

## The Early Neolithic Volling site of Kildevang – its chronology and intra-spatial organisation

By Mads Ravn

*Schlagwörter:* Dänemark – Kildevang – Neolithikum – Volling-Gruppe – Keramikgefäße –  
Siedlungsstruktur/Raumordnung – Gruben  
*Keywords:* Denmark – Kildevang – Neolithic – Volling-group – ceramic vessels – settle-  
ment structure – pits  
*Mots-clés:* Danemark – Kildevang – Néolithique – groupe de Volling – vases en céramique  
– structure d’habitat – fosses

### Introduction

This paper presents the main results from an excavation of a Volling site, the Kildevang site, excavated in eastern Jutland in Denmark, by the Moesgård Museum between 2001–2003<sup>1</sup> (Fig. 1). At the site three house structures, 88 pits and two major culture layers from the Early Neolithic were identified<sup>2</sup>. Of the Neolithic structures, eight can be interpreted as ritual pits, two are wells and one is probably a grave. Together 6598 pieces of flint artefacts and 40 kg of Neolithic pottery were collected. 5983 potsherds can be connected with the Volling group. Some of the Neolithic structures and finds from the Kildevang site will be presented here. The emphasis in this paper will be on the chronology of the pottery and the intra-spatial organisation of a small-scale Neolithic community through time. Therefore only the pits or structures revealing the most information on this aspect are selected.

<sup>1</sup> This excavation formed part of the Motorway project funded by Aarhus Amt. The overall project was directed by N. H. Andersen (Head of Department of Antiquities) and curator H. Skousen (Moesgård Museum). The author was the daily field director during three seasons. All flints were determined by Dr. B. V. Eriksen. The author would like to thank C. Meinert Risager (field assistant 2001), J. Bonde (field assistant 2002–2003), M. Andresen, M. Schifter Christensen,

J. Jeppesen, J. Westermann, A. Vegeberg Jensen, L. Pedersen, M. Wölck, B. Clemmesen, R. M. Andresen, J. Varberg and M. Kjeldsen. The full excavation report (RAVN 2004a) is to be found in Moesgård Museum under the archive number FHM 4092. Thanks to Dr. L. Klassen, M. Kähler Holst, T. Madsen and H. Skousen for commenting on the manuscript.

<sup>2</sup> There were also 39 houses from the era around the birth of Christ, which will not be discussed here.



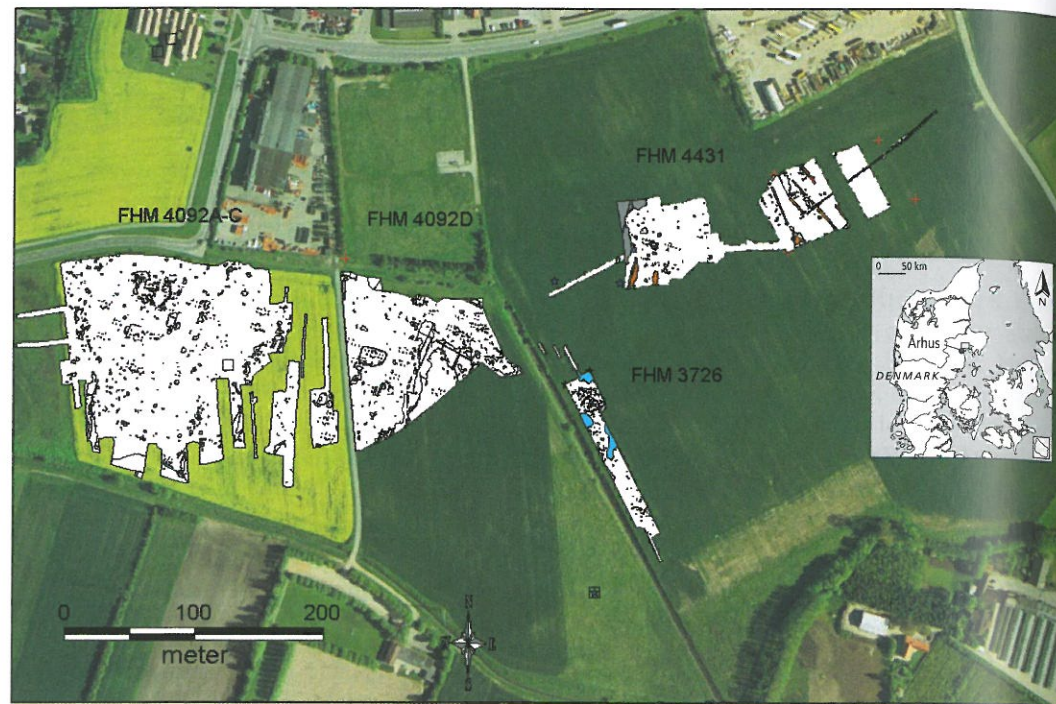


Fig. 1. Kildevang: 45 000 m<sup>2</sup> were uncovered just 10 km north of Aarhus in Denmark in the Lystrup valley. The entire area excavated in 2003 and 2004 covers 35 000 m<sup>2</sup>. The focus in this paper is on FHM 4092 A–D (Illustration: M. Ravn).

### The Kildevang site

The Kildevang site is situated in the Egå valley in eastern Jutland (Fig. 2). In the Mesolithic this valley was a shallow fjord, rich in marine life. It can be traced 5.5 km into the mainland of eastern Jutland and forms one of a number of fjords on the east coast of eastern Jutland<sup>3</sup>. The prehistoric fjord was 1.5 km wide. Today Lystrup Enge is between 0 m and 1 m above present sea-level (a.s.l.). The present meadow is situated in a valley, which is delimited towards the North, West and South by hills of Late Glacial moraine clay. Towards the West the valley narrows into a funnel where the ‘Gammel Egå’, a stream, rises in the bog ‘Geding Mose’. Towards the South, the hill of Vejlbj Bakke rises to 84 m a.s.l., and towards the North in the area around Hjortshøj and Trige the terrain reaches significant heights of up to 100 m. Except for the Egå stream, the area lacks fresh water. The Ellebæk rises north of the valley and passes the Kildevang site just towards the West, hence the name Kildevang, meaning ‘Springfield’.

There has been habitation in the Lystrup valley for thousands of years. It is notable that the Mesolithic and Neolithic sites are closer to the water, whilst in the Bronze and Iron Ages the undulating hills were preferred for settlement. The marked difference between the Mesolithic and the Neolithic sites is interesting. The Mesolithic sites in the fjord were presumably situated, on long peninsulars stretching out into the water. Most of those sites may be dated to the middle Ertebølle culture. For the Neolithic sites a habitation away from the actual fjord up to 4 m a.s.l. were preferred.

<sup>3</sup> ANDERSEN 1996.



Fig. 2. Egå Fjord and its surroundings with the estimated water extension marked with hatched green lines (Illustration: M. Ravn). – Scale 1:60 000.

Hence the site of Kildevang in the Neolithic was placed on a dry spot with a good outlook towards the South, North, East and West. There was access to freshwater from the stream of Ellebæk and to the resources from the fjord towards the South. Pollen analyses reveal that in the sub-boreal the locality was covered by forest. In the same sample, however, finds of *Lancea*, *Lanceolata* show that the area was used for grazing by domesticated animals<sup>4</sup>. A more detailed account of the Egå Valley with its numerous sites and finds is being published by H. Skousen<sup>5</sup>.

### The excavation

The excavation was initiated as large open-area field work. Trial excavations revealed a number of structures from the Late Pre-Roman Iron Age around the birth of Christ. However, light grey features of Neolithic structures appeared during the investigation of the Iron Age site. The original strategy employed in excavating Iron Age settlements – to open up large areas with a machine and removing the top soil – was still pursued. This strategy seemed a good choice, as in an area of 35 000 m<sup>2</sup> it revealed a rare case of three consecutive Neolithic settlements. This is probably the only large scale settlement pattern of a Valling site to this day in southern Scandinavia with three preserved houses. The site makes it possible to understand the internal spatial distribution of Early Neolithic habitations<sup>6</sup>.

<sup>4</sup> RAAL HANSEN/CHRISTENSEN 2002, 8.

<sup>5</sup> SKOUSEN 2008.

<sup>6</sup> Though in Sweden, noticeably in Malmö, a similar strategy has produced compatible material of an Oxie site (HADEVIK/GIDLÖF 2003).



Due to a long planning strategy<sup>7</sup> it was possible to record every feature in UTM in GIS, measuring four key points with GPS in each drawn plan, thus orientating the plans, which were drawn using a Pantograph®, into a GIS system<sup>8</sup>. The primary data are thus still the original drawings; the digital plan was continuously adapted to new observations and edited continually. Constructs and contexts were selected if they were a part of a larger feature, sectioned and photographed and according to the Harris matrix methodology, given a layer number, called context number (K-number), relating to constructs, structures, finds and larger features, such as graves, wells and houses. A large number of samples was taken, showing with certainty that the preservation of bones was bad. Samples for phosphate analyses of houses and wells were also taken. All fill from the Neolithic features and constructs were wet-screened, partly through very fine meshes. The few bones preserved were sent for analysis to the Zoological Museum at Copenhagen University. All data were transferred to a database. Thus it is reasonable to claim that this excavation is one of the most modern carried out in Denmark to this day.

### Orientation and definitions

The Neolithic features are situated between 3 m to 6 m a.s.l. Towards the South was a mixed culture layer; in the eastern section there were pits containing rubbish. The pits in this eastern region came from an uneven culture layer, and must be seen as forming part of a refuse layer from normal settlement activity towards the South of the excavation limit. The ritual pits were mostly placed towards the West, close to the water. "Ritual" is defined here as a fixed combination of a set of finds. In this case the combination of highly decorated, intentionally smashed pottery and broken axes<sup>9</sup>. In the western region there were eight ritual pits, two wells and one grave, as well as a hearth dug into a grave, all between 2 m and 4 m a.s.l. The rest were probably refuse pits and pits for obtaining clay. In the pits, post-depositional processes rendered only few animal bones. Only one molar from an animal was preserved.

In the western end of the Neolithic settlement two houses of the two-aisled type were revealed, one measuring 8 m the other about 15 m. House II had an identifiable width of 5 m. House II is at the highest point in the settlement, around 6 m a.s.l. It is centrally placed between the Neolithic deposition activities, the pits and the culture layer. One part of the occupation was on a minor hill top just south of the area of investigation, whereas the ritual activities were performed closer to water, towards the West.

### The habitation area

Probably the houses are representative of one family moving around through time. The fact that the houses had three different orientations suggests that they did not orientate themselves to each other, which contemporary houses often do. Additionally, analyses of stylistic elements on pots suggest that there were three or maybe four phases on the site (see below). As two of the houses were relatively normal in size and type the focus here will be on the atypical house: Neolithic house III (also called A938).

There were only two gable posts and four wall posts preserved, making house III rectangular (*Fig. 3*). It is oriented East–West and has dimensions of almost 4.9 m in length and 2.6 m

<sup>7</sup> SKOUSEN 2001.

