

THE TYPOCHRONOLOGY OF TRB WEST GROUP POTTERY

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ABSTRACT: In connection with the reconstruction of the large assemblage of pottery from the *hunebed* G2, near Glimmen, *gemeente* Haren, a survey of TRB West Group pottery was carried out. From this survey, a series of seven stages in the development of TRB pottery was identified, based on the development of form and decoration. These stages, 'horizons', are described in terms of the most popular motifs, techniques and forms at any one time. Horizon 1 shows distinct similarities to the pottery of the late Haassel-Fuchsberg group from which it is derived. The subsequent divergence and development of the West Group as a separate, regional entity is seen from Horizon 2 onwards.

The pottery belongs to two main traditions, one continuing through Horizons 1 to 4 and including most of the former Drouwen Style, and the second continuing through Horizons 4 to 7 and including most of the former Havelte Style. This development lasted approximately 550 years, beginning at about 3400 cal BC and ending at or around 2850 cal BC.

KEYWORDS: Northern Netherlands, Northwest Germany, Neolithic, TRB West Group pottery, typochronology.

1. INTRODUCTION

The reconstruction of the Glimmen G2 assemblage (Brindley, 1986) produced a representative collection of TRB pottery from all but the earliest stages of the development. This provided an opportunity to examine and review the typochronology outlined by Bakker (1979).

Van Giffen (1925/27) identified three styles of TRB pottery; the Drouwen, early Havelte and late Havelte styles. Later, Knöll (1959) published an exhaustive typological study from which he also identified three successive phases; Knöll 1, Knöll 1/2, Knöll 2. Although the material, sequences, and timespan of the two series are almost identical, the subdivisions are slightly different – the result of one being based ultimately on mutually exclusive assemblages and the other on typological considerations. This and Knöll's very detailed typological analysis led Bakker (1979: p. 48) to conclude that, during the 750 year long period which he believed was involved, further styles should be identifiable and that these should indicate chronological phases. He therefore used Knöll's typology (with slight amendment of two pilot series) as a basis on which to refine the Knöll and Van Giffen schemes. There is no denying that most of Knöll's typological explanations are reasonable and since then, radio-carbon dates have indicated that the general trend of his phases is correct.

Bakker discussed the Knöll typology in detail in

chapter 3 of his book. The absence of any illustrations in this section is a very great hindrance to any appraisal of the discussion and indeed of the briefly outlined typochronology which he puts forward in the subsequent chapter. It is difficult to follow the lines of his argument and to apply the typochronology – both of which are open to criticism. At the onset and in personal discussion, Bakker has stated that this sequence is purely a typology but his use of the term 'phase' and his discussions, particularly of the dating of megalithic tombs, indicate that a chronology is understood and accepted by him. Secondly, the typology is heavily dependent on decoration, as Bakker felt that the profile would reflect the skill of the potter rather than its typological position. However, although individual examples may show a greater or lesser expertise, the level of competence on the whole usually does not create a problem when identifying vessels. It is more probable that working from photographs and drawings made an analysis of profile development impossible.

In practice, it proved very difficult to assign specific pots to Bakker's scheme. Bakker's typology consists of seven phases (A-G with both D and E subdivided) based on two pilot series, bowls/pails and jugs/tureens/amphorae (Bakker, 1979: pp. 61-75). Phase A material is scarce and the period was probably of short duration. For Bakker's Phases B, C and D1, bowls/pails are defined by the presence or absence of single decorative elements – zigzags,

grooved lines or *tvaerstik* – and a general trend towards more rhythmic patterns. These bowls/pails are in fact all very similar and frequently occur together (Bakker, 1979: fig. 18). Similar problems arise with the second pilot series, this time from an over-emphasis of the chronological importance of triangles. It is more likely that Phases B, C and D1 represent a single phase, rather than subsequent and distinct chronological phases. Further problems of definition occur with Bakker's Phases D2 and E1. A large amount of material is assigned to these two phases, which Bakker himself states is difficult if not impossible to separate and which led him to suggest that a relatively long period of time might be involved. As with the definition of C and D1 material, the problems of definition arise from an over-emphasis of the importance of *tvaerstik* and in this case, the difficulties of reconciling the two systems, Van Giffen's and Knöll's, which diverge chiefly at this point.

In attempting to resolve some of these issues a series of seven horizons were identified, based on examination of a large number of assemblages, either in collections, publications or photographic archives (see Appendix) representing all stages of TRB development. The assemblages represent both long term and short term depositions. The horizons are described in terms of the most popular forms and decorative schemes at any one moment and the development of these. Within each horizon several typological changes may occur, but these are not necessarily chronologically significant. In general, typological developments are restricted at any one moment to a specific type, and secondly, the changes themselves are usually quite small and it is not difficult to imagine that some occurred spontaneously on separate sites. A horizon is only identified when changes can be noted across a wide spectrum. As with any sequence, the boundaries inevitably include some element of arbitrary judgement. In particular, within each horizon a general progression can be noted in the general direction of the overall sequence, while inevitably, pots with characteristics of two horizons will occur. In accepting the artificial constraints of an imposed system, allowances and judgements must sometimes be made.

2. THE TYPOCHRONOLOGY

In the following sections and the illustrations therewith, all examples are selected from groups of finds in the Netherlands, the Emsland (including the Hümmling) and Westphalia. Regional differences in decoration of TRB West Group pottery are recognizable even within this relatively small area. Although the typological development of the pottery here outlined is broadly valid for the whole of the

West Group area, the citing of examples from Oldenburg and farther east is deliberately omitted because of the local variations that occur there. A good survey of the TRB West Group pottery in Oldenburg has recently been published by Fansa (1982).

Examples are cited from several large assemblages whose publications are widely available. For reasons of convenience the references consist only of site name and figure number. These large assemblages are: Emmeln (Schlicht, 1968), Gross Berssen (Schlicht, 1972), Wechte (Knöll, 1983) and Glimmen G2 (Brindley, 1986).

2.1. Horizon I

Types: the full range of types has not been identified but include: bowls with lugs or perforations in pairs immediately below the rim, jugs with rounded bodies, funnel beakers with rounded bodies, lugged beakers, collared flasks, possibly lugged flasks (a single example is known from Glimmen G3 (Brindley, 1983: fig. 11); its early date is not in question but its precise date in relation to other material is not clear; lugged flasks may have occurred through a relatively short Horizon 1 and into Horizon 2). In addition to these, other lugged vessels seem to have occurred. The single sherd from a large pot with large handle at midbelly from Angelslo-Heemingslag (fig. 3:6) seems to belong to a 4- or 8-handled amphora of the type found in Baalberge or Salz-münde contexts (Behrens, 1973: Abb. 26, 27, 29, resp. 33). An amphora of this type was also found in Oldendorf, Kr. Lüneburg, Grab II (Sprockhoff, 1952) together with pottery belonging to Laux's Group B, which may be equated to West Group Horizon 2 (see 4).

Decoration: horizontal elements immediately below the rim (e.g. maggot impressions or dots or oblique lines forming a rough zigzag). Vertical, decorated strips (chiefly ladders with horizontal, oblique or vertical hatching, zippers, maggot zippers) on remainder of body. Few bowls are sufficiently complete to allow a full analysis, but one of the three bowls from Exloo D30 and the bowl from Bronneger D21 show a regular and repeating series of what at first glance appear to be randomly arranged strips, for 2/3rd to 3/4th of their circumference (figs 3:1 and 4). Both jugs and funnel beakers usually have undecorated necks and decoration which covers shoulder and body in a single scheme. An exception is the jug from Emmen D43a which also has a narrow horizontal ladder below the rim (fig. 3:8, courtesy J. Molema).

Techniques: *Tiefstich*, incised lines, maggot impressions.

Motifs: narrow strips, either as ladders (horizontal hatching) or hatched (oblique or vertical hatching), zippers, dots.

Closed finds: Exloo D30, three bowls (fig. 3:1-3, one only recently recognized) found amongst the packingstones of the *hunebed* (Van Giffen, 1925/27, part II: p. 227), Angelslo-Heemingeslag (Bakker, 1979: p. 183, fig. B 1; new reconstruction this paper: fig. 3:5-6).

Other finds: Valthe, sherd of a lugged beaker (fig. 3:7). A very fine and well-preserved lugged beaker which is closely comparable to this is known from Neumünster (Struve, 1939: Abb. 1 and 2), Emmen D43a, sherds of jug (fig. 3:8), Emmen-Oude Roswinkelerweg (collection and information, E. Drenth), Bronneger D21 (figs 3:4 and 9), Rijs F1 (Van Giffen, 1925/27: Pl. 152: 5,8,9), Glimmen G3 (Brindley, 1983: fig. 11).

2.2. Horizon 2

Types: lugged bowls and pails, jugs with increasingly angular profile and handles with angular bend, angular tureens with wide and curving strap handles (rare, Tinaarlo), funnel beakers, collared flasks, undecorated amphorae type I (one example known, Hooghalen (Bakker, 1979: fig. B4:5)), lugged beakers (no known examples, but the type occurs in both Horizons 1 and 3), biberons, possibly lugged flasks (see above, Horizon 1).

Decoration: the horizontal elements below the rim tend now to consist of continuous or repeated elements, e.g. zigzag lines, sometimes doubled, or a band of short vertical lines, or a horizontal ladder. This zone is most frequently found on the bowls and pails but may also occur on jugs where it is usually narrow and separated from the shoulder decoration by an empty area (towards the end of the horizon a few vertical lines may occur in the zone, Tinaarlo, fig. 4:12, Hooghalen, fig. 4:14-15). On the bowls and pails, however, there is no empty area and the lower decoration starts immediately below the horizontal elements, and consists of vertical strips including ladders, zippers, hatching, and chevrons, interspersed with vertical lines (including *tvaerstik* lines). These strips are often combined to give wider strips of decoration. The strip itself may broaden and may be bordered by narrow ladder strips (e.g. Zeijen A and E, Bakker, 1979: figs B13:33, B14:20a). This combination of motifs leads eventually to the well-defined panels of Horizon 3. Although simple vertical lines in groups and fringes are now very common, strip decoration also occurs occasionally on the shoulders and bodies of funnel beakers (Hooghalen, fig. 4:19), and on the shoulders of the jugs where it is augmented by triangles or their equivalent. Apart from the *tvaerstik* line the most important addition to the decoration is the shoulder triangle, which appears first during this horizon, subsequently becoming perhaps the most characteristic motif of the following horizon. Its origin is unclear; it may have developed from the

ladder. A jug from a stone cist at Gudendorf, Stadt Cuxhaven (Tempel, 1979) has shoulder decoration which may be an early mutant of these ladders. Its shoulder triangles are unusual in both form (very narrow and truncated) and hatching (horizontal). The overall impression suggests a connection with ladders rather than with the broader triangles which may have developed subsequently in line with the shorter shoulders of the tureens of the Düsedau horizon (see chapter 4). In West Group terms the Gudendorf stone cist can be dated to the transition of Horizons 1 and 2. The true hatched triangle occurs in conjunction with tureens with wide, angular shoulders and broad strap handles. It occurs in hatched form on tureens of the Düsedau Horizon of Altmark *Tiefstich*. Subsequently, probably shortly afterwards, it is replaced by the filled triangle which is a constituent of the Haldensleben Horizon (Preuss, 1980). In the West Group, hatched triangles are rare (e.g. Tinaarlo, fig. 4:12), but the variants – filled, pseudo triangles and shoulder stamps – all occur during Horizon 2, at least during the end part of it (filled: Hooghalen, fig. 4:14; pseudo triangles: Hooghalen, fig. 4:15; shoulder stamp: Zeijen, fig. 4:11).

Techniques: chiefly *Tiefstich* or simple lines. Maggot impressions (Elspeet, Bakker, 1979: fig. B10:25); Glimmen G2, No. 126; Hooghalen (fig. 4:20), these do not seem to occur after this horizon. The earliest examples of *tvaerstik* date from this horizon. Sherds from a pail or bowl found in a pit at Emmen D43 show a combination of ladder and single *tvaerstik* line. Two jugs (Exloo D30, Van Giffen, 1925/27, part II: fig. 9:22; Weerdinge, fig. 4:10) have *tvaerstik* lines on the shoulder. The horizontal ladder pattern on the Weerdinge strap handle is comparable to that on the early Horizon 3 tureen from Glimmen G2 (No. 246) which on other grounds has been compared to jugs (Brindley, 1986). This handle decoration may also be compared to decoration on the strap handles of tureens from Issendorf (Tempel, 1972: figs 4-6). Zigzags are executed as a continuous incised or *Tiefstich* line, or as discrete, incised or maggot impressed strokes.

Motifs: strips as for Horizon 1 but increasing in width and including chevron zigzag and zigzag and interspersed with vertical lines. Narrow vertical ladders play an increasingly important role in defining wide strips of ornament. Horizontal zigzags, true hatched and filled triangles, pseudo-triangles, shoulder stamp.

Closed finds: Diever (Bakker, 1979: fig. B3, except No. 3 which was found outside the cist and is later), Zeijen (Bakker, 1979: fig. B12-15, the relatively broad strips on both the jug (B15:44) point to a late stage in this horizon), Hooghalen (Bakker, 1979: fig. B4-B5).

Other material: Weerdinge (fig. 4:10), Barger-compascuum (fig. 4:2, information O.H. Harsema),

Bronneger D21/22, Glimmen G2 (Nos 113, 238-240), Exloo D30 (Van Giffen, 1925/27, part II: fig. 9:22), Elspeet (Bakker, 1979: fig. B6:3), Rijs Fl (fig. 4:24).

2.3. Horizon 3

Types: lugged bowls, pails, tureens with angular profiles and strap handles, funnel beakers, lugged beakers, amphorae type I, collared flasks, biberons.

Decoration: within this horizon, the decoration diversifies further and in certain instances becomes more specific to individual forms. Immediately below the rim, a horizontal zone develops, usually consisting of vertical lines bordered by horizontal elements. The horizontal elements are usually zigzag or related motifs or simple lines, the lower border may be a broad and shallow grooved line. On bowls/pails, the band of vertical lines is usually continuous, but occasionally the lines are grouped. On tureens, the lines are usually in small, well-spaced groups but are sometimes replaced by pointed multiple arcs or by narrow, horizontal blocks of two lines (e.g. Glimmen G2 Nos 258, 259). Vertical lines occur frequently on both sides of the handle, and on the handle itself, extending down onto and sometimes over the shoulder. Zigzags, spaced verticals and pointed multiple arcs occasionally occur also on the necks of funnel beakers.

On the bowls/pails, below the horizontal zone the strips develop into relatively large panels often defined by either broad shallow grooves or broader *Tiefstich* lines pendant from the basal line of the horizontal zone (the grooves may also penetrate the upper horizontal zone). The panels form fairly regular, vertical zones, filled with vertical lines, chevron zigzags, vertical chevrons (particularly common below the lugs), zippers and in the upper portions of the widest panels, horizontal lines and zigzags.

The decoration on the shoulders of tureens also includes these panels, but the major decorative element of the tureens is the triangle or a related motif. The triangle occurs in various forms, true triangles (i.e. outlined and filled) pseudo-triangles (i.e. approximately triangular impressions) and as shoulder stamp. All these occur throughout Horizon 3, but only the shoulder stamp occurs frequently in Horizon 4. Decoration occasionally moves over the shoulder onto the upper body. A decorative panel, usually incorporating a chevron or multiple arc often occurs below the handle itself. Simple vertical lines are the most common form of decoration on the handles.

Decoration on funnel beaker bodies is similar to that of the preceding horizon, except that the decorated strips seem to have disappeared entirely.

Lugged beakers, having comparatively long necks, include a horizontal zone below the rim, and

two vertical zones, one on the lower part of the neck and the second covering the shoulder and body. These zones consist of alternating panels. Lugged beakers are not particularly common but examples occur at Glimmen G2 and Exloo D30 where a second has been recognized recently (fig. 5:29-31), Hundedorf (Schirinig, 1979: Abb. 5) and Tannenhäusen (information J.A. Bakker). Amphorae do not appear to be numerically significant until Horizon 4. A very finely decorated example was found in a flat grave at Werlte, Kr. Aschendorf-Hümmling (Schlicht, 1968: Abb. 7). The neck, which has a pseudo-*tvaerstik* line immediately below the rim, is incomplete and its decorative scheme is unreconstructable, but the shoulder shows a well-developed panel decoration. Other amphorae show chiefly *tvaerstik* technique but include elements such as vertical lines on the neck and panels on the shoulder and body which are more at home in Horizon 3 contexts (Bottrop-Kirchhellen, fig. 5:26; and Emmeln, fig. 5:24).

Typological developments within this horizon: several important typological developments contribute to the diversification in decoration, both in motif and technique. One of these is the progressive movement from true zigzag (executed by a single continuous movement) and zigzag by discrete opposed strokes, by way of separate strokes which are no longer discrete but which cross at each extremity, to strokes which cross to such a degree that they are termed skating motif. All of these variations occur within this horizon on vessels which are otherwise identical (compare Glimmen G2 Nos 113, 120, 118, 114). The *Tiefstich* technique also varies considerably through the use of variously shaped stylus heads, several different impressions often appearing side by side on a single vessel. The most important of these is the pointed nib- or quill-like stylus giving a deep-tipped triangular impression. This results in a line of close set impressions looking remarkably similar to *tvaerstik*. In fact, this form of *Tiefstich* is executed along a guideline which may occasionally protrude at the end of a line, or even more rarely, may still be visible behind the pointed impressions. However, the execution of these impressions normally destroyed the guidelines entirely (see Glimmen G2, Nos 111, 116, 251). A second variant of this technique involves the use of a pointed stylus to create a line of opposed, chevron-like deeply indented stabs. This is also executed along a guideline which is subsequently destroyed by the deep indentations of the stylus tip (e.g. Glimmen G2, No. 248). The typology of the panel defining lines or grooves is demonstrated most clearly on two large, well-decorated pails from Bronneger D21. The first (fig. 5:2) represents an undeveloped example of Horizon 3 decoration – the layout of the lower zone is emphatically vertical, with the few panels outlined by ladder strips. The

second (fig. 5:4) shows a well-developed example of the same horizon, with wide panels and ladders replaced by very broad and shallow *Tiefstich* lines. The association of ladder strips with strips of other types which occurs from Horizon 1 onwards is highly significant for the ultimate development of the defined panels. Two additions to the motifs range, the multiple arc and the horizontal block, are significant in their continued importance through the following horizons. The multiple arc in its pointed form occurs sporadically during Horizon 3. Its use is confined chiefly to the necks of tureens (Glimmen G2, No. 251). It seems to have developed out of the single standing triangles at the base of the neck, examples of which are also known from early Horizon 3 tureens (i.e. the Seeste tureen, Bakker, 1979: fig. 31:1. The marked angularity and panel decoration of its shoulder are more easily reconciled with similar features not only of Horizon 3, but also of the previous horizon. *Tvaerstik*, presumably the main reason for Bakker's somewhat later dating of this vessel (to Phase D1) is an infrequent but well-established element of both Horizons 2 and 3). In its rounded form, the multiple arc becomes one of the most popular motifs of Horizon 4. Two line horizontal blocks also occur sporadically during Horizon 3, chiefly on the neck of tureens (Glimmen G2, Nos 258, 259) and at the top of the vertical panels on bowls and pails (Fig. 5:5). The motif has a long life, occurring throughout Horizon 4 where its lines have increased to between three and eight or nine, and well in to Horizon 5 where it is an equally important constituent of both the Heek-Emmeln and the Udelermeer-Anlo Styles. In the former, it may include up to thirteen lines.

