

Bell Beaker common ware and Giant Beakers. A Final Neolithic to Early Bronze Age settlement model based on the sequence of site Altgaul, Brandenburg

Ralf Lehmphul

Abstract

A well-preserved Final Neolithic to Early Bronze Age settlement stratigraphy on the western edge of a lowland area in east Brandenburg allows the possibility to derive a model of Final Neolithic settlement dynamics. The obtained sequential evidence of features and intra-site patterning would have been difficult to detect under regular preservation conditions. Both the settlement pattern as well as the typochronological development of specific vessel forms, derived from the stratigraphic sequence, can serve as an explanation for larger spheres of interaction within second half of the 3rd millennium BC. Of great importance is the close relationship of Bell Beaker common ware and the Giant beaker horizon as settlement pottery within the sequence. The analyses of the sequence from Altgaul and the results presented in this paper are taken from my doctoral thesis (Lehmphul in press).

Introduction

The settlement system at the end of the Neolithic and at the beginning of the Early Bronze Age especially in Middle Europe was considered to be only partially investigated, until a few decades ago, due to a lack of well preserved and settlements researched by modern standards. The majority of the finds are either only relatively closed finds e.g. layers and a few features, e.g. pits, or have been recorded in the form of stray finds on surface sites. Johannes Müller described settlement archaeology in the second half of the third millennium BC as an “extreme challenge” (Müller 2008, 393). In 1993 Knut Rassmann noted “there are no traces of specific settlement pottery for Late Neolithic and Early Bronze Age in Northeast Germany” (Rassmann 1993, 68) and ten years later he formulated a desideratum to evaluate influences of Bell Beaker culture in northeast Germany regarding the simultaneous regional cultures and groups (Rassmann 2003, 85). The settlement sequence from the site Altgaul provides a contribution to the scientific discussion addressing the issue of settlement archaeology at the turn of the 3rd to 2nd millennium BC.

The site

The site Altgaul 2, Lkr. Märkisch-Oderland is located about 65 km east of Berlin on the western edge of the Oderbruch – a wetland area within the Oder river valley (Fig. 1). It lies between two geomorphologically distinct areas: a hilly ground moraine to the west and a wide, flat river valley to the east. The excavations were carried out in advance

Article history:

Received 06 February 2018

Reviewed 19 March 2018

Published 19 December 2018

Keywords: Bell Beaker common ware, Giant Beakers, settlement stratigraphy, house structures, lithic, bayesian model, cultural concept

Cite as: Ralf Lehmphul: Bell Beaker common ware and Giant Beakers. A Final Neolithic to Early Bronze Age settlement model based on the sequence of site Altgaul, Brandenburg *JNA* 20, 2018S, 143–160 [doi 10.12766/jna.2018S.8]

Author's address:

Ralf Lehmphul M.A.
Goethe Universität Frankfurt
Institut für Archäologische Wissenschaften
Abt. III Vor- und Frühgeschichte
Campus Westend
Norbert-Wollheim-Platz 1
60629 Frankfurt/Main



Fig. 1. Altgaul 2, Lkr. Märkisch-Oderland.
 Location of site.

to the construction of an onshore gas pipeline by teams of the Brandenburg State Office for the Preservation of Monuments. The first excavation took place between September 2008 and March 2009. A second, adjacent area was excavated during the summer of 2010.

Within the excavation a complex stratigraphy was documented. A large number of Late Bronze Age and Early Iron Age complexes could be separated by horizontal stratigraphy (Lehmphul 2012 a). However, the preservation of a complex Final Neolithic to Early Bronze Age stratigraphy is of great importance for the settlement archaeology of the late 3rd millennium and the beginning of the 2nd millennium BC.

The Final Neolithic and Early Bronze Age phases were remarkably well preserved. This was largely due to the gradual accumulation of drift sand which covered features such as the remains of houses, post-structures, and the oldest known plough marks in eastern Germany. As all features dating to the Late Bronze Age and Early Iron Age had been dug into the Aeolian deposits a clear separation from the later Early Bronze Age features was possible, thus aiding in our understanding of the site's relative chronology (Lehmphul 2012 b, fig. 2).

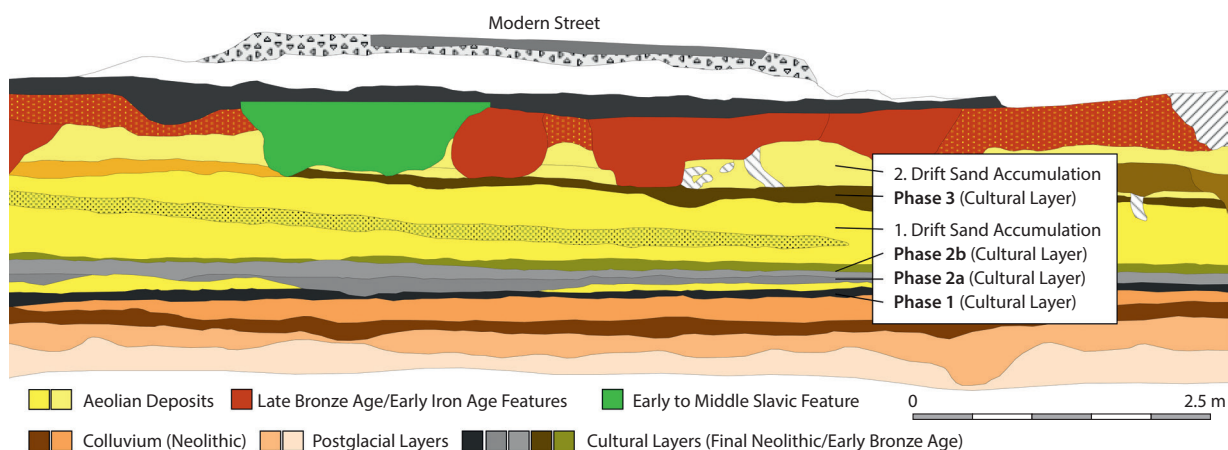
A variety of excavation methods were employed to ensure the stratigraphic integrity of the artefact assemblages originating from the occupation layer between two main phases of Aeolian deposition, the layers under the accumulation of drift sand, and the individual features. Pits, postholes, and hearths were block-sectioned. Due to the complex stratigraphy of the site the occupation layers and Aeolian deposits were stratigraphically excavated. Fortunately the contrasts between individual stratigraphic units made it possible to distinguish them. A Separation of four different occupation layers in and under the drift-sand-formations became possible. Among the most impressive features are the plough marks (Lehmphul 2012 b, fig. 4; Lehmphul 2013, 22–23 and fig. 4) and a heap or midden. It offered insights into the disposal behavior of its inhabitants and serves as a clear evidence for an above ground waste disposal (Lehmphul 2013, 22; Heyd 2004, 201). More than 80% of every find class (pottery, flint, animal bones) had been recovered from deposited layers. The average depth of the features like postholes and pits varies between 30 and 40 centimeters, similar to the average depth of a modern plough. Without these extraordinary preservation conditions, there would have probably been nothing left aside of a scatter of flint artefacts and stone tools.

The sequence of dune accumulation was recorded in a number of geoarchaeological sections, covering about 260 metres in total. There was constant alternation between individual thick layers of

drift sand and fossilised old surfaces or occupation layers. The understanding of this development became vital to the reconstruction of individual occupation-phases and their dating.

The dating of stratigraphy

The Final Neolithic to Early Bronze Age part of the sequence can be grouped into five stratigraphic phases (1, 2a, 2b, 3 and 4). In principal the distinction of phases is based on the alternation of the different cultural layers with Aeolian deposits like drift sand accumulations of different thickness (see Fig. 2) Phase 1 consists of three house structures varying in size, form, and orientation, a fence consisting of double stake-holes, and a circular structure composed of stake-holes. Due to their stratigraphic relation, some of the plough marks could also be dated to the beginning of Phase 1. Another house can be assigned to Phase 2a. In Phase 2b a feature that can be referred to as rubbish heap or midden as well as a high density of plough marks are present (Lehmphul 2013, 22, fig. 3). This indicates a complete shift within the usage of the central area, from a settlement area in phase 1 to an arable farming area in Phase 2b (Fig. 3).



Phase 3 is a settlement horizon situated between the first and the second main drift sand accumulation (Fig. 2). It was a compact layer containing postholes and some shallow pits. Some of the posts were arranged in a row, indicating post structures as well as a certain time depth during this phase. It implies a continuity of settlement, despite the changing environmental conditions evident through the dune accumulation. The final phase 4 followed the second drift sand accumulation. Due to massive Late Bronze and Early Iron Age activities and its subsequent destruction of the underlying layer it is only represented by individual pits (Lehmphul 2012 b, see fig. 2).

Additional to the relative age of the individual phases and their associated structures, the absolute age and temporal dimension of the stratigraphy is important. This allows indications for the most probably periods of at least local changes in the material culture. As the sequence outlines chronological relations for the stylistic and formal-typological changes within the pottery.

The probabilistic characteristics of ^{14}C -dates, their position in the course of the calibration curve, and most importantly the obtained structural archaeological evidence, such as the post structures in the phases 1 and 2a or soil formation processes in phase 2b, give strong indications for a long habitation (Tab. 1).

