Aalstrup – a settlement site and causewayed enclosure at Horsens Fjord

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By Torsten Madsen

Introduction

Horsens Fjord is among the areas in South Scandinavia with the highest density of finds from the late Mesolithic and Neolithic. The big fjord with its many islands, varying width, flat grounds, deep stream channels, and many valleys leading inland with wetlands and variable soils along their edges, provided excellent settling conditions reflected in numerous sites (Borup 2003, Fig. 8; A. H. Nielsen 2003, Fig. 6).

Seven settlement sites have been excavated along the north side of the fjord, and despite their small number they cover every part of EN and MN A. EN I is found at Mosegården (Madsen & Petersen 1984, Madsen & Jensen 1982), and EN II at Toftum (Madsen 1978). MN A I is found at Hanstedgård (Eriksen & Madsen 1984), while MN A II is found at Bygholm Nørremark (Davidsen 1974, 12 f.), and MN A III/IV at Lindskov (Davidsen 1978, 58). MN A V is found at Alrø (Davidsen 1978, 55), Bjerggård (Madsen 1988, 309 ff.) and Lindskov (Davidsen 1978, 58). In addition to the settlement activities, the sites at Toftum (Madsen 1978; 1988, 311 ff.) and Bjerggård (Madsen 1988, 309 ff.) were also causewayed enclosures.

There are eight excavations of megalithic tombs close to the town of Horsens, of which only three has been dealt with in the literature – Grønhøj (Thorvildsen 1946), Mosegården (Madsen & Petersen 1984) and Bygholm Nørremark (Rønne 1979). To this comes an EN II long barrow with a wooden chamber from Rokær (Kristiansen 2000).

A very special find complex comes from Nørrestrand and Stensballe Sund. Stone battle axes, flint axes, flint daggers and pottery have been offered here in salt water on depth of up to 3-4 m (Lomholt 2003). The offerings took place in all periods although there is a majority of finds from the TBK culture. Further, the richness of the TBK in the Horsens Fjord area is emphasized by two Hoards of copper from Bygholm and Aarupgård (Klassen 2000, 79 ff.).

The most recent investigation at the fjord focused on a settlement site, not far from the village of Aalstrup. This excavation also resulted in the appearance of yet another causewayed enclosure.

The Aalstrup site lies on the eastern side of Åkjær valley (Fig. 1 and 2) – a flat bottomed 3-500 m wide basin created by melt water. It leads northwards from Horsens Fjord, takes a sharp turn towards the east, and then back again towards the north to Norsminde Fjord and further into Kattegat. On its west side lies a hilly terrain with traces of several glacial stationary lines, and in Sondrup Bakker, directly across the valley from the site, marked thrust faults of frozen earth are seen (Holm 2000, 131 ff.). The soil here is varied with both clay and sand. East of the valley the landscape lies as a flat plane created under the ice and dominated by morainic clay. Along the edges of the valley sand is more common and towards the south, where it adjoins Horsens Fjord, sand is dominating.

Despite its flat bottom Åkjær valley has several deep basins. Today they are filled with peat, but in the Stone Age they were open lakes. Towards the north at Norsminde Fjord and south at Horsens Fjord the bottom lies deep and here the sea has penetrated well into the valley. Today Norsminde Fjord reaches 3 km inland, but when the sea was at its highest during the Stone Age it reached almost 7 km inland. At Horsens Fjord the situation is a little more uncertain. There are indications that the sea reached almost 2 km inland from the present coastline. A more conservative estimate of 1.3 km can be based on the five feet curve, which is a reasonable bid for the highest water table in Horsens Fjord. As Aalstrup lies 1.4 km from the present coastline, and as the highest water table in Horsens Fjord was reached in the later part of the Neolithic, and most likely contemporary with the latest part of the settlement activities, the site has been fairly close to the cost, if not directly adjacent to it (Borup 2003; Madsen 2003).

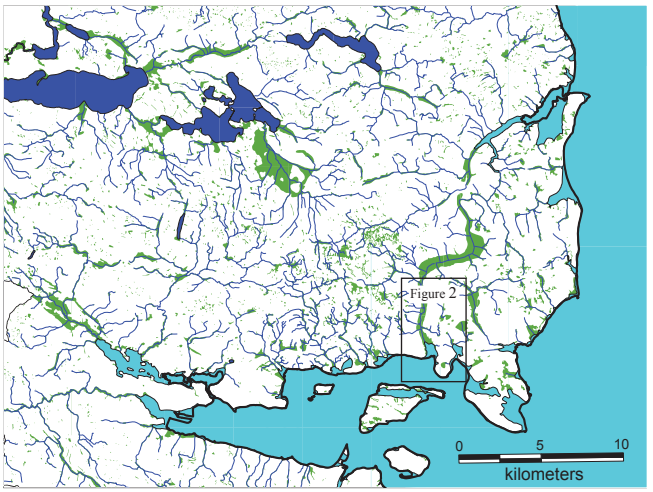


Figure 1. Map of Horsens Fjord and the area up to a little north of Norsminde Fjord. On the map lakes and watercourses (dark blue), wetlands (green), and the maximum extent of the Litorina Sea (light blue) are shown. The current coast line is marked with a black line. The location of Figure 2 is shown by a rectangular frame.

Aalstrup is located at the very edge of the valley on a flat, sandy, well drained plateau 8-12 m above the valley bottom. Behind the site the terrain raises gradually to a heights of 25-30 m above sea level before it continues in an only slightly undulating landscape towards the east. Immediately north of the site, only slightly higher than the settlement, is a flat rounded hillock consisting of tertiary marl. The site is situated in part on land register 2a of Aalstrup cadastral unit, and in part on land register 11a of Amstrup cadastral unit covering a total of approximately 2.5 ha. It was first recorded during the national survey in 1904 (sb. 13, Falling sogn, Hads herred, Århus amt).

In 1949, immediately after he had become professor at University of Aarhus, P.V. Glob began an excavation at Aalstrup. This excavation (FHM 10) is very badly documented, as nothing in writing was ever delivered from Globs hand for the archive. We know from a newspaper clip that he started in August 1949. After that there are a few letters showing that he had plans of continuing excavations in 1950, and letters showing that he was digging in 1951. The next is a short note from 15/12 1954 saying that Glob has stated that the excavations were finished. From the same year we have a Royal Air Force Basic Cover air photo showing an excavation area of approximately 1620 m^2. Glob never covered up the excavation area, and part of it with characteristic corner points is still visible today.

Figure 2. The position of Aalstrup in Åkjær valley. The site is marked as a black area. Squares mark other settlement sites from MN A, stars mark the position of certain and likely megalithic tombs, and triangles show submerged settlements from the Ertebølle culture. Soil types (Basisdatakort) are from light to dark (yellow to brown): Sand; Clayey sand; Sandy clay; Clay. Wetlands (green) are reconstructed by the author based on information from Høje målebordsblade (KMS 1862-1899) and Historiske Sognekort (KMS 1816-1900). Contours with five feet intervals are drawn based on Høje målebordsblade (KMS 1862-1899). The limit of the Litorina Sea follows the five feet contour line, which equals the maximum extent of the sea in sub boreal time.

These together with the air photo have made it possible to position Globs excavation very precisely ("A" on Fig. 3).

In 1969 a few plans and a section drawing from Aalstrup were found among papers from other of Globs projects. The section was in a ditch seen on the air photo stretching from the excavation area to the wetland in the valley bottom to

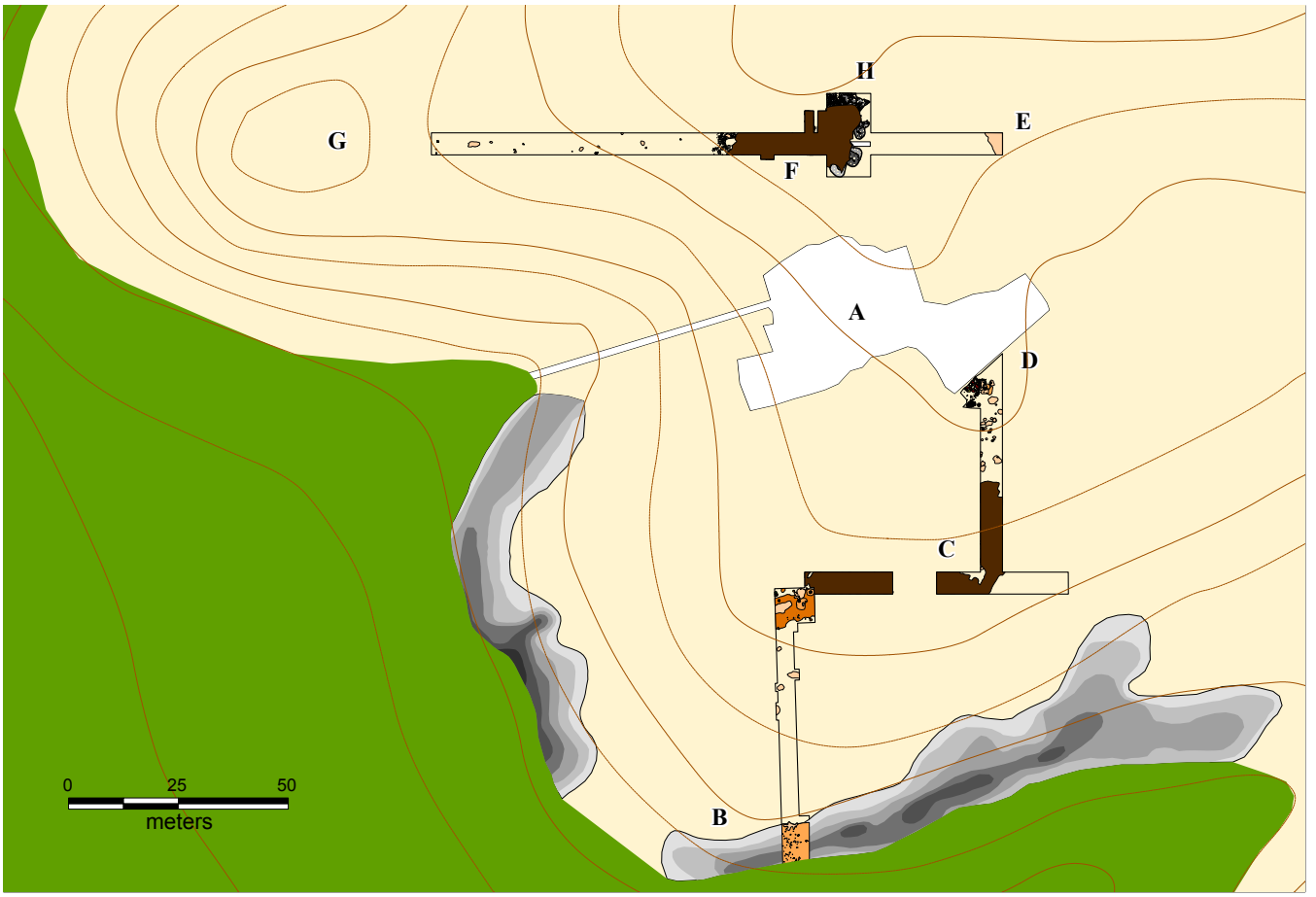


Figure 3. Plan of excavated areas at Aalstrup. A: Excavation area of P.V. Glob. B: Midden along the wetland area – contour interval of the grey tone scale is 20 cm. C: Traces of settlement at the southern part of Aalstrup. D: Megalithic tomb. E: Depression with cultural debris. F: Traces of settlement at the northern part of Aalstrup. G: Likely settlement area towards the northwest. H: Area with segmented ditches from a causewayed enclosure. Green indicates wetland, and yellow moraine sand. Within the excavation areas dark brown indicates covering layers of cultural debris, while the yellow-brown colours indicates other types of cultural deposits. Landscape contours are at five feet intervals.

the west. The plans, dated to 1951, can be fitted together to one drawing, but this cannot be orientated or placed within the excavation area seen on the air photo, and the structures shown can thus not be given a location. A few photos have also been retrieved, some of which shows structures found on the plans.

A very large artefact material from Globs excavation is in the store rooms. The material was not cleaned and numbered, when originally placed there, but lay packed in boxes and newspapers with loose labels. There is a partly preserved list of numbers, but the cross references to find location and find circumstances are cryptic and only very few numbers can be correlated with the plans.

Aalstrup is by and large not mentioned in the literature. Karsten Davidsen has included the site in his catalogue of MN A V sites (Davidsen 1978, 55 f.) based on a few but characteristic pottery shards in Globs material. He adds that the major part of the material date to MN A II. The same year Niels H. Andersen and Torsten Madsen mention a Fuchsberg Bowl from the site (Andersen & Madsen 1978, 151) and add that the major part of the material date to MN A II-III.

New excavations at Aalstrup

The new investigations at Aalstrup have been carried out over six seasons from 2000 to 2005 as a training excavation for students in prehistoric archaeology at University of Aarhus (FHM 4271). In addition to the author, who directed the excavations, professor Helle Juel Jensen participated as joint director from 2002 to 2005[1].

The site is currently not under cultivation, and it has turned out that no part of it has been cultivated after Glob left it, and further that the southern part of the site has not been cultivated for the last 70-80 years at least. This is clearly reflected in the thickness of the top soil being no more than 15-20 cm. The wear and tear of the site is thus minimal, and in many areas a cultural layer is preserved.

The primary purpose of the excavation was to form an overview of the size, nature and dating of the site. With this in mind the investigations were carried out using a five m wide trench that edged its way through the site. The standard approach of parallel trenches was avoided because it could not be carried through systematically due to tree growth and because it would result in too large an area being uncovered. A system of small scattered trenches, on the other hand, was decided to be too difficult to handle on a training excavation. By and large the system with a more or less continuous five m wide trench was maintained throughout the excavation. Only when ditch segments from a causewayed enclosure turned up, extensions to the side of the original trench were made. A total of 1646 m^2 were investigated during the six seasons.

