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5 On the Bandkeramik features

Pieter van de Velde

In the excavation on the Janskamperveld 2429 singular and 119 complex features with LBK antecedents were recorded. They were classified according to their shape and context. Regular, standard shapes presuppose standard primary functions, "free" shapes rather relate to loam quarrying for potting, construction, and the like. By far the largest class of regular shapes is that of the post holes: 1369 located within houses, 373 elsewhere; from the house plans it can be estimated that a similar number of post holes is missing. Near the houses, 98 kettle pits and 79 side pits have been examined; the first, with a regular shape, probably have served as cellars with a volume of approximately 2.5 m^3 each, the second irregularly formed group will have been used as loam quarries for the construction and upkeep of the houses. Away from the houses three sets of ditches are vestiges of (successive) palisades around the settlement during the first two house generations; the remaining three gates with screens/palisades in their centres are illustrated. Eight fence-like structures are likely to be later than the occupation of the village; they have been interpreted here as pertaining to the gardens of the nearby Haesselderveld LBK village.

5.1 Introduction

In the excavation on the Janskamperveld, 2778 Bandkeramik "features" (*Befunde* in German) have been recorded. Visible as darker spots in the yellow-brownish loess, they have been measured, cut, their profiles drawn, sometimes completely sometimes only half dug up, and any artefacts in their fillings collected. "Features" are the present-day signatures of early pits. They come in several varieties, either defined according to their supposed early functions, their shape, or their position in the settlement, generally acknowledging an equation of form and function (Kok 1998, 21-33). There is also a basic distinction between composite and singular pits, and component pits that make up the first group, and numbering 119, 2429 and 230, respectively. In this chapter I shall mainly deal with the shape of the pits, their position in the settlement, and their mutual relationships. I shall also discuss their primary function (i.e., the reason why they were dug in the first place; Kok 1998, 66-69), as quite often implied by their context rather than their contents, which are characteristically secondary. Indeed, after an intensive study of the pits in the Langweiler 8 settlement on the Aldenhovener Platte, Boelicke claimed of Bandkeramik pits that neither shape nor position correlate to function (Boelicke 1988, 341-342). However that may be, in LBK archaeology several pit types are regularly distinguished on the basis of their shape and/or their position (e.g., Stäuble 1997). Based on the criterion of morphology, regular even standard geometrical shapes are supposed to relate to a primary function, whereas "free" forms all refer to the primary and secondary function as clay pit (Stäuble *contra* Boelicke). While a rigid application of morphological criteria does not work well, a rather more liberal definition of geometrical shapes allows the distinction of cylindrical kettle pits (cellar-like structures), smaller cylindrical post holes (foundations for house posts, but also for many other settlement furnishings such as fences, poles etc.), tan pits (*Schlitzgruben*, also known as *Gerbergruben*, presumed to have served in the tanning of hides), and also the ubiquitous trenches (foundations for house walls, palisades etc.). Free shapes come in three varieties, more or less distinguished on the basis of their ground plan and size: the *Längsgruben* (oblong side pits of the houses), pit complexes with Rorschach appearances on the excavation plan, and *sonstige Gruben* ("other pits").

Going beyond the characteristics of individual pits, in an often quoted study Boelicke has found a standard configuration of pits on the yards in relation to the houses in the Langweiler 8 settlement (Boelicke 1988). It is unclear, however, whether the same or a similar standardized configuration can also be found in other settlements (Stäuble 1997, 73; Hauzeur 2006, 161). At least in the present settlement the density of features (plus the paucity of finds in the pits other than *Längsgruben*) precludes attempts in this direction, nor has it been tried to my knowledge in any other LBK site apart from the Aldenhovener Platte, not even Pavlů's analysis of the Bylany site has a word on it (Pavlů 2000); probably for the same reason. Nevertheless, and based on the idea of relative position, in-house pits (like wall trenches and post holes), near-the-house pits (*Längsgruben*, and outer trenches — *Aussengräben*) and away-from-the-house pits (any pit not associable with a house plan) can be distinguished.

Assuming that *all* houses in the excavation have been identified, the dimensions of shape and relative position will be used to structure the account of the Janskamperveld features below, although it be borne in mind that 374 features (13.5%) could not be reliably classified.

5.2 In-house features: post holes and trenches constitutive of house plans

The first category of singular features, consisting of the in-house pits, comprises two classes, each a combination of the in-house position with one of two distinct geometrical forms and therefore presumably dedicated features. The most numerous class by far is that of the smaller cylindrical pits, the post holes that made up the construction. Some of the major characteristics of the "post holes" thus selected have been assembled in table 5-1. The metric properties of the different variables show statistically normal distributions (interquartile ranges of approximately 2 decimetres), except for the depth which is rather skewed, as is to be expected. The median depth is at only some 1.5 to 2.0 dm below datum[1], yet the maximum value is much larger at almost 10 dm (one metre), testimony to the misfit between the originally undulating surface and the present smooth excavation plane. Importantly, features which showed up as dark spots on the excavation plan but which proved 'empty' or 'invisible' when cut have been entered in this class as well. Occupying structural places in houses (numbering 432 post holes, or 23.7%), they are considered literally the terminal shadow of their previous existence — after all, a fairly reliable estimate of the number of posts in the houses is almost exactly twice the number of observed posts. It should be noted that such a rate is quite common in LBK excavations; e.g., Von Brandt reports the survival of only 42% of the in-house post holes in the Langweiler 8 settlement (Von Brandt 1988, 221).

	count	median		
		length	width	depth
all post holes	1821	40	35	19
within houses	1369	44	35	20
outdoors	452	36	30	17
max values		170	140	95

table 5-1 Major characteristics of post holes in the Janskamperveld settlement
length and width in centimetres, depth in centimetres below the excavation plane

pit bottoms		
	in-house	outdoors
concave	5.4	5.2
flat	17.9	14.1
convex	42.1	50.1
saucer	10.9	8.6
stepped	17.4	9.1
pointed	4.3	8.4
complex	2.1	4.4
ref. count	1023	383

pit sides		
	in-house	outdoors
conical	0.2	0.0
vertical	63.4	52.2
funnel	28.8	36.5
slope	7.6	11.3
	975	362

table 5-2 Morphology of post holes, percentages

Regarding the geometrical properties of the in-house post holes a few remarks may be appropriate. Table 5-2 features a summary of the relevant characteristics, with separations drawn at 2 dm depth for the sides: if the pit remnants are shallower, their direction can no longer be established reliably. A similar separation for the bottoms has been set at 1 dm, for, if shallower, not all of it may have been preserved. Though there are differences between indoor and outdoor post holes, these are not very large, as table 5-2 suggests. Stepped pit bottoms do occur more frequently inside houses (where the tops of the rows of poles had to be at an even level), and also vertical sides of the holes are better represented inside than outside, but that is all that is remarkable about this table.

Except for an occasional sherd or flint spall, little of interest has emerged from the post holes, be they located in the houses or in the field: not even building sacrifices have been observed, though the diggers were on the lookout for them. Another exception is provided by the occurrence of lumps of burnt loam and charcoal particles in house post holes; as detailed in the chapter on houses, in ten houses at least half of the post holes (as well as the wall trenches) show these traces of fire, probably testifying to a conflagration. The other vestiges of fire in houses (observed in 18 houses) are restricted to single post holes generally situated in the central part — in the vicinity of where the kitchen fire may have been kept. It should also be noted that in 13.6% of the post holes the ghosts of former posts have been observed. Their distribution is quite uneven, as in three houses (HH 24, 29, 35) more than half of the holes show this feature, whereas most other houses have few occurrences only.

Apart from the post holes in the house plans, 19 out of 69 houses also muster wall trenches, the second class of "geometrical" in-house features: five or six 'a'-type houses with trenches all around (all of them tripartite, and thus usually referred to as type 1a houses), and thirteen houses of the 'b'-type, with trenches restricted to their rear parts (6 three-partite or 1b and 7 two-partite or 2b type houses) (cf. the chapter on houses). The bottoms of the trenches are generally uneven, with deeper spots where wall posts have stood (sometimes still in evidence) and somewhat shallower stretches underneath the former boards. It is evident that they are foundation trenches as for the fourteen houses with

sufficient data eleven show vertical sides and trench heads, the remainder being rather more sloped in appearance on the section drawings generally because of their shallowness. The steep cuts render the measurement of the widths of the trenches sensible: their median is 5 dm (with a rather narrow interquartile range of 1.5 dm). The maximum depth recorded in this excavation was 9 dm, adding another estimated 4 dm towards the original surface, their approximate 1.3 metre depth roughly converts to about 2 to 2.5 metre wall height. The two instances of interior walls (in HH 08, 18) show vertical sides and heads (width 3 dm both), and also complex bottom profiles. Regarding finds, wall trenches are just as barren as post holes.