Fig. 2. Altgaul 2, Lkr. Märkisch-Oderland. Detail of geoarchaeological profile "Nr. 23" with different layers and stratigraphic phases (1, 2a, 2b and 3) of the Final Neolithic to Early Bronze Age sequence; Phase 4 is not visible in the profile.

Tab. 1. Altgaul 2, Lkr. Märkisch-Oderland. ¹⁴C-data with sample-/lab. number, sample material and stratigraphic context or phase (see Fig. 2).

sample-/lab. Number	stratigraphic phase	sample material	age BP	cal BC 1-sigma (68,2 %)	cal BC 2-sigma (95,4 %)
Erl-16591	1	animal bone (cattle)	3851 +/- 69	2456–2209	2489–2060
Erl-16592	1	animal bone (cattle)	3824 +/- 59	2431–2150	2467–2064
Erl-16590	2a	animal bone (cattle)	3687 +/- 76	2196–1966	2333–1881
Erl-16589	2b	animal bone (cattle)	3628 +/- 96	2187–1881	2286–1703
Erl-16157	2b	animal bone (cattle)	3693 +/- 50	2192–1985	2269–1941
Erl-16158	3	animal bone (herbivore)	3687 +/- 52	2188–1981	2267–1927
Erl-16588	3	animal bone (cattle)	3684 +/- 68	2194–1966	2284–1891
Erl-15208	4	animal bone (dog)	3558 +/- 33	1954–1786	2016–1773

Supported by radiocarbon dates the postulated chronological frame as well as the continuous inhabitation is further demonstrated by the regular occurrence of specific artifact types (flint daggers of type-I and *Zapfenkeile*) in the individual phases (Fig. 4). Hardening the evidence for house structures and a prolonged activity in every of the five phases, it is very likely, that the genesis of the stratigraphy was not within a short episode. According to the modelled radiocarbon dates there is a time span within the two sigma range of 115 to 580 years for the accumulation of the whole sequence.

The Bayesian model displayed in Table 2 based on eight radiocarbon dates. The index (A model), specified for the Bayesian model, is a value that indicates the degree of agreement of the entire Bayesian model with the non-modelled dating probabilities. The value is above 120 and therefore shows a very good consistency and provides a stable model. Linking the one sigma range with the archaeological information a duration of 50 to 75 years can be assumed for each individual phase. Correlated to the frequency and intensity of the recorded house structures and activities, this leads to a duration of estimated 300 years for the whole sequence. This Bayesian model, of 50 to 70 year phase intervals allows to study variations, breaks, continuities, and development of the material culture *de facto* on a scale of one to two generations per phase (Tab. 2).

House- and post-structures

In total, five house- or post structures were recorded within the sequence (Fig. 3). House 1, stratigraphically dated to phase 1, was almost completely preserved and about 9.8m long and 3.8m wide. The post construction is oriented north-northeast to south-south-west and had a two-aisled interior construction with central ridge posts. The houses gable ends had an apsis-like-form, whereby the northern part was much better preserved. In the filling of a post a piece of tooth-stamped decorated pottery was found. It was most likely not accidentally inserted but intentionally deposited (Lehmphul 2012b, fig. 5.3). Such deposits are usually interpreted as foundation deposits and have been frequently documented in other sites (Beran/Hensel 2013, 56–57; Spatzier 2017, 151–180).

Previously house structure 2 had been interpreted as incompletely excavated house or floor plan (Lehmphul 2013, 24–25 fig. 4). However, the preservation of the posts, their symmetric relation to each other, as well as the new study of their stratigraphic relation, have shown that it is highly probable that the structure can be

Tab.2. Altgaul 2, Lkr. Märkisch-Oderland. Bayesian model with posterior probabilities of the phases and phase durations.

(Amodel 123)	modelled data	modelled data
	1 σ (68,2 %)	2 σ (95,4 %)
start Phase 1	2310–2150 cal. BC	2450–2065 cal. BC
span	0–25 years	0–85 years
time range	0–75 years	0–205 years
transition Phase 1 to 2a	2235–2130 cal. BC	2325–2060 cal. BC
time range	0–75 years	0–170 years
transition Phase 2a to 2b	2190–2090 cal. BC	2215–2035 cal. BC
span	0–15 years	0–50 years
time range	0–50 years	0–115 years
end Phase 2b	2130–2055 cal. BC	2185–2010 cal. BC
time range between phase 2b and 3	0–40 years	0–95 years
start Phase 3	2105–2020 cal. BC	2140–1975 cal. BC
span	0–15 years	0–50 years
time range	0–50 years	0–110 years
end Phase 3	2060–1975 cal. BC	2105–1935 cal. BC
time range between phase 3 and 4	0–55 years	0–120 years
start Phase 4	2025–1935 cal. BC	2055–1895 cal. BC
time range	0–60 years	0–160 years
end Phase 4	2010–1885 cal. BC	2030–1800 cal. BC
entire period for the sequence	210–415 years	115–580 years

reconstructed completely. The total length was 9.6 m with a maximum preserved width of 5.5 m in the central section and 4.5 m in the area of its western narrow side. The ground plan is oriented to the east-northeast and west-southwest with a more oval shape. It had a two-aisled inner structure, partly supported by individual additional internal posts. Similar to house 1, it dates to phase 1. Analogously a piece of a single rim with a fine cord decoration was recovered from a post hole in the north-eastern part – apparently another foundation deposit. In the southeastern part of the house a 0.4 m deep pit was found. It was filled with a dark grey sediment, a granite hammerstone and two flint artifacts were recovered from the filling. The feature belongs to the house and is interpreted as working pit or the remains of a buried fireplace.

The dating of house 3 is completely based on its stratigraphic relations. However, the majority of this relations cannot be assigned to a single phase (1 or 2a). Only two posts clearly belong to phase 2a, resulting in the stratigraphic dating to phase 2a. The ground plan has a two-aisled layout, is approximately rectangular and about 4.3 to 4.6 m wide and 12.4 m long. The east-northeast to west-southwest orientation corresponds with the post structure 2. In the center is a shallow, circular hollow still 10 centimeters deep. This suggests either a working pit or the rest of a fireplace located in the house center.

House 4 is 14.2 m long, has a two-aisled subdivision principle and is oriented north-northeast to south-southwest. It varies slightly in width from 5.1 m in the south, 5.4 m in the center, and about 5.2 m in the north, leading to a rectangular shape with slightly concave long sides. As north end of the house is not completely secured, the maximum length of the ground plan could not be determined with certainty. Due to the stratigraphic relations of its post-pits with different layers, the house is dated to phase 1.

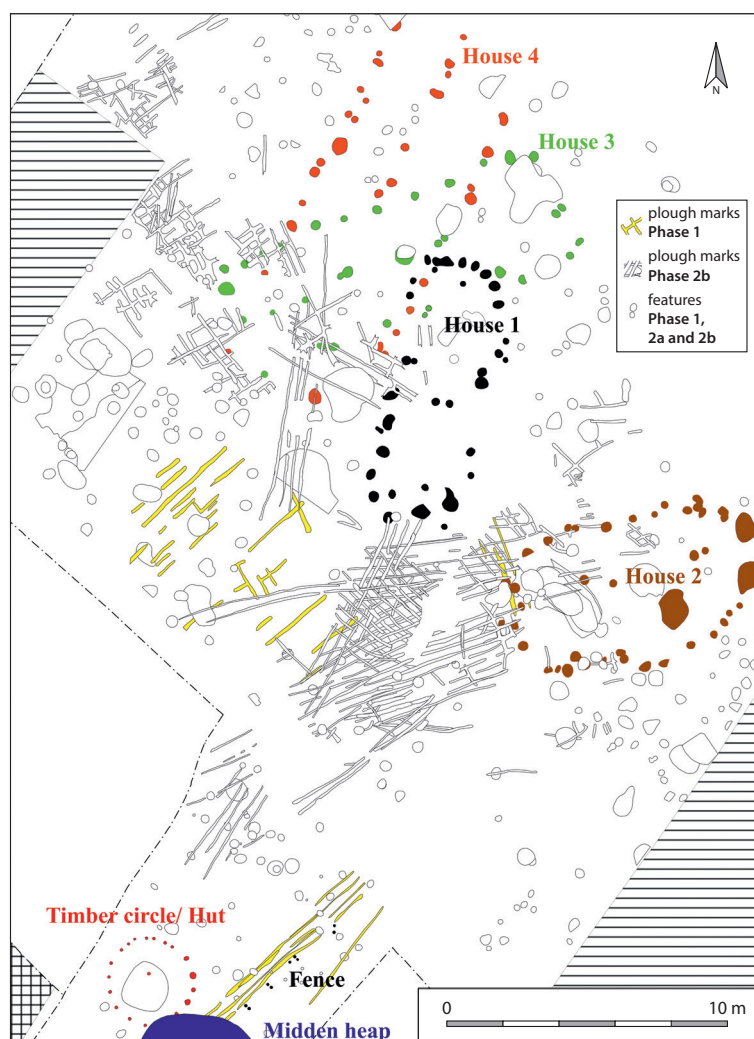


Fig.3. Altgaul 2, Lkr. Märkisch-Oderland. House and post-structures of phase 1 (red: timber circle/hut, black: house 1, brown: house 2, red: house 4) and phase 2a (green: house 3), plough marks of phase 1 (yellow) and phase 2b (white), and the position of middenheap of phase 2b (blue).

