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Leven met de Vecht: Schokland-P14 en de Noordoostpolder in het neolithicum en de bronstijd

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SUMMARY

This dissertation addresses the habitation history of the Noordoostpolder during the Neolithic and the Bronze Age. The site P14 serves as a *pars pro toto*.

P14 is located on the Schokland sand ridge on top of boulder clay, lying underneath and perpendicular to the former island Schokland. This sand ridge was accessible by way of the most important river in the region, the Vecht. Lengthy habitation, the relatively good preservation and the presence of nearly all deposits characteristic of the Noordoostpolder make P14 the key site for the entire region. Discovered in 1957, a large part of the site was excavated between 1982 and 1990 by the University of Amsterdam.

Structure of this book

Part I (chapters 1-2) provides a general introduction to P14, and discusses the significance of the site, the research history and the aims and structure of this book. The research approach was one of zooming out: from the level of minutiae (pot sherds) to the local, regional and regularly also the supra-regional level.

To get a handle on the habitation history, first the chronological framework had to be reconstructed in detail, primarily on the basis of ceramics (part II) and lithostratigraphy (part III). Subsequently, a number of feature categories and structures are dealt with in depth, in order to link these to habitation phases (part IV). The results from parts II-IV are used in part V to present a period-by-period overview of the long-term habitation history of P14. The habitation of and environmental developments in the Noordoostpolder are sketched in part VI.

Part II – Chapters 3-12

Part II deals with nearly 32.500 ceramic sherds from P14. The ceramic analysis, explained in chapter 3, centred on both typological and technological aspects. All cultures known from the Middle and Northern Netherlands up to and including the Middle Bronze Age are represented at P14, although not all of their phases have been attested (see fig. 12.1). Some cultures lacked an adequate typo-chronological framework. Creating or improving such frameworks constituted an important part of this study.

SW/Pre-Drouwen ceramics from trench 89-17: a chronostratigraphic subdivision (chapter 4)

It is usually impossible to distinguish Swifterbant (SW) sherds from those of Pre-Drouwen, the oldest phase of the West group of the Funnel Beaker culture (further TRB West group). Therefore, these ceramics could only be referred to as SW/Pre-Drouwen. This category comprised the vast majority of sherds recovered from P14.

Trench 89-17 in the riparian zone of the Vecht, with many tens of thousands of finds, was crucial to the understand-

ing of SW and Pre-Drouwen. By means of an analysis of ceramic traits, particularly temper characteristics, and by recording sherd numbers and weight per collection unit, a chronostratigraphic subdivision was constructed (layers A-E, see figs. 4.3-4.6). Finds from each overlying layer are generally younger than those from the underlying layer (with the probable exception of finds from layer E). However, most individual finds within these layers might be dated too early or too late, due to trampling, displacement or as a result of the excavation method employed (see fig. 4.7). This implies that only a rough impression of the typo-chronological trends can be achieved. Layers A-E have been roughly dated on the basis of ceramic typology and technology, and by ¹⁴C-dates of organic residue on sherds (see fig. 4.8 and table 4.1). ¹⁴C-dates are possibly affected by the reservoir effect though.

Going by ¹⁴C-dates (including dates from elsewhere at P14), it is likely that P14 was frequently visited from the start of SW (ca. 6000 BP; ca. 4900 cal BC) onwards. The site appears to have been permanently inhabited from ca. 5400 BP (ca. 4300 cal BC) until (just prior to?) the end of Pre-Drouwen (around 4650 BP; ca. 3400 cal BC).

SW/Pre-Drouwen ceramics from trench 89-17 (section 5.1)

The SW/Pre-Drouwen ceramics from layers A-E exhibit chronological trends of which only the most significant are mentioned here.

The high degree of fragmentation precludes extensive conclusions being drawn about the morphological development within these predominantly S-shaped ceramics. There is however a clear shift in base-type. Knob-type bases only occur in layer A, alongside round bases. Flat bases are absent here. From layer B onwards, round bases are gradually replaced by flat bases. P14 supports the notion that most biconical vessels and vessels with a cylindrical neck are relatively young.

Some shifts are apparent in the preferred location of decorations too (in general a simple horizontal motif). Decoration on the interior of the rim is a quite rare and relatively early phenomenon (in layers A and B). Decoration on the rim occurs much more frequently, but diminishes over time. Decoration below the rim/on the neck is already common in the lower layers and from layer C onwards, surpasses decoration on the rim. Decoration on the shoulder/at the point of greatest body diameter is relatively rare. Few vessels were all-over decorated, mainly from layer B.

Among the technological traits, clear shifts are found in temper preference. Initially, organic temper increases relative to mineral temper. Organic temper (often mixed with mineral temper) predominates in layer B, but subsequently decreases. Mineral temper predominates in layers D and E.

Another trend can be seen in vessel construction. Over time, so-called H-joints are by and large replaced by N/Z-joints.

Changes over time in surface finishing techniques, firing (colour) and function (occurrence of residue) do not reflect real cultural trends, but can be linked to post-depositional conditions. These relate to trampling (degree of fragmentation), humic content and preservation conditions in the various layers.

SW/Pre-Drouwen ceramics elsewhere at P14 and selective degradation (sections 5.2-3)

Elsewhere at P14, on elevated terrain where lithostratigraphic support is absent, abundant numbers of SW/Pre-Drouwen ceramics were found too. Some typologically older traits, such as the knob-type bases, are absent here, while typologically younger elements appear more frequently. Furthermore, compared to trench 89-17, fewer sherds contain organic temper, also suggesting the predominance of younger finds. This however does not tally with the fact that the H-joints, an early characteristic, are far more frequent on the top of the sand ridge. Within this category, organic temper is rare. These differences are probably the result of selective degradation. The finds in trench 89-17 were soon covered by a thick layer of sediments, while those on the crest remained exposed at or just below the surface for many centuries, suffering the effects of ground frost to a much greater extent. Organically-tempered sherds are much more prone to disintegration through freezing than those with mineral temper. The finds on the top of the ridge therefore do not constitute a representative range of SW pottery at P14. On the crest, the ceramics belonging to the SW period during which organically-tempered pottery dominated (SW2) have largely disappeared from the archaeological record. This problem pertains not only to P14, but also to other SW sites that were not, or only after a long period of time, covered by peat or clay.

