

Østbirk – a strategic settlement at the end of the Neolithic

Per Borup

Abstract

Over a period of more than 10 years, Horsens Museum undertook a series of excavations at Østbirk, north of Horsens. These resulted in an extensive and diverse body of evidence from a settlement area with scattered houses and an associated cemetery with barrows and flat-field graves. The two areas lay together within a melt-water valley that also framed their areal extent. In dating terms, the burial ground extends from the Single Grave culture to the early Pre-Roman Iron Age, while the settlement is restricted to the period from the Late Neolithic to Early Bronze Age period IA (EBA IA), 2350–1600 BC. Neither the settlement nor the burial ground have been fully exposed, but collectively these two areas provide an excellent insight into a local agrarian community that, in the course of the Late Neolithic, developed under successive external cultural influences. In Late Neolithic I (LN I), these were, in the first instance, from the northern Jutish Bell Beaker environment, while in Late Neolithic II (LN II) they came from southern Sweden and the continental Únětice culture. The changes saw expression in not only a number of new artefact types but also in completely new grave forms and house types. In LN II, the latter included the hybrid house and the three-aisled longhouse, which both occurred together with the traditional two-aisled longhouse with a sunken floor.

Throughout the entire habitation period, the settlement consisted of small households that, via economic cooperation, were able to practise intensive arable agriculture aimed at producing an economic surplus. The special significance of arable agriculture is demonstrated, first and foremost, by the farmsteads' utility- or economy buildings, and it was perhaps an increased need for these buildings that led to the development of new types of longhouses at the end of the period. The locality lay on one of the area's important travel and communication routes and later, in the Bronze Age, a palisade was built across the mouth of the valley, probably to regulate or control movement through this natural bottleneck.

Introduction

When Horsens Museum launched an archaeological evaluation in 1997, in advance of the construction of some new storage buildings on the southeastern outskirts of Østbirk, there were no great expectations as to the findings. This was because the locality lay within a Lateglacial melt-water valley, where conditions did not appear to be immediately well-suited for prehistoric settlement. The investigation resulted, however, in several remarkable finds, and it also became the first in a series of excavations of varying extent that, over the course of the subsequent decade, were undertaken in the local area

Keywords: Single Grave culture, Late Neolithic, Early Bronze Age, cemetery, flat-field graves, settlement patterns, two-aisled houses, hybrid houses, archaeobotany, agriculture, Bell Beaker culture, Únětice culture, metal trade

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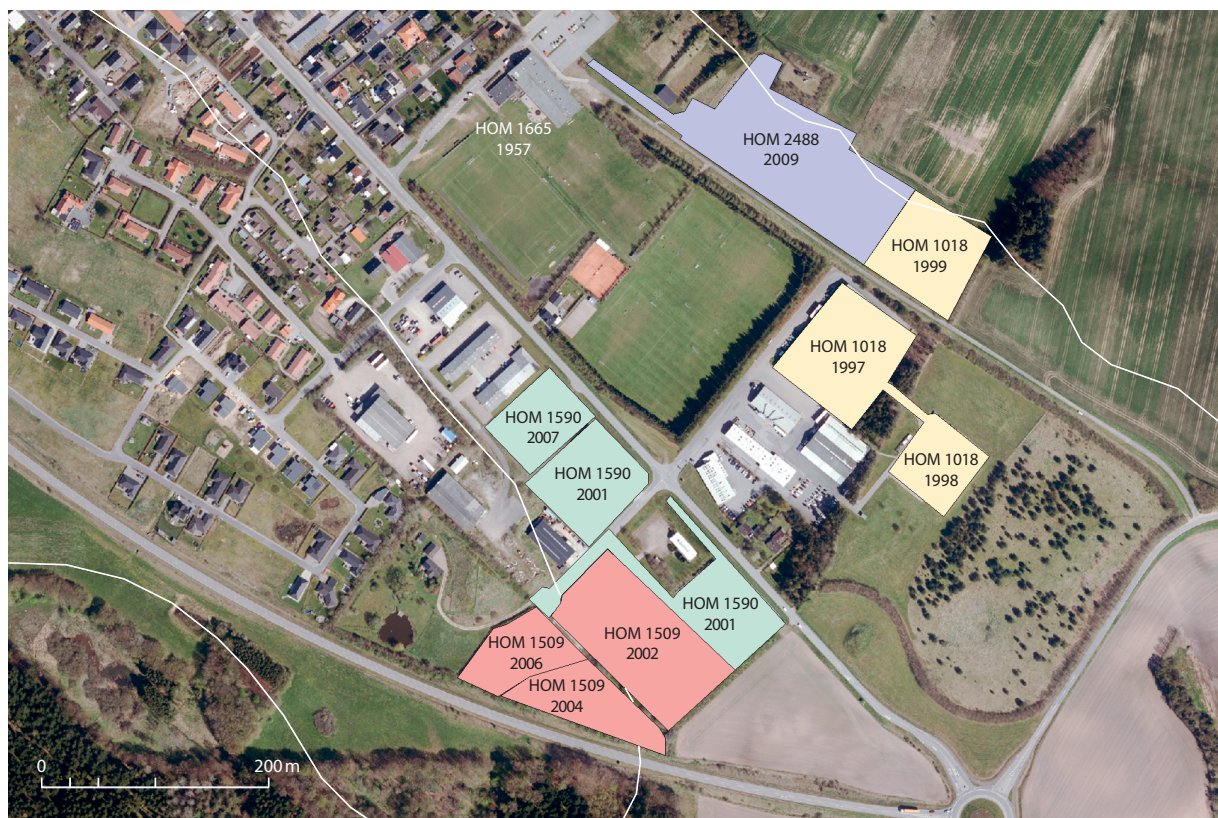
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in connection with various construction and development works.¹ The most recent major excavation was undertaken in 2009, prior to the construction of a new kindergarten, while several minor excavations were carried out in subsequent years. Collectively, this has resulted in the archaeological assessment of an area of c. 7.7 ha and resulted in the excavation of a total area of 2.4 ha. The most important finds and results from this work will be presented in the following, against a background that includes the results of some preliminary scientific investigations.

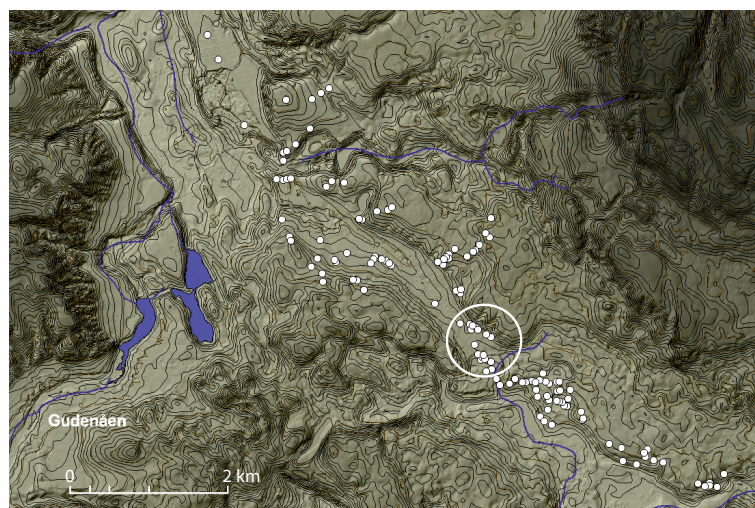
Fig.1. Overview of all the excavation stages. The individual excavations are shown with the year and Horsens Museum's archive number.



Topography

Østbirk lies 14 km northwest of Horsens and the innermost part of Horsens fjord. The local landscape is hilly, and a range of hills just northeast of Østbirk includes some of the highest points in Denmark. The locality lies in the southeastern part of a c. 500 m wide and almost 3 km long NW-SE-oriented melt-water valley that forms the watershed here between the Gudenå river to the northwest and Horsens fjord to the south. The valley today appears sandy and dry, with an almost flat floor and sloping, in parts steeply sloping, valley sides. It also constitutes the southeastern part of a narrow outwash plain that, to the northwest, can be traced to the western part of the lake Salten Langsø. Until the 20th century, the valley was characterised by heather heathland. There are no watercourses or lakes within the valley itself, but to the southeast the valley mouth is truncated by meadow areas. The investigated locality is naturally delimited by the two valley sides, and with the meadow area to the southeast, the landscape is naturally bounded on three sides.

¹ As the areal extent of excavations was determined by individual construction and development projects, the excavation stages were recorded under four different museum archive numbers (HOM 1018, HOM 1509, HOM 1590 and HOM 2488). In 2018, a collective digitalisation was undertaken of all the original excavation plans, which also encompass a small excavation of a grave field undertaken in 1957.



Cultural background

At the beginning of the Neolithic, the area around Horsens fjord was densely populated and numerous examples of the settlements and megalithic tombs from the Funnel Beaker culture are found within the near-coastal zone (Madsen 1982). Further inland the settlement is more scattered, and at Østbirk the traces of this culture's presence are scarce. This picture changes at the transition to the Single Grave culture, when a more intensive settlement pattern is reflected inland by the barrows of the Single Grave culture. At this time, Østbirk becomes part of the Single Grave culture's core area with many new barrows being built in the local area as a result.

The distance from Østbirk to the coast and the Funnel Beaker culture's former core area is not great, but the two areas are, over the course of the Single Grave culture, characterised by different cultural traditions. It is not until the end of the period that some of the Single Grave culture's burial mounds also turn up further out by the coast. The different cultural traditions apparently also form the background for developments through the Late Neolithic and Early Bronze Age, when a special dynamic appears to characterise the settlement within the Single Grave culture's former core area. Consequently, it is here that new house types and grave forms are first introduced in the area (Borup in press). While new graves at Østbirk are either placed in the Single Grave culture's earlier burial mounds or in completely new barrows, in the Late Neolithic, out by the coast, it continues to be common to make use of the Funnel Beaker culture's former megalithic tombs (e.g. Madsen 2018). The closest of these (Østbirk *sb* (i.e. parish record no.) 144, and Lundum *sb* 4) stand only 3 km southwest of Østbirk, where they are oriented towards the innermost part of Horsens fjord. Despite the Østbirk locality's position on the boundary between the two cultural traditions, its orientation is towards the interior.

The barrows of the Single Grave culture mark out some of the new communication routes that, with the appearance of wagons at the beginning of the Single Grave culture, also transform the valley at Østbirk into a traffic corridor. Its strategic location is probably the reason for the first graves being established at the site and its continual use as a burial ground up into the Iron Age.

Fig. 2. The location of the Østbirk site (circled) at the southern mouth of a glacial melt-water valley.

The barrows reflect a prehistoric route through the valley.

The locality

The excavations encompass part of a large settlement area and an associated cemetery with both barrows and flat-field graves. The two areas are contiguous and here they occupy the full width of the valley. Both have been only partially excavated and the preliminary investigations suggest that the total settlement and cemetery area is significantly greater. Running in a longitudinal direction along the valley, the settlement is estimated to cover more than 1 km, corresponding to a total area of more than 40 ha.

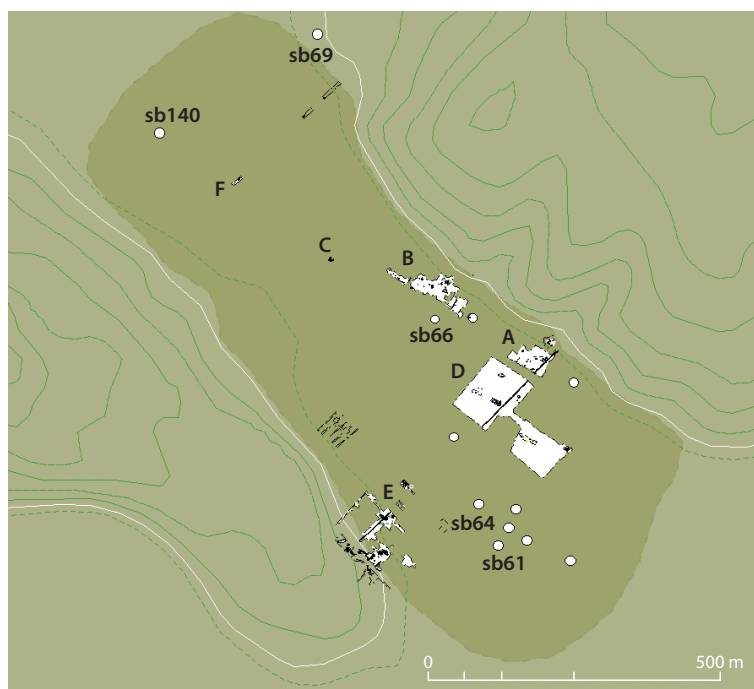


Fig.3. The excavation trenches and barrows mentioned in the text. The estimated extent of the total settlement area is marked in dark green.

The settlement consists primarily of scattered houses with a generally low settlement intensity, with the houses in most cases lying isolated or together with one other archaeologically contemporaneous building. The various features and structures have therefore not been disturbed by later settlement activities. This situation has not only enabled soil samples to be taken that are well-suited to scientific analysis but also improved the possibility of relating buildings and features to one another. This has been further optimised by the fact that settlement and activity traces from other periods have only been encountered to a very limited extent. In total, remains of 16–17 houses have been demonstrated. Of these, 11 have been ^{14}C dated to the Late Neolithic, based on charcoal or charred grain from the features. Based on similar ^{14}C dates for some graves, it can be argued that there is contemporaneity and perhaps a connection between several graves and houses.

Collectively, the graves represent a long period extending from the early Single Grave culture to the beginning of the Early Iron Age, while the recorded settlement is restricted to a shorter period within the Late Neolithic and the Bronze Age. On the face of it, this could suggest that the graves are, to a greater extent, a result of areal continuity rather than site continuity in relation to the actual settlement. It must, however, be presumed that remains of settlements from other periods may lie outside the investigated areas. Variations and innovations can be observed in both the graves and the houses that reflect shifting influences from other cultural environments. In an

attempt to illuminate these relationships, there is a focus in the following description on parallels to, and possible prototypes for the house and grave types encountered at Østbirk.

Graves

A total of 15 barrows were recorded in the southeastern part of the valley. These can be followed from the mouth of the valley, almost like beads on a string, running to the southeast. Most of them were demolished in the late 19th century, and today only one of the original monuments is preserved as a scheduled burial mound (sb 67). In connection with their removal, several of the barrows were excavated by the National Museum of Denmark and, as a rule, these investigations showed that they contained several graves, the earliest of which were inhumation graves from the Single Grave culture, and the latest were urn burials from the Late Bronze Age. In 1962, Horsens Museum undertook a further excavation of two burial mounds that were part of a small barrow group around the now scheduled burial mound sb 67 (Ousager 1962). But a few years prior to this, a small cemetery with flat-field graves (sb 192, area C) was also investigated during a rescue excavation prior to the building of a new sports centre. A further 30 graves, divided equally between inhumation and cremation graves, were investigated during the museum's excavations in the period 1997–2009. If all the excavations are included, over a distance of just less than 300 m along the northern side of the valley (fig. 3, areas A-C), a total of 28 inhumation graves have been excavated and an even greater number of cremation graves, if several urn burials from a number of the demolished barrows are included. All the inhumation graves are dated to the period from the Single Grave culture to the Early Bronze Age, while the cremation graves are dated to the Late Bronze Age and early Pre-Roman Iron Age.