The investigations showed that traces of settlement are present with varying intensity all over the site. The excavation was not comprehensive enough to delimit the individual concentrations, but we have sufficient information to form a general picture. A large rubbish heap is situated to the south and west along the edge of the wetland area ("B on Fig. 3). Its outline and thickness was determined by use of an auger, and a trench was cut through it. Very little settling seems to have taken place on the adjacent slopes north and east of the heap. Very comprehensive traces of settlement on the other hand are found on the flat plateau above the slopes ("C" on Fig. 3). These presumably continued into the area that Glob excavated ("A" on Fig. 3). In the same area, at the very edge of Globs excavation traces of a dolmen were found ("D" on Fig. 3). Due to tree growth and the presence of a shotgun shooting range in and around Globs excavation area, the trench was discontinued for 45 m. Where it was resumed to the north, the settlement traces were more scattered. Furthest to the east the trench touched the beginning of a depression stretching eastwards with a thick cultural deposit ("E" on Fig. 3). Moving west an area with yellow subsoil and no settlement traces followed. This again was followed by a major depression, where massive traces of settlement lay covered by up to 80 cm of topsoil deposited by erosion ("F" on Fig. 3). Beneath the settlement debris a large number of ditch segments from a causewayed enclosure were uncovered ("H" on Fig. 3)). Further to the west only a few traces of human activities were found, and only at the western end of the trench, traces of Neolithic settlement reappeared. The trench could not be continued any further, as the outer part of the small promontory that has once existed here is destroyed by a sand pit. We do have some information suggesting that extensive settlement traces has been present here as well ("G" on Fig. 3).

The traces of settlement

The rubbish heap

At the southern foot of the hill, at the edge of the wetland, the trench cut through a thick grey to black deposit of cultural debris coloured by charcoal and humus ("B" on Fig. 3). Embedded in this deposit were large amounts of pottery shards and worked flint. In addition there was a fair amount of burnt stone tending to lie in small clusters. Organic material was not preserved except for pieces of enamel from ruminants, most probably cattle. At the bottom of the deposit, directly on the subsoil, were two stone built fireplaces (Fig. 4a). In general the deposit can be dated to MN A based on the pottery as well as the presence of both thin butted and thick butted flint axes. The section shows a clear horizontal layering (Fig. 4b), but the individual strata could not be separated while digging. An analysis of the

1 At the beginning of excavations in august 2000, land register 2a of Aalstrup was owned by Per Højgaard Andersen, while land register 11a of Amstrup was owned by Olav Madsen, Amstrup. Both owners were most obliging and gave us unlimited access to their land. With respect to Per Højgaard Andersen's land all arrangements for the excavation went through the former owner of the land – Christian Simonsen, who is the organiser of a shotgun shooting range on the area and the game licence tests that are held there. From the excavators point of view an excellent relationship with all parties has existed all through.

Figure 4. Section orientated N-S through rubbish heap at the edge of the wetland (cf. "B" on fig. 3). a: edge of the rubbish heap with an erosion step filled with decomposed peat covering part of it. At the bottom of the rubbish heap, a stone build fireplace can be seen. b: Central part of the rubbish heap with a fairly clear stratigraphy that could not, however, be acknowledged in the surface during excavation.

position of the individual pieces of pottery in relation to the strata in the section will probably be able to outline the chronological development of the deposit.

Where it was cut, the deposit was about 12 m wide and had a maximum thickness of 60 cm. It lay on sloping terrain in direct contact with the wetland, where it had been eroded, resulting in a clearly visible step in the terrain. Along the edge of this step lay a deposit of decomposed peat, which also covered a lower un-eroded part of cultural debris, now constantly under water (Fig. 3a). The debris continued only a little further into the waterlogged area, where peat took over lying directly on the greyish white virgin soil. There is nothing to suggest that the cultural debris ever stretched further out, but at 5-6 m above present sea level it cannot be the sea that set the limit. The present water logging is due to springs at the bottom of the hill. During excavation 2-3 m^3 of water per hour was pressing through the sand, and pumps had to be run continually. The springs were probably also active in the Stone Age, but at a lower level, since peat formations had not built up at that time.

To map the rubbish heap a total of 228 auger holes were made in a 5 by 5 m grid. For each hole the depth and

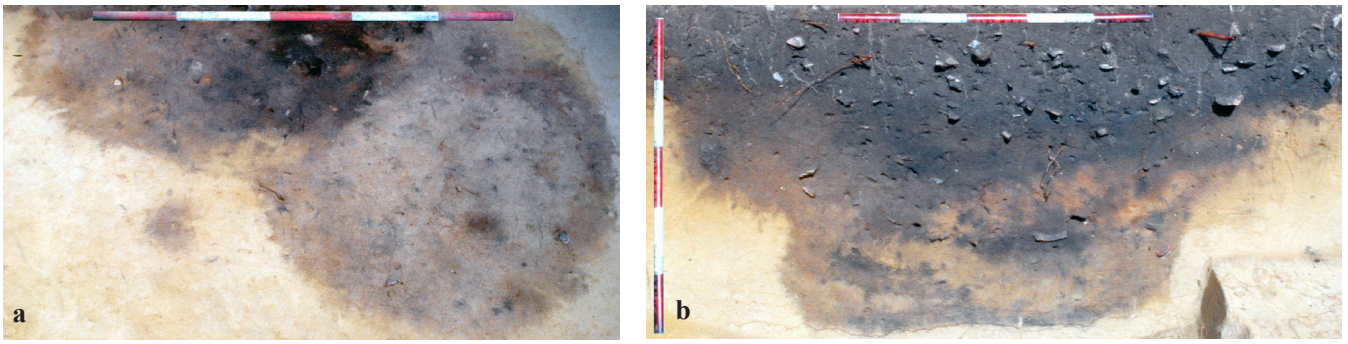


Figure 5. a: Two circular settlement pits of which the younger to the left cuts the older to the right. b: Section through the younger of the two settlements pits with traces of fire at the bottom and several recuts each with traces of fire at the bottom. The pit is covered with a massive black layer of cultural debris containing many partly fire cracked stones.

nature of the strata were recorded. The delimitation of the rubbish heap was by and large determined through these auger holes. Only the northern end could not be determined due to dense vegetation, and the exact edge along the wetland could not be determined either, because the water here washed the sand out of the auger. Especially to the west this posed a problem as the rubbish heap seemed to have its greatest thickness along the line where augering had to be suspended.

The rubbish heap follows the wetland to the west and south ("B" on Fig. 3), but in the south western corner there is a gap in the heap dividing it into a southern and a western part. This gap appears to be original, but a minor sand pit in the hill situated right behind the gap makes this uncertain, since it could have caused the destruction of the heap in this place. Only an excavation will be able to determine whether the gap is original or due to disturbance.

The southern part of the heap runs approximately ENE-WSW. It is 146 m long and 12 m wide in the western end, increasing to 17 m towards the east. If a couple of tongue shaped expansions are included, it reaches a total width of 30 m. The greatest thickness is in the middle with 100 cm, decreasing to 60-80 cm towards the ends.

The western part of the heap runs approximately N-S and is evenly curved along the edge of the wetland. It is 92 m long and has a width of at least 17 m, but more likely 25-30 m. A greatest thickness of 120 cm is reached in its southern part.

All over, the augering showed the nature of the heap to be the same as in the excavated part: Grey to black charcoal and humus coloured sand with huge amounts of pottery, worked flint, and occasionally fire cracked stones. No sign of shells were seen, and there is nothing to suggest the presence of a shell midden. This is noteworthy because of the closeness to the coast, and because in some areas of the settlement higher up the hill, deposits of shells are found. Based on the mapping of the rubbish heap, its volume can be calculated to a minimum of 1814 m^3, 26 m^3 of which were excavated through the 6 m wide trench, meaning that less than 1.4% has been investigated.

Settlement traces to the south

The settlement traces in the southern part of the site was dominated by pits ("C" on Fig.3). In an area with a slight depression in the terrain these were covered by an up to 15-20 cm thick cultural layer. Outside the depression the culture layer was only preserved in spots. The layer appears dark brown to greyish black and black. In addition to large amounts of pottery and worked flint it contained many stones of which a large part were fire cracked (Fig. 5 b). It should be noted that the glacial sand immediately below the cultural layer in this area does not contain stones at all.

The excavated pits were of widely varying form, and their fill varied as well. There were quite a few small bowl shaped pits, most of them with a sparse material, but others with large amounts of worked flint and pottery, occasionally preserved in large flakes. Other pits were large, deep and of an irregular shape. Mostly, they contained amounts of pottery and worked flint, but were not notable in any other way. Notable, on the other hand, were a number of circular pits with vertical sides and flat bottoms (Fig. 5 a and b). Their fill was generally characterized by alternate layers of dark charcoal filled sand and light yellow-brown sand. In some of the pits the light layers clearly consisted of slides of glacial sand from the sides, in others they ap-

Figure 6. Settlement pit covered by an undisturbed and well protected layer of cultural debris containing oyster shells.

peared to represent deliberate backfilling as part of complex stratigraphical sequences, where they interchanged with the charcoal filled layers (Fig. 5 b). This type of pit is quite well known from TBK settlement sites, and for instance common at Sarup (Andersen 1999, 76 ff.).

Soil samples were taken from most of the charcoal filled layers in the pits at Aalstrup. The macro fossil content of the samples has not yet been analysed, but a preliminary survey shows that hazel nut shells are present in most samples often in huge quantities. In a number of samples, charred grain is also present. In the southern part of the site, bones are preserved as small burnt fragments only. In addition there are scattered finds of enamel.

The pottery in cultural layers and pits from the south part of the site generally belongs to MN A with predominance to period II, but pottery from other periods also occur. In the northern part of this area close to the remnants of a megalithic tomb ("D" on Fig 3 and Fig. 7a), a few pits with material from EN I were found containing among other things fragments of rims with decorations in twisted cord and stab and drag technique.

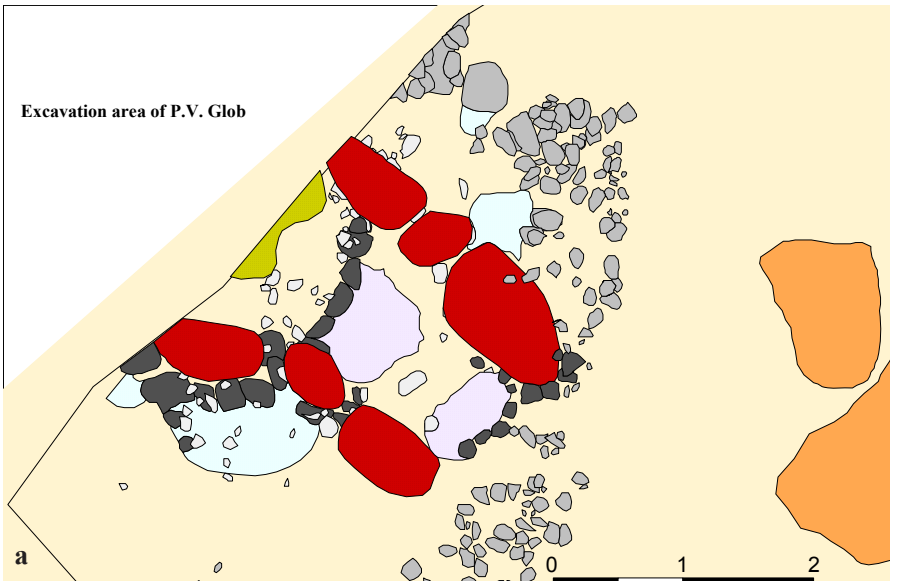
Six cooking pits with fire cracked stone were also found on the southern part of the site. Four of them lay in a cluster close to the megalithic tomb, while the two others lay close to each other to the southwest. The cooking pits are not immediately datable, and they may well be later than the rest of the settlement site. However, close to the two southwesterly cooking pits a layer of completely worn out fire cracked stones were found at the top of the cultural layer. This layer seems to belong to the Neolithic deposits, based on pottery and a piece of a thick butted flint axe of B-type. It is thus possible that the cooking pits belong to a late phase of the settlement site from the beginning of MN B.

During the excavation of the southern part of the site a fair amount of worked flint from the older part of the Maglemosian culture was uncovered. The major part of this lay in two concentrations mixed with the Neolithic flint, one towards the north around the megalithic tomb and one towards the south. It is not difficult to separate between the flint from the two periods, because not only is the technology different, but the surface of the flint has a very different look as well. In connection with the southernmost concentration, a number of pits with a very light fill were found. These exclusively contained flint from the Maglemosian culture together with small pieces of charred hazel nut shells. With certainty these pits were not due to windfalls.

Settlement traces to the north

In the E-W trench north of Globs excavation a 35 m wide cultural layer preserved in a depression in the terrain was found ("F" on Fig. 3). As in the same area ditch segments from a causewayed enclosure came to light, the trench was extended to both sides uncovering 20 m of the cultural layer in an N-S direction. Towards the north the limit of the cultural layer was reached, while to the south it continued downhill with growing thickness. Below this layer, and starting from it, a number of pits were found, mostly of a varying size with rounded sides and bottom (Fig. 6), but several circular pits with vertical sides and flat bottom were also found. Both types contained greyish black to black charcoal coloured sand at the bottom, and in several cases it was possible to ascertain that burning had taken place in the pits themselves. In part of the area the cultural layer contained dispersed deposits of shells, mostly from oysters (Fig. 6), leaving bones preserved. Based on pottery and worked flint the cultural layer in general could be dated to MN A with a dominance of MN A I material. This part of the settlement site thus seems to have been of a generally earlier date than the southern part.

Pits with settlement debris did not occur east or west of the depression, indicating that the settlement does not continue here. Immediately to the north of the excavation area were a cultivated field and survey here showed only a few pieces of worked flint on the surface. Probably the trench has thus uncovered the northern limit of the settlement stretching up from the south into the depression.



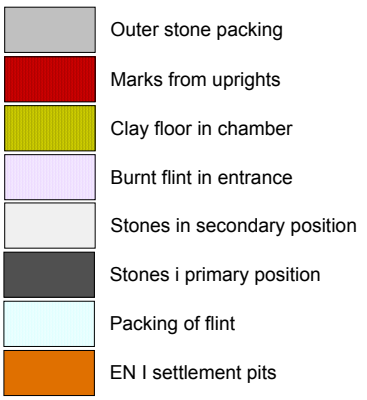


Figure 7. Remains of dolmen centrally in the settlement area (cf. "D" on fig. 3). a: Plan of dolmen. b: Passage and chamber seen from SE with clear traces after the uprights to the left and a stone lined step between the passage and the slightly lower lying floor of the chamber in the background. In the foreground are traces of burning in the passage after removal of a layer of white burned flint.