Post structure 5 is composed of stake-holes with a diameter of 3.15 m to 3.20 m. They are arranged in an almost ideal circle with one single central post. This structure is the only one of the post structures that had been identified during both excavations. Therefore profile sections were made specifically in direction through the center of the circle. Most profiles indicated a vertical position, however few were actually oriented oblique to the center of the circle. One possible interpretation of this structure would be as a small roofed hut. In this case the central post would have had a function as a support for the huts roof.

Ten more stake-holes with a diameter of approximately 0.1 m were recorded on a length of approximately 5.80 m. They were positioned with irregular intervals and usually arranged in pairs. The distance between the double stake-holes was about five centimeters. This configuration is interpreted as the remains of a fence. The distance between the pairs would allow the stacking of thin brushwood between them, resulting in an effective fence. This feature is remarkable, as it occurs in combination with up to 10 m long parallel plough marks, clearly related to the fence thus indicating their contemporary existence. Additionally the small distance between the plough marks and the fence allows the assumption that the plough was laterally attached to a single draft animal, most likely cattle, and had not been centrally positioned between two animals.

Based on the features, and their stratigraphic and scientific dating and relations, the following aspects can be deduced: The development

of small oval houses to rectangular ground plans can be observed in the sequence. This early evidence of a fence at a field's border clearly indicates the fencing of fields. It was proven further that the rebuilding of the various houses resulted in a clear settlement structure. The accumulation of selected domestic waste in specific areas like middens reflects a tendency towards an aboveground waste disposal behaviour. This practice is probably connected to a specific kind of arable agriculture: The midden cultivation "(...) a crossover between gardens and arable fields" (Guttmann 2005, 235). Furthermore, it could be shown that these purposefully created disposal areas also acted as activity zones for flint-tool-production. The entire chaînes opératoires of typical artifacts' primary production sequence could be found in the midden heap of phase 2b and also in the areas of former midden heaps dating to the older phases (Lehmphul in press).

Pottery and vessel forms

Approximately 3600 fragments of pottery with a total weight of 78.5 kg were recovered. The accumulation of the pottery finds is linked to the different usage of the excavated settlement area in the phases. The relation of pottery between the phases was: phase 1 = 5.1 kg, phase 2a = 25.3 kg, phase 2b = 21.1 kg, phase 3 = 13.3 kg and phase 4 = about 7 kg. The remaining pottery finds are distributed among finds that cannot be clearly assigned to one phase and stray finds. Based on the good conservation conditions, it was assumed that the majority of the fragments could also be grouped into vessel units. A disadvantage for the reconstruction was the only slightly varying vessel spectrum consisting of mostly undecorated forms, especially within the group of weakly S-shaped vessels. In total, the pottery could be divided into 1431 individual units which exhibit different degrees of fragmentation. A vessel unit can be represented either by a single body sherd or by a completely preserved or almost completely reconstructed vessel. From a formal-typological point of view, a total of 84 vessels could be distinguished on the basis of their one-, two- or three-part profile. A selection of partially or almost completely reconstructed vessels is illustrated in Figure 4 (Fig. 4).

Only 2% of the pottery is decorated and belongs to the category of fine ware. Decorations include fine cord markings, toothed-stamps, and deep circular impressions below the rim (cf. Lehmphul 2012b, fig. 5). The most distinctive ornamental element consists of a raised horizontal cordon. The cordons encircle the vessel and are mostly located on the upper part of the vessel neck, close to the rim. They generally occur solitary, although there are some examples with two or three parallel cordons. Their appearance varies greatly: They can be well-formed and distinct, but also poorly-formed and indistinct. During the formation of the stratigraphic sequence different preferences are observable: In the older phases is the cordon thick and distinct, within the later phases poorly-formed and indistinct, disappearing during the final phase 4. Less pronounced is the positional variation of the horizontal cordon. In younger phases it is closer to the bend of the neck while in later phases it is close to the rim (Lehmphul 2013 in press).

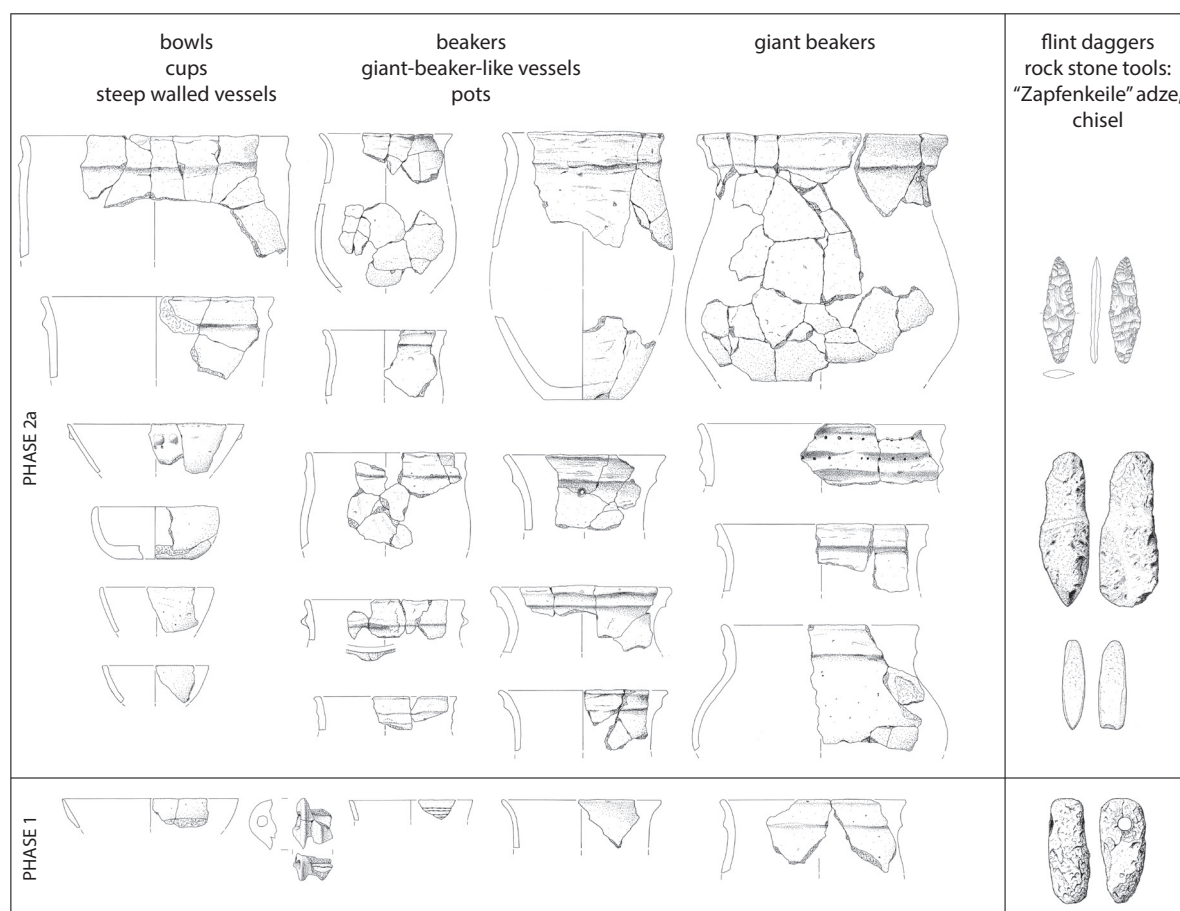
Another temporal sensitive feature is the position of the vessels belly or rather maximal diameter: In phase 2a and 2b the maximal diameter is close to the bottom of the vessel, during the later phase 3 and 4 the maximal width moves closer to the rim. This tendency is not related to the size of the vessel. Furthermore the shape and size of the vessels neck changes: While it is wide and high or kind of funnel-shaped during the older phases it becomes shorter and

steep within phase 4 (Lehmphul in press). Especially in those cases where two or three indistinct cordons occur, the decoration appears very similar to broad, shallow grooves. Such decoration is known for example from the sites at Bejsebakken (Sarauw 2008, fig. 15.2) and Mortens Sande (Liversage 1987, fig. 10.3) in Denmark.

Parallels to the cordon decoration at Altgaul have been found on a large number of sites dating to the Final Neolithic and Early Bronze Age. For example Lanz 14, a settlement site in Mecklenburg-Vorpommern, consisted of a succession of occupation layers with aeolian deposits similar to those in Altgaul. Sherds with raised cordon decoration were found on the whole site in a particularly large number.

Fig.4. Altgaul 2, Lkr. Märkisch-Oderland. Reconstructed vessel-shapes and stone tools (flint daggers of type I, *Zapfenkeile*) in relation to the stratigraphic phases.