5.3 NEAR-TO-HOUSES FEATURES: *LÄNGSGRUBEN*/ SIDE PITS ALONGSIDE THE HOUSES (INCLUDING *AUSSENGRÄBEN*/OUTER TRENCHES)

Very much present in any Bandkeramik excavation, the long pits alongside the houses (*Längsgruben* in German, *fosses de construction* in French) have no fixed shape; constant is only their position within a distance of about 4m from the side walls. Their origins/primary function can be found in the 'mining' of loam for the wattle-and-daub walls and probably sometimes also the filling of a raised floor inside the house; afterwards the pits became filled up firstly with their own useless top soil and secondly with natural and anthropogenic depositions, among which household debris of the adjoining house is thought to be most prominent (Coudart 1998, 73; Stäuble 1997, 23), hence their interest for the interpretation of the behaviour of the house's occupants. When repairs to the walls or floors were due, no doubt the same close to hand pits were used to obtain raw materials, one of the likely causes of the irregular contours and composite nature of these pits. In the chapter on houses their frequency and distribution in the settlement are discussed, and in the chapters on pottery and flint social and technical aspects of the artefacts in them are dealt with, here I shall deal with their volume and contents to seek an answer to the question of whether larger side pits contain more finds than smaller ones (the "artefact trap problem"). As a start, table 5-3 lists some of the major metric characteristics of these features. The number of pits ('count') register the numbers of features on the site excavation plan, where 56 houses show associated *Längsgruben*, of which 33 times single ones[2] and 23 times two; in most cases broken up into several separate pits. These latter, separate pits are considered distinct attributes by Coudart, but in my opinion they are simply a function of the depth of the excavation plan below the neolithic surface (Coudart 1998, 32, 44). Length, width, and depth relate to the excavation plane thought to be at the very least 4 dm below the neolithic level. As noted repeatedly the latter level was probably more undulating than the excavation plan shows, hence depth (or length or width, for that matter) cannot be easily converted to the original value. To estimate the original volumes, the average present depth (7.2 dm) has been augmented by 4 dm to suggest a minimum original depth — with a minimum depth set at 11 dm, the E(depth) in the table (for *estimated depth*). To provide reference values for the artefact trap problem (below) the rest volumes in the table have been calculated by simple multiplication from the excavation's figures, disregarding the depth below the original surface. It will be observed that the pits do not match box formats but should be corrected for by block coefficients in the order of perhaps 0.7 to 0.9. However, in the Janskamperveld excavation the pit forms have not been registered except on the drawings of the length and cross sections (cf. the reconstructed outlines of *Längsgruben* in Stäuble 1997), moreover the 'true' values of the rest volumes will be highly correlated with the values in the table as the deviations from the block shape are very similar in all cases anyhow. Table 5-4 provides an idea of the 'real' looks of the side pits, as derived from the excavation records. Funnel-like and steeply vertical sides are preponderant in the sections, from which it may be deduced that the deeper lying unweathered loess was required for Bandkeramik house building pursuits. Apart from that, there are some side pits which seem to have originated as (the ruins of) kettle pits, cf. the relevant section below.

	Length (dm)	Width (dm)	Depth (dm)	E(Depth) (dm)	restvol. (tons)	E(vol/p) (tons)	Vol/house (tons)
max	174	48	17	21	28.1	80.4	98.9
Q3	89	26	9	13	5.2	24.8	30.3
median	55	18	7	11	1.8	11.2	14.6
Q1	29	11	5	11	0.8	3.7	7.0
min	9	4	1	11	0.0	0.5	0.5
average	54	18	7	11	1.8	11.5	14.7
count	78	79	79	82	131	76	55

table 5-3 Side pits, major metrical characteristics

		cross section					
		vertical	funnel	sloping	irregular	indet.	
length section	vertical	4	7	4	1	1	17
	funnel	5	12	4	–	1	22
	sloping	1	–	4	–	–	5
	irregular	–	1	–	1	–	2
	indet.	–	–	–	–	1	1
		10	20	12	2	3	47

table 5-4 Morphology of side pits, counts

To return to the "artefact trap problem": it is generally assumed that larger pits carry more finds, and if so it would be difficult to base conclusions on quantified distributions — as is done in most chapters of the present publication, and indeed also in most Bandkeramik studies. In the Janskamperveld settlement 87 among 133 side pits (or pit fragments) have yielded pottery sherds, and with these numbers this "artefact trap hypothesis" can be tackled. As a test, the rest volumes of the side pits have been correlated with the sherd counts in them, with an outcome that cannot be misunderstood: $r = 0.43$ (and so $r^2 = 0.19$), signifying hardly any relationship between size and content. That is, side pits are no artefact traps. But then, side pits are supposed to have provided the loam to daub the wattle of the walls, and perhaps also to raise the inside house floor (Modderman 1988, 104), so there should be a relationship between the volume of the pits and the surface area of either the walls or the floor, or the two together. Just as an exercise and to get some idea of the quantities involved, with an average joint side pit volume of about 14.7 m^3 (table 5-3), and an average house size of 75 m^2 (cf. the chapter on houses), the loam would be sufficient to raise the house floor to a height of just over 15 cm; with a side wall height of 175 cm their total surface will also equate to about 75 m^2, and thus the wall thickness can be calculated to 15 cm, not counting the wattle; if both purposes obtained, height and thicknesses should be reduced accordingly. Pertinent coefficients for the relationship of the side pit volumes and the individual measurements of the houses are shown in table 5-5: the correlation of both variables, collectively for all houses, or separately for houses with boards only ("a-type"), with part boards and part wattle-and-daub walls ("b-type"), and with wattle-and-daub walls exclusively ("c-type"). The figures are truly disappointing to put it mildly; no relationship whatsoever can be confirmed on their basis. Even acknowledging the 'guesstimates' character of especially the pit volume estimates is no recourse. Therefore it is likely that the loam of the pits was put to other uses as well, for instance the upkeep and repair of walls and floors, and/or pottery production. On the basis of these figures, not one single exclusive function can be assigned, which is also the opinion of Stäuble after careful analyses of data from several settlements (Stäuble 2005, 180). Additionally, the post-depositional excavation effect of splitting up the original side pits into several smaller ones, jointly considerably shorter than their 'parent' is perhaps an additional explanation — and I refer to Coudart again, who does not go into this matter, though she did quantify almost every other aspect of Bandkeramik houses in her book (Coudart 1998, 73).

	all	a-type	b-type	c-type
wall surface	0.21	0.47	0.02	0.22
floor surface	0.29	0.38	0.15	0.38
jointly	0.24	0.47	0.06	0.25
references	55	6	14	35

table 5-5 Side pit volume correlated with house wall characteristics

In his analysis of the pit shapes *à propos* the excavations at the Oldest LBK settlement at Bruchenbrücken near Frankfurt, Stäuble remarks that the opposite side pits of the houses have systematically unequal depths, the difference being 5 to 6 dm there (Stäuble 1997, 125). In the Janskamperveld settlement there is also a tendency to unequal depths: for thirty houses with pits to both sides the differences are between 0 and 7 dm, with an average of 3 dm. In one house the left side pits are shallower than the right side pits; yet in the next house, it is the other way around: the median depths (computed for all pits, not just those that can be paired) are 7 dm on both sides. An average difference of 3 dm is not very impressive, in my opinion, and with Stäuble I should not be willing to draw wide ranging conclusions from it. It brings to mind, though, the report on the excavations at Cuiry-lès-Chaudardes on the Aisne River in France where kitchen refuse is found to be decently thrown into the side pits not on the side of the neighbours (Hachem 1997), suggesting differential use of these pits, if the Paris Basin Late Bandkeramik may be brought in as a model for the Flomborn cultural conduct on the Janskamperveld.