Pre-Drouwen TRB ceramics at P14 and the SW-TRB relationship (sections 5.4-5)

A small minority of the SW/Pre-Drouwen ceramics can be attributed with certainty (or great probability) to Pre-Drouwen, on the basis of typology, lithostratigraphy or ¹⁴C-dates. Sherds of at least 30 vessels have been identified, with cord decoration (cord arches, zigzag motifs, neck and belly fringes) grooves and stab and drag lines (again neck and belly fringes), collared flasks with relatively large collar and rim diameters, baking plates with fingertip impressions, and baking plates or flat dishes with raised edges. From layer C onwards, Pre-Drouwen sherds are a regular occurrence alongside ceramics in the SW tradition. They exhibit N/Z-joints and are in the main tempered with granite. Organic temper and other temper materials occur sporadically. Pre-Drouwen pottery is technologically similar to that of the SW tradition. Morphologically it is also indistinguishable from SW (except collared flasks and baking plates). Its decoration techniques, other than cord impressions, already occur in SW. The motifs are, if not identical, plausi-

bly derived from SW. The ¹⁴C-dates of the Pre-Drouwen ceramics demonstrate contemporaneity with SW-type pottery.

The many similarities with SW support the argument that Pre-Drouwen has its roots in this autochthonous tradition, whereas no convincing case can be made for an external development. Moreover, cord arches are absent outside the SW distribution area. This justifies the ascription of the majority of the finds from layers C-E to Pre-Drouwen TRB, including pottery in SW style, for instance sherds with various types of impressions below the rim.

The TRB West group therefore is rooted in SW by way of Pre-Drouwen. Pre-Drouwen TRB can broadly be dated between ca. 5100 and 4650 BP; ca. 3900-3400 cal BC.

Contrary to general belief, the TRB West group did not arise under the influence of the TRB North group (the latter being equally unthinkable without impulses from late SW2, see further down). There were contacts between the two TRB groups however. For instance, the importance of TRB North group impulses for the development of the Drouwen phase (TRB1) is widely acknowledged, and rightly so. Not only are typological and technological elements of the SW pottery tradition easily recognizable in Pre-Drouwen, they seem to persist into the younger phases of the TRB West group. Examples are the deep round impressions below the rim, knobs on the shoulder, biconical vessels, joint reversal, and the incidental occurrence of organic temper. Pre-Drouwen elements such as cord impressions, collared flasks, baking plates and funnel beakers also still feature in younger TRB times.

SW phasing (sections 5.6-7)

Accepting Pre-Drouwen as the earliest TRB West group phase entails adjustment of the SW phasing. Therefore, a division into SW1 (ca. 6000-5600/5500 BP; ca. 4900-4400 cal BC) and SW2 (ca. 5600/5500-5100 BP; ca. 4400-3900 cal BC) is proposed, Pre-Drouwen TRB replacing what was formerly known as Late SW (or SW3 or SW4).

Hoge Vaart is the SW1 type-site for the IJssel/Vecht/Eem group, to which P14 belongs. Characteristics are mineral temper; predominantly H-joints; round, tapering and (barely pronounced) knob-type bases; S-shaped profiles, occasionally biconical, incidental knobs; largely undecorated except impressions on the rim. SW2 can probably be subdivided. The type-site for early/advanced SW2 is Swifterbant-S3 (mostly organic temper, though admixture with mineral temper occurs; round, tapering and knob-type bases; mainly S-shaped profiles, incidental lugs and knobs; decoration mainly on neck/shoulder and on the interior of the rim, also on the rim itself, occasionally below the rim, and all-over decoration). Its layer B makes P14 the type-site for late SW2 (mostly organic temper mixed with mineral temper; round, tapering and flat bases; mainly S-shaped profiles, incidental lugs and knobs; decoration mainly on and below the rim, incidentally on the interior of the rim, also occurring on the shoulder/at the point of the greatest body diameter, and all-over decoration).

SW/Pre-Drouwen and neighbouring contemporaneous culture groups (section 6.1)

Differences between SW and Ertebølle, such as the lack of lamps in SW, were never ignored. Nevertheless, SW has long been regarded, incorrectly, as a Dutch variety of Ertebølle, mainly due to its knob-type bases. There are in fact significant technological and typological differences. Ertebølle ceramics have thicker walls, display a type of joint that does not occur in SW, their wall surfaces are not polished, and the greatest body diameter is found lower down, lending the Ertebølle vessels an entirely distinct appearance. Except for knob-type bases (the knobs of which are not attached in the form of appliqués in contrast to SW practises) there are no convincing morphological commonalities. Lugs and knobs are absent and decoration is much more scarce, exhibiting different motifs and different preferences for location on the vessel.

There are also differences with the ceramics of the cultural sequence in the neighbouring south-eastern region (Rhine-land and surroundings): Grossgartach, Planig-Friedberg, Rössen, Bischheim and Michelsberg, united under the heading 'Danubian tradition'. Often, a simpler construction technique (H-joints) was used for SW ceramics. They display a much more limited range of forms. Knob-type bases do feature, whereas they are absent in the Danubian tradition. SW pots are less decorated and in general have a much cruder appearance. They did not serve as grave goods. And yet, there are also convincing commonalities in technological and typological respects. These can be found in particular among the mostly undecorated settlement ceramics of the Danubian tradition (see fig. 6.1), that has been somewhat overshadowed in the literature by the fine, richly decorated ware from graves. The similarities between those settlement ceramics (chiefly storage vessels, Kugelbecher and dishes) and SW pottery are remarkable, both in form as well as in wall thickness and techniques for roughening the exterior. Knobs and lugs, frequently applied in the Danubian tradition, occur in SW as well. Technological similarities include the joint reversal around the shoulder zone and the highly specific manner in which knobs were attached to the vessel wall. There are further parallels in location, techniques and motifs of decoration.

