Abhandlung

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The Evil Twin: Older Bronze Age Ceramic Typology of the Nordic Circle

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Schlüsselworte: Keramikstudien; Typologie; Multivariate Statistik; Bronzezeit; Norddeutschland; Materielle Kultur

Abstract: This paper focuses on the Older Bronze Age pottery of the Nordic Circle, which has so far been given a wide berth in research. Due to the insufficient amount of published material, the study applied the classical and yet often frowned upon type classification and brought it into dialogue with multivariate statistical analyses. This represents then the first overview study of the Older Bronze Age ceramic material of Schleswig-Holstein and it is even more relevant, because it can be helpful for later refinements and the classification of further material. In addition to the elaboration of ten vessel categories, which in turn could be subdivided into different numbers of types and type variants, the study makes clear how pottery production gains during the course of the Older Bronze Age in variety of form, size and expression. Links between this increasing complexity and the change in burial customs around 1300 BCE are also highlighted in relation to other changes in this period that have already been identified in the context of intensive transformation research in this region, so that the relevance of an examination of Older Bronze Age pottery becomes even clearer.

Keywords: Ceramic studies; Typology; Multivariate statistics; Bronze Age; Northern Germany; Material Culture

1 Introduction

The ceramic of the Older Bronze Age\footnote{In the chronological terminology of Schleswig-Holstein, the division into the Older Bronze Age and Younger Bronze Age is used, but corresponds to the same absolute chronological classification into the Early and Late Bronze Age, used in studies on the Nordic Circle.} of the Nordic Circle have so far been often ignored. This is not only because it does not necessarily correspond to our modern aesthetic sensibilities, but also because it does not appear particularly characteristic nor rich in variation. In particular, the Older Bronze Age ceramic material, which in German is called “Kümmerkeramik”, which means that it is poorly and rudimentary made, usually remains hidden like an evil twin, not least because the finds from the Nordic Bronze Age Period I (1800–1500 BCE) as a whole are few and do not yet stand out typical as “Bronze Age” enough from the Late Neolithic ceramic material. With Period II (1500–1300 BCE), the number of pottery vessels increases in parallel to the other finds, but they do not show any prominent forms or decorations that would explicitly encourage the archaeologist to take a closer look at them. Instead, archaeologists
prefer to deal with the metal finds, which reach the Nordic Circle in great numbers with Period II (1500–1300 BCE) and Period III (1300–1100 BCE), as can be seen for example in Schleswig-Holstein. Thus, for the Nordic Older Bronze Age pottery no comprehensive type classification is available yet. For the Younger Bronze Age (ca. 1100–530/500 BCE), on the other hand, which is often characterised by a large range of forms and decorations, there are already several studies on type classifications. In order to put an end to this unjustified imbalance, this article aims to sort and categorise Older Bronze Age pottery on the basis of the material published by Aner, Kersten and Willroth for Schleswig-Holstein. The type classification will be based on the ceramic material from contexts that have already been relatively chronologically dated with regard to other findings.

2 State of Research

Often, Older Bronze Age pottery is treated in research discourse as the “problem child” of the material culture of the Nordic Circle. Ernst Sprockhoff wrote in 1954:

„Die altbronzezeitliche Kümmerkeramik, nur selten bereichert durch Ware nach Art böhmischer Oberpfälzischer Hügelgräberkul tur; wird abgelöst durch Tonware von Großformat in Gestalt von Zylinder- und Kegelhalsurne, Amphore und Doppelkonus, deren Machart auch der Bezeichnung als Keramik wieder mehr Berechtigung verleiht.“

[Authors translation: The Older Bronze Age puny ceramic, only rarely enriched by wares of the Bohemian-Upper Palatinate tumulus culture, is replaced by large-format pottery in the form of cylindrical and conical neck urns, amphorae and double cones, whose designation as pottery is once again more justified.]

In other studies, this “Kümmerkeramik” is always described as coarse and ungraceful. One example comes from Schwarzländer, who describes the Older Bronze Age pottery from Archsum with the following terms: a coarse leanness; a rough, clumsy appearance; poorly fired clay; surface treatments limited to roughening, partly smoothed, finger nail impressions; ornaments are mostly plastic; vessel forms can be decimated to double coni, pots and bowls, which have features such as handles, handle pins, treatment of the wall surface, eyelet handles, band handles and various rim shapes; The few fine ceramics are limited to bowls, some with articulated profiles and funnel rims, handles and collar neck bottles.

In comparison, Jensen summarises the Danish material for Older Bronze Age pottery in a similar way as follows:

‘The forms of the pots were as a rule quite simple, almost without decoration, nor was the technical side of the matter given much attention: the pots were usually rather poorly fired. The surface of the pot was almost always irregular, uneven and knobbly typified by the way the large, sharp-edged tempering grains stuck out. The surface of the newly made pot was often smoothed with a wet hand. This meant that the finest clay particles came to lie outer most as a thin, covering layer. The tempering grains then appeared as peaks and bumps beneath the covering layer. The clay pots were rarely fired all the way through. This can be seen in the fracture surfaces of the potsherds. The outer layer or the inner layer of the potsherd is often missing. From this we can infer that the firing was not done at a constant temperature or with an even supply of air. The pots often have a ‘flamed’ surface. Along with the deficient firing, this shows that the pots were probably fired in an open fire and that differentiated in the wind direction and other conditions were allowed to affect the firing process. All this contributed to the fact that the pottery found at the settlement of the early Bronze Age is often much disintegrated. With the introduction of the cremation, pottery appears in burial. At that time, the design becomes more precise, and the appearance of the pots is given more care.”