Closely linked to the side pits and even more so to the houses are a number of relatively narrow trenches, of which figs 1 and 2 provide examples. Though in most cases discontinuous on the excavation plan, they are considered singular in origin: dug in one go with unexplained purpose. They have all been dug to the same width (7 dm), with average depths of *c*. 4 dm below the excavation plane. These outer trenches are situated between the house walls and the side pits, they are characteristic of Oldest LBK houses and peter out in the Flomborn phase (Stäuble 2005, 186). Thought by some to be foundation trenches for low exterior walls (and then called *Außengräben* in German; Lüning 1988; Cladders/Stäuble 2003, Stäuble 2005), this is contested by others who see artificial rain trenches in these features (with the label *Traufrinnen* or *Traufgräben* in German; Lüning 1988, Coudart 1998, 73). Coudart notes that rarely if ever ghosts of posts have been seen in these trenches; she therefore considers the first interpretation less likely and prefers the gutter interpretation[3]. Stäuble, however, noting that their position is too far from the walls for vertical roof supports and adducing civil engineering arguments, explains these trenches as to provide horizontal or lateral strength to the soil. In Ältestbandkeramik houses the central part has no interior roof posts and so the roof rests entirely on the walls which therefore exert lateral pressure on the soil in the direction of the *Längsgruben*. The trenches held flat lying tree trunks which countered these stresses, according to him (Stäuble 2005, 177). The *horizontal* position of the beams would presumably also explain the often noted absence of post shadows since their weathering would provide similar colouring in the entire 'berth'. When in the central house parts roof supporting posts appeared (an innovation of the early Flomborn phase) taking over the roof load from the walls, the lateral stress exerted by the walls largely disappeared, and the need for outer trenches with it; as demonstrated by the other houses here on the Janskamperveld as well as in all younger LBK villages. At Geleen-Janskamperveld there are no houses without central roof posts, yet five or six houses are accompanied by (strictly spoken) superfluous outer trenches alluding to past situations. These houses (HH 05, 13, 16, 57, 58 and possibly 24 as well) are all fitted with central configurations of the Y or dY type and therefore built in the early Flomborn period. There is also a section of a pit (no. 49080) which has all the characteristics of an outer trench though not accompanied by a house, which may at least partially be situated outside the excavation and therefore not adequately registered on the plan. One of the houses accompanied by outer trenches has many post shadows in the post holes of its DPRs (HH 24, 35), so if there would have been posts in its outer trenches they would have been noted — no shadows were found though. Along other houses they are similarly absent. In Pavlů's Bylany report, an absence of post ghosts is also acknowledged; however to keep up the foundation trench hypothesis he suggests that boards used to stand in them instead (Pavlů 2000, 193). The photograph of the excavation of House 13 (fig. 5-1) shows its outer trenches clearly between the *Längsgruben* and the house walls. Fig. 5-2, a drawing of a section through one of the best examples of these trenches (feature 26090, to H57), shows the thin layering through gradual filling by natural agency, as required when either the rain gutter interpretation or the lateral stress alleviation hypotheses are correct; in the opposite case, the fillings would have to be more like post holes judging from Stäuble's theses on pit fillings (Stäuble 1997, 22-26). In the Graetheide *Siedlungskammer*, Geleen-De Kluis also yielded houses with outer trenches (Waterbolk 1959, Abb. 79, 80 – houses W1 and W2), as did Sittard (Modderman 1959, Abb. 23 – house 1), Elsloo and possibly also Stein (Modderman 1970, Taf. 26, 188 – houses Elsloo-59, Stein-26), all showing Y-configurations of their central posts.

fig. 5-1 House 13 during the excavation showing outer trenches on both sides

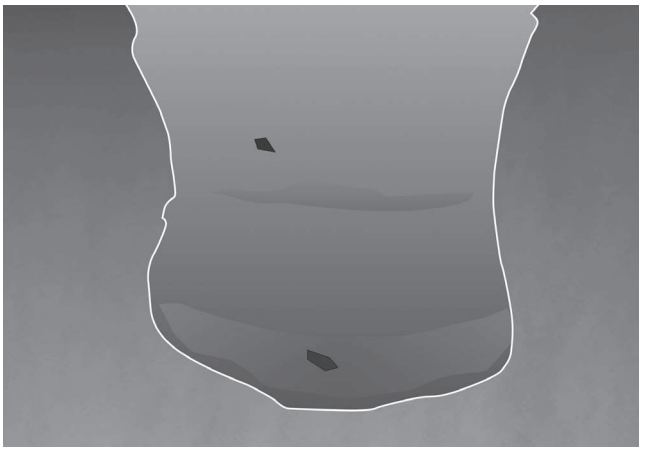

fig. 5-2 Cross section drawing of an outer trench of House 57 (feature no 26090)

5.4 NEAR-TO-HOUSES FEATURES: KETTLE PITS

Lüning describes a great number of cylinder-shaped pits at Langweiler 9 on the Aldenhovener Platte, which he interpreted as silos. . similar pits in the Dutch loess region 40 km away, the Graetheide, are totally absent. ... This does not mean that the existence of underground silos in the LPC [Linear Pottery Culture, Bandkeramik] need in principle be rejected. ... If the silos prove to be a phenomenon that shows important differences in use on a local or regional scale, it becomes even more interesting to find an explanation. Modderman 1988, 104

Lüning's description of these drum like "kettle" pits (*Kesselgruben* in German) to which Modderman alludes is clear though quite extensive, so I shall summarize his text. A kettle pit, according to him, shows a box-like outline on section, the bottom and walls are straight; on the excavation plan it shows a round or slightly oval outline. In the Langweiler 9 settlement a large number of these pits has been found (121 are on record), which suggests a "regular need" for them — possibly the storage of stock in earth cellars. In an excavation, they feature a thin black layer at the bottom ("perhaps deriving from its primary use") on top of which a brownish layer of 20-35 cm has been deposited (possibly the earth with which the wooden boards over the pit were covered which on abandonment has fallen in). On this brownish layer irregular clumps of loess are found (torn loose from the cellar's walls once the cover was gone). Finally, these pits tend to be sealed by blackish and brownish naturally deposited layers mixed with human refuse like sherds, charcoal, burned loam, stones and flint spalls (Lüning 1977, 66-67).

Modderman lived to see the refutation of his statement above: in 2000 the present author was involved in the excavation of a Bandkeramik settlement at Beek-Geverikerveld, 7.5 km southwest of the present site, where associated with every house one or two silos have been found. In the report on the excavation we stated:

The Bandkeramik has been an orderly society as is proven time and again by the standard position of the various types of pits relative to the houses ... On the Geverikerveld silos are located to the South of the rear parts of the farm houses ...

Van de Velde/Bakels 2002, 45 (my transl., PvdV)

We also presented a section drawing of the largest silo there, measuring about 180 cm in diameter, and with a depth of an estimated 200 cm below the original surface (140 cm below the excavation plane; Van de Velde/Bakels 2002, afb. 14); Lüning's description fitted this specimen like a glove. The Beek-Geverikerveld settlement was dated to stages 2c and 2d of the Dutch sequence (LBK V in the German chronology). Ironically, in 2006 in a rescue excavation in the Elsloo-Koolweg village – the site of Modderman's extensive investigations in the 19-fifties and -sixties – several kettlepits were found, too.

Generally, silos are cylindrical pits with average diameters of between one and two metres, and depths of more than two metres. It is thought that they served as cellars and either had small entrances like a manhole covered by a lid sealed with loam, or that they were cylindrical to the surface and covered by wooden boards. In the wake of the excavations on the Aldenhovener Platte, Boelicke has conducted field experiments with this type of pits (Boelicke *et al.*, 1976, 309-312). In the Janskamperveld site nearly one hundred features answering to Lüning's definition of kettle pits have been found and another 69 pits that show at least partially the main characteristics of vertical sides, flat bottom, round plan and characteristic fill pattern. Morphological characteristics have been assembled in table 5-6, their distribution in the settlement is indicated in the accompanying fig. 5-3. From the plan can be seen that few kettle pits in this settlement were found in separate spots, most are components of *Längsgruben* or of pit complexes; only 21 are individually visible on the excavation plan and therefore only these can be said to be singular; they have round or slightly oval plans. As with all other features, the depth of the kettle

walls:	kettle pits	look alikes
conical	14	–
vertical	63	52
funnel	11	7
indet.	7	4
sum	95	63

bottoms:	kettle pits	look alikes
concave	13	21
saucer	2	
flat	73	23
convex	4	–
indet.	0	16
sum	92	60

table 5-6 Morphology of kettle pits and "pseudo"-cellars

fig. 5-3 Kettle and kettle-like pits

pits can be approximated only because of the original undulating surface, although a minimum offset of 4 dm can safely be assumed. Table 5-7 shows the distribution of the depths of the kettle pits and the 'pseudo' kettles. It can be deduced that the original depth was at least 5 dm below the excavation surface. It is also clear that depths of over 13 dm below the present excavation (plus 4 dm to correct for post-occupational effects) should be considered exceptions; the regular depth seems to have been in the order of 11 to 14 dm (minus 4 dm in the excavation), which is obviously short of a man's height unless these ominous four dm are an underestimate. Similar sizes are reported for the kettle pits on the Aldenhovener Platte (Boelicke *et al*. 1976, 310).

