Bisserka Gaydarska (Ed.)

Early Urbanism in Europe

The Trypillia Megasites of the Ukrainian Forest-Steppe

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Contents

Structurally, the pit lacks observable micromorphological evidence for distinctive infilling episodes, whether because the samples did not capture transitional boundaries indicative of discreet infilling episodes, the pit was filled in a single event or bioturbation has homogenised structural variation beyond microscopic recognition. Nonetheless, concentrations of finds which we term 'episodes' were readily distinguishable from the background noise of low-level sherd discard. A total of 30 episodes was identified (https://doi.org/10.5284/1047599 Section 5_4_4_1_ EPISODES), sometimes marked by indices of burning, with a high proportion of ceramic clusters and rather fewer concentrated animal bone deposits. These depositional episodes were created by cutting into the fill, placing material in the negative features and then re-filling it – often with the same material. Parts of the pit had little evidence for this re-cutting/re-filling cycle, while such cycles were common in other parts of the pit (Fig. 4.53). By far the higher frequency of Episodes came in the middle layers of the pit, especially in SU 4. The initial interpretation is that the beginning and the end of a fill episode was marked in material ways. Two AMS dates from the pit (a third sample had low collagen yield and a fourth date was an outlier) show an overlap at 1 sigma, and within the model for the overall duration of the site (see Chapter 4.8.6), OxA-29598 calibrates to 3950–3780 BC (95.4%) and OxA-29599 to 3940–3830 BC (74.4%) or 3820–3760 BC (21.0%) (Fig. 4.63/3). There are so few dates that a sensible estimated duration of pit deposition cannot be made. We can cautiously suggest that the pit was oval in shape at the base (Fig. 4.54 upper) and mid-depth, while its upper part was much larger and amorphous in shape.

Mykhailo Videiko, Natalia Burdo & John Chapman

4.7 Excavations, Ukrainian Side

Mykhailo Videiko & John Chapman

4.7.1 Ditches[59]

4.7.1.1 Introduction

At Nebelivka, the perimeter of the site covers a linear distance of ca. 5.9km, of which 76% (ca. 4.5km) was available for geophysical investigation. The geophysical plot shows a single ditch over much of the available perimeter, specifically the North, West and South sides of the settlement; erosion down the steeper slope of the East side probably removed traces of the ditch in that area (Figs. 4.3 and 4.4). A triple ditch appeared to show up in the South part of the geophysical plot, in Quarter L, and was confirmed by excavation (Sondazh 10).

59 See Chapman et al. (2016); https://doi.org/10.5284/1047599 Section 5.6.

There are 13 well-defined gaps in the well-preserved parts of the perimeter ditch, with the width of the smallest gap being 10m and the largest 180m. Since there were no geological or pedological reasons to cause the magnetometry to miss existing stretches of ditch in these Quarters, we can assume that these gaps were genuine and thus resemble the kind of porous perimeter boundary well known to British prehistorians in the class of monument known as the 'causewayed enclosure' (*aka* 'interrupted ditch enclosure': Mercer 2006; Whittle et al. 1999).

4.7.1.2 Ditch Coring

The initial exploration of the oval linear anomaly took place by coring and trial excavation in 2013. The first core was placed in the North-East part of the linear anomaly and reached a depth of 5.50m, without hitting any obvious ditch fill. Instead, there were two principal deposits in the core: a lower reddish silty clay deposit 1.79m in width (4.29m–2.50m) and an upper off-white silty clay deposit 1.80m in width (2.50m–0.30m). Informal testing of these clays showed that both were suitable for pottery-making. It is currently hard to explain how such thick clay deposits came to be present in a feature that may have been a ditch.

The second core through the linear anomaly was placed in the North-West part of the megasite. At the base of the 4.50m-deep core, a buried chernozem C horizon had developed over 1.10m (4.50–3.40m), with a 1.40m-thick deposit of alluvial clay above the first C horizon (3.40–2m). Above the alluvial clay, a typical chernozem sequence developed with an A, a B and a C horizon. Intriguingly, the contents of both cores into the so-called 'ditch' differed markedly from each other, as did the types of clay found in the two cores.