<sup>8</sup> Danske Koordinatsystemer UTM Zone 32 [ED 50].

MapInfo 7.0®; see also SKOUSEN in press.

<sup>9</sup> See ANDERSEN 2000.

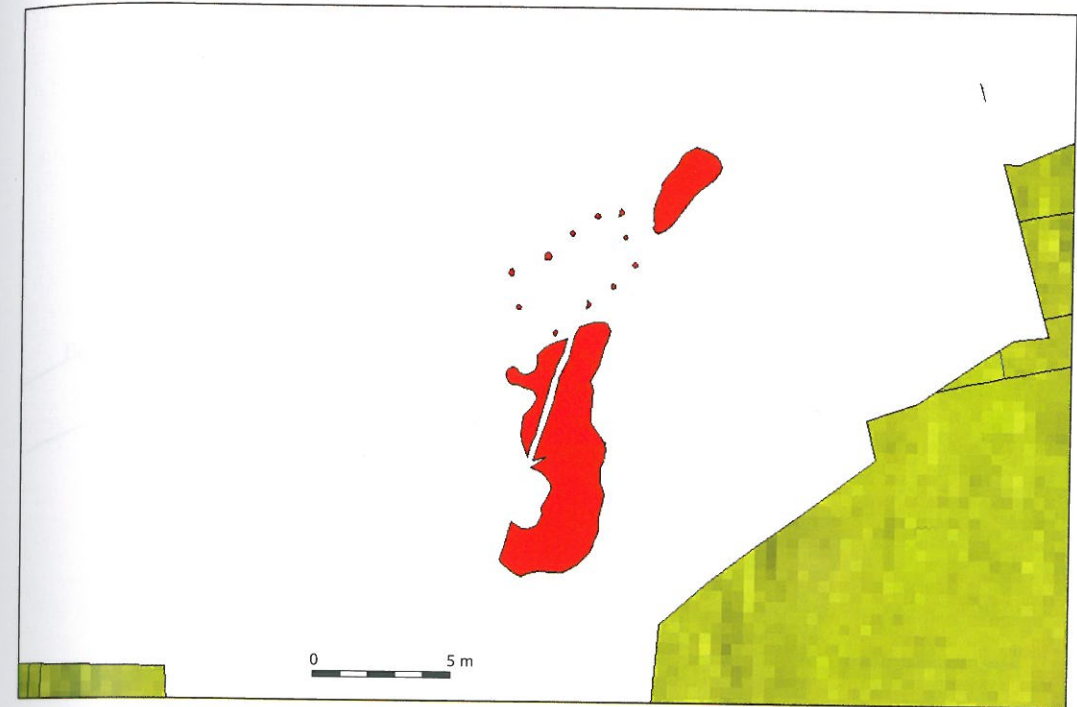


Fig. 3. House III with a well covered by a small culture layer to the South (Illustration: M. Ravn).

in width. There is no doubt that it must be dated to the Early Neolithic, as a <sup>14</sup>C sample of a piece of charred wood places it within the Early Neolithic I, around 3710 cal BC (sample no: AAR-8516). This result is in accordance with a small piece of Neolithic ceramic found in one of the post holes belonging to the house. The undisturbed yellow-brown fill in the post holes support the fact that the fill is not mixed. This house is unusually small compared to other Neolithic house types<sup>10</sup>. It could be suggested that part of the house is missing, so that an unidentifiable part, is continuing towards the East<sup>11</sup>; in either case it is an unusual house. The house is close to another Neolithic feature – a well which must be assumed to be contemporary (A951).

### Ritual pits

The ritual pits are essential to the understanding the chronology of the site. The most important ones are described in the following.

#### Pit A181A and B (*Figs. 4–5*)

Pit A181 was a flat pit partly disturbed by a drainage ditch. A181A had convex sides and a flat bottom and measured 0.5 m in depth. In the pit there were 37 flint artefacts. Seven of these were tools including two drills, a burin, part of a burnt axe with specialised edge (*Fig. 6*) and

<sup>10</sup> NIELSEN 1999.

<sup>11</sup> RAVN 2005, 7.



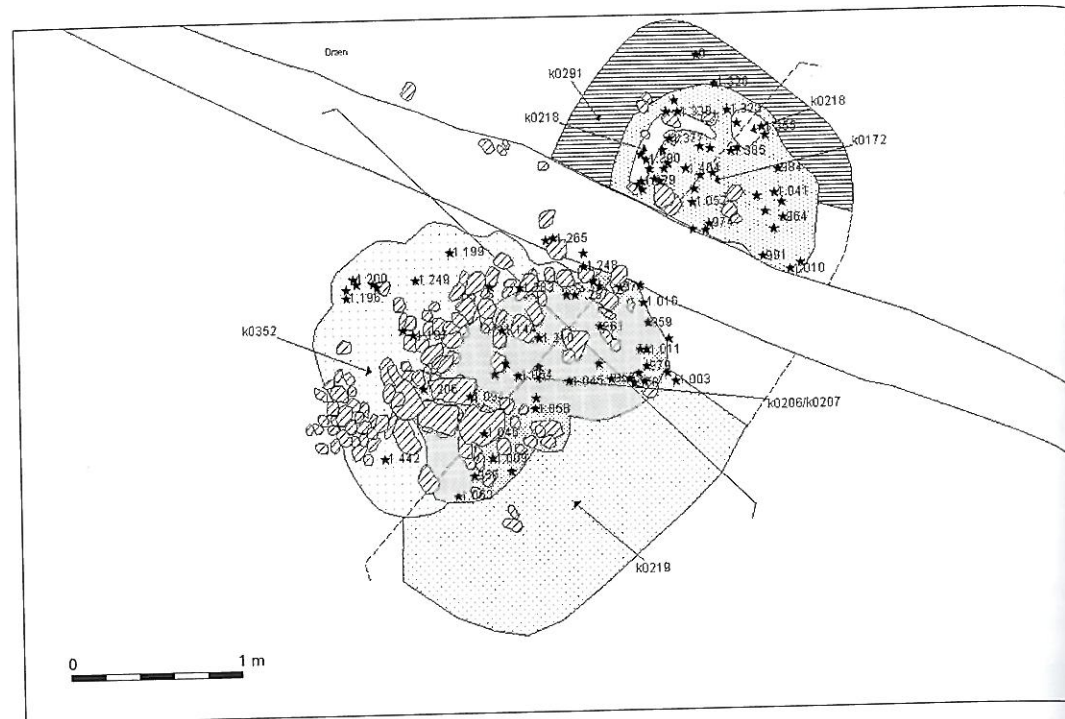


Fig. 4. Pit A181 seen in plan. There are three later cuttings (Illustration: M. Ravn).

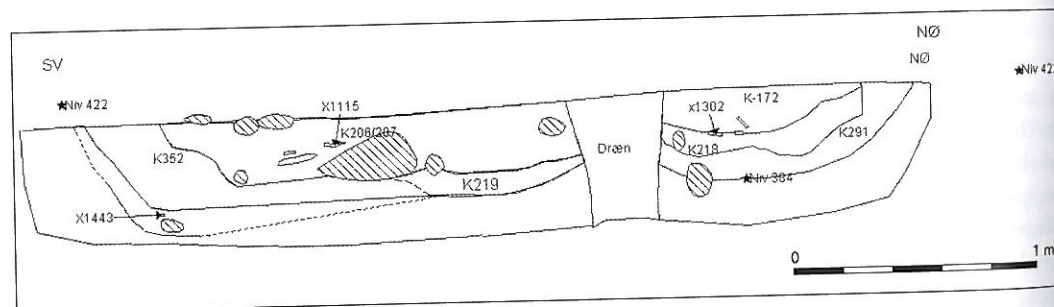


Fig. 5. Section of A181 (Illustration: M. Ravn).

a blade sickle. 25% of the flints were tools, the rest of the flints were debris. There were 45 finds of ceramics that could be reconstructed to a full-size vessel with incised stab-and-drag ornamentation over the entire body (Fig. 7).

A181B was the other part of the pit on the other side of the drainage disturbance. Pit A181B had convex sides with a rounded bottom, measuring 0.35 m. In this pit there were 26 flakes including four which had been affected by fire. There were two scrapers, two retouched pieces and a flake axe of the Havnelev type. There were 55 finds of Neolithic type ceramics of which five were ornamented. A body sherd of a pot (no. X1107:1) displayed traces of organic material pressed into the inner side of the sherd, after which it has been carbonised during the firing. A181B consisted of at least two cuts while its relation due to the drainage ditch is unclear. A  $^{14}\text{C}$  date places the pit (layer K-172) to 3770 cal BC (sample no: AAR-8511).



Fig. 6. X1001, an edge from a burnt core axe with specialised edge found with a funnel beaker of Volling type with stab-and-drag ornaments (Photo: Moesgård Museum).



Fig. 7. Reconstructed Volling vessel found in combination with a core axe with specialised edge (Photo: Moesgård Museum). – Scale c. 1:2.

Pit A181A and B have been interpreted as ritual pits, as the finds in it appear to have been systematically deposited. Not only the combination of a fragmented axe and a highly ornamented vessel in A181A, but also traces of continual recutting suggest a systematic and repeated behaviour pointing forward in time<sup>12</sup>. The core axe with its specialised edge is unusual in combination with Volling vessels. Had it not been for the fact that other pits at the site had the same combination it would have been dismissed as a coincidence.

<sup>12</sup> ANDERSEN 1999.



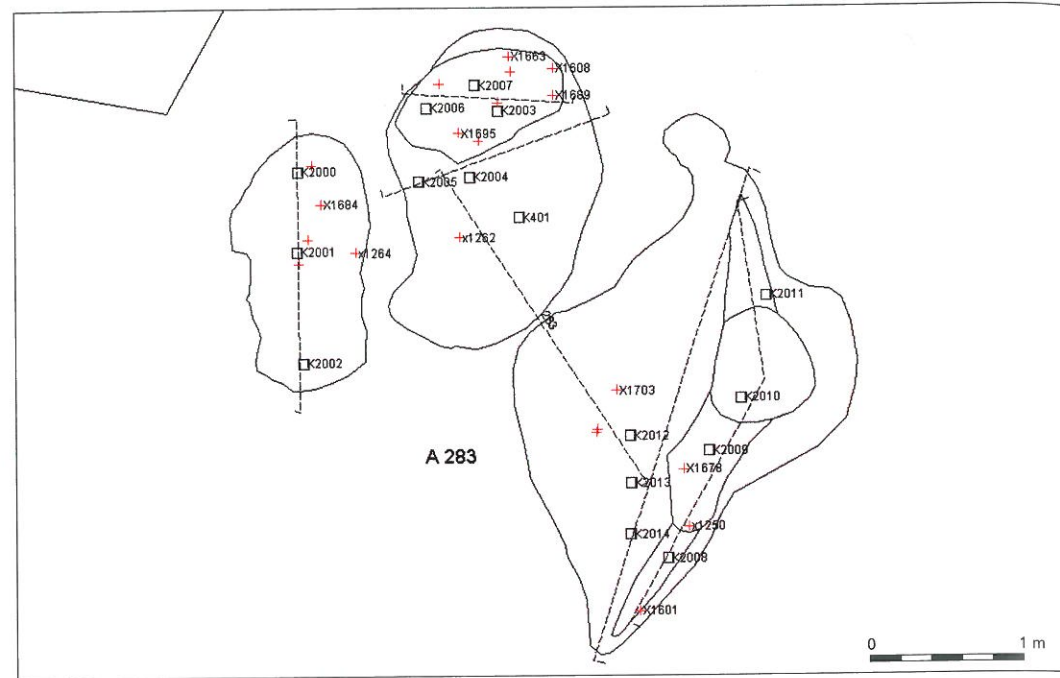


Fig. 8. A283 with three pits (Illustration: M. Ravn).

