Continuity and change: on a computer-aided classification of Late Neolithic and Early Bronze Age pottery from the Netherlands

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Abstract

This article discusses the preliminary results of an ongoing project on the typological classification of Late Neolithic and Early Bronze Age pottery from the Netherlands. The overall goal of the present study is to contribute to the improvement of the current pottery typologies. The SECANTO computer program was used to group the pottery in shape groups, based on their profiles, and the resulting groupings were compared with the current pottery typologies.

Key words: typologies, neolithic pottery, Single Grave Culture, Bell Beaker Culture, Barbed Wire Beaker Culture

1 Introduction

This article discusses the preliminary results of an ongoing project on the typological classification of Late Neolithic and Early Bronze Age pottery from the Netherlands. To be more specific, vessels of the Single Grave Culture (in the following abbreviated as SGC), the Bell Beaker Culture (further BBC) and the Barbed Wire (Beaker) Culture (BWC) are being analyzed. The first two cultures lasted from c. 2800-2400 BC and c. 2400-1900 BC resp.¹ and are regarded as marking the end of the Dutch Neolithic. The BWC (c. 1900-1600 BC) is seen as representing the onset of the Bronze Age in the Netherlands.²

With respect to the emergence and development of the Late Neolithic and Early Bronze pottery, different views are held. At the moment there are basically two theories: the uni-linear model and the two-track model. These shall be discussed in detail, but before doing so it should be mentioned that the basis of these two models are in many respects the same.


Figure 1. Typological subdivision of the SGC beakers. Notice that f. e. the type 1a includes several varieties. After Van der Waals & Glasbergen 1955.

Both are primarily based on more or less archaeologically complete vessels, associated with burials. Furthermore they are both grounded in typo-chronological considerations. In view of the following setbacks this comes as no surprise, there are practically no (pottery) stratigraphies and although there are associations these are far from common. Moreover, ¹⁴C-dates appear to be unsuited for high-precision dating. A two sigma
calibration covers usually a time span of several centuries. Therefore, considering the importance
that typo-chronology has, the overall goal of the present study is to contribute to the improvement
of the current pottery typologies. In our view they show several shortcomings which results from
the fact that the potential the pottery has is yet to be fully exploited. The current typologies are too
broad and thus inaccurate, as the example of the 1a type SGC beaker illustrates (see Figure 1). The
type includes vessels with only cord impressions and beakers with other forms of decoration, such
as herringbone motifs. The cord impressions can constitute either an uninterrupted or a zonal
decoration, i.e. a regular alteration of decorated and plain strips. As these varieties are related to
differentiation in time and space, a subdivision of the 1a type would be useful.4

Another limitation is that the current typologies shed too little light on the variation in vessel shape.
As indicated above, the classification of SGC beakers is based on decoration, yet the BWC beakers have not yet been subdivided on whatever
grounds at all. It is worth mentioning, that none of the typological subdivisions to date have been
established with the aid of a computer. A classification of the Late Neolithic and Early Bronze Age vessels from the Netherlands with the
SECANTO computer program would therefore be a first.

This study specifically aims to test both the unilinear model and the two-track model and evaluate
which of the two is the most plausible, with the focus of the study being the vessel shape itself as
this area until now, has largely been neglected. The present analysis is being carried out in the
framework of the PhD research by the first author, which focuses on the Late Neolithic from the
Netherlands. The final results of the present investigation will be integrated into the dissertation,
specifically into a chapter about the emergence and development of bell beakers.

2 Late Neolithic and Early Bronze Age pottery: a general overview of earlier studies

A milestone in Dutch Late Neolithic beaker research is a paper by Van der Waals &
Glasbergen in Palaeohistoria IV from 1955. It may be considered as being the first attempt of a
systematical typological subdivision, seeking to explain differences in pottery in terms of cultural
diversity and as differentiations in time and space. The subdivision of the SGC beakers uses
variations in decoration, as does the group of All-Over-Ornamented (AOO) beakers. In the case of the (‘true’) bell beakers, not only ornamentation,
but also the form of the vessel are seen as being significant. The typology by Van der Waals &
Glasbergen is still today, the standard used to classify Late Neolithic beakers. The fact that
several additions and redefinitions have been made does not change this.