Apparently, the Danubian tradition served as a significant source of inspiration for the SW communities. Nonetheless, SW pottery maintained its own distinct character, demonstrating its own preferences, based on choices made within its own cultural context. SW ceramics are characterized not only by receptiveness to new elements from the south-east but also by a degree of conservatism. Fresh stylistic impulses, from both within and outside, resulted in additions to the morphological and decorating repertoire, but many older traits were retained for a considerable period. These include decorative elements drawn from the Danubian tradition that had long since gone out of style in their region of origin.

The development of TRB from SW (section 6.2)

It has already been argued above that Pre-Drouwen is rooted in SW. The ceramics are an important argument for

this, but for instance the ritual depositions and collective burials of the TRB West group can also be traced back to SW traditions. The transformation from SW into TRB West group occurred very gradually.

P14 has a fine counterpart in the ceramic complex of the site Hüde I, extensively published by Kampffmeyer (1991). The SW component at this site, located along lake Dümmer in Lower Saxony, is much greater still than Kampffmeyer recognized. He attributed his oldest habitation phase mainly to SW. Bearing P14 in mind, the overwhelming majority of the Hüde I ceramics can be assigned to SW/Pre-Drouwen, even those that Kampffmeyer attributed to Hüde's younger habitation phases. This applies for instance to the supposed Ertebølle and Rössen pottery and to the ware regarded as a late local Bischheim development. Additionally, there are many Bischheim imports at Hüde, which can be explained by the proximity to Bischheim settlements.

Kampffmeyer's postulations about the transition to TRB were partly influenced by Schwabedissen's developmental model. Schwabedissen (1979b) surmised the existence of the Dümmer group, a Bischheim group that endured locally at Hüde I and elsewhere in northwest Germany, which, influenced by and in tandem with Michelsberg, must have initiated the emergence of the TRB pottery style. Supposedly this could be inferred from early TRB elements (various types of impressions below the rim, including cord impressions, and occasionally on the interior of the rim) present within this Dümmer group.

According to Kampffmeyer, the development into TRB at Hüde I and in Lower Saxony went through various phases: a formative/earliest TRB phase (including Bischheim variants, a subset of Schwabedissen's Dümmer group), a TRB phase A/B and a TRB phase C (cf. Becker 1948). The latter phases would represent, as the terminology indicates, a development more or less parallel to the early TRB North group. Kampffmeyer's developmental sequence is not underpinned stratigraphically and is by his own admission hypothetical. Furthermore, his assignments of ceramics to his phases are regularly contradictory.

According to Kampffmeyer, Michelsberg played a minor role at Hüde I. For that reason, Michelsberg did not feature in his TRB developmental model. Nevertheless, the Hüde ceramics exhibit traits that can be traced back to Michelsberg influences (surface roughening, marked shoulder/neck transition, rim diameters that exceed the greatest body diameter, preference for decoration below the rim, 'Arkadenränder/Tupfenleisten', lugged flasks, 'Ösenkranzflaschen' and also baking plates). Thus Schwabedissen's ideas of Michelsberg impulses driving the development to TRB, recognizable not only at Hüde I, but also elsewhere in northwest Germany, are quite plausible. Schwabedissen (1979c, 172) noted almost prophetically that in Northern Germany a still largely unknown culture group must have been present which had contributed heavily to the neolithisation of the North. This culture group must be SW, insufficiently known at the time. Many of Hüde's ceramic traits (those displaying TRB- and Michelsberg-like elements) that were linked by Schwabedissen to the Dümmer group, and by

Kampffmeyer to either his formative phase (with Bischheim variants) or his earliest TRB phase (including TRB A/B), are equally known from P14, more precisely from late SW2 context (layer B). Other traits (including cord arches like at P14) can be linked to Pre-Drouwen. Thus the same development from SW to TRB West group can be surmised for Húde I as for P14. Neither site however allows the lengthy Pre-Drouwen period to be subdivided into recognizable stages. Besides Pre-Drouwen decoration types and vessel shapes that also occur at P14, Húde I has yielded additional characteristics. These include sherds exhibiting ‘Wickelschnur’ impressions, funnel beakers featuring knobs on the shoulder, ‘Ösenkranzflaschen’ and possibly lugged beakers, lugged flasks with four vertical lugs at the location of the greatest body diameter and amphorae/jars of the Klenzau/Húde I type. Future discoveries will have to determine whether these additions typify only the eastern part of the Pre-Drouwen distribution area, west of the river Elbe.

The TRB West group is the only TRB group whose ceramic tradition has local origins. The cradle of the TRB culture must therefore lie in the former SW region. Late SW2 ceramics not only lay the foundations for those of Pre-Drouwen (Pre-Drouwen in turn being the inspirational source for the pottery of the Vlaardingen culture). Late SW2 pottery, uniting elements of Bischheim and Michelsberg among others, and featuring both round and flat bases, also presents itself as the only direct source of inspiration for the ceramics of the various early TRB North groups. SW served as a conduit for all kinds of Neolithic attributes to the former Ertebølle region. Via the Ertebølle region, these new impulses reached the late Janisławice culture in Poland, which gave rise to the TRB East group.

Figure 6.2 summarizes the relationships between the Danubian tradition, SW and TRB.

Drouwen and Havelte TRB ceramics at P14 (chapter 7)

P14 yielded sherds belonging to some 70 vessels which could be typologically linked to the Drouwen and Havelte phases of TRB (TRB1-7). These are mainly sherds of funnel beakers, but also of baking plates, collared flasks, bowls, necked bowls, a pail, a tureen, a funnel beaker cup and possibly other types as well. Many funnel beakers and several baking plates and collared flasks can however be assigned not only to Drouwen or Havelte, but also to Pre-Drouwen on typological and lithostratigraphic grounds. For this category, distinctions between a suspected Pre-Drouwen contingent and the younger TRB were drawn mainly on technological but occasionally on typological grounds as well. The pottery demonstrates that P14 was inhabited/visited during TRB3-4 and TRB7. A presence during TRB1-2 and TRB5-6 is possible, but cannot be established typologically.