These sherds were found together with tooth-stamped pottery, and G. Wetzel suggests that this indicates a later date for the artifacts. He assigns it to the Single Grave culture, with a strong Bell Beaker influence (Wetzel 1969, 160–161). On the site Parchim 113, also in Mecklenburg-Vorpommern, sherds with raised cordon decoration and fragments of tooth-stamped pottery were recovered from occupation layers and pits. The typological analysis also indicates a Single Grave culture context with Bell Beaker influence (see Wietrzichowski 2008, 60–61 fig. 4.1–2). Pottery with raised cordons was recovered from a circular ditched enclosure near Pömmelte-Zackmünde in Saxony-Anhalt. Here the typological analysis showed that the decoration on the pottery was influenced mainly by Bell Beaker and early Únětice culture (Spatzier 2017).

A remarkably good parallel to one of the vessels from Altgaul (Lehmphul 2012b, fig. 6.3) comes from the Alle-Noir Bois site in Switzerland (Othenin-Girard 1997, plate 8, 10–11). The vessels found there were part of a domestic assemblage of Bell Beaker material. The layer delivered 193 vessel fragments, 20 % of which had raised horizontal cordons. The ¹⁴C-data showed dating ranges between 2400–2140 cal BC (Othenin-Girard 1998, 58 and fig. 3, 10).

Deep impressions below the rim and cordons on the upper part of the neck (Fig. 4, Phase 2a) are characteristic decorations found on the pottery from a number of Bell Beaker domestic sites in France (Besse 1996, plate 11). The frequent occurrence of cordons on the upper part of the neck in combination with S-profile vessels and perforated rims also suggests a Bell Beaker influenced domestic pottery (cf. Heyd 2004, 189–190). Other Examples include material from radiocarbon-dated pit clusters, in the Kuyavian region of Poland (sites Toruń 243 and Żegotki 3), that can be assigned to phase III of the Iwno culture,

Fig. 4, continued. Altgaul 2, Lkr. Märkisch-Oderland. Reconstructed vessel-shapes and stone tools (flint daggers of type I, *Zapfenkeile*) in relation to the stratigraphic phases.

or to the transitional phase between the Iwno culture and Trzciniec culture (Makarowicz 2001, figs. 19; 21). In contrast to the stylistic evolution traceable for the coarse ware in Altgaul, no change in technology could be observed. The majority of the pottery assemblage is connected to the group of Giant Beakers with and without horizontal cordons (Moser 1994) and smaller Giant Beaker-like vessels with cordons (cf. the discussion of the terms: Schunke 2009; Lehmphul 2012 b; Lehmphul 2013; Spatzier 2017).

The vessel spectrum in Altgaul is not particularly variable and more or less constant over time. In addition to large vessels such as the Giant Beaker and the smaller Giant Beaker-like vessels, cups, bowls, undecorated beakers and steep-walled vessels in different sizes appear. This highlights the continuation and stability of technological parameters throughout the whole sequence, providing a further line of evidence for a continuous inhabitation of the site.

Lithic

The lithic spectrum is characteristic for the Final Neolithic debitage and flake industry (Fig. 5), containing a few blades, some borers, flint daggers of type I, and a high percentage of scrapers. Statistically significant is a difference in size and weight of scrapers and debitage from the older phases under the drift-sand-formation to the later phases above it. The difference in size of the stone tools is remarkable. During the older phases (1, 2a 2b), the scrapers are smaller and flatter, resembling small thumbnail scrapers, typical for bell beaker complexes, for example in Southern France (Furestier 2008). While the scrapers of the later phases (3 and 4) are thicker and significantly larger thus resembling tools used in Denmark's older Bronze Age (Eriksen 2010, 85–86, table 1). This shift is not connected to technical aspects of the chaînes opératoires and correlates with the gradual development of the pottery.

A total of 116 flint tools were recorded. They belong to a secondary production sequence. The spectrum of modifications is dominated by different types of scrapers (74), followed by lateral retouched flakes and blades (14). The remaining 23 % consist of borers (5), flint daggers and dagger fragments of type I (5), as well as axe fragments (5), arrowheads (3), and a larger number of debitage pieces, including cores and core debitage used as hammerstones (10). The latter are usually characterized by larger areas with splintered surfaces.

Bell Beaker common ware and Giant Beakers

The basis for the empirical comparison with other sites is created on the base of the pottery. The vessels are linked within the stratigraphy of the site Altgaul, and therefore are dated relative and absolute. The raised horizontal cordon underneath the rim is the most distinctive element of the vessels from the sequence and similar vessel forms from other sites as well as the decoration have a wide geographical distribution. For the comparison of geographical aspects, such as the topographical features of a site, it must be noted that only few settlements of this period have been examined. However, even if only individual pottery fragments and settlement finds that are relatively dated were collected from the surface, the sites are still reference value to the local chronology. They can be used as an indication of a comparable and contemporaneous site. Both, the few ¹⁴C-dates as well as the frequent lack of other diagnostic finds have hindered a precise contextual or chronological object classification. In most of the

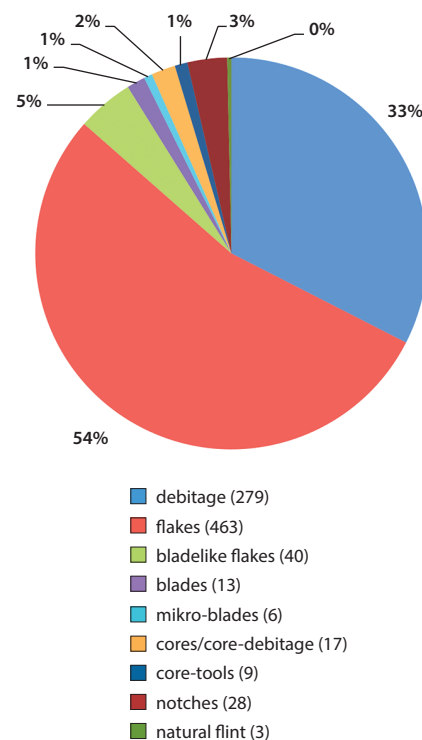
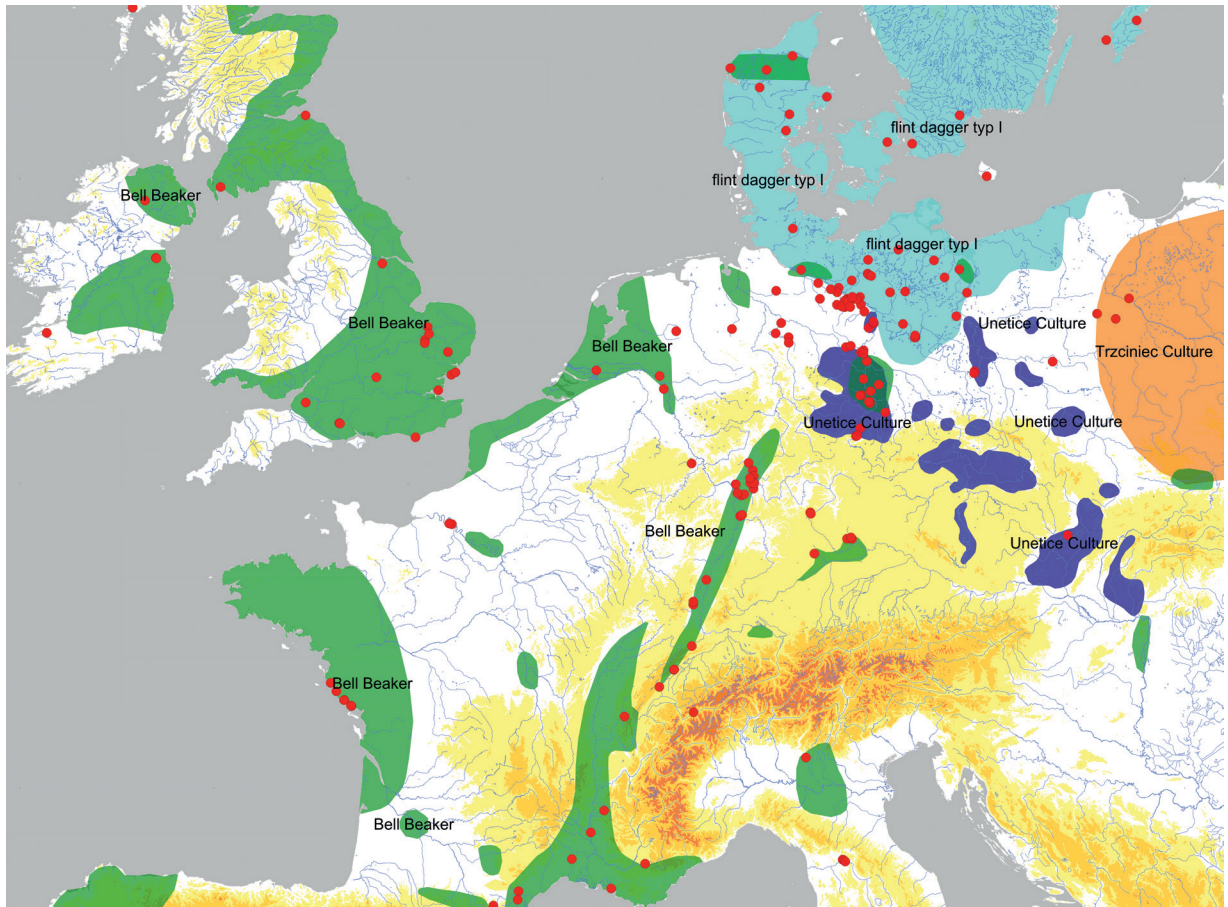


Fig. 5. Altgaul 2, Lkr. Märkisch-Oderland. Percentage Distribution of the primary production sequence (n = 858).

studies, this led to a variable, usually typological or cultural based dating. Most finds were attributed to an archaeological culture by means of cultural or chronological diagnostic pottery or were dated to the respective period on the basis of this cultural assignment.