Table 5-8 summarizes the diameters of these features; that is as far as these can be read from the section drawings. In many (though not specifiable) cases it is not clear whether the true diameter has been obtained: sections may have touched the pits, cut partially, or centrally, there is no way to

separate this out from the available drawings. It is clear that when the section does not cut through the centre, the reported width is at best equal to the true width, so any computation based on the observed width provides a minimum estimate. Generally, the diameters seem to centre around 8 dm, and this obtains for both the 'true' kettles and the 'pseudo' cellars; again, values of 2 metres and more are rather exceptional just like the depths in that order. The computation of the original volumes provides approximate minimal values (table 5-9), firstly because of the estimation of the depths, and secondly because of the problems associated with the determination of the diameter. Given the averages of diameters and depths, the tendency toward volumes of 2000-2500 litres comes as no surprise. This volume equates to 1000 to 1250 kg of unthreshed grain (900-1100 kg after threshing) which would support 5 or 6 adults for a year, and includes seed-corn for the next harvest (cf. Van de Velde/Bakels 2002, 46-47).

All kettle pits in the settlement have collapsed; in several cases new cellars have been dug immediately next to, sometimes even within the perimeter of previous pits. The section drawings depict (almost standard) dark, generally conically shaped bottom layers, non-homogeneously structured and with coloured layers above these, and a much wider trough-like layered top-filling. The dark bottom layer possibly derives from remnants of the stored products (and several times many kernels of grain have been encountered); the inhomogeneous filling derives from the collapsed side walls, including part of the A-horizon; the layered top will be the natural after-fill of the depression which formed with the settling of the soil in the pit ruin (Boelicke *et al*. 1976, 309-310; Lüning 1977, 66-70).

Most kettle pits are situated close to houses, and it is likely that the inhabitants of these houses rather than other people used them. An undiscussed and unsolved problem is how they were kept dry: distances to the houses are larger than an overhanging roof would cover. Eventual post holes along their perimeter to support an awning have long disappeared — even if they would have been sufficiently deep to penetrate the excavation level, the collapsing pit sides would have obliterated their shadows. The number of

depth	kettle pits	look alikes
2	–	–
3	–	2
4	1	1
5	5	2
6	5	13
7	13	18
8	27	12
9	13	9
10	12	4
11	9	5
12	6	1
13	2	1
14	–	–
15	–	–
16	2	–
sum	96	68

table 5-7 Depths of kettle pits and "pseudo"-cellars below excavation planum, in decimetres

width	kettle pits	look alikes
<6	11	2
7-8	40	7
9-10	25	12
11-12	15	20
13-14	2	11
15-16	2	6
17-18	–	7
19-20	–	3
21-22	–	–
>22	–	1
sum	95	69

table 5-8 Diameters of kettlepits and "pseudo"-cellars, in decimetres

volume	kettle pits	look alikes
500	4	1
1000	1	5
1500	9	5
2000	11	10
2500	14	13
3000	9	10
3500	9	4
4000	5	1
4500	9	4
5000	8	4
6000	6	3
7000	3	2
8000	2	1
9000	2	4
10000	3	0
>10000	3	1
sum	98	68

table 5-9 Estimated original volumes of kettle pits and "pseudo"-cellars, in litres

per house	kettles	look alikes
0	17	–
1	18	13
2	13	12
3	2	5
4	3	8
5	–	3
6	1	1
10	1	1
Σ	78 + 17	115

table 5-10 Numbers of kettle pits and "pseudo"-cellars per house

pits per house is quite variable (table 5-10), if we base ourselves on the (more than questionable) assumption[4] that all pits have been discovered during the dig and registered on the section drawings. The largest numbers have been observed along the type 1a houses H 35 (ten cellars) and H 17 (six kettles); type 1c house H 38 and type 2 houses H 25 and H 45 each had four kettle pits. From the Langweiler 2 and 9 settlements on the Aldenhovener Platte, kettle pits are reported to a maximum number of five per house (Boelicke *et al*. 1976, 309). On the Janskamperveld, probably several may have escaped detection (see footnote), but the larger house types seem to be accompanied by more cellar structures than the smaller ones; however, as two type 2 houses figure among those with the largest numbers this may be erroneous. Finally, one fifth of the kettle pits has no house in its immediate vicinity (as do 29 'pseudo'-cellars), and whether they served the community as a whole or any sub-group larger than the individual household, or are vestiges of the pioneering (pre-building) stage of the settlement will probably remain obscure: only very few finds which might establish a date derive from them.

One other problem with the kettle pits of the Janskamperveld should be signalled. The fact that 60 of them are part of 34 *Längsgruben* renders it at first glance difficult to accept them as 'cellars' or something similar. At the very least a simultaneous existence of side pit and kettle pit is very unlikely. Which leaves us with three not-exclusive options: either the kettle pits were in disuse before the side pits were opened, or the side pits are only apparently *Längsgruben* but rather the outcome of the collapse of earlier cellars; or the 'kettle pits' were not cellars at all, but just traces of the way in which the side pits were dug by some people. Given that 20 side pits hid one single cellar, the first option seems the best fit, which would perhaps imply the second option for the *Längsgruben* hiding several kettle pits; the third option seems less probable, given the findings from Beek and the Langweiler settlements — and thus Modderman's statement can be assigned to archaeology's history.

5.5 Features away-from-houses: trenches, fences and post holes

Among the features away from houses, several conspicuous ditches are visible, especially when houses and house-related features are removed from the site plan (fig. 5-4). This quite *irregular configuration* is clearly contemporaneous with the Bandkeramik occupation of the site: at several places the ditches lie plied around houses, as shown in fig. 5-5: H 24 in the western part, H 53 in the northeast. It is not certain whether the ditch constituted a continuous ring around the settlement, as no connecting traces have been found neither in the northern nor in the southern part of the site although they were intensively searched for during the excavation. On the profile drawings, the ditches get shallower towards their ends, suggesting that their bottoms are not fully parallel to the excavation plane and were originally considerably longer. Therefore I think that there was such a strong village perimeter or enclosure all around the settlement. Remarkably, hardly any post ghosts have been found in the trenches, although the irregular bottom profiles (in 24 out of 67 segments) would suggest their earlier existence, and at places their depth reached 60 cm, as if the posts were pulled out before abandonment of the installation. On cross sections the sides of half of the trenches are vertical and half are slanting. The remnants of the trenches are too narrow, however, to decide on the issue of their cross section, either Y- to V-shaped or with flat bottoms (so-called *Spitzgraben*, resp. *Sohlgraben*); their small width on the plan (most of them about 35 cm) is strongly at variance with the latter possibility (compare the Erkelenz-Kückhoven ditches where for the second ditch system with a depth below plane of only 40 cm a width of 1.2 m has been observed, and interpreted as a trench of the second type; Lehmann 2004, 228). No traces of a wall behind the trench have been found (although post-construction erosion would have obliterated any vestige of it), which is as would be expected, the palisade being founded in the trench itself, and not behind it.