At the east end of the E-W trench a marked depression in the subsoil with rich cultural deposits turned up ("E" on Fig. 3). It was only tested through a 1.5 m wide trench, and no attempt to delimit the depression was made. A shallow fairly large depression, partly covered with a dense vegetation of spruce, can be seen in the terrain. The cultivated field to the north showed both pottery and worked flint on the surface, so we probably have yet another area with a preserved cultural layer here.

Towards the west the trench stopped at a larger now abandoned sand quarry that has removed the outer 70-80 m of a small promontory (Fig. 2G). A few settlement pits were found in this area showing the presence of yet another settlement area. The existence of this is fairly certain based on information from the former owner of the area, who saw many pits with cultural debris along the edge of the sand quarry, when it was worked.

The megalithic tomb

Immediately south of Globs Excavation the traces of a megalithic tomb were uncovered ("D" on Fig. 3). It was situated directly on the borderline between the cadastral units of Aalstrup and Amstrup, and Globs excavation has removed the rear part of the chamber. Only the passage and the front end of the chamber were now preserved. We do not know, if he during his excavations realised the presence of the tomb.

The megalithic tomb had been an extended dolmen with a short passage, but the exact form of the chamber cannot be determined (Fig. 7 a). The passage leading towards the southeast has had two sets of uprights. It was 1.6 m long and 0.7-0.8 m wide and the floor consisted of a 5-10 cm thick layer of finely crushed white burned flint. Below the flint was charcoal coloured sand mixed with reddish coloured sand indicating an *in situ* burning, but we cannot be certain that it has to do with the megalithic tomb (Fig. 7 b). The marks from the two first uprights in the chamber showed that one side formed a direct continuation of the passage, while the other side was extended. The chamber had a minimum width of 1.5 m, while its length is unknown. At the border between chamber and passage four stones were placed on edge in a slight curve forming a step from passage down to chamber floor, the latter lying 14 cm lower than the passage (Fig. 7 b). The chamber floor consisting

Figure 8. Small offering pit 3 m south of the dolmen. a: Shards from a shallow bowl placed in the pit. b: Small heap of burned flint together with a denticulate piece placed under the bowl.

of a 2 cm thick layer of clay was preserved in an area of 25 x 90 cm.

The packing around the chamber was very disturbed. It appears to have consisted of some larger packing stones around the base of the uprights, as can be seen at the west side (Fig. 7 b). Above and outside of these were the remains of an up to 80 cm wide layer of crushed flint. Outside this again, in a distance up till 1.6 m from chamber and passage, was a layer of stones, which probably had continued over the layer of flint.

No traces of kerbstones were found, but considering the heavy wear and tear on the tomb this does not guarantee that they have not existed. A more solid indication of their absence, however, comes from a layer of pottery shards that were the remnants of pots placed as offerings in front of the tomb. It was positioned very close to the front and east of the passage partly covering the outmost packing stones. The pottery has not yet been dealt with, so a detailed mapping of the offerings is not available. The closeness of the shard layer to chamber and passage, however, makes it unlikely that kerbstones have been present and also unlikely that a mound of any significance has existed. The dolmen can thus be considered as yet another example of a free standing chamber (N. Nielsen 2003, 139 ff.). As for the dating, at least part of the shard layer is from MN A Ib, based on among other things a pedestal bowl decorated with arc stamped lines.

Three meters south of the passage entrance lay a pit with a content that makes it feasible that it should be seen in connection with the tomb. It was 0.7 x 0.8 m large and only 16 cm deep with concave sides, a rounded bottom and a greyish black fill. In the pit the shards of a shallow bowl were found, laid out in such a way that it looks as if the bowl has disintegrated *in situ* (Fig. 8 a). Resting upon the shards were four stones that may have been used to break up the bowl. Beneath the shards was a small heap of burnt flint including a denticulate piece (Fig. 8 b). In the fill above and beneath the shards, small fragments of burnt animal bones were found.

The shallow bowl has straight sides and is only decorated on the inside of the rim with a single row of oblong vertical stabs. The date is uncertain, but the form indicates MN A II. It is thus contemporary with the settlement in general, and the pit may of course belong to this. The nature of the content, however, makes it likely that it should be seen as the result of an offering in relation to the megalithic tomb, not least when the deliberate breaking of the bowl is considered.

The causewayed enclosure

The presence of a causewayed enclosure at Aalstrup was anticipated (Madsen1988, 326). The structure and date of the enclosure turned out to be a surprise, though. When

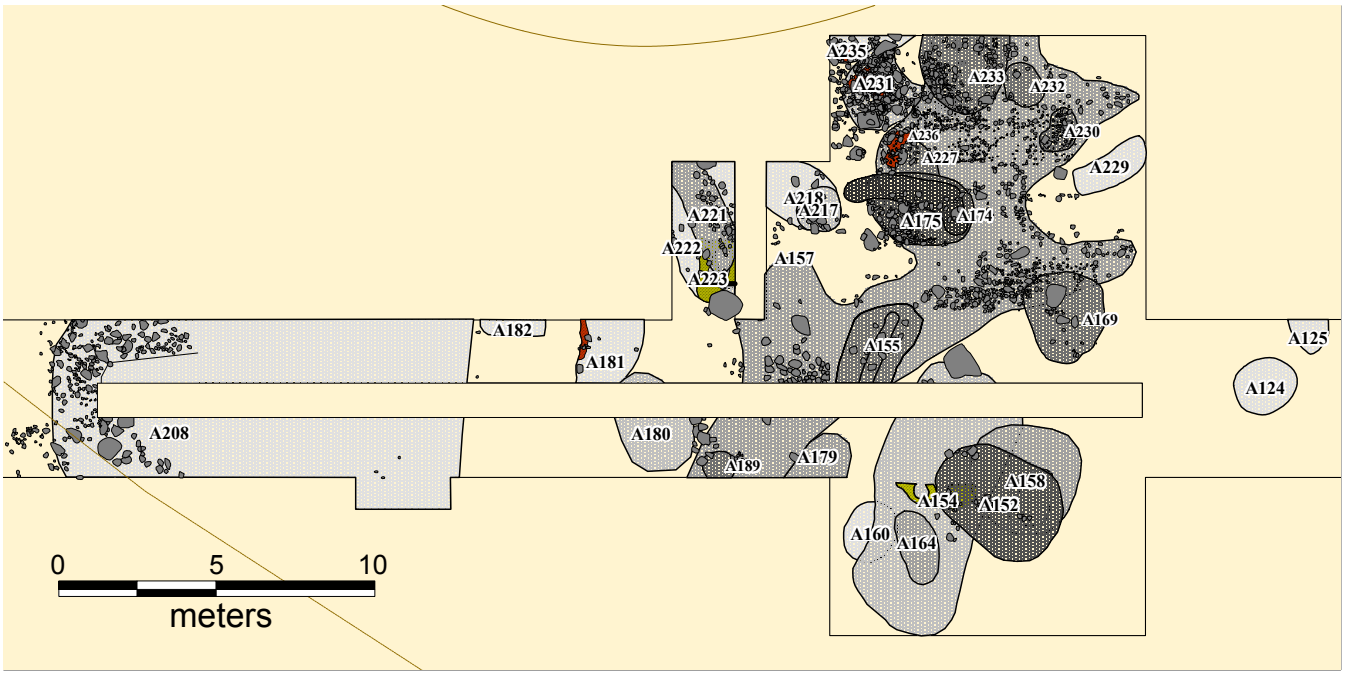


Figure 9. Plan of ditch segments from causewayed enclosure (cf. "H" on fig. 3). The ditch segments are shown in grey tones. The lightest are the oldest and the darkest the youngest within local stratigraphical sequences. The light yellow background indicates moraine sand, dark yellow indicates layers of yellow clay and red indicates layers of reddish clay. The horizontal baulk in the middle of the excavation area represents an area that was not excavated.

uncovered it appeared as a confusion of ditch segments in a 30 m wide band, probably stretching in a NNE-SSW direction (Fig. 9). The oldest of the ditch segments can be dated to EN I, and the youngest to EN II. Judging from the position of the ditch segments in the terrain ("H" on Fig. 3) they cut off a small promontory to the west. This would be in agreement with what we know of the layout from other causewayed enclosure.

With an unchanged direction the band of ditch segments would have cut the western part of Globs excavation. Two of the preserved photos marked "stone paving in SW" actually shows a comprehensive packing of stones that seems to fill out an oblong depression. Unfortunately there is no orientation to the picture so it is not possible to decide whether the feature has the same orientation as the ditch segments.

Within the excavation area no less than 30 ditch segments could be separated. All possible forms and depths of ditch segments occur, and their placement does not seem to follow a systematic plan. Separating primary ditches from secondary ones is thus difficult although there are a few clear-cut cases. In general, later ditch segments seem to have been placed in a fairly random fashion in relation to earlier ones. The frequent overlaps between ditch segments lead to stratigraphical sequences with a sequence of six ditches in one case and a sequence of four ditches in another.

The confusion of ditch segments makes a logical pattern of description difficult to obtain. In the following the ditch segments are divided into three groups. The central group consists of those segments that were stratigraphically related to the long and very irregular A157. In addition to this it is A155, A169, A174, A175, A179, A189, A227, A230, A231, A232, A233, A235 and A236 (Fig 9). The Eastern group consists of those ditch segments that lay to the east and southeast of A157. They are: A124, A125, A152, A154, A158, A160 and A164 (Fig. 9). The western group consists of those ditch segments that lay to the west of A157. They are: A180, A181, A182, A208, A217, A218, A221, A222 and A223 (Fig. 9).

The central group of ditches

A157 stretched across the excavation area in a NE-SW direction. It had a minimum length of 16.4 m and a width of 2.8-5.0 m not including three tongue shaped extensions

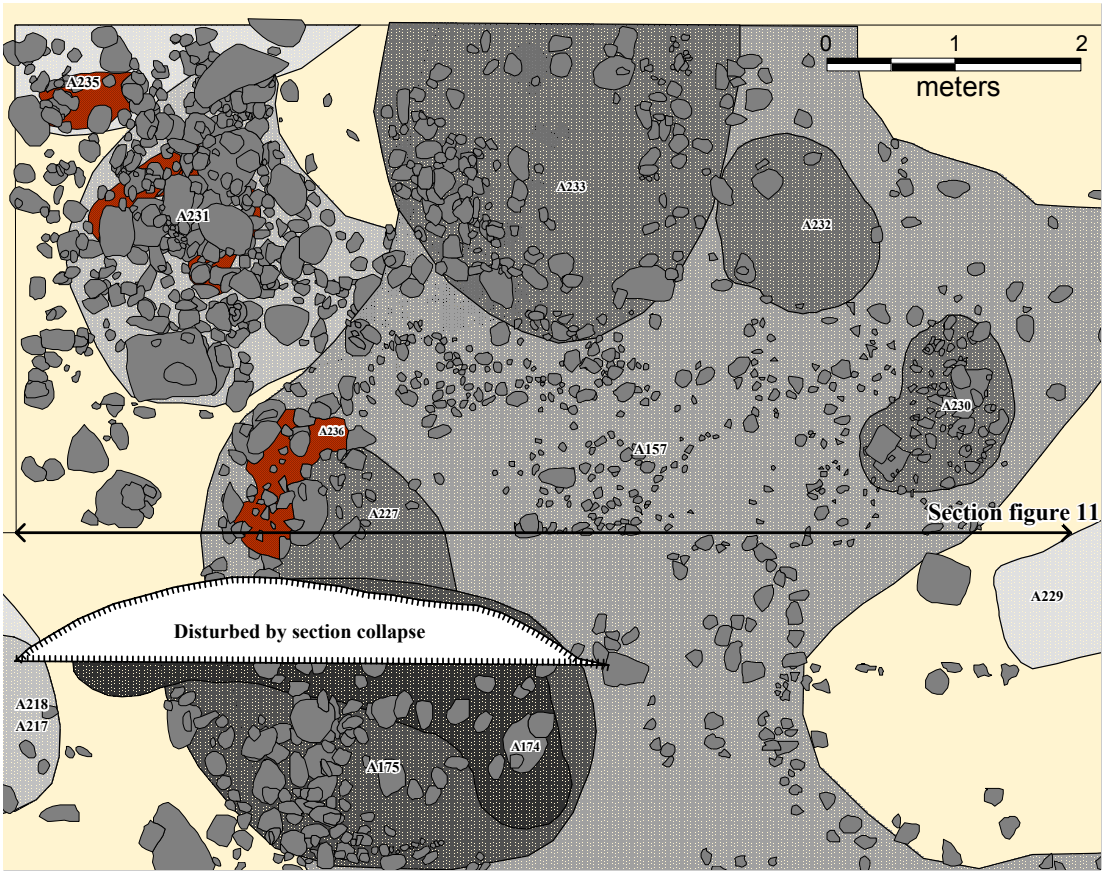


Figure 10: Detail from Figure 9 (cf. signatures on this) with a sequence of some of the most important ditch segments mentioned in the text. The position of the section shown in Figure 11 and an area disturbed as the result of the collapse of a section is also indicated.

(Fig. 9). The depth lay between 60 and 80 cm, but reached 110 cm in a couple of places. The sides were mostly concave and gently sloping, but in some parts to the east they were steeper with a lining of smaller stones and flint nodules. The bottom was mostly flat and irregular, but in the deeper parts also rounded. In the northern, central and southern part there were limited spreads of stones along the bottom with sizes varying from quite small to 40 cm across. The northern spread of stones is described in more detail in connection with A236, which formed a separate part of A157.

A157 had three tongue shaped extensions, one to the west and two to the east. The western one was 2.5 m long, 2.8-4.0 m wide and 50 cm deep. It had a flat irregular bottom and a steep rounded end. The southernmost extension to the east was 3.7 m long and 0.9-2.5 m wide with a flat bottom that sloped from 65 cm of depth to ground level at its terminal. The bottom was covered with a spread of stones of variable size that connected with the central spread of stones in the ditch itself. The northernmost extension to the east was 3.4 m long and 0.5-3.7 m wide. The depth was 50 cm, dropping to 20 cm at its terminal, where it ended with a steep edge. There was a fair amount of stones in its filling.

A157 with its long and very irregular form do not look like any of the other ditch segments. There is no doubt that its form is due to accumulating digging and construction activities over time. Today the individual activities cannot be singled out from the anonymous background with one very notable exception, the construction A236.