For the inter-site comparison only flat horizontal cordons on smoothed vessel surfaces were recorded, resulting in 160 comparable sites covering large parts of Central and Northern Europe and include the countries of Great Britain, Ireland, France, Switzerland,



Italy, Germany, the Netherlands, the Czech Republic, Poland, Denmark and Sweden. Over 90% of these sites are located on shore-lines, big river valleys or smaller rivers close to the former (Fig. 6). The range of variation and preservation is variable, both on a quantitative and qualitative level. Due to the preservation conditions of the sites most vessels are highly fragmented. Only rarely the complete profiles of the vessels could be reconstructed or material for radiocarbon dates had been recovered.

There are two chrono- and chorologically cornerstones to this distribution. One is the research of Marie Besse (Besse 1996; 2003 and 2004) and Oliver Lemerrier (Lemerrier 2004) on western Bell Beaker common ware and the other the research of Aleksander Gardarwski (Gardarwski 1959), Primislav Makarowicz, and Janusz Czebreszuk (Czebreszuk 1998; Kosko/ Czebreszuk 1998) on the Trzciniec culture or the Trzciniec circle in Poland. But Trzciniec—interestingly a phenomenon similar to the Bell Beaker phenomenon—is younger and dates to the Early Bronze Age, approximately after 1950 BC (Makarowicz 2001).

The majority of the radiocarbon-dated sites can be limited to a period between approximately 2450 and 2000 cal BC within the

Fig. 6. Final Neolithic to Early Bronze Age sites with horizontal cordons near by the rim (Giant Beakers, Giant Beaker-like vessels, bowls, cups) in context of different cultural phenomena (Bell Beaker after Furholt 2017, fig. 1; Únětice culture after Zich 2013, 136 fig. 1; Trzciniec culture after Makarowicz 2010, fig. 1; Typ-I Flint Daggers after Rassmann 1993, 238 map 5; Lomborg 1973; Apel 2001, 282 fig. 9.2 and Czebreszuk/ Kozłowska-Skoczka 2008).

two-sigma range. The quality of the data varies greatly depending on the sample material. While the Danish sites studied in the 1980s and the southern Swedish settlement of Fosie IV are associated with a high degree of uncertainty due to conventional dating almost exclusively derived from charcoal, the more recent and modern complexes from central Germany are comparatively precise, most analyses were conducted on the basis of bones and macro remains (Lehmphul 2017, fig. 3). For the Danish settlement of Bejsebakken, a total of 22 radiocarbon dates have been recorded. The high number of ^{14}C -dates improves statistical significance, indicating dates between 2350 and 2000 BC (Sarauw 2008).

For certain regions, such as Italy, individual inventories from Central Germany, and the Swiss settlements Alle Noir Bois (Othenin-Girard 1998) and Cortaillod/Sur les Rochettes Est (Burg 2002), dates at the beginning of the 2nd half of the 3rd millennium BC points towards an early phase between 2400 and 2200 BC. Very early data between 2550 and 2200 BC was collected for the Marktbergeler Doline (Nadler 1998).

Longer, continuous settlement and occupation phases are highly probable for some sites. These include the already mentioned settlement of Bejsebakken, as well as the sequence of Altgaul, the circular enclosure of Pömmelte-Zackmünde (Spatzier 2017, 245–254) and probably also the recently presented Bell Beaker settlement from Klobikau in Saxony-Anhalt (Balfanz/ Fröhlich/ Schunke 2015).

Relatively late, if compared to the majority of the data, are the Polish complexes of the Trzciniec culture starting already in the first half of the 2nd millennium BC and dating back to the transitional horizon Iwno-Trzciniec at the beginning of the development. Usually Trzciniec culture are the most recent sites. Nevertheless, there are – albeit only sporadic so far – late dating inventories in the Western distribution area of the facies, such as for the inventory of Trimbs, Rheinland-Pfalz (Sensburg 2004) or a complex from the Rhône valley in Southern France (Lemerrier 2004, fig. 100).

Therefore the phenomenon that can be dated from the second half of the 3rd century BC to the beginning of the 2nd millennium BC and spreads throughout Northern, Central, and above all Western Europe (Fig. 7; Table 3). Depending on the region, state of research and sources, but primarily due to the prevailing cultural-historical view, this temporal depth has led to different interpretations and in the absence of radiocarbon dating, to very variable relative dating approaches, which were usually linked to an archaeological culture until the mid-1990s.

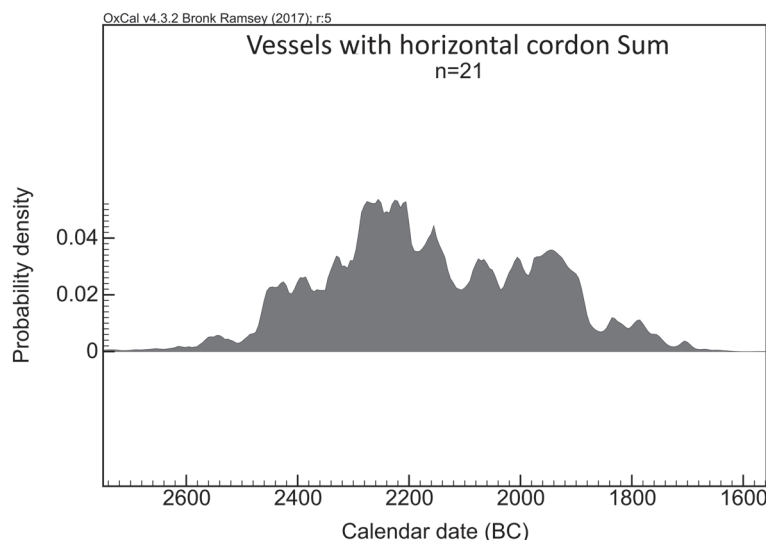


Fig. 7. Sum calibration of vessels with horizontal cordons of different sites, contexts and sample materials (Table 3; see also Lehmphul 2017, fig. 3).

Tab. 3. ¹⁴C-dates of Final Neolithic to Early Bronze Age sites with horizontal cordons and with references.

Sitename/region	Country	Sitecategory/ context	¹⁴ C-Date (BP)	2-sigma-range cal BC	Reference (Illustration of pottery and ¹⁴ C-date)
Zwenkau, Saxony	Germany	settlement/well	3813 ± 34	2436–2140	Schunke 2009, 291 fig. 3–5.
Bad Lauchstädt, Saxony-Anhalt	Germany	settlement/pit	3815 ± 30	2432–2142	Schunke 2017, 67 fig. 14, 3.5 footnote 26.
Alberstedt, Saxony-Anhalt	Germany	Grave	3858 ± 57	2472–2146	Leinthal/Bogen/Döhle 2006, fig. 4.1 footnote 3.
Klobikau, Saxony-Anhalt	Germany	Settlement/pit	3713 ± 35	2205–1981	Balfanz/Fröhlich/Schunke 2015, 756 fig. 6, 7.
Parchim 113, Mecklenburg- Western Pomerania	Germany	settlement/pit	3795 ± 30	2338–2137	Wietrzichowski 2008, 57 fig. 3, 17–18 and 4, 1–2 footnote 9
Parchim 37, Mecklenburg- Western Pomerania	Germany	settlement/pit	3720 ± 25	2198–2036	Wietrzichowski 2011, 47 fig. 3.3.
Trimbs, Rhineland-Palatinate	Germany	settlement/pit	3557 ± 49	2026–1756	Sensburg 2004, 68 fig. 8, 11, 12
Ergersheim, Bayern	Germany	settlement/doline/ layer	3763 ± 48	2340–2030	Ullrich 2008, 173 table 1; plate 7, 13, 14
Windecken, Hesse	Germany	Grave	3777 ± 44	2346–2036	Wiermann 2004, 331–332 plate 42.8
Diverhøj	Denmark	settlement/layer	3870 ± 80	2570–2061	Asingh 1987, 151 fig. 22a footnote 16.
Fosie IV	Sweden	settlement/post pits	3680 ± 130	2461–1750	Björhem/Säfvestad 1989, 36 plate XIII, f.g.
Molenaarsgraaf	Netherlands	Settlement/layer	3640 ± 30	2133–1921	Louwe Kooijmans 1974, 259 fig. 85, 88.
Sainte-Croix-en-Plaine (Haut Rhin)	France	settlement/well with burials	3790 ± 35	2344–2058	Landolt/Gersende/Putelat 2010, 86 fig. 9, 7
Le Camp de Laure (Le Rove, Bouches-du-Rhone)	France	fortified settlement	3500 ± 60	2010–1667	Lemerrier 2004, 134 fig. 100.
Les Juillères (Mondragon, Vaucluse)	France	settlement	3635 ± 50	2141–1885	Lemerrier 2004, 308 fig. 251, 252.
Bois-Sacre (Saint-Côme-et- Maruéjols, Gard)	France	fortified settlement	3890 ± 140	2864–1977	Roudil/ Bazile/ Soulier 1974, 207 fig. 34, 35, 37.
Erstein	France	settlement/shal- low pit	3835 ± 35	2458–2154	Croutsch/Tegel/ Pascutto 2010, 53 fig. 6, 12
Olmi 1 und 2	Italy	settlement/shal- low pit	3890 ± 30	2468–2291	Sarti et.al. 2008, 29. Leonini/Sarti 2008 fig. 5.9.
Semitella	Italy	settlement/shallow sunken structures	3930 ± 80	2832–2147	Sarti et.al. 2008, 31. Leonini/Sarti 2008 fig. 8.19.
Torun 243	Poland	settlement/pit	3600 ± 30	2031–1888	Makarowicz 2001, 217 table 1 fig. 19.
Żegotki 3	Poland	settlement/pit	3580 ± 30	2028–1828	Makarowicz 2001, 218 table 1 fig. 21