The many graves and barrows lie within an area of the valley that was used as a cemetery by the nearby settlements during this entire period. The investigated graves are perceived as representing part of a larger burial ground containing both barrows and flat-field graves. Based on the topography of the area and the distribution of several nearby barrows and barrow groups, the total linear extent of the burial ground is estimated to be greater than 400 m. It lies within the northern part of the valley, but a little further in, several burial barrows appear above the slope, where they were also visible from down in the valley. The extent of the burial ground was not defined from the beginning but developed gradually over time as new

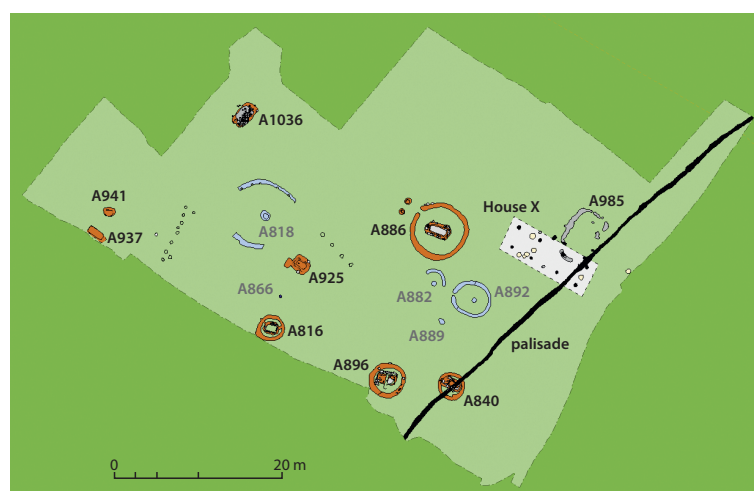


Fig.4. Area A: brown – graves from the Single Grave culture, light blue – graves from the Pre-Roman Iron Age. The small three-aisled house X and the northern part of a long palisade ditch also lie within this area.

local grave fields were established. Consequently, the graves do not form one cohesive cemetery, but are clustered in several minor grave fields. No systematic chronological displacement is immediately evident in relation to the individual grave fields.

Single Grave culture

Graves from the Single Grave culture are numerous in the area around Østbirk, either as primary mounds or large multiphase barrows, where they frequently constitute the earliest of several burial phases. During the excavations in the period 1997–2009, nine inhumation graves from the Single Grave culture were investigated, but none of these were recorded or visible on the surface prior to the investigation. The graves lay within two different areas or grave fields: seven within the rather more than 0.2 ha area A (fig. 4) and two (A6 and A819) easternmost in area B, about 100 m to the northwest (fig. 7). The graves are not seen as representing all the burials originally present and, in particular, further graves could presumably be encountered in area A, outside the investigated area. Five of the graves can, based on their content of battle axes or flint axes, be identified as male graves, while only one – containing two amber beads – is thought to be a female grave. The remaining three graves, one containing two pottery vessels and two without grave goods, are less certain, but the smallest of these (A941) is presumed to be a child's grave.

The preliminary typological dating of the grave forms and grave inventories broadly covers the Single Grave culture. On this basis, five graves are dated to Single Grave culture period 1(b/c), one to period 2(b) and one to period 3(b), while two graves can provisionally not be dated more closely than to the Single Grave culture. While the actual graves themselves vary only slightly in SGC 1, within some relatively narrow and firmly rooted limits, this picture changes with time, so the graves in SGC 3 appear more varied than was the case earlier. A corresponding development is evident in the grave inventory, where the flint axe and the battle axe, which are almost a constant in the early male graves, like the grave goods in general, lose their importance in the later part of the period. This is probably a significant

Fig. 5. Overview of graves from the Single Grave culture in areas A and B. The typological dating of the grave goods is based on Hübner (2005).

Grave	A896	A886	A6	A840	A816	A819	A925	A941	A937
length (m)	2.6	3.0	3.4	2.5	1.9	2.7	2.2	1.4	2.0
width (m)	2.0	1.8	1.5	1.4	1.5	1.6	1.9	1.0	0.8
depth (m)	0.5	0.4	0.3	0.2	0.3	–	–	0.5	0.2
coffin	plank	plank	plank	plank	plank	–	plank	?	–
length (m)	2.4	2.5	2.7	2.3	1.2	–	1.75	–	–
width (m)	1.2	1.4	1.0	0.8	0.8	–	1.0	–	–
stone frame	+	+	+	+	+	–	–	–	–
paving	+	+	+	–	–	–	–	–	–
grave goods	1 battle axe 1 flint axe	1 battle axe	1 battle axe 1 blade	1 flint axe	–	1 battle axe	2 amber beads	–	2 beakers
ring ditch (m)	3.0	5.5	–	2.4	2.5	–	–	–	–
mound	–	–	+	–	–	+	–	–	–
dating, Single Grave culture	1 (b)	1 (c)	1 (c)	1	1 (?)	2 (b)	Single Grave culture	Single Grave culture	3 (b)

factor in explaining why burials from this period are underrepresented relative to those that are earlier.

Four of the five graves from SGC 1 lay together in area A, while one was in area B. Although the actual graves appear in many ways identical, the variations become more obvious if attention is focussed instead on the ritual behaviour that was performed both before and after interment. An impression of this is given by the two archaeologically coeval and almost identical graves A886 and A6, which each lay within their own area or grave field. In both cases, the individual was laid a plank coffin on a rectangular cobbled area measuring c. 2.5 x 1–1.4 m and surrounded by supporting stones on all sides. In grave A6, traces of the use of fire could be observed in several places and the coffin was also scorched along its outer surface. The grave goods comprise a battle axe (in both cases of type 5F), which dates the burials to SGC 1c. The only difference between the two graves

Fig. 6. Battle axes from graves A6, A886, A896 and A819, and pottery vessels from flat-field grave A937.



is in the position of the deceased in the coffin. Corpse traces in the graves reveal that the deceased in grave A886 was placed in the classical hocker position with their head to the west and facing south, while the individual in grave A6 lay in extended supine position, similarly with their head to the west. Both positions are known previously from this period in central Jutland (Hübner 2005).

Due to demolition in the past and subsequent ploughing activities, it is often difficult to evaluate whether a grave was once covered by a mound (Hübner 2005: 600–602; Rostholm 1982: 35; Siemen 2009: 23), and frequently it is simply assumed that this was the case. At grave A6, traces of a primary mound were revealed by podsolisation of the subsoil; a heavy iron pan had formed outside but not under the original mound. Neither the grave nor the mound was marked in any other way. The burial mound had originally had an estimated diameter of c. 13 m and was not reused for later burials. The nearby, later grave A819 was originally covered by a mound too, and with inclusion of the demolished burial mound sb 66 (fig. 7), found to contain four to five inhumation graves from the Single Grave culture during the National Museum's excavations in 1895, the three burial mounds can be considered as a cohesive barrow group. As in area A, the graves here represent all three phases of the Single Grave culture.

Podsolisation also characterised the subsoil in area A of the burial ground, but here the graves were overlain by iron precipitations, a process that could be shown to have taken place during the course of the Late Neolithic or the Bronze Age. This suggests that all the graves were established as flat-field graves, something that is further indicated by the fact that a palisade (fence) was built through one of them in the Late Bronze Age (see below).



Fig. 7. Area B with burial mounds, flat-field graves and houses. Further to these are a presumed animal pen (A150) and a post row (A9).

Unlike the barrow grave A6, the four graves in area A were surrounded by a c.30–50 cm wide ring ditch that, as in the Corded Ware culture (Czebreszuk 2011), constitutes a characteristic element in burial structures from the early part of the Single Grave culture (Hübner 2005: 482–499). The ring ditches vary in both form and size, and they are usually seen as being associated with the burial mound in the concluding phase of the overall burial ritual (e.g. Andersen 1952: 172–179; Madsen 1990: 87–92). It is rarely possible to observe clear stratigraphic relationships between the grave, the ring ditch and a possible burial mound, but several investigations have demonstrated that the ring ditch could, in these cases, be related to an early phase that preceded the actual interment (Andersen 1978²: 9–12; Hübner 2005: 484). The ring ditch and the burial mound thereby marked what can be considered as, respectively, the initial and concluding phases in an, at times, complicated and extended burial ritual.

That the function of a ring ditch was not directly linked to a barrow is shown by its use around four flat-field graves in area A. Furthermore, some stratigraphic observations at grave A840 revealed that the small ring ditch here had already outplayed its role and had been backfilled before the grave was established. A small post-built fence had probably marked out an area that was specially



Fig. 8. Grave A6. A battle axe was placed by the deceased's shoulder in the western end of the grave.

- 2 At Sarup on Funen, a female grave was surrounded by a 7 m diameter ring ditch which was established in two phases, but it was not until the second phase, and apparently after a longer period had elapsed, that the grave was covered with a mound (Andersen 1978: 9–12).

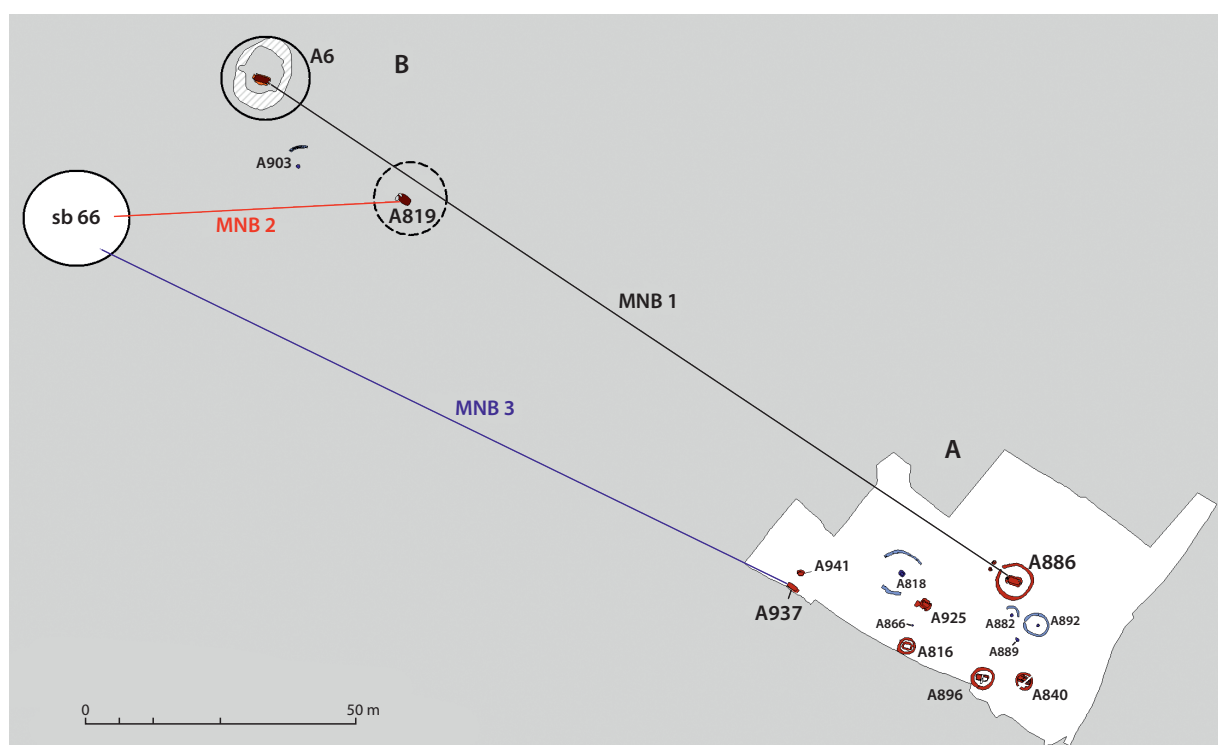
dedicated to the deceased for a period prior to the actual interment. A c.50 cm wide opening, marked by two posts, in a larger ring ditch around grave A886, may represent a passage that was used in connection with some ritual acts performed within the fenced area – unless this narrow opening was of purely symbolic significance. Behind the fence, the deceased presumably lay for a period either in the actual grave (Rostholm 1977: 101–102) or perhaps in one of the houses of the dead that are also known from these grave complexes (Madsen 1990: 81–84).

Barrow or flat field – tradition or status?

Flat-field graves from the Single Grave culture are still only known in limited numbers in Denmark. This is due in part to the difficulty of demonstrating these graves in relation to barrows, but also to the fact that graves are presumed from the outset to have been covered by a mound. In recent years, however, several flat-field graves have been localised together with burial mounds (Jensen 2009; Grundvad & Poulsen 2014). At Østbirk flat-field burials, which here contained the remains of men, women and children, were established side-by-side with barrow graves throughout the entire Single Grave culture, and apparently each within its own area. This naturally raises the question of the significance of the individual graves and grave fields and, not least, the relationship between them.

It is usually considered an expression of a degree of status when a grave or a grave complex stands out from the norm. Only the highest-ranking members of society were interred to the accompaniment of advanced rituals or had their grave ultimately covered by a mound. On this basis, both barrow grave A6 and flat-field grave A886 can be perceived as expressing special status. But as these two graves reflect divergent burial rituals and traditions, this might mean that the burial ground was used by different families at the same time, and this makes it difficult to compare the graves in relation to their mutual status. The different ritual traditions probably also saw

Fig.9. Relations between various graves in areas A and B, based on the grave goods. Coeval barrow graves and flat-field graves occur in both Single Grave culture periods 1 and 3. Definite period 2 graves have so far only been demonstrated in two barrows.



expression in the deceased's position in the grave, where tradition demanded laying the deceased on their side in the classical hocker position in grave A886, while the individual in grave A6 was placed in extended supine position. Moreover, only in grave A6 was the exterior of the coffin charred on its surface.

In contrast to the flat-field graves, where the burial ritual was specifically directed towards the deceased, the barrows continued to be visible in the landscape long after the interment and had therefore, to a greater degree, significance for those left behind. The mound was though associated primarily with the deceased. It was first with the new barrows and burial rituals of the Early Bronze Age that this picture became more radically altered.

Graves also continued to be established in areas A and B throughout the remainder of the Single Grave culture. With time, as the traces of the earlier burial rituals diminished or disappeared completely around the flat-field graves, the contrast with the barrow graves became even further emphasised. This makes it more difficult to evaluate the flat-field graves in relation to status. In SGC 2, a new primary mound (A819) was established c.30 m east of grave A6, and in the same period an individual was secondarily interred in the nearby mound sb 66. This mound was used again at the end of SGC 3 (Hübner 2005: cat. no. 660), when a further flat-field grave (A937) was also established in area A (fig. 9). The latter had the character of a simple inhumation grave without any traces of grave structures or ritual acts, but as in the case of the barrow grave, the grave goods consisted of pottery vessels (of, respectively, Hübner's types B2 and B3). Both graves are dated on this basis to SGC 3b.

The quantity and character of grave furnishings are often employed as an expression of social or status-related differences between the interred. As a consequence, society in the early Single Grave culture is usually considered to be without distinct social divisions. Despite the battle axe's powerful symbolism, this observation is based mainly on relatively uniform furnishings of the graves (Ebbesen 2006: 240; Hübner 2005: 636–650). But, to a greater degree, it was perhaps the extent of the entire burial ritual that signalled the deceased's standing and status, or the size of the dedicated "sacral" area(s) that in the first instance were marked out by a ring ditch. In area A, there was only one ring ditch, around grave A886, that, as an element, stood out from the other graves. With a diameter of 5.5 m it was, accordingly, about twice the size of the others. The actual size of the enclosed area could vary in a similar way to the characteristic small barrows of the period. Perhaps the mound ultimately made visible an area that had, from the very beginning, been determined and defined by a ring ditch. Consequently, these markers sometimes reached a size that corresponded to the largest primary mounds of the period.