Techniques: *Tiefstich* (see paragraph above) is the most common technique employed. The size of the stylus and the form of the *Tiefstich* line vary, contributing to the general range in decoration. True *tvaerstik*, where the guideline is a dominating visual part of the technique, increases in popularity during this horizon. Early examples include Glimmen G2 Nos 245 (vertical), 246 (horizontal), pails from Bronneger D21 (vertical, fig. 5:2) and Mander O2 (information Bakker), and a bowl from Emmen D43a (fig. 5:11, courtesy J. Molema).

Motifs: panels, zigzags, filled triangles, pseudo-triangles, shoulder stamp, pointed multiple arcs, two-line horizontal blocks, chevrons (usually chevron zigzag). Narrow strips decline.

Bakker places considerable emphasis on typological changes to separate his Phases B and C, including in the first only true zigzag and using as a major indicator of the second the presence of a broad shallow groove at the base of the upper decoration (Bakker, 1979: p. 64 and p. 66). Broad shallow grooves, zigzags and other related motifs occur on otherwise identical bowls and pails. These

two elements are insufficient to categorize vessels which are largely identical into two separate and distinct typochronological phases. In the second of his pilot types, strip patterns are given as the shoulder decoration type for Phase B and the hatched triangle as the type for Phase C (Bakker, 1979: fig. 29(B), p. 66). However, strip/panel decoration occurs well into Phase C (Bronneger D21, Bakker, 1979: fig. 30:2), while triangles occur on the jugs from Hooghalen which is otherwise a B assemblage. Within the Glimmen G2 assemblage, it has been argued that the tureens Nos 245 and 246 have proportions which are closer to jugs than to tureens, have triangles and shoulder stamp but no hatched triangles on the shoulders, and also include *tvaerstik* decoration. The vessels therefore show examples of triangle decoration at an early stage of development, in conjunction with *tvaerstik* technique. Individually, these elements belong to three separate phases in Bakker's typochronology (shape Phase B, triangles Phase C, *tvaerstik* Phase D).

Assemblages: many *hunebeds* contain large quantities of this material, including Emmeln, Gross Berssen, Glimmen G2, Bronneger D21/22.

2.4. Horizon 4

Types: lugged bowls, non-lugged bowls, pails (more squat than formerly and probably only during the early part of the horizon), tureens (including two-handled tureens and spouted tureens) with various profiles but with a marked tendency towards progressively contracting shoulders and smaller lug handles, funnel beakers with angular shoulders, lugged beakers, tureen-amphorae, amphorae type 1, collared flasks, biberons.

The decoration on the lugged bowls of the previous horizon breaks down and splits into three fairly distinct groups which are matched on both the tureens and the amphorae. The lugged bowls (and non-lugged bowls with similar ornament) form a typological link between the bowl series of Horizons 3 and 4. The upper zone remains distinct and fairly well-defined, although the middle part contracts sharply. The band of verticals often consists of little more than a line of short stab marks, or is replaced by a line of lozenges, 'C' motif or zigzag, or is simply left vacant. The lower boundary line consists most characteristically of a well-marked line of chevrons along which the lugs are situated, when they occur. Below this, vertical chevrons (below the lugs) divide the lower body into otherwise undefined areas, either left empty or partly filled with vertical lines or a combination of horizontal and vertical lines. Bowls of this type occur at Glimmen G2 (Nos 127, 128); Landersum (Bakker, 1979: fig. B15:8, 12b, 15); Heek-Ammerter Mark, Kr. Borken (information W. Finke, Münster); Emmeln (e.g. Nos 64, 159, 161), Gross

Berssen (e.g. Nos 44, 45). Bowls of this type belong to the first part of the horizon.

A second group of bowls shows the band of verticals being replaced by blocks of horizontal lines, occasionally incorporating multiple arcs. The lower border line (and sometimes the upper one as well), disappears. Blocks of vertical lines, interspersed with or replaced by blocks of horizontal lines replace the panels on the body. A third zone, repeating this pattern may occur, and in general the decoration covers a large portion of the bowl. Block decoration is widespread, occurring not only on bowls and pails, but also on tureen-amphorae and amphorae type 1.

A third group of bowls incorporates a zigzag (often multiple) in the mid area of the former upper zone which is associated with chevron panels or blocks on the lower body. Multiple arcs rarely occur on bowls.

On the tureens and amphorae type 1 the decoration follows similar lines, allowing for the motifs which are specific to the tureens themselves. Thus there is a group of tureens with horizontal lines on the neck and a very small, usually empty zone just above the shoulder (Glimmen G2, Nos 260, 280). This contracted zone may also include elements such as the 'C' motif, or lozenges which may then be repeated on the narrow shoulder (Glimmen G2, No. 261). The neck may also include horizontal blocks of more than two lines, the number of which seems to increase with the largest blocks of up to eight occurring at the end of the sequence. Tureens with shoulder decoration of this type usually have broad shoulders to incorporate horizontal bands of several lines or blocks of horizontal lines alternating with vertical blocks (Glimmen G2, No. 278). The decoration may derive ultimately from panel decorated shoulders. The width of the shoulder is related more to the necessity to accommodate the block decoration than to the angular and broader shoulders of the previous horizon which in fact contract.

The most widespread motifs on the necks of the tureen are the zigzag and the multiple arc usually in conjunction with narrow shoulder stamp. Tureens with this decoration develop very narrow, in some cases almost non-existent, shoulders, sometimes marked by a deeply indented line, and small lugs, becoming increasing more like tureen-amphorae. The lugs are now usually decorated with chevron motif, in place of the vertical lines. The multiple arc has its origin in the occasional pointed arcs of the Horizon 3 tureens and amphorae, and does not occur after Horizon 4. The zigzag also occurs sporadically on tureens of Horizon 3 (e.g. Gross Berssen No. 10, in association with both pointed multiple arcs and shoulder triangles). It continues into Horizon 5. Multiple arcs may occur with horizontal blocks and lozenge lines (Landersum,

Bakker, 1979: fig. B15:14), and zigzags may occur with horizontal chevron and lozenge (Emmeln No. 194). Late examples of the multiple arc occur on a tureen-amphora at Glimmen G2 (No. 282) and on small tureens from Ekelberg (Bakker, 1979: fig. B17:15) and Mesum (Bakker, 1979: fig. B18:9). Multiple arcs and zigzags occur as alternative motifs in some assemblages. At Glimmen G2, the multiple arc predominates, with only one possible example of a zigzag (No. 264). However, both are present at Wechte, Emmeln and Gross Berssen (a.o.) where intermediate forms occur, probably due to the presence of both motifs on the sites rather than to a typological link between the two (Wechte Nos 303, 210, 211, 221).

The tureen-amphorae develop out of tureens. As they frequently include zigzags and block patterns on the necks but rarely multiple arcs, it is probable that they developed from tureens with these motifs only. This suggests that tureens with multiple arcs may have disappeared at a slightly earlier stage.

Amphorae type 1 also show these three types of ornament. Some amphorae have basically horizontal line decoration, but may include chevrons below the lugs and some lozenge motif in the otherwise empty band (Glimmen G2, Nos 288, 289). Others show horizontal blocks, occasionally interspersed with multiple arcs on the neck and horizontal blocks with or without vertical blocks on the shoulder, these last sometimes extending onto the body (Glimmen G2, No. 292).

Motifs: block patterns occur throughout Horizon 4, on vessels of all types. Blocks of vertical lines or multiple arcs (or a combination of the two) occur frequently below the shoulders of tureens. Shoulder stamp, 'C' motif, lozenge (this and horizontal chevron are very reliable indicators of early Horizon 4), vertical chevron, multiple arc, zigzag (often multiple and larger than the zigzag of Horizon 2 and 3).

Techniques: *tvaerstik* of various forms executed with a variety of different stylus heads, *Tiefstich*, occasionally hollow stamp impressions.

Assemblages and other finds: the assemblage from Drouwen D19 includes a large representative group of Horizon 4 material. Landersum (Bakker, 1979: fig. B15), Oldenburg-Ofenerdiek (Knöll, 1952: Taf. 15:1-2), Oldenburg-Donnerschwee, Grambergs Gründe (Knöll, 1952: Taf. 15: 12, 15, 16), Ekelberg (Bakker, 1979: figs B16; B17), Sleen-Kruidhaarsveld (Van Giffen, 1937); Rheine-Mesum (*Neujahrsgross Münster*, 1985: pp. 28-29 and Bild 13). The assemblage from Mesum (Bakker, 1979: fig. B18), if a closed find (see Bakker, 1979, p. 193), represents a late Horizon 4/early Horizon 5 group, with elements of both.

2.5. Horizon 5

Types: bowls (sometimes globular in shape, frequently with small unpierced lugs), tureen-amphorae, amphorae type 2, some funnel beakers, funnel beaker cups, collared flasks.

Decoration: during this horizon, the decoration becomes more simplified. Two distinct styles are identifiable – the Heek-Emmeln Style which predominates in the eastern part of the West Group and the Uddelermeer-Anlo Style which predominates in the Northern and Central Netherlands. The two styles are confidently assigned to a single horizon because of the various motifs and techniques which they share. The most important of these are the zigzag motif and the block pattern, both of which derive from the previous horizon and form the basis of all subsequent decoration.

Heek-Emmeln Style

Types: within this style, the most important forms are the bowl with/without low, narrow lugs and the tureen-amphorae with sinuous curved profile and small lugs. Amphorae type 2 do not seem to occur.

Decoration: bowls have 2-3 horizontal lines below the rim. These always occur with block pattern, but may be omitted where a band of continuous large multiple zigzag or the related oblique blocks (see Wechte No. 266) is present. Vertical blocks occur on the lower body. Initially these continue almost to the base, but become shorter during the horizon. The decoration on the tureen-amphorae (which replace the tureens) is essentially similar, with the frequent addition of a line of *Tiefstich*, dots or stabs at the base of the neck and the occasional occurrence of a band of large zigzag on the shoulder, in addition to the vertical panels which occur on the body. Small blocks of zigzag or chevron related ornament occur below the lugs. Zigzag decoration occurs frequently on the necks of funnel beakers (e.g. Glimmen G2 No. 48).

Motifs: the large zigzag is derived from the zigzag of Horizon 4, but usually incorporates 4 or more lines. The horizontal blocks incorporate as many as 13 lines. The combined effect of both motifs is vertical, in comparison to that of the Uddelermeer-Anlo Style which is more horizontal in effect. The oblique block, a combination of the zigzag and the block pattern, also has an ancestry in Horizon 4.

Technique: chiefly fine pointed *Tiefstich*.

Assemblages: this style is represented in the following assemblages – Emmeln, Heek (Finke, 1983), Gross Berssen, Wechte, Gittrup, Ostenwalde (Fansa, 1978), S. of Hunneschans (Bakker, 1979: fig. B20). It also occurs in small quantities in many other assemblages, including Beekhuizerzand (Modderman, Bakker & Heidinga, 1976), Baalder Es (Bakker, 1979: fig. 34:1), Glimmen G2, and other *hunebeds*. Late within this style, and already

showing elements of Horizon 6 in form and decoration: Haltern-Westrupe Heide (Knöll, 1959: Taf. 41:14-16).

Uddelermeer-Anlo Style

Types: the most important forms within this style are bowls (with/without small round knobs), tureen-amphorae with cylindrical necks, small round shoulder and a distinct junction between neck and shoulder where the small lugs are situated, and including towards the later part of the horizon, large examples with heavy, horizontally pierced lugs (e.g. Harderwijk), and amphorae type 2 (derived from amphorae type 1, having cylindrical necks and spherical bodies).

Decoration: the bowls are essentially similar to those of the Heek-Emmeln Style, but the large zigzag is replaced by a band of close-set multiple zigzag. The horizontal blocks do not incorporate the very large numbers of lines which occur within the Heek-Emmeln Style. The vertical blocks on the lower body are frequently interspersed with 2-3 lines of close-set zigzag or stabs. Ultimately, these disappear, giving way to a continuous band of short verticals. These frequently terminate in 'tear' shaped impression. The tureen-amphorae have similar decoration, but with one important addition – in addition to blocks of vertical or horizontal lines and close-set zigzag, block patterns may also be executed in hollow stamp. Amphorae type 2 do not include block patterns on the neck. Two forms of funnel beakers occur: slack profiled funnel beakers with a line of fine dots beneath the rim are present at Beekhuizerzand (Modderman, Bakker & Heidinga, 1976: fig. 9, Nos 7-13); several small funnel beakers at G2 bear resemblances to the smaller amphorae type 2 in fabric, form and decoration to such an extent that the presence or absence of lugs was taken as the defining characteristic (e.g. compare No. 64 and Nos 298, 306, 307).

Motifs: close-set small zigzag in bands and blocks, linear blocks, hollow-stamp blocks. The close-set zigzag is a regional variation of the larger zigzag motif of the Emsland-Westfalen area where it occurs from Horizon 3 onwards. The block pattern has a well established ancestry in Horizon 4.

Techniques: fine *Tiefstich*, hollow stamp, grooved lines (rare: Glimmen G2 Nos 305, 306).

Assemblages: G2, Anlo (Waterbolk, 1960), Uddelermeer and Ugchelen (Bakker, 1979: figs B19-20). Some material in this style also occurs at Emmeln. Late within this style, and already showing elements of Horizon 6 in form and decoration: Harderwijk (Manssen, 1980; this paper: fig. 7:-22-23).

The Uddelermeer-Anlo Style as a whole can be characterized as horizontal when compared to the Heek-Emmeln Style. It is a regional offshoot of this

latter style and probably started somewhat later. It occurs in most areas at least sporadically, although it is absent from the Heek-Gittrup area.

2.6. Horizon 6

This material, identified first by Kat-van Hulten (1947), is essentially a further typological step beyond Horizon 5 in the direction of Horizon 7.

Types: only a limited amount of material is known from this period which on the basis of the undecorated material from both Horizons 5 and 7, can be assumed to include a large proportion of undecorated material. The main types include large amphorae derived from the tureen-amphorae of the preceding horizon and large, flaring, straight-walled pails also derived from tureen-amphorae with shoulders which have become so subtle as to have disappeared entirely. These two types have characteristically large horizontally pierced lugs. Other types include necked bowls, also developing out of tureen-amphorae (e.g. fig. 8:7-8), bowls, collared flasks and funnel beaker cups.

Decoration: the decoration is restricted to the necks and to a narrow area along the shoulder. The neck decoration may occur either with small breaks or as a continuous band. No empty area occurs in the vicinity of the base of the neck. Initially the decoration covers most of the neck, but subsequently contracts towards the base. Similarly, the shoulder decoration contracts upwards to the base of the neck. The neck decoration consists almost entirely of close-set zigzag, related motifs or horizontal lines. The shoulder decoration is usually in very narrow, discrete blocks or a narrow band, chiefly contracted versions of the decoration styles occurring during the previous horizon. Narrow, horizontal lugs with vertical lines occur (fig. 8:7-9), from which develop the slashed cordons of the following horizon.

Technique: pointed *Tiefstich*.

Material: Havelte D53 (collection B.A.I.: fig. 8:6,7 and 9; the most extensive and important collection of Horizon 6 material, with good examples of all typological developments within this horizon), Glimmen G2 (fig. 8:4-5), Nottuln (Eckert, 1986: Abb. 11), Angelslo, grave 4 (fig. 8:1), Harderwijk (Manssen, 1980: this paper fig. 8:2).

2.7. Horizon 7

The material in this horizon may be identified with Bakker's Phase G.

Types: large amphorae and/or large, flaring, straight-walled pails, with large lugs, were still produced. The rim fragment with paired handles from settlement pit 7 at Angelslo (Bakker & Van der Waals, 1973: fig. 7) and the lower part of a high, straight-walled pot from flat grave 13 at Angelslo

(Bakker & Van der Waals, 1973: fig. 8) belong to these types. Other types include necked bowls which are ultimately derived from tureen-amphorae via Horizon 6, simple bowls with/without lugs including so-called cordoned bowls, funnel beaker cups, collared flasks. The necked bowls show considerable variation in proportions and may occur with lugs. The lugs may be vertically or horizontally pierced or take the form of bosses.

Decoration: the decoration on these vessels is extremely limited, confined to the shoulder and consisting of narrow, often discontinuous, slashed cordons, and narrow panels of small stabs and opposed strokes. Decoration has disappeared from the neck area entirely. Decoration is a feature of the North-East Netherlands and the German coastal area (Bakker & Van der Waals, 1973). There are some indications that regional variations in form also occur. Amongst the undecorated material are funnel beaker cups, including some fairly broad examples, bowls and collared flasks.

Motifs: small slashes, stabs and strokes, applied, narrow cordons.

Assemblages: Denekamp (Bakker & Van der Waals, 1973: fig. 1), Angelslo (Bakker & Van der Waals: figs 6-9), Spier (Bakker & Van der Waals: fig. 10:4), Valthe (Musch, 1970), Drouwen, (Van Giffen & Glasbergen, 1964: the so-called pre-Drouwen finds), Glimmen G2 (e.g. Nos 174, 175, 213, 237).

3. RECONCILING THE HORIZON SERIES WITH THE WORK OF KNÖLL AND BAKKER

The most important typological studies of West Group TRB pottery are those of Knöll (1959) and Bakker (1979), both of which must be acknowledged and discussed in any new approach to the subject. Knöll's detailed typological analysis and his large photographic catalogue provide a corpus of information not otherwise easily accessible. Bakker's extensive study of TRB material, his discussion of Knöll's typology and application of his conclusions to problems of the West Group, are pioneering works in a field which had, during the Van Giffen era, concentrated on the excavation of TRB monuments and sites in terms chiefly of structure and morphology, largely ignoring any analysis of the artefacts either as sources of cultural documentation or as dating tools. By high-lighting aspects of applied typochronology, Bakker opened up new avenues of research. However, perhaps inevitably, it has become necessary to upgrade the tool itself, in this case, the typochronology.

The weaknesses of Bakker's typochronology are most apparent in:

1. The overlap in many of his small find groups

and assemblages, which often include at least two, and sometimes even three, phases (Bakker, 1979: fig. 18). The fact that the find groups overlap, indicates that the sequence is basically correct but that the relevant stages have been incorrectly identified.

2. Emphasis on minor typological features to define phases B, C and D1 on the one hand, and lack of defining characteristics for Phases D2, E1 and E2 on the other (Bakker, 1979: pp. 48-50, 61-75).

Throughout his study, Bakker records his debt to Van Giffen, but above all, to Knöll and the typology which he worked out. Indeed, it is absolutely impossible to assess Bakker's work without Knöll's text and illustrations. Bakker's phases are essentially a reworking and refinement of the Knöll typology. This was achieved by identifying each step of Knöll's very detailed typological argument of each pot type (e.g. bowls, shouldered pots etc.), with a letter. Two 'pilot types' (Bakker, 1979: p. 48) were then identified as being diagnostically useful and the lettered steps for these were brought together to form a series of stages or phases. Bakker (1979: p. 51) summarized his revision as shown in table 1.

Unfortunately, the absence of any illustrations in the text at this point, makes his arguments extremely difficult to follow. The main discrepancies between the series of horizons offered here and that proposed by Bakker arise through:

- The absence of specific pots amongst Knöll's large, but not fully comprehensive catalogue.
- Knöll's stages which heavily influenced Bakker and which he retained within his new series of phases.
- Knöll and Bakker's reliance on the upper zone as a) typologically pre-eminent at the expense of the lower zone, b) the basis on which most of the sequence depends. Knöll's sequence ends when the upper zone breaks down and disappears.
- Bakker's over-reliance on the importance of technique at the expense of individual motif and

overall pattern. (When the impressions are filled with paste, the technique employed to execute the impressions becomes of little visual importance).

In correlating the three systems (Knöll's, Bakker's and the Horizon series) it is clear that

- Knöll's three stages are too broad for the timescale and typology involved. He paid little attention to the end phases of the TRB and to material which he considered of poor quality or degenerate and therefore late.