The main problem is the lack of associated finds or other accompanying diagnostic vessels and finds. Specifically Giant Beakers are often single finds (Mertens 1998, 197). Almost 80% of the here presented sites are linked to settlements. This is a clear indication that the presented pottery, is closer related to settlements than to cemeteries.

The assignment to a “culture” is more often a result of the application of a typo-chronological concept (Fig. 8). It illustrates the wide spread, but locally strong Bell Beaker influence in Final Neolithic and Early Bronze Age assemblages. Almost 15% of the sites are based on decorated sherds associated with more than one cultural assignment. They fall into the category Mixed cultures (e.g. Single Grave culture, Bell Beaker and Únětice culture). For example the sites Altgaul, the Danish settlement of Bejsebakken or the circular enclosure of Pömmelte-Zackmünde fall into this category and all exhibit clear

indications for constant inhabitation or usage over a long period of time (Sarauw 2008; Spatzier 2017, 245–254).

In relation to the diffusion of the different cultures the chorological pattern points towards a strong Bell Beaker influence. It is also connected to the late Single Grave culture or rather the Late Neolithic Dagger Period, the Proto-Únětice culture, and the late Iwno and early Trzciniec phenomenon in Poland.

Discussion

The analyses of the site Altgaul have shown that most finds were deposited near the surface in midden heaps or in layers. Without extraordinary conservation conditions, such as the extensive covering of large areas by drift sand layers or colluvial layers, the evidence would be drastically reduced, mainly to stone artifacts and some highly fragmented pottery sherds. This specific aboveground waste disposal behaviour of the 2nd half of the 3rd millennium BC is apparently the main problem leading up to the difficulties in identifying settlements.

The most distinctive decorative elements of the pottery assemblage are raised horizontal cordons, a smooth vessel surface, and S-shaped bodies of vessels varying size. The equal distribution of various vessel-forms within the stratified phases of Altgaul indicates no typo-chronological difference associated with vessels sizes (like Giant Beakers and Giant Beaker-like vessels) (Schunke 2017). Moreover it seems that there is a similar empirically comprehensive package in terms of a *longue durée* (Fig. 4).

Individual regional and transregional studies have shown that this decoration, which is applied to various vessel shapes, such as bowls, cups and storage vessels, is primarily connected to Final Neolithic and Early Bronze Age cultures or phenomena. These include the settlement and Bell Beaker common ware in central and southern France (Besse 1996; Lemerrier 2004), a few tomb and some settlement finds from the Bell Beaker culture in central Germany (Hille 2012, 22; Wiermann 2004; Spatzier 2017; Schunke 2017), the (late) Single Grave culture with Bell Beaker influences in northern Germany (Jacobs 1991; Wetzel 1969) and the closely associated Early Bronze Age Giant Beakers (Moser 1994) as well as the smaller Giant Beaker-like vessels. The latter were defined and named by T. Schunke in reference to the Giant Beakers and were first linked with cultural influences from the northern Late Neolithic Dagger period and the late Single Grave culture and finally also to the Únětice culture (Schunke 2009). A few years later and due to stratigraphic evidence and in the light of a pit-inventory with a bell beaker with metope ornamentation, the Giant Beaker-like vessels were then linked to the Bell Beaker culture (cf. Schunke 2017). Even within the younger Early Bronze Age Trzciniec culture, raised horizontal cordons are an essential characteristic of the pottery decoration on vessels from settlement as well as from grave contexts (Gardawski 1959).

The connection between the various types of Bell Beaker Common Ware and the Giant Beakers are evidenced by the sequence of vessel forms from Altgaul: In the older phases 2a and 2b there are more similarities with Bell Beaker forms linked to the common ware, while in the younger phases 3 and 4 forms of Únětice culture dominate. There are also differences in the flint artifacts for certain types (scrapers), while other tools, such as type-I flint daggers or *Zapfenkeile* (Danish: Tapkiler, English: tounge wedges), are present during all phases. However, the transitions within the pottery are fluent and, together with the proven, consistent pottery technology, are an indicator for the continuity of the settlement.

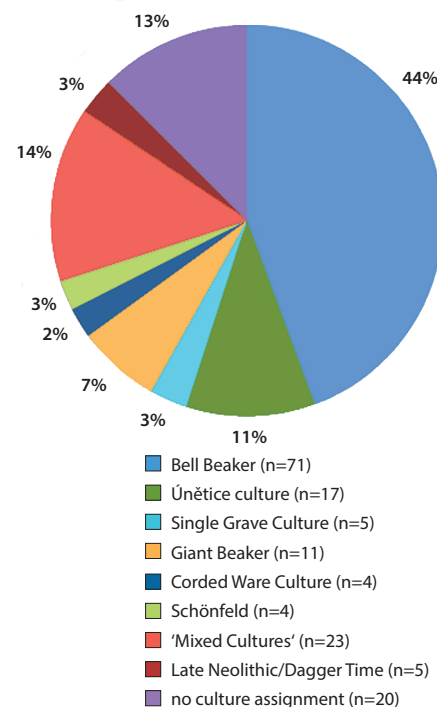


Fig. 8. The different cultural assignments of the sites on the map in Figure 6.

Conclusion

The classical cultural concepts, some of which were developed a hundred years ago to aid the chronological and spatial allocation of the artifacts, make a comparative study difficult. Considering difficulties in the identification of these mostly river bound settlements and the high mobility during these times one question remains: What linked the Bell Beaker common ware and the Early Bronze Age Giant Beaker horizon? A few well preserved settlements such as Altgaul, Bejsebakken in Denmark or the monument of Pömmelte-Zackmünde, which have been studied using modern approaches, provide evidence for a long continuity of these sites. Apparently there was a stable but difficult to detect settlement system oriented towards large communication paths – the great river valleys. We should ask ourselves what held this settlement system together over long distances and long periods of time. In the second half of the 3rd millennium BC the picture is dominated by grave complexes. As a result, the relationship of these cultures or phenomena becomes less comprehensible on the basis of complex settlement remains, but mostly on the level of the grave complexes and thus in the sphere of beliefs and mortuary praxis – a basically ritualized and conservative level. Perhaps the location close to the big rivers was not only strategically important for communication, but was further caused by certain subsistence strategies. The prerequisite for maintaining the interaction space and overcoming a distance, ranging from southern France, through central Germany to southern Scandinavia and even the British Isles is not only due to a network of settlements existing over a prolonged period of time, but, in my opinion, a previously underestimated form of subsistence, which requires a high degree of mobility. It is a semi-settled form of transhumance that combines both the aspect of sedentariness and increased mobility and therefore sustains these extensive areas of communication and interaction. This network of settlements is based on the diffusion of people. Through interactions between groups and individuals, ideas and technologies started to spread at the dawn of Early Bronze Age. Finally while the phenomenon of these specific settlement pottery is diminishing in the West due to the formation of Early Bronze Age cultures, the tradition continues to exist within the eastern Trzciniec culture leading to strong arguments for a European wide network based on and stable, long existing settlement systems.