As can be seen on the plan, not all ditches are part of one, singular trace; both in the northwest and the northeast smaller ditch segments run deviating courses. They may either be explained as internal subdivisions of the settlement or as earlier or later versions of the surrounding ditch. The ditch-palisade system seems to be more than just one single enclosure. At several places there are *three* ditches behind one another, in some places (e.g., the western part) situated rather close together, in other places (e.g. towards the northeastern part) with ample space between them. Although at several places cutting into each other (but nowhere could the sequence be established), the ditches nevertheless seem to follow roughly similar courses, and we may ask whether they were contemporaneous. On the one hand one wonders why there should be more distance between them here than

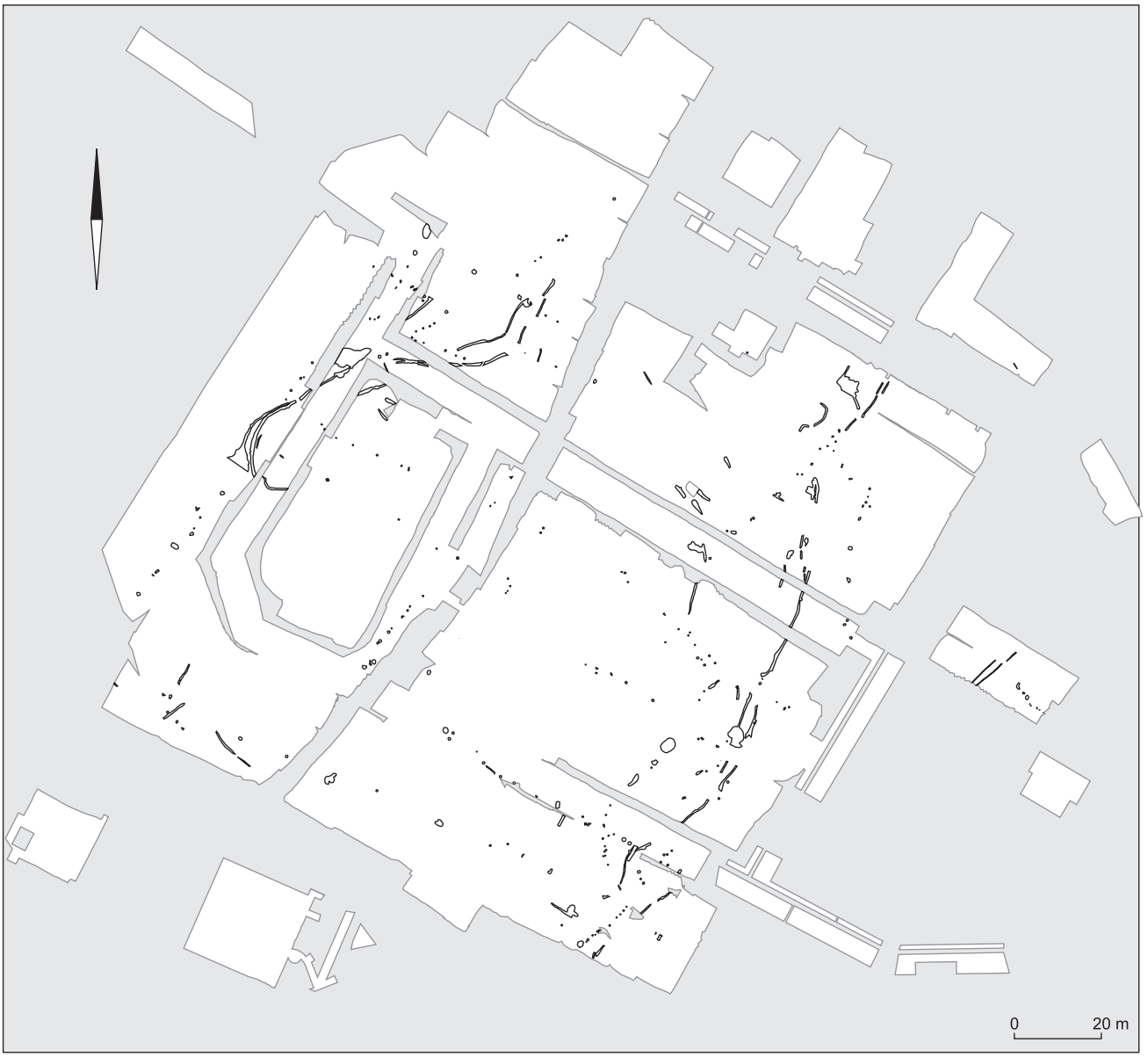

fig. 5-4 Site plan after removal of pit complexes, houses and near-to-house features

there, the narrow spaces between them do not at all look like fortified entrances (cf. Höckmann 1990, Abb. 20). And on the other hand, Bandkeramians seem to have had an inclination toward re-building rather than repairing, as witnessed by their house building practice. On the same topic, it is of interest that some of the section drawings or the accompanying field notes mention differences in colour, especially when the ditches are near to each other. Thus, in the northwestern quadrant, a light brownish grey filling is reported when the outermost ditch is discussed, in contrast to more inward ditches with darker colours. The colour differences may point to chronological differences — lighter colours referring to earlier situations (when the site was comparatively little soiled), darker to later points in time. If this were the case, the sets of treble ditches may really point to three different moments of construction. As none of the ditches can be followed all around the settlement, recourse has to be taken to guesswork: perhaps all or most of the outer segments of the sets constitute a single system, perhaps the inner ones form another circuit, and what is in between was an

fig. 5-5 Houses, palisade trenches and fences

intermediate palisade ditch. Following this through, and based on the colour differences, the assumption that the outer segments represent the oldest palisade ditch is confirmed by the dating of the houses lying along the visible parts of its supposed course, suggesting construction in the first house generation. By the same means, the inner ditch seems to come next, at the transition towards or even in the second house generation; and the intermediate ditch segments would have been dug in the second or towards the third house generation. Even if all three ditches were dug conspicuously around the rear of H 24[5], the course of the intermediate (youngest) palisade has more of a bend than of a bulge around that house, and so may have been laid out after the house's dismantlement yet approximately in line with the

palisade's predecessors. The tentative dating of the three phases of the ditch system is of course irrespective of the precise connection of the individual ditch segments to one another. Originally the ditches may have followed crossing courses, fact is that a small number of segments can be associated with either contemporaneous or chronologically discordant houses and with it the originally associated enclosure; unsolved is the problem whether the enclosure was partially repaired several times or re-built (*i.e.*, newly erected) twice.

On the Graetheide Plateau, ditch complexes are known from Sittard and Elsloo (Modderman 1985) while yet another one at Stein is also mentioned in the literature. The latter has been reported in older investigations (Beckers/Beckers 1940) but with modern hindsight we would say that the very extensive twinned walls and ditches structure seems to be a medieval construction. In the autumn of 2005 a wider and deeper example, probably a *Sohlgraben*, has turned up in an evaluative heritage excavation at Beek-Kelmond, to the south of Geleen; its LBK origin is hardly questionable. Similarly a fairly large *Spitzgraben* construction was found on the valley bottom below the Beek-Hoolweg settlement in 2007 (Wijns/Van de Velde, in prep.). Also known from the literature is a double-ditch enclosure on the Caberg above the left bank of the Meuse River near Maastricht (Holwerda n.d.; Thanos 1994), which however is better attributed to the Michelsberg culture (Modderman 1959, 25).

The size of the enclosure can be estimated at 1.9 or 2.0 ha, which is in the order of the majority of the known neighbouring trench systems: the Langweiler 3 single ditches fence in about 0.55 ha (Eckert *et al*. 1971, Abb. 19), the Langweiler 8 trapezoid ring occupied 0.8 ha (Kuper *et al*. 1974, 429), Langweiler 9 measured about 0.6 ha within its inner circle, 0.8 ha within the outer circle (Lüning/Stehli 1977, 82); Inden-Altdorf 1.3 ha (Bollig *et al*. 2001); Erkelenz-Kückhoven 1.3 ha, 1.7 ha, and 4.1 ha (Lehmann 2004, 227); Darion-Colia "a little less than 2 ha" (Cahen 1986, Bosquet *et al*. 2004); Köln-Lindenthal 3.4, 4.4 and 3.4 ha (Bernhardt 1990); at Sittard-Monseigneur Claessenstraat only parts of two ditch systems have been excavated (Modderman 1959) but may be estimated at 0.4 and 1.2 ha; in Oleye-Al Zèpe and Waremme-Longchamps (Bosquet *et al*. 2004) the excavations were rather limited and surface areas can therefore not be established. Entrances, though restricted in number, have been perceived in all enclosures mentioned; on the Janskamperveld three are apparent on the excavation plan (figs. 5-5 and 5-6) — they suggest only a little elaboration by screens built longitudinally in the passages between the ditches/palisades (cf. Höckmann 1990 for the various LBK variations on this theme). With an estimated perimeter of about 600 metres, and approximately 200 metres of trenches left, the original number of entrances should be appreciably higher, but divided by three again to accommodate the separate trench phases.