SGC ceramics at P14 (chapter 8)

P14's pottery of the Single Grave culture (SGC) consists of sherds belonging to at least 80 beakers. The fine ware consists of protruding foot beakers (PFB) and all-over ornamented (AOO) types; the latter mainly comprising all-over

corded (AOC) beakers. The less frequently recognized coarse ware consists of beaker pots with short wave moulding, beaker pots with fingertip impressions and SGC beaker pots. The latter can be subdivided into PFB and AOO beaker pots in accordance with the fine ware typology. It is unclear to which of the regional SGC groups proposed by Van Ginkel & Hogestijn (1997) P14 and the Noordoostpolder should be assigned.

On typological grounds, it cannot be ruled out that P14 was visited during SGC1-3, while presence during SGC4 is certain.

BB ceramics at P14 (chapter 9)

The existence of a Middle-Netherlands and a Northeast-Netherlands Bell Beaker (BB) group is endorsed, but the ceramic developments among both regional groups appear to correspond to each other to a much greater degree than Lanting (2007/08) supposed. The existing typologies for bell beakers are difficult to apply to a heavily fragmented find assemblage like that of P14. In this study, practical reasons dictated that a distinction be made between Early BB (comprising maritime and epi-maritime beaker types) and Late BB (comprising Veluvian and other late bell beaker types). That leaves a remainder category, comprising BB fine ware sherds that cannot be attributed with certainty to either Early or Late BB, as well as sherds belonging to bell beaker type 2Ic. P14's BB ceramics include sherds belonging to at least 200 bell beakers and over 100 pot beakers (the beaker pots of the BB).

Partly based on the old idea that the beaker pots of the beaker cultures are simply enlarged beakers, exhibiting the same typological developments as the fine ware, a developmental sequence can be constructed for the BB coarse ware (and other beaker pots; see table 9.3). This applies to both the Middle-Netherlands and the Northeast-Netherlands bell beaker group. The sequence runs from (presumed) zone pot beakers, via curved-tripartite pot beakers, and successively (and partly overlapping) neck pot beakers, belted pot beakers, and trumpet pot beakers to pot beaker derivatives – the latter still occurred in the earliest BWB phase and were later replaced by uniformly decorated BWB beaker pots.

For all that, due to fragmentation P14's pot beakers can seldom be attributed to a specific pot beaker type with any degree of confidence.

From a technological point of view (temper and wall thickness) the early bell beakers of P14 correspond well with the SGC beakers, and the pot beakers with the preceding SGC coarse ware. Late bell beakers tend to be somewhat more coarsely tempered than early bell beakers.

The lithostratigraphy of P14 offers some footholds for bell beaker and pot beaker chronology, not contradicting the generally accepted ceramic sequence.

At P14, traits are present that are associated with the Middle-Netherlands bell beaker group as well as with the Northeast-Netherlands group, albeit more rarely. Clear-cut assignment to either one of the two groups is not really possible. The site offers an exceptionally broad range of early and late bell beaker and pot beaker types. There are

no typological hiatuses. For this reason, continuous (permanent) presence at the site is surmised.

BWB ceramics at P14 (chapter 10)

A more detailed phasing with associated sites and criteria has been proposed for the Barbed Wire Beaker culture (BWB; see section 10.11 for proposed dates for the BWB phases). This phasing based on the ceramics can largely be supported stratigraphically at P14 (see fig. 10.4). Only about a dozen beakers, all with barbed-wire decoration, can be assigned with certainty to BWB1, although a number of bell beakers and pot beakers or pot beaker derivatives are likely contemporaneous. P14's BWB1 beakers, recovered from different soil layers, seem to allow a differentiation into early and late BWB1. Technological characteristics appear to support this.

BWB2 is likewise represented by some barbed-wire decorated specimens. For this phase too, there are a number of potential examples of contemporaneous undecorated and alternatively decorated coarse ware (pot beaker derivatives and uniformly decorated BWB beaker pots).

In contrast to its earlier BWB phases, P14's BWB3 phase represents a more or less sealed off find complex with the remnants of about 80 vessels. The ceramic finds offer a rather complete picture of the BWB3 inventory. This largest BWB3 assemblage uncovered thus far can be further subdivided on the basis of stratigraphic differentiation, providing some insight into pottery trends within BWB3.

The ceramics at P14 demonstrate a development, from BWB1 onwards, towards plainer and coarser pottery (a trend found elsewhere too). This is manifested in the decoration (increasing sloppiness in execution, impressions with increasingly loose-wound cord stamps, and impressions wider apart from each other; simplification of motifs; simplification in decorating techniques, towards mainly barbed-wire impressions and, characteristic of BWB3, cord decoration on the rim and on the interior of the rim). The tendency towards coarseness is also displayed in technological aspects (more and coarser temper and thicker-walled). Probably grooves and zigzag decoration were abandoned during the course of BWB3, and perforations below the rim were replaced by deep round impressions below the rim, often accompanied by 'Lochbuckel' on the interior. There does not yet appear to be a shift towards a greater share of undecorated ceramics in BWB3.

There are significant regional differences within the Dutch BWB distribution area, not so much in the ceramic typology, but in the timing of the transition from BWB (Early Bronze Age) to Hilversum culture (HVS; Middle Bronze Age). In the dune area, in the south and in the riverine area this transition took place in early BWB3. In the Noordoostpolder and north of the great rivers up to Overijssel this did not occur until the end of this probably lengthy phase. It is a well-known fact that in the northeast of the country only the youngest HVS ceramics (Drakenstein- and Laren-like types) occur. Only in that region is a largely undecorated phase, BWB4, suspected to have existed, Gasteren being

the type-site. BWB4 may have lasted about a century and a half but this supposition requires further research.