### Pit A283

Pit A283 was a flat, oval, North–South oriented pit with several recuts, also dating to the Neolithic. It was 2 m long and 1.22 m wide. The pit was sectioned in several places, as it turned out to consist of three different pits (Fig. 8). The pit had convex sides and a round bottom. It was 0.2 m deep and contained three layers. After the hole was dug, it was filled by a dark grey layer (K-2007). In a prehistoric recutting of the pit a brown layer (K-2006) was deposited in the former layer. In the pit as a whole 67 flakes were found, of which seven were heavily influenced by fire. There were one macro blade, one flake from a core, three exhausted cores and four tools. The relationship of tools to flint debris lies at 5.4%. Amongst the tools was a fragmented core axe with a specialised edge. The pit also contained 32 pieces of pottery of Neolithic type (12 ornamented pieces) including an ornamented simple rim sherd with oblique spatula stabs (Figs. 9–10)<sup>13</sup>. The latter was found in relationship with a core axe with specialised edge (Fig. 11). Furthermore some charcoal was found in the feature. The pit may have had more functions but the combination of ceramics and a core axe, also apparent in other pits supports the contention that this pit was used for ritual purposes. The high occurrences of ornamented ceramics also suggest a ritual function<sup>14</sup>. One of the layers (K-2006) must have been a secondarily deposited fireplace, indicated by the presence of stones affected by fire. The core axe was not burnt. A <sup>14</sup>C date of the layer indicated a date not older than 3755 cal BC (sample no: AAR-10005).

<sup>13</sup> R54 by ANDERSEN 1999.

<sup>14</sup> See Ibid. 75.



Fig. 9. A283 seen from the South with the core axe and the vessel side (Photo: Moesgård Museum).



Fig. 10. Vessel x1663 with the ornament R54 (Photo: Moesgård Museum).



Fig. 11. Axe x1695 found in combination with vessel side X1663. The milky consistency of the flint shows that it is Danien flint rarely used by the Ertebølle culture (Photo: Moesgård Museum).





Fig. 12. Section of A383 with a fragment of a flask neck (Photo: Moesgård Museum).

#### Pit A383

Pit A383 contained remains of a flask (Fig. 12) and that may also indicate a ritual context. It was a flat pit, North–South oriented, with at least two deposits. The pit had convex side walls and a flat bottom 0.3 m deep. When the original pit was almost full it was recut and a rich grey layer (K-1001) was deposited. This is the youngest layer. There were 76 flakes of which six were affected by fire and three cores (one affected by fire). There are six tools (7.6% tools in relation to flint debris) including a flake axe and a specific piece with gloss. Within the 26 ceramics (four ornamented) a fragment of a flask must be emphasised. As in other cases this pit had two cuttings. The flask fragment suggests the layer in the first cut was not from an ordinary rubbish deposit<sup>15</sup>. The flask was found in a layer in which there was a concentration of ceramics.

#### Pit A951

Pit A951 was a kettle formed pit which turned out to be a well. The orientation is East–West. It measured 3.01 m in length and 2.15 m in width; the fill was wet screened (Fig. 13). The pit had convex walls, a round bottom and was 0.9 m deep. During the use of the Well a grey layer (K-2072) was deposited. At that time the sides collapsed, after which a number of large stones, some affected by fire, were thrown in with a brown layer (K-2065) of rubbish and charcoal. In the pit there were 143 flakes of which 24 were burnt. There are three cores and four tools, that is 2.8% artefacts in relation to debris. Ten finds of Neolithic ceramics were identified of which five were ornamented. Unfortunately the pit was disturbed by a collector, who removed essential information. This well is placed close to the Neolithic house III and its primary phase is presumed to be contemporary with this.

<sup>15</sup> Id. 2000, 35.



Fig. 13. Pit A951 seen from the South (Photo: Moesgård Museum).

#### Pit A626

The last pit to be mentioned here is pit A624. It was a kettle-formed pit with several secondary deposits. The pit had convex walls and a flat bottom. The date is also within the Early Neolithic I. It was an almost rectangular North–East South–West oriented pit, 4.28 m long, 1.87 m wide and 0.58 m deep (Fig. 14). A <sup>14</sup>C sample of food remains dates a vessel to 3660 cal BC (Sample No: AAR-8515). Shortly after the pit had been dug a charcoal rich layer was deposited. At this point the pit was left open (K-1028). After the deposition of the charcoal rich layer, the pit was filled up with a mixed layer of subsoil (K-1027) with only a few artefacts. This layer was recut and refilled with an artefact-rich deposit (K-1014). Shortly later a large concentration of ceramics (no. X1775) and another layer (K-1016) were deposited.

There were plenty of flints: 663 flakes, of which 121 were affected by fire, six cores of which five were exhausted; several broken production sequences could be refitted. The assemblage contains 62 tools, including one transverse arrow head and several unique examples of spectacular flint tools (9.27% tools in relation to debris)<sup>16</sup>.

Of the 129 finds of ceramics, 59 were ornamented and some of the pieces could be refitted. According to their stratigraphic position, the refitted vessels must have been deposited at the same time. Some of the fragments are from a clay disc and one fragment belongs to a flask. There are up to 20 different vessels in this pit. Additionally, there are several fire-affected stones in the pit and the lower part of a quern stone. In short this pit had several functions, one of the last being a rubbish pit. The artefacts are remains of material from a settlement. Most of the ornamentation elements suggest an Early Neolithic I date.

#### The finds

Only a brief overview on the finds can be given here.

The flint consists of 119 macro blades, 6 micro blades, 5615 simple flakes and 222 specific flakes (Fig. 15). 122 pieces of flint with notches and teeth were found, as well as 80 core blocks. 18 transverse arrow heads and one microlith as well as 90 scrapers and 26 borers were also recovered.

<sup>16</sup> RAVN 2004a.



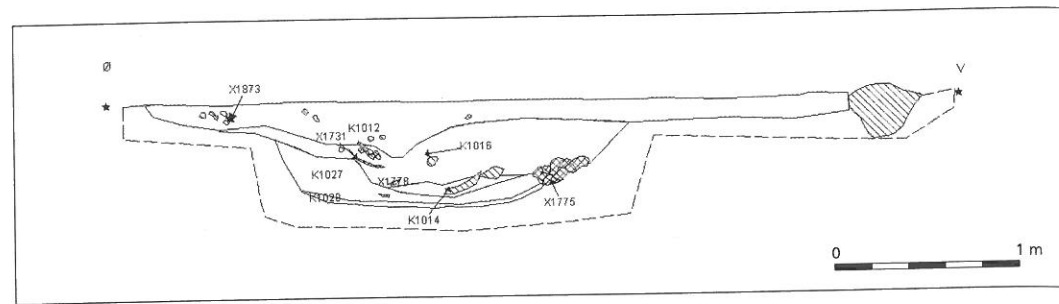


Fig. 14. A624 seen from the South (Illustration: M. Ravn).

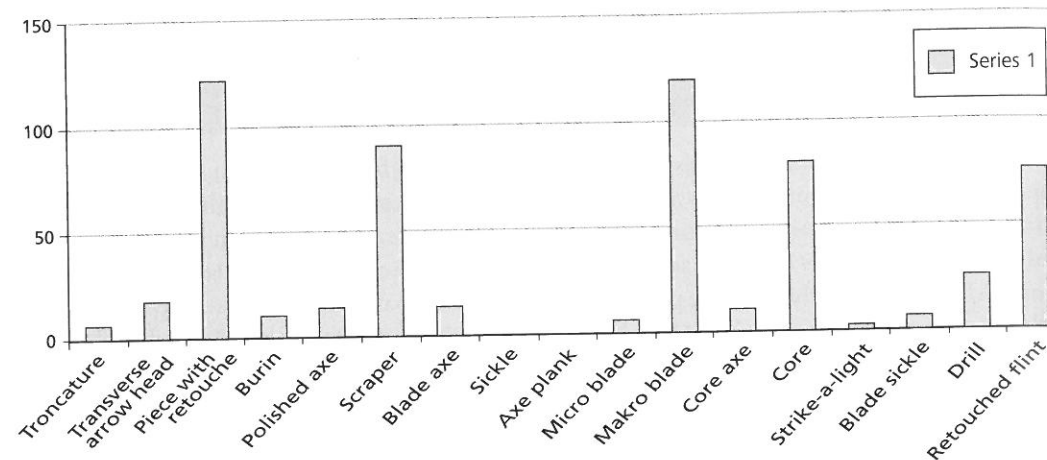


Fig. 15. Overview of flint.

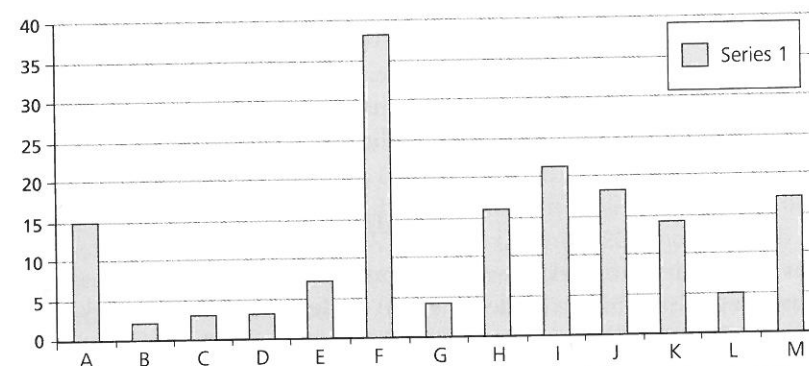


Fig. 16. Presence of decoration elements and techniques. From left to right: A B10 vertical incised band lines; B R54; C Whipped cord; D Cylinder stabs; E Finger imprints; F Stab-and drag; G Stabs; H Oblique grooves; I Narrow - stab and drag; J Spatula - stab and drag; K Oblique spatula - stab and drag; L Spatula stabs; M Two-ply-cord.

Larger tools were represented by 43 axes and chisels, of which 18 are polished or fragments of such. Nine pieces were from thin butted axes. On site, 17 core axes were found, of which six are core axes with a specialised edge. Of the core axes with a specialised edge, five were located in context with Neolithic ceramics. Furthermore 21 flake axes were detected on the site, of which three can be assigned to the Havnelev-Type. Four are atypical, one is worked from the narrow side and twelve from the broad side.