The largest ring ditch that has been demonstrated to date in Denmark was found at Gantrup, only a few kilometres north of Østbirk (HOM 319 Gantrup; Madsen 1990, 1995). The ditch was 1.5 m wide, just less than 1 m deep and had a diameter of no less than 19 m. Along its outer edge had stood a robust palisade, formed of closely-spaced, c.30 cm diameter cloven tree trunks (Madsen 1990: 85–89). In the centre of the enclosed area, the deceased, prior to interment and later covering with a mound, had been placed in what may have been a small tent-like dead house, built on posts. The grave is dated to SGC 1c and is therefore coeval with graves A6 and A886 at Østbirk.

The grave complex is one of several with especially large ring ditches that have been excavated within an area of a few square kilometres around Gantrup. Three other graves here were marked with ring ditches with diameters of, respectively, 9 m (HOM 2308 Gantrup),

13 m (HOM 828 Højvang; Nielsen 1997) and 14 m (HOM 349 Fyel Mose; Madsen 1995). It was not only the size of the sturdy palisade in the largest grave complex that was unusual, the number and composition of grave goods was, respectively, greater and more diverse than normal. The same was also the case in the slightly smaller grave at Højvang (Hübner 2005: 646), which is dated to SGC 1b. These four grave complexes probably reflect not only a form of status differentiation for the interred individuals but also the existence of a local high-status area here, just north of Østbirk.

Late Neolithic

In the more recent investigations, five inhumation graves from the end of the Late Neolithic were investigated. These lay within a small grave field in the middle of area B, c. 30 m northwest of grave A6. These graves were not visible at the end of the 19th century, and as neither traces of a mound nor other grave markers were detected during the excavation, they are also considered to have been flat-field graves. The ¹⁴C dates and the relative positions of the graves suggest actual contemporaneity and perhaps a relationship between the five graves.

Fig. 10. The graves in area B. All ¹⁴C dates are based on charcoal or charred wood* from oak.

Grave	A2	A3	A25	A64	A79
length (m)	3.9	2.4	3.2	1.5	1.9
width (m)	2.1	0.9	1.0	0.9	0.8
depth (m)	0.5	?	0.5	0.35	0.4
coffin	oak coffin	–	oak coffin	–	–
grave goods	arrowhead	flint dagger (?) type IVd	–	–	–
Lab.no. AAR	13982	13986*	14432	13980	13981
BP	3433±43	3575 ±55	3439±38	3420±36	3398±30
BC 1σ	1776-1685	1985-1879	1776-1689	1770 -1667	1741-1666

In the middle of the grave field were three graves: A2, A3 and A25. The graves lay parallel to each other, oriented NW-SE, corresponding to the longitudinal axis of the nearby valley side. The three graves were all different, and like those from the early Single Grave culture in area A, graves A2 and A3 were both characterised by extensive and advanced burial rituals. Grave A3 was surrounded by a c.50 cm wide and more than 90 cm deep oval ring ditch with an external longitudinal diameter of 3.4 m and a minimum transverse diameter of 1.6 m. Along the inner edge of the inwardly-sloping ditch were the remains of the charred upper surface of sloping, c.35 cm diameter, cloven tree trunks which were preserved in places to a length of more than 70 cm. The fact that the timber was charred to this depth shows that the ditch had stood open while the fire did its work. The timbers constituted the remains of a tent-like wooden structure that had been raised over the deceased. The small building was subsequently exposed to fire, but this apparently only resulted in surface charring of the timbers and not the burning down of the entire structure. Perhaps this restricted scorching of the timbers with “sacred fire” was a significant element in a ritual that previously, in the Single Grave culture, was performed on the actual coffin. Unfortunately, there were

no traces of either the coffin or the deceased here, only white-burnt flint covering part of the presumed grave bed. It is uncertain whether the pressure-flaked flint dagger (type IVd, fig. 37), which lay *ex situ* on the edge between graves A2 and A3, belonged to this grave.

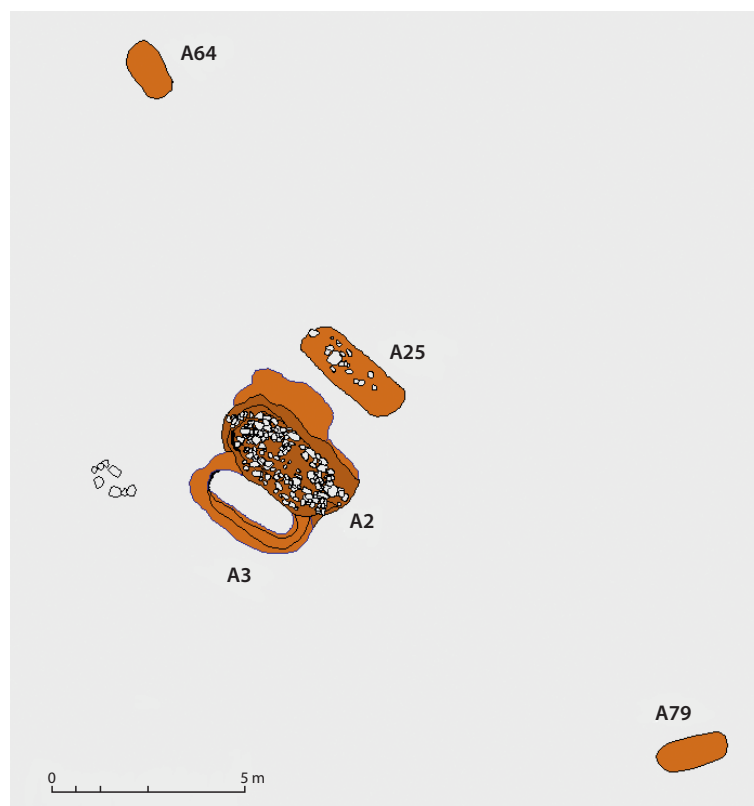


Fig. 11. Flat-field graves in area B. To the right graves A2 and A3 (in foreground). Double grave A25 can just be perceived in the background.



The nearby grave A2 was evident in plan as a 3.9 x 2.1 m approximately elongated-oval feature, partly covered at the surface by fist-to head-sized stones. With a virtually stone-free area in the middle, the stone setting formed a 2.2 x 0.9–1 m frame with rounded ends. The stones had supported a log coffin which, in section, was evident as a dark, concave feature. Within a restricted area at the western end of the grave there was, in addition to charcoal, burnt human bone (including a fragment of the uppermost vertebra, the atlas). As the burnt bone only represents a minor part of the corpse, it must be seen as representing the remains of an individual who was placed in the inhumation grave and not an independent cremation grave.



The grave goods comprised a small pressure-flaked barbed arrow-head (type 8; Kühn 1979) and perhaps also the aforementioned flint dagger.

The grave covered an earlier inhumation grave that had been cut 45 cm below the stripped soil surface. As the upper burial was not sub-surface but placed uppermost in the feature cut for the earlier grave, together they formed a tiered grave. At the base of the lower grave were traces of a 2.2 m long, decayed log coffin, which had been supported at each end by a couple of large stones. Corpse traces and fragmentary remains of tooth enamel showed that the deceased had lain in supine or lateral position with legs extended, head to the west and facing north.

The grave contained no apparent grave goods. Instead, the remains of several charred oak posts or trunks had been left on its base. In the western end lay the lower part of a probably originally vertical tree trunk, while another trunk, preserved to a length of c. 1.65 m, lay beside the decayed coffin. While the first tree trunk was charred all the way through, the second was only scorched on its upper surface and therefore lay flattened by the grave fill. Both timbers must be presumed to have formed part of a wooden structure over the grave, perhaps serving as gable posts. The meticulously placed trunk along the side of the coffin suggests that the timber from the grave building had been deliberately placed in the grave, perhaps as a form of grave goods. The stratigraphy shows that the oval ditch around grave A3 had played out its role and had already been back-filled when grave A3 was established. How long afterwards this took place is unknown, but it was probably a relatively short time. Based on the burial rituals, both graves must be seen as displaying especially high status. The flint dagger and the arrowhead correspond to the grave furnishings that characterise the weapon graves of northern Jutland in LN I (Sarauw 2007: 66–67; Ebbesen 2004: 95) and the graves here consequently reflect a continuation of earlier weapon ideals, only now with the newer flint dagger of type IV/V.

Fig. 12. The west end of tiered grave A2, seen from the west. The remains of some charred posts from a presumably tent-formed superstructure can be seen in the foreground and to the left of the decayed log coffin. The outline of a further log coffin, placed uppermost in the grave, can be seen in the section in the background. On the right, the remains of a scorched tree trunk in the ring ditch encircling grave A3.



Fig. 13. Grave A25 (right) with traces of the corpses of two individuals placed “top and tail”. To the left inhumation grave A79 with traces of the deceased who was laid in supine position.

Only 1.5 m north of grave A2 lay inhumation grave A25, which was without any trace of a preceding burial ritual. The grave contained a c. 2.4 x 0.6 m log coffin, supported at the sides by a few large stones.

Clear corpse traces with preserved remains of bone and tooth enamel revealed that the coffin contained two individuals, who were buried with the feet together in opposed supine position, and with their heads, respectively, to the east and the west. Neither was accompanied by grave goods, and without visible coffin and corpse traces, the grave would have appeared as a simple inhumation grave.

Two smaller inhumation graves, A64 and A79, lay 7 and 10 m away, respectively, on either side of the other graves and therefore slightly detached from these. The smallest grave, A64, consisted of an only 1.5 x 0.9 m pit with no secure traces of a coffin. Neither were there traces of a coffin in the slightly larger grave A79, but shadows of the corpse revealed that the deceased had lain in extended supine position along the southwestern side of the grave, perhaps to allow room for another individual to be placed in the grave. The height of the person was less than 1.2 m, and this is therefore considered to be a child's grave.

The five graves make up a small coherent grave field, and some almost identical ¹⁴C dates (fig. 10) suggest that all five were established within a relatively short period, and perhaps only during one or a few events, at the end of LN II. As the complex burial rituals must be presumed to have been performed collectively, the differences between the graves are perceived as expressions of some degree of social stratification.

Parallels to graves and burial rituals

Despite a certain contemporaneity, and possible a mutual relationship, the two central graves A2 and A3 each contain several specific elements which may suggest that the nearest parallels should be sought within two different cultural environments that are each characterised by characteristic funerary traditions. Whereas parallels to grave A3 are probably to be found among some of the new grave forms of LN II, the tiered grave A2 contains different elements that

characterise some earlier grave types with a special local distribution in northwestern Jutland during LN I.

Tiered burials are known from the Single Grave culture in western Jutland (Odgaard & Rostholm 1987), but they do not become common until LN I, when the distribution is centred in north and central Jutland (Ebbesen 2004: 98). In two cases (Fjallerslev on the island of Mors, northern Jutland, and Kvindvad in western Jutland), remains from cremation were found among several inhumation graves, and this was apparently a tradition that was associated with tiered burials (Ebbesen 2004: 100). In the grave at Fjallerslev, a heap of bones from a cremated individual had been buried in the lowermost and earliest of, in all, three graves (Simonsen 1978: 33–35), but as the bones did not lie within a specific grave, it is uncertain whether they may represent an independent cremation burial. In the grave at Kvindvad, a local collection of burnt bones had, in a similar way, been buried in a tiered grave; in this case the bones were seen as originating from a secondary burial (Ebbesen 2004: 86). Even though there is doubt here about the relationship between the cremated individuals and those who were interred, in all three grave complexes, cremation constituted part of a more extensive burial ritual that encompassed several individuals with special mutual relationships. All the tiered graves at Fjallerslev and Kvindvad contained weapons in the form of pressure-flaked flint daggers (type I) and arrowheads. The graves are also considered to be special weapon graves or archery graves that characterise the northern Jutish Bell Beaker environment in LN I (Sarauw 2007). That cremation can be directly linked to this cultural environment is also shown by the finds from a small grave field with flat-field graves at Esbjerg (Solbakkegård IV), where several cremation graves contained Bell Beaker pottery (Siemen 2009 b: 426). There is therefore much to suggest that some of the burial rituals performed in connection with the establishment of grave A2 at Østbirk can be related to earlier traditions with roots in a local northwestern and western Jutish cultural environment within the Bell Beaker complex. That this cultural environment also influenced the locality at Østbirk in LN I is shown for example by the discovery of one of this period's archery graves in burial mound sb 40, which lay c. 350 m to the west of grave field C. In addition to a flint dagger (type Ix), this grave also contained four flat-pressure-flaked arrowheads (Sarauw 2003: 83 no. 6).

Dead houses were not an integral feature of the northern Jutish tiered graves, but wooden chambers and superstructures have been seen in other Jutish graves from both the Single Grave culture and the Late Neolithic (Hansen 1996; Ethelberg 1982), where the burning down of these buildings could also be a characteristic part of the rituals. This was the case at both Vester Egebjerg near Esbjerg in western Jutland (AUD 1998: no. 486; Sarauw 2007: 70) and Diverhøj on Djursland in eastern Jutland (Asingh 1987). In both places, the graves were enclosed by a robust, tent-like building made from sturdy planks, before this was burnt down. The graves are dated to the Single Grave culture and LN I, respectively. This indicates that both the tent-shaped grave structure and, not least, the subsequent burning ritual, were based on earlier traditions.

Even though the two central graves appear, on the face of it, to encompass some of the same burial rituals, and consequently express a mutual affiliation, oval grave A3 also contains elements that are seen among other graves from LN II. The closest Danish parallel to grave A3 is found at Hjortkær in southern Jutland, where some similar graves and rituals formed part of the well-known wheel-grave structure, which is dated to LN II (Jørgensen 1984). In the earliest of several burial phases, the central grave here was enclosed by an up

to c. 65 cm deep, oval ditch that, in terms of size, corresponds to the ditch in grave A3: As in the latter case, the ditch formed the foundation for some sloping timbers from a tent-shaped structure erected over the grave. This structure had not been burnt, but traces of fire were found here in the form of brittle flint which partly made up the basal layer in the grave.

Remarkably, this impressive grave contained no grave goods. A short time later, only 1 m to the south of the grave, a log coffin was placed parallel to it. This contained two individuals, who were laid close together in supine position with their heads facing in opposite directions. In this case, two flint daggers (type IVb) revealed that the two individuals were two men. The central grave and the double grave were covered by a contiguous stone packing, which indicates a certain contemporaneity and relationship between them.

Both the two central graves at Østbirk and Hjortkær, and the nearby, almost identical double grave with two individuals placed close together and laid “top to tail”, show remarkable similarities in their collective grave complexes and funerary rituals. There can therefore be little doubt that the characteristic double grave found at both sites constituted part of the overall burial complex. Coeval burials of several individuals may be coincidental, but the impression is often gained that more tragic or intentional acts may lie behind them. The degree to which this was true here, and the relationship between the two men in the double grave – who at Hjortkær both bore weapons – and the higher-ranking person in the central grave, is something we can only speculate about. The dagger alone may symbolise status (Varberg 2005: 72), but not necessarily elite status (Saraauw 2006: 78). At Hjortkær, this status apparently did not apply to the person in the weapon-less central grave, but to the two men who accompanied him. At Østbirk, one must presume that a similar relationship between those interred also existed between the three individuals in tiered grave A2, including the person who was cremated.