HVS and later prehistoric ceramics at P14 (chapter 11)

A Laren pot was found north of the sand ridge on P14. The site itself yielded fragments of a vessel dating to the Early Iron Age. These are the youngest prehistoric ceramics recovered from P14.

Chapter 12 (fig. 12.1 and table 12.1) provides a summarizing typo-chronological overview of the ceramics of P14.

Part III (chapters 13-14)

Part III delves into aspects of landscape and the lithostratigraphy at and around P14.

Landscape features (chapter 13)

The site, established at the eastern tip of the Schokland sand ridge, has been preserved relatively well thanks to its protected setting sheltered by the later island of Schokland in the Zuiderzee (see figs. 13.1-2). However, especially the crest has been affected by recent agricultural activities. Erosion took place in the past as well, in particular in the riparian zone. The most significant erosive force was the Vecht, the river that flowed directly adjacent to the site, repeatedly carving itself a new channel (see table 13.1 and fig. 13.3). The Unio II channel for instance nearly completely wiped out the earlier riparian zone. In turn, the Unio II riverbed and the associated riparian zone disappeared almost entirely upon the formation of the Oude Detritus channel. The riparian zone of the latter was largely eroded by the formation of the Cardium channel. These channel migrations and incisions were closely related with coastal developments in North-Holland (see fig. 13.4).

Stratigraphy (chapter 14)

Insight into the nature of the soil layers of P14, their relationships and chronology was necessary to further unravel the habitation history and to be able to connect features and environmental analyses to a specific period. The stratigraphy is quite complicated (see appendix I). In order to identify, interpret and date the soil layers, data from the literature about layers occurring elsewhere in the polder were used as well, together with the regional groundwater curve (see fig. 14.1), stratigraphic observations and ¹⁴C-dated features and artefacts. On the basis of the principles of 'vessel peak' and 'culture peak', the ceramic content of the horizons yields important dating footholds (see table 14.1). The discerned layers have been represented in detail. They could often be correlated with developments elsewhere in the Noordoostpolder and in the North-Holland coastal area. Depending on the available data the layers have been dated with a greater or lesser degree of precision.

Fig. 14.5 provides a spatial overview of the stratigraphy. The essence of the lithostratigraphy has been summarized in table 14.3 and fig. 14.8. Fig. 14.9 provides the relevant ¹⁴C-dates and the link to archaeological periods.

The stratigraphy at and around P14 has been largely determined by a continuous process of (re)sedimentation of detritic gyttja and, incidentally, clay. This process was interrupted periodically by at times severe erosion. As the average water level of the river rose, sediments were deposited ever higher on the sand ridge and even the higher parts began to suffer from the effects of erosion. At some stage during the Bronze Age the Vecht assumed a more eastern course through a series of shallow lakes, allowing the channel adjacent to P14 to silt up. The P14 terrain was steadily overgrown by alder carr, rendering it barely accessible, if at all.

The consequences of the complex history of sedimentation and erosion varied for each individual archaeological period at P14. Naturally, the various erosional episodes have had a negative impact on the archaeological record at the site. But the sediments in turn sometimes provided horizons, separating features and finds from different periods. Besides, some soil layers present along the flanks and in the riparian zone harboured find assemblages almost unaffected by contamination.

Part IV (chapters 15–18)

Part IV centres on the most important feature categories and structures. These are described in great detail and discussed in order to link them to distinct habitation periods. The features that are not discussed in this section are relatively easy to assign to a period on the basis of stratigraphy or other considerations.

Graves and associated soil features (chapter 15)

P14 has yielded certain and potential graves, a number of associated posts and fire-pits, a few potential grave gifts, and finally some scattered human skeletal remains. They have been assigned to different periods on the basis of ¹⁴C-dating of tooth enamel, wood and charcoal, and on the basis of burial position, burial gifts, cross-cutting, state of preservation of skeletons, presence or absence of wood and stratigraphy within the burial pits, and the degree of visibility of the grave pits (see tables 15.1-2, and figs. 15.45-47). The SW/Pre-Drouwen component comprises badly or barely preserved remains of adults (probably both male and female) and children. They come from single graves, one or more multiple burials (including a collective burial with at least six individuals), and one or more skull burials. Grave goods seem to be absent, with the possible exception of a head dress (strictly speaking not a grave good), a piece of antler and flowers. The potential graves, at best marked by vague soil discolourations (remains of body silhouettes?), also belong to SW/Pre-Drouwen. The majority of these certain and potential graves were located in a little burial ground in the eastern part of the site. A possible double grave was found some 50 metres further west. A moderately preserved, disturbed, flexed burial without grave goods can be assigned to the Drouwen or perhaps Havelte TRB. Some moderately preserved skeletons of men and a woman in flat graves as well as a ring ditch with a central pit, pre-

sumably the remnants of a burial mound, can be attributed to the Late Neolithic, at least to late SGC. This small burial ground cross-cuts the earlier cemetery.

The Late Neolithic grave goods consist of a 1d type beaker, flint artefacts and a yew club. A pseudo-Grand-Pressigny dagger may represent a grave good that was washed out of the burial mound. The presence of (poorly preserved) wooden structures within these graves is quite exceptional. These point to the existence of little burial chambers with a variety of floor and wall linings and covers. For parts of these constructions incidental use was made of sticks, but for the most part, bark and wicker-work were used.

The Late Neolithic cemetery alongside the river (and particularly the burial mound) appears to have been demarcated by a number of posts, one of which was extremely sturdy. Two fire-pits belong to this burial ground. Such fire-pits are a recurrent phenomenon near graves, and probably much less scarce than thought previously. They date from (late) SGC onwards, and at least until early BWB. They had certainly disappeared by the Middle Bronze Age. Fire-pits did not necessarily play a role in the burial ritual of any specific deceased person. It does appear however that proximity to graves of the ancestors was a prerequisite.