The ceramics (Fig. 16) were fragile consisting of middle or coarse ware. 5983 pieces have a Stone Age context. Only a small proportion (70 pieces; 3.45 %) are ornamented sherds dating to the Neolithic and 15 of these can be placed in the Early Neolithic. The low frequency of ornamentation and the fact that 53 % of the ornamented sherds are rimsherds suggest for a pure Volling Group site. Three flasks were found dating to the Early Neolithic and the elements of ornamentation suggest that the ceramics must be primarily dated to the early part of Early Neolithic I<sup>17</sup>. Simple rims are typical and the ornaments on rim sherds are dominated by two-ply-cord followed by two parallel grooves or stab rows (ornament R54) followed by incised vertical line (ornament L2)<sup>18</sup>. The decorative elements confirm the attribution of the vessels to the Volling Group<sup>19</sup>.

### An intra-site relative chronology

The large open-area excavation technique holds a potential for revealing the intra site spatial organisation of an Early Neolithic society in eastern Jutland. An attempt to date the individual pits on the site in relation to each other is pursued in the following. This is best done by looking at the stylistic elements and techniques of decoration of the pottery, as much work has already been done in this field<sup>20</sup>. Correspondence analysis can reveal complicated relations<sup>21</sup> and an analysis undertaken on the stylistic decoration elements<sup>22</sup> of the rim sherds of the pottery revealed a division into four groups of the stylistic elements and decoration techniques<sup>23</sup> (Fig. 17). Having gone through every pit the pattern seems to be chronological. Had the groupings for instance been an illustration of ritual versus profane behaviour it would be strange that ritual pits are present in all groups. Also, that the pattern of the groups as a reflection of a social division is hard to substantiate, as there is not a clear spatial division of the groups, which would in this case be expected.

In Group A, two-ply-cord, spatula stab-and drags are present together with ornament L2 and L3. Pit A861 is contemporary with pit A624. Group A must be older than Group B because of the stratigraphy in pit A624 (layers K-1012, K-1014 and K-1016 are younger than layers K-1027 in Group B). It seems that the two phases are very close in time<sup>24</sup>. In Group B, the younger phase of A624 is present together with a layer (K-218) in pit A181B and contemporary with a layer (K-2020) in pit A489<sup>25</sup>. Of the decoration elements and techniques in Group B, stab-and-drag, spatula stabs and B10 are dominant. In pit A181B a layer (K-218)

<sup>17</sup> MADSEN/PETERSEN 1984, 94.

<sup>18</sup> ANDERSEN 1999, 174.

<sup>19</sup> MADSEN/PETERSEN 1984, 88 ff.

<sup>20</sup> E.g. MADSEN/PETERSEN 1984, 99; ANDERSEN 1999.

<sup>21</sup> MADSEN/PETERSEN 1984; MADSEN 1988.

<sup>22</sup> A specific definition of the type of ornamentation element depicted in the variables is to be found in Andersen 1999. Except for two-ply cord which by MADSEN/PETERSEN (1984, 99) is seen as an early element.

<sup>23</sup> The analyses however, produced no parable structure and the criterion of seriation is not fulfilled. Therefore it is possible that the pattern could depict other structures than chronology (see also discussion and Tab. 1-2).

<sup>24</sup> Layer K-1013 is probably the same layer as K-1012. If one omits it in the analysis it does not change the overall picture.

<sup>25</sup> This pit is the same as A553.



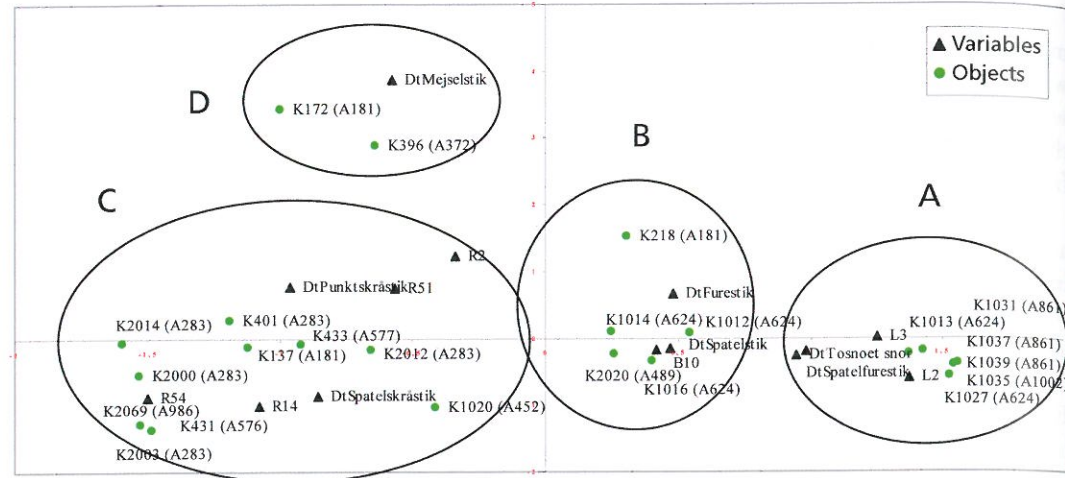


Fig. 17a. Dt. = Decoration Technique. Other variables mentioned are decoration elements. Dt. Mejselstik = Broad spatula stabs; Dt. Spatelstik = Spatula stabs; R2 = Row of vertical incisions (after ANDERSEN 1999, 162); R51 = Row of grooves/stabs (after ANDERSEN 1999, 163); R10 = Row of three vertical incisions (after ANDERSEN 1999, 162); Dt. Furestik = Stab-and-drag; Dt. Tosnoet snor = Two-ply-cord; Dt. Punktskrästik; Oblique grooves; R14 = Vertical incisions in two rows (after ANDERSEN 1999, 162); L4 = Three parallel horizontal lines (after ANDERSEN 1999, 174); R54 = Two parallel grooves or stab rows (after ANDERSEN 1999, 163–170); Dt. Spatelfurestik = Spatula-stab-and-drag; L2 = One straight line; L3 = Two parallel straight lines (after ANDERSEN 1999, 173); K-numbers refer to layers; A-numbers refer to pits.

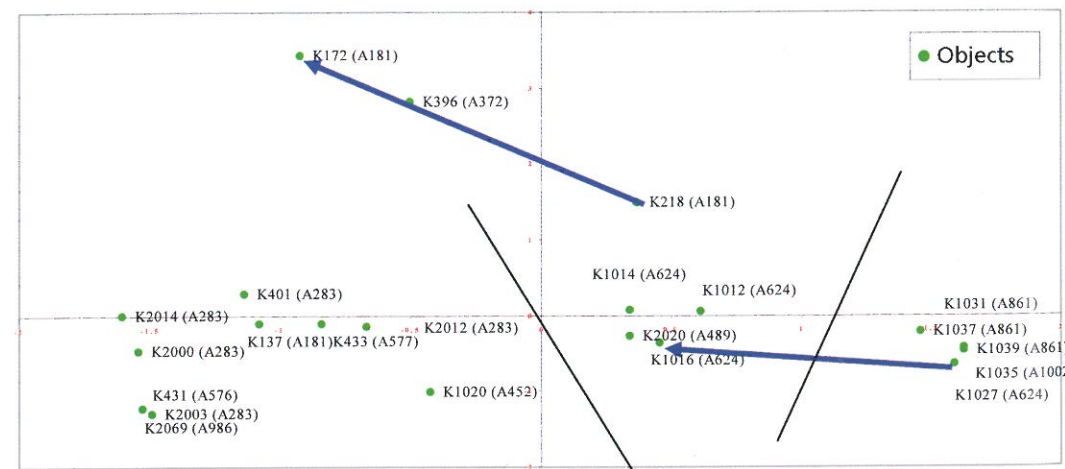


Fig. 17b. Blue arrows indicate stratigraphic relations, whereby the arrowhead marks the youngest layer.

Contexts	B10	DtFurestik	DtMejselstik	DtPunktskrästik	DtSpatelfurestik	DtSpatelskrästik	DtSpatelstik	DtTosnoet snor	L2	L3	R14	R2	R51	R54
K1012 (A624)	1	1			1	1		1		1		1		
K1013 (A624)					1			1		1				
K1014 (A624)	1					1	1	1		1		1	1	
K1016 (A624)	1			1	1		1	1	1		1			
K1020 (A452)					1	1					1			
K1027 (A624)					1				1					
K1031 (A861)								1		1				
K1035 (A1002)					1				1	1				
K1037 (A861)								1		1				
K1039 (A861)								1	1	1				
K137 (A181)				1		1					1		1	
K172 (A181)			1	1										
K2000 (A283)				1							1			1
K2003 (A283)						1					1			1
K2012 (A283)				1				1						1
K2014 (A283)				1										1
K2020 (A489)	1	1				1		1	1	1			1	1
K2069 (A986)						1								1
K218 (A181)		1	1	1	1					1				
K396 (A372)			1									1	1	
K401 (A283)												1		1
K431 (A576)						1								1
K433 (A577)						1							1	

Tab. 1. Cross tabula matrix as the basis for the CA analysis. The data are presence / absence values.



	1. Axis	2. Axis	3. Axis	
EigenValues	0,5	0,4	0,3	
Explanation;%	22,57	17,99	13,66	
Cumulative;Explanation;%	22,57	40,56	54,22	
Variable coordinates				
B10	0,47	-0,14	0,49	
Dt.Fingerindtryk	-1,42	1,8	-1,03	
Dt.Furestik	0,47	-0,14	0,49	
Dt.Mejselstik	-1,14	-2,44	0,38	
Dt.Punktskråstik	-0,68	0,8	-0,77	
Dt.Spatelfurestik	1,5	-0,55	-0,26	
Dt.Spatelskråstik	0,08	0,74	1,87	
Dt.Spatelstik	-0,76	-2,16	0,63	
Dt.Tosnoet;snor	0,02	0,76	-1,03	
L2	1,76	-0,28	-0,88	
L3	1,48	-0,35	-0,73	
L4	-1,06	1,06	-1,48	
R14	-0,06	0,25	0,45	
R2	-1,3	-1,44	-0,15	
R51	-0,72	-1,07	0,3	
R54	-0,14	1,43	1,17	
R60	-1,81	1,05	-1,83	
Objects coordinates				
A1002	2,24	-0,62	-1,14	
A118	-0,83	0,4	-1,34	
A181	-0,12	-0,47	0,09	
A283	-1	1,14	-0,57	
A372	-1,49	-2,61	0,32	
A452	0,72	0,23	1,24	
A489	0,61	0,19	0,38	
A553	0,61	0,19	0,38	
A576	-0,04	1,72	2,76	
A577	-0,45	-0,26	1,97	
A579	-1,04	1,62	-1,43	
A624	0,23	-0,26	0,22	
A861	1,54	0,07	-1,6	
A867	2,24	-0,62	-1,14	
A951	-1,81	-0,77	-1,02	
A986	-0,04	1,72	2,76	
A991	-1,31	-2,46	0,47	
Quality of fit in plots – variables	Mass %	Inertia %	Axis 1-2 fit	Axis 2-3 fit
B10	4,76	2,57	Relative contributions could not be calculated	
Dt.Fingerindtryk	1,19	4,48		
Dt.Furestik	4,76	2,57		
Dt.Mejselstik	2,38	8,51		
Dt.Punktskråstik	4,76	3,26		
Dt.Spatelfurestik	5,95	7,87		
Dt.Spatelskråstik	10,71	7,02		
Dt.Spatelstik	2,38	8,2		
Dt.Tosnoet;snor	8,33	4,66		
L2	7,14	6,77		
L3	8,33	5,39		
L4	4,76	6,16		
R14	4,76	4,77		
R2	7,14	6,41		
R51	10,71	6,46		
R54	8,33	6,81		
R60	3,57	8,1		