The collective grave complex at Hjortkær contains elements that are also seen in the Tumulus culture’s slightly later burial mounds and which therefore perhaps reflect the introduction of a new epoch, when cultural influences now also extended from north to south. The most remarkable aspect of the entire burial complex is a stone-set wheel cross, which enclosed the central grave. In addition to a striking resemblance to the spoked wheels of the Bronze Age, this symbol also heralded the beginning of a new era, when not only the significance and function of the burial mounds changed relative to earlier times, but also the entire process involved in building them (Holst et al. 2004, 2008). The discovery of a similar wheel cross around a slightly later grave at Grabonóg in western Poland (Makarowich 2017: 145) exemplifies the long-distance dissemination of cultural perceptions and traditions that also existed at this time between Jutland and east-central Europe, south of the Baltic. Perhaps it was also the “princely graves” which accommodated the highest members of society in the Únětice culture that were the source of inspiration for the tent-shaped dead houses in eastern and southern Jutland.

Grave field C

In area C, which lay c. 180 m west of the graves in area B, a small grave field containing nine inhumation graves and a circular, stone-covered cremation grave (sb 192) was excavated in 1957. The grave field covered an area of c. 17 x 13 m. It was not possible, either before or during the excavation, to identify traces of any burial mounds,

Figure 14. The graves in area C.

Area C	B	C	D	E	F	G	H	I	J
length (m)	2.5	2.1	1.6	2.5	2.5	2.5	2.5	2.2	2.0
width (m)	1.0	0.5	0.2	0.7	0.6	0.6	0.8	1.0	0.8
coffin	oak coffin	oak coffin	oak coffin (?)	–	–	oak coffin	oak coffin	–	–
paving	+	–	–	–	–	+	+	+	+
grave goods	–	–	–	–	amber beads	flint dagger Vb	+	bronze frag.	–

and the graves must therefore all be assumed to have been flat-field graves. Five of the graves were covered by a stone heap measuring 3.5 x 4.5 m and 75 cm in height, while the other four lay slightly outside this. Similar stone coverings are well known in relation to both barrow graves and flat-field graves (Ebbesen 2004: 98; Strömberg 1984: 59), where they sometimes can have the character of small cairns. The graves appeared identical in some ways, but also displayed distinct differences. Six of the graves, which consisted of a uniformly-shaped pit with rounded ends, probably all contained log coffins. Four graves showed traces of a log coffin which in three cases was supported by stone packing.

As none of the graves have been scientifically dated and only a few contained grave goods, it is still unclear whether they all represent an archaeologically coeval grave field. The tendency for the graves to be aligned according to two different orientations could indicate that they were established in several phases and perhaps periods, while the common, covering stone layer suggests that most are contemporaneous. Only grave G can, on the basis of a flint dagger (type Vb), be relatively securely dated to the transition between the Late Neolithic and EBA I. This grave is therefore contemporaneous with, or just slightly later than, the graves in area B. A similar date may apply to grave I, which contained a small, uncharacteristic bronze or copper fragment. The degree to which a similar date applies to grave F is less certain. This grave contained 20 amber beads, the majority of which were spherical. Amber beads occur relatively rarely in Late Neolithic graves (Thrane 1962: 91–94, 109–110; Ebbesen 2004: 99) but

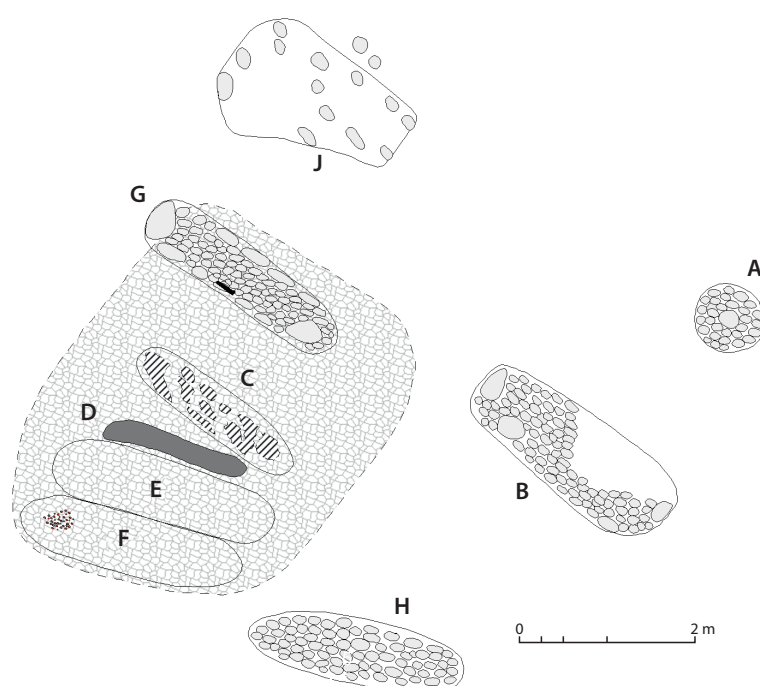


Fig. 15. Flat-field graves in area C. Grave F contained amber beads and grave G a flint dagger (right). Graves C-G lay under a contiguous stone covering.

graves are known from EBA II where small round amber beads reflect a new special status. Amber beads are also sometimes found together with imported glass beads. At Ry, 14 km north of Østbirk, 18 small round amber beads formed part of a necklace with several beads of bronze foil and a simple glass bead (Fischer 1977: 76). Perhaps the amber beads were specifically shaped to match the new glass beads, which by the same time had also reached another grave near Østbirk (Varberg 2015: 171, 177).

Summary of graves in the Late Neolithic

The investigated burials show great variation in grave form and funerary customs, both in time and space, with examples of barrows and flat-field graves occurring side-by-side. At Østbirk, the log coffin became the most frequent coffin type in the Late Neolithic, following the plank coffin's dominance in the early Single Grave culture. Probably in the same period, there were burials in full-length stone cists in several of the barrows in the local area (Ousager 1962). One of these was the closed stone cist measuring only 1.7 x 0.3 x 0.4 m found in burial mound sb 69. The coffin was covered by a cairn which was first covered by a turf mound in connection with a later burial (HOM 2159 Rugballegård). While most Jutish high-status graves during the Single Grave culture, Late Neolithic and Early Bronze Age were covered by mounds, flat-field burials were more common on Zealand and in southern Sweden (Vandkilde 2005: 14; Iversen 2014: 156–157; Strömberg 1984), and as with the use of stone cairns it was



Fig.16. Full-length stone cist in burial mound sb 69 (fig. 3). The grave was covered by a stone cairn.

presumably from here that this funerary custom, at times, reached Jutland.

When very different grave types and forms are established in the same period and in the same place, this bears witness to a mobile and dynamic society under constant change. External contacts and successive outside influences led to the adoption of new burial traditions and types. Even though the picture becomes blurred when these are implemented within earlier local traditions, the graves also reflect the general cultural trends that impacted the area during the course of the Late Neolithic. Like northern Jutland in LN I, southern Sweden apparently became the new cultural innovation centre in southern Scandinavia in LN II. One of the consequences of this was the appearance of totally new regional house types in these areas (see below). Influences from both areas can be observed in the graves at Østbirk. In LN I, the Limfjord area was characterised by great diversity in the grave forms. This has been interpreted as an indication of the presence of, and a certain degree of competition between, different social groups within the area (Vandkilde 2005: 32–33). In southern Sweden, new isotope analyses of human bones from graves have similarly revealed a high degree of mobility during the Late Neolithic (Pokutta 2014; Bergerbrandt et al. 2016; Blank et al. 2018). It was not just new ideas and traditions that moved between near and far, but also the people behind them, and this sometimes led to foreign burials in the local burial ground. It seems likely that a similar mobility and dynamic is reflected in the graves found at Østbirk.

Settlement

In contrast to the graves, the settlement covered the entire valley floor with scattered houses, extending out to the foot of both valley sides. The valley formed the physical frame for the settlement area. This picture seems first to change in the early Pre-Roman Iron Age, when a settlement is demonstrated for the first time above the valley, but the dead continue to be buried down in the valley, on the burial ground.

The orientation of the houses corresponds in all cases to that of the sides of the valley. To the north, several houses stood within the grave field, only a few metres from the nearest graves, where they were built both before and after the graves were established. This suggests that the grave field was not perceived as a separate sacral place but perhaps constituted part of the overall settlement area. While the burial ground appears to have been used almost continuously throughout the Single Grave culture, Late Neolithic as well as the Early Bronze Age and Late Bronze Age, the same continuity is not immediately reflected in the settlement. Despite the many graves from the Single Grave culture, no definite traces of the settlement from this time have been demonstrated. The degree to which this is a true picture could perhaps be illuminated by future investigations.

In the recent investigations, a total of 16–17 building constructions were demonstrated, encompassing both dwelling houses and various forms of outhouses/utility buildings. Eleven of the buildings have been ¹⁴C dated to the period Late Neolithic/EBA IA, while two longhouses and an oval construction with turf walls are dated typologically to EBA I–III. The remaining buildings, which comprise two minor two-aisled longhouses and a small three-aisled house, are so far undated, and it does not appear immediately possible to relate them to the other buildings.

Fig. 17. The ^{14}C -dated houses at Østbirk. The distances given are measured between the central posts of the buildings. The building lengths correspond partly to the distance between the outer central posts (*) and partly to the estimated length of the building. The dates were obtained for either charcoal or charred grain from the respective features.

House	Construction	central posts	distance east (m)	distance west (m)	length(m)	width (m)	depression (m)	Lab. no. AAR	charcoal	date BP	Oxcal 1 σ BC
I	two-aisled	3	6.5	3.8	10.3* (13–14)	4.5–5	6.6 x 4.0	10355	ash	3635 \pm 48	2050–1930
II	two-aisled	3	6.6	5.6	12* (15–16)	–	5.7 x 3.0	13984	hazel	3635 \pm 50	2041–1932
III	outhouse	–	–	–	–	–	5.9 x 4.3	13979	hazel	3658 \pm 31	2045–1975
IV	two-aisled	–	–	–	5	5	–	Poz-96066	birch	3660 \pm 35	2049–1972
V	two-aisled	3	5	4.5	9.5* (12–14)	4.5	4.4 x 3.0	10357	(bread?)	3584 \pm 41	1980–1880
VI	outhouse	–	–	–	–	–	5.4 x 5.0	15072	hazel	3600 \pm 21	1978–1924
VII	outhouse	–	–	–	app. 11	4.5	8.0 x 5.0	10354	grain	3547 \pm 41	1950–1870
VIII	hybrid	2+4	5.9	4.5	17	6	3.8 x 5.0	7286	oak	3485 \pm 55	1860–1770
IX	two-aisled	3	6.8	7.8	14.7* (17–19)	6–6.5	7.5 x 5.6	10356	hazel	3436 \pm 41	1780–1680
X	three-aisled	–	–	–	9* (app. 12)	4.3	–	14431 14430	hazel hazel	3427 \pm 38 3379 \pm 38	1744–1669 (combined)
XI	outhouse	–	–	–	–	–	4.5 x 6.0	7287	grain	3380 \pm 55	1740–1615

Houses with a sunken floor

Of the 11 ^{14}C dated houses, nine were of the type with a sunken floor.³ Four of these were two-aisled longhouses, which are usually perceived as having been wholly or partially used as dwellings (Saraauw 2006). Four others are perceived as being outhouses or utility buildings. In the latter case, a sunken floor was evident in a hybrid building. The four two-aisled longhouses all stood near the sides of the valley, one close to the north side and the three others to the south. The houses appeared largely without wall posts, which is usually a consequence of modern ploughing activities. In this case, it was due to the difficulty in recognising minor features in a dark, fossil soil layer which today covers most of the valley floor to a depth of up to 30–40 cm. As the postholes for the wall posts could not be identified in the underlying subsoil, this must mean that the walls were constructed with small posts or stakes, probably with heather turf as an important component of both wall and roof constructions. Traces of heather turf were demonstrated in several of the buildings.

Two of the longhouses are dated to the end of LN I, while the two others are from, respectively, the beginning and the end of LN II.

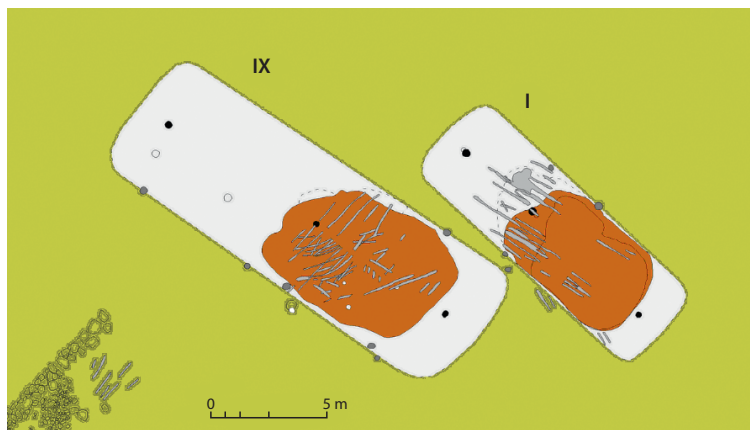


Fig. 18. Houses I and IX from, respectively, the end of LN I and the end of LN II.

- 3 For the sake of clarity, these houses have been given new numbers which correspond to the original records as follows: house I (HOM 1509, A121), house II (HOM 2488, A8), house III (HOM 2488, A5), house IV (HOM 1018, A7), house V (HOM 1590, A8), house VI (HOM 1590, A90), house VII (HOM 1509, A120), house VIII (HOM 1018, A2), house IX (HOM 1509, A122), house X (HOM 1018, A5), house XI (HOM 1018, A680).

Despite a relatively long period of use for this house type, the internal construction and functional layout apparently remained unchanged throughout. With a length of merely 13–16 m, these were relatively small buildings, and only the latest reached a length of 19 m. A corresponding greater width is reflected in the house floors which increase in width from c. 4.5 m in the earliest house to 6–6.5 m in the latest. All four houses were constructed with three central posts. With an almost constant distance of 6.5 m between the two easternmost posts, corresponding approximately to the length of the sunken floor, it was the distance between the western posts that increased together with the building length. The floor hollow had a depth of 20–30 cm and was at the eastern end of the building in all cases. It is characteristic for this area that the longhouses only contain a limited finds assemblage and there appears, therefore, not to have been the same tradition of depositing “old refuse” when the houses were abandoned, as we see at some of the localities in northern Jutland (Sarauw 2007: 11–15; Simonsen 2017: 367–372).

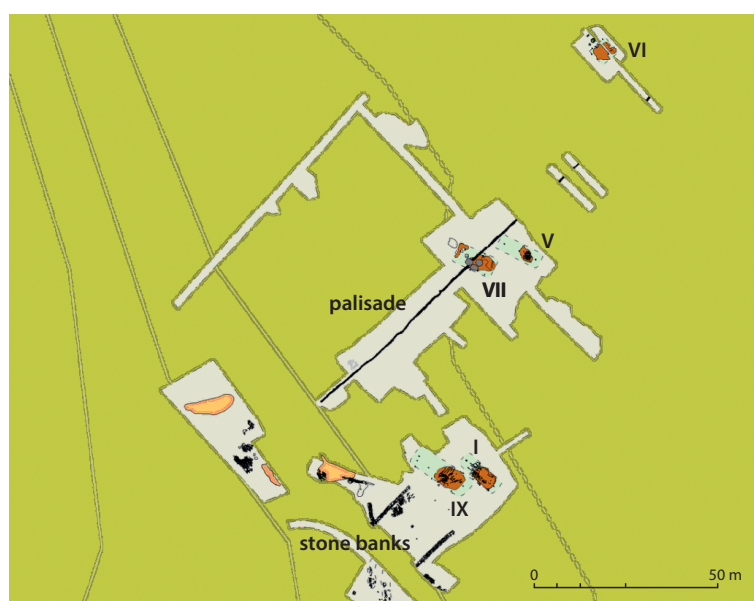


Fig. 19. Area E with houses, the southern part of a palisade and a system of stone banks.