References

- Apel 2001: J. Apel, Daggers, knowledge and power. The social aspects of flint-dagger technology in Scandinavia 2350–1500 cal BC. (Uppsala 2001).
- Asingh 1987: P. Asingh, Diverhøj – A Complex Burial Mound and a Neolithic Settlement. *Journal of Danish Archaeology* 6, 1987, 130–154.
- Balfanz et al. 2015: K. Balfanz/ M. Fröhlich/ T. Schunke, Ein Siedlungsareal der Glockenbecherkultur mit Hausgrundrissen bei Klobikau, Sachsen-Anhalt, Deutschland. In: H.H. Meller/ H.W. Arz/ R. Jung/ R. Risch (eds.) 7th Archaeological Conference of Central Germany October 23–26, 2014 in Halle (Saale). (Halle 2015), 747–763.
- Beran/Hensel 2013: J. Beran/ N. Hensel, Zum früh- und mittelbronzezeitlichen Siedlungswesen im westlichen Brandenburg. Rettungsgrabungen und archäologische Baubegleitungen der Archäologie Manufaktur GmbH 1996 bis 2012. In: J. Kneisel/ H.J. Behnke/ F. Schopper (eds.) Frühbronzezeit-Mittelbronzezeit. Neue Erkenntnisse zur Besiedlung zwischen Elbe und Warthe und angrenzender Regionen (2000–1400 v. Chr.): Symposium vom 24.–25. September 2011 in Welzow/ Brandenburg (Bonn 2013), 55–94.

- Besse 1996: M. Besse, Le campaniforme en France. Analyse de la céramique d'accompagnement. British Archaeological Reports: International Series 635 (Oxford 1996).
- Besse 2003: M. Besse, L'Europe du 3^e millénaire avant notre ère. Les céramiques communes au Campaniforme. (Lausanne 2003).
- Besse 2004: M. Besse, Bell Beaker Common Ware during the third Millennium BC in Europe. In: J. Czebreszuk (ed.) Similar but different. Bell beakers in Europe (Poznań 2004), 127–148.
- Björhem/Säfvestad 1989: N. Björhem/U. Säfvestad, Fosie IV. Byggnadstradition och bosättningsmönster under senneolitikum. Malmöfynd 5 (Malmö 1989).
- Croutsch et al. 2010: C. Croutsch/W. Tegel/E. Pascutto, Le site d'Erstein Grassweg/PAE: un habitat campaniforme dans le sud de la Plaine du Rhin supérieur. In: C. Jeunesse/A. Denaire (eds.) Du Néolithique final au Bronze ancien dans le Nord-Est de la France. Actualité de la recherche. Actes de la table ronde internationale de Strasbourg organisée par l'UMR 7044 du CNRS Maison Interuniversitaire des Sciences de l'Homme - Alsace (MISHA), 9 juin 2009 (Zimmersheim 2010), 43–56.
- Czebreszuk 1998: J. Czebreszuk, "Trzciniec", an alternative view. Baltic-Pontic Studies 6, 1998, 165–189.
- Czebreszuk 1998: J. Czebreszuk (ed.) The Trzciniec area of the Early Bronze Age civilization. 1950–1200 BC. Baltic-Pontic studies 6 (Poznań 1998).
- Czebreszuk/Kozłowska-Skoczka 2008: J. Czebreszuk/D. Kozłowska-Skoczka, Sztylety krzemienne na Pomorzu Zachodnim. (Szczecin/Poznań 2008).
- Eriksen 2010: B.V. Eriksen, Flint working in the Danish Bronze Age. The decline and fall of a master craft. In: B.V. Eriksen (ed.) Lithic technology in metal using societies. Proceedings of a UISPP Workshop, Lisbon, September 2006 (Aarhus 2010), 81–93.
- Furestier 2008: R. Furestier, Bell Beaker Lithic industries in the French Midi. In: M. Baioni/V. Leonini/D. Lo Vetro/F. Martini/R. Poggiani Keller/L. Sarti (eds.) Bell Beaker in Everyday Life. Proceedings of the 10th Meeting "Archéologie et Gobelets" (Florence–Siena–Villanuova sul Clisi, May 12–15, 2006) (Firenze 2008), 291–299.
- Furholt 2017: M. Furholt, Soziale Welten und Kollektive als alternative Ansätze in der Forschung zu vorgeschichtlichen Gesellschaften. Das Beispiel der endneolithischen Schnurkeramik in Europa (2800–2000 v. Chr.). Zeitschrift für Kultur- und Kollektivwissenschaft 3, 2017, 19–34.
- Gardawski 1959: A. Gardawski, Plemiona kultury Trzcinieckiej w Polsce. Tribes of the Trzciniec Culture in Poland. Materiały starożytne 5, 1959, 7–189.
- Guttmann 2005: E. B. Guttmann, Midden cultivation in prehistoric Britain. Arable crops in gardens. World Archaeology 37, 2005, 224–239.
- Heyd 2004: V. Heyd, Überregionale Verbindungen der süddeutschen Glockenbecherkultur anhand der Siedlungen. In: V. Heyd/L. Husty/L. Kreiner (eds.) Siedlungen der Glockenbecherkultur in Süddeutschland und Mitteleuropa (Büchenbach 2004), 181–202.
- Hille 2012: A. Hille, Die Glockenbecherkultur in Mitteldeutschland. Veröffentlichungen des Landesamtes für Denkmalpflege und Archäologie Sachsen-Anhalt – Landesmuseum für Vorgeschichte 66 (Halle 2012).
- Jacobs 1991: J. Jacobs, Die Einzelgrabkultur in Mecklenburg-Vorpommern. Beiträge zur Ur- und Frühgeschichte Mecklenburg-Vorpommerns 24 (Schwerin 1991).
- Kosko/Czebreszuk 1998: A. Kosko/J. Czebreszuk, "Trzciniec". system kulturowy czy interkulturowy proces? (Poznań 1998).
- Landolt et al. 2010: M. Landolt/G. Alix/O. Putelat, Premiers éléments sur le puits funéraire de la fin du troisième millénaire avant J-C de Sainte-Croix-en-Plaine "Holzackerfeld" (Haut-Rhin). In: C. Jeunesse/A. Denaire (eds.) Du Néolithique final au Bronze ancien dans le Nord-Est de la France. Actualité de la recherche. Actes de la table ronde internationale de Strasbourg organisée par l'UMR 7044 du CNRS Maison Interuniversitaire des Sciences de l'Homme - Alsace (MISHA), 9 juin 2009 (Zimmersheim 2010), 57–72.
- Lehmphul 2012b: R. Lehmphul, Final neolithic to Early Iron Age Settlement Stratigraphy at Altgaul, Brandenburg. A Preliminary Report. In: J. Kneisel/W. Kirleis/M. Dal Corso/N. Taylor/V. Tiedtke (eds.) Collapse or Continuity? Environment and Development of Bronze Age Human Landscapes (Proceedings of the International Workshop "Socio-Environmen-