Quality of fit in plots – objects	Mass %	Inertia %	Axis 1-2 fit	Axis 2-3 fit
A1002	3,57	6,06		
A118	3,57	5,98		
A181	13,1	4,28		
A283	10,71	8,45		
A372	3,57	10,11		
A452	3,57	6,84		
A489	9,52	3,14		
A553	9,52	3,14		
A576	2,38	4,66		
A577	2,38	3,95		
A579	5,95	7,43		
A624	15,48	2,34		
A861	3,57	5,2		
A867	3,57	6,06		
A951	3,57	7,59		
A986	2,38	4,66		
A991	3,57	10,11		
Absolute contributions of variables to principal axes	1. Axis	2. Axis	3. Axis	
B10	0,41	0,04	0,44	
Dt.Fingerindtryk	1,63	2,55	0,87	
Dt.Furestik	0,41	0,04	0,44	
Dt.Mejselstik	4,01	17,75	0,44	
Dt.Punktskråstik	1,1	1,47	1,41	
Dt.Spatelfurestik	16,03	2,09	0,5	
Dt.Spatelskråstik	0,07	6,02	40,36	
Dt.Spatelstik	1,73	13,32	1,19	
Dt.Tosnoet;snor	0	3,26	6,37	
L2	22,8	0,55	5,79	
L3	15,05	0,79	3,7	
L4	4,98	4,87	9,84	
R14	0,01	0,21	0,71	
R2	11,71	13,83	0,15	
R51	5,42	11,55	0,94	
R54	0,16	16,99	11,93	
R60	14,47	4,69	14,92	
Absolute contributions of objects to principal axes				
A1002	15,87	1,02	5,05	
A118	2,13	0,41	6,9	
A181	0,13	1,51	0,09	
A283	13,26	14,33	5,22	
A372	11,7	30,1	0,66	
A452	1,83	0,16	6,78	
A489	1,61	0,13	0,77	
A553	1,61	0,13	0,77	
A576	0	4	15,22	
A577	0,28	0,08	6,54	
A579	6,96	14,13	16,32	
A624	0,28	0,3	0,31	
A861	6,47	0,01	8,59	
A867	15,87	1,02	5,05	
A951	12,94	1,95	5,06	
A986	0	4	15,22	
A991	9,07	26,71	1,45	

Tab.2. Statistics from the CA analysis.



with a Havnelev axe is according to stratigraphic observations older than layer K-172 in pit A181B, from Group D, suggesting that Group D is younger than Group B. Layer K-172 (pit A181B) dates to 3765 cal BC. The relation between layer K-218 in A181B to layers K-137 in A181A is unfortunately not clear because of the recent drainage ditch. Layer K-137, where a pot was placed with an axe with a specialised edge, is dated between 3765 and 3660 cal BC and is presumably older than or contemporary with Group A. A Layer (K-2003) from pit A283B in which an axe with a specialised edge appears alongside Volling ceramics also belongs to this group. Almost contemporary must be pit A283C (layers K-2012 and K-2014). The group is characterised by a concentration of row decorations such as ornament R2, R51, R14 and R54 and oblique stabs. Oblique spatula stabs also represent the typical technique. In Group C we see pit A452 as contemporary. And from stratigraphic observations pit A577 seems slightly older than pit A576, but not old enough to place it in another group. Pit A986 also belongs to Group C. The relationship between Group D and B is already established. Group D is younger. The relationship of Group D to Group C is not certain but the presence of broad spatula stabs points to a chronological position close to Early Neolithic II. In Group B we have a <sup>14</sup>C date of 3660 cal BC<sup>26</sup>.

In summary I suggest the following relative chronology based on stratigraphic observations: Group C is probably the oldest. This must be assumed on the basis of combinations of finds, where axes with specialised edges appear in two different pits (A181 and A283)<sup>27</sup>. <sup>14</sup>C dates suggest it to be dated to 3765 cal BC or at the earliest 3790 cal BC. Group A may be younger than Group C, but older than Group B. Group B cannot be older than 3660 cal BC. On stratigraphic observations Group B is older than Group D.

The analysis also suggests that oblique spatula stabs and row patterns (R2, R51, R54, R14) and oblique stabs may be an early decoration element within the Volling group, belonging to Group C. It is followed by spatula stab-and-drag as well as two-ply-cord decoration and horizontal lines (L2 and L3) in Group A. In Group B normal stab-and-drag, spatula stabs and ornament B10 follow on. It is in this context that polished axe fragments appear, not earlier than 3660 cal BC and broad spatula stab-and-drag decoration elements are significant<sup>28</sup>.

#### Activity areas – ritual and profane space (Figs. 18–19)

The spatial distribution of the chronological groups does not disagree with the analyses of the houses and their different orientation, pointing to the fact that there were at least three or maybe four different habitation phases in the Early Neolithic at the Kildevang site. Considering pits which could not be included in the correspondence analysis, but containing the same elements, just not combinations of them, pits A991, A951, A118, A489 are probably contemporary with Group C. If that is accepted, Group C is indirectly dated by pit A118, layer K-134 as the oldest – to 3790 cal BC (Sample No: AAR-8512).

The chronological distribution of the pits suggest that the earliest Group C could have started out in the East moving towards the West, thereby establishing house III and well A951

<sup>26</sup> The date (sample no: AAR-8515) was obtained from food remains on a pot (layer K-1014). Such dates have recently been suggested to be problematic and should be treated with reserve (FISCHER/HEINEMEIER 2003).

<sup>27</sup> This argument is based on the presumption that from an evolutionary point of view the axe with specialised edge must be older. If on the other hand those axes are the result of a ritual selection, where “old axes”

are seen as a way of showing continuity out of the past they need not in theory be chronologically older, but only used in exclusively ritual contexts. In fact in A283C in layer K-2012 there was one incidence of the two types of axes appearing together, an axe with a specialised edge and fragment of a polished axe.

<sup>28</sup> For a full account of the style elements and their relative age please see the captions under the figures.

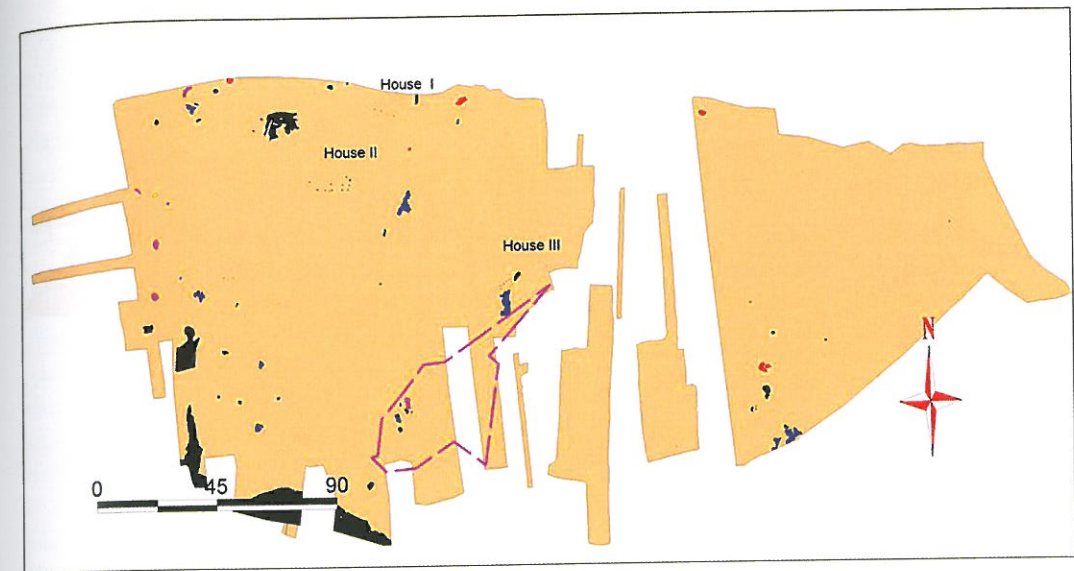


Fig. 18. All Neolithic features: blue Group C, purple Group A, red Group B, yellow Group D, which is covered by other phases (see below). Purple line indicates wet area. Black indicates features that could not be placed in the relative chronology but which are roughly contemporary (Illustration: M. Ravn).

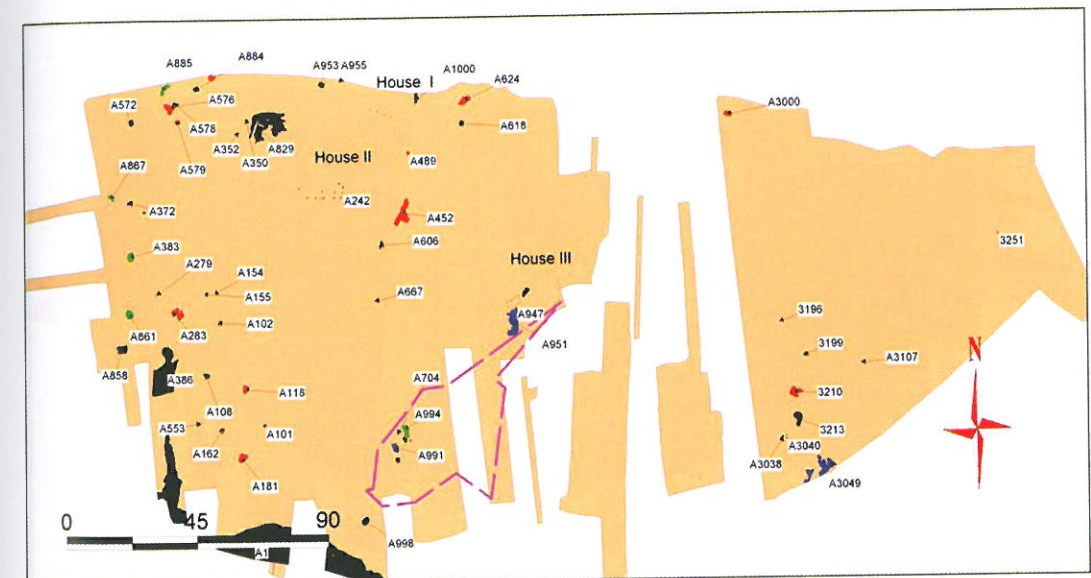


Fig. 19. Numbers of the most important features mentioned in the text. Not included is A577, which is to the East next to A576. A986 and A1002 cannot be located (Illustration: M. Ravn).