- Bakker's typochronology leans heavily on the typological explanation behind Knöll's three stages, leading him to define seven phases and two sub-phases. These phases are somewhat shakily established on the basis of minor typological changes and on cross-associations of only two pilot types in a number of closed and semi-closed finds.

Horizon 1. This horizon is identical with Bakker's Phase A and the material included within Knöll's Stage 1 which is identified by Bakker with the letters K, H, R. However, Knöll also placed in this stage material considered by Bakker to constitute a separate Phase B.

Horizon 2 consists basically of jugs of Bakker's Phase B and bowls considered by Knöll and Bakker to be 'incompletely decorated' (U1, U2 and T) and therefore typologically useless. This misconception arises from Knöll's and Bakker's belief that the upper zone decoration was of greater importance than that of the lower zone in showing typological change, and that this upper zone must consist of three elements, namely a middle 'band' rigorously defined on either side by horizontal lines. As the descriptions of the lower portions of bowls from Horizons 1-3 show, the lower zone is of equal value for the purposes of definition: Horizon 1 - narrow vertical strips; Horizon 2 - broader, usually combined strips, with intervening vertical lines; Horizon 3 - broad, well-defined panels.

Knöll was influenced by the theory of the degradation of potting traditions through time and therefore placed sparsely or 'incompletely' decorated bowls in the latest stages of the TRB. Bakker realized that this material was considerably earlier in date, but continued to be influenced by Knöll into accepting that these zones were incompletely decorated. He divided them amongst several different phases or stated that they were unclassifiable. Most of these bowls should be viewed as the necessary typological step between those of Horizon 1/Bakker Phase A/Knöll 1 and the bowls with developed well-defined horizontal upper zones and well-defined lower panels. Bakker's Phase B is artificially composed of jugs of direct typological descent from Phase A and bowls which are typologically developed from the 'incompletely decorated' bowls which in reality belong to the following phase, i.e. pilot types of two different steps. The

Table 1. Correlation of TRB West Group phases according to Bakker, Van Giffen and Knöll (columns 1, 2 and 4), and the steps in the typological development of two pilot types, worked out by Knöll and Bakker (column 3).

A = Drouwen A	= K+R+H	} Knöll 1
B = Drouwen B	= L+T+U1+I	
C = Drouwen C	= M+V+U2+J	
D1 = Drouwen D1	= N+W+U3	} Knöll ½
D2 = Drouwen D2	= O+X	
E = Early Havelte	= P+Y	} Knöll 2 (or Havelte)
F = Middle Havelte	= ∅	
G = Late Havelte	= ⊕ ⊙ + ♪	

main evidence put forward by Bakker for the existence of Phase B, despite some difficulties, is the Hooghalen find group.

Horizon 3 consists of Bakker's Phases B, C and D1 material/part of Knöll 1 and most of Knöll 1/2, with the exception of the jugs which Bakker placed in his Phase B. This material shows the normal range of expected variations within any single horizon. These variations, however, Bakker considered to have chronological and typological significance. This was partially caused by the initial composition of Phase B; in associating the 'wrong' bowls with jugs of Phase B, Bakker was forced to form his Phase C by giving phase status to bowls which differed only on minor typological grounds. Knöll had already conveniently indicated a break between his stages 1 and 1/2, which Bakker therefore adopted. But Knöll's sequence, composed of a range of types, appears to move smoothly from stage to stage through these bowls, because his much broader groups also placed less emphasis on detail. Bakker's recognition that the jugs constitute a separate phase led him to elevate one of Knöll's minor typological steps in the bowl series into a phase of its own, which in turn put the typological series under stress and unfortunately linked material from two different stages of development. Knöll's broader groups also placed less emphasis on the importance of the *tvaerstik* technique, which occurs only as one aspect of a large diverse group of material. Bakker used *tvaerstik* to define further phases. Material within Horizon 3 shows the increasing importance of this technique, but the overall decoration of the pots remains unchanged. The broader terms of both the Knöll and Horizon system allow for such an eventuality.

Horizon 4 consists of Phases Bakker D2/Knöll 1/2 and Bakker E1/Knöll 2. This section of Knöll's catalogue unfortunately includes few examples of either multiple zigzags or multiple arcs. Bakker's (1979: pp. 66-72) typo-chronology is at its weakest at this point. D1 material is described as similar to the preceding Phase C material except for the use of *tvaerstik*; D2 which may be distinguished from D1 on the basis of new motifs, is described as being practically indistinguishable from E1 which itself differs only from E2 in terms, once more, of technique. With such very small differences, at least as described in the text, there seems to be no justification for separate phases at all. For Bakker, however, who wished to refine Knöll's stages, this was too much, and he therefore adopted Knöll's break between 1/2 and 2 to divide D2 from his E1. The sub-divisions 'D1', 'D2 and E1', and 'E2' are in fact the more important divisions (D1 going to Horizon 3, D2 and E1 together forming Horizon 4 and E2 constituting a very homogenous Horizon 5). However, Bakker was heavily influenced by Knöll in choosing to divide his D2 from E material but

apparently ignored the fact that within the much broader stages envisaged by Knöll some overlap could be accommodated, which in a narrower phase system would lead to practically identical phases if adequate care was not given to the detailing of the phases in the first place. Knöll's division of his Stage 1/2 from his Stage 2 bowls (what Bakker terms Knöll's X and Y bowls) was based once again on his reliance on the importance of the upper zone, which is crucial because this division is based on the breakdown of the upper zone. X pots (Bakker's annotated step) are those where the upper zone is still defined between horizontal border lines (below the rim and at the base of the upper zone). Y pots are those where these lines break into sections or even disappear ... degeneration. In using this feature, Knöll paid insufficient attention to other motifs and patterns appearing while this process was taking place, and which make it difficult to identify D2 from E1 in Bakker's division. In fact, there are no real grounds for dividing D2 from E1. Together they constitute Horizon 4, which may be summed up as the horizon during which the evolving strip-panel-zone patterns break down and a new decorative scheme replaces it, allied to new pot forms evolving out of the existing range. This development may be traced by placing more emphasis on the totality of the decoration and individual motifs, rather than on the degeneration of the upper zone.

Horizon 5 consists of E2 material. Knöll dealt very cursorily with material after Horizon 4/Phases D2-E1/Knöll 2, seeing it as degraded, undecorated and therefore late. The finely decorated material of this horizon and the subsequent one was unknown to him. Bakker, however, for no very clear reason, considered his E2 material to be part of a larger E Phase. Once more, he subdivided the phase on the grounds of technique, this time, the finely pointed *Tiefstich*, but stated in his description that otherwise the two subphases were the same. In this case, this is not true. Bakker's own text (1979: pp. 70-71) clearly describes E2 material rather than E Phase material (E1 and E2). Subsequently he states "to E1 was assigned the pottery which as regards shape and arrangement of ornamentation was applied in *tvaerstik* lines or with a heart stamp, hollow stamp or double stamp" (Bakker, 1979: p. 72). The vessels which he illustrates for his two subphases are, however, quite dissimilar and in any case, some of the E2 patterns cannot be executed in *tvaerstik* (e.g. the very dominant bands of closely set small zigzag). There is no justification in placing the two subphases together. Horizon 5/E2 material is fairly homogenous, with good typological antecedents in Horizon 4 and a well-defined progression through the following phases. It occurs on several settlement sites without the admixture of other material.

Horizons 6 and 7. Knöll's typology is obviously

inadequate in its handling of the later material, some of which only became available after he had completed his work. Horizon 6/Phase F was first identified by Kat-van Hulten (1947) working on material with Van Giffen. This was greatly enlarged by the work of Bakker and Van der Waals (1973) on both this and the subsequent Horizon 7.

4. TRB DEVELOPMENTS IN THE ADJACENT AREAS OF SOUTH DENMARK AND NORTH GERMANY

In the areas adjacent to the TRB West Group, related and parallel developments in the pottery took place. The Haassel-Fuchsberg Group of the late Early Neolithic C occurs in Denmark and north Germany, extending as far south as the river Elbe. In a small area of north-east Lower Saxony, it extended south of this river (Schwabedissen, 1979: Abb. 5). The earliest relevant material belongs to the latest stages of this group. Of particular importance are the bowls with decoration of large bar chevron. Other relevant elements are the jugs with very slightly flaring undecorated necks, slightly angular profiled thick handles, and rounded bodies with strip decoration. These are comparable to the jugs of Horizon 1 (e.g. Bronneger, fig. 3:9). Collared flasks and funnel beakers with vertical lines on the body also occur. The assemblage from Bistoft belongs to the end of the Haassel-Fuchsberg Group, already incorporating elements of the Troldebjerg development. The assemblage is important not only because of its radiocarbon dates, but also because of the close similarities this assemblage bears to Horizon 1 material (in particular, the lugged flask and the two bowls with a line of dots below the rim and simple, single ladders on the body, Johansson, 1981: Tafel 13 and 15; Meurers-Balke, 1978-79: Abb. 1). It is quite clear that the earliest TRB pottery arrived in the area of the West Group during the transitional stage of the Haassel-Fuchsberg and Troldebjerg Groups. Horizon 1 material includes informal lines of dots etc. below the rim and simple strip ornament which occur during this transition.

The subsequent developments are indicated by the Troldebjerg Group in Denmark and Schleswig-Holstein (Schwabedissen, 1979: Abb. 8). The Troldebjerg Group includes (amongst others) bowls with a band of short verticals below the rim and body ornament derived from the bar chevron. Sherds of a bowl from Emmen-Oude Roswinkelerweg belong to this type (collection E. Drenth). The strips may now be doubled or trebled and incorporate various elements including *tvaerstik* lines, in addition to simple hatching (e.g. the lugged beaker from Neumünster, Schwabedissen, 1979:

Abb. 8:1). The jug from Tinnum/Sylt (Schwabedissen, 1979: Abb. 8:3) shows the development of an angular profile with broad strap handle and large shoulder decorated with vertical ladders. This stage of development is represented in the West Group by material of Horizon 1 and the earlier part of Horizon 2.

South of the Elbe, the Haassel-Fuchsberg Group occurs only in the Uelsen-Lüneburg area (Schwabedissen, 1979: Abb. 5). It was succeeded by Altmark *Tiefstich* which is not immediately derivable from the Haassel-Fuchsberg Group. It may either have arrived as a developed entity or it evolved by a short-lived but as yet unrecognized step from the Haassel-Fuchsberg Group. Preuss (1980) identified two phases of Altmark *Tiefstich*.

- Düsedau Horizon, characterized by (amongst others) standing triangles below the rims of the bowls, true hatched triangles on the shoulders of the tureens and *tvaerstik* lines. The material from this horizon, including the material from Issendorf, Kr. Stade (Tempel, 1972: Abb. 4-8), may be equated with West Group Horizon 2 where all the elements occur, although rarely. Elements of both horizons are combined on a bowl from Achim, Kr. Verden, with standing triangles below the rim and vertical ladders and chevrons in the lower zone (Schünemann, 1972: Abb. 20a). The single vertical *tvaerstik* line is also of interest. Both Preuss (1980: p. 90) and Schwabedissen (1979: p. 158) have indicated that the Düsedau Horizon is contemporary with the Troldebjerg Group.

- Haldensleben Horizon, characterized by (amongst others) bowls with two decorative zones, the upper consisting of a band of short verticals, and tureens with filled shoulder triangles. This horizon is comparable to the West Group Horizon 3.

In most of the area in which Altmark *Tiefstich* occurred, it was succeeded by the Walternienburg-Bernburg Groups. However, within the Uelsen-Lüneburg area Laux distinguished a local and according to him continuous development of five steps (Laux, 1979: pp. 59-82).

- Group A includes the material of the Haassel-Fuchsberg Group;
- Group B belongs to the Düsedau Horizon of Altmark *Tiefstich*;
- Group C is the Haldensleben Horizon of Altmark *Tiefstich*;
- Group D includes material which is comparable to the West Group Horizon 4;
- Group E has no specific similarities to West Group material. Laux unconvincingly suggested that Group E may show influences from the Bernburg Group.

5. CHRONOLOGY AND DATING OF THE TRB WEST GROUP

The chronology and dating are based not only on the available dates from the West Group itself but on dates from earlier TRB material from south Denmark and Schleswig-Holstein, too.

The earliest relevant dates are from the Satrup Group. According to Schwabedissen eighteen dates are known for this group, which fall between 5050 and 4720 BP (no standard deviation given; Schwabedissen, 1979: Abb. 12). The Fuchsberg Group which follows Satrup is apparently well-dated to the period c. 4750-4550 BP. Schwabedissen (1979: p. 156) mentions 'eine Reihe von ^{14}C Daten zwischen 4700 und 4550 BP' from the settlements of Fuchsberg itself and Sachsenwald. Elsewhere in the same paper (Abb. 12) seven dates are indicated between 4740 and 4555 BP (without standard deviation) for the Fuchsberg Group. These are probably the dates from the two settlement sites; the figures mentioned in the text seem to be incorrect.

Eleven dates are available from the Fuchsberg settlement at Toftum (Madsen, 1977; Madsen & Petersen, 1982-83: p. 117, note 53). Charcoal samples: K-2985 4500 ± 85 BP, K-2986 4690 ± 90 BP, K-2987 4690 ± 90 BP, and K-2988 4730 ± 90 BP, mean c. 4650 BP. Marine shells: K-2978 4500 ± 85 BP, K-2979 4620 ± 70 BP, K-2980 4520 ± 85 BP, K-2981 4690 ± 70 BP, K-2982 4550 ± 90 BP, K-2983 4590 ± 90 BP, and K-2984 4530 ± 85 BP, mean c. 4570 BP.

No details of contexts are given in the publication. The dates fall into two groups, those from charcoal samples being on average 80 years earlier than those from shells. Two main problems are connected with the dating of shell samples.

a) *Reservoir effect*, which is brought about by the mixing of ^{14}C depleted deep ocean water (i.e. below c. 200 metres) with surface water. This mixing results in a lower ^{14}C content in the surface water in comparison to that in the atmosphere (Olsson, 1980; Tauber, 1983). Marine materials thus affected take on an own age in ^{14}C years. In the North Atlantic and adjacent seas this age is about 400 ^{14}C years.

b) *Isotopic fractionation*: Due to isotopic fractionation marine carbonate (shell) contains more ^{14}C than the surrounding sea-water and seems to be younger, therefore. This effect also amounts to about 400 ^{14}C years in the North Atlantic and adjacent seas (Olsson, 1980; Tauber, 1983).

Because of the coincidental cancellation of the two effects no corrections are applied to radiocarbon dates derived from marine shells in a number of laboratories, including Copenhagen (Tauber, 1983: p. 371). However, in the Baltic Sea, the reservoir effect is reduced because there is less mixing with

deep ocean water. It amounts to c. 340 ± 30 years on the Swedish west coast, and c. 320 ± 30 years on the Danish east coast (Olsson, 1980). Toftum lies in east Jutland. It is therefore very likely that the shell dates from Toftum are c. 80 years too young in comparison with contemporaneous terrestrial material, like charcoal. Taking this in account, the discrepancy between the dates disappears. After correction the shell dates have an average age of c. 4650 BP, similar to that of the charcoal samples.

In addition, several dates are known from the Fuchsberg settlement near Sarup (Andersen, 1980; see also Bakker, 1979: p. 144). These dates are from the remains of three posts in the palisade trench (A 307): K-2630 4600 ± 90 BP, K-2631 4620 ± 90 BP, K-2632 4760 ± 90 BP (mean 4660 ± 55 BP), from charcoal in a flat grave (A 310): K-2629 4690 ± 90 BP, and from charred grain in a pit with pottery (A212): K-2628 4580 ± 70 BP.

The settlement of Bistoft LA 11 may be considered as belonging to the last stages of the Fuchsberg Group. There are no indications that this settlement (Johansson, 1981) was of long duration. This is not contradicted by the fact that in the peatbog beside the settlement site a large fragment of a decorated bowl, formally of MN1 type, was found at a higher level than fragments which can be attributed to EN C (Meurers-Balke, 1978-79). According to Johansson (letter to A.E. Lanting, 10.5.1983) definite EN C sherds were also found at different levels. He is convinced that the site was visited only once by a single group of people, and was used as an extraction camp during the summer. The pottery should be treated therefore as a closed find. If the fragments illustrated by Johansson (1981: Taf. 15:13) and Meurers-Balke (1978-79: Abb. 1:5) had been found in a West Group context, they would have been attributed to Horizon 1. Two pieces of charred wood from the settlement have been dated: KI-921 4700 ± 65 BP and KI-1231 4610 ± 120 BP.

The dates from Sarup and Bistoft have been included in figure 10. When all these dates are combined they indicate absolute dates of 3800-3550 cal BC for the Satrup Group and 3550-3400 cal BC for the Fuchsberg Group. The dates from Bistoft which are slightly older than the Sarup grain date are in accordance with the calibration curve at this point; around 3400 cal BC radiocarbon ages are greater than around 3500-3450 cal BC.

The earliest West Group material – Horizon 1 – is comparable to the decorated pottery from Bistoft LA11 (Johansson, 1981: Tafel 15; Meurers-Balke, 1978-79: Abb. 1). Therefore Horizon 1 must have begun at or around 3400 cal BC, with radiocarbon dates of about 4700 BP. So far, no material from this horizon has been dated. The following dates for younger West Group material are known.

Odoorn: GrN-2226 4590 ± 80 BP. Charcoal from

a flat grave or pit in front of the entrance to *hunebed* D32. According to Van Giffen (1961) this feature was intersected by the socket of one of the orthostats. This interpretation is at least questionable. The intersecting pit seems to be due to recent stone digging, not an original socket. Two funnel beakers were found in the grave/pit, which cannot be more closely dated than to Horizons 1-4.

Odoorn D32a: GrN-12609 4550±40 BP. Charcoal from pit next to east end stone of destroyed *hunebed* D32a. This pit may be connected with the construction of the tomb (Taayke, 1985). The oldest pottery in D32a belongs to Horizon 3.

Odoorn D32c: GrN-13184 4630±60 BP. Charcoal from under in situ stone packing of destroyed *hunebed* D32c (cf. Taayke, 1985). Oldest pottery belongs to Horizon 3.

Gittrup F. 707: GrN-12263 4490±60 BP. Charcoal from flat grave with Horizon 5 pottery (see *Neujahrsgruss Münster* 1983: pp. 36-39).

Harderwijk-Beekhuizerzand: GrN-7746 4520±70 BP. Charcoal fragments from filled-in bed of stream, in layer with sherds of Horizon 5 pottery (Modderman et al., 1976).

Heek F. 4: GrN-9202 4520±35 BP. Charcoal concentration in flat grave with Horizon 5 pottery (Finke, 1983).

Heek F. 27: GrN-11764 4400±60 BP. Charcoal from flat grave with Horizon 5 pottery (cf. Finke, 1983).

Heek F. 38a: GrN-11766 4480±60 BP. Charcoal from flat grave with Horizon 5 pottery (cf. Finke, 1983).

Anlo: GrN-1824C 4410±60 BP. Charcoal from settlement pit with pottery belonging to Horizon 5 (Waterbolk, 1960).

Glimmer Es: GrN-6156 4380±40 BP. Charcoal from pit with Horizon 6 pottery next to destroyed *hunebed* G2 (Brindley, 1986).

Nottuln: GrN-12414 4240±60 BP. Charcoal from layer with Horizons 6 and 7 pottery in upper part of filled-in ditch of Michelsberg fortified settlement (Eckert, 1986: Abb. 11-14).

Angelslo: GrN-4200 4415±65 BP and GrN-4201 4380±75 BP, mean 4400±50 BP. Charcoal from settlement pit 5 with Horizon 7 pottery (Bakker & Van der Waals, 1973: fig. 6).