4.7.1.3 Sondazh 2

This sondazh was laid out over a linear geophysical anomaly just North of Sondazh 1. Despite two extensions, no signs of a ditch profile were encountered (https://doi.org/10.5284/1047599 Section 5.6.1 SONDAZH_2_S-facing_profile). This meant that a priority for excavation in summer 2014 was at least one section cut across the linear anomaly.

The initial excavation of sections across the Northern part of the perimeter ditch (Sondazh 4) and its Southern part (Sondazh 10) was accomplished by the Ukrainian side using ambitiously large trenches (Sondazh 4: 22 × 5m; Sondazh 10: 15 × 2m). In both trenches, the geophysical plans proved accurate guides of the location of the ditches but in neither trench were the ditches as deep as had been expected.

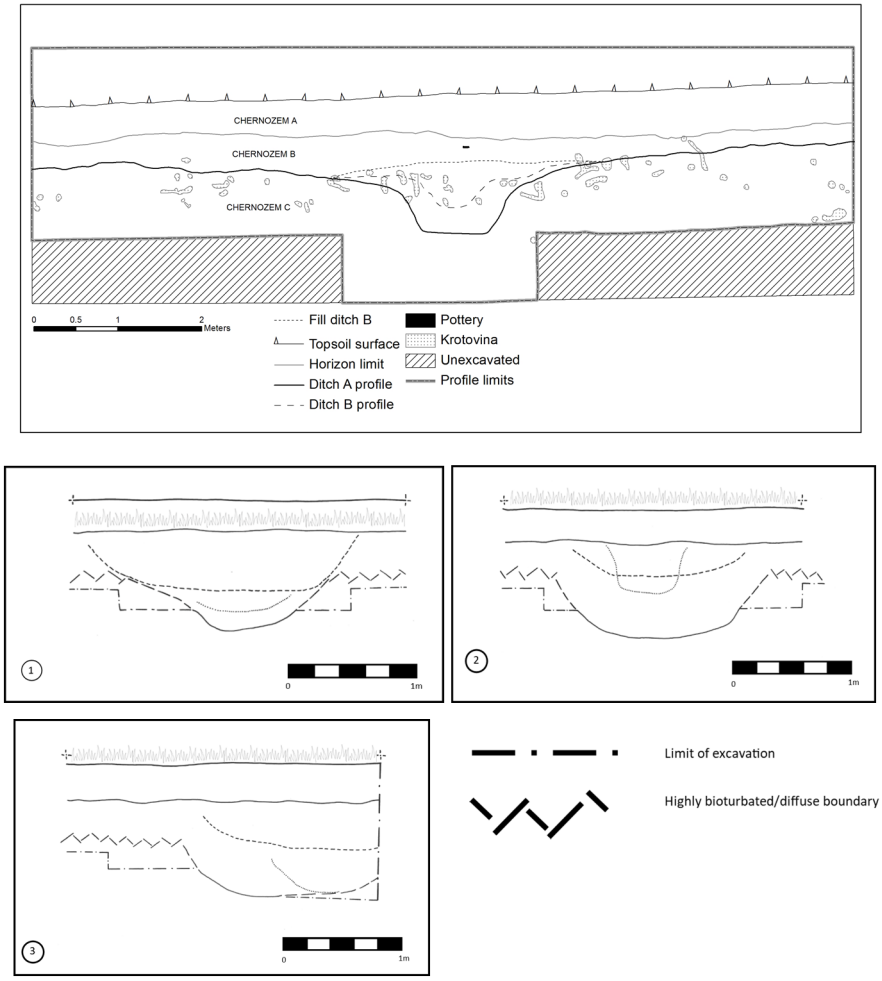

Figure 4.55: Upper: North Ditch profile from South-East; lower: Triple Ditch profiles 1–3 from East (by L. Woodard).