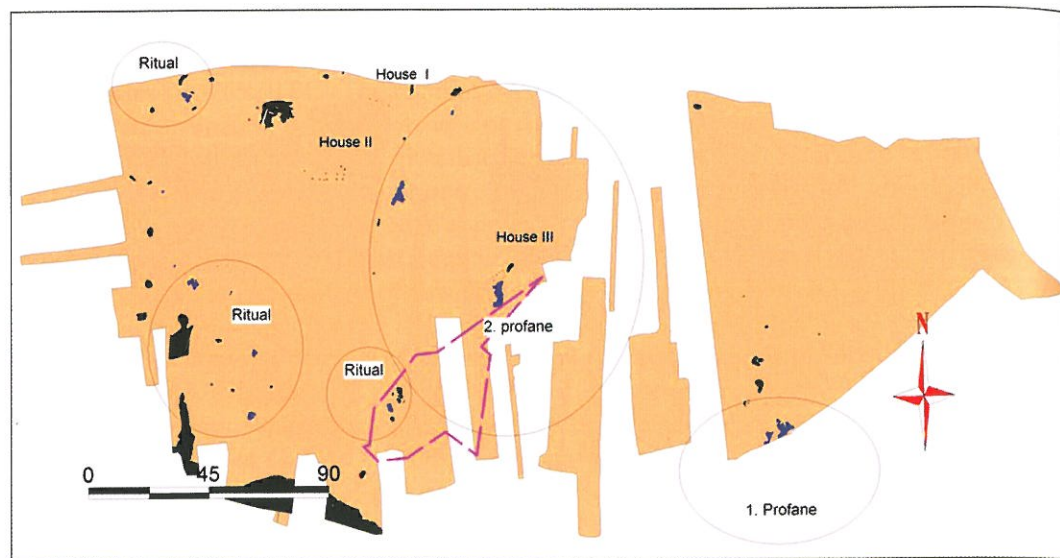


Fig. 20. The earliest phase and its activities (blue, Group C) (Illustration: M. Ravn).

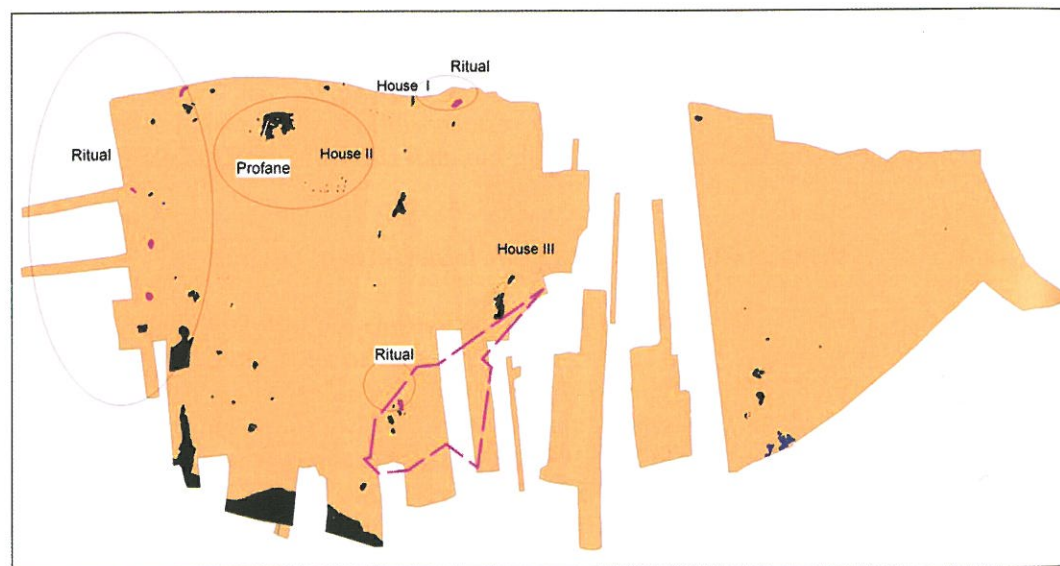


Fig. 21. Second phase, divided into ritual, profane/refuse activities (Illustration: M. Ravn).

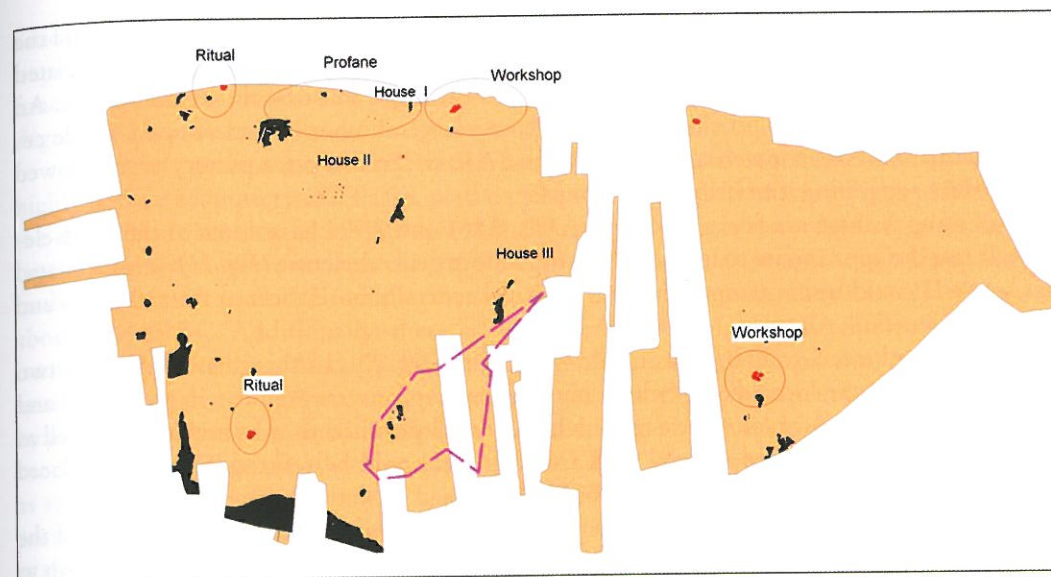


Fig. 22. Phase 3 (Group B). A624 in the extreme North has a refuse layer in its later phase. The production of polished axes in the North may be slightly later (red, Group B). In the eastern pits the polished axes were found in the upper layer (Illustration: M. Ravn).

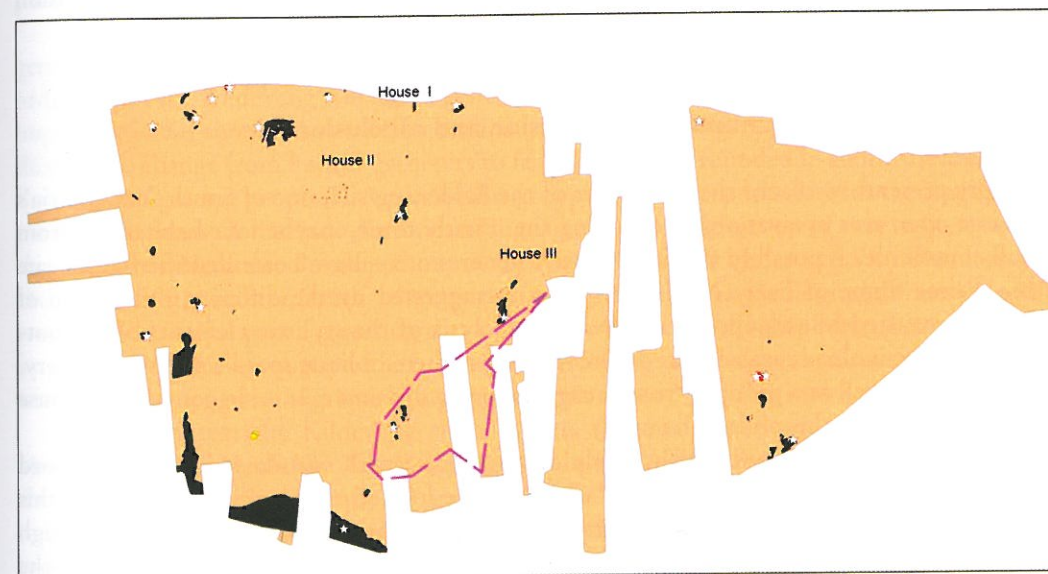


Fig. 23. Phase 4 (Group D, yellow) is only represented with two pits. White asterisks mark polished axes or polished flakes. All polished artefacts are found in a later secondary cutting layer, except for pits 3207 and 3210 to the East (Illustration: M. Ravn).



(Fig. 20). Group C's ritual activities were performed in the wet area towards the South and the West, before the pits in the wet area in the South were flooded. If house III can be associated with well A951, house III belongs to Group C and therefore must be the earliest house. An earlier phase in the East is possible (see Fig. 20), as a large number of undecorated, crude ceramics was found in the lower layers in that area (A3049). In this pit, a pottery piece showed element R51 suggesting it to belong to Group C.

In Group A there are few pits. As pit A383, A861 and A994 have some of the same elements it may be appropriate to include them for a more general picture (Fig. 21). It is estimated that house II could be contemporary, as it is placed centrally in relation to the ritual pits and to other activities.

The next phase, Group B, has only few activities (Fig. 22). In this phase, however, two workshop areas were located, one where numerous scrapers were found – in pit A3210 and A624. In pit A624 and its late phase there were several polished thin-butted axes, as well as polished flakes together with several flint artefacts that could be refitted. House I is placed centrally to these activities, but no dates could be assessed from this house.

In the next phase (Group D) there are only few activities and it could mark the end of the occupation of the site (Fig. 23). Presumably the same population moves its activities 500 m to the East where another large ritual feature has been identified<sup>29</sup>.

Pits seem to cluster into an area that can be divided into a ritual area close to water and a profane area further away and on higher ground, where the pits are rubbish pits rather than ritual pits. Given that the landscape rises up to 6 m towards the East and then declines again, one should look for closeness to water rather than cardinal points of orientation when searching for ritual pits. The pits seem to be reused again and again, and it is obvious that the division of profane and ritual space remained in the same location for all phases.

### Summarising discussion and conclusion

The paper presents results of the excavation of the Kildevang site, one of South Scandinavia's only large open area excavations of a Volling site. Firstly three, maybe four habitations from a small community – possibly four consecutive generations – have been identified at the site within a time frame of Early Neolithic I. This is suggested by the differing orientation of the three excavated houses and by multivariate analysis of the stylistic elements of the pottery. This analysis also revealed four different groups where oblique spatula stabs on pottery, oblique stabs as well as a group of row patterns seem to dominate. It is suggested, that house III is associated with this phase (Group C).

After Group C, Group A with two-ply cords appears with spatula stabs. Two-ply cord has traditionally been seen as early<sup>30</sup> and we may have located an even earlier phase on this site. On the other hand the linear elements also appear in this group (Group A). Future high precision <sup>14</sup>C dates on samples from the various pits can may provide a possibility for testing the chronology presented here<sup>31</sup>.

