalith of undefined architecture.

Bokenäs 22
Dolmen with square chamber, collapsed. Capstone and one orthostat missing, no passage stones.
No kerbstones (Ekhoff 1887:313).

Bokenäs 20
Dolmen with (probably) rectangular chamber, one orthostat missing. Round mound with kerbstones.
The grave has according to Ekhoff been destroyed and later restored before he visited (Ekhoff 1887:311-313).

Bokenäs 24
Passage grave of unknown architecture. Removed.

Forshälla 42
Dolmen of unknown architecture.

Högås 7
Dolmen with square chamber (two orthostats forming a 90 degree corner remains) and mound (6-7m diameter) with k

Skredsvik 149
Dolmen with rounded chamber (originally probably 5 orthostats, one orthostat missing). Mound with possibly two remaining kerbstones (Ekhoff 1887:306-308).

Lyse 192
Dolmen with square chamber (4 orthostats). It is almost closed, a narrow opening between the two southerly orthostats (0,3m according to Ekhoff, seems wider now). The distance between these stones has probably emerged over the years, for example when the capstone was moved away from the original position, or there may have been a tree there pushing out the stones. It has either been totally closed or had a small triangular opening. No passage stones. Mound with high kerbstones (Ekhoff 1886:441-442).

Lyse 165
Dolmen with rounded chamber (5 orthostats, one is fallen, 1,8m diameter), an impressive capstone, and a passage stones (one missing). Even though there is a passage stone, the chamber seems closed, but it may have been a triangular opening at the fallen orthostat, which is in south east. Mound (ca 11m) with a few remaining small kerbstones (Ekhoff 1886:439-441).

Lyse 93
Passage grave with square chamber and large capstone. A few stones may show the passage.
No kerbstones. Ekhoff describes a passage and round kerbstones in a mound (ca 13m) with only stones. The grave is i

Lyse 64
Passage grave with square chamber (3,2x2,2m) and a large capstone (4x3,1m and almost 05m thick).
Two remaining passage stones. The opening is large and indicates a small missing stone or that the orthostats have been pushed. The mound is slightly oval (14m long) (Ekhoff 1886:452-454).

Brastad 134b
Passage grave with square chamber (9 orthostats, 3x2m) and an unusually large capstone (4,7x3,7m).
The passage is not visible or missing. The mound is 11m (Ekhoff 1886:450-452). The passage grave is only about 10m from the dolmen below.

Brastad 134a
Dolmen with square chamber (two orthostats missing). A pair of passage stones and mound with kerbstones.
According to Ekhoff it could also be a passage grave. One orthostat is at a distance from the three and could form a chamber. Maybe it is more reasonable to see this 4th stone as the capstone, or part of the capstone.
The rather high kerbstones similar to many kerbstones at a dolmen mound (Ekhoff 1886:452).

Bro 156
Probably passage grave. Destroyed.

Bro 109
Megalith of undefined architecture.
Askum 425
Dolmen of undefined architecture.

Tossene 268
Dolmen, probably square. Capstone. No kerbstones. Indication of triangular opening.

Tossene 262
Dolmen with square chamber (4 orthostats, displaced, now 1,2x0,8m). A small opening (triangular?) and a pair of passage stones (Ekhoff 1886:438).

Tossene 157
Passage grave with elliptical (or rectangular with rounded ends) chamber (8 remaining orthostats, 3,1x1,7m). No capstone, remains of passage. Mound with 11m diameter. Passage, mostly covered by the mound, 3,8m long (Ekhoff 1886:445-446).

Bottna 150
Megalith of undefined architecture, maybe passage grave. Dolmen according to Ekhoff (Ekhoff 1879:133).

Svenneby 138
Dolmen with (probably) square chamber, one passage stone and mound with kerbstones (Blomqvist 1989:234, Ekhoff 1879:132).

Svenneby 137
Passage grave with rounded chamber (3x2m). One round capstone on the chamber and capstones on the 5m passage. Threshold stones (round) at the entrance to the passage and at the entrance to the chamber. Only the capstone on the chamber is visible (Ekhoff 1880:134).

Svenneby 118
Dolmen (Påls hus) with undefined chamber (Ekhoff suggests polygonal with 5 orthostats) and high capstones. Possibly triangular opening. Oval mound with high kerbstones (Ekhoff 1897:126-127).