Postholes and house plans (chapter 16)

The postholes of P14 are assigned to habitation periods on the basis of depth, degree of visibility, presence or absence of layering and non-carbonized wood, ceramic content and cross-cutting. The overwhelming majority belongs to the SW/Pre-Drouwen period, and narrowing it down, most likely to Pre-Drouwen, considering the temper characteristics of the ceramics (predominantly granite temper). This outcome may be skewed however, as a result of selective degradation. A SW2 date for a number of postholes remains a possibility. In the swarm of postholes on the crest two plans have been recognized of southwest-northeast oriented, two-aisled houses, 12-13 m long and 5.5-7 m wide, with a rectangular or trapezoidal floor plan, lightly convex or straight walls and a division in front and rear quarters. Two other plans of the same type can be discerned with some difficulty, but they are less certain. P14's plans resemble to some extent houses of the Danubian tradition.

Neolithic arable field (chapter 17)

A large part (0.25-0.5 ha) of the crest of the sand ridge at P14 was covered by an agricultural layer, originally 15 cm and in places up to 20 cm thick. Thousands of ard marks showed up at its base. These can be brought back to five patterns and at least 14 different phases. On the grounds of ceramic content, cross-cutting, depth of the ard marks in relation to the surrounding sediments and to the regional ground water curve, and the estimated date of the overlying layer, the duration of use of the arable field can be estimated. It probably dates from late SGC until into late BB (between ca. 4050 and 3750 BP; ca. 2550-2200 cal BC).

Ditches (chapter 18)

The western ditch system, to the west of the mentioned arable field, consisted of about a dozen parallel ditches, but

they are not all coeval. A successor was found at the same locality. The eastern system, on the northern edge of the arable field, consisted of only two parallel ditches. This eastern system may have flanked a little path that ran from the riverbank westwards. It might have linked up with the western system, presumably a drainage system in a ford-like depression, leading to the higher parts of the Schokland sand ridge. Both ditch systems can be assigned to BB, based on cross-cutting, stratigraphy and height among other things. They were covered over around 3750 BP (ca. 2200 cal BC) by run-off sand. The western system was then repaired, and used during Late BB and possibly into BWB times (at the very latest until ca. 3450 BP; ca. 1750 cal BC).

Part V (chapters 19–25)

In part V the habitation history of P14 is presented per period. The approach is described in chapter 19. Below only the main aspects of each period are mentioned.

Habitation of P14 during SW and Pre-Drouwen (chapter 20)

During SW/Pre-Drouwen, the sand ridge at P14 was an elevated, dry location in what was initially a wooded area, although sedge vegetation gradually began to play a more important role. Graves and potential graves, a ritual deposition in the form of a complete lugged beaker, pits, post-holes that can partly be assigned to house plans and cattle hoof prints have been discovered. These features were located almost without exception in the central and eastern part of the excavated area (see fig. 20.4). Furthermore, tens of thousands of finds belong to this period. These include ceramics, flint, stone, bone and antler artefacts, remains of wild and domesticated mammals, and (though less than expected) remains of fish and birds, and additionally plant remains, including collected plants and cereals. The reconstructed chronostratigraphy of trench 89-17 (see chapter 4) provides some insight into the broad diachronic trends; not just in the ceramics, but also within the other find categories and the subsistence economy. Outside trench 89-17 the SW1, SW2 and Pre-Drouwen material at P14 was found intermixed, containing some younger finds as well, and for that reason not or only rarely assignable to any particular phase.

On the basis of ¹⁴C-dates and typological indications (particularly material from layer A) it is plausible that P14 was visited regularly right from the start of SW1. This was probably a continuation of the Mesolithic tradition. However, hardly any specific finds and not a single feature can be linked to this earliest SW phase with confidence. Therefore, no firm conclusions can be drawn about frequency, duration and nature of the habitation, the spectrum of activities and the means of subsistence. Evidence for the presence of cereals and domesticated animals is absent (and based on findings elsewhere not to be expected). The elusiveness of this habitation period, as well as the oldest phase of SW2, derives in part from the total erosion of the contemporaneous riparian zone (that of the Unio I channel).

The picture of the habitation from ca. 5400 BP (ca. 4300 cal BC) onwards is somewhat clearer. The oldest graves date to around that time. In particular the finds from layer B, that mainly will have been deposited between ca. 5250 and 5000 BP (ca. 4050–3800 cal BC) are helpful for a better understanding. Layer B represents the only known large find assemblage for late SW2.

A small community was present at P14 during SW2, comprising both adults and children. The subsistence economy was based on hunting (particularly beaver and red deer), on fishing and gathering, on animal husbandry (cattle and pig) and presumably also on local agriculture, as indicated by the remains of cereals. There is evidence for a broad spectrum of partly seasonal activities, carried out in spring, summer and autumn. Presence in wintertime is hard to demonstrate, but cannot be ruled out. The house plans of P14 may date from SW2. They point to substantial long-lasting structures. Presumably, the site was in use as a permanent settlement from ca. 5400 BP (ca. 4300 cal BC), during the course of SW2, until well into Pre-Drouwen. The site seems to have been at the heart of a territory that was exploited not only from P14 but also from temporary satellite camps. The latter were located chiefly on neighbouring river dunes and levees.

Pre-Drouwen finds indicate a continuation of the outline sketched for SW2, with an increased share of the domesticated component (animal husbandry and arable farming). The youngest graves date to early Pre-Drouwen. If not already belonging to SW2, the house plans will certainly date to Pre-Drouwen. It is unclear whether habitation came to an end during late Pre-Drouwen, or continued uninterrupted until into Drouwen TRB, since ceramics that are exclusively typical for TRB1 are lacking.

Habitation of P14 during Drouwen and Havelte TRB (chapter 21)

During Drouwen and Havelte TRB (TRB1–7) the Schokland sand ridge was surrounded by alder carr. No waterlain sediments at P14 can be connected with certainty to the TRB phases mentioned. An isolated grave and a possible ritual deposition might be linked to this period (see fig. 21.3). Attributable finds are relatively scarce. Apart from a few transverse arrow-heads that could date to earlier periods as well, they consist of pottery only. This meagre dataset hinders interpretation. A permanent settlement for this entire period cannot be ruled out but seems improbable. In the case of permanent habitation, the accompanying features at P14 must have been largely wiped out by erosion and later prehistoric agricultural activities. It is more likely that P14 was visited only sporadically during this time, in any case during TRB3–4 and TRB7, en route from the hinterland to the coast and vice versa, or in the context of hunting expeditions. If P14 was used more sporadically, a plausible explanation lies in the unfavourable environmental conditions at the time. The extensive surrounding carr must have hampered accessibility considerably and was hardly suitable for pasture.