On a more technical plain, a chronological distinction between pottery of the Older and Younger Bronze Age is made in that the Older phase is assigned a coarse to medium coarseness, a low firing temperature and a more barrel-like form, while the Younger phase presents a higher strength and finer fineness, which also means a better preparation technique and a high firing temperature. Kersten and La Baume occasionally describe regionally specific pottery deposits of the Older Bronze Age. For North Frisia, they presented a classification of vessel pottery. Wirth, who dealt with the Archsum/ Melenknop site, already made some morphological comparisons between his find material and the material published by Aner and Kersten (1979) on North Frisia. In doing so, he was able to draw some parallels to vessel ceramics that can be dated to period III on the basis of the associated finds. Hultén (2000) dealt with the Swedish site of Skåne and worked out a phase division of the pottery from the transition to the Younger Bronze Age and beyond. In particular, two phases (A and B) are distinguished, which are characterised by different surface treat-
ments. Lolk uses this classification for a comparison with Danish ceramic material (Jutland and Funen), which she divided into the Nordic Bronze Age phases after Montelius and evaluated statistically. A recent examination of Older Bronze Age ceramic material was undertaken for the Bjerre site (Thy) in Jutland by Kristensen. Those pottery forms are comparable in many respects with the Schleswig-Holstein specimens. A comparison with the Danish find material according to Lolk and Kristensen would be extremely useful in future studies, in order to be able to determine holistic and probably parallel developments between both regions. However, in order to take this step, the Schleswig-Holstein material must first be extensively described and structured, which is what this paper aims to achieve.

3 Typology – who still uses such a thing?!

The implementation of a type classification in archaeology is always associated with a critical frown, as typology implies an abstraction that may not always do reasonableness to the object and is based on reliance on subjective judgement. Especially in recent decades, opinions on typology have become more and more hardened and it sometimes seems that one has to justify it more and more if one chooses this “outdated” method. Even in teaching, there are only the last “survivors” who manage to convince students to classify different types of an artefact category. Digital methods, on the other hand, are increasingly outpacing classical typology. We much prefer to trust the results we get from artificial intelligences, because no one can accuse us of subjectivity. In this definition, the subjective character of a typology is unavoidable. Thus, a type classification is initially based on the typology (artificial selection). The “natural” intuition is very variable or subjective.

According to Adams & Adams, typology is a conceptual system formed by dividing a given field of objects into a comprehensive set (seriation) of mutually exclusive types according to a set of common criteria given by the intention of the typologist. Within the typology, each type represents a category created by the typologist to place separate objects with specific identifying characteristics in order to distinguish them from entities with other characteristics, in a way that is meaningful for the purpose of the typology. In this definition, the subjective character of a typology is unavoidable. Thus, a type classification is initially based on the typologist’s aim and is subject to the process of selection. A type is a specified member of a typology that can be distinguished from others and used as a category for sorting objects. An object can be a member of only one type. The consistent classification is done by setting up characteristics that represent a type and allow it to be recognised. Ideal types are idealised specimens, and all other specimens differ from them to a greater or lesser extent. For example, ceramic vessels are considered to be of the same type if they are identical in all essential features of form and material structure, and not just similar in general appearance.

The following part, it will be dedicated to define and discuss type classification as a scientific method before applying it.

3.1 Basics of the typological approach

The typological method is one of the classic methods in archaeology – but also one of the most controversial. Fundamentally, the classification of types could be based on the philosophical foundations of metaphysics, such as that of Aristotle, who dealt with the being and recognition of things, their matter and form. This approach also gave rise to taxonomy in the natural sciences, such as biology, in which plants and animals were classified based on morphological characteristics (species, genus, etc.). On the contrary, type formations are partly natural and partly artificial. The environment (e.g. nature) forms the modalities – the typologist, instead, selects what is informative for the intention behind the typology (artificial selection). The “natural” intuition is very variable or subjective.

14 Kristensen 2018, 161–244.
15 Di Maida et al. 2022.
16 Adams/Adams 1991, 8; 265 ff.
17 cf. e.g. Kühn 2017, 98 ff. 104 ff.
18 cf. Aristotle, De partibus animalium (Kullmann 2007); cf. also: Carl von Linné 1735.
20 Ibid. 91.
3.2 Application in archaeology – a short outline of the history of research

The first type classifications from the field of archaeology are available, for example, from architectural research. In 1817, Thomas Rickman presented his study on different styles and the stylistic development of English architecture: ‘An attempt to discriminate the styles of English architecture, from the conquest to the reformation; Preceded by a Sketch of the Grecian and Roman Orders, with notices of Nearly Five Hundred English Buildings’. In it, he describes the individual styles, distinguishes them from one another and classifies them chronologically – but without explaining his methodology. In initial steps, a more or less conscious structuring and chronology of archaeological material became possible through the introduction of the three-age system by Christian Jürgensen Thomsen in his contribution ‘Leitfaden zur nordischen Altertumskunde’ (1836) on the basis of stratigraphy, which was adopted from geology. His student Jens Jacob Asmussen Worsaae defined the ‘geschlossen Fund’ a little later and thus prepared a basis for the application of seriations. By 1900, the typological method was more and more applied in archaeology, as for example by Hans Hildebrand in the context of the type classification of fibulae (1872–80) – but Hildebrand did not elaborate on his approach. A proper discussion of the method followed in 1903 by Oscar Montelius in his work with the unequivocal title ‘The Typological Method’ (Stockholm 1903). In it, he describes the establishment of a typological series that can also be divided chronologically by the occurrence of typological rudiments. ‘Secure’ or ‘closed’ finds (objects that were laid down together and at the same time) allow temporal sequences with combination statistics. Today they find their representation, for example, in statistical analyses (e.g. seriation, correspondence analysis).