Together with the dwelling houses, outhouses or utility buildings are commonly found throughout the entire Late Neolithic. These are best known from some of the settlements in northern Jutland and southern Sweden (Sarauw 2006; Simonsen 2017; Artursson 2005a; Brink 2009). In LN I, the construction and function of these buildings is not unequivocal, and they have often been identified simply on the basis of a small depression and some rather less systematically arranged posts than those in the longhouses (Sarauw 2006: 47). The buildings change character in LN II, so both their construction and their function in many cases become clearer. At Østbirk, outhouses have been identified partly based on the absence of central posts and partly due to the building's overall character and possible relationship to other houses. In several cases, it has been further possible to demonstrate the likely contemporaneity and association between a dwelling house and an outhouse with the aid of ^{14}C dates. In these instances, the household here is termed a farmstead, while dwelling houses without other definite buildings are simply termed households.

A total of four houses with sunken floors—all from LN II—were left in a burnt-down state: Three of these were utility buildings. In

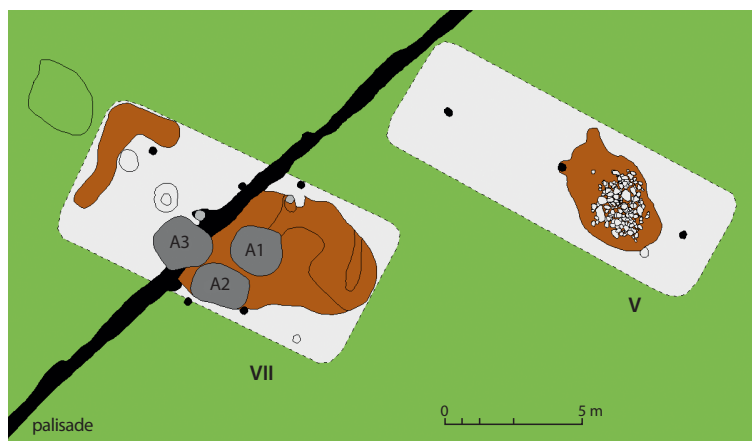


Fig.20. Outhouse VII with the three cellar pits A1–3 (lowermost) and the archaeologically coeval longhouse V. The out-house is cut through by a palisade ditch from the Bronze Age.

contrast to the dwelling houses, most of the outhouses also contained a diversity of finds that made it possible to illuminate some of the activities and functions associated with these buildings. One of them (house III) stood directly below the northeastern valley side, where, together with a longhouse (house II), it formed a small farmstead. The relatively small building had a flat-bottomed hollow measuring c. 4 x 4 m and 30 cm in depth, in which a floor layer with activity traces was evident in the middle of the feature as a distinct grey sandy horizon. Both the floor and the fill of the hollow yielded a large finds assemblage which can, for the most part, be related to the working of stone and flint.

Of special interest were several tools that probably had been used for the working of a stone axe with a drilled shaft hole. In addition to 19 flint points with blunt or slightly pointed tips, which were used for pecking the surface of the axe, the tools also comprise five barely hand-sized stones with deep cupmarks that are presumed to have been used in the subsequent drilling of the hole, and a shaped hazel rod was perhaps used for this (Sehested 1884: 30). The reason the cupmarked, pocket-sized stones are thought to have been used as tools is due to the cupmarks' very uniform diameter of around 2.8 cm, which corresponds to the hole in the stone axe (four similar stones with cupmarks were found in a double grave at Tørring, East Jutland (Borup 2013: 50–54). The grave is ^{14}C dated to the transition LN I/LN II). At the base of the hollow also lay the finished product in the form of a newly-completed stone axe which still lacked grinding on one broad side. Traces of flintworking were also evident: Apart from the flint debitage, there were two roughouts for



Fig.21. The sunken floor in outhouse III. The floor level can be perceived as a grey horizon.

pressure-flaked arrowheads and a newly-worked flint dagger (type 1b, fig. 37). Like the axe, the dagger also lay on the floor of the hollow. It is unknown why these tools were left here. Perhaps it was part of a sacral act, when the farm was abandoned. In which case the finds suggest that the hollow had accommodated a small workshop hut that belonged to the local flintsmith.



Fig. 22. Tools from outhouse III. The flint points lowermost were used for pecking when working stone artefacts, while the stones with cupmarks were perhaps used in the drilling of shaft holes. To the right newly-worked axe and disc-shaped stone artefact, both shaped by pecking.



The three other outhouses were all burnt-down sites that contained large quantities of charred material. In two of the buildings (houses VII and XI), this consisted predominantly of charred grain. House VII was evident in plan as a c. 8 m long and 4.5 m wide hollow, but which actually had the character of a 5–10 cm thick black burnt layer that is assumed originally to have covered the entire house floor. The junction of the wall and gable at the northwestern corner of the house was marked by an almost right-angled and up to 35 cm deep, pit-like feature which suggests a building length of more than 11 m, and that the building had straight gables. The pit's relationship to the house is revealed partly by some finds, partly by the fact that its base was covered by the same layer of burnt material as the

rest of the building. Immediately outside the western gable lay a pit, 2 m in diameter, with a content of pottery which also links it to the building. Even though several burnt wall posts were clearly evident in plan, only two possible, unsystematically arranged roof-bearing posts were demonstrated. Beneath the central, southern part of the burnt layer, were three almost circular 40–60 cm deep cellar pits. The smallest of these measured rather more than 1 m in diameter, the largest 2 m. The fire had created an up to 10 cm thick layer of charred grain on the base of all three pits, corresponding to 15–20 l of grain in each pit. In one of the pits, black markings revealed that the grain had been stored in some c. 50–60 cm diameter round wooden containers. Apart from pottery, the finds from the building were limited to a single flake scraper from the burnt layer and two pressure-flaked flint sickles from the gable ditch. Evidence of intense heating of the pottery showed that the fire had generated very high temperatures. Like the pits, the covering burnt layer also contained charred grain, and as the few tools recovered can specifically be related to cereal harvesting and processing, it seems obvious to interpret the building as a place where crops were processed and stored.

House VII stood only a few metres away from longhouse V, and a further 50 m to the northeast stood yet another presumed outhouse (house VI). In this building, a similar burnt layer covered the base of a 5 x 5 m almost circular depression that was partially surrounded by burnt posts. The burnt layer here contained remains of charred acorns and hazelnut shells. In this case, two large and evidently find-free cellar pits had apparently been left untouched by the fire. A further two pits, which lay a few metres outside the hollow, can be related to the building. Their contents of a hollow-ground lower stone of a saddle quern and matching rubber stone, together with two pressure-flaked flint sickles, show that cereal processing also took place here.

House XI, which is dated to the end of LN II or the beginning of EBA IA, stood easternmost in the area and was isolated relative to the other buildings. The building comprised a hollow measuring 3.5 x 4.5 m, but a few posts and the black colouration of the subsoil to the west suggests that its actual size can be estimated as c. 9 x 6 m. At the base of the depression lay an elongate, stone-set hearth made from some small stones of uniform size. This was covered by an up to 10 cm thick layer of charred cereals, corresponding to c. 35 l of grain. A black marking in the subsoil around the stones probably derives from a rectangular container made of organic material, on which the grain had



Fig.23. Outhouse XI. In the black, burnt layer, which mostly consisted of charred grain, several outlines of possible wooden containers can be seen, as well as ard marks from subsequent ploughing.

originally been placed, raised above the heat from the heated stones and glowing charcoal, i.e. a grain dryer. Other circular markings outside the hearth could originate from some large grain containers. The building was subsequently ploughed through with an ard, which has increased the mixing of the original grain layer. Only very few finds were encountered; these comprised a small blade sickle and a small potsherd bearing Bell Beaker ornamentation. Among the small heat-affected stones was a small arrow-shaft straightener (fig. 24).

Longhouses of two- and three-aisled construction

Houses VIII and X represent some new house types that emerged at the end of LN II. House VIII measured 17 x 6 m and was constructed with a narrow, 20–25 cm wide and up to 10 cm deep rectangular wall ditch running all the way round. The house site had unfortunately been exposed to heavy removal of overburden, but the ditch – which was best preserved in its eastern half – had originally been dug all the way round. Several posts were demonstrated at the eastern end of the ditch, which suggest that the wall here was made of wood, perhaps in bole construction. The usual door openings were replaced in both sides by two opposing, slightly recessed and 3 m wide doors, marked at both sides by some sturdier posts. These doors are presumed to have divided the building up into two



Fig. 24. An arrow-shaft straightener which lay among the burnt stones at the base of the sunken floor in outhouse XI.

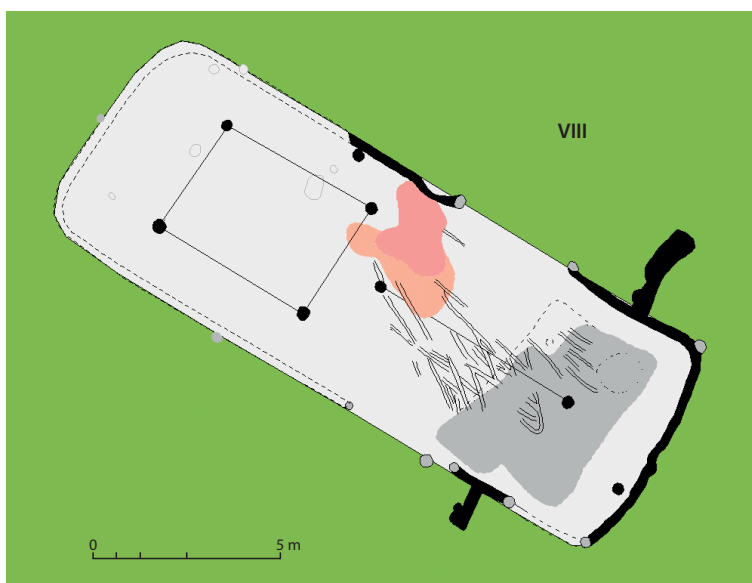
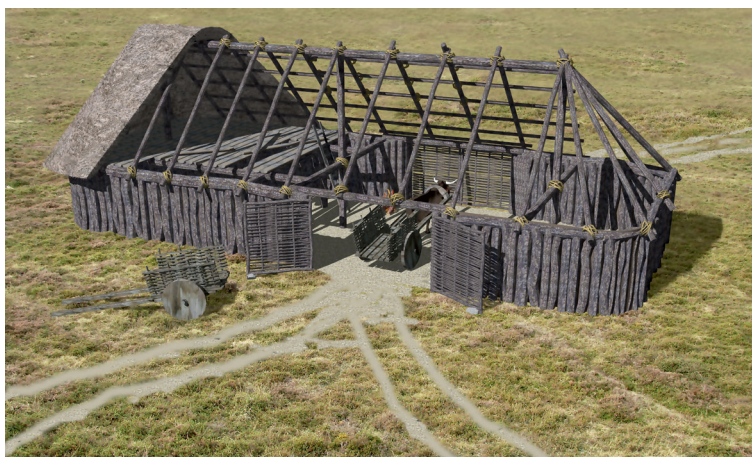


Fig. 25. Hybrid house VIII. A hearth is located close to the northern door opening. Like several of the other longhouses with a sunken floor, the house site was subsequently ploughed with an ard. On the right is a proposed reconstruction.



functionally distinct halves, and with a displacement somewhat towards the east, the western part of the building was more than twice the size of the eastern. Like the other longhouses, the building contained a hollow, which here measured c. 4 x 5 m.

The internal post construction consisted of two central posts in the eastern end and two opposing post pairs in the western end, which makes the building a constructional hybrid between the two-aisled and the three-aisled longhouses. The posts in the western end were 22–25 cm in diameter and set 30–45 cm below the stripped surface; this is markedly deeper than the central posts in the eastern end. The sturdy posts had apparently supported a loft that covered most of the western room. That there was a covering below the roof ridge extending across this entire part of the house is further suggested by a large hearth here being placed out towards the wall, away from the central part of the room. The building's largest western part presumably functioned as a utility building and barn, in which the two opposing doors were particularly suited to driving through with a wagon, a feature that probably also played a central role with regard to the entire house construction. The dwelling quarters are usually associated with the house's hearth (Sarauw 2006: 56–58). But in this case the hearth was actually situated by the door, close to the place where a wagon must have been able to pass, so the building must have had a different function. It is not therefore inconceivable that its primary function was as a utility building, possibly with a byre. The hybrid house has been ¹⁴C dated to the later part of LN II.

About 100 m northeast of the hybrid house stood the somewhat smaller house X. It stood within the burial ground, only a few metres away from the nearest graves. The house contained four post pairs and apart from these just a few wall posts, giving a maximum building length of c. 12 m and an estimated width of just over 4 m. In the middle of the north wall, a 1.3 m wide door opening was marked by two larger posts. Inside the building were several cooking pits, five in the western end and one in the eastern. It is uncertain whether these pits should be related to the building, as a few similar features were also found just outside it. The house does not immediately stand out from other similar buildings without traces of the wall, but with postholes for roof posts of 23–27 cm in diameter, the latter are comparable with the posts in the western end of the hybrid house. That this small building had a special significance is shown by a small trapezoid bronze awl, which was found deposited in one of the postholes (fig. 26). The building, which is ¹⁴C dated to the end of LN II or the transition to EBA IA, is stratigraphically earlier than a c. 6 x 3.5 m oval feature (A985), which covered one of the longhouse's postholes. This feature comprised a c. 50 cm wide and 20 cm deep ditch, which formed the foundation for a turf wall. Similar features have previously been interpreted as houses and are seen in particular on northern Jutish settlements, where they are dated to the Early Bronze Age (Rasmussen 1993: 34).



Fig. 26. Trapezoid bronze awl from one of the postholes for a roof-bearing post in the three-aisled house X.

Parallels to the houses

Houses with sunken floors were previously seen as a special northern Jutish phenomenon, associated with the area's Bell Beaker culture in LN I (Vandkilde 2001). But today, similar buildings are known to be a common house type in the rest of Jutland, where they also constitute part of a Bell Beaker environment. In east-central Jutland, the house type turns up with Bell Beaker pottery at the end of the Single Grave culture, but apparently at a later point in time than in northern Jutland, which should probably be seen as a result of the longer duration of the Single Grave culture in central Jutland (Hübner 2005). Evidence from another settlement in the area suggests that the boundary between the two periods here lay as late as 2350–2200 BC (Borup in press). In east-central Jutland, the earliest buildings with sunken floors are generally dated to the later part of LN I (after 2200 BC), and it must be presumed that the central Jutish Bell Beaker environment arose as a result of influences from northern Jutland. Consequently, the inspiration for the earliest houses with a sunken floor at Østbirk should also be sought in the settlements in this region.

As in northern Jutland, buildings with sunken floors were used at Østbirk throughout the remainder of LN I, both in the form of two-aisled longhouses and outhouses. In contrast to the longhouses, the outhouses changed in both character and significance during this period, probably as a consequence of an increased requirement for utility buildings. Neither did the function always follow the size of the building, and the dimensions of these utility buildings could at times exceed those of the smaller dwelling houses. An impression of the outhouses of the period can be gained from the contemporaneous locality of Resengaard in northern Jutland, where 13 presumed outhouses from the period LN II-EBA IA were excavated (Simonsen 2017: 93–103). None of the outhouses at Resengaard had been burnt down, and they contained only a little charred material. Nevertheless, they are considered to have functioned predominantly as utility buildings. The outhouses varied in both size and form, and in most cases the sunken area is presumed to have extended along the full extent of the building. As for the size and form of these sunken areas, the outhouses at Østbirk appear not to deviate in this respect. At Resengaard, the basic form of the outhouses apparently followed that of the contemporaneous longhouses which, with a local constructional form, were built with slightly rounded gables.