- tal Dynamics over the last 12,000 years: the Creation of Landscapes II (14th–18th March 2011) in Kiel) (Bonn 2012), 171–184.
- Lehmphul 2012a: R. Lehmphul, Die jüngere Bronze- und frühe Eisenzeit auf dem mehrperiodigen Fundplatz Altgaul 2. Lkr. Märkisch-Oderland, Brandenburg. In: P. Łuczkiwicz (ed.) *The Younger Generation: „Akten des ersten Lublin-Berliner Doktorantenkolloquiums am 09.–10.06.2010 in Lublin“* (Lublin 2012), 23–43.
- Lehmphul 2013: R. Lehmphul, Stratigrafie–Siedlung–Datierung. Die endneolithisch bis frühbronzezeitliche Siedlungsstratigrafie von Altgaul, Lkr. Märkisch-Oderland. In: J. Kneisel/H.J. Behnke/F. Schopper (eds.) *Frühbronzezeit–Mittelbronzezeit. Neue Erkenntnisse zur Besiedlung zwischen Elbe und Warthe und angrenzender Regionen (2000–1400 v. Chr.)*: Symposium vom 24.–25. September 2011 in Welzow/ Brandenburg (Bonn 2013), 17–32.
- Lehmphul 2017: R. Lehmphul, Kollektive Standardisierungen der materiellen Kultur im ausgehenden Neolithikum und am Beginn der Bronzezeit in Mitteleuropa. Ein Fallbeispiel zu „Riesenbechern“ und glockenbecherzeitlicher Siedlungskeramik. *Zeitschrift für Kultur- und Kollektivwissenschaft* 3, 2017, 35–60.
- Lehmphul in press: R. Lehmphul, Die Stratigrafie von Altgaul–Siedlungsarchäologische Studien zum Übergang vom Endneolithikum zur Frühbronzezeit. *Forschungen zur Archäologie im Land Brandenburg* 19 in press).
- Leinthal et al. 2006: B. Leinthal/C. Bogen/H.-J. Döhle, Spätneolithische Befunde von Alberstedt. In: V. Dresely/H. Meller (eds.) *Archäologie auf der Überholspur. Ausgrabungen an der A 38* (Halle 2006), 83–97.
- Lemercier 2004: O. Lemercier, *Les Campaniformes dans le Sud-est de la France*. Monographies d'Archéologie Méditerranéenne 18 (Lattes 2004).
- Leonini/Sarti 2008: V. Leonini/L. Sarti, Bell Beaker Pottery in the Florentine Area. In: M. Baioni/V. Leonini/D. Lo Vetro/F. Martini/R. Poggiani Keller/L. Sarti (eds.) *Bell Beaker in Everyday Life. Proceedings of the 10th Meeting „Archéologie et Gobelets“* (Florence–Siena–Villanuova sul Clisi, May 12–15, 2006) (Firenze 2008), 87–102.
- Liversage 1987: D. Liversage, Mortens Sande 2–A Single Grave Camp Site in Northwest Jutland. *Journal of Danish Archaeology* 6, 1987, 101–124.
- Lomborg 1973: E. Lomborg, *Die Flintdolche Dänemarks. Studien über Chronologie und Kulturbeziehungen des südsandinavischen Spätneolithikums*. Nordiske Fortidsminder Serie B–in quatro Bind 1 (København 1973).
- Louwe Kooijmans 1974: L.P. Louwe Kooijmans, *The Rhine/Meuse Delta, four studies on its prehistoric occupation and Holocene geology*. *Analecta Praehistorica Leidensia* 7 (Leiden 1974).
- Makarowicz 2001: P. Makarowicz, The second half of the Third and Second Millenium BC in Kujawy, Northern Poland, in the Light of ¹⁴C Determinations. In: J. Czebreszuk/J. Müller (eds.) *Die absolute Chronologie in Mitteleuropa 3000–2000 v. Chr.* (Rahden 2001), 209–270.
- Makarowicz 2010: P. Makarowicz, The Creation of New Social Space–Barrows of the Corded Ware Culture and the Trzciniec Circle as Markers of a Mental Map in the Upland Parts of Poland and the Western Ukraine. In: *Landscapes and human development. The contribution of European Archaeology. Proceedings of the International Workshop „Socio-Environmental Dynamics over the Last 12.000 Years : The Creation of Landscapes (1st–4th April 2009)“* (Bonn 2010), 203–215.
- Mertens 1998: K. Mertens, Die nordostniedersächsischen Riesenbecher. Ein lokales Phänomen mit überregionaler Bedeutung? In: A. Kosko/J. Czebreszuk (eds.) *„Trzciniec“ – system kulturowy czy interkulturowy proces?* (Poznań 1998), 193–202.
- Moser 1994: A. Moser, Zur zeitliche Stellung der „Riesenbecher“ des Hannoverischen Wendlandes. *Nachrichten aus Niedersachsens Urgeschichte* 63, 1994, 3–38.
- Müller 2008: J. Müller, Siedlungs- und umweltarchäologische Modelle zum 3. Jahrtausend v. Chr. In: W. Dörfler/J. Müller (eds.) *Umwelt–Wirtschaft–Siedlungen im dritten vorchristlichen Jahrtausend Mitteleuropas und Südskandiaviens* (Neumünster 2008), 393–399.
- Nadler 1998: M. Nadler, Kein „reisig Volk von Bogenschützen“!–Ein Siedlungskomplex der Glockenbecherkultur aus Marktbergel. *Das archäologische Jahr in Bayern* 1997, 1998, 61–64.
- Othenin-Girard 1998: B. Othenin-Girard, A Bell Beaker settlement at Alle,

- Noir Bois (Jura, Switzerland). In: M. Benz/S. Van Willigen (eds.) Some New approaches to The Bell Beaker 'Phenomenon'. Lost Paradise...?, Proceedings of the 2nd Meeting of the "Association Archéologie et Gobelets", Feldberg (Germany), 18th-20th avril 1997 (Oxford 1998), 57–73.
- Rassmann 1993: K. Rassmann, Spätneolithikum und frühe Bronzezeit im Flachland zwischen Elbe und Oder. Beiträge zur Ur- und Frühgeschichte Mecklenburg-Vorpommerns 28 (Lübstorf 1993).
- Rassmann 2003: K. Rassmann, Glockenbechereinflüsse und regionale Gliederung Nordostdeutschlands im Spätneolithikum. In: J. Czebreszuk/M. Szmyt (eds.) The Northeast Frontier of Bell Beakers (Oxford 2003), 85–100.
- Roudil et al. 1974: J.-L. Roudil/F. Bazile/M. Soulier, L'habitat campaniforme de Saint-Côme et Maruéjols (Gard). Gallia préhistoire 17, 1974, 181–213.
- Sarauw 2008: T. Sarauw, On the Outskirts of the European Bell Beaker Phenomenon. The settlement of Bejsebakken and the social organisation of Late Neolithic societies. In: W. Dörfler/J. Müller (eds.) Umwelt – Wirtschaft – Siedlungen im dritten vorchristlichen Jahrtausend Mitteleuropas und Südkandinaviens (Neumünster 2008), 83–125.
- Sarti et al. 2008: L. Sarti/C. Balducci/P. Brilli/P. Fenu/V. Leonini/F. Martini/G. Pizziolo/M. Zannoni, Catalogue of Bell Beaker Settlements in Sesto Fiorentino, Florence. In: M. Baioni/V. Leonini/D. Lo Vetro/F. Martini/R. Poggiani Keller/L. Sarti (eds.) Bell Beaker in Everyday Life. Proceedings of the 10th Meeting "Archéologie et Gobelets" (Florence – Siena – Villanuova sul Clisi, May 12–15, 2006) (Firenze 2008), 23–32.
- Schunke 2009: T. Schunke, Die frühbronzezeitliche Siedlung von Zwenkau, Ldkr. Leipziger Land. Untersuchungen zur Chronologie und Beobachtungen zur Wirtschaftsweise und sozialen Differenzierung anhand der keramischen Funde. In: M. Bartelheim/H. Stäuble (eds.) Die wirtschaftlichen Grundlagen der Bronzezeit Europas. The economic foundations of the European Bronze Age (Rahden/Westfalen 2009), 273–319.
- Schunke 2017: T. Schunke, Eine Siedlungsgrube der Glockenbecherkultur und endneolithische Gräber bei Bad Lauchstädt, Saalekreis – Überlegungen zum Typus der Leistenbecher und dem Ende der neolithischen Becherentwicklung in Mitteldeutschland. Jahresschrift für mitteldeutsche Vorgeschichte 96, 2017, 43–76.
- Sensburg 2004: M. Sensburg, Eine frühbronzezeitliche Siedlung bei Trimbs, Kreis Mayen-Koblenz. In: H.-H. Wegner (ed.) Berichte zur Archäologie an Mittelrhein und Mosel (Trier 2004), 33–83.
- Spatzier 2017: A. Spatzier, Das endneolithisch-frühbronzezeitliche Rondell von Pömmelte-Zackmünde, Salzlandkreis, und das Rondell-Phänomen des 4.–1. Jt. v. Chr. in Mitteleuropa. Forschungsberichte des Landesmuseums für Vorgeschichte Halle Band 10/I (Halle 2017).
- Ullrich 2008: M. Ullrich, Endneolithische Siedlungskeramik aus Egersheim, Mittelfranken. Untersuchungen zur Chronologie von Schnurkeramik und Glockenbechern an Rhein, Main und Neckar. Universitätsforschungen zur Prähistorischen Archäologie 160 (Bonn 2008).
- Von Burg 2002: A. Von Burg, Die Glockenbecherkultur auf dem Plateau von Bevaix. Archäologie der Schweiz 25, 2002, 48–57.
- Wetzel 1969: G. Wetzel, Ein Dünenwohnplatz bei Lanz, Kreis Ludwigslust. Bodendenkmalpflege in Mecklenburg Jahrbuch 1967, 1969, 129–169.
- Wiermann 2004: R.R. Wiermann, Die Becherkulturen in Hessen: Glockenbecher-Schnurkeramik-Riesenbecher. Freiburger Archäologische Studien 4 (Rahden 2004).
- Wietrzichowski 2008: F. Wietrzichowski, Endneolithische Siedlungsbefunde von Parchim, Lkr. Parchim. Jahrbuch für Bodendenkmalpflege in Mecklenburg-Vorpommern 55, 2008, 53–65.
- Wietrzichowski 2011: F. Wietrzichowski, Eine spätneolithische Siedlung in Parchim, Lkr. Parchim, mit Einflüssen der Glockenbecherkultur. Jahrbuch für Bodendenkmalpflege in Mecklenburg-Vorpommern 58, 2011, 31–50.
- Zich 2013: B. Zich, Die Siedlungsgrube "Befund 250/2007" von Karsdorf, Burgenlandkreis, im Siedelgeschehen der mitteldeutschen Aunjetitzer Kultur. In: J. Kneisel/H.J. Behnke/F. Schopper (eds.) Frühbronzezeit-Mittelbronzezeit. Neue Erkenntnisse zur Besiedlung zwischen Elbe und Warthe und angrenzender Regionen (2000–1400 v. Chr.): Symposium vom 24.–25. September 2011 in Welzow/Brandenburg (Bonn 2013), 135–148.

Imprint

ISSN 2197-649X

Layout draft: Holger Dieterich, Ines Reese
 Technical edition: Agnes Heitmann
 Language revision: Eileen Küçükkaraca
 © 2018 Ralf Lehmphul/UFG CAU Kiel
 Published by the Institute of Prehistoric and Protohistoric Archaeology, Kiel University;
 All rights reserved.
 For further information consult
www.jna.uni-kiel.de