Angelslo: GrN-5767 4315±60 BP. Charcoal from settlement pit 7 with Horizon 7 pottery (Bakker & Van der Waals, 1973: fig. 7).

Angelslo: GrN-2370 4145±100 BP. Charcoal from flat grave 3 with cremated bone and Horizon 7 pottery (Bakker & Van der Waals, 1973: fig. 5).

Angelslo: GrN-5070 4100±30 BP. Charred sticks from flat grave 14 with cremated bone and Horizon 7 pottery. In the filling, a sherd of Horizon 6 pottery and a sherd of Corded Ware pottery were also found (Bakker & Van der Waals, 1973: fig. 9).

Six dates are not included in figure 10.

Angelslo: GrN-5103 4355±45 BP. Fragments of charcoal found in the filling of a tree-fall pit, together with sherds of Horizon 4 pottery. There is no certainty that the charcoal and sherds were associated.

Harderwijk-Beekhuizerzand: GrN-7745 4165±35 BP. Fragments of charcoal from filling of pit in which sherds of Horizon 5 pottery were also found. In an adjacent pit of the same type a Late Bronze Age pot was found. It is possible that the dated pit was also dug in the Late Bronze Age but filled with soil containing TRB settlement refuse. The charcoal appears to have been mixed with about 20% of Late Bronze Age charcoal.

Heek F.5:	GrN-11762	5030±70 BP
Heek F.25:	GrN-11763	4980±60 BP
Heek F.34:	GrN-11765	4890±80 BP
Gittrup F.440:	GrN-12262	4920±70 BP

These four samples are from charcoal in flat graves with good Horizon 5 pottery. The dates are much older than expected. This is probably due to the use of mature wood. In this part of Westphalia, where previous Neolithic settlement is lacking, such wood must have been widely available.

The dates for Horizon 6 and 7 material show clearly that the latest TRB West Group material should be dated to around 2850 cal BC. The available radiocarbon dates correspond clearly with the steep part of the wiggle between 2930 and 2850 cal BC, where radiocarbon dates drop from c. 4400 BP to 4080 BP. On archaeological grounds there is no reason to suppose that Horizon 7 continued beyond c. 2850 cal BC, although this cannot be excluded on the basis of the radiocarbon dates alone.

This indicates that the West Group lasted about 550 years. Horizons 1 and 2 seem to have lasted only a short time, together probably about 100 years. Horizons 6 and 7 appear to have been fairly short also, possibly lasting about 100 years too. The remaining 350 years must encompass Horizons 3, 4 and 5. From the amount of material and the variations which occur within each horizon, one can suggest a period of around 100 years for Horizon 3, about 150 years or slightly more for Horizon 4 and about 100 years or slightly less for Horizon 5.

When evaluating the radiocarbon dates for the West Group the source of the samples should not be forgotten. With the exception of GrN-5070, the dated material consisted of fragments of charcoal which may have had an age of their own of several decades. This may explain why two of the Horizon 7 dates are older than expected. In the wiggle section of the calibration curve between 2930 and 2850 cal BC, an age differential of several decades

could mean an increase in radiocarbon age of 100-200 years.

According to the calibration curve of Pearson et al. (1986), between c. 3350 and 2930 cal BC, differences between the radiocarbon age of the sample and the event should not be apparent unless very small standard deviations are involved. The age differential of the sample, therefore, should have no great influence during most of this period. However, the age differential of samples which fall in the steep part of the curve between 3350 and 3400 cal BC, will have a marked influence on the result. An age differential of several decades can result in differences of 100-150 radiocarbon years.

6. ACKNOWLEDGEMENTS

I wish to thank S.W. Jager, J.M. Smit and H.R. Roelink for illustrations of pottery in the collections of the B.A.I. and the Provinciaal Museum of Drenthe; H.R. Roelink for the tables and for mounting the tables and figures; J.H. Zwier for the ^{14}C figure. I am most grateful to J.A. Bakker for showing me the material from the *hunebeds* D26 and O2, and to W. Finke for his hospitality during several visits to examine material from his excavations at Heek, Gitttrup, Heek-Ammerter Mark and Mesum. I am grateful to A.E. Lanting for pointing out the Toftum dates to me and to B. Kamlag for reading the manuscript, and checking numbers. For discussion along the way and especially for seeing this paper through press, my best thanks to J.N. Lanting.

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Hunebed inventories

F1	Rijs	Coll. F.M.
G2	Glimmer Es	Coll. G.M.
G3	Glimmer Es	Coll. G.M.
G5	Heveskesklooster	B.A.I.
		inf. J. Schoneveld
D9	Annen	Coll. P.M.D.
		inf. D.J. de Groot
D14	Eexterhalte	Coll. B.A.I.
D21/22	Bronneger	Coll. B.A.I.
D26	Drouwenerveld	I.P.P.
		inf. J.A. Bakker
D28	Buinen	Coll. B.A.I.
D30	Exloo	Coll. P.M.D.
D32a	Odoorn	B.A.I.
		inf. E. Taayke
D32c	Odoorn	B.A.I.
		own research
D32d	Odoorn	B.A.I.
		inf. B. Kamlag
D40	Emmen	Coll. B.A.I.
D43a	Emmen	B.A.I.
		inf. J. Molema
D53	Havelte	Coll. B.A.I.
D54b/c	Hooghalen	Coll. B.A.I.
		inf. H. Bouman
O1	De Eeze	Coll. B.A.I.
O2	Mander	Coll. O.K.T./R.M.T.
		inf. J.A. Bakker
Spr. 981	Rheine	Coll. W.M.A. Münster
		inf. J. Eckert

Hunebed inventories, seen only in photos

D19	Drouwen	courtesy I.P.L.
D43	Emmen	courtesy I.P.P.

Hunebed inventories, seen only in publication

G1	Noordlaren	Bakker, 1982/83
-	Emmeln 2	Schlicht, 1968
Spr. 861	Gross Berssen 7	Schlicht, 1972
-	Lengerich-Wechte I&II	Knöll, 1983
Spr. 835	Ostenwalde I	Fansa, 1978

APPENDIX: Assemblages utilized for this study

The Horizons 1-7 were identified after a survey of the assemblages given in table 2.

Most of the important flat graves and other groups of short timespan have been published by Bakker (1979), Knöll (1952)

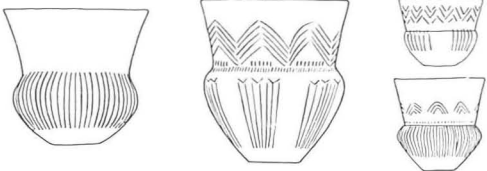
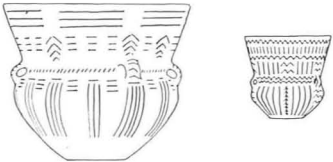


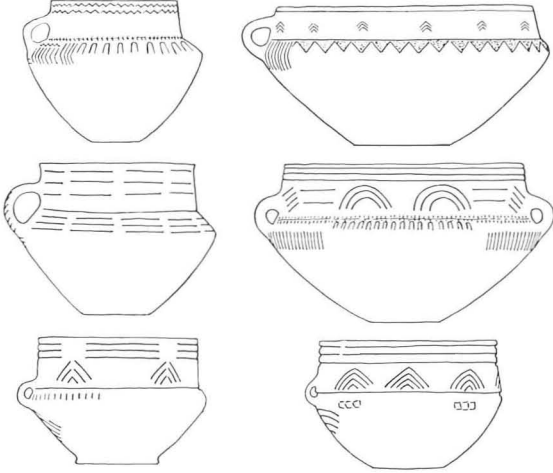
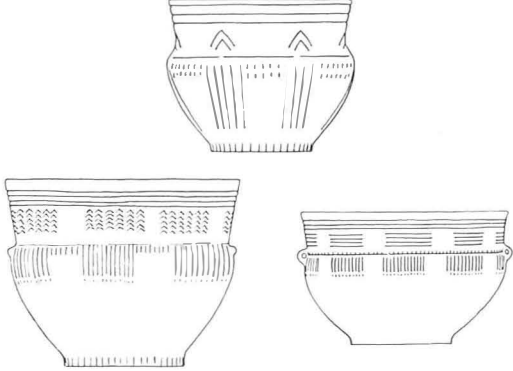
	TYPE	HORIZON
	FUNNEL BEAKER	1-5
	LUGGED BEAKER	1-4
	FUNNEL BEAKER CUP	5-7
	JUG	1-2
	TUREEN	3-4
	TUREEN-AMPHORA	4-5

Fig. 1. Table of most common pot types.

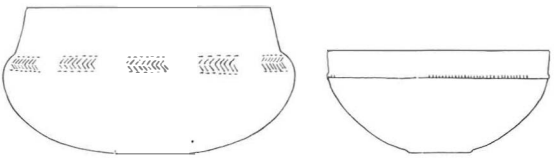
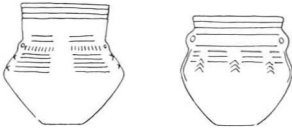

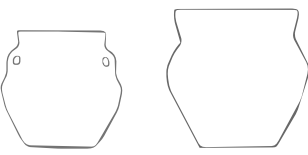


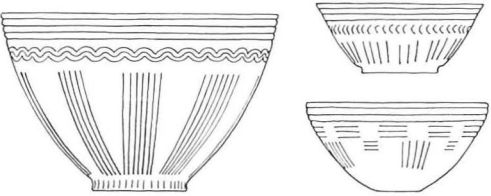
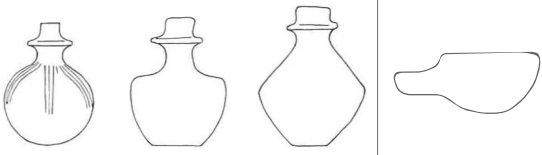
		TYPE	HORIZON
		NECKED BOWL	7
		AMPHORA TYPE 1	3-4
		AMPHORA TYPE 2	4-5
		LUGGED OR NON-LUGGED SHOULDERED VASE	2-7
		LUGGED BOWL	1-3
		PAIL	2-4
		NON-LUGGED BOWL	decorated 3-5 undecorated 2-7
		COLLARED FLASK	1-7
		BIBERON	2-4

Fig. 1 (cont.).


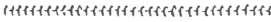














DECORATION		
    	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p>	<p>1. tiefstich</p> <p>2. tvaerstik</p> <p>3. incised lozenge</p> <p>4. zigzag</p> <p>5. C motif</p> <p>a. continuous horizontal line</p> <p>b. discontinuous horizontal line</p>
 	<p>a</p> <p>b</p>	<p>horizontal band of verticals (upper zone)</p> <p>a. continuous b. discontinuous</p>
  		<p>large multiple zigzag</p> <p>multiple zigzag</p> <p>close set multiple zigzag</p>
  	<p>a</p> <p>b</p> <p>c</p>	<p>horizontal blocks</p> <p>a. zigzag</p> <p>b. tiefstich</p> <p>c. hollow stamp</p>
		<p>vertical blocks</p>
		<p>alternating long and short vertical blocks</p>
		<p>continuous verticals</p>

Fig. 2. Table of main decorative elements, layout and applied features.

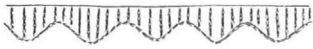





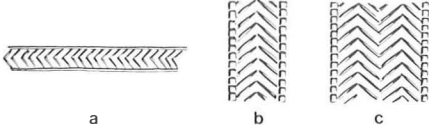
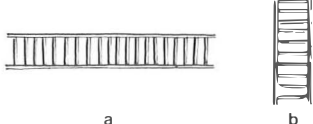
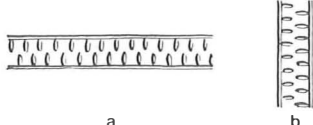
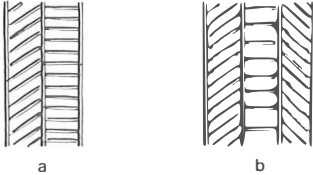
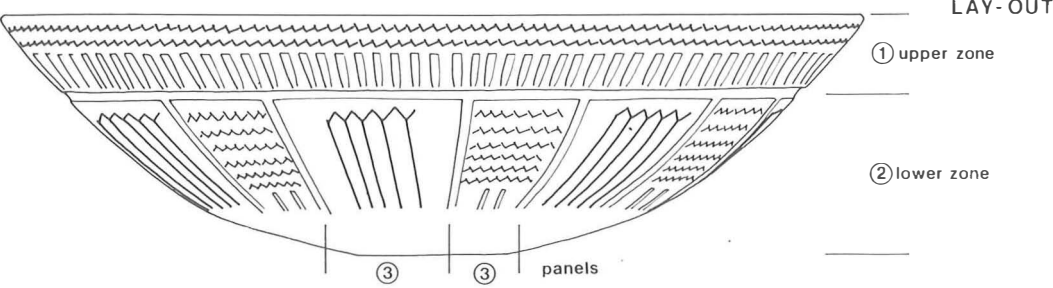
	hatched triangles
	filled triangles
	pseudo triangles
	shoulder stamp
	multiple arcs a. rounded b. pointed
	inverted arcs a. rounded b. pointed
	chevron a. horizontal b. vertical c. chevron zigzag
	ladder a. horizontal b. vertical
	zipper a. horizontal b. vertical
	multiple strips a. double b. treble
 <p>LAY-OUT</p> <p>① upper zone</p> <p>② lower zone</p> <p>③ panels</p>	

Fig. 2 (cont.).

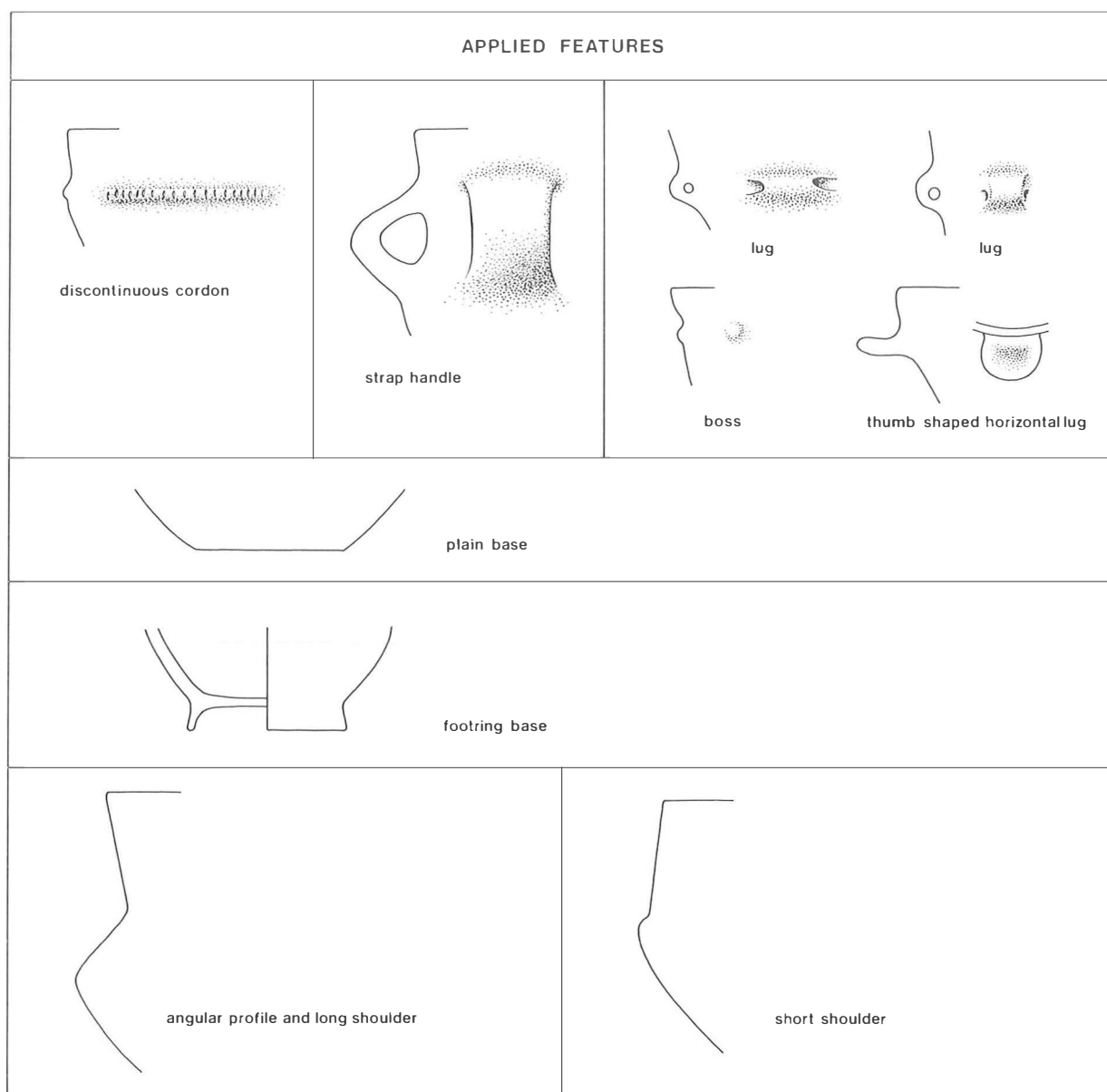


Fig. 2 (cont.).

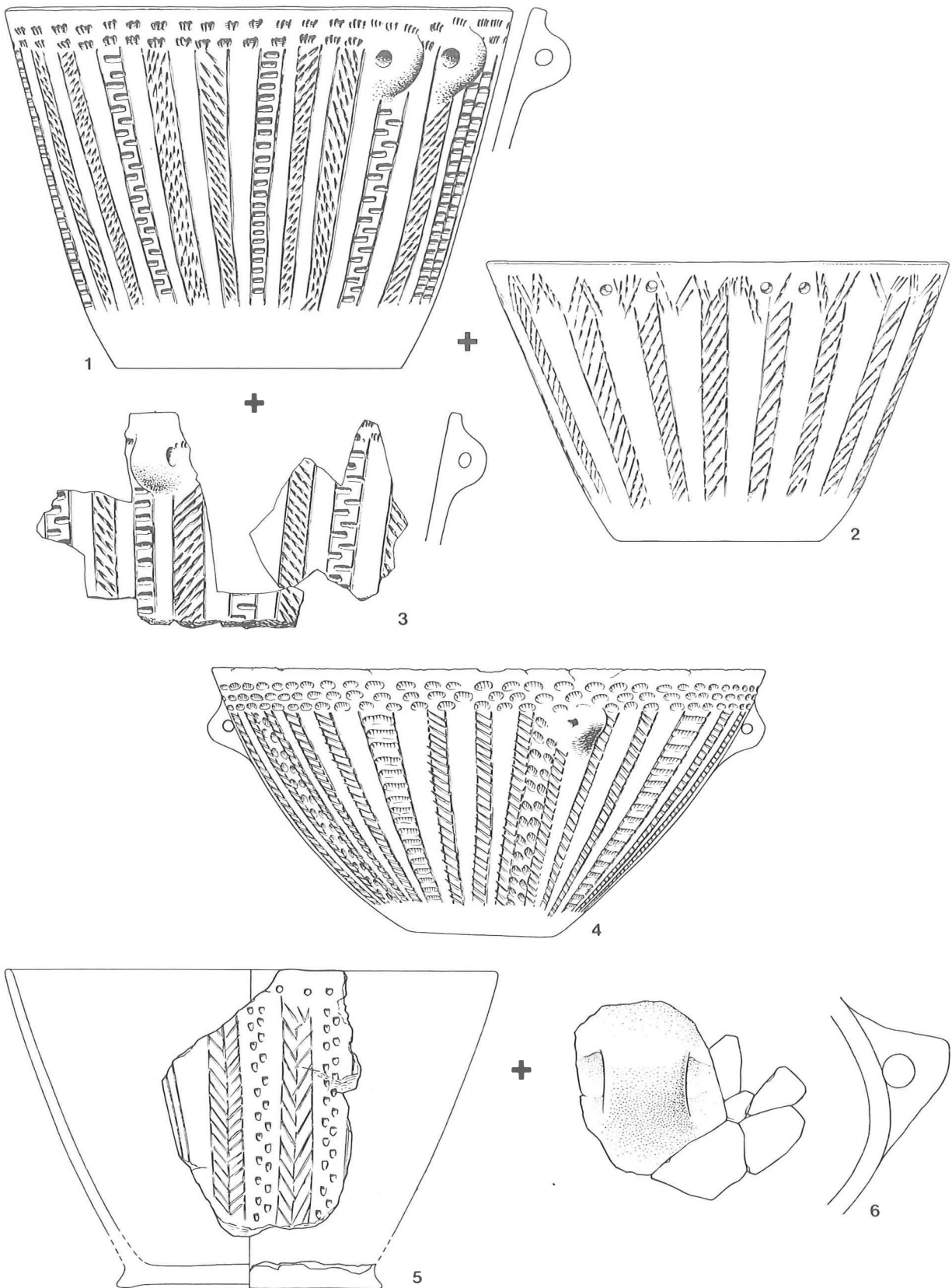


Fig. 3. Horizon 1. 1-3. Exloo, D30; 4 and 9. Bronneger, D21; 5-6. Angelslo-Heemingeslag 1963; 7. Valthe 1897; 8. Emmen, D43a; 10. Glimmer Es, G3 (after Brindley, 1983).