In LN II, a series of new building types were introduced in Jutland, prompted initially by new cultural influences from southern Sweden and eastern Denmark. The prototype was, first and foremost, the characteristic rectangular two-aisled longhouse with straight and apparently open gables that occurs in large numbers at southern Swedish and eastern Danish settlements (Artursson 2005a, 2005b). The size of these varied over time – from quite small to larger and more monumental buildings such as those known from localities like Fossie IV (Artursson 2005a: 9–11) and Almhov (Brink 2009) in Scania, but the inspiration for the buildings was apparently the same (Johannsen 2017: 13–15). While the largest longhouses in Jutland are still only known from relatively few localities (e.g. Boas 1993; Grundvad et al. 2015), the smaller longhouses are becoming increasingly common, including more locally in east-central Jutland (Borup in press; Jensen & Bagge in press). Characteristic elements of this house type were, at the same time, implemented in the local building types, which frequently resulted in house forms with a wall construction built in local materials. In ground plan, the houses often appear to have relatively closely-spaced wall posts, straight gables and rounded gable corners.

The constructional and morphological developments also influenced the coeval outhouses. At Østbirk, house XII, which measures 11 x 4.5 m, is thought to have been built with straight gables, and several elements in this building can also be recognised in small buildings at several Swedish settlements (e.g. Strömberg 1992; Artursson 2005a: 25–26). Houses with sunken floors are also known from southern Sweden and eastern Zealand, and a close parallel to house A120 has been excavated at Gödastorp Halland in western Sweden. Here, house 1 consisted of an 8 x 4 m hollow with no definite traces of central posts but with unsystematically arranged posts along its sides (Westergaard 2009: 14–15). The hollow presumably extended over the entire house here and, as a special feature, one of the gable corners of the sunken area was, like in house A120 at Østbirk, marked by a right-angled ditch.

Further and clearer parallels can be drawn with longhouse VIII, which is characterised by both a rectangular wall ditch and an internal hybrid construction. These two elements do not form an integrated part of the same house type but can occur independently in different house types. Even though house VIII contains elements that, in various ways, can be recognised in other houses with wall ditches and a hybrid construction, there are as yet no records of other direct parallels in southern Scandinavia. Houses with wall ditches are known in particular from several Jutish localities (Poulsen & Grundvad 2015: 28–32; Ethelberg 2000: 168–170). But of particular interest in this respect is the locality of Hagestad 44 in Scania where, among a total of 12 modest, rectangular houses, were also houses with both a wall ditch and a three-aisled construction (Strömberg 1992: 70; Artursson 2005a: 25–26). These are dated, based on the finds assemblage, to LN II and the Early Bronze Age (Strömberg 1992: 82–84).

The true hybrid construction has similarly only been demonstrated in Jutland and, to date, in only very few instances. The closest parallels to house XIII are some remarkably similar house sites recorded at the localities of Ginnerup (Bech & Olsen 2013: 14) and Fjordglimt (Bech 2002) in northern Jutland. Both houses here are relatively large, respectively 27 and 24 x 7.5 m, and built with wall posts, but in the regional constructional form with closely-spaced wall posts and rounded gable corners. Along the centre of the houses stood four sturdy posts, which in the western third of each building were replaced by two post pairs, probably representing a separate department, delimited by two narrow, opposing entrances. The spacing between the four posts is the same as in house XIII at Østbirk, and it is obvious to see their function as being the same in all three buildings. A further pair of entrances indicates that the two houses in northern Jutland were functionally divided into three rooms. The two northern Jutish houses are dated to EBA I and are therefore slightly later than house XIII.

Similar constructions are known from other Jutish houses, including houses 1 and K5 at Vestervang near Vejen in southern Jutland (Hertz 1997; Poulsen & Grundvad 2015), and house K1, a longhouse of Fosie-type at Skovsgårde in Eastern Jutland (Jensen & Bagge in press). Both were two-aisled, but in the western end the central posts were augmented by further post pairs. The posts were only shallowly set, which suggests that they did not have the same load-bearing function as those in the hybrid houses. Similar post constructions are found in the monumental longhouse III at Hemmed Kirke, eastern Jutland, and here the excavator linked them with hearths which the posts stood around (Boas 1992: 125). That a true hybrid construction is not seen in some of the largest Danish longhouses is perhaps because the function associated with this feature had no significance for these large buildings or halls.

The hybrid construction probably constituted the introduction to the first Danish three-aisled longhouse, which was seen until recently as appearing in EBA I/II in the form of large longhouses (Ethelberg 2000: 263). Several earlier and smaller three-aisled buildings have now been found in both northern and southern Jutland (Poulsen 2017: 210; Bech & Olsen 2013: 15), all dated to the transition between LN II and EBA IA around 1700 BC. This means that the house type had already spread rapidly across large parts of Jutland by this time.

The three-aisled building construction was, during this period, employed in some of the Únětice culture's longhouses in central Europe, either as a fully integrated construction or just in part of the building. It was probably from some of these areas that the new constructional forms reached southern Scandinavia.

Both constructional forms have been demonstrated in various buildings within a relatively small area at Leipzig, in central Germany, between Zwenkau in Saxony (Donat 2018: 18–23) and Salzmünde in Saxony-Anhalt (Duchniewski et al. 2014). At Salzmünde-Schiepzig, a partial three-aisled construction has been demonstrated in four out of a total of nine two-aisled houses. Wide openings in the long side walls are characteristic for all the buildings at this locality, and in a hybrid house measuring 25 x 6.2 m (house 1), an opening in the south wall was marked by a more than 3 m wide door (Duchniewski et al. 2014: 99). That the inspiration for the early Danish three-aisled houses should be sought in this area is also suggested by a trapezoid bronze awl found in house X at Østbirk. Similar bronze awls are relatively common finds in central Germany (Barthelheim 1998), and an awl fitted with bone handle was found in a grave very close to house 1 at Salzmünde-Schiepzig (Moser 2017: 83–87).

Agriculture

Sickles and quern stones, charred grain in postholes and furrows left by ploughing with an ard (ard marks) are commonly found today at many Danish Late Neolithic settlements, where they testify to the increased significance of arable agriculture in LN II. Similar discoveries were made at Østbirk, where traces of arable agriculture (crop cultivation and processing) almost exclusively dominate the overall finds assemblage, both inside and outside the buildings. Animal husbandry (cattle rearing) was also a natural part of farming, but the traces of this are only indirect, in the form of ard marks in the cultivated fields, where oxen were used as draught animals. Small areas with ard marks in the subsoil have been demonstrated in seven discrete places within the settlement area. In five cases, ploughing had been undertaken across the sunken floors of house sites. Even though this form of ploughing was perhaps of ritual character, associated with the demolition of the building (Sarauw 2006: 39), the other examples show that the cultivated fields lay within the overall settlement area and not far from the farmsteads. Other signs of livestock were evident in the form of two presumed animal pens which, together to a small oval turf-walled structure (A885), comprised a combined ditch and post-built enclosure (A150).

The most important finds in relation to local arable agriculture are the large quantities of charred grain found in houses VII and XI. These assemblages apparently represent different stages in the processing of the crops and each therefore contributes in its own way to an understanding of how crops were handled at the time. In the case of the charred grain from house VII, preliminary archaeobotanical investigations have shown that the three cellar pits each contained a different cereal type with emmer, spelt and naked barley,

Fig. 27. Cereal grains and chaff (glume bases) in three small samples taken from each of the three cellar pits (A1, A2 and A3) in house VII. It is evident that each of the three pits is dominated by a different cereal type but also contains a small admixture of one of the other types. These latter could derive from the previous year's crop and thereby reflect crop rotation. The totals give the numbers of plant remains actually recorded, while those in brackets are the calculated totals for the entire samples.

	A2	A1	A3	Species
Flotated (ml)	57/7.5	115/5	1048/12.5	Flotated (ml)
Hordeum vulgare var. nudum	–	1 (14)	49 (6821)	Naked barley, grains
Triticum dicoccum	5 (174)	27 (378)	–	Emmer, grains
Triticum dicoccum	4~5 (35~44)	45~64 (504~717)	–	Emmer, glume bases
Triticum monococcum	1 (35)	2 (28)	–	Einkorn, grains
Triticum spelta	21 (731)	–	–	Spelt, grains
Triticum spelta	62~74 (598~729)	–	5~5 (350~350)	Spelt, glume bases

respectively, being represented in an almost pure form (Jensen 2007). This shows that the three cereal types were cultivated as monocultures, each in its own plot on the field, and probably with annual crop rotation. The latter observation is reinforced by the fact that, in addition to the pure cereal type, each pit also contained a minor element of one of the other types (fig. 27), which could represent remains of the crop from the previous year. The possibility that cereal cultivation in the Late Neolithic involved crop rotation has been mentioned in several publications (e.g. Andreasen 2007: 21–22) but has not previously been demonstrated in the finds. Cultivation of several cereal crops simultaneously led not only to more diverse, but also more stable agriculture (Andreasen 2009: 19) and improved the conditions for the production of a surplus.

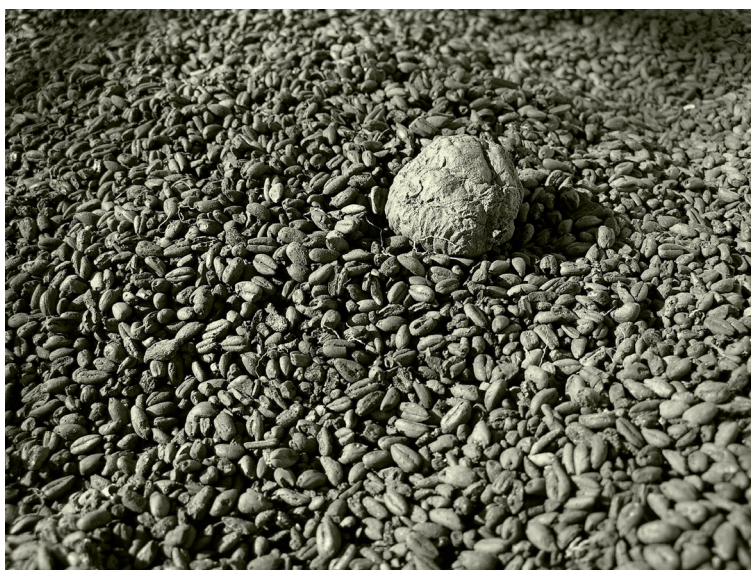
In the case of all three pits, the grain had been processed and was without weed seeds. While the barley occurred as naked grains, the wheat grains (emmer and spelt) were still enclosed within the glumes, i.e. as spikelets, which is the characteristic way of storing these cereal types until they are to be used (Andreasen 2009: 29). As a consequence, the grain could also be employed later, either for consumption or as seed corn (Robinson 2000: 284). The storage of the grain in wooden containers in the pits inside the house would have protected it against for example decay. The uniform and almost measured quantities of grain could suggest that it was part of the seed corn for the following year that had been destroyed by the flames.

A possible similar, minor utility building with presumed cellar pits, though with markedly smaller quantities of grain, was excavated in 1910 at Birknæs (Madsen T. in prep, no. 160515–12, Helbæk 1952, Jørgensen 1979, Robinson 2003, table 1), only a few kilometres north-west of Østbirk. Here, four out of a total of five pits lay inside a small post-built building. Three of the pits contained a total of 2.7 l almost pure wheat species, while the fourth contained 4.3 l almost pure naked barley (Helbæk 1952: 98–99), which here too suggests separate cultivation of the individual crops. The building's function as a utility building is further indicated by the finding of a saddle quern with associated rubber stone in one of the pits. With a ¹⁴C date at the end of LN I, the building is slightly earlier than house VII.

In the somewhat later house A680, where a layer of charred cereals covered a stone-set hearth, the grain had presumably been laid out to drying or to be roasted when the entire building was destroyed by fire. A preliminary analysis revealed the presence of emmer and spelt, and if this is representative of the entire assemblage, roasting may possibly have been a step in the final processing (i.e. dehusking) of the grain prior to use (Andreasen 2009: 28).



Fig.28. Outlines of round wooden containers that held some of the grain in one of the cellar pits (A2) in house VII. To the right charred grain (mostly emmer) from cellar pit A2 in house VIII. The pit also contained a small apple.



Over time, numerous large finds of charred grain have been made at Late Neolithic and Early Bronze Age settlements in Jutland. The finds from Østbirk constitute just two of several large grain finds from the immediate local area, extending from Østbirk to around the lakes between Silkeborg and Skanderborg (fig. 29). The largest find to date was discovered recently at Resenbro near Silkeborg (Andreasen 2017), where a pit was found to contain more than 100 l charred grain (Malene Madsen pers. comm.). Collectively, these finds reflect not only increased and more efficient agriculture but also the wide range of cultivated cereal crops that characterises most of the Late Neolithic. Throughout this period, however, a clear dominance is evident of the wheat species emmer and spelt, and these occur in all the finds. In relation to emmer and naked barley, spelt is a somewhat later cereal type, and in Denmark it was probably not cultivated in its own right until LN I (Robinson 2000: 283; Andreasen 2009: 19). Unlike the older cereal types, spelt is considered to have

originated in Europe (Jørgensen 1979: 143; Akeret 2005: 284–285; Stika 2013: 360–361), but its place of origin is, as yet, uncertain, as spelt finds of approximately equal age are known from both northern and southern Europe. The earliest find so far from the Østbirk area comes from a pit (A137) which lay only 300 m northwest of the investigated settlement area (area F). Emmer and spelt, intact with glume bases, were dated here to late in LN I (Helbæk 1952; Jørgensen 1979).

Fig. 29. Localities in the local Østbirk area with large finds of charred grain. ¹⁴C datings are based on grain.

Museum	Structure	Amount litres	Emmer	Spelt	Einkorn	Bread wheat	Naked barley	Hulled barley	Lab.No.	14C BP	Oxcal 2σ BC
Horsens											
Østbirk, A137	pit	>2	x	x					Poz-95820	3655±35	2139–1938
Birknæs, sb 141	cellar pits	7	x	x	x	x	x		NM k-2929 NM k-2927	3630±85 3520±85	2070–1930
Østbirk, house VII	cellar pits	50114–60	x	x				x	AAR 10354	3547±41	1980–1750
Østbirk, house XI	depress.	c. 36	x	x					AAR 7287	3380±55	1740–1615
Skanderborg											
SBM 1194, A584	pit	3.5	x	x	x		x		AAR 15157	3610±23	2030–1901
SBM 1271, K1	depress.	c. 37	x	x			x	x	AAR 18541	3279±25	1619–1498
Silkeborg											
SIM 5126, A223	pit	c. 100	x	x	x (?)	x					LN/BA

The finds of charred grain, which include both unprocessed and processed cereals, come from various kinds of features, so there is no obvious unequivocal explanation for how they became burnt. This is, however, unlikely to be due to random events. The grain was normally found as a compact layer at the base of the feature or structure that, in most cases, was the source of the actual conflagration. At five localities the grain lay in pits (fig. 29), which in two cases functioned as cellars in buildings, while the three others were solitary features, but all had the character of storage pits. Two of the largest finds (from Østbirk house XI and SBM 1271 house K1) were encountered as an up to 10 cm thick, surface-covering layer on the sunken floor of a burnt house site; both contained more than 35 l of charred grain.