4.7.1.4 Sondazh 4

Trypillia sherds were recorded from the middle and upper fill of the Northern ditch, as well as from the cultural layer above the ditch, but not in the lowest fill, where daub was encountered; no animal bones were recovered from within the ditch. However, daub was also found outside the ditch in the supposedly 'natural' sediments. The width of the Northern ditch segment was ca. 1.5m, while there was considerable debate about the depth of the Northern ditch exposure, with different views recorded on Vince Cherubini's section drawing (Fig. 4.55 upper). While the shallower depth

was believed to be 1.30m, the deepest ditch line was considered to be closer to 1.50m. Analysis of molluscs retrieved from bulk samples from the ditch fill indicated a distinctive habitat which persisted for some time – for example; an open, gradually infilling ditch, mainly dry, but holding significant pockets of moisture, with thick/long grasses and other herbaceous plants, perhaps sparse trees, but in a landscape dominated by short grassland. Thus the debate over whether this shallow ditch contained a palisade has not entirely been settled, although there were no post-holes visible to document this kind of feature.

4.7.1.5 Sondazh 10

This sondazh was laid out across an area in which three parallel ditch sections were indicated by the geophysical plot (https://doi.org/10.5284/1047599 Section 5.6.3 SONDAZH_10_Plan). Each ditch was recognizable but their depths were less than the shallowest interpretation of the Northern ditch segment, in no case exceeding 1m in depth (Fig. 4.55 lower). One Trypillia sherd was found in the middle fill of Ditch 1, with one sherd loosely associated with Ditch 3. One animal bone sample was recovered from near Ditch 3 for AMS dating but proved to have insufficient collagen.

The interim conclusion is that the shallowness of the ditch segments in the Northern and Southern areas was not commensurate with a defensive ditch but, rather, a marker of an enclosed space.

Mykhailo Videiko & John Chapman

4.7.2 House A9[60]

In the first season of geophysical investigations (2009), parts of the Outer and Inner House Circuits defining the Nebelivka plan were revealed, enabling the choice of a dwelling house (A9) for complete excavation during that trial season. The contours of the excavated house rubble coincided closely with the archaeo-magnetic plot, which showed a narrower Southern part and a wider Northern part of the dwelling. In some cases, a geophysical anomaly was registered even where parts of the house were totally destroyed by ploughing. The total excavated area was 236m², with a recording grid set to 2 × 2m (Fig. 4.56). The remains of the building consisted of burnt daub found at depths of 0.25–0.4m. The investigated area was on a slope and the difference in height between the ends of the burnt daub was up to 1.3m (Fig. 4.57). The burnt daub scatter had a rectangular shape and was nearly 18m in length and 4.5–5.6m in width. This area consisted of two daub scatters of different dimensions:

60 See Chapman et al. 2015; https://doi.org/10.5284/1047599 Section 5.2.1.

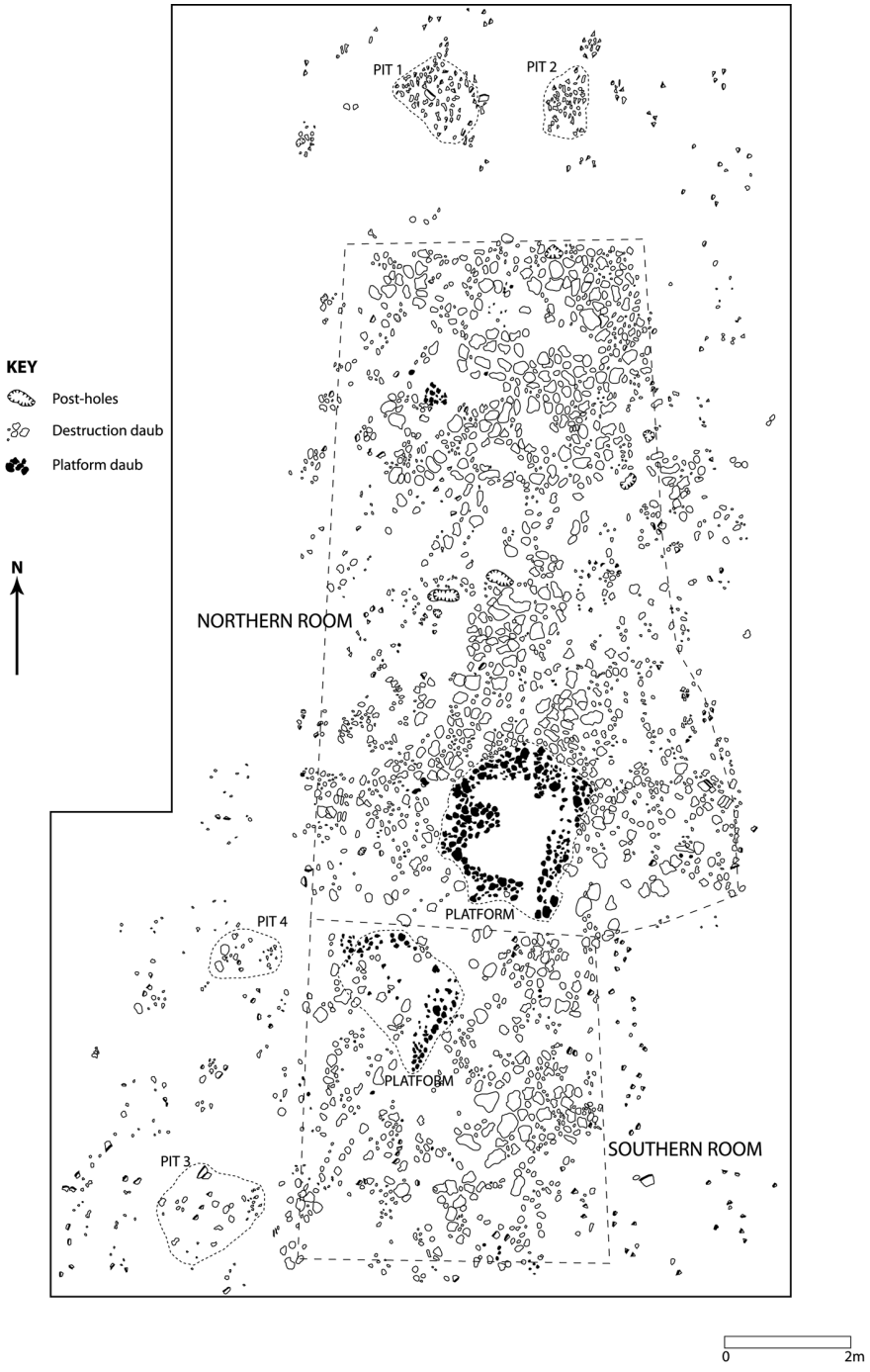

Figure 4.56: Plan of House A9, Nebelivka (by L. Woodard).