Habitation of P14 during SGC and BB (chapter 22)

During SGC, the vicinity of the site was initially dominated by alder carr, and later by poorly drained sedge swamps. In the course of SGC, an open landscape developed characterized by better drained sedge marshes. As BB progressed, a myrtle-rich birch marsh woodland gradually gained predominance. During the Late Neolithic, dry terrain at P14 decreased significantly (see figs. 22.4-5). To this period belong a burial ground with associated posts and fire-pits, an arable field, ditches, a riverbank reinforcement, a number of postholes, small pits, stakes and stake holes, hearths with remains of the surrounding tread surface, a concentration of cooking stones, large (water) pits, hoof prints and possible human footprints. The features are located in both the east and west of the excavated area. The Late Neolithic finds were mixed with younger and older material. A substantial amount of Late Neolithic pottery was identified. Only a few flint arrow heads can be firmly ascribed typologically to this period. Stratigraphic context and the state of preservation allowed some other finds to be assigned to the Late Neolithic. These consist of worked wood, a number of bone and antler artefacts, mammal bones, few bird and fish bones as well as plant remains, including collected plants, cereals and charcoal.

It seems that P14 was only visited sporadically during SGC1-3. From SGC4 onwards however, indications for human presence are plentiful. This turnaround appears to be the result of environmental changes that rendered the adjacent landscape fit for permanent habitation once more. These changes appear to be connected to the formation of the Oude Detritus channel, improving drainage in the river valley after a period of stagnation.

During SGC4 a burial ground was created directly along the river bank at P14, consisting mainly of flat graves. Probably around the same time, an arable field was reclaimed, and remained in use for several centuries. Unfortunately, the faunal and plant remains cannot be assigned to either SGC or BB, but it would appear that people subsisted on the fruits of agriculture and livestock rearing during the Late Neolithic. Bones of domesticates (cattle, pig, sheep/goat) predominate over those of wild animals (particularly beaver, also red deer). Indications for fishing and hunting are more scarce. Evidence for foraging/collecting is meagre, which undoubtedly severely understates its role in the subsistence economy.

During Early BB the burial ground was marked with posts. Rituals were conducted around fire pits. Later in BB, the cemetery fell into disuse. Furthermore, agriculture at P14 was abandoned, probably as a result of the rising water table and flooding. Ditches and a stone embankment at the river bank can be linked to these ever increasing wet conditions. Hearths were built in the periodically dry riparian zone, and probably also on the sand ridge itself. This occurred while the arable field was still in use, and also after its abandonment. Various activities took place around these hearths. A few hearths have been found far off to the west. They point to similar activities, only now taking place during wet seasons, when the water edge was shifted to the west.

It is plausible that the terrain of P14 formed the periphery of a permanent settlement during late SGC and the entire BB. The houses and other arable fields were probably located further west on the Schokland sand ridge, on elevated ground. As before, the Schokland sand ridge will have formed the centre of a territory that was also exploited from temporarily used satellite settlements.

Habitation of P14 during BWB (chapter 23)

As a result of the increasing tidal influence, the birch carr surrounding the Schokland sand ridge during BWB1 and BWB2 gave way to a reed-rich sedge marsh. During BWB3, reed progressively dominated the vegetation, replaced by sedges and alder carr towards the end of BWB3. Throughout the Early Bronze Age, the excavated area was usually flooded (see figs. 23.4-5). BWB is represented by posts, stakes, cooking pits, remains of burned down vegetation, hearths, tread surfaces, cattle hoof prints and human foot prints. Finds consist of ceramics, flint and stone (that still awaits analysis), antler and bone artefacts, other mammal remains, few bird bones, many fish remains, some worked wood, charcoal and other plant remains including cereals and collected plants. The BWB1 and BWB2 finds were mixed with older material. Bar a few features, only ceramics can be attributed to those early BWB phases. A BWB3 assemblage on the other hand, was stratigraphically separated from the earlier finds.

Site activities in the Early Bronze Age were basically the same as in Late BB, concentrating around hearths and cooking pits. Probably, the entire riparian zone was once littered with the remnants of such short-term activities, including leading cattle to drinking water. By burning down reed vegetation open space was created. Seasonal presence is implied, particularly in the summer months, when water levels were low. When water levels were higher, similar activities took place in the western part of the excavated area.

Continuing an earlier trend, rearing livestock (especially cattle, along with pigs and sheep/goat) gained further weight at the expense of hunting (mostly beaver and red deer). Livestock was probably allowed to graze in the vicinity on pasture created by burning down the reed vegetation. Compared to earlier periods, the large number of fish bones detected points towards a greater share of fishery in food procurement, but the comparison is severely affected by differences in preservation conditions. The proportion of foraging/gathering in the subsistence economy is as ever difficult to estimate. The inhabitants had access to cereals.

Presumably, there was still a settlement with houses, arable fields and graves on the higher part of the Schokland sand ridge to the west of P14. In essence, the Late Neolithic exploitation system continued into the Early Bronze Age. During the course of BWB3 the potential uses of the terrain of P14 became more and more restricted due to the rising average water level, the reduction of fluctuations therein, and the development of an alder carr. In late BWB3, the regular seasonal activities ceased altogether.

Middle Bronze Age and Iron Age finds from P14 (chapter 24)

After the Early Bronze Age, the landscape around the sand ridge consisted of a raised bog along expanding lakes. The Vecht river was no longer recognizable. Indications for human presence at P14 are very scarce (see fig. 24.3). They consist of a Laren pot, found to the north of the site in a pool amidst alder carr, and part of an Early Iron Age vessel, recovered from what was once a rivulet or puddle at the site itself. Both presumably are ritual deposits.