Over time the theories of Dutch researchers about the chronological and cultural relations between
the SGC and the BBC has changed profoundly. Van der Waals & Glasbergen claimed in 1955 that
the SGC and the BBC were two separate cultures, which were partially contemporary. But in the
1970s Lanting & Van der Waals argued in a series of articles, that in the Lower Rhine Basin, basically
comprising the Netherlands and the bordering Belgian and German regions, the BBC followed
the SGC. A high degree of continuity between the two is suggested, with regards to both culture and

3 According to the subdivision by Van der Waals & Glasbergen. See J. D. van der Waals and W. Glasbergen.


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population. A similar view is held by Lanting of the BWC in the Netherlands and northwestern Germany, which is believed to have derived from the indigenous BBC. Among the arguments put forward are the strong similarities in burial customs. The pottery associated with both cultures is also used to illustrate this continuity.

According to Lanting & Van der Waals, the group of All-Over-Ornamented (AOO) beakers developed (Figure 2) from the SGC beakers, which are decorated with impressions on the vessel’s upper half or up to and including the largest belly circumference. As suggested by their typological name, the AOO is characterized by ornamentation covering (almost) the entire outer surface. The next stage in the beaker development is thought to be represented by the bell beaker of maritime type or, the 2Ia type bell beakers. These beakers also show a decoration applied to more or less the entire outer surface. However, in contrast to the AOO beakers, the ornamentation is zonal, i.e. a regular alternation of decorated and plain zones, both of about equal height. There is one type in particular amongst the group of AOO beakers which Lanting & Van der Waals consider the predecessor of the maritime bell beakers: the 2IIa type beaker (Figure 3).

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This development is thought to have been a fluent one, in which the height of undecorated zones on beakers gradually increased. The two scholars further believe that the maritime bell beaker was the earliest bell beaker, from which all other decorated bell beakers originated. Or, to put it differently, the remainder of decorated bell beaker types from the Netherlands supposedly have their roots, either directly or indirectly, in the maritime type bell beakers.

Very recently Lanting has reiterated this view. On the basis of the bell beakers not classified as

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Maritime type beakers two regional groups have been identified: one encompassing the district of the northeastern Netherlands (the provinces of Drenthe, Groningen and Overijssel as well as parts of the province of Friesland and the area within the province of Gelderland E of the rivers IJssel and Oude IJssel), the other occurring in roughly the remainder of the country. It has been suggested that each region had a beaker development of its own. Among the characteristic types from the first district are rated the “epimaritime” bell beakers (Figure 4, left), while in the rest of the Netherlands the bell beakers belong predominantly to the bell beakers of the Veluwe type (the Veluvian bell beakers) (Figure 4, right; see also Figure 2: the types 2I-d-If).

Figure 5. The two-track model as proposed by Drenth & Hogestijn (2007). Please note that the beakers depicted are only examples of “halfway down” decorated beakers (bottom row) and beakers with a (practically) completely decorated outer surface (top row). So, they are not displayed in a “genetic” sequence though in a chronological order, starting with the late SGC on the left and ending with the BWC.

In conclusion, the uni-linear model envisages the development of beakers as the following sequence: SGC beakers -> AOO beakers -> bell beakers of the maritime type -> other (decorated) bell beaker types. Due to the crucial position given to the maritime bell beaker this theory of beaker development has been named the uni-linear model by Drenth & Hogestijn. They have however challenged this model, by pointing out that from the late SGC until the BWC the beakers can basically be divided into two groups: “halfway down” decorated and beakers whose outer surface is (practically) decorated from rim to bottom (Figure 5).

They arrived at this conclusion after measuring the height of the decoration on several hundreds of vessels. The beakers of the late SGC, for example, fall into two groups: the SGC beakers, which belong to the “halfway decorated” group of beakers, and the AOO beakers, that represent the group with an outer surface ornamentation of 95-100%. This bimodal distribution can also be identified in bell beakers and BWC beakers, suggesting that Late Neolithic and Early Bronze Age beakers in the Netherlands may have developed along these two “lines”. Accordingly, Drenth & Hogestijn have introduced the term “two-track model” to explain the emergence and development of Dutch bell beakers.