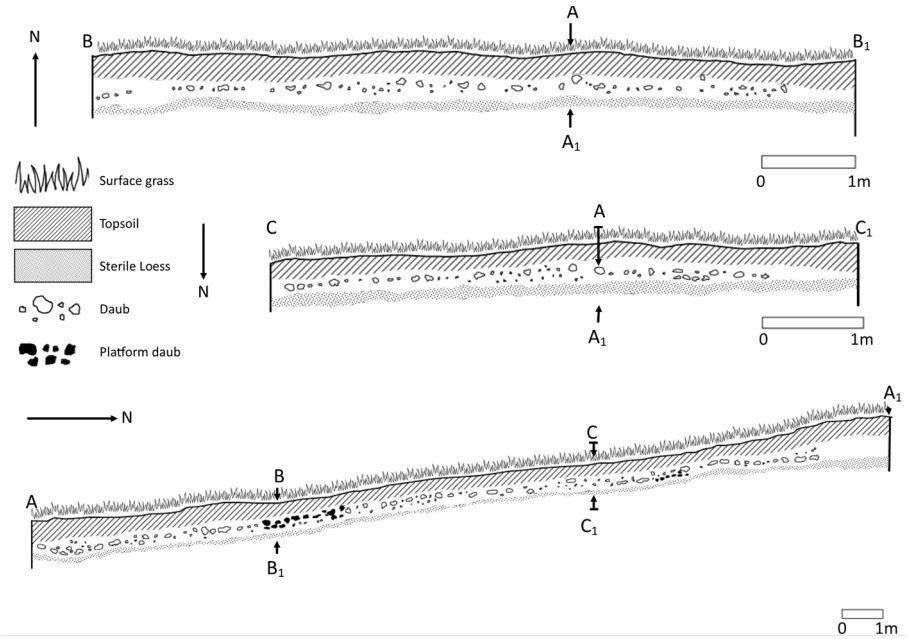

Figure 4.57: Upper: sections of House A9: B–B1 – South-facing; C–C1 – North-facing; A–A1 – East-facing (by L. Woodard).

a Northern, trapezoidal daub scatter measuring 10.5m (North-South) in length and 4.1m (Northern part) 6 or 7m (Southern part) in width; and a Southern, rectangular daub scatter, measuring 5–5.5m (North-South) in length and 4.3m in width. The difference in widths of the two rooms is considered to reflect the additional wall tumble falling outwards (i.e., to the East) from the Northern room (the outer limit of wall tumble is marked by a dashed line on the plan in Fig. 4.56). In the South-West part of the scatter, an area of daub was found that remained outside the area of compact rubble. The edges of the excavated area lay 1.5–3.5m from the edge of the compact daub, allowing the investigation of the culture layer surrounding the building. For example, two sherd and bone scatters located opposite the short side of the building, 1–1.5m from its end, marked the position of two pits (Pits 1 and 2) – 1.2–1.5m in diameter and up to 0.2m deep. A detailed discussion of pottery distributions in House A9 is presented below (p. 319 & Figs. 5.22–5.25).

Burnt daub was identified over the entire area of the house. The building remains consisted mainly of pieces of burnt daub mixed with the remains of threshed cereals/grasses. The surface and the cross-section of the daub contain visible traces of stubble, ears and grains of cereals and/or grasses. The smooth part of the daub faced up; some pieces have traces of smoothing by hand. On most pieces, the lower part of daub had the imprints of a wooden post, including longitudinally-cut beams of timber 15–25cm in diameter. In one area, matching pieces of daub with wood impressions

were traced over 2m in length, suggesting fallen walls of the kind observed in the excavation of the experimental burnt house. Fragments with impressions of rods 2–2.5cm in diameter were found in some places outside the main rubble area. It is possible that these fragments are the remains of walls that had fallen outside the house (cf. the experimental results). In addition, impressions of three vertical posts 8 to 12cm in diameter, probably supporting some sort of a structure, were identified in the Northern room. In general, there were no traces of postholes, which suggests that usually the posts were inserted into sleeper beams. Each room had its own platform constructed on the earthen floor. The Northern room had a larger platform, covering 2m × 2m, while the Southern room had an eroded platform measuring ca. 1m × 1m. Both platforms consisted of three layers of clay mixed with sand (each 20–25cm thick), the lowest of which had been laid directly on the ground surface. The next layers were laid during later repairs. The remains of a large vessel and a flask, as well as some stones, including one grindstone, were found next to the platform of the Northern room, while vessels and two small grinding stones were found near the Southern room's Platform.

The construction of House A9 is typical for Trypillia settlements in this region. It was destroyed by fire as is evident from the burnt daub, some of which was vitrified. The complete excavation of House A9 as a single unit allowed a broader perspective on dwelling-house taphonomy, with several features replicating both the test pit observations and also the findings of the excavation of the experimental burnt house. The diffuse scatter of destruction daub probably represents the falling of wall daub out from a core house area of two rooms, one no larger than 10m × 4m and the other no larger than 5m × 4m, rather than a house with rooms of differing widths. The presence of *in situ* platform daub in both rooms suggests that this was a one-storey house. The fallen wall panel marked by parallel withy impressions is well matched in the experimental burnt house excavation (Fig. 4.27 lower); its location suggests a section of fronton or wall that fell inside the house. The discovery of figurines and binocular vessels mixed with the destruction daub suggests they fell with the walls and ceiling from shelving or wall-pegs during the burning of the house.