A236 was a wall, 125 cm long, 50 cm wide and 117 cm high (Fig. 10), constructed of reddish brown, sandy clay mixed with minor stones and pieces of cracked flint. In dry condition it was hard as concrete. Its west side was set directly against the glacial sand, which had been cut vertically (Fig. 11 a, b). Its east side, facing the ditch segment, had a large upright stone, 70 cm high, 50 cm wide and 40 cm thick, partly embedded into it (Fig. 12 a,b). To the north, the wall ended gradually on the sloping side of the ditch segment, while to the south it ended abruptly due to a re-cut formed by ditch segment A175 (Fig. 10).

A236 was situated within A157, but clearly it stood in

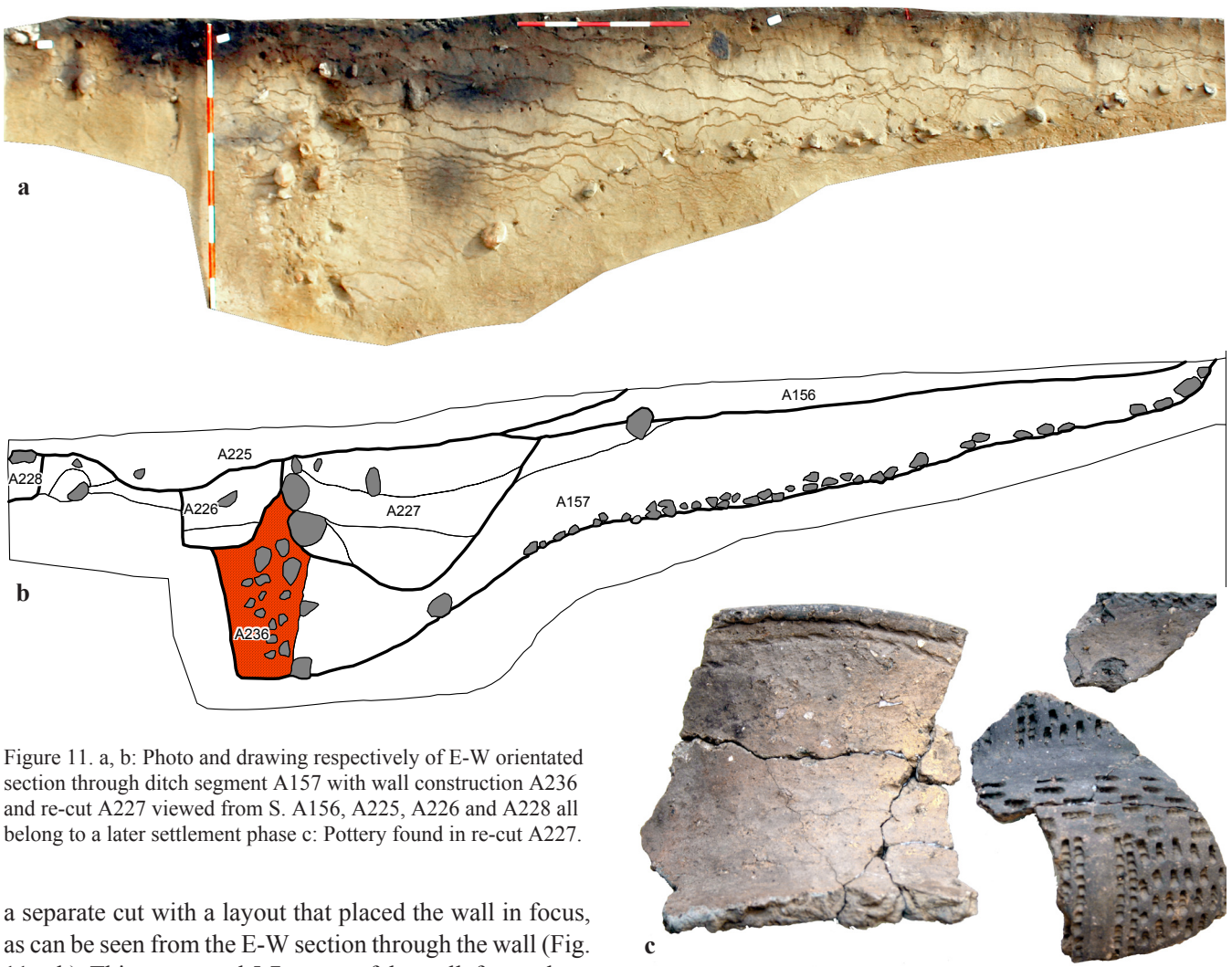


Figure 11. a, b: Photo and drawing respectively of E-W orientated section through ditch segment A157 with wall construction A236 and re-cut A227 viewed from S. A156, A225, A226 and A228 all belong to a later settlement phase c: Pottery found in re-cut A227.

a separate cut with a layout that placed the wall in focus, as can be seen from the E-W section through the wall (Fig. 11 a, b). This cut started 5.7 m east of the wall, from where it gradually sloped down to a point 1.5 m in front of the wall. From here it became steeper and in a curve ended at the foot of the wall. The bottom was lined with a layer of stones 5-10 cm across, which followed it as it rose more steeply to the north of the wall (Fig. 12 a). The filling above the stone lining consisted of sterile, completely stone free, greyish yellow sand.

The wall thus stood as a vertical revetment along the west side of the cut. Against this the other sides sloped, first gently from the east, and then gradually steeper as one moves closer to the wall. It is not know how the south side appeared due to the disturbance by A175. As apparently A236 stood in an isolated ditch segment totally within the bounds of A157, this irregular ditch can never have appeared as we see it today, at any point in time. In stead it must be viewed as an aggregate of a series of activities over time. It was only our lacking abilities to separate the individual components that made it appear as one structure during excavation. To handle the complex stratigraphy of the ditch segments, excavation was carried out "from the side" with sections for every one or two meters. All sections through A157 had an E-W orientation as it happened. It is not unthinkable that, if the sections had run N-S, we would have been able to at least partly resolve A157 into its constituent components.

A227 was a re-cut of A157/A232 (Fig. 10). The ditch segment was at least 1.6 by 1.1 m across and 90 cm deep with steep sides and a rounded bottom. To the west it started exactly above the wall and followed its side vertically down. The lower part of the ditch segment was filled with greyish brown to yellow sand without finds, while at the

Figure 12. The wall construction A 236 in ditch segment A157. a: The fill in A157 and the recut A227 has been removed leaving the wall seen from S partly sectioned and partly unearthed in the ditch segment. b: The unearthed wall with the outward turned flat side of the large stone seen from E.

top there was a 30 cm thick grey to black deposit that contained flint and pottery (Fig. 11 a, b). Among the flint was a denticulate piece of a type that is quite common at early Neolithic sites along Horsens Fjord (Madsen 1978, 173; 1984, 80 f.), and among the pottery there were shards from three decorated pots (Fig 11 c). One pot has a high flaring neck with two horizontal lines of twisted cord beneath the rim. Another has been a richly decorated beaker with probably identical decoration on neck and belly, now best preserved on its lower part. It consists of a horizontal zone with six rows of short horizontal stab-and-drag lines in a checkerboard pattern. Below this are vertical zones filled with short vertical stab-and-drag lines in horizontal rows flanked by two vertical stab-and-drag lines. The decorated zones are separated by narrow blank fields. The third pot is only represented by a rim shard decorated with short vertical lines of whipped cord. In addition to these three pots, a belly shard with vertical lines of whipped cord was found at a higher level than the rest of the pottery. It is uncertain whether it belongs to A227.

A175 was a rounded almost oval ditch segment measuring 3.5 by 2.5 m across and 170-180 cm in depth that cut the southern part of A227 and A236. At the top it was funnel shaped, but for the lower 120-130 cm the sides were almost vertical leading to a flat bottom. The south side of the ditch segment was lined with stones of various sizes. A section was recorded through its southern part, but the section through the central part collapsed before it could be recorded (Fig. 10). The only find from the fill of the ditch segment is a bone fragment.

A174 was an oblong slightly curved ditch segment measuring 3.9 by 1.0 m across and 35-70 cm in depth that cut A175 (Fig. 10). It was filled with shells, mostly from oysters, lying in heaps along its sides (Fig. 19 d). The section collapse mentioned above took most of the shells with it, but fortunately samples had already been taken and all soil from the collapse was carefully sifted through. Apart from the shells, the filling of the ditch segment contained only a few pieces of flint, a few shards of pottery that could not be dated, and a few pieces of well preserved animal bone.

A further seven ditch segments that cut into A157 were documented. They occurred in various locations, were generally small, without internal structures, and without finds. They were given the numbers A155, A169, A179, A189, A230, A232 and A233, and are not described any further here. Two ditch segments stratigraphically predate A157.

A231 seems to have been a drop shaped ditch segment with the broad deep end (2.0 by 2.7 across and 97 cm deep) to the west and a long more shallow tongue (1.8 by 1.0-0.5 across) to the east. The wider west end contained a marked construction. The top of the fill was dominated by two large stones, one to the north (79 by 36 cm across) and one to the south (64 by 50 cm across) both tilting towards the centre of the ditch (Fig. 10). Between the two stones was a packing of minor stones several layers deep, decreasing in

Figure 13. Ditch segment A231. a: the lower part of the stone cover of the ditch segment seen from S. b: The horseshoe shaped construction of clay and stone at the bottom of the ditch segment seen from SW.

extent downwards. At the bottom the packing consisted of one large stone (57 by 53 cm across) to the north, together with a layer of minor stones to the south measuring 1.4 by 1.0 m (Fig. 13 a). Below these stones reddish brown sandy clay mixed with small stones lined the NW and SE side of the ditch segment to a height of 30-50 cm above the bottom. This lining adjoined on each side of the larger stone forming a horseshoe shaped structure measuring 105 by 95 cm with a 30-40 cm stone free internal space that partly continued below the large stone. There were no finds, but at the bottom of the hollow, beneath the stone, a speck of charcoal coloured sand was visible (Fig 13 b).

A235 was a ditch segment that lay in the corner of the excavation area, and it was thus only partly uncovered. Along its southern side a wall of reddish brown sand packed with minor stones, measuring 82 by 45cm across and 48 cm high, could be seen. The ditch segment, which contained no finds, was seemingly cut by A231.

The eastern group of ditches

A154 was the most notable of the eastern group of ditch segments, and the one that has the most familiar look, when compared with other causewayed enclosures (Fig. 9). It was 8.4 by 3.2-3.7 m across and up to 189 cm deep with rounded sides and bottom. Its northern end was very steep. In just 30 cm the depth fell to 110 cm and the maximum depth was reached 1.7 m from the end. From here the depth decreased. In the middle it was 100 cm and to the south 70 cm.

Adjacent to the north end of the ditch segment was a big stone measuring 110 by 90 by 50 cm. It was placed directly on the virgin soil, but a narrow 40 cm deep extension from the ditch was dug along its west side and partly below it. The fill of this extension contained a few pottery shards. The only other finds from the ditch were pottery shards and worked flint including a thin butted axe from the south end of the ditch. In general, the fill of the ditch was very light, with yellow brown colours, but locally there were patches of charcoal coloured sand.

In the centre of the ditch two clay linings were uncovered close to each other at slightly different levels (Fig. 14). The most westerly and deepest lying had an irregular rounded shape measuring 1.2 m across. The greyish yellow, stone free clay lay as a collar around a sand filled centre, which narrowed to a hole through the lining leading to the glacial sand. The 30-35 cm thick clay lining had been placed at the bottom of a cut that had gone right through A154. Despite the presence of a section through the area, it was not possible to follow the upper parts of this cut. No finds were made in connection with the clay lining.

The other lining, made of the same type of clay as the western one, appeared crescent shaped, but it certainly looks as if it had been disturbed by the cut for the other lining (Fig. 15 a, b). It may thus originally have been round with a hole in the middle as well.

A very deep and narrow posthole that went trough the fill of A154 should probably be seen in connection with the clay linings (A166 on Fig. 15 b). It passed close by the eastern lining and stopped 45 cm below it, only 20 cm from the western lining. It is probable that the post was erected, when the latter lining was constructed to mark its position

Figure 14. Two clay linings at the bottom of ditch segment A154 seen from N. The deepest lying is circular with a centrally placed hole through to the sandy glacial soil, here cut by the section wall. Presumably it has been placed in a re-cut that has partly destroyed the other slightly higher lying clay lining to the left.

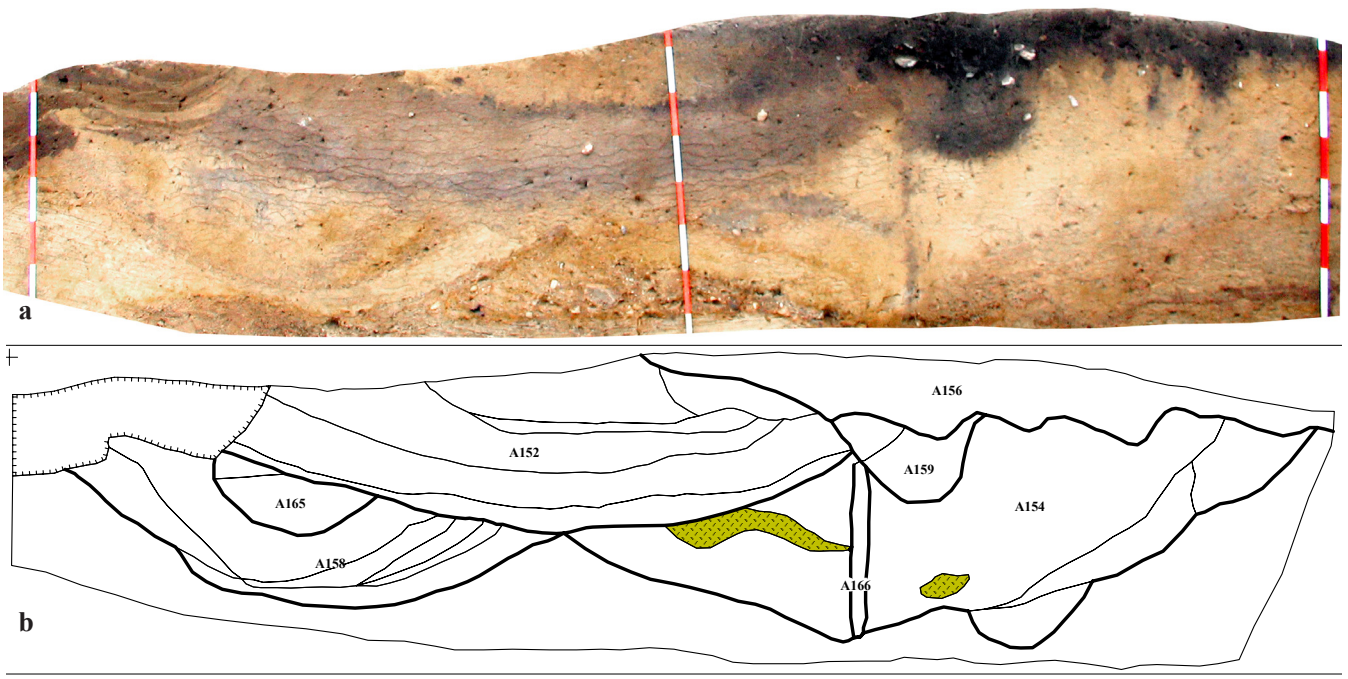


Figure 15. a, b: Photo and drawing respectively of E-W orientated section through a complex series of ditch segments seen from N (A152, A154, A158 and A165). The yellow coloured areas in b are the clay linings shown in Figure 14. A156 and A159 belongs to a later settlement phase.

after it had been covered.