In addition, they have drawn attention to the wide variety of decoration present during the late SGC as well as the full and late BBC, stressing how positioning a maritime bell beaker phase in between would not be consistent with the notion of cultural continuity, the foundation of the uni-linear model in its latest version. In such a phase the decorated bell beakers would exclusively be associated with the maritime type beakers, decorated with herring-bone motifs in combination with horizontal lines. The two-track model overcomes this inconsistency, by suggesting that the ornamentation found on beakers of the late SGC, continued to be applied although frequently in an altered form. In other words, there never was a decline in the decoration variety during the early BBC. Instead, the motifs used in the late SGC either continued or were transformed in the course of time, examples of which being the herring-bone and zigzag motifs. The triangles and lozenges that are found on several early bell beakers may well be rooted in the late SGC cross-hatching.


Let us discuss in further detail the likeliness of a maritime bell beaker phase. In addition to the aforementioned arguments Drenth & Hogestijn have disputed its existence on other grounds. Firstly, no sites are known which have produced unequivocal evidence for such a stage in time. Secondly, during the late SGC, daggers made of French flint and stone battle-axes seem to have served as high status objects or prestige items in flat and barrow graves. The stone wrist-guards or bracers and copper daggers dating to the BBC period probably fulfilled the same role. Yet, none of the maritime bell beakers from graves in the Lower Rhine Basin have been found in association with these high status items. The existence of a maritime bell beaker phase would therefore imply severe socioeconomic changes, which would contrast strongly with the overall concept of cultural continuity. Thirdly, it should be pointed out that in the case of a maritime bell beaker phase, regional differentiation would be less distinct. In other words, if this phase is rejected regional differences are clearly discernible without interruption throughout the Dutch Late Neolithic, from the early SGC onwards up to and including the late BBC.

Last but not least, it should be mentioned that sherds decorated in maritime style have been recovered from late SGC settlements in the province of North Holland. This places doubt on the existence of a maritime bell beaker phase, although admittedly this still does not exclude the possibility that during the very beginning of the BBC the decorated bell beakers were all decorated in a maritime style. At the moment the exact dating of the maritime type is unclear. There are indications that it was also present during the onset of the BBC.¹²

3 The data set

The data set we have so far analyzed, comprises c. 240 vessels, all of which are tripartite in forms. The majority of these vessels are usually being labeled as beakers. The remainder consists of vessels traditionally known as "beaker pots", dating from the BBC and the BWC, a proto-pot beaker of the late SGC, and bowls belonging to the BBC. Each piece of pottery has been published in the form of a drawing in publications. To mention each and every publication upon which our data set rests in this article is obviously not possible; however they will of course be referred to in the final report. Here it suffices to cite the major works from which the data derive.¹³

To conclude this section, it should be stressed that the analyzed sample only includes vessels which are complete or at least archaeologically complete, by which we mean that a complete profile is present.

4 The SECANTO computer program

The SECANTO computer program is a sophisticated version of the “sliced method” as developed by Wilcock & Shennan in order to classify bell beakers from Central Germany.¹⁴ Vessel profiles are divided into equidistant slices along the vertical axes and the ‘distances’ between the vessels are calculated as a sum of squares of the distances between the points on the outer surfaces of the vessels (Figure 6). To incorporate not only the shape of the outer vessel wall, but also the overall vessel width, the distances between the central axes are added as well.¹⁵


¹⁵ For more specific information about Secanto see V. Mom "SECANTO, the Section Analysis Tool." In The World is in your eyes, Proceedings of the XXXIII Computer Applications
The advantage of the SECANTO computer program over the slice method is its greater accuracy. Apart from that it has several advantages when compared to the traditional intuitive classification. The main one being that it measures exactly the distance between the overall shape of vessels. Such a procedure is more precise, objective and repeatable (and therefore easier to check) than an intuitive classification such as “beaker A looks very similar to B, however specimen C has entirely different shape”. Such a statement does not include a precise quantification of the degree of similarity.