The site contains 88 pits, three house structures and two major culture layers from the Early Neolithic. Of the Neolithic structures, eight were determined to be ritual pits. All these pits were located in the vicinity of water, indicating that ritual and water in this phase of Early Neolithic I were important factors for the Volling group. The pits had been recut several times so a spatial pattern relating to time is not possible. The main focus has been on pottery deco-

<sup>29</sup> RAVN 2004b; SKOUSEN in press.

<sup>30</sup> MADSEN/PETERSEN 1984.

<sup>31</sup> See also FISCHER/HEINEMEIER 2003.

ration elements, techniques and its combinations with other material culture. This focus is important when discussing both chronological issues of ceramics as well as the meaning and function of the structures. It was possible to trace the activity pattern of the settlement to a degree where profane and ritual activities could be distinguished in time and space.

The strict combination of finds of core axes with specialised edges, intentionally smashed, highly decorated, pottery and flasks, placed close to water, substantiates an interpretation that the depositions are ritualistic. The fact that the axes had specialised edges suggests that this type continued some time after the introduction of agriculture, even though these axes are traditionally seen as a late Ertebølle phenomenon. If this is the case, they must continue until about 3800 cal BC. Additionally, there are no other finds of the late Ertebølle culture in the immediate surrounding. Also, the fact that the combination of Volling ceramics together with axes with specialised edges occurs five times, suggest that the axes were not mixed into the pits by accident. This is supported by the fact that we have no other finds of this type of axe. Not even in the Iron Age pits that dominate the site. That axes with specialised edges continue, as suggested also by Fischer and Klassen to about 3800, seems the obvious conclusion<sup>32</sup>. The presence of Danien flint as a raw material also points away from an Ertebølle use of the axes, as the Ertebølle population preferred Senon flint.

That these axes could have been deposited by the Volling group, but just were "ritual old axes" is not likely. The lack of late Ertebølle sites in the region and the Danien flint raw material used for the axes are arguments against the "ritual old axes" theory. Also the axes with specialised edges do not seem to display heavy use wear<sup>33</sup>. So the axes must certainly have been produced in the Neolithic but could have had a ritual function. Only more sites may reveal the pattern behind this behaviour.

This is not the place to discuss in great detail the process of neolithisation in Europe in general and in southern Scandinavia in particular, as it has already been done elsewhere. In order to put the Kildevang site into a general context, a short overview, mentioning the most important issues should, however, be outlined. In general, one group of scholars proposes that this drastic change from hunter-gatherers to farmers must be founded in an intrusive colonisation by immigrating peoples<sup>34</sup>. A part of this group links the hypothesis with the language dispersal hypothesis of the Indo-European languages<sup>35</sup>. A second group of researchers suggests that the Early Neolithic developed out of the local Mesolithic under various influences from Danubian cultures to the South<sup>36</sup>. One part of this group adds an ideological dimension to this process<sup>37</sup>, the major part suggesting that social processes of inequality were the main reasons for change<sup>38</sup>. A third group sees the process as developing from a combination of both theories, with small groups of immigrants bringing packages of the Neolithic into Scandinavia<sup>39</sup>.

In this context the Kildevang site supports the model of some continuum from the Mesolithic to the Neolithic. The Volling group in this region, by its ritual selection of axes, shows continuity, either intentional or unintentional, into the Ertebølle culture. This stands in contrast to the obviously close connections of the Volling group to the Paris lowlands and southern England, as well as its rather late introduction in Jutland at around 3800 cal BC<sup>40</sup>.

<sup>32</sup> KLASSEN 2004.

<sup>33</sup> Dr. B. V. Eriksen pers. comm.

<sup>34</sup> BECKER 1948; Id. 1955; LICHARDUS 1976; SOLBERG 1989.

<sup>35</sup> RENFREW 1987; Id. 1989; Id. 1994; Id. 1996; BELLWOOD/RENFREW 2002; BELLWOOD 2005.

<sup>36</sup> AHLFONT et al. 1995; FISCHER 1982; JENNBERT 1984; Id. 1985; LARSSON 1987; MADSEN/PETERSEN 1984;

NIELSEN 1985; PRICE 1991; Id. 2000; SCHWABEDISSEN 1979; HARTZ 1999.

<sup>37</sup> HODDER 1990; THOMAS 1991.

<sup>38</sup> BENDER 1978; Id. 1990; JENNBERT 1984; Id. 1985; PRICE 1995; TILLEY 1996.

<sup>39</sup> LARSSON 1987; MADSEN/PETERSEN 1987; MADSEN 1991; KLASSEN 2004.

<sup>40</sup> Ibid. 203.



But it supports the fact that the thin-necked axe is used in Kildevang, probably around 3700 cal BC<sup>41</sup>.

Chronologically the axe with the specialised edge must continue at least until around 3800 cal BC, as suggested by Klassen<sup>42</sup>, maybe even down to 3765 cal BC as suggested by the date from pit A181 or 3755 cal BC by the date from pit A283. They could even have been used at the same time, as layer K-2012 of pit A283C seems to reveal, but more evidence for that is needed. Only further information may support a pattern of continuation.

The possibility of some immigration into Scandinavia must be allowed for, although the general consensus among scholars seems to hold Scandinavia out of the colonisations that they have investigated on the basis of genetic studies and strontium analyses in Central Europe<sup>43</sup>. However, instead of only looking at flints showing continuity or ceramics showing intrusion, one should look at several combinations of finds. The nature of a culture cannot be understood by only one category of artefacts. The Kildevang site has revealed that careful excavation of each layer of repeatedly recut pits can reveal a chronology of the Early Neolithic – a methodology that Becker pointed out already in 1955<sup>44</sup>.

#### Acknowledgment

Thanks to the organisers for inviting me to the symposium in Schleswig in October 2006 and for a great few days in Schleswig; also thanks to Dr. S. Hartz for supporting me in writing this paper. The manuscript was submitted July 2007.

<sup>41</sup> In layer K-2012 we have one incidence of finds of both polished axe fragments and an axe with a specialised edge. A closer look at the presence of polished axes and polished flakes at the site, shows, however, that polished flakes and polished axes are found in secondary cuts of excavation layers of numerous pits.

<sup>42</sup> Ibid.

<sup>43</sup> BELLWOOD 2005, 257; PRICE et al. 2001; BENTLEY et al. 2003.

<sup>44</sup> BECKER 1955.

#### Zusammenfassung · Abstract · Résumé

**ABSTRACT** Due to the lack of large undisturbed sites, questions relating to the early Neolithic I (ENI) transition in Scandinavia, 6,000 years ago, repeatedly get caught up in discussions of chronology and the nature of the fragmentary and regionalized source material. This paper presents an uncontaminated ENI Volling site in Eastern Jutland, Denmark, dating to around 3800 cal BC. It outlines a high-resolution ceramics chronology by combining stylistic elements with combinations of other finds. With 35,000 square metres excavated, 40 kg of pottery and 5,983 pottery sherds recorded in high detail, this is probably one of South Scandinavia's largest and best recorded open-area excavations of an ENI, Volling site to date. The site produced 88 pits, 1 grave, 3 house structures and 2 major cultural layers from the ENI. 8 pits have been identified as ritual. Few sites of this quality, where regionality can be ruled out, have previously been analyzed in such detail revealing the intra-site organization in space and time. The analyses presented here identify 3 relative chronological phases and two major activity areas within the time frame of ENI. This pattern is reached by multivariate analysis of stylistic elements on pottery in relation to its spatial distribution, as well as its combinations with other find material and <sup>14</sup>C-dates. For example, the two-ply cord decorative element traditionally seen as belonging to the earliest phase is here preceded by an even earlier phase. Also the core axe with specialized edge was found here as many as five times in clear combination with Volling ceramics.

**ZUSAMMENFASSUNG** Aufgrund des Fehlens von gut erhaltenen Fundplätzen, werden Forschungsfragen zum Übergang zum Frühneolithikum in Skandinavien wiederholt im Kontext von Diskussionen zur Chronologie und Lückenhaftigkeit der regionalen Fundüberlieferung erörtert. Der vorliegende Beitrag behandelt einen ungestörten frühneolithischen Fundplatz vom Typ Volling in Ostjütland, Dänemark. Er datiert in das Frühneolithikum I in die Zeit 3800 cal BC. Im Rahmen der Untersuchungen konnte eine hoch aufgelöste Keramikchronologie entwickelt werden, die auf der Auswertung von stilistischen Elementen und anderen Funden aufbaut. In Kildevang konnten auf etwa 35 000 m<sup>2</sup> 40 kg Keramikfunde geborgen werden. Davon sind 5983 Scherben detailliert aufgenommen. Es handelt sich wahrscheinlich um den größten und am besten dokumentierten Datensatz eines frühneolithischen Fundplatzes vom Typ Volling. Auf dem Fundplatz wurden 88 Gruben, 1 Grab und 3 Hausstrukturen und zwei Kulturschichten des Frühneolithikums I erkannt. 8 Gruben ließen sich mit einem rituellen Kontext verbinden.

Bislang konnten nur wenige derart gut erhaltene Fundplätze, unter Berücksichtigung der Verteilung der Funde in Zeit und Raum detailliert untersucht werden.

Dabei ließen sich drei chronologische Phasen und zwei Hauptaktivitätszonen erschließen. Die Muster konnten durch multivariate und raumbezogene Analyse stilistische Merkmale des keramischen Fundstoffes in Verbindung mit der Auswertung weiterer Funde und <sup>14</sup>C-Daten nachgewiesen werden. Es zeigte sich, dass der Phase mit Doppelschnurverzierung, bislang als früheste Phase angenommen, eine frühere Phase vorangeht. Fünf Kernbeile mit spezialisierten Kanten wurden in eindeutigem Kontext mit Volling-Keramik gefunden.



**RÉSUMÉ** Vu l'absence de sites bien conservés, les questions concernant le passage au Néolithique précoce en Scandinavie sont abordées à plusieurs reprises lors de discussions sur la chronologie et les lacunes des vestiges régionaux. Cet article traite d'un site intact du début du Néolithique de type Volling dans le Jutland oriental (Danemark). Il date du Néolithique précoce I, plus précisément 3800 cal BC. On a pu établir, au cours des analyses, une chronologie de la céramique très précise qui repose sur l'exploitation d'éléments stylistiques ainsi que d'autres objets. A Kildevang, 40 kg de céramique ont pu être ramassés sur près de 35000 m<sup>2</sup>, dont 5983 furent enregistrés en détail. C'est probablement le jeu de données le plus grand et le mieux documenté pour un site néolithique précoce de type Volling. Le site a livré 88 fosses, 1 tombe, 3 structures de maison ainsi que deux couches archéologiques du Néolithique précoce I. Les fosses peuvent être rattachées à un contexte rituel. Seuls peu de sites aussi bien conservés ont pu jusqu'ici être étudiés en tenant compte de la distribution des objets dans le temps et l'espace. Trois phases chronologiques et deux zones d'activité principales ont pu être dégagées. On obtient ce schéma par une analyse multivariée et spatiale d'éléments stylistiques de la poterie en relation avec d'autres objets et des datations <sup>14</sup>C. Ainsi, il s'est révélé qu'une phase précoce précède la phase du décor à corde double, considérée jusqu'ici comme la plus ancienne. On a retrouvé, apparentées à de la céramique Volling, cinq haches faites sur bloc avec des arêtes spécialisées.