3.3 Aims of a type classification in archaeology

In archaeology, a type classification aims at structuring phenomena of development – be they cultural or social. In application, this means that the divisions of types can express successive sequences that are formed with the help of the typological method. Forms – such as vessel forms – are grouped or separated from each other. Systematic typification requires clear definitions of types that abstract the object in order to intertwine it with preceding and subsequent types. The spatial distribution of formed (leading/ideal) types is often used to more or less establish areas in which they occur and/or to assign them to a “cultural phenomenon”. This approach must always be viewed critically, since diffusions and convergences also play a role in the expression of forms, so that a “demarcation” can usually only be determined to a limited extent. In the present study, however, it is less a matter of geographical delimitation than of distinguishing ceramic categories, types and variations whose temporal phases of use can be determined on the basis of finds. For example, are certain forms associated with a certain category of features?

3.4 Typology under criticism

The application of the ‘typological method’ in archaeology is always accompanied by the idea that a type classification can only presuppose a linear development that should actually not be presupposed. The 19th century idea of development – from which the ‘typological method’ originates such as the development of human abilities – has long been outdated in science. Paul Feyerabend illustrates this problem with the dating of rock art: naturalism was initially assessed as a late phase supposed to be preceded by an archaic-infantile stage. This was refuted by noting that the early stages are more lively and follow each other in rapid succession, while later forms are ‘better painted’ but more static and lifeless. Typology also led to confusion in other studies. Furthermore, this method depends on the subjective type classification that is often criticised. The example of the Chauvet Cave in particular shows that the surprisingly old dating is accompanied by a already mature naturalism.

In archaeology, therefore, when types are divided, there should be an awareness that typologies are initially abstractions and merely subdivide a continuity of development into (useful) units. A greater or lesser degree of certainty about the actual succession of corresponding types can only be achieved through a combination with scientific (e.g., absolute dating) and statistical analyses (see above).

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22 Rickman 1817.
23 Montelius 1903, 14 ff.; 17.
24 Ibid. 3.
25 Ibid. 17 ff.
28 Di Maida 2022, 1174.
29 Feyerabend 2009, 48 f.
30 Di Maida 2022, 1174 ff.
31 Di Maida 2022, 1175, cf. bibliography.
4 Type classification of the Older Bronze Age pottery in Schleswig-Holstein

A classification of Older Bronze Age vessels is the aim of the following study. The main objective is to determine which vessel types and variants existed in which periods and whether certain vessel types correlate with particular time phases as well as find contexts. It is also of interest to find out to what extent cremation and the introduction of urn burial had an influence on the emergence and development of types. For example, is the increase in vessels in Periods II and III mainly due to the increase in urn burials? Statistical methods (e.g. Multiple Correspondence Analysis, CA) are used to check the chronological and context-oriented delineation of vessel types and variants. The CA is particularly suitable for identifying possible clusters and determining their correlation with the corresponding chronological or finding-oriented accordance. The present paper would have liked to integrate the machine learning (ML) component as well and bring it into dialogue with the type classification, but the small database of only 288 vessels does not lend itself to such an approach. However, this aspect should be considered for a future study, while the present one is only meant to represent a first step in the classification of Older Bronze Age pottery.

4.1 What the study is based on (and what it is not based on)

The study is based on the material that is available in form of drawings – i.e. with profile and scale. This approach brings with it the problem that it only represents the ceramics record in a distorted way because only a selection is shown. This selection thus brings with it the risk that the published ceramic material is either described as “typical” and thus represents an unreflected confirmation of past interpretations, or is characterised as “rare” and highlighted accordingly as something outstanding. This problem is known and also described by Lolk in her study of Danish ceramic material33. However, this approach offers the possibility to get an overview study that allows for later refinements and the classification of further material. For the type classification, all-available illustrations of ceramic vessels from Schleswig-Holstein (see Aner/Kersten volumes & card catalogue of the Archaeological state office Schleswig-Holstein) were first cut out by hand in order to then display, compare and sort them. Unfortunately, there are hardly any reconstructed vessels from the card catalogue that could be classified based on drawings, so that the south of Holstein which is not covered by the investigations of Aner & Kersten, is underrepresented in the present classification. Furthermore, some vessels from the whole of Schleswig-Holstein could not be assigned to any group. In order to prevent the formation of types based only on a single vessel, those were omitted. Vessels that were only completed on the basis of one or two sherds, were also excluded from the analysis for the time being, as their shape is uncertain. In the sorting process, the shapes and sizes have been used as the most indicative elements. Size was used, for example, to distinguish between tons and beakers, which otherwise had the same shape. Ornaments were initially disregarded – unless they represented a specific characteristic (e.g. handles of cups or eyelets of Jugs).

4.2 Comparison with other approaches

The approach used in this paper, differs from that of Lolk, who classified the Danish Bronze Age ceramic material by initially distinguishing both form and ornamentation, thus following Rasmussen’s system of classification34. As part of her statistical analyses, she added size as a parameter. In doing so, she found that functional categorisations in for example bowls and jugs seem to be blurred in the ceramic material of the Bronze Age. She therefore describes an initial classification into such groups as quite problematic. Moreover, the structure and decoration of a vessel probably played a greater role than small metric deviations, which could ultimately determine whether the vessel belongs to one group or another. Correlating this typological aspects with chronological data, Lolk found out that some groupings of stylistic and form-dependent combinations seem to be chronologically significant, while others seem to occur continuously during the Period II–V35. Based on these results, Lolk formulates three conclusions:

- Between the Early and Late Bronze Age, there is to some extent a gap in which some types disappear and are replaced by others, whereas others persist throughout.
- There is a certain uniformity with the Swedish division into phases A and B. Phase A features appear in two

33 Lolk 2009, 59.
34 Ibid. 60 ff.; Rasmussen 1993.
35 Lolk 2009, 61 ff., 67 fig. 3.
to three cases from Period II and III, but only become more general from Period IV. Phase B features, on the other hand, are concentrated in Periods V–VI. The passage between these two phases happens during Period V or at the transition between Periods IV and V, possibly with some overlap.

Bronze Age pottery is characterised by a high degree of conservatism in design and some types are also unchanged during most of the Bronze Age. This is associated with the presence of many unique vessels – especially in the Older Bronze Age.