It should be emphasized that the SECANTO computer program focuses on the overall vessel shape and, therefore, ignores any details. Accordingly, nominal traits, such as inverted rims, protruding feet and carinated profiles, are not seen as being important, in contrast to traditional typologies. This is certainly the program’s major disadvantage. It means that analyzing a data set does not automatically create a usable typology. Instead, grouping the vessels is something which must done by taking, not only the overall shape but also form details, such as the shape of a rim and the foot, into consideration. This means that one must self study the vessels in detail, highlighting the limitations of SECANTO.

5 Preliminary results

The SECANTO analysis has resulted into the distinction of 13 individual shape groups. Several of these groups are very similar or even identical to the groups of earlier classifications. To give an example, Lanting has distinguished the category of large Barbed Wire pots, using both the decoration and the vessel shape as criteria, the latter, having an egg-shaped body, a small foot and an short inverted high placed neck. This form is typical of one of the groups resulting from the SECANTO analysis (Figure 7, left). Two other shape groups consist of vessels with a relatively wide base, no protruding foot and a slightly everted or more or less cylindrical neck. The main difference between these two groups is the relative height of the belly. These two groups mainly contain vessels which traditionally are classified as Veluwe type beakers. However our study has also produced a number of new groups.
or at least groups that have not been published as such. An example being a group of vessels with an S-shaped profile, of which the maximum belly diameter is situated relatively low, about 1/5 to 2/5 of the vessel’s height. Judging by the decoration, the majority of the vessels under consideration must be rated among the SGC beakers (Figure 7, right).

As noted before, we were compelled to take a closer look at specific shape traits, as the SECANTO computer program does not take these into account. This lead to two discoveries of note: firstly, it is possible that two SGC beakers were produced by the same maker. The rim of these beakers is characterized by a small lip (Figure 7, right), a feature which is further unparalleled in the sample group. In addition to this trait there are two other arguments that support the view that they were produced by the same hand. The first argument is a geographical one, since the beakers were found together in the central primary grave of barrow II on the Ermelose Heide (mun. of Ermelo, prov. of Gelderland). The overall shape, the herringbone motif, the height of the decoration and the lip at the rim on both beakers as well as the context from the pottery derives suggest that they are the products of the same potter.

The second discovery concerns three bell beakers recovered in the northeastern part of the Netherlands. The beakers were found in the central grave of barrow I at Diever, mun. of Westerveld, a probably secondary grave in barrow Otterberg II, mun. of Midden-Drenthe and the primary central grave of a burial mound at Odoorn. All three barrows are located in the province of Drenthe. Typologically the beakers belong to regional beaker types. What sets these three beakers apart, from other examples of the regional beaker types in the northeastern Netherlands, is the internally beveled rim. Rims with an internal bevel are more often encountered in bell beakers of the Veluwe type.

As regards the former, the SECANTO analysis shows that within the sample investigated these beakers are one another's closest matches. Furthermore, both are decorated with a herringbone motif. Equally the height of the decoration is very similar, i.e. in both instances covering c. 64% of the outer surface.

Figure 8. Bell beaker from Odoorn, prov. of Drenthe, in the northern part of the Netherlands. Notice the internally beveled rim, a feature which is rarely encountered in the local and regional bell


beakers. Such a rim type is however frequently found in the bell beakers of the Veluwe type. The beaker type has its main distribution in the central and southern districts of the Netherlands. Therefore, we can assume that the beakers from Diever, Drijber and Odoorn display influences from elsewhere, since the core area of the Veluvian type bell beakers in the Netherlands encompasses roughly the western, central and southern part of the country. Our suggestion is supported by the fact that several bell beakers of Veluwe type have come to light in the northern Netherlands.

6 Conclusions

It goes without saying that the pottery analysis with the help of the SECANTO computer program is a step in the establishment of a new typological subdivision. Apart from shape, vessels have other relevant traits. Decoration is usually considered, at least from a typological point of view, as one of the major ones. By combining different traits we hope to arrive at meaningful and useful units. But what is useful and meaningful? In our opinion, creating a typology with these qualities requires not only an assessment of a combination of the intrinsic features that individual vessels have, but also to include extrinsic aspects (contextual information). In other words, the typological approach is holistic. The aforementioned results, notwithstanding their preliminary character, illustrate this. The advantage of typologies based on this approach is that the line of reasoning can be followed and the outcomes can be tested. The use of the SECANTO computer program is well suited to this method.

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