There is much speculation regarding the function of ditch systems in the literature, by itself suggestive of a drive toward one homogeneous explanation for all these features. In my view, however, as diverse as the plans of the ditches are as diverse are their functions. Thus, in the present, Janskamperveld case, its rather irregular perimeter is quite ineffective as a defensive objective. With a depth of less than one metre below the original surface, if left open it would have been easy to jump across the ditches, when set with a palisade this would not have been higher than 1.5 perhaps 2 m above ground level and as such would only slightly have slowed down a human attack. Add to this the probably quite high number of entrances and it is clear that as a defensive bastion the system is virtually ineffective. Moreover, the LBK menu posed hardly a competitive threat to the hunters and gatherers in the forest — though their brethren within an hour's walk to the North, West and South may be another, more threatening option. Consequently rather than an enclosure, a marked separation of village area and forest, a within/without line, to keep regulars like children and pigs in, phantoms and wild creatures out, seems more plausible (in an attenuated sense of Hodder's *ager-domus* opposition; Hodder 1990, also cf. Höckmann 1990). In the same vein, the later, more regular plans (such as in Darion and its neighbours, Köln-Lindenthal if its rings were contemporaneous with the village) are likely to have more warring appeal, more likely also as intra-LBK tensions may have been building up towards the end of that culture. For these same tensions some other LBK groups may have sought ritual alleviation, as instantiated in the Langweiler-3 rings and elsewhere.

Let's now turn to post holes away-from-houses. In the section above on in-house post holes the outdoor orphans have already been introduced: those post holes not assignable to house plans. Post holes were defined there as geometrical, standardized more or less cylindrical features. It is difficult to separate post holes (which is a functional assignment) from other features that also show cylindrical features (a shape characteristic), many of them too large to serve as foundation for any reasonable post. Sometimes a palisade-like trail of pits may show up on the excavation plan, lending substance to the interpretation 'post hole'. More generally the problem lies, of course, with the single/singular round features with steep sides strewn over the site. A statistical approach to the problem (such as: all oval or round features with diameters of less than *xx* dm) comes up against the continuous, non-peaked distribution of pit sizes, which renders the selection of the value *xx* arbitrary. Fortunately, there are a considerable number of quite large unmistakable post holes in houses with ghosts clearly visible. Their maximum sizes are over

one metre; and so *xx* was set to the largest of these post holes: 15 dm (within the class of geometrical or cylindrical features). Here, too, several features have been added which showed up only as dark spots in the excavation plan when configured in palisade rows (61, or 14.2%) and proved 'empty' when cut. As stated in the in-house post hole section, a fairly reliable estimate of the number of posts in the houses is almost exactly twice the number of observed posts including those with zero-depth, hence a positivist attitude rejecting such observations does not further the debate. As the depth of the outdoor post holes is generally less than those inside houses, their original number should probably be estimated at more than double the number in table 5-1.

Even so, the considerable number of 433 post holes has been *recorded* outside recognizable houses, still within the perimeters of the excavation. It could be objected that these holes may represent the bare survivals of otherwise completely vanished houses. As detailed in the chapter on houses the minimum count of post holes that was recognized as house remains was five holes, the legibility of their configuration probably sheer luck. Assuming (for the sake of argument only!) that some ten to twelve post holes normally suffice for the recognition of a house, the 433 ungrouped post holes would be evidence of another forty houses in the village — which strikes me as absurd.

The geometrical characteristics of the outdoor post holes are presented in table 5-2 in an attempt to compare them with the indoor post foundations. It appears that on the whole there were only small differences between the two sets. The smaller number of stepped pit bottoms in the outdoor class appeared most notable; also, there were twice as many pointed holes in the latter. Both, of course, readily understandable when it is assumed that there were no crossbeams on top of them.

This leaves us with the problem of the interpretation(s) of these features. As noted above, when post holes and trenches which make up the houses as well as features associated with them are removed from the excavation plan, what is left shows a distinct patterning, especially in combination with the remnants of the palisade ditches (figs 5-4 and 5-5). Two decades ago, at the end of his career, Modderman wrote regarding a less clear and marginally less complex yet comparable situation:

Single palisades, or with a second one parallel to them at a short distance, are now known from ... the Netherlands. They are usually not dug deeply, so that their presence must have been more common than present data would suggest. They have stayed unnoticed because either the settlement terrain was eroded or because rescue excavations on the site had to be made that went down too deeply into the surface.

Modderman 1988, 102

Though referring to the Sittard settlement, the quote seems applicable to the Geleen-Janskamperveld excavation too. In fig. 5-5 lines have been drawn connecting sets of the remaining post holes, suggesting a sub-division of the site by fences[6] — straight or slightly curved lines of at the very least five post holes with regular distances between them. Of the 433 orphaned post holes, 161 can provisionally be assigned to 14 palisades (table 5-11). Regular distances between the pales are sought for on the assumption that Bandkeramians, being the craftsmen their houses suggest,

fence no	n(pp)	pp-twins	netto(pp)	length	E(d)	E(pp)
F01	15	0	15	64.0	2.2	29
F02	14	3	11	66.6	4.4	15
F03	8	0	8	23.7	2.2	11
F04	5	1	4	10.5	2.2	5
F05	23	5	18	106.7	2.2	48
F06	14	2	12	31.2	2.2	14
F07	14	4	10	43.2	2.2	20
F08	9	2	7	40.8	1.5	27
F09	5	0	5	19.0	1.5	13
F10	18	3	15	52.1	2.2	24
F11	18	1	17	18.5	0.6	31
F12	6	1	5	16.3	2.2	7
F13	6	2	4	19.1	1.5	13
F14	6	2	4	28.2	3.0	9
	161	26	135	539.9		266

table 5-11 Major characteristics of fences
n: count; pp: posts; d: interval (metres);
E: estimate

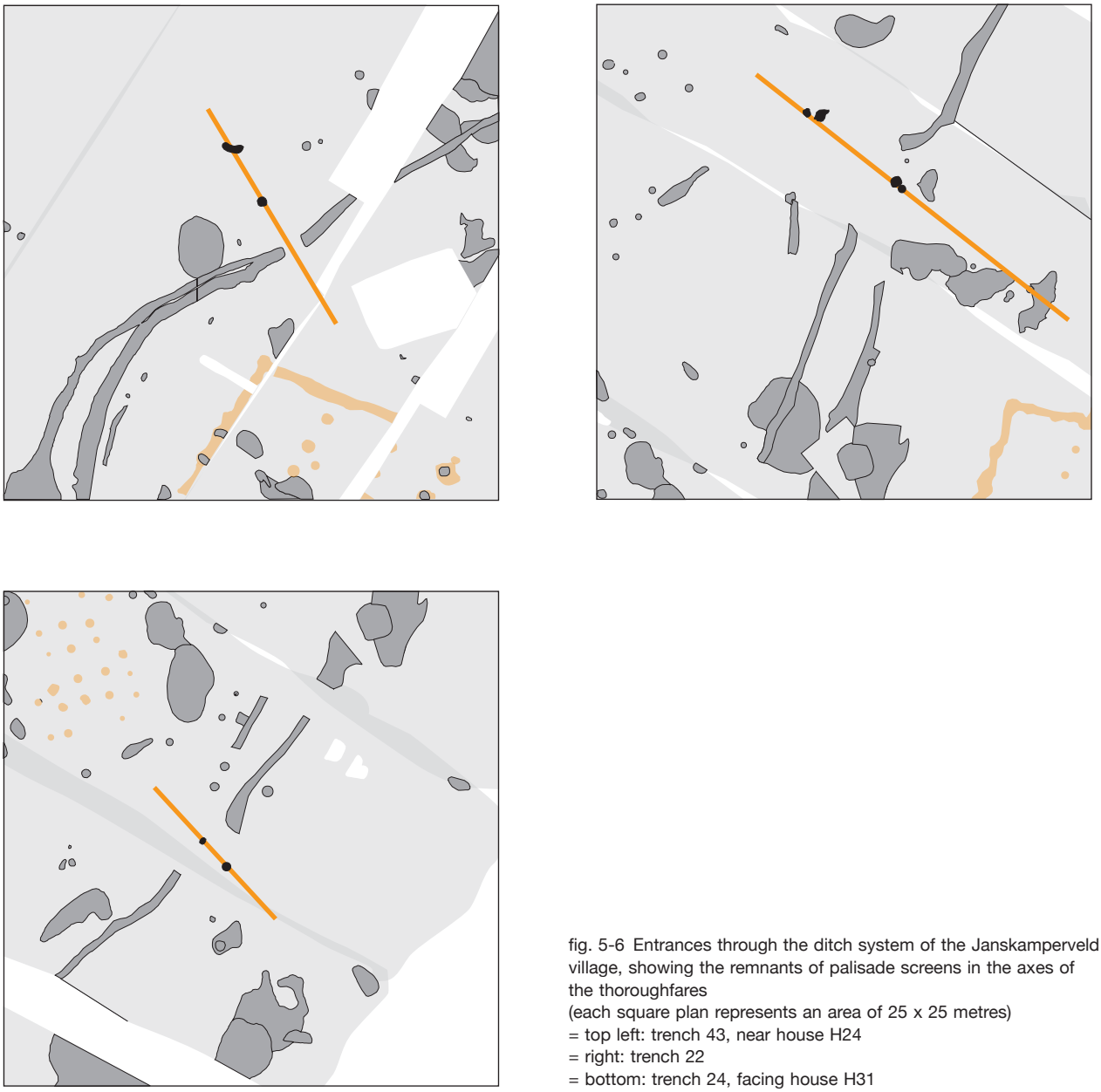

fig. 5-6 Entrances through the ditch system of the Janskamperveld village, showing the remnants of palisade screens in the axes of the thoroughfares
(each square plan represents an area of 25 x 25 metres)
= top left: trench 43, near house H24
= right: trench 22
= bottom: trench 24, facing house H31