A158 was a round ditch segment, measuring 3-4 m across and with a depth of 110 cm (Fig. 9) that by all probability cut A154. This is not absolutely certain due to a disturbing cut by A152 (Fig. 15 a, b). The fill was greyish to brownish yellow sand, and was without finds.

A152 was a round ditch segment measuring 3.7 by 4.0 m across and with a depth of 92 cm (Fig. 9) that cut both A154 and A158. The ditch segment was shallow with a rounded bottom and concave sides. Its fill of interchanging dark charcoal coloured and lighter layers of sand contained both pottery and flint with a firm date to the EN II Fuchsberg group (Fig. 15 a, b).

A160 was a small round ditch segment measuring 1.8

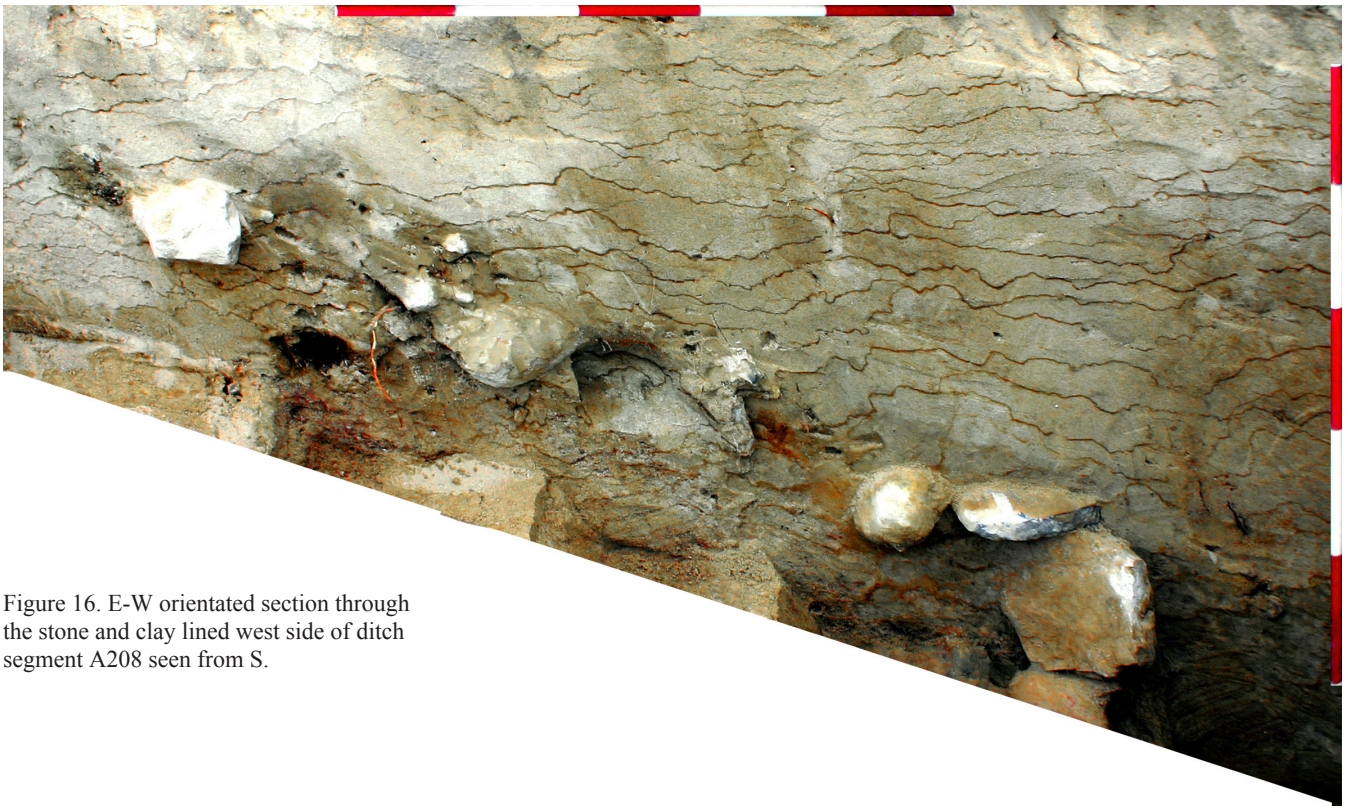


Figure 16. E-W orientated section through the stone and clay lined west side of ditch segment A208 seen from S.

m across and with a depth of 102 cm that was cut by A154 (Fig. 9). It had steep sides, a rounded bottom and was filled with reddish brown quite coarse sand. It contained no finds.

A124 was yet another small round and deep ditch segment measuring 1.9 m across with a depth of 172 cm. It had very steep sides and a flat to slightly rounded bottom. The fill was mostly light grey and yellow and contained a few pieces of flint and a few undecorated pottery shards. Along the bottom was a thin greyish brown layer of a compact nature containing specks of charcoal.

The western group of ditches

A208, the westernmost of the ditch segments uncovered, was of gigantic dimensions compared to the others (Fig. 9). In the fairly narrow trench it was first acknowledged at the very end of the last season of excavation, where huge piles of sand had already developed in excavated parts of the trench on what was then believed to be glacial sand. Because of this and because of the danger of section collapses we could not achieve a complete section through the ditch. We did however attain a fair idea of its form and size.

A208 ran across the 5 m wide trench and continued to both the north and south. In the E-W direction it measured 13.3 m and had a minimum depth of 180 cm. The west side of the ditch was the first to be acknowledged. A spread of stones lying on the glacial sand turned out to continue into a more concentrated stone lining dipping steeply towards the east along the side of the ditch. The stones were of differing sizes from fairly small and up to 60 by 60 cm. Included were also many flint nodules, the largest of which measured 50 by 50 cm. Flake scars along its edge showed successful testing of quality, yet still it had ended up in the stone lining.

The stone lining was most dense at the north edge of the excavation trench, where it could be studied in relation to the cut for the ditch segment that here had a 30 degree slope and showed marked steps (Fig. 16). An upper step, 40 cm high, was filled with stones to form an even slope. A second step, 50 cm high, was also filled with stones, but these were themselves built up to form and emphasise the step with red sandy clay between the stones to reinforce the stacking. Along the southern edge of the excavation trench the slope of the cut was more gentle (18°) without steps and with a sparser lining of stones.

The east side of the ditch segment was gently sloping

Figure 17. Stone marking at the southern end of the sequence A222, A223 and A221 of ditch segment seen from N. Presumably it was set to mark A223.

with an angle of 18° at the north side of the excavation trench and 10° at the south side. There was no stone lining of the side here, and the stone free sandy fill lay directly on the glacial deposit, which at this point is fairly coarse with a marked content of gravel (Fig. 19 b). No finds were made in connection with A208.

A181 was an N-S orientated ditch only partly excavated (Fig. 9). It was 2.2 m wide and 84 cm deep. It had a flat bottom and a sloping side to the east. The west side was vertical and supported by a 20 cm thick layer of reddish brown sandy clay. There were no finds from the lower part of the ditch segment, but from its upper parts came pottery shards among which are pieces of rims decorated with horizontal lines made with twisted cord and stab-and-drag technique indicating an EN I date.

A222 was an N-S orientated ditch segment that was only partly uncovered and excavated (Fig. 9). A length of 5.0 m, a width of 2.0 m and a depth of 115 cm are all minimum measures. The bottom was flat and the fill consisted of homogenous yellow brown to greyish white sand without finds.

A223 was an N-S orientated approximately 2.1 m long, 1.2 m wide and 75 cm deep ditch segment that cut A222. The bottom was flat and lined with a 15 cm thick layer of greyish yellow clay that measured 115 by 87 cm with an N-S orientation. In the middle of the clay lining was a 90 by 40 cm hole leading directly to the glacial sand. The west side of the cut was steep and the edge was lined with clay that continued downwards along the side of the cut. The lining continued around to the south side going beneath the northern end of a large stone (108 by 85 by 70 cm) (Fig. 17). To the north the clay lining bend towards the east and then stopped, seemingly leaving an opening into the clay lined area. The eastern side of the ditch segment lay under a balk that was not excavated.

A221 was a ditch segment that cut both A222 and A223. It was at least 2.9 m long, had a width of 1.2 m and a depth of 36 cm (Fig. 17). The ditch was filled with light grey charcoal coloured sand and from this fill came several tiny pottery shards. Most of these, found within a limited area, belong to one pot that has so far eluded reconstruction due to a high degree of fragmentation, but what can be seen from its decoration tentatively suggests an EN I date.

Discussion

There are many interesting aspect associated with Aalstrup. Some are evident now, while others can only be discussed when all of the material from the site has been analysed. In the following I will only briefly comment on the settlement site, while the causewayed enclosure and the many astounding new features associated with it, will be discussed in detail.

The settlement

With an estimated 2.5 ha, the total extension of the area used for settlement activities is quite large. However, it is clear from the preliminary analyses of the finds that this area was never settled in its totality at any point in time. Thus traces from MN A I are mainly found to the north, while traces from MN A II or later are found in the central (Globs excavation) and southern parts of the site. Analyses of the pottery will make it possible to qualify this picture further, but with the small percentage of the site excavated we should not expect to be able to draw a detailed picture of the shifting location of settlement across time. It seems clear, however, that with time the settlement grew in size and intensity in accordance with the general development within the TBK (Madsen 1982, 222 ff.).

The presence of the megalithic tomb emphasizes the changeable conditions of the site. The tomb was built on

an EN I settlement site, which is not uncommon (see for instance Madsen 1977, 77 and Madsen & Petersen 1984), but contemporary settlement activities does not seem to have been present in its vicinity. The nearest MN A I settlement material comes from the area around the causewayed enclosure 60-70 m away, while the settlement material close to the tomb is from MN A II or later.

The separation between the settlement area on the plateau and the huge rubbish heap along the foot of the slope is interesting, and it must of course be taken into consideration, when evaluating the intensity of the settlement. Thus the amount of debris found on the plateau in the various pits and cultural layers cannot be taken as a direct indicator of settlement activity. Considerable cleaning activities must have taken place to form the massive amounts of debris in the heap. As our five meter wide trench through the heap cannot be taken to represent it as a whole, we cannot evaluate the extent of the settlement activities in various periods using the material from this trench.

Separate rubbish heaps outside the actual settlement area are only sparsely documented in the literature, which is probably more due to the sporadic nature of excavations on MN A settlement sites, than to a scarcity of this feature. A clear parallel to the situation at Aalstrup is found at Spodsbjerg (Sørensen & Bech 1998, 56 ff.), and it is also likely that the thick layers of rubbish along the foot of the slopes at Fannerup represent a similar situation (Eriksen 1984, 14 ff.). Future excavations will probably show the separation of settlement area and rubbish dumps to be a quite common feature.

With the lack of ploughing in recent time there ought to be a fair chance of finding traces of houses at Aalstrup, but none were found. We did find a few undisputable postholes, but the five meter wide trenches did not leave sufficient space to acknowledge any patterns. What is more, the combination of the very loose, course glacial sand, combined with the numerous pits that had to be sectioned, made surface observations very difficult. Finding houses at Aalstrup certainly demands a different excavation technique than the one used.

Proper surveys have not been carried out in the Aalstrup area. Yet we have three other settlement localities with MN A pottery within two km (actually four recordings, but two of them are so close to each other that they must represent the same site) (Fig. 1). We clearly have to view these sites in conjunction with Aalstrup, but we have no idea, whether it was the same group that moved around, or it is parallel settlements. The pottery from the three sites all date to early MN A, but it is uncertain whether this indicates that the dispersed pattern is limited to this period, or that late material outside Aalstrup has not been found yet. All the sites are situated on light sandy soil not far from wetland areas, as is generally true for TBK sites in this part of eastern Jutland (Madsen 1982, 275 ff.).

The causewayed enclosure

The segmented ditch process

An archaeological excavation often produces a static picture of what in the past was a dynamic process of often deep time depth. In most cases it is very difficult to deduce the dynamic process from the static picture. It requires painstaking and well documented investigations of the spatial relationships between the features that we separate. A special emphasis must be on the stratigraphical relationships between all contexts, which do not always happen on extensive large scaled surface excavations.

Understanding the dynamic process, however, is just one of the aims of an excavation. More attention is often given to the structure. We wish to be able to present a picture of how things looked - were organised - at a certain point in time. This ought not be done without a previous clarification of the dynamic process, but often does, partly because of lacking ability to handle the dynamic process, and partly because the preservation and/or the documentation of our object of investigation is too poor to allow a proper reconstruction of the dynamic process. In stead, through generalisation from our visual impressions of the object and all its features, we try to conjure up pictures of entirety like “a village” or “a causewayed enclosure” as a fully integrated unit in time and space (see Holst 2000 for a discussion of this topic).

The question is, however, if the picture of entirety we draw up has any foundation in reality. Did the causewayed enclosure Sarup I exist in the form we know from the publication, somewhere between 3450 and 3350 BC (Andersen 1997, 28)? Or is it a phantom drawing created by adding together the traces of activities taking place over a 100 year long period? In the following I shall try to approach this problem focusing on the ditch segments, which are the key feature of causewayed enclosures both in South Scandinavia and in other areas of Europe (Andersen 1997,

133 ff.) Wherever we find causewayed enclosures, it is the ditch segments alone or in combination with post settings that draws the picture of the enclosure as an entirety.