For some Older Bronze Age vessels as well as for many Younger Bronze Age vessels of the Danish material (especially from Per. III/IV onwards), Lolk also notes similarities to Lusatian types (e.g. double coni). Lolk explains the fact that some forms endure over several periods or occur in both the Older and the Younger Bronze Age with Dean Arnold’s ‘motorhabits’ concept, based on ethnographic examples, according to which the inertia that lies behind the design of material culture is related to physical everyday actions and determines long-lasting vessel forms. However, in addition to the differences in the presented approaches, Lolk does not distinguish vessel types within the Older Bronze Age, but focuses only on the differences between the Older and Younger Bronze Age, so that a comparison of the outcome of this paper with the one of Lolk lacks in comparability.

Kristensen provides another approach for the ceramic material found at the Bronze Age sites Bjerre 1–13 in Northern Jutland. She recorded each ceramic find with regard to all relevant characteristics (e.g. number, weight, dimensions, characteristic sherd, quality, state of preservation, shape). Since the finds could not be fitted into any existing approach to typo-chronological analysis due to their heterogeneity, Kristensen chose a new approach. This was based on the calculation of vessels by using diagnostic sherd (rim sherd, base sherd, breakover sherd, eyelets, handles, ornaments), which were then subdivided into forms as far as the material allowed. This stringent procedure, together with technical observations (colour, firing, wall thickness, traces of manufacture), made it possible to divide the vessels into forms that could be assigned to the Older and Younger Bronze Age of the sites. Kristensen was able to convincingly establish that the simple and coarse ceramic vessels of the Older Bronze Age have been produced by a controlled firing process and that the porosity and the so often frowned upon coarse appearance of the vessels was probably intentional. Consequently, the potters of the Older Bronze Age were no less competent than those of the Younger Bronze Age. The use of new vessel forms in the Younger Bronze Age, which appear to be finer, thinner-walled and more standardised, is characteristic and, according to Kristensen’s extensive functional analysis, possibly functionally conditioned. Although this approach is very much tied to one site, the result greatly enriches the discussion, which has flared up again and again, regarding the competences and intentions of the Older and Younger Bronze Age potters.

For the present study, due to the data basis, the classic type classification is applied, which is described in more detail below.

### 4.3 Classification by sorting

The vessel images were first sorted according to ‘obvious’ vessel forms. Only then the shapes were systematically differentiated. The rim, neck, shoulder, belly and base forms played a decisive role as they determine the basic shape of a vessel, while ornamentation, surface treatment and lean of temper were initially less considerable, because they seem to be applied very inconsistently. Should the shapes of vessels could only be vaguely distinguished, they were subdivided into variants. Above all, the question was pursued: which morphological aspects of a form category make the vessel so distinctive? An attempt was then made to classify the rest of the material in terms of the same variables. If this was not possible, further features were added. In case these new features would reveal a pattern in the material, the original ‘obvious’ vessel forms must be then reconsidered.

### 4.4 Nomenclature

In order to give the classification a name, it is essential to describe the characteristics of the vessel forms, to give an explicit definition, and to name the type in order to be able to address and discuss it in the further course (‘type representation’). The vessels were thus first divided into general groups such as cups, tons, etc. according to their shape and size, and within these groups then subdi-

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36 Ibid. 70 f.
37 Ibid. 72 f.
38 Arnold 1993; Lolk 2009, 81 ff.
39 Kristensen 2018.
41 Ibid. 30 f. 55 f.
vided according to specific characteristics — concerning, for example, their break zones, base and rim features. In some cases, special forms can also be defined within a type and its variants. Ornamentation that occurs rather rarely overall was not taken into account — except when the shape of a vessel that also has conspicuous ornamentation differs from other shapes.

4.5 Chronological classification

The vessels are often classified chronologically on the basis of other finds. Therefore the types can be more or less precisely assigned to a period. With regard to the dating horizons, it is noticeable that the majority of the vessels date to Period III. This dominance of ceramic finds in Period III can also be seen in the overall overview of the material occurrence in Figure 1. The vessels that were only classified as belonging to the Older Bronze Age were aoristically divided between the periods for the evaluation (see below)\(^{42}\). This is noted accordingly in each case. A chronological study based on this material in order to achieve a more precise chronological classification is not yet available. For the present study, only the associated finds were used to approach the questions of transformations in a first step.

4.6 Statistical analysis: CA

In contrast to seriation, the correspondence analysis (CA) can spatially represent the data from the contingency tables in a coordinate system, i.e. the correlation of data is visualised\(^{43}\). While the data was evaluated manually in the case of series, algorithms are used in CAs from multivariate statistics. This means that the evaluation of the data is done automatically by computer programmes. It no longer depends on the mathematical skills of the archaeologists, but on the quality of the used algorithm. Furthermore, this method supports analysing data not only in terms of its presence/absence over a period of time, but also in terms of its frequency and illustrates the relationships between categorical variables\(^ {44}\). For the individual steps in the procedure and mode of operation, reference is made to Backhaus et al.\(^ {45}\). The CAs used in this paper were carried out using various computer programmes: R (using RStudio (Version 3.5.3) & FactoMineR), PAST (Version 4.03) and CAPCA (Version 3.1). A discussion on the individual software programs for performing a CA has already been dealt with by Siegmund, so that reference can be made to his work\(^ {46}\). In the present study, an ongoing ‘dialogue’ was conducted with the computer programmes by constantly re-evaluating the


\(^{43}\) Greenacre 2007, 1 f.; 137 f.

\(^{44}\) Ibid. 144.

\(^{45}\) Backhaus et al. 2015, 401 ff.