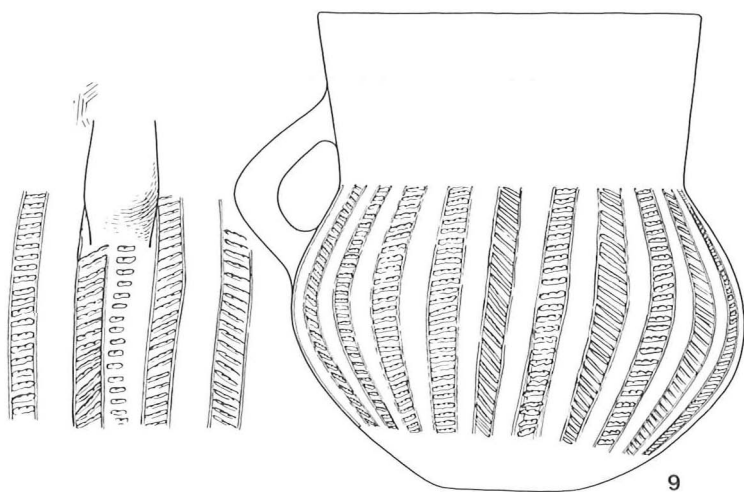
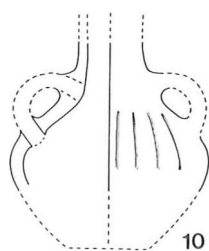
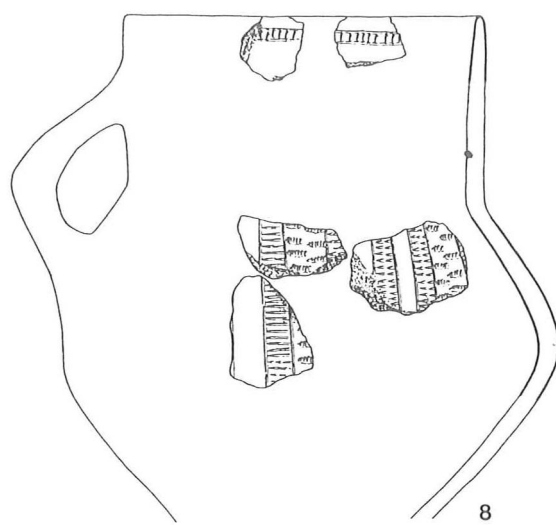
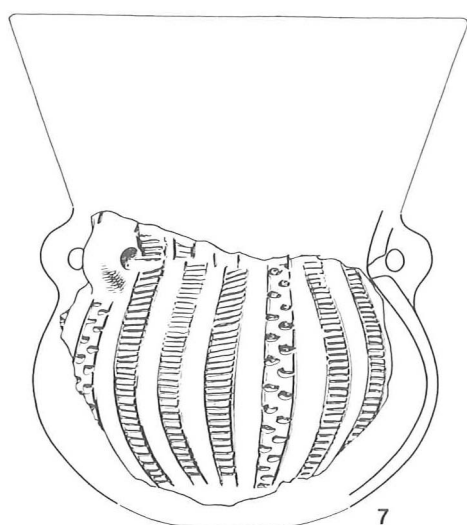


Fig. 3 (cont.).

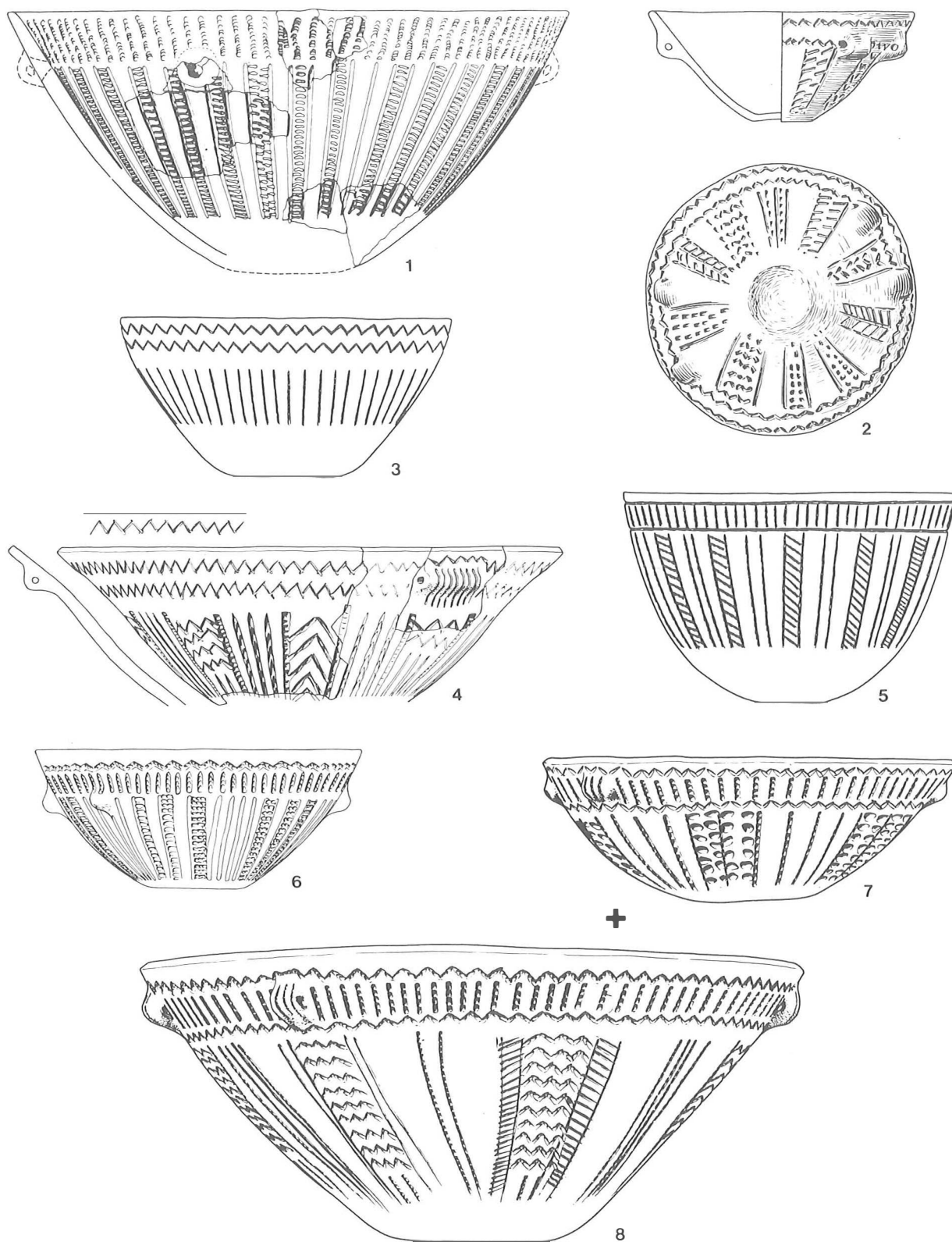


Fig. 4. Horizon 2. 1. Elspeet (after Bakker, 1979); 2. Bargercompascuum, peat find (private collection); 3 and 11. Zeijen, flatgrave e (after Bakker, 1979); 4. Glimmer Es, G2; 5. Diever, stone cist (after Bakker, 1979); 6. Brønneger, D21; 7-8 and 14-22. Hooghalen, stone cist(?) (after Bakker, 1979, but No. 18 after Brindley, 1983); 9. Hooghalen, D54b; 10. Weerdinge, peat find; 12. Tinaarlo, near D6e/f (after Bakker, 1979); 13. Zeijen, flatgrave a (after Bakker, 1979); 23. Zeijen, flatgrave(?)f (after Bakker, 1979); 24. Rijs, F1 (redrawn after van Giffen, 1925/27).

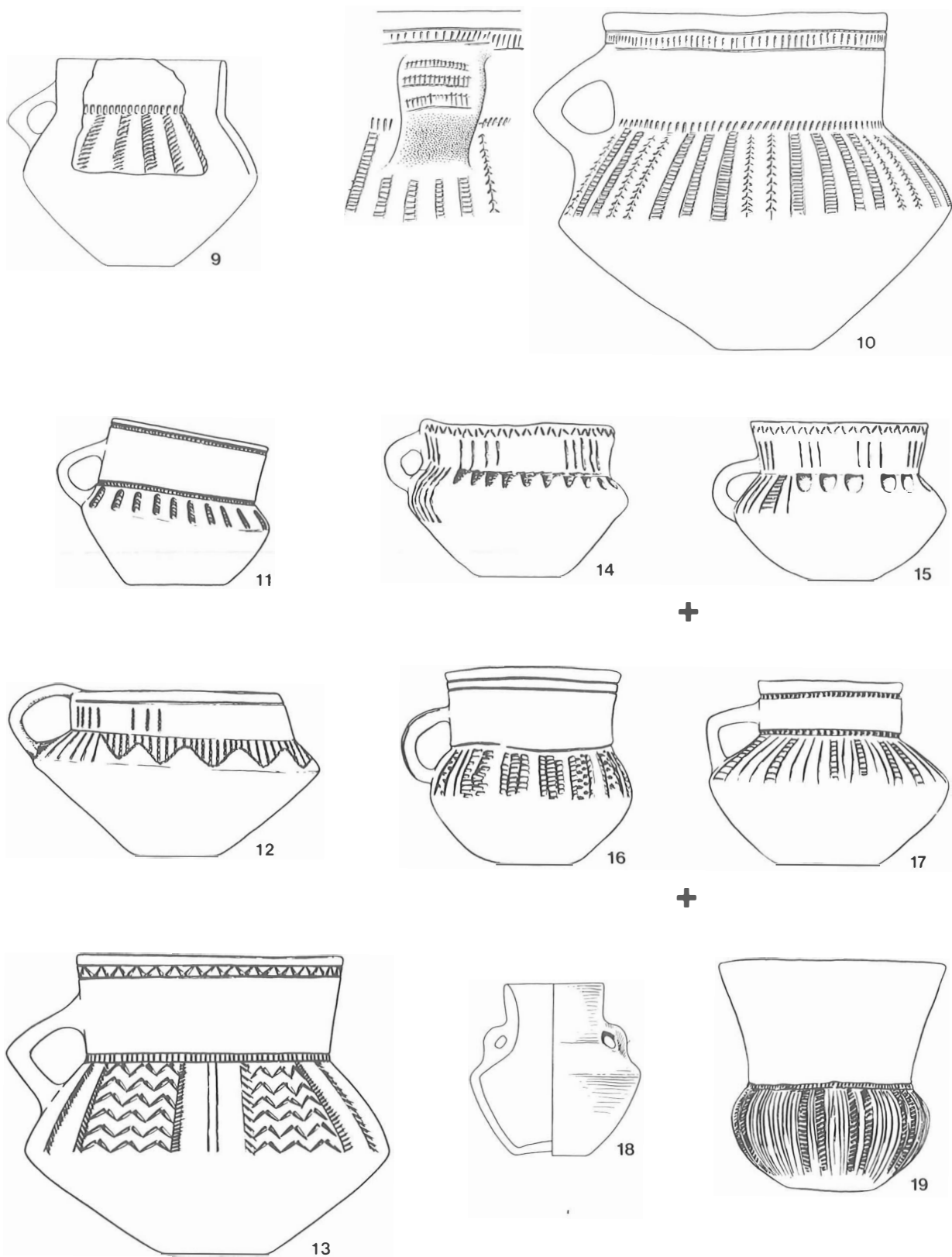


Fig. 4 (cont.).

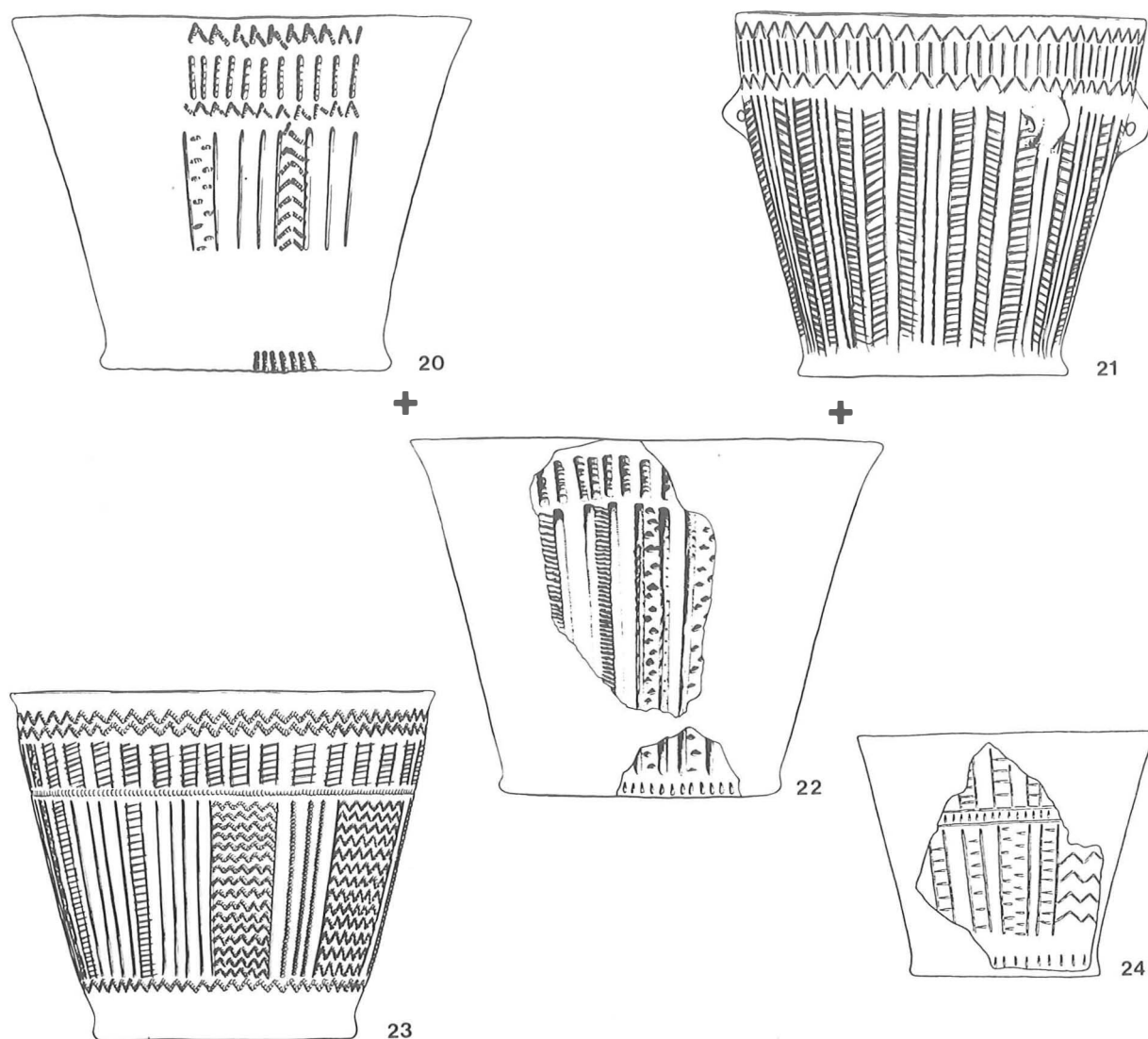


Fig. 4 (cont.).

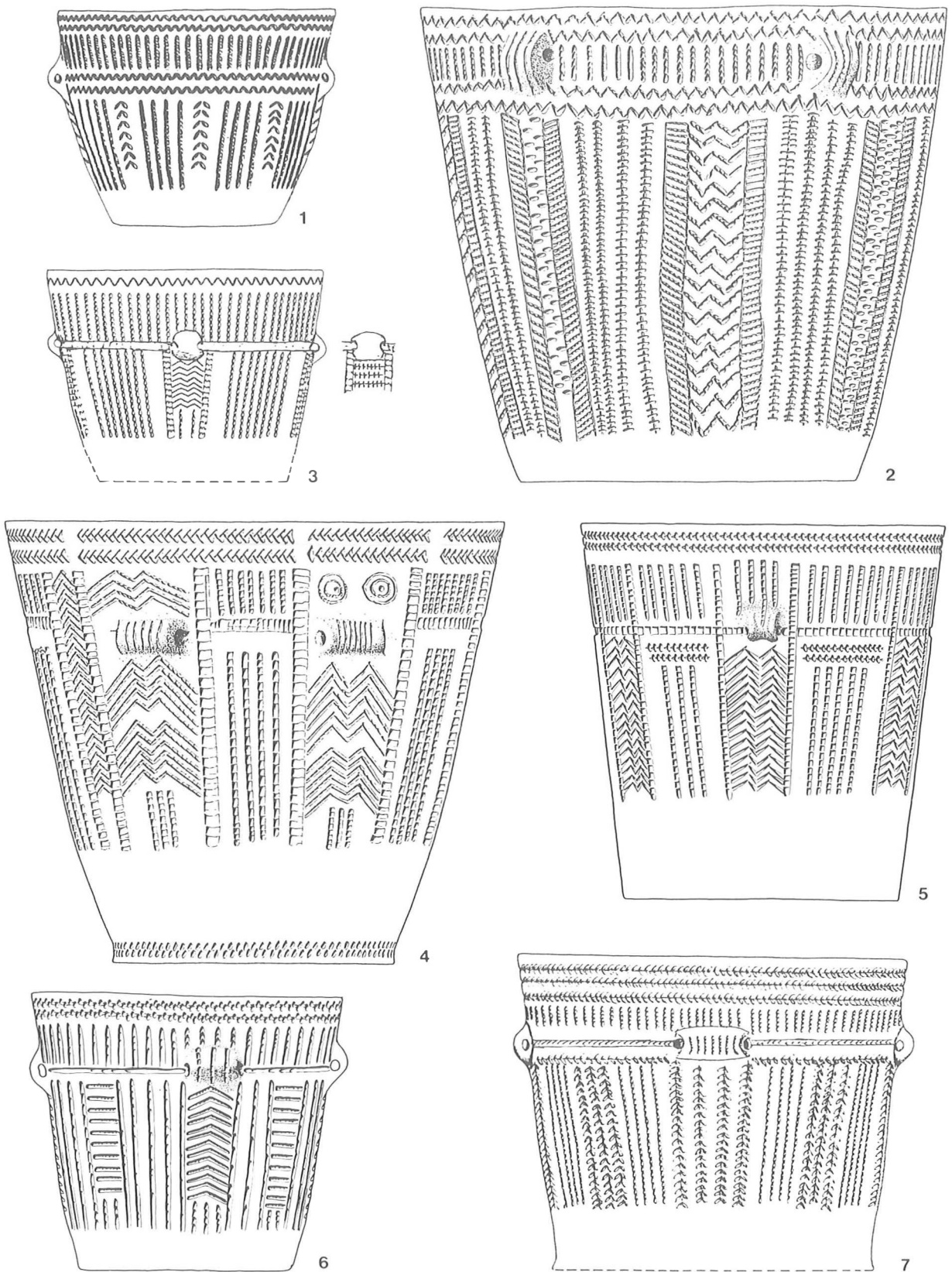


Fig. 5. Horizon 3. 1, 14, 21, 22, 24, 25. Emmeln (after Schlicht, 1968); 2, 4, 16, 28. Bronneger, D21; 3, 7, 12, 13, 15, 17. Gross Berssen (after Schlicht, 1972); 5, 8-10, 18-20, 23, 29. Glimmer Es, G2; 6. Angelslo, flatgrave; 11. Emmen, D43a; 26. Bottrop-Kirchhellen (after AFWL 3, 1985); 27. Angelslo, flatgrave; 30 and 31. Exloo, D30.