While most of the pits can be dated to the end of LN I or the beginning of LN II, the two burnt house sites are dated to late in the period. This could suggest that the way in which the grain became burnt changed character – from combustion in the individual pits to later encompassing the burning down of an entire building. Perhaps this was also an expression of a change in the handling and storage of grain reserves: From being kept in isolated storage pits outside the buildings to later storage of the grain inside the houses. It has, for example, been suggested that the burnt grain found in the sunken floors could be a result of it being stored, prior to the fire, on an open loft above the hollow (Møbjerg et al. 2007: 33; Jørgensen 2013: 15). It is, however, difficult to see how the presence of a loft can be as consistent with the normally unsystematically arranged posts around the sunken floor of these building.

Just as probably was the case for the relatively numerous burnt house sites from this period, the burning of the grain stores must also be seen as the result of a deliberate acts. But did this take place as part of a ritual activity (Simonsen 2017: 374) or could it be the result of a hostile intervention? With intensified cereal production in LN II came also an increased focus on the ritualisation that surrounded agriculture, and the burning of the crops perhaps formed part of these

rituals. On the other hand, if the charred grain was the result of a hostile act, the destruction of grain stores can similarly be considered to have been the primary goal.

Settlement through the Late Neolithic

Collectively, the buildings at Østbirk represent a settlement that covers the period from the end of LN I to the end of LN II (fig. 30): A period that is characterised, in particular, by many new habitations in central Jutland. At some of the largest of these, efforts have been made to identify the various phases represented by the many house sites to illuminate the development and extent of the individual settlements through time: Bejsebakken (Sarauw 2006) and Resengaard (Simonsen 2017) in northern Jutland and Almhov in southern Sweden (Brink 2009). Attempts have for example been made to illustrate how the individual households moved around within the overall settlement area over time (Simonsen 2017: 364–367; Sarauw 2007: 219) and how large farmsteads developed through the Late Neolithic (Brink 2009). A crucial aspect of such investigations is the possibility of demonstrating actual contemporaneity between houses or farmsteads. As this is often rendered difficult by both the high settlement intensity and the margins of uncertainty associated with the ^{14}C dates, the picture of the settlement structure that emerges at these extensive settlements is not unequivocal (e.g. Sarauw 2006: 9; Artursson 2005b: 47). But the investigations suggest that during this period there was a diverse and at times complex settlement structure, which could see reflection as both small clusters and scattered houses and farmsteads (Brink 2009: 47) – patterns that could change at individual localities through time. At Østbirk, there was a relatively low settlement intensity with scattered and undisturbed house sites. It is therefore possible, based partly on the ^{14}C dates and partly on the mutual relative positions of the buildings, to demonstrate relative contemporaneity and in a few cases actual contemporaneity between several of them. Even though the buildings cannot be seen as representing the original overall settlement, by involving the other finds groups it would be possible to draw a general picture of a society that was experiencing continuous change, not least as the result of contact with other cultural environments. Based on the ^{14}C dates, the period in question can be divided into three phases, covering the end of LN I, the beginning of LN II and the end of LN II/EBA IA, respectively (fig. 30).

Late LN I (2050–1950 BC)

The earliest definite settlement traces at the locality are dated to the end of LN I and comprise primarily two households, one on each side of the valley, about 450 m apart (fig. 31). In this case, some almost identical ^{14}C dates demonstrate an actual correspondence between all the buildings. The main building in both households consisted of a two-aisled longhouse with a sunken floor. While the southern house (house I) apparently stood alone, a workshop building (III) and a presumed animal enclosure (A150) were evidently associated with the slightly larger house II. This farmstead's two buildings stood about 15 m apart. The animal pen was only 6–8 m from the dwelling house and consisted of a combined ditch and post-built enclosure, with an area of c. 22 m².

No signs of arable agriculture were demonstrated, either in any of the buildings or in the finds assemblage. Ard marks show that

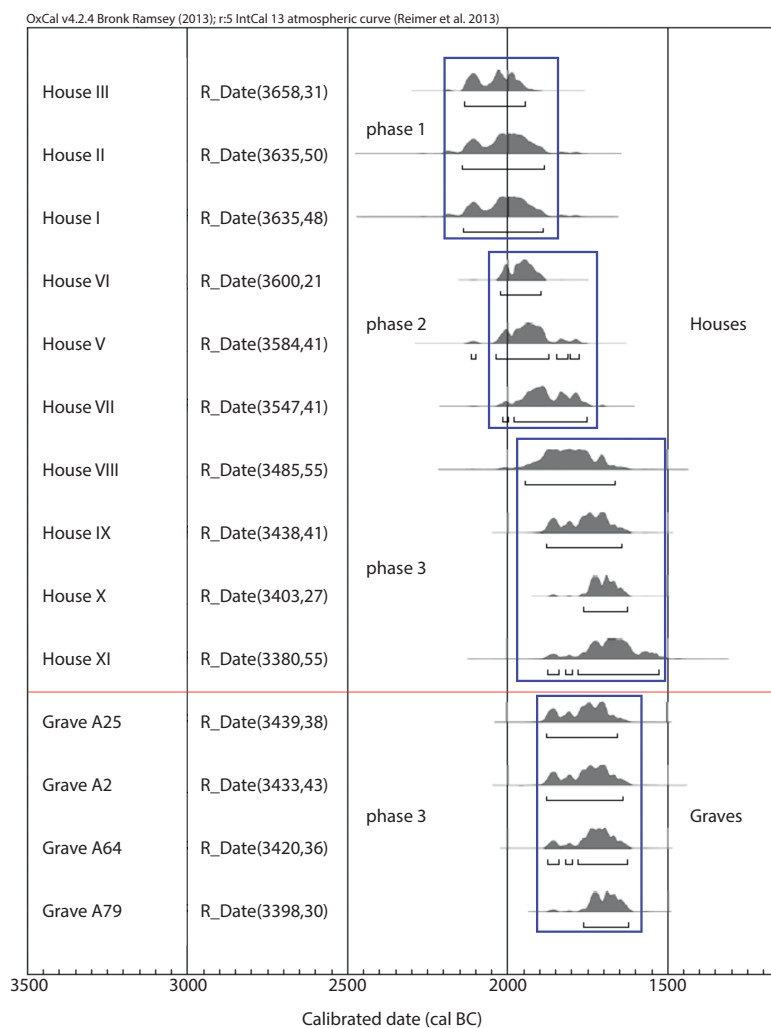


Fig.30. ^{14}C dates for houses and graves. The dates form the basis for a description of the Late Neolithic settlement in three phases.

ploughing had been undertaken later across house A121. Definite evidence of arable agriculture was, however, provided instead by the charred grain found in pit A137, which was excavated in a narrow trench almost 400 m further into the valley (fig. 3, area F). The discovery of some contemporaneous postholes suggests that this pit was associated with a further longhouse. The findings show, therefore, that both arable agriculture and animal husbandry were practised at the settlement, but probably on a scale that was no greater than it could be managed independently by the individual households, and this was perhaps also the reason for the farmsteads' scattered distribution.

The physical extent of the valley not only delimited the overall settlement and agricultural resource area, but probably also determined the frame for the social bonds between the individual households, and it must be presumed that bonds of this kind existed between the two small households. This is a pattern that is also known from Bejsebakken in northern Jutland, where the excavator sees the many buildings as representing a small number of coeval farmsteads or households which, over time, moved around within the settlement area (Sarauw 2006: 64). Judging from the sizes of the longhouses alone, there does not appear to have been any status-related difference between the two households. Conversely, there could perhaps, in relation to the livestock herd and the workshop, have been a certain status associated with one household relative to the other. There was also status associated with the coeval archery grave in burial mound sb 140, which lay c. 500 m further into the valley.

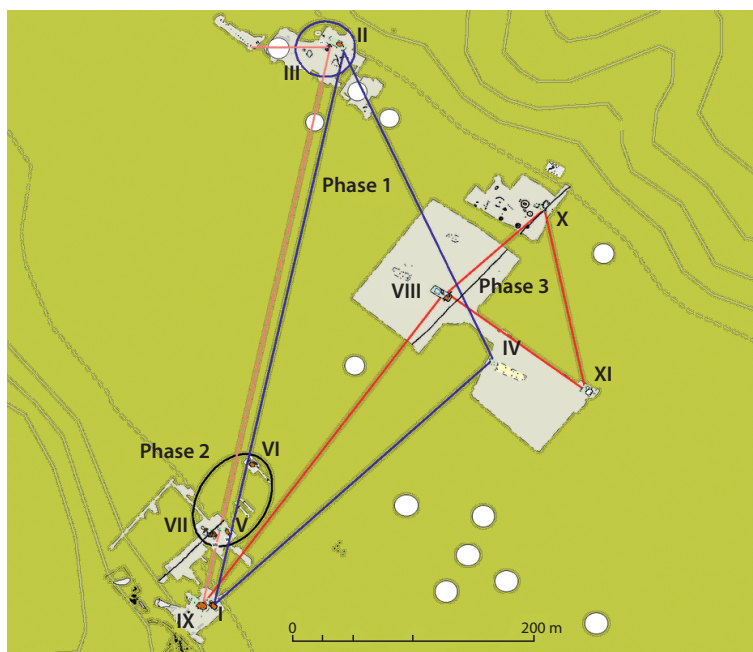
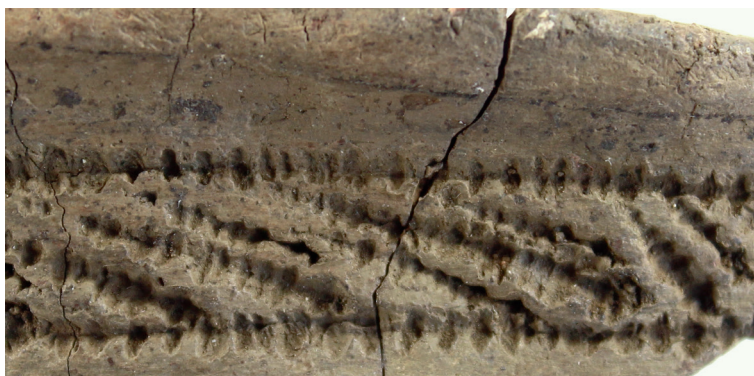


Fig.31. Possible relations between archaeologically coeval houses. Red – houses from phase 1, blue – houses from phase 2, and green – houses from phase 3. The flat-field graves and a post structure (A9) in area B also belong to phase 3 (pink).



Fig.32. Bell Beaker pottery from out-house III, phase 1. The ornamentation is executed in fine barbed wire technique.



The beginning of the period can be related to a cultural environment that encompasses several of the Bell Beaker culture's characteristic elements. Bell Beaker pottery was found in three of the features: most in relation to house III, but also a handful of sherds in a posthole

in the small building IV, located just less than 300m further to the east. House III contained sherds from two such pots. One is an out-turned vessel with a belly break, which is metope-ornamented with cross-hatched, horizontal chevron bands executed in toothed stick and particularly fine barbed wire.⁴ The barbed-wire ornamentation has previously been employed to characterise a specific late “degenerate” phase in the northern Jutish Bell Beaker environment (Liversage 2003), but subsequently it has also been possible to link this ornament to the earlier, classic phase (Olsen 2013: 64–67). In the Dutch Bell Beaker culture, the fine barbed-wire ornamentation occurs until c. 1800 BC (Butler & Fokkens 2005: 373). In house III, the Bell Beaker pottery was found together with a flint dagger of type I(b), which also helps to characterise this phase.

Fig. 33. Bell Beaker pottery from houses and pits.

	Structure	BB sherds, number	Lab. No.	14C BP	Oxcal 1σ BC
house IV	two-aisled house	5	Poz-96066	3660±35	2049 – 1972
house III	sunken floor/pit	>10	AAR 13797	3658±31	2045 – 1975
house V	pit	8	AAR 10357	3584±41	1980 – 1880
house VI	pit	1	AAR 15072	3600±21	1978 – 1924
A1036	pit	1	Poz-95904	3560±35	1959 – 1878
house VII	house / pits	18	AAR 10354	3547±41	1950 – 1870
house XI	sunken floor	1	AAR 7287	3380±55	1740 – 1615

Early LN II (1950–1850 BC)

At the beginning of LN II, a farmstead was established c. 50 m north of the earlier house I. In addition to the small longhouse V, the settlement now also included two utility buildings (houses VII and VI), which all stood within a distance of c. 50 m of each other. In contrast to both the longhouse and all the buildings in the preceding phase, both utility buildings were burnt down. Standing only a few metres apart and with almost identical ¹⁴C dates, the longhouse and the slightly smaller utility building VII may together have constituted a farmstead, while the somewhat more distant building VI probably belonged to another farm. In which case, the dwelling house from this is expected to lie outside the investigated area. Unlike previously, numerous clearer traces of agriculture and crop processing are evident both inside and outside the houses, but only in association with the two utility buildings. The finds from the three cellar pits in house VII reflect an advanced and stable form of arable agriculture, in which the various cereals were cultivated singly and at the same time. The aim was probably to produce an economic surplus. This was resource demanding and presumably now lay beyond the capacity of the individual small household. Consequently, the overall working process of sowing, harvesting and ploughing of at least three different fields was conceivably undertaken jointly by several households. In such a communal system, one or more utility buildings were perhaps used for processing and storage of the common agricultural products and seed corn. Because of this increased economic collaboration, perhaps more complex social bonds were developed between the individual households than was previously the case.

Just as the economic collaboration may have been necessary between the small households, it was perhaps also fundamental to the

4 For a more detailed description of the pottery, see Olsen (2013), which also includes comparative studies.



Fig.34. Bell Beaker pottery from out-house VII, phase 2. The ornamentation is executed in cardium technique. On the right is a vessel with similar ornamentation that has been subjected to heavier secondary firing.

production on the large farms, where an economic surplus could for example be used for long-distance trade (Kristiansen 2013). At the Almšov settlement in Scania, collective cooperation of this kind between independent large farmsteads is considered to have been essential for the development of the more complex society, in which an increased economic power also formed the background for a kin-based social elite (Brink 2009: 51, 2013: 435–439).

Bell Beaker pottery was also used during this phase and remains of this were found associated with all three buildings. The largest amount of material originates from the burnt house site (VII), where heavily heat-affected sherds were found in various places in the building. Collectively, the sherds represent four different vessels, including some with characteristic friezes employing horizontal lines and intermediary chevron bands of parallel lines (fig. 34), all executed with cardium technique. Similar motifs are seen on pottery vessels from the Single Grave culture, for example in Poland (Ebbesen 2006: 202 fig. 140), but an equivalent ornament and technique in LN have so far only been found in the sunken area of a house (K32) at the locality of Mannehøjgård at Vejen in southern Jutland (Poulsen & Dollar 2013). A single sherd with classic barbed-wire ornamentation (fig. 35) was also found in an isolated pit within area A (A1036). The Bell Beaker-influenced ornamentation was, consequently, still employed some time into LN II, but now also with some motifs that are no longer evident in the northern Jutish Bell Beaker environment.



Fig.35. Bell Beaker sherds with barbed-wire ornamentation from pit A1036, phase 2.