## Bibliography

- AHLFONT et al. 1995  
K. AHLFONT/M. GUINARD/E. GUSTAFSSON/  
C. OLSON/S. WELINDER, Patterns of Neolithic  
farming in Sweden. *Tor* 27, 2, 1995, 133–84.
- ANDERSEN 1996  
S.H. ANDERSEN, Ertebøllebåde fra Lystrup.  
*Kuml* 1993/94 (1996), 7–36.
- ANDERSEN 1999  
N.H. ANDERSEN, Sarup. 2. Saruppladsen. *Text.*  
*Jysk Ark. Selskab Skr.* 33, 2 (Århus 1999).
- ANDERSEN 2000  
N.H. ANDERSEN, Kult og ritualer i den ældre  
bondestenalder. *Kuml* 2000, 13–57.
- BECKER 1948  
C. J. BECKER, Mosefundne lerkar fra yngre  
stenalder. *Studier over Tragtbægerkulturen i*  
*Danmark.* Aarb. Nordisk Oldkde. og Hist.  
1947 (1948) 1–318.
- BECKER 1955  
C.J. BECKER, Stenalderbebyggelsen ved Store  
Valby i Vestsjælland. Problemer omkring tragtbægerkulturens ældste og yngste fase. Aarb. Nordisk Oldkde. og Hist. 1954 (1955) 127–197.
- BELLWOOD/RENFREW 2002  
P. BELLWOOD/C. RENFREW, Examining the Farming/Language Dispersal Hypothesis (Cambridge 2002).
- BELLWOOD 2005  
P. BELLWOOD, First Farmers. The origins of Agricultural societies (Oxford 2005).
- BENDER 1978  
B. BENDER, Gatherer-hunter to farmer: a social perspective. *World Arch.* 10, 1978, 204–220.
- BENDER 1990  
B. BENDER, The dynamics of nonhierarchical societies. In: S. Upham (ed.), *The Evolution of political systems* (Cambridge 1990) 62–86.
- BENTLEY et al. 2003  
R.A. BENTLEY/L. CHIKHI/T.D. PRICE, The Neolithic transition in Europe: Comparing broad scale genetic and local scale isotopic evidence. *Antiquity* 77, 295, 2003, 63–65.
- FISCHER 1982  
A. FISCHER, Trade in Danubian shaft-hole axes and the introduction of Neolithic economy in Denmark. *Journal Danish Arch.* 1, 1982, 7–12.
- FISCHER 2002  
A. FISCHER, Food for Feasting? An evaluation of explanations of the neolithisation of Denmark and southern Sweden. In: A. Fischer/K. Kristiansen (eds.), *The neolithisation of Denmark. 150 years of Debate.* Sheffield Arch. Monogr. 12 (Sheffield 2002) 341–393.
- FISCHER/HEINEMEIER 2003  
A. FISCHER/J. HEINEMEIER, Freshwater reservoir effect in <sup>14</sup>C dates of food residue on pottery. *Radiocarbon* 45, 3, 2003, 449–466.
- HAEDEVIK/GIDLÖF 2003  
C. HAEDEVIK/K. GIDLÖF, RAPPORT 22. Öresundsförbindelsen (Malmö 2003).
- HARTZ 1999  
S. HARTZ, Die Steinartefakte des endmesolithischen Fundplatzes Grube-Rosenhof. *Studien an Flintinventaren aus der Zeit der Neolithisierung in Schleswig-Holstein und Südsandinavien.* Unters. u. Mat. Steinzeit Schleswig-Holstein 2 (Neumünster 1999).
- HODDER 1990  
I. HODDER, *The Domestication of Europe: structure and contingency in Neolithic societies* (Oxford 1990).
- JENNBERT 1984  
K. JENNBERT, Den produktiva gåvan; tradition och innovation i Sydsandinavien för omkring 5300 år sedan. *Acta Arch. Lundensia, Ser. 4°* 16 (Lund 1984).
- JENNBERT 1985  
C. JENNBERT, Neolithisation – a Scanian perspective. *Journal Danish Arch.* 4, 1985, 196–7.
- KLASSEN 2000  
L. KLASSEN, Frühes Kupfer im Norden. Untersuchungen zu Chronologie, Herkunft und Bedeutung der Kupferfunde der Nordgruppe der Trichterbecherkultur. *Jysk Ark. Selskab Skr.* 36 (Århus 2000).
- KLASSEN 2004  
L. KLASSEN, Jade und Kupfer. Untersuchungen zum Neolithisierungsprozess im westlichen Ostseeraum unter besonderer Berücksichtigung der Kulturentwicklung Europas 5500–3500 BC. *Jysk Ark. Selskab Skr.* 47 (Århus 2004).
- LARSSON 1987  
M. LARSSON, Neolithisation in Scania – a funnel beaker perspective. *Journal Danish Arch.* 5, 1987, 244–247.



## LICHARDUS 1976

J. LICHARDUS, Rössen – Gattersleben – Baalberge: ein Beitrag zur Chronologie des Mitteldeutschen Neolithikums und zur Entstehung der Trichterbecherkulturen. Saarbrücker Beitr. Altde. 17 (Bonn 1976).

## MADSEN 1975

T. MADSEN, Tidligneo-litisk anlæg ved Tolstrup. *Kuml* 1973/74 (1975) 121–154.

## MADSEN 1988

T. MADSEN, Multivariate statistics and archaeology. In: T. Madsen (ed.), *Multivariate archaeology: Numerical approaches in Scandinavian archaeology* (Århus 1988) 7–27.

## MADSEN/PETERSEN 1984

T. MADSEN/J. E. PETERSEN, Tidlig-neolitisk anlæg ved Mosegården. Regionale og kronologiske forskelle i tidligneo-litikum. *Kuml* 1982/83 (1984) 61–110.

## MOSE JENSEN 2004a

P. N. D. MOSE JENSEN, Tidligneo-litisk Tragtbægerkulturs og sen førromersk jernalders planteøkonomi på FHM 4092 – foreløbige resultater af de arkæobotaniske undersøgelser. Unpublished report for Moesgårds Naturvidenskabelige undersøgelser (2004).

## MOSE JENSEN 2004b

P. N. D. MOSE JENSEN, Undersøgelse af planteaftryk i Tidligneo-litisk lerkarskår fra Kildevang (FHM 4092). Unpublished report for Moesgårds Naturvidenskabelige undersøgelser (2004).

## NIELSEN 1985

P. O. NIELSEN, De første bønder. Nye fund fra den tidligste Tragtbægerkultur ved Sigersted. *Aarb. Nordisk Oldkde. og Hist.* 1984 (1985) 96–126.

## NIELSEN 1999

P. O. NIELSEN, Limensgård and Grødbygård. Settlement with house remains from the Early, Middle, and Late Neolithic on Bornholm. In: Ch. Fabech/J. Ringtved (eds.), *Settlement and Landscape. Proceedings of a conference in Århus, Denmark may 4–7 1998* (Århus 1999) 149–165.

## PRICE 1991

T. D. PRICE, The Mesolithic of northern Europe. *Annu. Rev. Anthr.* 20, 1991, 211–233.

## PRICE 1995

T. D. PRICE, Agricultural origins and social in-

equality. In: T. D. Price/G. M. Feinman (eds.), *Foundations of Social inequality* (New York 1995) 129–151.

## PRICE 2000

T. D. PRICE (ed.), *Europe's First Farmers* (Cambridge 2000).

## PRICE et al. 2001

T. D. PRICE/T. DOUGLAS/R. ALEXANDER BENTLEY/J. LÜNING/D. GRONENBORN/J. WAHL, Prehistoric human migration in the Linearbandkeramik of Central Europe. *Antiquity* 75, 289, 2001, 593–603.

## RAAL HANSEN/CHRISTENSEN 2002

J. RAAL HANSEN/C. CHRISTENSEN, Pollenanalytisk undersøgelse af prøver fra udgravning af mesolitisk kulturrester i fjordaflejringer forbindelse med Søften-Skødstrup motorvejsprojekt nord for Århus. NNU Rapport 8 (Moesgård 2002).

## RAVN 2004a

M. RAVN, Beretning for FHM 4092A-D Kildevang, Lystrup. Bebyggelse fra tidlig neolitikum og sen førromersk jernalder. Egå Sogn, Øster Lisbjerg herred, Randers amt. SB 53. Unpublished excavation report (Moesgård).

## RAVN 2004b

M. RAVN, Beretning for FHM 4431 Kildevang E, (Kirstinelund II) Lystrup Bebyggelse fra tidlig neolitikum, samt sen førromersk jernalder Øster Lisbjerg herred, Randers Amt (150602). SB 54. Unpublished excavation report (Moesgård).

## RAVN 2005

M. RAVN, Fjordbønder. *Skalk* 2005/2, 5–12.

## RENFREW 1987

C. RENFREW, *Archaeology and Language: The puzzle of Indo-European Origins* (London 1987).

## RENFREW 1989

C. RENFREW, The origins of Indo-European languages. *Scien. Am.* 261, 4, 1989, 106–114.

## RENFREW 1994

C. RENFREW, World Linguistic Diversity. *Scien. Am.* 270, 1, 1994, 104–110.

## RENFREW 1996

C. RENFREW, Language families and the spread of farming. In: D. H. Harris (ed.), *The origins and spread of agriculture and pastoralism in Eurasia* (London 1996) 70–92.

## SCHWABEDISSEN 1979

H. SCHWABEDISSEN, *Der Beginn des Neoli-*

thikums im nordwestlichen Deutschland. In: H. Schirrig (ed.), *Grossteingräber in Niedersachsen. Veröff. Urgesch. Slg. Landesmus. Hannover* 24 (Hildesheim 1979) 203–222.

## SKOUSEN 2001

H. SKOUSEN, Ny Motorvej A4 Søften – Skødstrup. Forslag til undersøgelse af den arkæologiske kulturarv, der berøres af vejen. Rapport udgivet af Moesgård Museum (Moesgård 2001).

## SKOUSEN 2008

H. SKOUSEN, Arkæologi i lange baner. Undersøgelser forud for anlæggelsen af motorvejen nord om Århus. Moesgård Museum. (Højbjerg 2008).

## SOLBERG 1989

B. SOLBERG, The Neolithic Transition in southern Scandinavia: internal development or migration. *Oxford Journal Arch.* 8, 1989, 261–296.

## THOMAS 1991

J. THOMAS, *Rethinking the Neolithic* (Cambridge 1991).

## TILLEY 1996

C. TILLEY, *An ethnography of the Neolithic* (Cambridge 1996).

Contact details of the author

Mads Ravn  
University of Stavanger  
Museum of Archaeology  
N-4036, Stavanger  
mads.ravn@uis.no