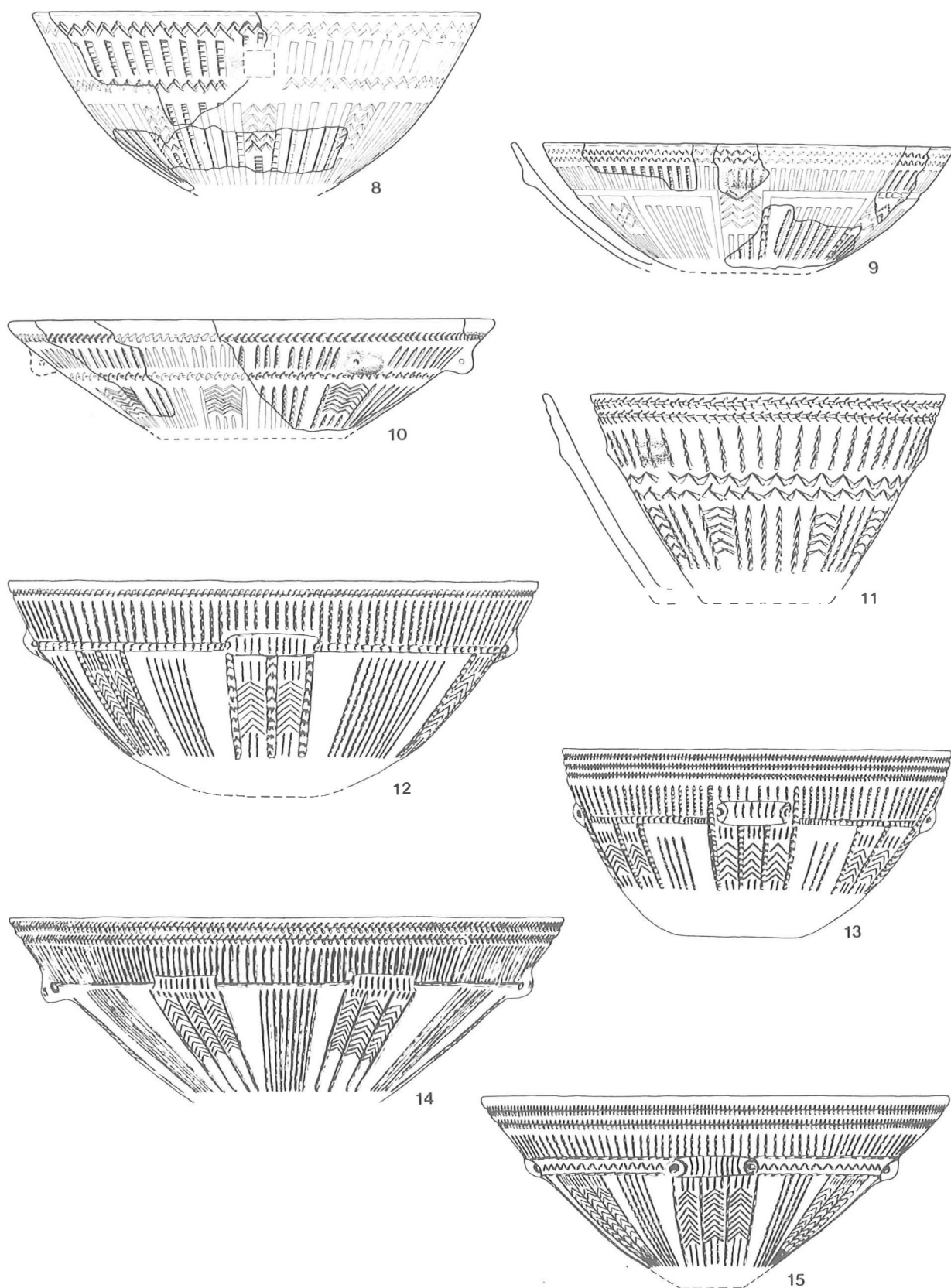
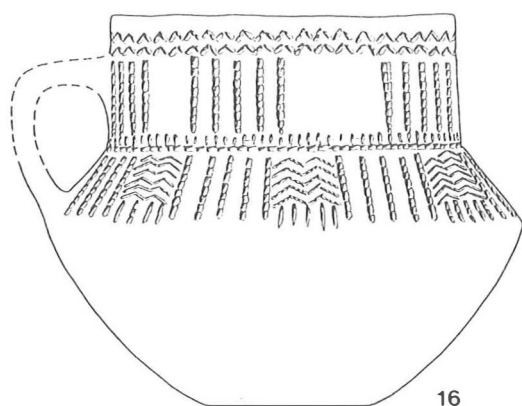
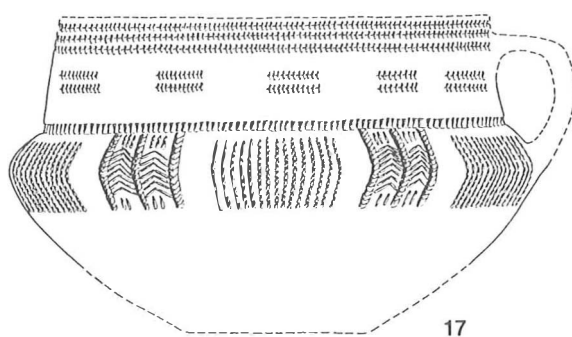


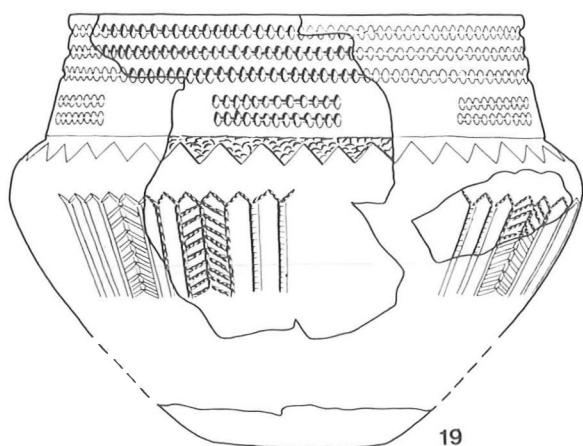
Fig. 5 (cont.).



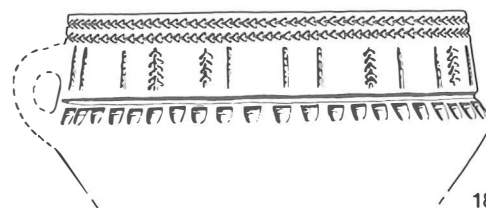
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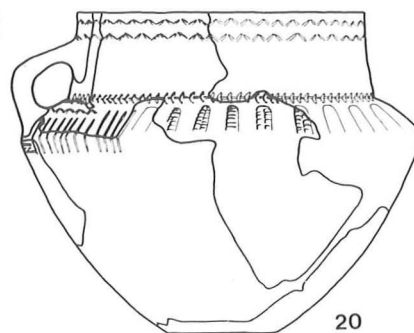
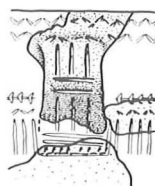
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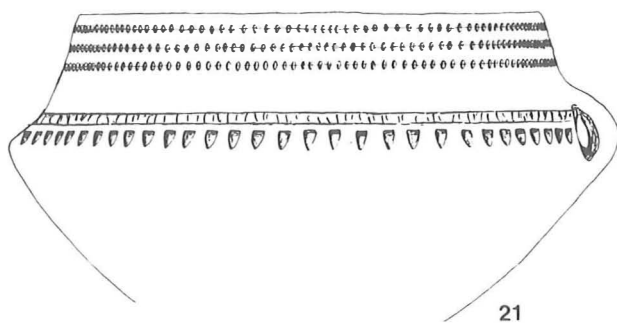
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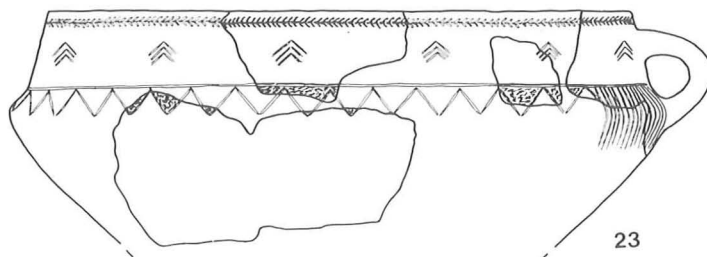
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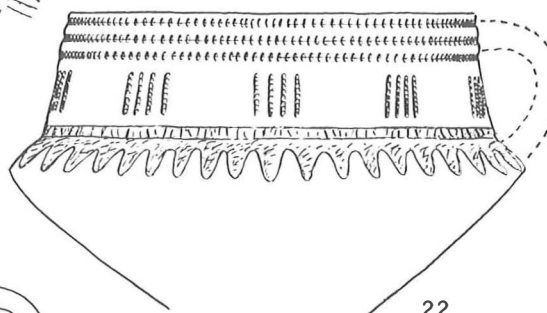
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Fig. 5 (cont.).

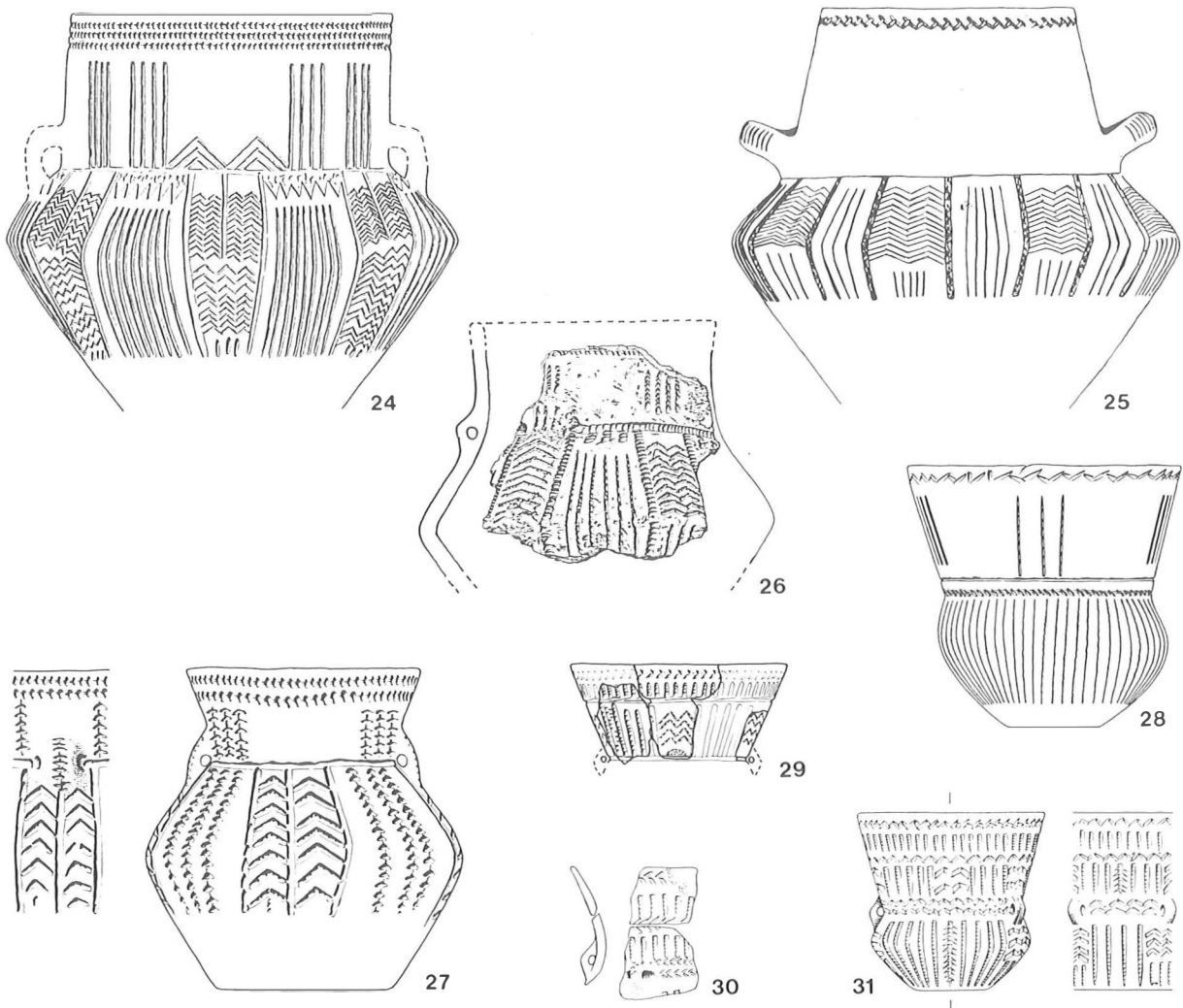


Fig. 5 (cont.).

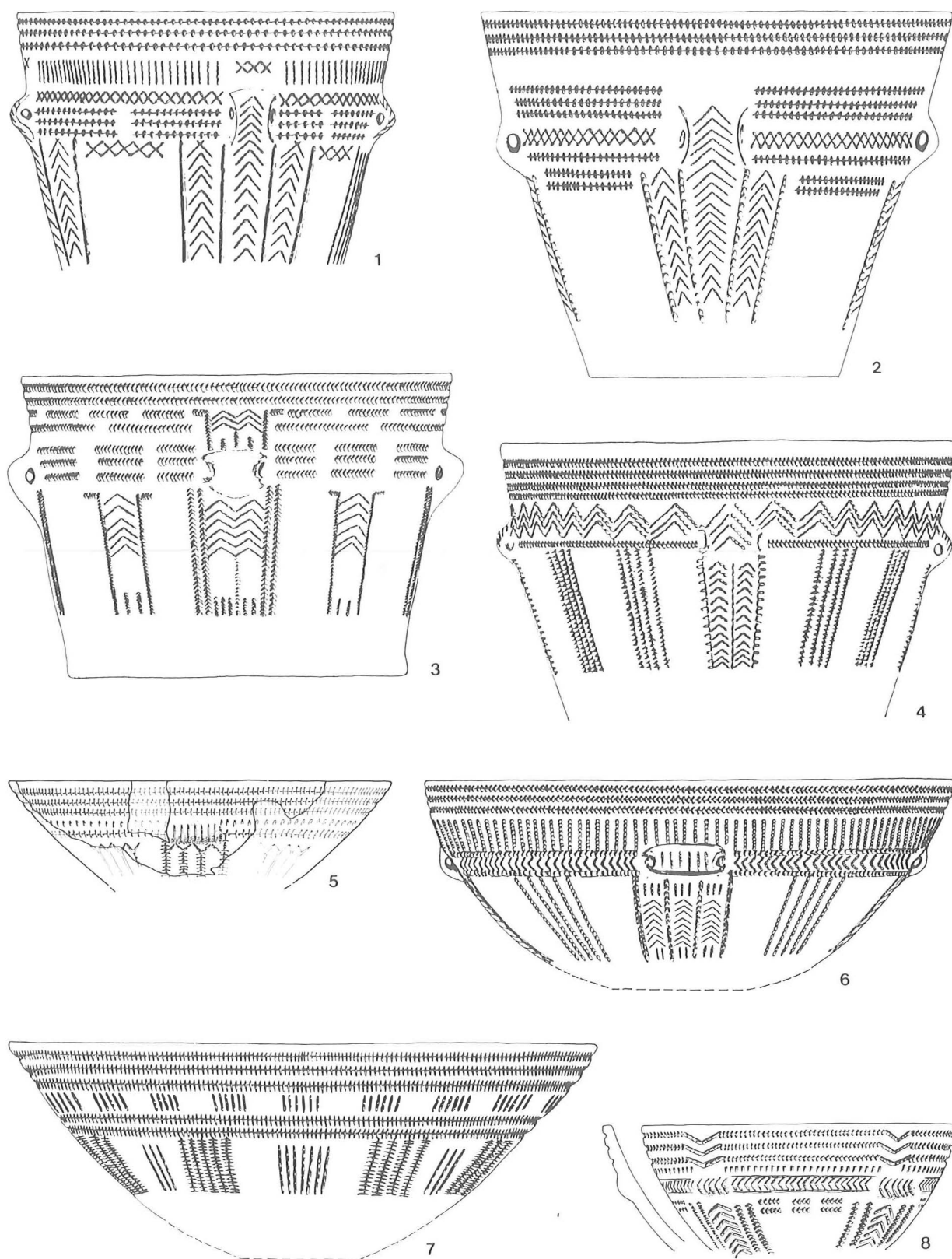


Fig. 6. Horizon 4. 1-4, 19, 20, 22-24, 26, 28, 29. Emmeln (after Schlicht, 1968); 5, 8, 11, 13-18, 21, 25, 27, 30-32, 35, 36. Glimmer Es, G2; 6, 7, 9. Gross Berssen (after Schlicht, 1972); 10. Veele, flatgrave(?); 12. Hankampsveld, flatgrave(?); 33. Ekelberg, flatgrave e; 34. Ekelberg, flatgrave (33 and 34 after Bakker, 1979).