Late LN II / EBA IA (1850–1650 BC)

A total of three longhouses and one small utility building (XI), which lay isolated furthest east in area D, can be related to the latest phase. Another one or more buildings coeval with the utility building are presumed to be present in the immediate vicinity of the investigated area. While the two new house types, hybrid house VIII and three-aisled house X, were built in the northernmost part of the

valley, longhouse IX was established by the southern valley side, close to the site of the earlier house I. The ^{14}C dates indicate archaeological contemporaneity between all four houses. Although an actual link between several of the houses cannot be demonstrated, the dates show that the traditional house type was still employed, even after the new house types gained a footing at the locality. The houses therefore reflect not only a three-phased typological development of the two-aisled to the three-aisled longhouse, but apparently also a local community where old traditions and continuity now existed side by side with completely new traditions.

While the house type with a sunken floor continued to be used unaltered, Bell Beaker pottery is now found less often. A single small sherd with Bell Beaker ornamentation was recovered from the sunken area of the late house XI (fig. 36), where a fire-affected arrow-shaft straightener also lay incorporated into the building's hearth. The finds can be considered to be deposited by chance in connection with the backfilling of the sunken area, but perhaps the sherds may also have had a certain significance of a more ritual character in this late phase. An identical sherd was found isolated in a pit in the earlier house VI, but small Bell Beaker sherds have also been recovered from the sunken areas or postholes of buildings at a number of other settlements in the immediate local area, and normally always as single finds (e.g. Bagge et al. 2011: 17). Ritual depositions in connection with the backfilling of the sunken floors are a familiar phenomenon (e.g. Simonsen 2017: 374), and perhaps sherds were also deposited as *pars pro toto* offerings. The latter is known from this period in the form of a child's grave at Kildebjerg, Skanderborg, where one of the grave goods consisted of a single large sherd from a bell beaker (Bagge 2012: 9).



Fig. 36. Bell Beaker sherds from outhouses VI, phase 2 (left), and XI, phase 3.

With the new three-aisled houses came new traditions and feature types, and collectively they reflect the close contacts (perhaps also on a personal level) that at this time had arisen with the Únětice culture's settlements south of the Baltic. It is uncertain whether the small three-aisled longhouse was used as a dwelling for a family or was associated with other and perhaps more communal functions, but together with the trapezoid bronze awl, the house reflects the clearest contact with the Únětice culture. This small awl was part of personal equipment that apparently was produced in the south, but whether it represents an import, or perhaps accompanied its original owner northwards, is not known.

The new ritualised activities included the erection of a straight, 32m long row of 15 sturdy posts (A9). This post row, which stood close to the burial mound sb 67 in the westernmost part of area B, has been ^{14}C dated to 1795–1783 BC. A few similar structures are known

from other Danish localities (Freudenberg 2012: 626–628), also in association with burial mounds. The closest parallel, both geographically and in terms of date, was investigated at Boest, only 20 km west of Østbirk (Rassmann et al. 2015), where a more than 109 m long post row had been erected in several phases. The features here could be directly related to several exceptional metal finds, including a gold ornament from the Únětice culture (Rassmann et al. 2015: 39).

The degree to which the various cultural traditions are also an expression of the presence of different cultural environments, perhaps with relations to the individual households, or whether there was a more general implementation of new traditions and elements, is difficult to evaluate on the basis of the available relevant evidence. That the latter was the case is suggested by hybrid house VIII, where both the building's sunken floor and the subsequent ploughing over of the house site are elements that normally characterise the traditional houses with sunken floors.

It is perhaps the same relations between different cultural traditions that see expression in the contemporaneous grave complex containing the two high-status graves A2 and A3. The two graves here apparently represent different burial rituals, based partly on earlier traditions from LN I (A2) and partly on completely new traditions (A3). In a cultural time of unrest and upheaval, identity and affiliations are often manifested through familiar rituals and symbols, but at the same time the graves also express an interconnectedness and a social communality, which probably also characterised everyday life on the settlement.

As previously, this communality presumably also encompassed economic collaboration between several households. The continuing dominance of agriculture is not only evident now from the large amount of charred grain found in house XI, but also indirectly from the new hybrid building, in which the construction appears to be specifically tailored to agricultural production. As there still appear to be small farmsteads, this building perhaps functioned as a common utility building for several households.

Based on the sizes of the buildings alone, it is still not possible to observe any signs of social stratification. All the longhouses can, accordingly, be described as being either modest or small in size. It is particularly striking that the three-aisled building, with its length of only 12 m, is conspicuously smaller than the two other longhouses. This new standard house was, accordingly, not ostentatious and not intended to impress in that respect. But its actual construction was apparently associated with special status. This is shown not least by the deposition of the bronze awl in one of the building's postholes. Depositions or offerings of flint tools and pottery in postholes is a well-known phenomenon in southern Scandinavia. Conversely, there is to date only one other record of a metal object, namely at the Fosie IV settlement in Scania, where a bronze flat axe was placed in the largest, and high-status, house 95 (Vandkilde 2017: 13). Such depositions were apparently only dedicated to buildings of the highest status (Artursson 2005b: 43). But the extent to which this status was only associated with the actual building and its function, or also extended to an equivalent degree to its occupants, remains unknown. Even though signs of special status can be observed in both the farmsteads and the contemporaneous graves at Østbirk, these do not suggest, in the same way, the existence of an elitist society.



Fig. 37. Flint daggers from house III (type I) and grave A2/3 (type IV). The two dagger types are characteristic for phases 1 and 3, respectively, and both were made locally.

Conclusion

The Østbirk locality must be seen as one of the period's characteristic agricultural settlements, where sandy soils and nearby meadowlands formed the basis for both arable agriculture and animal husbandry. Throughout the entire Late Neolithic, the settlement consisted of some small, scattered farmsteads that in LN II were able to establish stable and intensive agriculture by way of economic and social cooperation, probably with special reference to the production of a surplus. As no signs could be observed that the buildings were repaired, or rebuilt in the immediate vicinity, it seems that the farmsteads did not stand in the same place through several generations.

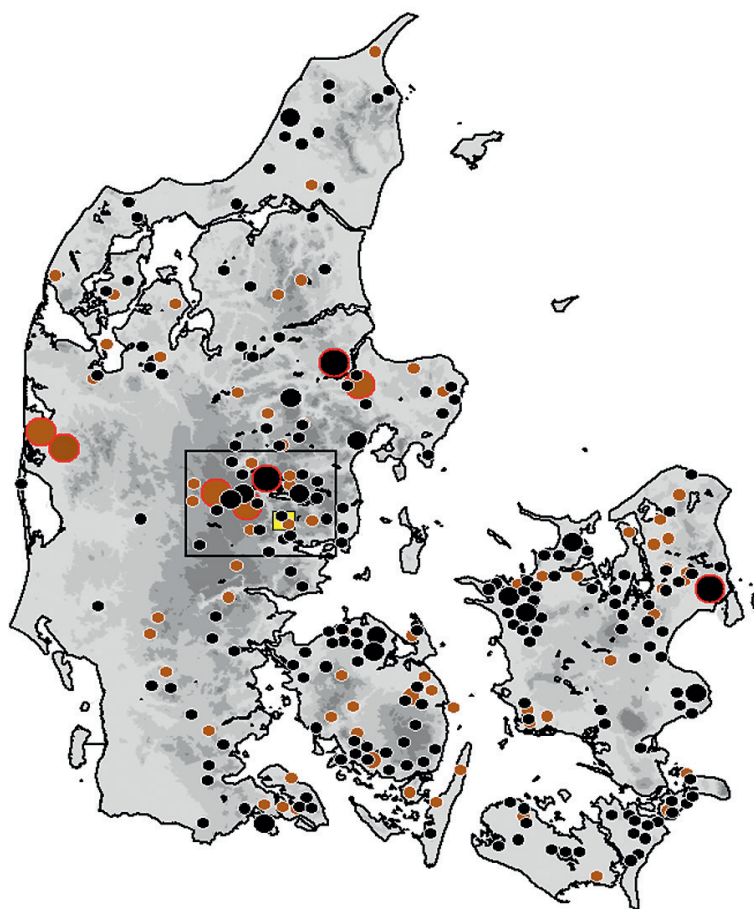
Judging from the sizes of the buildings alone, they do not appear to reflect a social stratification, but at the end of LN II, a form of status is apparently marked by new foreign elements, not least the three-aisled longhouse. This new construction was, in the first instance, functional and initially only employed in part of the building, or in a small building the size of which did not exceed that of the smallest two-aisled longhouses. It was only somewhat later that this construction also became implemented in the larger and more impressive longhouses of the Bronze Age. With this, some of the functions that previously had been assigned to the farmsteads' utility buildings became incorporated into the longhouses (Artursson 2009: 70).

Like the very diverse grave forms evident in the burial ground, the settlement reflects a dynamic and mobile local society that underwent continual development under the influence of cultural trends that also affected southern Scandinavia generally during the Late Neolithic (Iversen 2014: 170–173; Varberg 2005). In the later part of LN I, the contact with the northern Jutish Bell Beaker culture resulted in the development of a corresponding central Jutish cultural environment that continued to have a local influence throughout major parts of LN II. As the south Scandinavian innovation centre, due to new contacts with the Únětice culture south of the Baltic, became displaced eastwards at the transition to LN II, new links arose with southern Sweden and eastern Zealand. At the end of LN II, there were probably direct relations between southern Scandinavia and the northern area of the Únětice culture in central Germany (Vandkilde 2017: 149). At the same time as some of the important settlement centres around the Hyllie bog in southern Sweden again lost their significance at the end of LN II (Brink 2013: 444), contacts from the south became focussed more directly on central Denmark. This may also be the reason that the three-aisled building construction apparently turns up earlier in Jutland than in southern Sweden, where the earliest three-aisled longhouses have so far dated to the period EBA IB/II (Artursson 2005b: 52, 2009: 73; Brink 2013: 441).

The many burial mounds at Østbirk reflect the function of the Østbirk valley as a traffic corridor as early as the Single Grave culture. The settlement's location by this corridor was probably of major significance for both its structural and cultural development. The corridor's importance was made seriously conspicuous when, at some time in the Bronze Age, a c. 500 m long palisade of closely-spaced, c. 20 cm diameter posts was erected across the valley and through the settlement area. In association with this fence, a system of stone banks was built at the same time at its southern end. The sturdy palisade functioned as a barrier in a corridor that not only had significance for local traffic but also for the important road network that linked Horsens fjord with the river Gudenå and the areas around it further inland. The position of the palisade, at the southeastern end of the valley, shows that the barrier was oriented towards the fjord in the

south. North of Østbirk, the burial mounds mark some routes that, via holloways and fords, gave access to that most important of transport routes up through Jutland, the later *Hærvej* (also called the Ox Trail or Military Road).

There was also access from Østbirk to several localities with important finds of metal artefacts from LN II and EBA IA deposited on dry land, including several objects imported from the Únětice culture. In addition to that from Boest, they also include the well-known find from Skeldal (Vandkilde 1988, 1996) at Salten Langsø, only 14 km north of Østbirk. These are part of a large concentration of metal finds that have been recorded within an area northwest of Østbirk (Vandkilde 1996: 209; Scholz 2015: 135). Several bronze daggers, discovered in burial mounds close to Østbirk (e.g. Madsen 1990b), can also be related to this concentration.



The distribution of Danish metal finds in LN II and EBA IA shows a special association with coastal areas in the central part of the Kattegat (Vandkilde 1996: 209), normally considered to be an expression of the fact that the distribution of metals at this time took place via water routes (Vandkilde 1996, 2017; Earle et al. 2015; Kristiansen 2004; Ling et al. 2017: 223). In Jutland, this is also indicated by metal finds from this period not following the road network up through Jutland; a pattern that does not alter until the establishment of new metal routes in EBA IB (Vandkilde 1996: 249 fig. 272, 251 fig. 273B). It was natural when travelling by sea to use sheltered fjords as landing places, and Horsens Fjord can be conceived to have been one of these. The fjord constituted the nearest access to the sea from both Skeldal and Boest, and even though the Boest find lies close to *Hærvejen*,

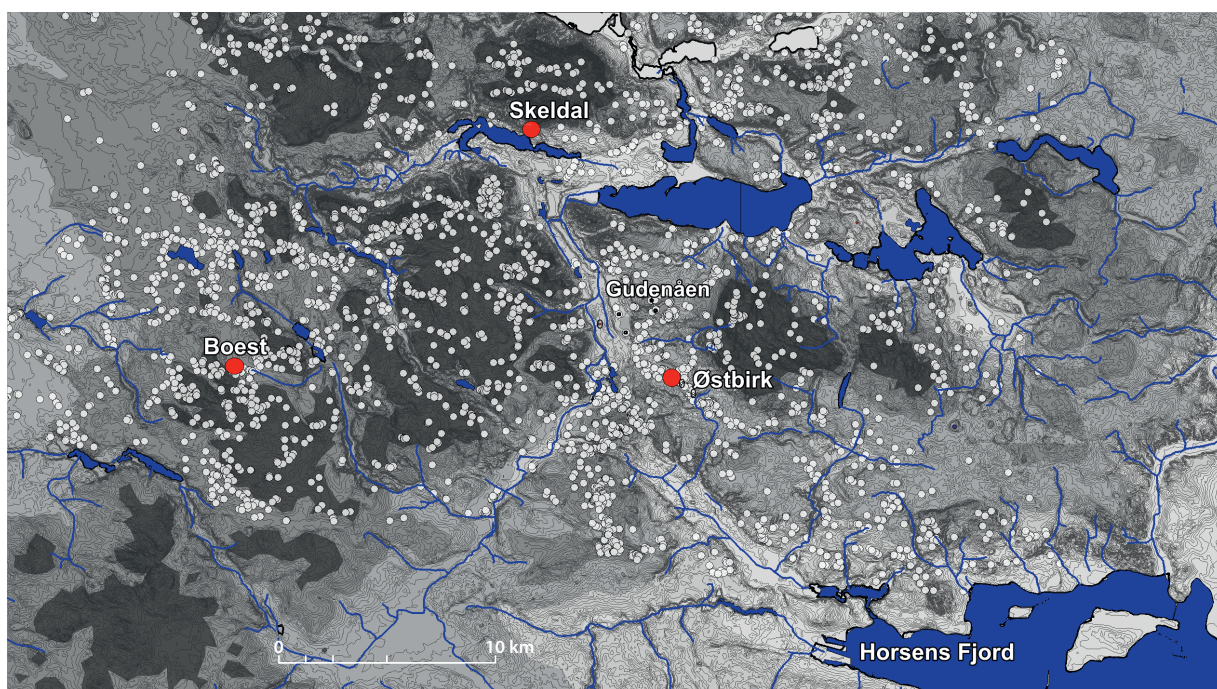


Fig.38. Section showing post traces from the palisade fence that was built across the valley (and the site) in the Bronze Age.

Fig.39. The distribution of Danish metal finds from LN II (black) and EBA IA (brown) shows a concentration in the area immediately northwest of Østbirk (yellow square). Multi-type hoards are marked with red circles (after Vandkilde 1996).

the metals were probably brought here from out on the coast. From the innermost part of the fjord, transport inland was via the Østbirk valley, which formed a natural bottleneck on the supply route (Earle et al. 2015: 16–17). Later in the Bronze Age, a new social structure made it possible, to a greater degree, to control this traffic route with the construction of a palisade. In EBA IB, land transport gained greater significance for the distribution of metals up through Jutland, but many rich graves in the area around Østbirk show that the locality continued to lie in a significant traffic corridor during the remaining part of the Bronze Age.

Fig.40. The distribution of barrows also reflects various routes around Østbirk. Metal objects from the Únětice culture have been found at the localities of Skeldal and Boest.



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