\(^{46}\) Siegmund 2023, 8 f.; 12 f.
5 The Types (and their variants)

The material of the present study includes 288 ceramic vessels, which were initially divided into ten vessel forms of which Beakers clearly predominate. Tons are the second most common vessel form, followed by Terrines. Cylindrical-neck vessels, Cups, Conical-neck vessels, Steep-bowls and Bowls, on the other hand, are rare, while Jugs and Funnel-neck vessels are the exception (Fig. 2a). Most of the vessels come from North Frisia (especially Amrum and Sylt), far ahead of the other parts of Schleswig-Holstein. The other districts are only represented with between two and 26 vessels (Fig. 2b). For two districts (Stormarn; Pinneberg), it was not possible to calculate vessel numbers, as no usable and dated database is available yet. However, the clear over-representativeness of vessel-amounts in North Frisia is mainly due to surplus of research or to the presence of illustrated finds in the Aner & Kersten.
volumes from this region (Fig. 3). The contexts of the finds are almost always graves. Only occasionally do the vessels come from contexts such as settlements, single finds or depositions.

The above-mentioned vessel forms were subdivided into types, which revealed different variants, the characterization of which is described below. The order of the descriptions is based on the occurrences in the database listed in Figure 2a.

5.1 Beakers

The Beakers are characterized by their tall shape. These are generally small vessels between 7.5 and 15 centimetres, that is, at least half of tons in height (see 5.2.). They are thereby found in all parts of Schleswig-Holstein and can be divided into 10 types, which can be partially subdivided into variants (see Table 1; Plate 1).

5.2 Tons

As the Beakers, Tons are also tall vessels. However, they are higher and larger than Beakers. They are at least 15 cm tall, but on average, they are 20 cm tall. Furthermore, they are characterized by the fact that their shapes do not show any breaks. They can be divided into five types, which can be partially subdivided into variants (see Table 2; Plate 2).

5.3 Terrines (plate 2)

Terrines include vessels that are wider than tall, but can be distinguished from low bowls (see below) in that they have a raised wall. Two types can be distinguished: Type 1 are single-linked tureens with a stepped neck that retracts slightly and ends in a straight rim. In some cases they are provided with a stepped foot and often with handlings at the neck bend. Variant 1 of Type 1 is larger than its Variant 2 (dating: Period III) and Variant 2 is correspondingly smaller than Variant 1 (dating: Period II). Vessels of type 2 are...
wide-mouthed bowl-like but tall terrines with an inwardly curving low neck. The lower part may be more or less bulbous and the bottom may be stepped (dating: Period III).

5.4 Cylindrical neck vessels (plate 3)

The vessels with cylindrical neck can be divided into three variants: Variant 1 includes wide-mouthed vessels, with a rounded lower part and a strong bend of the neck and possibly handling (dating: Period III). Variant 2, on the other hand, is narrow-mouthed and its lower part is bulbous-shaped and merges into a more or less strong bend of the neck that finally ends in the cylindrical neck. They may be provided with handling (dating: Period III). Variant 3 is overall smaller than variants 1 and 2 (Period II).

5.5 Cups (plate 3)

A cup is lower than a beaker and always has a handle. The Older Bronze Age cups can be divided into three types and their variants. Type 1 includes tall beaker-shaped cups that tend to be high shouldered and have a steep wall. The flat bottom may be slightly stepped. The single handle may be rimmed, or attached to the shoulder. Variant 1 of this type is equipped with a stepped rim (dating: Period III), while variant 2 (dating: Older Bronze Age). Type 2 includes all low cups. Variant 1 has a stepped rim and occasionally a bulging foot (dating: Early Bronze Age). Variant 2 is without a stepped rim and has occasionally a foot as well (dating: Older Bronze Age). Type 3 includes biconical cups, some of which may have a rimmed handle and a foot-like stepped base. They have a retracting neck end in a straight rim (dating: Period III).
**5.6 Conical neck vessels (plate 3)**

Vessels with a conical neck have a strong neck-shoulder bend and an overall narrow-mouthed appearance with a tall conical neck. Two variants can be distinguished. In variant 1, the lower part is rounded. This study further distinguishes a larger (Variant 1a, Older Bronze Age) and a smaller (Variant 1b, Period II) form. The vessels of this variant have at least two handles and the base is only occasionally stepped. Variant 2, on the other hand, includes funnel-shaped lower parts with narrow bases (dating: Period III).

**5.7 Steep bowls (plate 4)**

Steep-walled bowls have a mostly simple ton-like shape with partially inwards-bending rim as well as stepped bases. Compared to tons, however, they are much smaller. Handling occur very rarely. Variant 1 has a straight steep rim that may, occasionally, weakly bend inwards. The vessels appear almost like round-bottomed jars. A special form of these bowls is recorded in extremely low numbers (dating: Older Bronze Age). Variant 2 shows strongly inwards-bending rim ends and a special form is represented by a very low bowl (dating: Older Bronze Age).

**5.8 Bowls (plate 4)**

The bowls include low, wide-mouthed vessels with variously profiled rims (both outward and inward curving rims are possible). Vessels of this category may have handling as well as stepped bases (dating: Period III).

**5.9 Jugs (plate 4)**

Jugs were single-handled, tall, bucket-like vessels. The base may be slightly stepped like a foot. In some cases, the shoulder and rim are so pronounced that the profile appears s-shaped (dating: Period III).
5.10 Funnel neck vessel (plate 4)

Funnel neck vessels include beaker-shaped containers that have a biconical base and a tall funnel-shaped neck. Sometimes they are equipped with a handle on the neck (dating: Older Bronze Age).

6 Analysis

The quantitative distribution of the above-mentioned vessel categories over Periods I to III (with aoristic distribution of Older Bronze Age data over the three Periods) shows, on the one hand, that the number of ceramic vessels in the database initially increases steadily from Period I to II and then strongly towards Period III (Fig. 4). On the other hand, the variety and frequency of different vessels increases from Period I to III. Beakers occur most frequently in all periods. Terrines, cylindrical- and funnel-necked vessels, tons and steep-bowls are also significantly represented in Period II (for Period I, these forms have only been aoristically calculated on the basis of Older Bronze Age values, but not verified). In Period III the spectrum is completed by evidence of conical-neck vessels, cups and bowls. Above all, terrines and conical-neck vessels now also account for a comparatively high quantitative share. In a further step, the category of findings is therefore moved to the centre in order to determine whether the strong increase in vessels is linked to the emergence of urns.