To understand the ditch segments of the causewayed enclosures we must look at the dynamic process of use – the sequence of events from they were dug till they were covered up again. Mostly, the assumption of this process has been quite simple: A ditch segment was dug in conjunction with and at the same time as other ditch segments in order to create the physical outline of an enclosure. They were then left to silt up over time by forces of nature alone, or in combination with human activities. Careful investigations over the years in many countries, however, have shown that the process often did not follow this pattern and perhaps never did. In stead another pattern is beginning to emerge surprisingly constant over time and space.

The process is tripartite. First of course comes the digging of a ditch segment, and whenever it is possible to determine the outline of the segment it appears to be of limited size. The digging seems to be immediately followed by some sort of activity at the bottom of the ditch. In some cases we find constructions of some sort, in others we find deposits of artefacts or bones, in yet others we see traces of fires, and in quite a few we find nothing at all or next to nothing – perhaps just a mere suggestion of an activity like a thin layer of charcoal, or a thin dark greasy layer suggesting the presence of organic material, now completely decomposed. Whenever the traces of the activities become more substantial, we are left with little doubt that they have been of a ritual nature. Covering up of the ditch segments seems to have been deliberate, and it took place shortly after the activities at their bottoms, in most cases before natural sedimentation could occur. We are speaking of hours and days rather than weeks and months. Finally, there does not seem to be a ditch segment that has not been re-cut by later segments.

This pattern – circumstantially to be referred to in the following as the *segmented ditch process* – has turned up regularly in Denmark (Madsen 1988, 320 f.; Andersen 1997, 267 ff.), but also in contemporary enclosures in the rest of Europe (See Andersen 1997, 133 ff. for an overview. See also Pryor 1998 for new detailed investigations at Etton in East England, and Thomas 2001, 133 ff. for documentation of a very complex sequence of re-cuts). New investigations have also shown the same pattern to occur in the LBK culture in Central Europe, at least in its late phases (Jeunesse 1996; Schmidt 2005).

The position and layout of ditch segments

The nature of the causewayed enclosure at Aalstrup is in principle not very different from other causewayed enclosures in South Scandinavia, and the *segmented ditch process* applies in full. The major difference is that the ditch segments do not follow a simple linear course, but are placed rather chaotically within a 40 m wide zone. Systematic re-cutting of individual ditch segments do occur and the long irregular A157 is probably the result of a linear sequence of smaller cuts, but the result look far from the long well organised sequences of ditch segments we know from for instance Sarup I. Even though only a small area has been investigated, it seems fairly certain that we do not deal with one or more phases of a large organised enclosure. We have a minimum of 30 and by all probability many more individual ditch segments within the excavation area, and we have no indication what so ever that just two of these have been open at the same time.

Aalstrup, as it appears, is the result of a sequence of individual activities within a delimited area, and although some of these activities have taken the form of precise re-cuts of earlier ditch segments already covered up, we cannot claim that we are dealing with one single structure. Aalstrup as a physical manifestation of a "causewayed enclosure" has with all probability never existed. It has merely been a reasonably well defined area within which the *segmented ditch process* took place.

The question now is, if the same is true for other causewayed enclosures, even if they appear with well ordered rows of ditch segments? For instance the nearby Toftum with its two rows of ditch segments (Madsen 1978; 1988, 311 ff.), the likewise nearby Bjerggård with a single row of ditch segments (Madsen 1988, 309 ff.), or indeed the complex well organised Sarup I with combinations of ditch segments in two rows, palisades and palisade enclosures (Andersen 1997, 27 ff). If the *segmented ditch process* as outlined above holds true, then the answer must be that these enclosures have never existed visually in the form that our excavation plans show. These are in fact phantom drawings. We will never know, how many ditch segments were open at the same time in an enclosure, but if we take the size of the enclosures together with the number of individual ditch segments, often of a very limited size, then it is not likely that the enclosure has ever been visible through simultaneously open ditch segments. There may have been a variable number of ditch segments open at the same time,

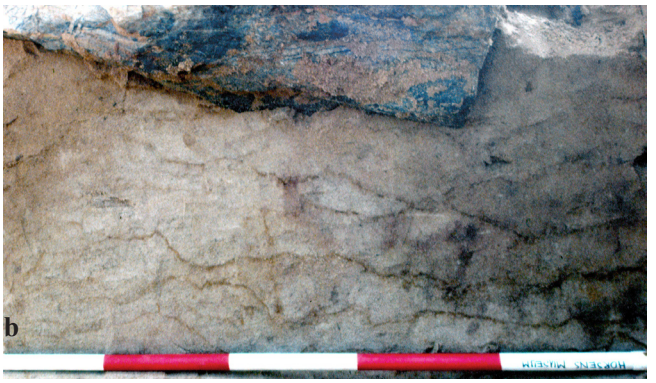


Figure 18. Stone marking of ditch segments at the Toftum causewayed enclosure. a: The stone seen from N placed at the northern and southern end of two sets of ditch segments. b: Section under the stone seen from W showing it to rest on a small plinth of glacial soil with the cutting for the ditch segments on both sides.

but it need only be very few. With an enclosure that has functioned for a hundred years or more it would take only a few cuts per year to produce the complexity we see today. Having said this, I should hasten to add that although these assumptions goes for the ditch segments at Sarup I as well, this enclosure may have been very substantially visible over time due to its palisades.

Marking of ditch segments

If we accept the *segmented ditch process,* it has some intriguing consequences. If we set aside Aalstrup for a moment, it is a fact that our excavation plans shows us complete enclosures with conceptually clear structures. Thus, even if the enclosures have not existed as a whole in a physical visual form, they must have existed in a conceptual form. Those who dug the ditch segments not only knew why they were digging, but also where they had to dig to make it part of the entirety. The layout of the enclosure was mentally clear and somehow physically visible to them. This indicates that focus points for the ditch segments were marked on the surface, and that the enclosure as a whole was "visible" through markings on the surface. Such markings can have been multifarious and not necessarily very substantial. However, to the extent solid markings were used they are archaeologically traceable.

At Aalstrup two types of markings have been documented: posts and large stones. Postholes have been found on several occasions in the general area of the ditch segments. Several of them may have been marking post, but due to the overlying settlement we cannot be certain that they do not stem from activities here. The traces of an indisputable marking post (A166), however, is seen in the section shown in Figure 15. It goes through ditch segment A154 and very probably marks the latest cut with a clay lining at the bottom (Fig.14).

Large stones, marking the end of ditch segments, are seen at the northern end of A154 (Fig. 9) and at the southern end of A221, where it probably was placed to mark the re-cut A223 (Fig. 9, Fig. 17). The extend to which stones were used as markers in causewayed enclosures is difficult to ascertain, as the stones by the very nature of their purpose has been lying high and therefore been subjected to removal by agricultural activities through time, and not least in modern time.

That the two stone markers at Aalstrup is not just another peculiarity for this site shows the investigation of ditch segments at Toftum in 2003[2]. Here a large stone

2 Excavations have taken place at Toftum at several occasions. Apart from the original excavations in 1975-76 (FHM 1815 – Madsen 1978), the continuation of the ditch segments towards the north was investigated in the eighties (FHM 2855). In connection with the planting of a wind mantle in 2003 the extension of ditch segments towards the south was investigated as well as parts of the settlement in the southeast part of the site (HOM 1800).

was found in the middle of what at first glance looked as one consecutive ditch (Fig. 18 a). At closer inspection, however, you may note that: the colour of the fill is darker behind the stone than in front of it; The outline of the ditch in front of the stone is very rounded and swings towards the stone on the left side; In front of the stone there is an inner outline created by a stripe of light sand; Finally there is a narrow tongue on the ditch in the proximal end. The investigation showed that the proximal tongue is the end of a narrow ditch segment that ran all the way up to the stone. This was subsequently cut by a wider and shorter ditch segment in front of the stone, which again was cut by a short narrow ditch segment. The colouration on the other side of the stone stems from a separate ditch segment, and the stone thus lies on the borderline between two ditch segments. This is clearly seen in a longitudinal section beneath the stone (Fig. 18 b). To the left is the light fill of the ditch segment in front of the stone, and to the right is the darker charcoal coloured fill of the ditch section behind the stone. In between a thin column of glacial sand reach up to the stone. The ditch segments have thus been dug right up to, and a little under the stone as was the case with the two marking stones at Aalstrup. It is worth noting that the ditch segments on either side of the stone cannot have been open at the same time as the column of glacial sand is not big enough to support it alone. From earlier excavations at Toftum there is also an example of a large stone placed at one end of a ditch segment (Madsen 1978, 104).

Activities at the bottom of ditch segments

Activities at the bottom of ditch segments in South Scandinavian causewayed enclosures seem to have been of a varied nature (Andersen 1997, 272 ff.; Andersen 2002, 4 f.). We see traces of fire in many ditch segments, and the activities in general have resulted in material leftovers. We find flint and pottery, often large parts of pots or even complete pots, but always broken. Bones are present, where conditions of preservation allow it, mostly in the form of animal bones, but human bones also appear. To this quite often come traces of completely decayed organic material. Proper constructions are rare, but stone linings of the bottom are seen at for instance Bjerggård (Madsen 1988, 310), and a dense layer of stones covering the remnants of fire is also seen (Madsen 1978, 164). Almost all causewayed enclosures in South Scandinavia show settlement activities from various periods of MN A leaving cultural debris in relation to the ditch segments. It is a common assumption that deposits of cultural debris in top layers of ditch segments have ended there by chance in hollows in half filled ditch segments. However, deliberately and carefully deposited settlement rubbish in ditch segments has been attested at Toftum (Madsen 1988, 315). This may indeed make us look critically at the assumption of a chance filling with settlement debris, not least if we consider that the *segmented ditch process* presumes that ditch segments were covered up completely after the activities related to them had ended.

The traces of activities in the ditch segments at Aalstrup are slightly different from the pattern we see elsewhere. First of all, there are very few material leftovers. Only in A154 do we have a "normal" pattern with pottery at one end and pottery and flint, including a thin butted axe, at the other. Apart from that we have only cultural remains in a few re-cuts. In A227, A181 and A221 flint and pottery was found, and in A174 a compact layer of oyster shells together with a few bones, shards of pottery and pieces of flint came to light. The conditions for preservation of bones in the ditch segments at Aalstrup were bad. In A175, beneath the layer of oyster shells in A174, they were however fair, and from here we have a well preserved so far unidentified piece of bone.

The most evident traces of activities in the ditch segments at Aalstrup are the many clay constructions. In three cases the bottom and in one case also the sides of the ditch segments were lined with greyish yellow clay. In each of the clay linings a centrally placed hole went straight through to the sand beneath. It can be assumed that these holes were of central importance to the activities that had taken place at the bottom of the ditch segments.

I know of only one parallel to these clay linings. At Bjerggård a combined clay and stone lining was found at the bottom of a ditch segment, where the clay also continued up one side of the cut. On this lining a pot together with very badly preserved skulls and a few other bones from 3-4 dogs were found (Madsen 1988, 310). Layers of clay in ditch segments, however, are not unknown phenomena. They are seen at Toftum for instance, where fires had been burning on them (Madsen 188,313).

The five other clay constructions all represented some kind of walls, and they were all made with red sandy clay mixed with stones and flint. In A231 a horseshoe shaped lining in association with a stone created a small enclosed space with an opening towards SW. Covered over it would

have been like a small chamber, and it could give association of ideas with the "mini dolmen" that has been found in a ditch segment at Sarup Gamle Skole (Andersen 2000, 29 f.; Andersen 2002, 5). However, it is also possible to associate with the clay linings with a central whole, as the horseshoe shaped construction terminates under the stone in a depression into the glacial sand containing a small speck of charcoal coloured sand (Fig. 13 b).

In A208 the clay was used to strengthen the steep stone lined western side of the ditch, and in A181 and A235 it was used to build a revetment against the soft glacial sand. The purpose seems to have been to make one side of the ditch segment stand steep and stable. Especially with A208 great pain has been taken to build up an impressive side in stone and clay.

The construction in A236 is exceptional. Functionally it may be viewed as a revetment to support the vertical side of the ditch segment, but the whole layout indicates that there is a lot more to it than that. The stone paved ramp gradually sloping down from the east and finally dipping to the foot of the wall in a relatively narrow hole is a staging of the wall and especially the large stone imbedded in it (Fig. 11 a; Fig. 12). The stone became an almost altar like focus point for the agents in the ritual that took place in the ditch segment.

Direct parallels to A236 are unknown to me, but the construction gives certain association of ideas. On the technological level the set up reminds of the uprights in the chamber of megalithic tombs with the packing of clay and flint behind them. However, the packing in the megalithic tombs is hidden behind dry walling and has never been visible. The visual effect has thus been different and the likeness is probably not significant. The monumental, vertical surface may, however, have had the same intension and function as other vertical surfaces in ritual structures. It is thus natural to see it in association with constructions like timber built facades in the east end of long barrows, kerbstone lines at megalithic tombs and wooden palisades at causewayed enclosures. We may reasonably assume that the clay and stone built wall in A236 was the focus point of ritual activities akin to those taking place at other vertical fronts, but unfortunately they have left us no traces.

Covering up of ditch segments

There is no doubt that the ditch segments at Aalstrup have been completely covered up again, and quite deliberately. The covering up took three different forms: Complete or partial coverage with stones; Coverage with charcoal coloured sand mixed with stones and cultural debris; Coverage with sterile sand.

Coverage with stones is first of all seen in connection with A231. The layer of stones here is massive, reaching a thickness of 60 cm (Fig. 13 a; Fig. 19c). A230, A233 and A235 have partly been covered with stones (Fig. 10). The many stones in association with A175 on the other hand are probably predominantly from a revetment of the side of the ditch. Unfortunately, due to the section collapse, this is not well documented.

Coverage with charcoal coloured sand mixed with stones and cultural debris in the shape of flint, pottery and in one instance oyster shells seems exclusively to have taken place in limited re-cuts in former ditch segments. They are A152 (Fig. 15 a), A174 (Fig.19 d) A222 (Fig. 17) and A227 (Fig. 11 a). It is too early to say, whether contemporary settlement activities took place in the nearby vicinity of the ditch segments, but as far as we are dealing with EN I dates there is nothing to suggest it. In this connection it is worth noting that at Toftum, where cultural debris in huge quantities was part of the covering up of ditch segments, the settlement area lies over a 100 m away.