Svenneby 117
Dolmen with oval chamber. No indication of passage or entrance, maybe due to that the mound is almost reaching up to the capstone (split in two). Defined as a gallery grave by Ekhoff (Ekhoff 1879:138), but it is more like a large polygon dolmen or maybe a passage grave where the passage is hidden under the mound.

Kville 383
Dolmen with polygonal chamber (5 orthostats, 2m diameter). Triangular opening. One passage stone and two threshold stones. Round dolmen with low kerbstones (Blomqvist 1989:233, Ekhoff 1879:126).

Tanum 581
Dolmen with undefined chamber. Round mound with few kerbstones.

Tanum 579
Dolmen with undefined chamber and a capstone. Kerbstones.

Lur 43
Dolmen with square chamber and a pair of passage stones. Round mound with kerbstones.

Ske 272
Longdolmen? With closed rectangular Type I chamber and few kerbstones.
Skee 506
Dolmen with square (one stone missing) chamber and capstone.

Skee 173
Passage grave with rounded/oval chamber with capstone. Passage with one passage stone. Kerbstones with rounded entrance to the passage.

Skee 147
Passage grave with round chamber and capstone. Destroyed passage.

Hogdal 111
Longdolmen with square chamber (one stone missing). No passage. Kerbstones in almost square mound.

Skjeberg (N)
Dolmen with polygonal chamber Type IV, capstone. Round mound with kerbstones.

Holmsbu 1
Megalith (probably dolmen)

Holmsbu 2
Dolmen with square chamber. Round mound with kerbstones.

Appendix II

Megaliths: N Halland, Bohuslän and Östfold (Norway)

Name RAÄ	**Excavation**	**C14**	**Where**	**Passage grave**	**Dolmen**	References
		Description		Chamber	Chamber	

					Type	Triang	Round/ Long	
Träslöv 37	No		N Halland		I/II		(x)	
Träslöv 29	No		N Halland		I/II			
Veddinge 24	No		N Halland	Undefined/oval				
Fjärås 41a	No		N Halland	Rectangular				
Fjärås 41b	No		N Halland	Rectangular				
Björlanda 190	No		Gothenburg	Rectangular				
Säve 57	Hultberg 1978	Charcoal under mound 3634-3094;3528-2931 cal BC 95,4%	Gothenburg		III		X	Särlvik
Torsby116	No		S Bohuslän		Undef			
Jörlanda 120	Eriksson 1964	Charcoal under mound, not dated	S Bohuslän		II/III			Särlvik
Stenkyrka 222	Ekhoff 1882		Tjörn	Round				Ekhoff 1882
Stenkyrka 110	No		Tjörn	Rectangular				
Stenkyrka 22	No		Tjörn	Rectangular				
Valla 98	Ekman 1915		Tjörn		IV			Enqvist 1922
Valla 50	Ekman 1915		Tjörn	Round		x		Ekhoff 1882
Valla 27	Ekhoff 1882		Tjörn	Rectangular				Ekhoff 1882
Valla 15	Ekman 1915		Tjörn		II/III			Enqvist 1922
Klövedal 1	No		S Bohuslän		I/II			
Långelanda 106	No		Orust	Undefined				
Långelanda 89	No		Orust		Undef		X	
Långelanda 86	No		Orust	Undefined				
Långelanda 60	No		Orust		III	x		
Stala 86	Ekman 1915		Orust		III/IV	x		Enqvist 1922
Stala 81	Ekman 1915		Orust		III/IV	x	(X)	Enqvist 1922
Tegneby 168	No		Orust		Undef			
Tegneby 166	No		Orust		Undef			
Tegneby 146	No		Orust	Rectangular				
Tegeneby 136	Ekman 1915		Orust	Undefined				
Tegneby 131	No		Orust	Rectangular				
Tegneby 117	No		Orust	Rectangular?				
Tegneby 111	Ekman 1915		Orust	Round				Enqvist 1922
Tegneby 103	No		Orust	D	Undef			
Tegneby 84	No		Orust	Undefined				
Tegneby 55	No		Orust	D	Undef			
Tegneby 54	Ekman 1915		Orust	Round?		x		Enqvist 1922
Tegneby 33	No		Orust	Undefined				
Tegneby 28	Ekman 1915		Orust	Rectangular				Enqvist 1922
Tegneby 18	No		Orust	Undefined		x		
Morlanda 327	No		Orust	D	Undef			
Morlanda 346	No		Orust	Undefined				
Morlanda 267	No		Orust	D	Undef			
Morlanda 266	No		Orust	D	IV	(x)	X	
Morlanda 70	No		Orust	D	Undef			