Looking at the spatial distribution of the vessels, which could be dated by periods based on additional findings in the same feature, one can see that in Period I there is a markedly unspecific distribution. With Period II, one can recognise on the one hand a more widespread distribution, while on the other hand, a clustering in the southwest is clear. With Period III, the pottery vessels discussed here occur almost everywhere, but also show individual accumulations, especially on the North Frisian Islands. The vessel contexts, which can only be generally assigned to the Older Bronze Age, show a widespread distribution corresponding to all the three periods.

6.1 Temporal sequence of types

In the following, not only the vessel forms but also the defined types and variants are to be examined more closely with regard to their chronological classification. The aim is to correlate the classification of pottery vessels with their temporal context in order to be able to determine possible temporal sequences of the form designs.

In a CA, the types (without variants) were correlated with the time phases (Fig. 5). The corresponding cross-classified table can be found in the supplement (Supplement 1). Here, the Older Bronze Age dates were aoristically divided among the Periods I–III. This method is helpful when
Fig. 5: Correspondence analysis of vessel types of the Older Bronze Age of Schleswig-Holstein and the Periods I–III (created with FactoMineR): 1st vs. 2nd eigenvector, p-value = 0.00108178. The Older Bronze Age dated vessels have been aoristically divided among the Older Bronze Age periods.
quantitative data are available that do not allow for exact dating, such as a specific period. If, for example, a find only dates to the “Older Bronze Age”, it spans over Periods I to III and is thus calculated with 0.33 per period. For this purpose, three objects (Periods I–III) per variable (respectively types and variants) were taken as a measure in the CA. The division into Periods I–III is clearly recognisable in the CA. It is noticeable that vessels of Period I, include mostly beakers, a few cups and steep-bowls. In addition to that it can be seen that different types of the same vessel categories occur in different periods. Beakers of type 6, for example, tend to belong to Period II, while those of type 4, for the most part, belong to Period I. During Period II, on the other hand, cylindrical-neck vessels, funnel-neck vessels and some terrines dominate, before Period III is characterised by an increased variety of forms of tons, bowls, jugs, conical-neck vessels, but also beakers, cups and terrines. For this CA focusing on the dating of vessel types (without their variants), a very good explanatory value was found for the first two axes (78.01 % and 21.99 %). Furthermore, the analysis yielded a p-value of 0.001, which shows a very high significance or over-significance and can thus represent a plausible correspondence between the vessel types and the time periods. However, the significance of the p-value and its reliability are not without error. Controversial voices criticise in particular the reproducibility of results and the extension of results by adding more data, which very easily shift the p-value into low significance as well as that with a p-value basically only a statement about the null hypothesis is made.\textsuperscript{47} For this reason, the p-value is only included as a complementary measure in this study and is not used to explain the data analysis variability. For comparison, the variants were included in a second CA (Fig. 6), which above all allows a separation of vessels of Period II and III. The corresponding cross-classified table can be found in the appendix to this study (Supplement 2). Beakers of variant 2 type 10, terrines of variant 2 type 1, cylindrical-neck vessels of variant 3 type 1 as well as beakers of type 6 and funnel-neck vessels in general thus only occur in Period II. The vessels of Period I are less clearly delineated. Only the type 4 beaker is reserved for Early Bronze Age Period I. Most of the vessel variations are bound to Period III and seem to occur only insignificantly in the first two periods. The explanatory values are in a high range (82.05 % and 17.95 %), while the p-value (7.042) shows no increased significance values.

With the temporal analysis it can thus be stated that with Period III not only the variety of types and the variants increase, but also the quantity of pottery in general. Accordingly, an increased production of pottery must be assumed for Period III, which can be proven for the whole of Schleswig-Holstein (cf. Fig. 1). As already observed, the transformation in material distribution has already been investigated in particular by changes in burials.\textsuperscript{48} In comparison with the general material distribution in the working area, a slight shift in quantity from Period II to III can be detected with regard to the graves, where ceramic finds from burial mounds are more strongly represented. This observation is surprising, as the building of burial mounds finds an end in Period III (around 1300 BCE), so that a rise of ceramic material in the very last barrows that were built, is very significant. With regard to the other materials from graves of Period III, the proportion of bronze finds remains stable if compared to Period II. In contrast, however, we see a clear increase in gold and pottery finds with Period III.\textsuperscript{49} The diversity of materials and also the inclusion of new and supra-regional symbolic languages in the production of artefacts (e. g. sun, horse, bird, etc.) show an outstanding transfer of new influences and accumulations of knowledge, which may also have had something to do with new world views and socio-political organisations. The ceramic spectrum is not unaffected by this new diversity and probably played a new and irreplaceable role, especially concerning the emerging cremation burials. When comparing the Danish ceramic forms that emerge with the Younger Bronze Age with the material from Schleswig-Holstein, parallels can undoubtedly be drawn. It is therefore inevitable that the ceramic forms from Period III onwards, in the course of this transformation process, became a class of object that was subject to conceptions of supra-regional nature.

### 6.2 Body treatment and types

In this paper, the question is not only addressed as to when which vessel types existed within the Older Bronze Age, but also what kind of find contexts are involved in which the individual vessel types occur. As it has just been discussed, the number of ceramics and their diversity increases strongly with Period III (see above). The aspect of a connection to changes in burial rites has already been mentioned and will be further focussed on in the following by asking question such as: Does the emergence of vessels and vessel variants relate to specific features? Can the change from inhumation to cremation be seen as a trigger for the...