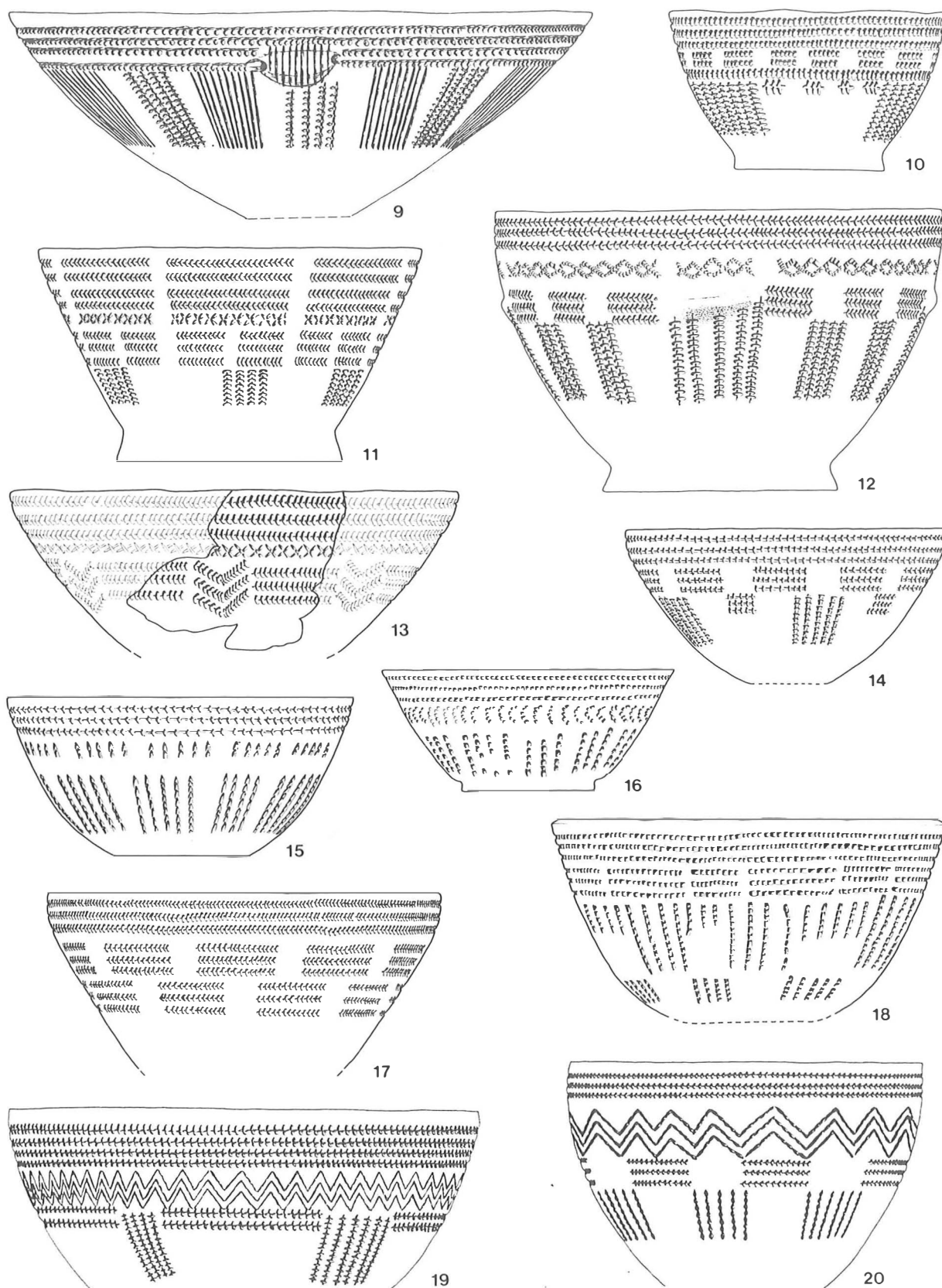


Fig. 6 (cont.).

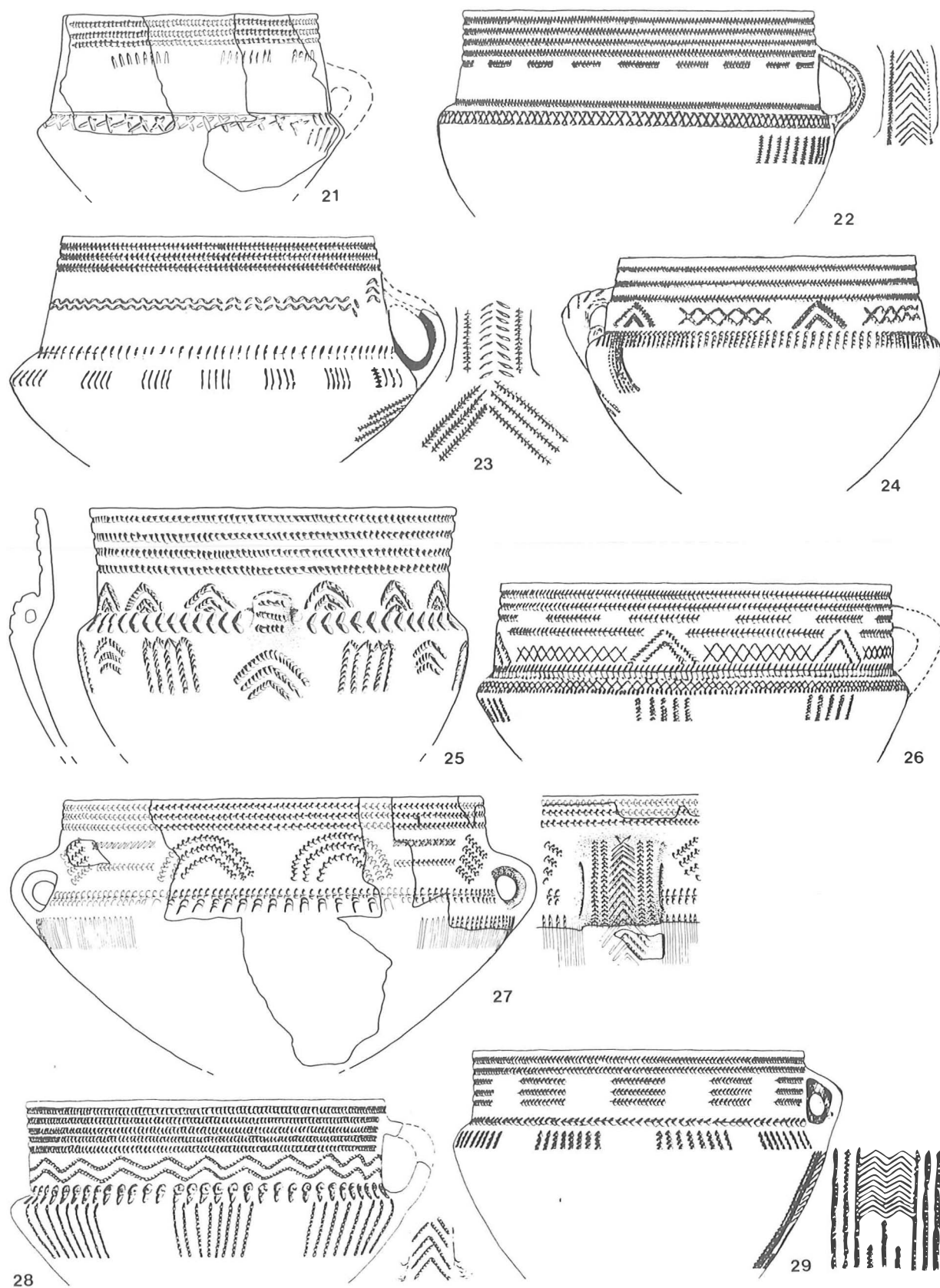


Fig. 6 (cont.).

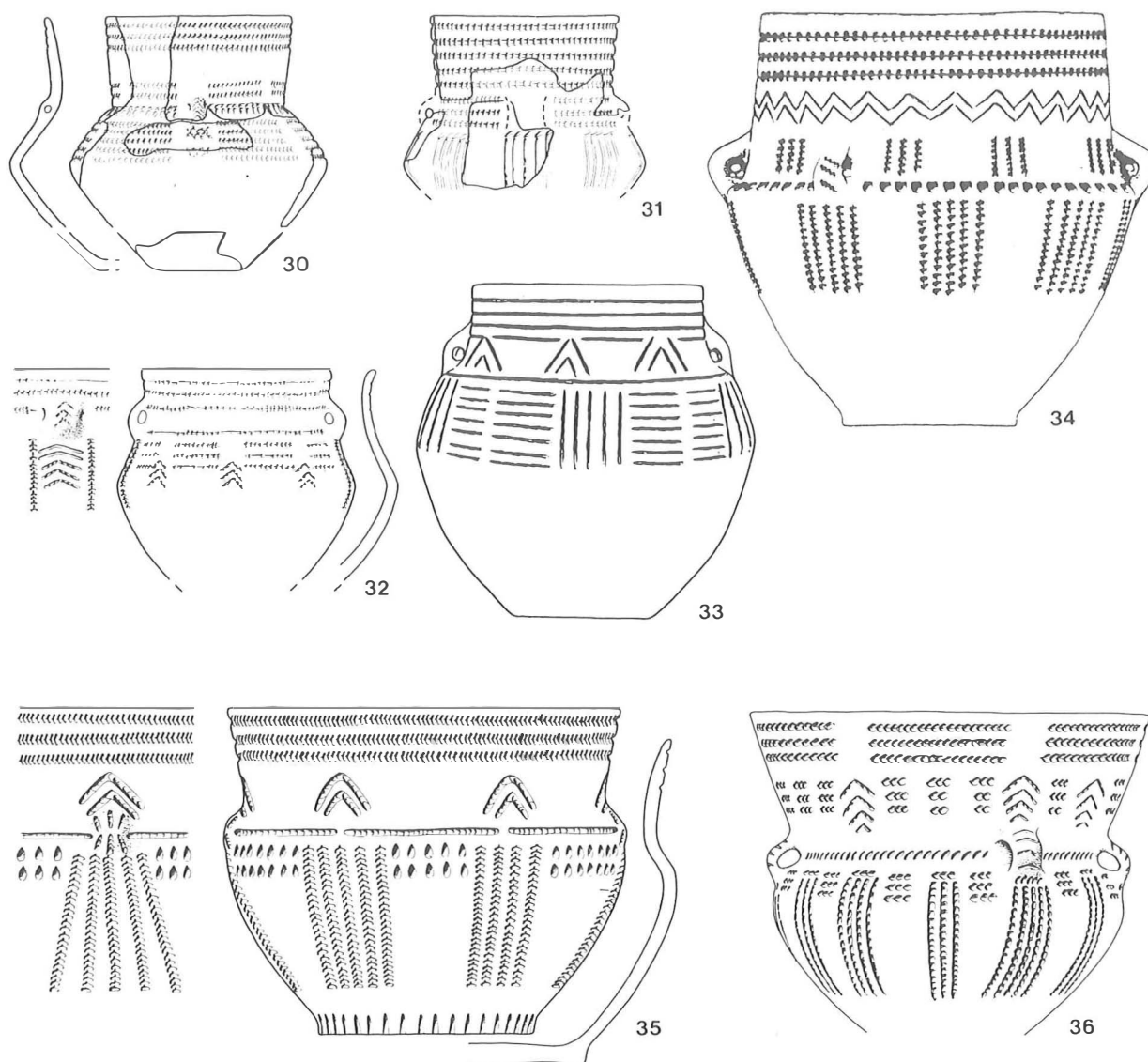


Fig. 6 (cont.).

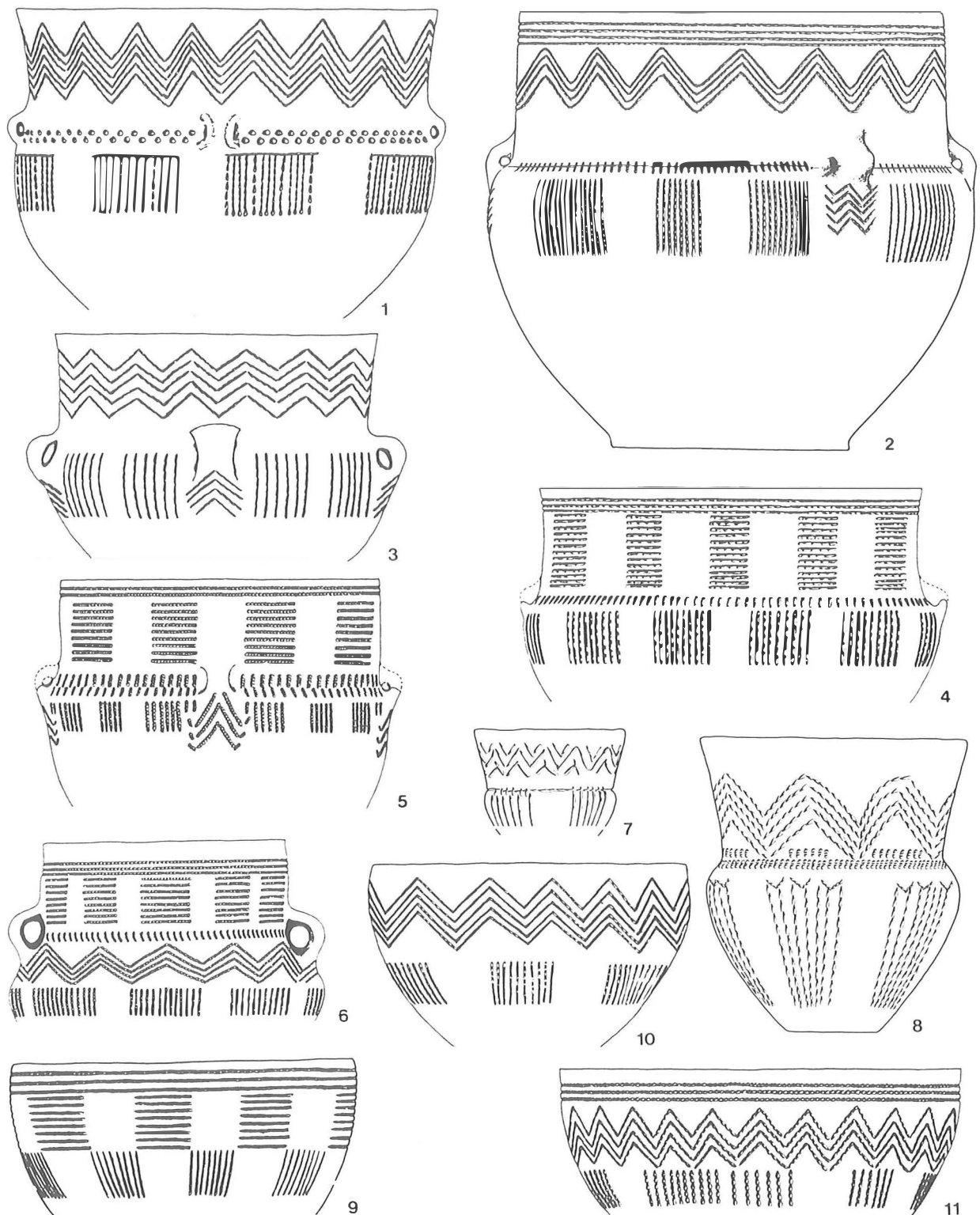


Fig. 7. Horizon 5. Emmeln-Heek Style: 1, 3-6, 10, 11. Emmeln (after Schlicht, 1968); 2. Uddelermeer, hut 3 (after Bakker, 1979); 7 and 8. Glimmer Es, G2; 9. S. of Hunneschans, settlement pit (after Bakker, 1979). Uddelermeer-Anlo Style: (22, 23 and 26 typologically late) 12 and 24. Anlo, settlement (redrawn after Waterbolk, 1960); 13. Uddelermeer, hut 8 (after Bakker, 1979); 14. Steenwijkerwold, flatgrave?; 15. Uddelermeer, grave 2 (after Bakker, 1979); 16-18. Glimmer Es, G2; 19. Ugchelen, flatgrave (after Bakker, 1979); 20. Uddelermeer, grave 1 (after Bakker, 1979); 22-23. Harderwijk (after Manssen, 1980); 25. Uddelermeer, grave 4 (after Bakker, 1979); 26-27. Havelte, D53. Funnel beaker cups and undecorated funnel beakers, found with both styles: 28. Uddelermeer, grave 2 (after Bakker, 1979); 29. Glimmer Es, G2.

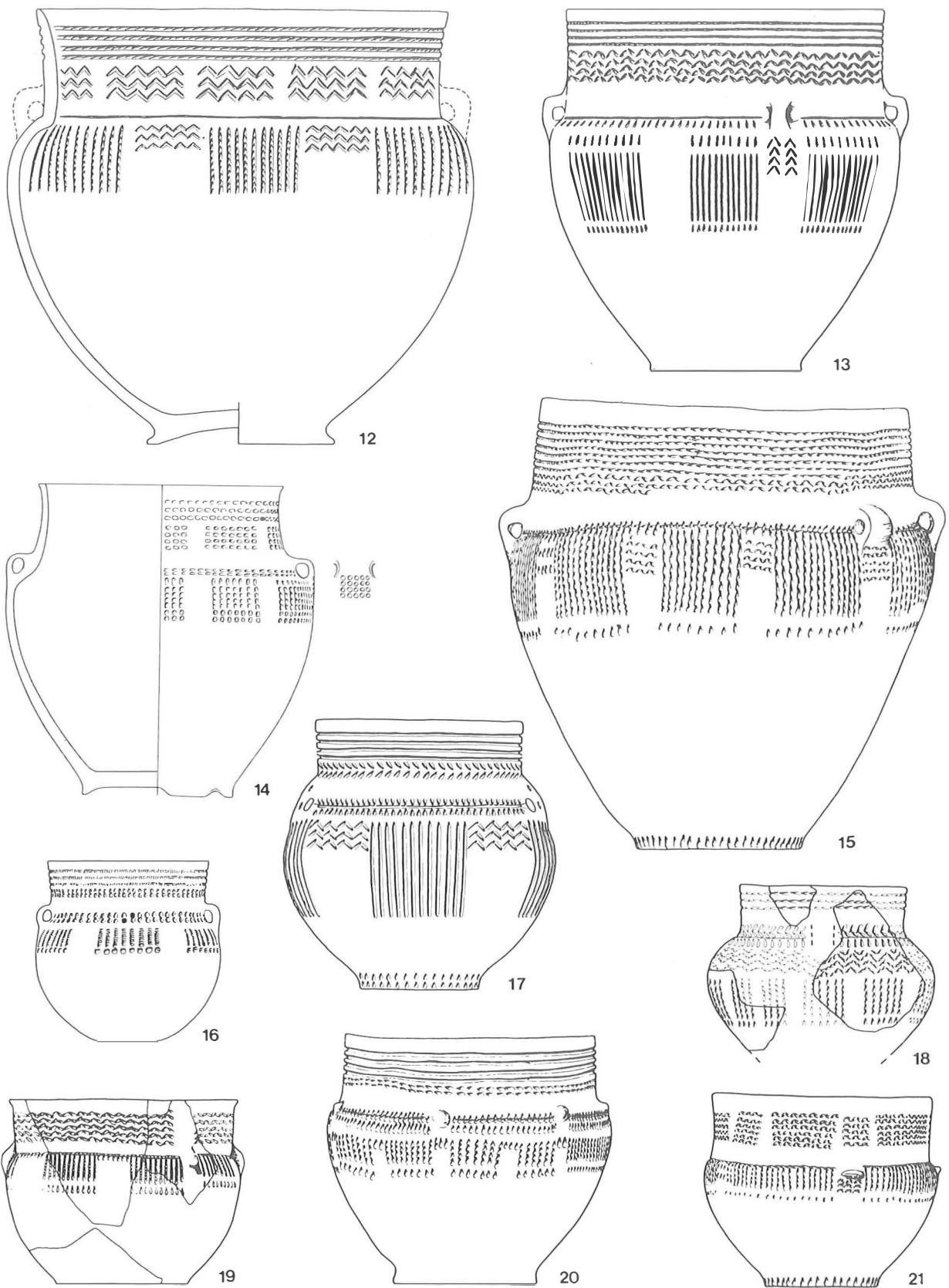


Fig. 7 (cont.).