also took care of regularity in their other constructions. However, regular intervals are not always evident: a number of post holes have not been observed where they should have been, if my previous assumption has any grounds. As noted time and again especially in the section on house-associated post holes, erosion and other post-depositional factors have wiped out many traces, so in the case of fencing lines something similar will have been the case. If so, then per palisade the observed intervals should be multiples of a common denominator; as the table 5-shows, that distance is in the order of two or two and a half metres for most rows. A comparison of the expected number of pales (*c.* 266) with the observed number of post holes (135, not counting doubles) suggests that approximately 49% of these holes have disappeared without trace (much like the house-associated post holes above).

If so, there are two distinct groups of palisades: a regular one, with lines running parallel and perpendicular to each

other, and an irregular pattern constituted by ditch-palisade combinations, with curved sides and generally positioned obliquely to the first set of lines. The latter, *irregular configuration* of fences and ditches is clearly contemporaneous with the Bandkeramik occupation of the site as has been discussed above. The fences which belong to this group are F 01, F 07, F 09, F 11 and F 12 as labelled in table 5-11 and fig. 5-5; perhaps F 04 in the western part of the site is also a continuation of one of the ditches. It seems likely that where now 'fences' are positioned, there were originally ditches, since lost by erosion of the neolithic surface 5 to 10 dm up from the excavation plane; hence 'palisade' is a better name in this context. One remarkable coincidence should be mentioned: to the northwest on the outside of F 01 a little Bandkeramik neighbourhood was constructed seemingly or apparently respecting that fence, with the houses 39-44, 62 and 63 all dated to the last house generation, whereas the palisade was built in either the first or second house generation. The *regular system* of fences is approximately oriented like LBK houses in general and consists of the other fences in table 5-11. This system is not associated to ditches, hence 'fences' is perhaps a better word to describe them. Parallel to the houses, the long traces of F 02, F 05, F 08 and F 10 are relatively easy to pinpoint; there are perhaps also some shorter fence-like structures (F 03 in the northern part, F 14 towards the eastern part of the excavation). Then, perpendicular to them is F 04 situated in the western part but this may be an extension of a ditch, and the shorter F 06 in the centre (perhaps with F 13 parallel at 15 m to the east, which is rather questionable for being quite short; moreover this is the part of the site which has suffered most from erosion). On the assumption that they indeed belong to one, regular system the dating of these fences is an enigma. The *regular system* cuts through or is cut through by the *irregular system* to the rear of H 24, an indication for non-contemporaneity. F 05, a clear member of the regular configuration is situated slightly more than one metre to the right of this very same house, which unequivocally has directed the course of the irregular palisade ditch. The house has been assigned to the first house generation, yet a nearly self-evident association with F 05 would suggest contemporaneity of both (regular and irregular) fences. There are more problems as two houses, HH 25/37 (final occupation, resp. third house generation), are situated 'against' this F 05, and H 36 (final LBK occupation) close by. Then, F 06 is interrupted by the remnants of H 35 (dating to an early house generation), as does F 08 to H 31 (possibly early, too). F 10 passes very close by H 04 (house generation 3) and H 12 (possibly house generation 1).

Only one inference seems reasonable: the regular system is not contemporaneous with the Bandkeramik settlement. However, in the field notes it is several times stated of post holes grouped here with the "regular system" to have definite Bandkeramik characteristics in colour, soil fillings, and outlook. Therefore, if the assumption that the *regular system* is one single coherent feature is right, and the conclusion of non-contemporaneity of settlement and system is acceptable, the fences have stood either in the pioneering phase before the colonists constructed the houses, or after abandonment of this place in the fourth house generation they stood perhaps as delimiting gardens of the adjacent Haesselderveld village (an even later date, after the final LBK occupation = LBK 2d is unlikely, as subsequently the Bandkeramik vanished entirely from the Graetheide Plateau). Of course, this inference is no better than speculation.

Fences as defined here have turned up elsewhere too. In most sites on the Aldenhovener Platte, one to several such constructions have been reported (Kuper *et al*. 1973 and Kuper 1977; Boelicke/von Brandt 1988); also in Darion one fence has been observed (near house M 1, in a configuration very similar to F 05-H 24 in the Janskamperveld settlement; Cahen 1986). Even more comparable is Cuiry-lès-Chaudardes, where two parallel straight fences are partly obscured by one of the biggest houses; that same house has a fence around its left and rear sides (Howell 1983).

With 161 post holes attributed to fencing systems, there are still 272 post holes on the plans of this excavation which are presently unaccounted for.

5.6 Features away from houses: pit complexes and unclassifiable pits

In any Bandkeramik excavation, composite pits are conspicuous entities among the features. Among them, the *Längsgruben* along the houses are best known, yet they do not exhaust this category; 'pit complexes' are their complement. The origins of the latter may be several and complex by themselves. Thus all kettle pits have collapsed after falling into disuse, and in many cases successor cellars were dug nearby which also collapsed in due time; the result is labelled 'pit complex' (fig. 5-7). Also, clay quarrying was apparently not restricted to the side pits, and may be the most obvious additional alternative cause for pitted surfaces, with the collection of rain water maybe as a secondary purpose (or *vice versa*). Pit complexes are defined as features demonstrably consisting of two or more parts (Lüning 1977, 74-76). Clearly *Längsgruben* do comply with this definition too, only their position next to the houses' central and front parts single them out. On the Janskamperveld several pit complexes (especially when of the collapsed kettle type) are situated near houses, on one or both sides of the rear part of the houses (e.g., H 47 in fig. 5-7), or alternatively, near one or even both of the front corners of a house (e.g., HH 20, 34, 41). If they could be linked to the neighbouring houses, they would be part of the inventories of the house yards, in the

fig. 5-7 Recorded pit complexes

vein of Boelicke's standard set of pits accompanying the Aldenhoven/Langweiler houses. In the present case, there is no evidence for such a link whatsoever, and their presence near the houses may be entirely fortuitous. Also, these twenty pit complexes near houses may as well be considered part of the (regular) side pits, although evidence is similarly lacking — I have separated them out just by keeping strictly to the customary definition of the latter as being situated along the central and front parts of the houses. Composite pits elsewhere, even close to a house, then automatically pertain to the 'complex' variety.

Additionally there are at least 21 pit complexes away from the houses in the Janskamperveld settlement. Those on the plan (fig. 5-7) are demonstrably composite, but it is to be expected that among the other, 'singular' pits several more are hidden which have simply not been sectioned at the right spot to show their separate components. Of all pit complexes (as defined here) 20 register complex shapes of their bottoms, walls, and/or plan. Their sizes have been grouped in table 5-12 (to be compared with those of the side pits in table 5-3). Pit complexes are generally larger than side pits: their median width and length, even their depth is substantially larger than those of the latter pits. In my opinion these figures cannot be used to estimate the original pit volume as I did for the side pits: shapes are complex, and the lost forty-plus centimetres of top soil may have hidden side lobes and additional depressed features. Also, as noted by Lüning long ago, a detailed analysis of their contents is senseless due to their palimpsest nature and multiple origins (Lüning 1977, 75).

	length	width	depth
maximum	90	75	16
Q3	49	24	8
median	32	17	7
Q1	20	10	5
minimum	10	4	1
count	36	38	39

table 5-12 Major metrics of pit complexes, in decimetres

	length	width	depth
maximum	80	38	10
Q3	15	10	4
median	10	6	2
Q1	6	4	1
minimum	0	1	0
count	359	348	278

table 5-13 Major metrics of unclassifiable pits, in decimetres

Here perhaps better than elsewhere a few remarks may be made regarding the 347 features that escape classification except that they are non-geometrical and non-standard in outlook. Almost fifteen percent of all pits remain in this category; their major metric properties have been collected in table 5-13. Maximum sizes are close to those of the pit complexes but they are exceptions, as all other values are considerably smaller, especially their depth is fairly small. In that shallowness one, perhaps the main, explanation for their non-classification may be found: with similar depths as the post holes, their non-geometrical shapes on section are most of the time in the realm of simple funnels or craters, therefore quite indistinct.