\textsuperscript{47} Hubbard/Lindsay 2008; Nuzzo 2014, 150–152; Raese 2021, 102.
\textsuperscript{48} Schaefer-Di Maida 2023, 283.
\textsuperscript{49} Ibid. 283–285.
Fig. 6: Correspondence analysis of vessel types and their variants of the Older Bronze Age of Schleswig-Holstein and the Periods I–III (created with FactoMineR and PAST): 1st vs. 2nd eigenvector, p-value = 7.042365e-10. The Older Bronze Age dated vessels have been aoristically divided among the Older Bronze Age periods.
increase in ceramic production, type complexity and creativity in vessel design and meaning?

With the transition from inhumation to cremation, the Older Bronze Age Periods II–III is characterised by a fundamental transformation process⁵⁰. This process not only caused a new body treatment, but brought with it also an end to the monumentality, since from 1300 BCE onwards no new burial mounds were built, but only secondary burials were placed in existing ones. At the same time, there is an increase in flat graves, which is also related to an increase in graves in general. In this context, not only the burial furnishings are changing from a focus on weapons to dress components and personal objects (e.g. razors, toilet sets), but also the number of grave goods, which are increasing overall and becoming more uniform.

This overall change seems to be regionally different, because in some areas the first cremations date already very early, as for example in the West of Schleswig-Holstein (Grave mound LA 29 in Albersdorf in Dithmarsh, KIA-54089: 3220±30 uncal BP [1533–1427 cal BC]), while in the greater part of the work area a later dating around 1300 BCE dominates⁵¹. Consequently, around 1300 BCE the change in the treatment of the dead seems to have been largely established. Subsequently, a transformation in grave construction also sets in (around 1200 BCE). The construction of burial mounds comes to an end around 1300 BCE and burials increasingly take place in flat graves. The cremated bones were either scattered on stone pavements or deposited in urns, which in turn were placed in stone constructions. In the course of Period IV (1100–900 BCE), however, urn burials seem to dominate more and more and from Period V on (around 900 BCE), burials take place almost exclusively in urn graves⁵². In terms of dating, the grow in the amount and diversity of vessels seems to increase with the new treatment of the dead and the new grave construction. This would mean that with the change in death customs we are also dealing with a change in material culture and especially in the importance of ceramic vessels and their diversity, which can also be connected to a rise in creativity and personal expression.

For the present study, it is of central interest to see to what extent the vessel forms correlate with regard to their combination in grave finds. For this purpose, all forms (types and variants) that originate from grave contexts were correlated with regard to the treatment of the dead known in the grave, in order to possibly trace the change from inhumation to cremation also in the design of the ceramic forms. The corresponding CA is presented in Figure 7. The respective cross-classified table can be found in the supplement to this article (Supplement 3). A slightly parabolic sequence from Inhumation to Scattered cremation to Urn is recognizable. The inhumation burials include small vessel forms such as beakers, steep-bowls or small terrines as well as small cylindrical-neck vessels. With the scattered cremation burial, the vessels occasionally become larger and in some cases increase in variation. This observation thus deviates from the results of Lolk, who established for the Danish ceramic material of the same period that the same types of vessels were used for scattered cremation burials as used in inhumation burials⁵³. However, in the present study, it can be stated that especially with the transition to urn burials, the variety of shapes is very pronounced and the vessels become larger overall, so that, for example, very large terrines can be found. The use of larger vessels in urn contexts is on the one hand logical, as they must be now larger to accommodate the cremated bones. On the other hand, there are also smaller urn vessels and altogether new forms, so that there seems to be no uniform specification for grave ceramics. It is possible to postulate, that social and societal aspects controlled the choice of grave vessels. The individuality in design may also include personal relevance, which possibly also depended on the individual themselves (group membership, gender, age). For example, it has already been demonstrated for the urn graves, that were placed around the burial mounds at the site of Mang de Bargen, that age played a significant role in the choice of the urn vessel, the associated grave goods and the location of the urn grave near the burial mounds⁵⁴.

7 Ceramics as part of a cross-regional transformation

In addition to the transformation in burial, changes are also taking place in other contexts around 1300 BCE, such as the different grave constructions, the declining frequency of placing depositions⁵⁵, the diet (e.g. introduction of millet⁵⁶) and the restructuring of households. The latter is particularly evident in a shift from very large (up to 250 m²) to small houses (ca. 65–80 m²)⁵⁷. This transition could not yet

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⁵⁰ Ibid. 323–327.
⁵¹ Ibid. 231.
⁵² Ibid. 323–329.
⁵³ Lolk 2009, 100.
⁵⁵ Ibid. 267–270.
⁵⁶ Feeser et al. 2022, 185–215.
Fig. 7: Correspondence analysis of vessel types and their variants of the Older Bronze Age of Schleswig-Holstein and the Body treatments Inhumations, Scattered cremations and Urns (created with FactoMineR and PAST): 1st vs. 2nd eigenvector, p-value = 7.988356e-13. The Older Bronze Age dated vessels have been aoristically divided among the Older Bronze Age periods.
be precisely dated for the working area of this study, but based on the data from Northern Jutland, we can state that with the end of barrow building, the construction of large houses came to an end and from then on smaller houses and thus smaller households emerged. In this context, Kristiansen assumes for Bronze Age Denmark that a household was linked to at least one burial mound. An overall restructuring of society and everyday living, brings not only a new organisational structure and new cooperative behaviour in both house and grave construction, but also suggests new group dynamics in living together; a novel division of labour, new decision-making-processes, new activities (e.g. implementing cooking stone pits areas) and a new way of dealing with resources and the dead. Such new dynamics must also have affected the production, circulation, use and meaning of everyday objects, such as pottery.

As it has been already mentioned, the Period III is the most diverse phase of the Older Bronze Age in terms of material culture, as other groups beside bronze are increasing, particularly ceramic finds (Fig. 1). The bronze finds in graves, for example, show a clear transition from a dominance of weapons in Period II to a dominance of dress components and personal objects in Period III, which could be interpreted as a change from objects charged with prestige and symbolism to objects that are less representative but of a more personal significance.