The major part of the coverage consists of sterile sand, or almost sterile sand as patches of charcoal colouring may be present. Most conspicuous is the filling of A154, A157 and A208 that are the major ditch segments. They are filled with sand of middle coarseness with no or very few small stones as inclusions. The same type of sand exists as glacial deposits. On the southern part of the site it was the only type of glacial deposit that we came across. On the northern part, where the ditch segments lie, the conditions are more mixed. Areas with stone free sand intermix with areas of coarser sand and gravel mixed sand, as you may note in Figure 15 a.

On Figure 19 a the section through A236 (in the middle of the picture) shows glacial sand to the left and beneath the wall and the fill of the ditch segment to the right. There is a clear difference to be seen between the glacial deposit and the fill. The first appears loose and without structure, while the latter is dense and with precipitation lines made of clay particles. There is no doubt, however, that the sand is of the same nature. It is only the conditions of deposition that has been different. It is thus reasonable to assume that in this ditch segment the backfill was the same material that had been removed by the cut.

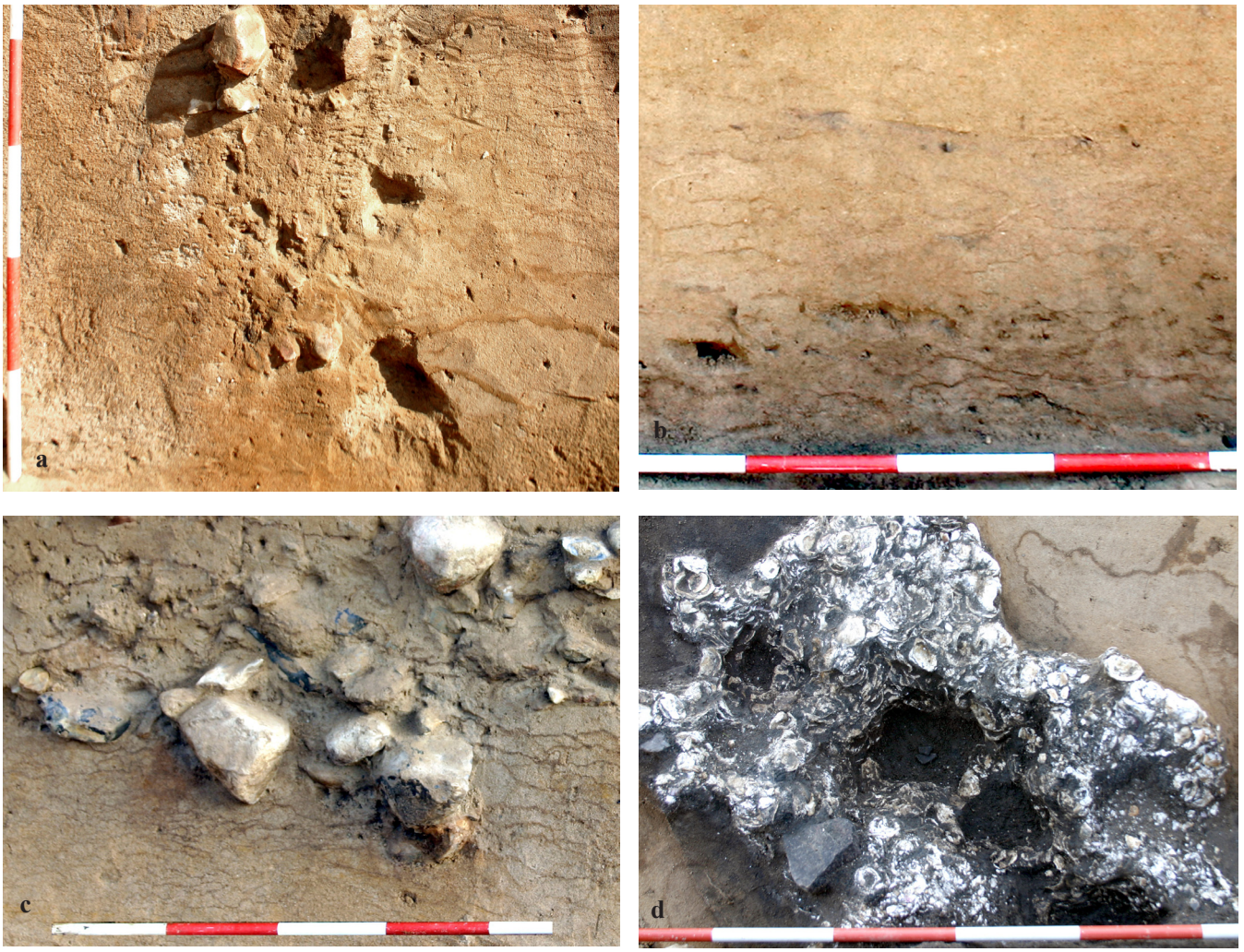


Figure 19. Examples of fillings in ditch segments. a: Homogeneous filling of sand in A157 (right) that presumably is the same sand as the underlying glacial sand deposits (below and left) – section seen from S. c: Homogeneous filling of sand in A208 that separates itself from the underlying more coarse sand – section seen from S. c: stone filling in A231 – section seen from S. d: Filling with oyster shells in A174 – seen from above.

As can be seen from Figure 15 a, A154 was cut into gravel, yet the fill of the ditch segment consisted of stone free sand. The same is true with the southern part of A157 and most remarkably all of the investigated part of A208. In Figure 19 b the lower greyish brown material is a glacial deposit, consisting of a mixture of sand and gravel, while the upper yellow brown material is the stone free sandy fill of the ditch segment. The conclusion from this is that the material that was dug from a ditch segment is not always the same material that was backfilled. Considering the size of A208 this certainly is a complicating factor for understanding the course of events, for what happened with the material that was dug out, and where did the backfill come from? Do cutting and refilling add up in the end – that is did material cut from one ditch segment end up as fill in another – or has large amount of dirt cut from ditch segments been removed from the site and comparable amounts been brought in from somewhere else for the refilling?

The date of ditch segments

Up till now the starting date of causewayed enclosures in South Scandinavia lies mostly in EN II. A few falls in MN A I and one in MN A II (Madsen 1988, 322; Andersen 1997,

270). How far up in time the ritual activities associated with ditch segments reach is not quite clear. It is the succeeding settlement phases on the sites that complicate matters. If we take the *segmented ditch process* into account as suggested above, then there would be no hollows left on the surface and the deposition of cultural debris would by itself be an outcome of that very same process, and then ritual activities related to the ditch segments continues at least to the end of MN A. The causewayed enclosures may thus have been "active" much longer than we hitherto have believed (Andersen 1997, 274).

The pots decorated with twisted cord and stab-and-drag from A227 (Fig. 11 c) are typical representatives of the Volling group. The same is true with the material from the top of A181, and possibly also from A222. In Northern Jutland the Volling group can be dated to both EN I and EN II, but at Horsens Fjord we are with certainty within an area, where it can be dated to EN I exclusively (Madsen 1994). In A227, however, are also shards decorated with whipped cord, which certainly indicates an EN II date, and consequently we are dealing with either a contamination of EN II material into an EN I context, or more likely a local transition/substitution phase between the two stiles. That at least one ditch segment can be dated to EN II proper is shown by clear cut Fuchsberg style pottery in the ditch segment A152.

It is not surprising to find a causewayed enclosure in South Scandinavia with a date earlier than EN II. In other parts of Europe causewayed enclosures appears much earlier (Andersen 1997, 133 ff.) and in England it is generally assumed that there is a close connection between causewayed enclosures and earthen long barrows. At Hambledon Hill for instance it has been suggested that the enclosure functioned as an excarnation site, and that bones from here ended in nearby earthen long barrows (Mercer 1980, 63 f.). Further it seems that the flanking ditches of the long barrows had a parallel function to the ditches in the causewayed enclosures (Thomas 1999, 74 ff.). Earthen long barrows with a high resemblance to the British ones occur quite early in Denmark (Madsen 1979; 1993), so why should causewayed enclosure not have a similar early date (Andersen 1997, 267)?

With the EN I date of Aalstrup established it will probably not take long, before other sites can be added, both from new excavations, where the issue will be in focus, and older excavations, where existing information will be reviewed. At the moment we do not know if the seemingly chaotic organisation of the ditch segments at Aalstrup has something to do with its early date, but the possibility remains. At any rate it means that we no longer can expect well organised layouts of ditch segments, which surely will add to the number of potential causewayed enclosures.

The function of ditch segments

The causewayed enclosures in Europe have through time been subject to a broad spectre of interpretations ranging from defence structures with or without settlement activity, over cattle pens, market places, social meeting places to cult and/or burial places (Andersen 1997, 301 ff.). Increasingly, focus has been on the ditch segments and their function, and if we acknowledge the *segmented ditch process* we can limit ourselves to discuss cult or ritual places.

One important element of the ritual activities carried out at causewayed enclosures was the handling of dead people. Human bones have been found regularly, if sparsely, at causewayed enclosures in South Scandinavia (Andersen 1997, 273), but in other parts of Europe with better conditions for preservation of bone they appear frequently (Andersen 1997, 133 ff.). Even though complete skeletons occasionally are found in ditch segments, it is clear that these were not meant for permanent burial. The main rule is that the ditch segments contain bones from skeletons that have been dismembered, and that the bones are often fragmented. Further, individuals are in most cases represented by just one or a few bones. This leads us to two contrasting scenarios of how the handling of the dead in causewayed enclosures may have taken place: Either the dead were placed/buried in the causewayed enclosures and subsequently most of the bones were moved – when excarnation had taken place – to their final resting places, or the dead were originally buried in ordinary graves, and a few of the bones were subsequently moved to a causewayed enclosures.

The idea of the causewayed enclosures as excarnation sites was originally introduced by Peter Drewett in connection with Offham Hill (Drewett 1977) and Roger Mercer in connection with Hambledon Hill. The latter site produced large amounts of scattered human bones in the fill of the ditch segments of the central enclosure – so many that, if the density of bones in the unexcavated parts equalled the excavated parts, at least 350 individuals would be present in the enclosure. It was assumed that excarnation had taken place on the inner surface, and that the major part of the

bones in the fill of the ditch segments had ended there more or less by chance. (Mercer 1980, 39 and 63).

Others have acknowledged this interpretation. With respect to the South Scandinavia enclosures Niels H. Andersen has accepted it, although he does not see the bones in the ditch segments as incidental, but as selected bones that were included in the ceremonies in the ditch segments together with other chosen components (Andersen 1997, 309).

It is important to maintain that the ditch segments were not used for excarnation. The Neolithic people did not excavate a ditch segment, bury the dead in it, cover it up again, and then subsequently dig up the body again, when the bones were cleaned for flesh. If this had been the case our investigations would have shown a completely different picture than the very controlled excavation, followed by activities at the bottom, and terminated by a careful sealing. The human bones found in the ditch segments have ended there as part of the rituals carried out in the ditches, as pointed out by Niels H. Andersen. The question is, however, if the movement of bones necessarily was from the causewayed enclosures to the graves? Why not the other way (Kaul 1994, 23)? This could among other things give a direct explanation for the headless skeleton in the Klokkehøj dolmen (Thorsen 1981, 117 ff.).

The reason why causewayed enclosures in England so readily have been interpreted as excarnations places can be found in the contemporary earthen long barrows, where in the wooden chambers there are ample evidence of aggregate burials of excarnated individuals (Mercer 1980, 63; Thomas 1999, 136 ff.). There is here seemingly a certainty that we are dealing with proper excarnation and not secondary manipulation of bones, as the chambers have been burned down and sealed after burial. The same certainty cannot be obtained in Denmark. We do have a fairly convincing case of excarnation from a pit beneath the Fakkemose dolmen on Langeland with a likely date to EN II (Skaarup 1985, 324 f.), but from EN I and EN II graves like Skibhøj, Bygholm Nørremark (Madsen 1993, 98) and Lohals (Skaarup 1985, 324 f.), where we are certain of a sealing immediately after the burial, there is no traces of excarnation. Likewise in several dolmens from EN II there is evidence for burial of complete individuals (Thorsen 1981, 117 ff.; Nielsen 1984). In megalithic tombs from MN A, on the other hand, there is definite evidence for deliberate manipulations of bones, but we do not know if the preceding excarnation happened in the chambers or on formal excarnation sites (Kaul 1994, 11). It is worth noting that even though there is undeniable evidence for excarnation in some long barrows in England, the opposite is in fact also true (Kaul 1994, 30), suggesting that no universal rule existed.

That the causewayed enclosures in South Scandinavia should have been excarnation sites, I find debatable. On the other hand, there is no doubt that the rituals performed there were associated with the dead just as in other parts of Europe. Probably these rituals should be viewed and understood under the heading of *rites of passage*: Rituals that should lead the dead from one state to another. The graveside ritual, which in its Danish version (directly translated, and probably more telling than the English equivalent) sounds: "From soil you have come, to soil you shall return, from soil you will raise again" is an example of such a ritual in the Christian church. Typically, we can expect such rituals at the graves, and probably they are represented through offerings at facades and kerbstone lines, but it is also obvious that we find them in connection with the causewayed enclosures. Here they appear along the periphery of a delimited area in the same way as they appear at the periphery of burial structures – why? Niels H. Andersen has suggested that the causewayed enclosures can be looked upon as a sort of settlements for the souls of the deceased (Andersen 1997, 309), which is indeed a probable explanation. The question however remains, in which way? The area inside the line of segmented ditches is considered by Niels H. Andersen to be the area where the souls roamed in a transition phase between life and death. This area would hence be potentially dangerous for the living, and therefore had to be blocked off by rows of ditches, palisades, wetland areas and steep slopes (Andersen 1997, 309).

Sarup with its uninterrupted palisade may give the impression of an entrenchment, but Sarup is in many ways unique, and we do not get the same impression from most of the other causewayed enclosures. In fact if we base ourselves on the nature of the ditch segments and the *segmented ditch process* as outlined above, then they would not appear as a physical barrier at all, and it becomes meaningless to see them as an entrenchment. Another thing is that the inner surface can hardly have been considered dangerous. Settlement traces contemporary with the use of the ditches are seen at many sites. This is true at Toftum[2], Bjerggård (Madsen 1988) and even at Sarup (Andersen 1997, 56 ff.), and at many sites there seems to be a gradual shift from ritual activities to settlement activities. The inner surface

was thus far from *taboo*.

If the dead souls were considered to live in the causewayed enclosures, which is certainly a possibility, then it may not have been on the inner surface, but instead in the ground beneath it. The ditch segments would then not be blockings for the souls, but rather openings through which contact with them could be established and/or through which the souls could pass.