Morlanda 69	No		Orust	D	Undef			
Röra 39b	Ekman 1915		Orust	D	III	x		Enqvist 1919
Röra 39a	No		Orust	Round				
Bokenäs 124	No		C Bohuslän	Undefined				
Bokenäs 43	Gustafson 1887		C Bohuslän	Rectangular				Gustafsson 1888
Bokenäs 77	Ekhoff 1887		C Bohuslän	Round				Ekhoff 1888; Gustafsson 1888
Bokenäs 22	No		C Bohuslän	D	I/II			
Bokenäs 20	No		C Bohuslän	D	I/II			
Bokenäs 24	No		C Bohuslän	Undefined Removed				
Forshälla 42	No		C Bohuslän	D	Undef			
Högås 7	No		C Bohuslän	D	II/III	x		
Skredsvik 154	Hallsgtröm 1913, Cullberg 1985.91	Charcoal (undefined), not dated	C Bohuslän	D	III/IV			Bolinder 1912
Skredsvik 149	No		C Bohuslän	D	IV			
Lyse 192	No		C Bohuslän	D	II	x		
Lyse165	No		C Bohuslän	D	III/IV	x		
Lyse 93	No		C Bohuslän	Rectangular				
Lyse 64	No		C Bohuslän	Rectangular				
Lyse 7	Jonsäter 1975	Charcoal under mound not dated	C Bohuslän	Round				Jonsäter1975
Brastad 134 b	No		C Bohuslän	Rectangular				
Brastad 134 a	No		C Bohuslän	D	III	x		Holmberg 1845
Brastad 91	Ekhoff 1886		C Bohuslän	Oval		x		
Bro 156	No		C Bohuslän	Undefined				
Bro 109	No		C Bohuslän	Megalith				
Askum 425	No		C Bohuslän	D	Undef			
Tossene 268	No		C Bohuslän	D	Undef	x		
Tossene 211	Nordkvist 1985	Charcoal in chamber Iron Age	C Bohuslän	D	II/III			Nordqvist 1985
Tossene 210	Gustafson 1884	Bone, two individuals 3486-2895 cal BC, 95,4%	C Bohuslän	Oval				Gustqfsson 1886
Tossene 262	No		C Bohuslän	D	III			
Tossene 157	No		C Bohuslän	Oval				Gustafsson 1886
Bottna 150	No		C Bohuslän	Megalith				
Bottna 141	No		C Bohuslän	D	IV	x	X	
Svenneby 138	No		C Bohuslän	D	II	x		Ekhoff 1879
Svenneby 137	No		C Bohuslän	Round				Ekhoff 1880
Svenney 118	No		C Bohuslän	D	Undef	x		Ekhoff 1879
Svenneby 117	No		C Bohuslän	Undefined				Ekhoff 1879
Kville 338	No		N Bohuslän	Undefined				
Kville 383	No		N Bohuslän	D	IV	x		Ekhoff 1879
Tanum 581	No		N Bohuslän	D	Undef			
Tanum 579	No		N Bohuslän	D	Undef			Frödin 1911

Tanum 206	No		N Bohuslän	Oval			
Lur 43	No		N Bohuslän	D	III		Frödin 1911
Skee 272	No		N Bohuslän	D?	I		
Skee 506	No		N Bohuslän	D	II/III	x	
Skee 173	No		N Bohuslän	Round			Frödin 1911; Bagge 1934
Skee 147	No		N Bohuslän	Round			
Hogdal 111	No		Norway	D	I/II		
Skjeberg (N)	No		Norway	D	IV		
Holmsbu 1 (N)	No		Norway	D	II		
Holmsbu 2 (N)	No		Norway	Undefined			