The change in the design of ceramic vessels can be traced back to this apex. The transition from non-uniform, thick-walled, roughly tempered but homogeneously fired vessels to larger, fine-walled vessels that are altogether finer but possibly less homogeneously fired could, on the one hand, be explained by the functional change mentioned by Kristensen. On the other hand (or maybe in relation to that), it could also be a new production strategy following new household and cooperation dynamics, which is reflected in the new production method. In connection with the change in the firing process and the increase in overall pottery production, it could be considered that the increased use of pottery vessels required new strategies of firing and thus it was carried out in a more centralised way, i.e. pottery vessels from several households were brought together for firing, thus reducing the average cost of pottery. However, the firing quality decreases with larger firings or is less controllable, which could explain the changes in homogeneity. Last but not least, it may also have been a socio-political decision to distinguish the new group structures from the preceding ones.

Taken together, it can be concluded that the changes in Older Bronze Age pottery production of the southern Cimbrian Peninsula (and beyond) had an important meaning for the society and was a significant part of an overarching process of transformation and should find relevance in discussions much more often.

8 Summary

The pottery of the Older Bronze Age in Schleswig-Holstein was neglected or deliberately ignored by scholars for a long time, as it did not seem to be particularly characteristic or attractive. The present study ventured to take on the pottery of Periods I–III (i.e. 1800–1100 BCE) and to subdivide it into categories. Due to the small amount of data, the type classification was chosen as the method and proved to be well suited in the evaluation in combination with multivariate statistics, so that initial statements on Older Bronze Age pottery can be made, which can be built upon in the future. Typology should not be condemned, but should continue to be recognised as an essential method for processing even small data sets.

The defined vessel types of Older Bronze Age pottery from the working area show a sequence of different vessels that were in use from Period I to III. It became apparent that during Period I mainly beakers of type 2 (variant 1), type 3 and type 4 were used, which originate from burials with inhumations under barrows. A small cylindrical-neck vessel of variant 3 also dates to Period I to II. The use of this variant demonstrably increases with Period II. In Period II, on the one hand, the beakers were supplemented by the type occurrences of type 1, type 2 (variant 1 + 2a), type 6 and type 10 (variant 2). On the other hand, terrines of type 1 (variant 2) were produced. Type 2 (variant 1) cups continue to be used, while types 3 and 4 are becoming less important. Funnel-neck vessels are represented by only one vessel. Furthermore, type 2 tons (variant 1a + 1b) appear for the first time, as well as variant 1 bowls. The vessels of Period II come mainly from inhumations under barrows. In this period only in two cases could a scattered cremation burial be found in a barrow. The two vessels from these scattered cremations are, on the one hand, the single funnel-neck vessel mentioned above and, on the other, a type 2 beaker (variant 2a).

With Period III, the spectrum of vessel forms is complemented by cups, conical-neck vessels and bowls. Terrines and conical-necked vessels now appear much more frequently and in more types and variants. While many new types and

59 Kristiansen 2018, 117.
60 Schaef-Di Maida 2022.
61 Ibid. 282–288.
62 Kristensen 2018.
63 Earle et al. 2011, 435.
variants of existing vessel forms are added, some are no longer included. Thus, cups of variant 1, terrines of variant 2 of type 1, cylindrical-neck vessels of variant 3, beakers of type 4 and beakers of variant 2 of type 10 are no longer recorded in Period III. Especially the cylindrical-neck vessels (variant 3), the terrines (type 1, variant 2) and the beakers of type 10 (variant 2) were replaced by larger specimens with the same design in Period III. From this it can be concluded that grave pottery size generally becomes larger with Period III. This is very probably also connected with the increasing use of some types as urns (cf. Fig. 7) – as shown, for example, by the find contexts of variant 1 of beaker type 10. However, small vessels were also used as urns, so that the new burial custom cannot be the only reason for the design. Regardless of this, it should be noted that in some cases the design has been retained, so that in these examples only a functional transformation of it is evident. In this context, it can also be stated on the basis of the data available from the site of Mang de Bargen that the forms of the Older Bronze Age beakers are reflected in the large urn vessels of the Younger Bronze Age, for example in the form of single-part terrines (cf. E. Schmidt 1993). Older Bronze Age dated vessels can further be identified by the occurrence of cups of variants 1 and 2, cups of type 1 (variant 1 + 2), type 2 (variant 1 + 2), terrines of type 1 (variant 2), conical-neck vessels of variant 1 a, funnel-neck vessels, beakers of type 1, type 2 (variant 1 and 2a), type 3, 4, 5b, 6, 7, 8, 9, 10 (variant 1+ 2), tons of type 2 (variant 1 a + 1 b + 2), type 3, type 4 (variant 2).

The general diversity of the form spectrum in Period III has thus been proven not only for the Bronze Age metal finds, which are usually prominently discussed in research, but also for the pottery finds, against the background of burial change, as an important aspect in the research of transformation patterns.

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64 Schaefer-Di Maida 2023; Kneisel et al. 2019; Schaefer-Di Maida 2018.
Plate 1: Beakers, all 10% of 1:2.
Plate 2: Tons, all 10% of 1:4; Terrines, all 10% of 1:2.
Plate 3: Cylindrical neck vessels, Cups and Conical neck vessels, all 10% of 1:2.

Cylindrical neck vessels

Type 1, Var. 1
Type 1, Var. 2
Type 1, Var. 3

Cups

Type 1, Var. 1
Type 1, Var. 2

Type 2, Var. 1
Type 2, Var. 2
Type 3

Conical neck vessels

Type 1, Var. 1a
Type 1, Var. 1b
Type 1, Var. 2
Plate 4: Steep-bowls, Bowls, Jugs and Funnel-neck vessels, all 10% of 1:2.