Passage of souls could logically happen in two directions – to the underworld in passage from living to dead, and from the underworld in passage from dead to living in a reincarnation process. Both possibilities are open, but the first is probably the most natural to consider, and the following scenario could be one possible way it had worked: At some point in time after a person had died and rested in a burial place, the soul had to pass to the underworld; To make this passage possible it was necessary to dig a hole in the ground at a chosen place where contact to the underworld could be established, and then perform a series of rituals in this hole to guide the soul through.

Such an assumption would certainly make the holes in the clay linings at the bottom of A154 and A323 as well as the horseshoe shaped construction at the bottom of A231 meaningful as regular spirit holes. Further, the presence of human bones in ditch segments, where on a European scale there is a preponderance of scull parts, can be seen as an active help for the dead souls to move to the ditch segments. If the bones were moved from the burial chambers to the enclosures, it could even be considered a "rational" element in the rituals. The frequent presence of animal bones, flint, pottery and remnants of fire in the ditch segments both in South Scandinavia and in other parts of Europe could then be seen as offering to the dead souls – something that they could take with them to the underworld.

The monumental wall construction A236 opens for a possible further connection. At Sarup I ritual activities occur not only in the ditch segments, but also along the palisade. With the presence of both human bones and pottery at the palisades there seemingly is a parallel here to what takes place at the timber facades of the earthen long barrows and at the kerbstone lines of the megalithic tombs (Andersen 1997, 274). With A236 we have a regular façade construction in a ditch segment that must have been the focus for rituals, and it strengthens the connection between the ditch segments and the burials.

The possibility of the souls passing in the other direction, that is reincarnation, should not be overlooked. The idea of revival in some form is deeply rooted in many societies, and it comes natural to agricultural societies that not only is everything returning to the ground when it dies, but also that life emerges from the ground. We have no certain indications that the rituals at the causewayed enclosures also played a role in connection with fertility and birth, but the possibility is there, and it is certainly worth while to consider. An example of how something like that could work out we find with the Hopi Indians. To the Hopis the world is divided in an upper and a lower world. The upper world is the present one, while the other lies somewhere beneath us in the ground. When a person dies in the upper world, a person is born in the lower and vice versa. So both at death and birth a soul is moved from one world to the other, which happens through *sipapu* – a mythical hole in the ground through which the Hopis originally populated the upper world from the lower (Plog 1997, 18). In the subterranean *kivas* of many pueblos, both in prehistoric and recent time there is a hole in the floor symbolising *sipapu*. This hole is the focus point of many rituals (Plog 1997, 21). For the Hopis birth and death is thus literally two sides of the same issue.

The geographical and temporal distribution of causewayed enclosures in Europe is amazingly wide (Andersen 1997, 133 ff.), and it is fascinating to acknowledge that despite architectural variability, and despite what looks like functional differences, there are striking similarities with respect to the ditch segments and the way they have been used (at least when we are dealing with recent well documented excavations). What is here termed the *segmented ditch process* seems to apply everywhere. It is far too early to claim that it is universal to causewayed enclosures, but it has been documented at various sites widely distributed in time and space cross cutting archaeological cultures and marked cultural boundaries. For instance there does not seem to be any dependence on burial customs. Even though we are by all probability dealing with rites of passage it is of no consequence whether the burials were individual or communal and whether bodies were articulated or disarticulated. Seemingly, we are dealing with ideas that are part of a common ideology beyond the regional cultural patterns. What is reflected in the *segmented ditch process* may be a more or less common agrarian religious cosmology for Neolithic Europe.

Aalstrup now and in the future

Aalstrup has its weaknesses and forces. To the weaknesses is not least that the sandy soil do not permit the preservation of bones. It is a big problem both in relation to the settlement and the causewayed enclosure, but it is not a rare thing in Jutland. Among the forces is the low rate of cultivation. It is in fact rather unseen to have a settlement area lying that has not been ploughed for the last 60 years or more, and where the cultivation zone is no more than 20 cm thick. As the situation is today this unique condition is not threatened, but it would only take one deep ploughing to destroy everything, and there is nothing to prevent this to happen sometime in the future. The site ought to be scheduled, but as things are in Denmark right now this is very unlikely to happen.

After six seasons of digging only a very small part of the site has been investigated, but the find material is staggering. Over 20.000 recordings of flint and pottery, counting hundred thousands of items have been made on the settlement site. This material has far from been analysed yet, and it will take a long time to happen. With this background there is clearly no basis for taking up further excavations of the settlement area.

With the Causewayed enclosure things are a little different. The part that continues downhill is covered by settlement layers, and should naturally be left alone. The continuation to the north, however, can easily be accessed. It lies under cultivated field, and there is no covering settlement. Due to the extent and depth of the ditch segments and the complex stratigraphy involved it will, however, take a major excavation to continue the investigation of the causewayed enclosure.

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Literature

Andersen, Niels H. 1997. *Sarup vol. 1. The Sarup Enclosures. The Funnel Beaker Culture of the Sarup site including two causewayed camps compared to the contemporary settlements in the area and other European enclosures*. Jutland Archaeological Society Publications XXXIII: 1, Højbjerg.

Andersen, Niels H. 1999. *Sarup vol. 2. Sarupplads*en. Jutland Archaeological Society Publications XXXIII: 2, Højbjerg.

Andersen, Niels H. 2000. Kult og ritualer i den ældre bondestenalder. *Kuml 2000. Årbog for Jysk Arkæologisk Selskab*, s. 13-57.

Andersen, Niels H. 2002. Neolithic Enclosures of Scandinavia. I: Gillian Varndell & Peter Topping (eds.): *Enclosures in Neolithic Europe. Essays on Causewayed and Non-Causewayed Sites*, 1-10. Oxbow books, Oxford.

Andersen, Niels H. & Torsten Madsen 1978. Skåle og bægre med storvinkelbånd fra yngre stenalder. Overgangen mellem tidlig- og mellemneolitikum. *Kuml 1977. Årbog for Jysk Arkæologisk Selskab*, s. 131-160.

Basisdatakort. *Jordklassificering Danmark, Basisdatakort 1:50.000*. Landbrugsministeriet (udgivet i løbet af 1970'erne).

Borup, Per 2003. Havet i Horsens Fjord i forhistorisk tid. *Horsens Ren Fjord. Nyhedsbrev Nr. 11, marts 2003*, s. 271-277.

Davidsen, Karsten 1974. Neolitiske lerskiver belyst af danske fund. *Aarbøger for Nordisk Oldkyndighed og Historie 1973*, s. 5-72.

Davidsen, Karsten 1978. *The Final TRB Culture in Denmark. A Settlement Study*. Akademisk Forlag. København.

Drewett, Peter 1977. The excavation of a neolithic causewayed enclosure on Offham Hill, East Sussex, 1976. *Proceedings of the Prehistoric Society XLIII*, s. 201-41.

Eriksen, Palle 1984. Det neolitiske bopladskompleks ved Fannerup. *Kuml 1984. Årbog for Jysk Arkæologisk Selskab*, s. 9-76.

Eriksen, Palle & Torsten Madsen 1984. Hanstedgård. A Settlement Site from the Funnel Beaker Culture. *Journal of Danish Archaeology vol. 3*, s. 62-82.

Holm, Eigil 2000. *Horsensegnen. Atlas Natur Miljø Historie Erhverv*. Eigil Holms Forlag.

Holst, Mads Kähler 2000. Tid og forandring i jernalderens bebyggelser. *Arkæologiske udgravninger i Danmark 1999*, s. 21-35.

Jeunesse, Ch. 1996. Les forsés d'enceintes de la culture à céramique lineaire en Alsace. I: P. Duhamet (ed.): *La Bourgogne entre les Bassins Rhénan, Rhodanien et Parisien: Carrefour ou frontière? Ates du XVIIIe Colloque interrégional sur le Néolithique, Dijon, 25-27 octobre 1991*, s. 257-269. Rev. Arch. Est. Suppl. 14, Dijon.

Kaul, Flemming 1994. Ritualer med menneskeknogler i yngre stenalder. *Kuml 1991-92. Årbog for Jysk Arkæologisk Selskab*, s. 7-52.

Klassen, Lutz 2000. *Frühes Kupfer im Norden. Untersuchungen*

zu Chronologie, Herkunft und Bedeutung der Kupferfunde der Nordgruppe der Trichterbecherkultur. Jysk Arrkæologisk Selskab, Højbjerg.

KMS 1816-1900/1862-1899. Historiske kort fra kort og matrikelstyrelsen. *www.kms.dk.*

Kristiansen, Anne Mette 2000. Langhøjen ved Rokær – variation over et tema. I: Steen Hvass (ed.): *Vor skjulte kulturarv. Arkæologien under overfladen*. S. 44-45. Det kongelige Nordiske Oldskriftsselskab, Jysk Arkæologisk Selskab.

Lomholt, Vibeke Ørnsholt 2003. Bondestenalderens ofringer i vandet i Nørrestrand og Stensballe Sund. *Horsens Ren Fjord. Nyhedsbrev Nr. 11, marts 2003*, s. 283-286.

Madsen, Torsten 1977. Jættestuen Hørret Skov I. Et nyt fund af fodskåle med massiv midtdel. *Kuml 1976. Årbog for Jysk Arkæologisk Selskab*, s. 65-94.

Madsen, Torsten 1978. Toftum ved Horsens. Et "befæstet" anlæg tilhørende tragtbægerkulturen. *Kuml 1977. Årbog for Jysk Arkæologisk Selskab*, s. 161-184.

Madsen, Torsten 1979. Earthen Long Barrows and Timber Structures: Aspects of the Early Neolithic Mortuary Practice in Denmark. *Proceedings of the Prehistoric Society XLV*, s. 301-320.

Madsen, Torsten 1982. Settlement Systems of Early Agricultural Societies in East Jutland, Denmark: A Regional Study of Change. *Journal of Anthropological Archaeology* 1, s. 197-236.

Madsen, Torsten 1988. Causewayed Enclosures in South Scandinavia. I: Colin Burgess, Peter

Topping, Claude Mordant & Margaret Maddison (eds.): *Enclosures and Defences in the Neolithic of Western Europe*, s. 301-336. Bar International Series 403(ii), Oxford.

Madsen, Torsten 2003. En bebyggelse fra bondestenalderen ved Handstedgård med vidnesbyrd om højeste havniveau i Horsens Fjord. *Horsens Ren Fjord. Nyhedsbrev Nr. 11, marts 2003*, s. 278-282.

Madsen, Torsten 1993. Høje med træbyggede grave. I: Steen Hvass & Birger Storgaard (eds.): *Da klinger I muld – 25 års arkæologi I Danmark*, s. 96-99. Aarhus universitetsforlag, Århus.

Madsen, Torsten 1994. Die Gruppenbildung im frühsten Neolithikums Dänemarks und ihre Bedeutung. I: Jürgen Hoika & Jutta Meurers-Balke (eds.) *Beiträge zur frühneolithischen Trichterbecherkultur im westlichen Ostseegebiet.* Untersuchungen und Materialien zur Steinzeit in Schleswig-Holstein 1, s. 227-237. Verein zur Förderung des Archäologischen Landesmuseum e.V. - Wachholz Verlag, Neumünster.

Madsen, Torsten & Helle Juel Jensen 1982. Settlement and Land Use in Early Neolithic Denmark. *Analecta Praehistoria Leidensia* XV, s. 63-86.

Madsen, Torsten & Jens Erik Petersen 1984. Tidligneolitiske anlæg ved Mosegården. Regionale og kronologiske forskelle i tidligneolitikum. *Kuml 1983. Årbog for Jysk Arkæologisk Selskab*, s. 61-120.

Mercer, Roger 1980. *Hambledon Hill. A Neolithic landscape.* Edinburgh University Press, Edinburgh.

Nielsen, Anders Horsbøl 2003. Indledning til Horsens Fjords arkæologi. *Horsens Ren Fjord. Nyhedsbrev Nr. 11, marts 2003*, s263-270.

Nielsen, Nina 2003. Ormslev-dyssen – en dysse uden høj? Fritstående dysser i tragtbægerkulturen. *Kuml 2003. Årbog for Jysk Arkæologisk Selskab*, s. 125-156.

Nielsen, Poul Otto 1984. Flint axes and megaliths – the time and context of the early dolmens in Denmark. I: Göran Burenhul (ed.) *The archaeology of Carrowmore. Environmental Archaeology and the Megalithic Tradition at Carrowmore, Co. Sligo, Ireland*, s. 376-387. G. Burenhults Förlag.

Plog, Stephen 1997. *Ancient peoples of the American Southwest*. Thames & Hudson, London.

Pryor, Francis 1998. *Etton. Excavations at a Neolithic causewayed enclosure near Maxey Cambridgeshire, 1982-87*. Archaeological report 18, English Heritage.

Rønne, Preben 1979. Høj over høj. Skalk 1979:5, s. 3-8.

Skaarup, Jørgen 1985. *Yngre stenalder på øerne S for Fyn*. Langelands museum, Rudkøbing.

Smidt, Katja 2005. Das bandkeramische Erdwerk von Herxheim bei Landau, Kreis Südliche Weistraße. Untersuchung der Erdwerksgräber. *Germania 82, 2004*, s. 333-349.

Sørensen, Hugo & Jens Bech 1998. Udgravningerne og anlæggene på Spodsbjergpladsen. I: Hugo Sørensen (ed.): Spodsbjerg – en yngre stenalders boplads på Langeland, s. 29-85. Langelands Museum, Rudkøbing.

Thomas, Julian 1999. *Understanding the Neolithic. A revised second edition of Rethinking the Neolithic*. Routledge, London.

Thomas, Julian 2001. Neolithic enclosures: reflections on excavations in Wales and Scotland. I: Timothy Darvill & Julian Thomas (eds.): *Neolithic Enclosures in Atlantic Northwest Europe*, s. 132-143. Neolithic Studies Group Seminar Papers 6. Oxbow Books, Oxford.

Thorsen, Sven 1981. "Klokkehøj" ved Bøjden. Et sydvestfynsk dyssekammer med bevaret primærgrav. *Kuml 1980. Årbog for Jysk Arkæologisk Selskab*, s. 105-146.

Thorvildsen, Knud 1946. Grønhøj ved Horsens. En jættestue med offerplads. *Aarbøger for Nordisk Oldkyndighed og Historie 1946*, s. 73-94.