5.7 Summary: the features of the Janskamperveld settlement

In the Janskamperveld Bandkeramik settlement 2778 features have been recorded in the excavation, 2429 singular ones, and 119 composite features formed by 230 component pits. In the analyses above they have been divided according to shape and context. Shapes are either standard geometrical or free forms; contexts refer to the position of the features in relation to the houses: in-the-house, near-the-house, and away-from-the-house. It is assumed that standard shapes relate to circumscribed primary functions: kettle pits served as cellars; post holes stabilized posts either in the house or outside, in fences; trenches founded fences or walls depending on context: in-the-houses walls, outside palisades. Free shape features are defined according to their context: near-the-house the side pits (*Längsgruben*), and away the pit complexes; they are supposed to have served primarily as loam 'quarries'. A residual category of 'other pits' grouped features that could not be otherwise accounted for.

In-the-house features are of two standard types: post holes and wall trenches numbering 1369 and 19, respectively. The former (which represent about half the original number, judging from the plans) show more or less cylindrical profiles, with 17% stepped and 42% convex bottoms; diameters average 4 decimetres, their average depth is about 2 dm below the excavation's level (originally probably 6 dm). Wall trenches, the second indoor feature, have a fairly standard width of 5 dm; there are five or six houses with a wall trench all around (type 1a), and another thirteen houses have trenches only around their rear parts (6 type 1b and 7 type 2b); the remaining houses are of the c-type, or too badly represented to tell us something about their walls. Two houses had traces of interior trenches with similar characteristics as the outward trenches (though less wide).

Next-to-the-house features appear in three types in this village: side pits, outer trenches, and kettle pits. Side pits are

irregularly shaped and situated parallel to the side walls of the central and front parts of the houses. Their supposed function as loam pits for the raising of the house floor and the daubing of the walls could not be confirmed by comparing the volumes of the pits with those of the walls, so there should have been additional uses for the loam like potting, the building of ovens or other small structures, the upkeep of the houses, etc. Also, the "artefact trap hypothesis" was discussed, according to which larger pits would contain more finds; at least in this settlement no relationship appeared to exist between side pit volumes and sherd counts, and thus the hypothesis has to be rejected.

Outer trenches are regularly shaped straight gutter-like pits with distinctive U-sections, situated between the walls of the central and front parts of the house and the side pits along the houses; they occur along all Älteste LBK houses, and carry over into the Flomborn phase only to disappear soon after. In the literature they are explained as either rain gutters, foundation trenches for light secondary outer walls, or as the beds of tree trunks with the function to pick up the horizontal stress exerted on the soil by the house walls. As their distance to the house walls is too large to suppose connections with even a widely overhanging roof, the first two possibilities appear less probable. In the Janskamperveld village five, perhaps six, houses have outer trenches; these houses are all equipped with central Y post configurations indicative of an early construction.

Kettle pits are cylindrical, flat-bottomed features usually situated anywhere next to the houses, with diameters of about 8 to 10 dm and depths approximately 8 (+ 4) dm. Arguably kettle pits represent cellars, with estimated volumes of around 2500 litres, which, if filled with grain is sufficient to feed five or six people for a whole year, including next year's seed. Ninety-eight of these pits have been recorded in the excavation; there were 20 kettle pits apparently not so near-the-houses (as their category suggests), and with 38 houses no such features have been observed. Yet there is a weak tendency toward two (probably non-simultaneous) cellars per house, to an observed maximum of ten kettle pits. Possibly, larger houses had more cellars, but this a very weak tendency at best.

First among the features away-from-the-houses are trenches, arranged in three irregularly configurated ditch systems. Much of the irregularity has to do with the position of apparently contemporaneous houses. No finds have emanated from the trenches, yet the dating of the associated houses suggests successive constructions in the first two house generations. Quite narrow in comparison with other Bandkeramik ditch systems, the section drawings suggest a function as foundation of palisades. The enclosed space is about two hectares, the perimeter about six hundred metres; three entrances are perceptible, with longitudinal screens in the passages. From the rather ephemeral impression made by these trench-palisades, a defensive function can probably be ruled out; instead, an enclosure to separate inhabitants from heathen creatures is suggested.

Second among the features away-from-the-houses range the lines of post holes, the latter again defined as cylindrical pits with diameters less than 15 dm, and numbering 373, to which have been added 79 small dark blots occurring on the excavation plan but faded when sectioned. Their shapes differ from in-the-house post holes in being less stepped and more pointed. When five or more such outdoor post holes were lying in a line and with regular intervals, they were grouped into 'fences', which grouped 161 features together into 14 palisades. On closer inspection two sets of fences could be suggested: a group of irregularly laid out palisades which are elongations of the ditch systems mentioned in the previous paragraph (and so dated to the first two house generations of the settlement), and a set of eight fences laid out parallel or perpendicular to the general direction of the houses. The latter set could not be associated with any of the other features of the settlement, although its constituents are clearly Bandkeramik.

Third among the features away-from-the-houses are the pit complexes, numbering 21, while another 20 complexes are found near houses next to the rear part or the front corners. Many pit complexes derive from sets of collapsed kettle pits, but other features in this class seem to be made up of 'regular', non-kettle components. Probably some more pit complexes are hidden in the category unclassifiable (which counted 374 features).

In the introduction to this chapter reference was made to Boelicke's standard yard model derived from the excavations in the German Rhineland, which suggests a common set of pits in specific locations on all yards. In the present case, the density of features precludes such a grouping, although the side pits are located along the central and front parts of the houses, whereas kettle pits or cellars are sometimes found near the rear part, sometimes along the central part (after their collapse giving rise to side pits) or even immediately next to one of the front corners; yet evidence for a link of house and cellar(s) is lacking, apart from spatial adjacency. Also, dependent upon the acceptability of other arguments, the social organization in the Dutch settlements may have differed from that in the Rhineland — here, houses were grouped in yards in a lineage-like organization, there each house was on its own as if the households were more mutually independent (Van de Velde 1979 and 1990; Louwe Kooijmans *et al*. 2002; Hauzeur 2006, 161) — and hence the layout of the yards would necessarily be different too. However that may be, lacking convincing evidence to the contrary, presently no such Dutch Bandkeramik yard layout can be proposed.

Notes

1 Table 5-1 has been drawn up in centimetres suggesting a better accuracy than warranted as the post holes are sometimes quite conventionally rendered on the (digitized) plans. Therefore I prefer metrical summaries by decimetres, one factor down.

2 As several houses are near to or partially over the boundaries of the excavation, this number may be too high.

3 She also presents two beautiful photographs of *Baruya* houses in Papua New Guinea showing ethnographic examples of such rain gutters (Coudart 1998: 73). However, their depth seems to be some 10 or 15 cm to judge from these images, considerably shallower than the present trenches.

4 Many side pits (in which sometimes kettle cellars have been observed) were excavated only partially; among the other features, quite often only one quarter was excavated. Also, several pits were emptied with a dragline, due to time pressure, so that only one section could be drawn.

5 While the associations of H 24 and two of the three ditches, or of H 53 with part of the inner ditch seem beyond doubt, thus firmly establishing dates of construction, other associations and dissociations require some discussion. Thus H 57 sits astride the inner and intermediate ditches — in one interpretation suggesting it being part of those ditches (as in Louwe Kooijmans *et al*. 2002, apparently predicated on Modderman's inference regarding one of the palisades and a type 1b house at Sittard; Modderman 1959: 75). In my opinion, though, previous ditches were obliterated by the construction of the houses (why should they stop outside the *Längsgruben* and not continue between these and the house walls?), thus indicating *termini ante quem*.

6 The word *fence* is used in contrast to *palisade*, to distinguish larger from smaller intervals between the poles.

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