It is quite possible that the surmised settlement on the sand ridge to the west of P14 persisted for several centuries during the Middle Bronze Age, but only if the location remained sufficiently accessible, for instance by a stream or trackway. The Schokland sand ridge was at the time one of the last remaining elevated locations in the region, and therefore would not have been abandoned easily. The system of one permanent settlement with seasonal satellite camps in the surroundings could have prevailed at least until HVS, considering HVS finds at Emmeloord-J97. That site (a temporary settlement that was visited frequently from Pre-Drouwen onwards) is considered to be an important satellite site belonging to the inhabitants of the Schokland sand ridge.

Habitation of P14: the general outline (chapter 25)

In contrast to elsewhere in the Holocene lowlands, the Neolithic and Bronze Age habitation of P14 was extremely long-lived. The centre of habitation gradually gravitated from east to west however (see fig. 25.1). Initially, during SW1 and early SW2, it presumably focussed on the extreme edge of the sand ridge, east of the excavated area. After the course of the Vecht channel shifted westwards around 4900 BP (3700 cal BC), habitation moved towards the terrain that lies within the confines of the excavation. Later, habitation relocated west towards higher grounds of the Schokland sand ridge, as a consequence of the rising water table. At that point, P14 began to form part of the settlement periphery. Ever-increasing wet conditions during the course of BB led to diminished functionality of the site, and eventually to the end of temporary use in late BWB3. The Schokland sand ridge west of P14 may have remained inhabited into HVS times or even later.

It would appear that P14 formed part of a permanent settlement (or its periphery) since SW2. Only for the Drouwen and Havelte TRB and for a large part of SGC does the evidence point at most to incidental, temporary use.

A combination of landscape and cultural factors can be advanced to explain this exceptionally lengthy habitation.

- The site was located on higher ground. Such locations were rare in the Noordoostpolder, and only became scarcer over the course of time. In addition, all kinds of raw materials were available here, including stone and flint. Furthermore, the sand ridge was large enough to accommodate arable fields and meadows.

- The site was located adjacent to a river, which meant a constant supply of drinking water and fishing grounds as well as easy access to the surrounding areas. The site could not be missed when navigating the Vecht.

- The site remained accessible thanks to repeated channel diversions directed towards the sand ridge. These diversions were a result of coastal developments. Under the influence of the tidal channels that form the lower reaches of the Vecht, the silting up and overgrowing of the river far beyond P14 was long prevented. And even when the river was eventually replaced in the Bronze Age by a series of interconnected lakes, the accessibility of the Schokland sand ridge via water could have remained adequate.

- The diversity of the subsistence economy, based on hunting, fishing, gathering, animal husbandry and agriculture, made it a flexible, robust system, a successful formula for coping with quite diverse environments for a long period of time. The shift in emphasis towards an agrarian lifestyle (especially cattle rearing) fitted in well with the landscape developments. At times, the use of fire could render additional areas fit for pasture.

- The presence of suitable pastures and their accessibility from the sand ridge may also have been decisive factors. The periods during which (permanent) habitation appears absent, coincide with the times when the Schokland sand ridge was surrounded by vegetation that hampered easy access, such as extensive poorly drained alder carr and sedge swamps.

Part VI (chapters 26-27)

Part VI zooms out to take in the Noordoostpolder as a whole.

Landscape and sites of the Noordoostpolder: introduction (chapter 26)

In chapter 26, the underlying principles of ten maps illustrating the development of the landscape are presented. Subsequently, the various landscape units are discussed: the elevated, dry landscape elements (the coversand region and coversand ridges, the river dunes, the sand ridges overlying boulder clay, the levees and a beach ridge), the peat region, and the 'wet' elements (rivers, brooks and lakes). Drawing on the existing data, a broad reconstruction was made of the drainage system in the polder. Furthermore, it is proposed that initial lake development can be related to the formation of the Oude Detritus channel around the beginning of SGC4, instead of around the Early Bronze Age as presumed before.

The archaeological sites in the polder have been categorized according to site type (permanent settlements, temporary settlements, arable fields, graves/burial grounds and ritual deposits) and projected on the corresponding landscape maps.

The Noordoostpolder during the Neolithic and the Bronze Age (chapter 27)

In chapter 27 the landscape developments and the habitation history from the start of the Neolithic to the end of the Bronze Age is illustrated on the basis of the ten landscape maps (figs. 27.1-10). The landscape in the polder changed from an environment dominated by deciduous forest dur-

ing the Early Neolithic, through a peat landscape during the Middle and Late Neolithic, into a lacustrine and raised bog landscape during the Bronze Age. P14 is the most prominent site on these maps. Time and again, the special, strategic setting of this site is apparent.

The book concludes with a number of observations and ruminations on the human reactions to the changing environment. Subsistence was to a large degree determined by environmental conditions. Everyday life took place mostly along the water. Gradually rising water levels meant permanent loss of lower-lying settlement locations. But strategically located settlements, which were of great importance to the settlement system, remained in use for as long as the landscape conditions permitted. Far-reaching changes in the landscape, such as the silting up of river channels and the emergence and expansion of lakes, must have led to

spatial shifts in the settlement pattern, which may have had a serious social impact. At times, too much water led to abandonment of settlements, as was eventually the case at Emmeloord-J97. Alternatively, the silting up of a channel could cause a settlement to be given up, as at Urk-E4.

The subsistence economy, based on hunting, fishing and gathering, and increasingly on animal husbandry and arable farming, combined with a settlement system comprising residential settlements and temporary camps, was flexible and robust, particularly suited to coping with a broad range of environmental circumstances. Sometimes, the surroundings were adapted to human needs, by burning down the vegetation to obtain more suitable pasture. People were able to adapt to many different landscapes and widely divergent vegetation types, but extensive swamps and poorly drained marshes appear to have precluded permanent habitation.