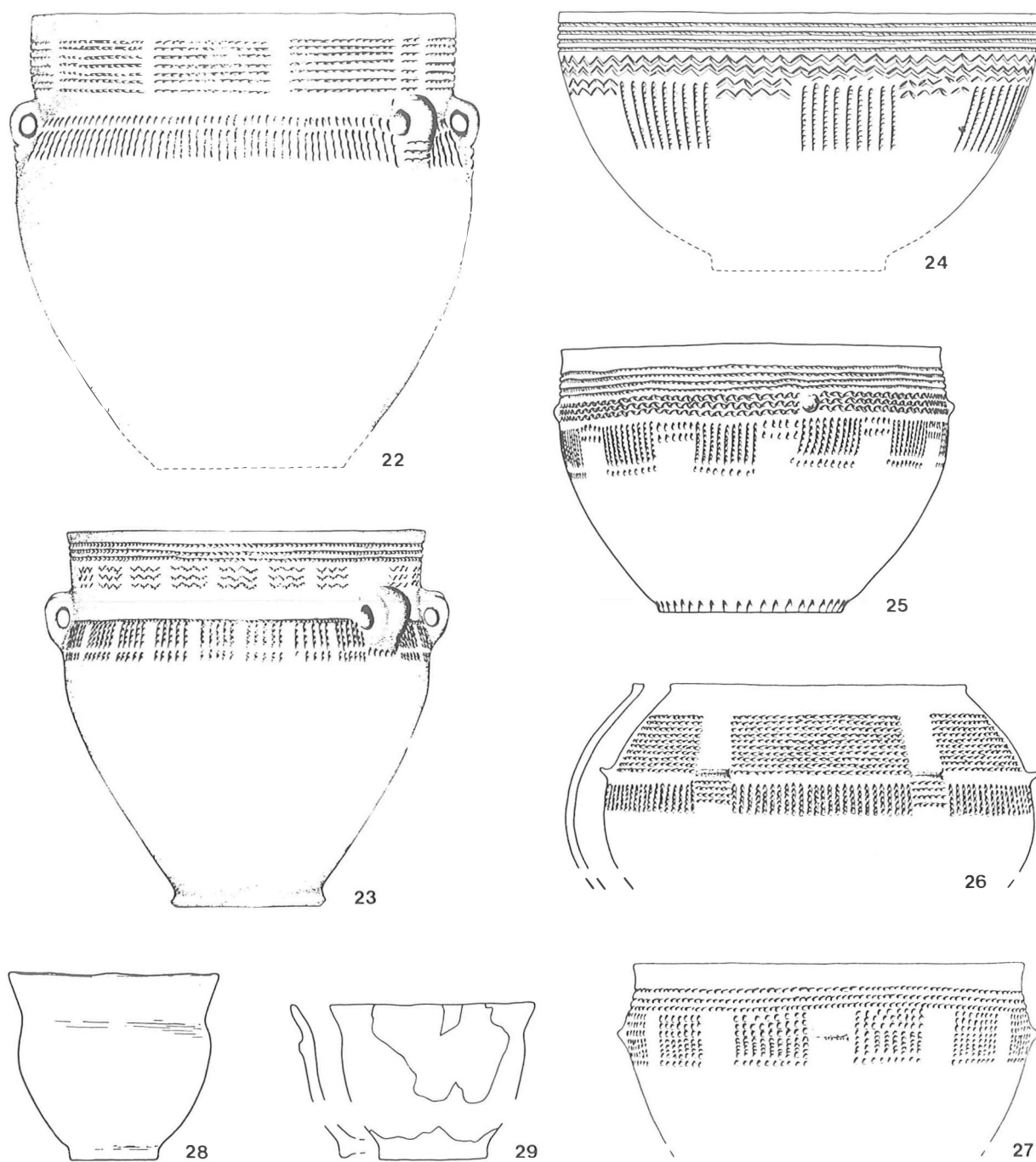


Fig. 7 (cont.).

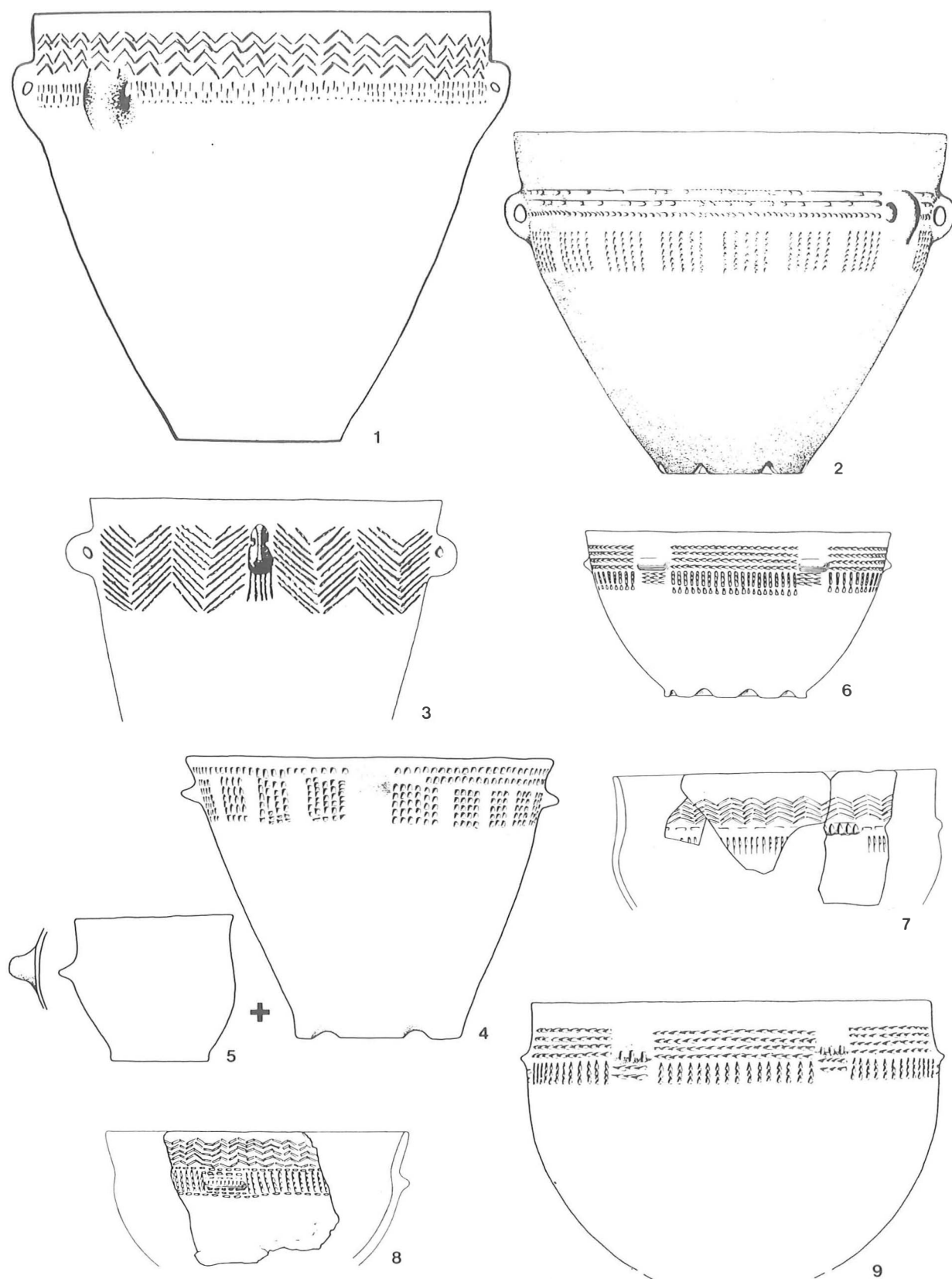


Fig. 8. Horizon 6. 1. Angelslo, flatgrave (after Bakker, 1979); 2. Harderwijk (after Manssen, 1980); 3. Emmeln (after Schlicht, 1968); 4-5. Glimmer Es, near G2; 6, 7, 9. Havelte, D53; 8. provenance unknown, collection B.A.I.

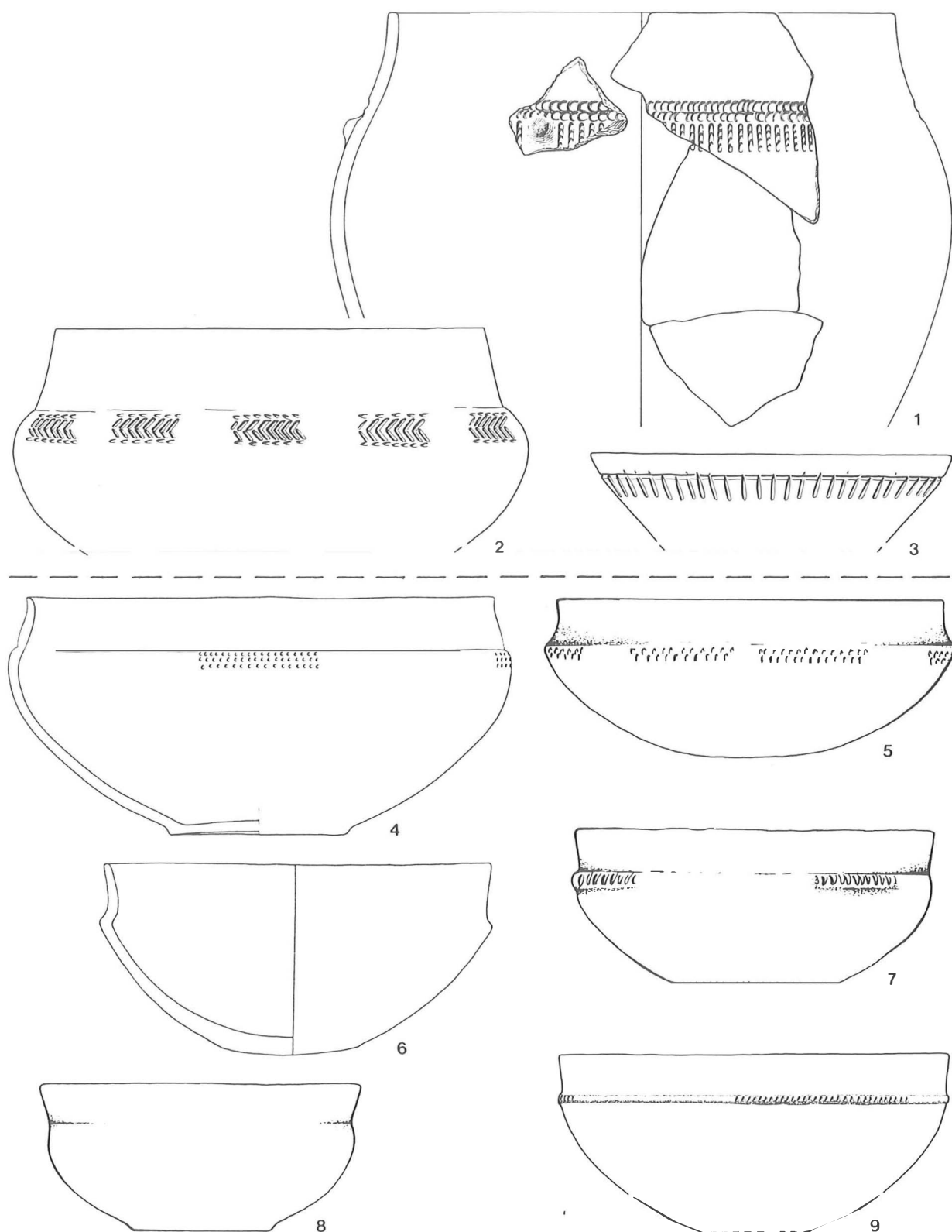


Fig. 9. Horizon 7 (1-3 typologically earlier). 1 and 12. Havelte, D53; 2, 3, 9, 15, 21. Glimmer Es, G2; 4. Leer, near megalithic tomb (after Bakker & van der Waals, 1973); 5. Hoge Loo, flatgrave (after Bakker, 1979); 6 and 20. Angelslo, flatgrave 1 (after Bakker, 1979); 7. Allardsoog, flatgrave? (after Bakker, 1979); 8. Schipborg, flatgrave? (after Bakker, 1979); 10. Angelslo, flatgrave 5 (after Bakker, 1979); 11. Nottuln (redrawn after Eckert, 1986); 13. Denekamp, flatgrave (after Bakker, 1979); 14. Angelslo, settlement pit 5 (after Bakker, 1979); 16. Losser (after Bakker & van der Waals, 1973); 17. Noordlaren, G1 (after Bakker, 1979); 18. Emmeln (redrawn after Schlicht, 1968); 19 and 22. Angelslo, flatgrave 3 (after Bakker, 1979).

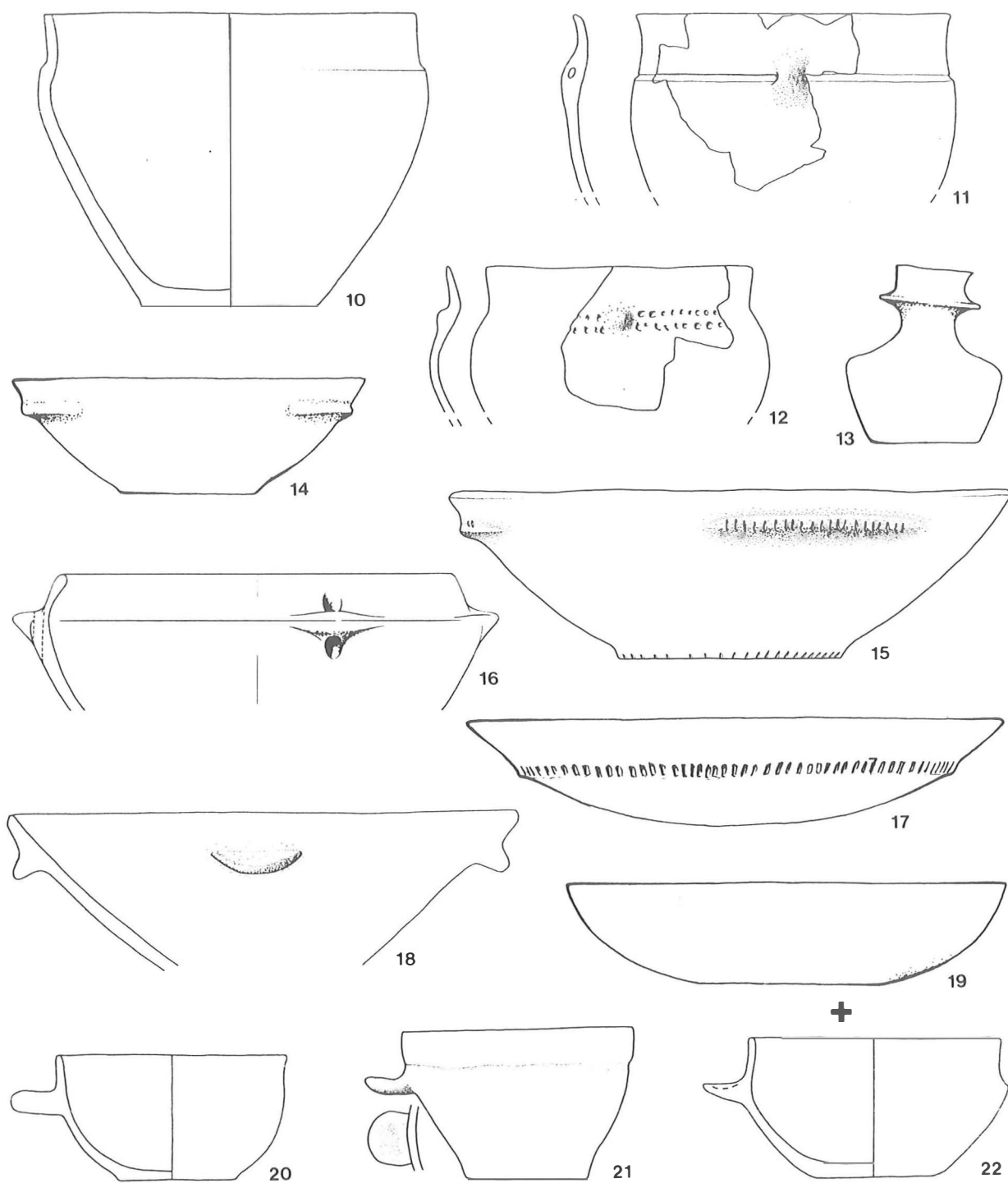


Fig. 9 (cont.).

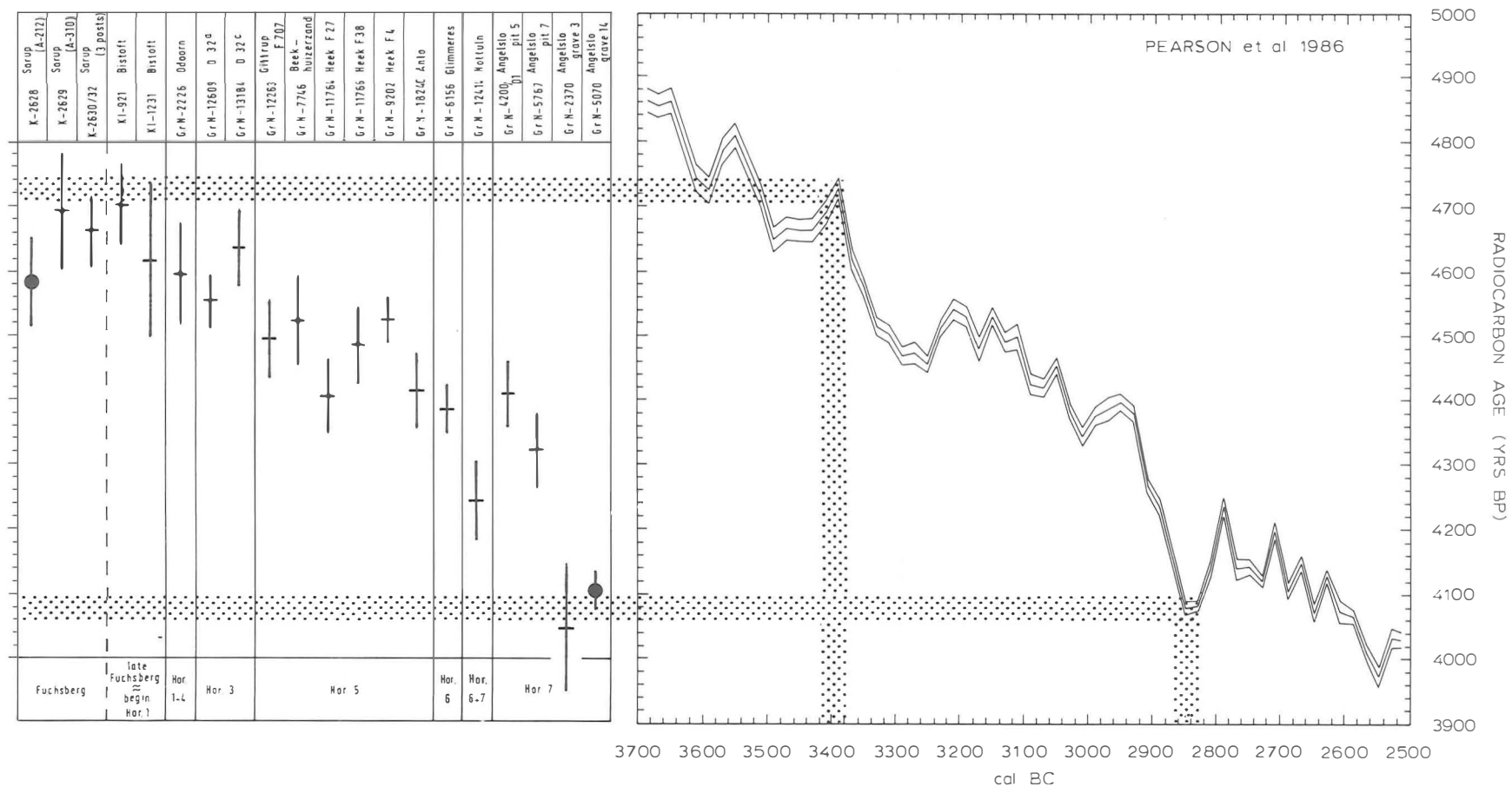


Fig. 10. Radiocarbon dates from Fuchsberg and TRB WestGroup contexts, in relation to the calibration curve, and arranged by horizon. The circular symbols indicate samples of short own life. The most likely beginning and end dates of the West Group are indicated by the shaded bars.