Mykhailo Videiko & Natalia Burdo

4.7.3 Houses B17 and B18 and Their Pits[61]

The 2009 geophysical plot revealed part of the inner and outer house circuits which lay close to the Mega-structure excavated in 2012 (Quarter A). The Ukrainian side chose to excavate two adjoining houses (B17 and B18) which lay closest to the Mega-structure, as well as investigating the supposedly associated house pits for each house. One complete burnt house was excavated (House B17), as well as part of a second house

61 See Burdo & Videiko (2016); https://doi.org/10.5284/1047599 Section 5.2.2.

(House B18). The shapes of the houses corresponded to the shape of the anomalies on the geophysical plot.

House B17 was constructed on a natural Chernozem A horizon. Its dimensions were 24m in length by 8 to 12m in width. Most of the area of the house was covered in destruction daub to a depth of over 0.30m (viz., the classic '*ploshchadka*': Fig. 4.26 upper), with few organic remains other than charcoal. Micromorphological analysis showed the absence of cultural inclusions other than daub reinforces field observations of houses that the structures are relatively impoverished in biocultural materials (Chapman et al. 2014). The lack of microscopic cultural inclusions (such as straw or charcoal) other than daub suggests that the building was kept clean during its use-life. Degrees of heat alteration are indicated by the range of yellow to red colours and optically inactive, undifferentiated b-fabrics, probably resulting from the firing of clay in temperatures exceeding 800–850°C (Macphail & Goldberg 2010; Quinn 2013). However, no dewdrop-shaped quartz grains could be observed at the available magnifications, suggesting that temperatures did not greatly exceed these readings (cf. Courty et al. 1989).

Interior details from House B-17 show a possible threshold in the West side. One example was noted of two sections of wall overlying each other – perhaps a sign of a two-storey building but also possibly one wall falling on top of another. Wall plaster showed occasional signs of incised and red-painted decoration; in particular, near the edge of the house, plaster fragments were found to have painted decoration. Under the daub were three Platforms decorated with incised ornament, comparable to that on the 'Platforms' in the Mega-structure. Two hearths were found near the Platforms. Up to eight sherd scatters in House B-17 corresponded to groups of once-complete pots, comprising smaller and medium-sized vessels but no storage-jars.

It was observed that chernozem had accumulated on top of the burnt remains, indicating continuous soil formation under relatively stable conditions after the settlement was abandoned. Whether and how Trypillian or later pre-modern land management contributed to this soil formation remains for future study.

The pit to the North-West of House B17 proved to be much bigger than the geophysical anomaly, amounting to 8m in diameter and 3.5m at its deepest point, near the Northern edge. The Southern edge of the pit came within 1m of the Northern edge of House B17 but this shallow area increased in depth as one moved North. The upper fill was a chernozem with a large number of small sherds and animal bones (Fig. 4.26 lower).

There were many placed deposits in the pit, which was extremely rich in material remains. At 1.2–1.3m depth, a sloping layer 10–25cm-thick contained many large sherds and animal bones, including a *Bos* horn core. This layer sloped into the centre of the pit at 1.6–1.8m depth and contained 14 finds concentrations, some with anthropomorphic female figurines (a total of over 20 was found in the pit as a whole). Under this layer was a burnt daub layer 5–10cm thick, which overlaid a 2–3cm-thick charcoal layer; 10–20cm deeper was a second charcoal layer separated by a yellow

loessic sediment from the upper charcoal layer. Many sherds and animal bones were recovered from all of these layers. A special style of pottery consisted of many sherds with incised decoration, starting at 1.2–1.3m depth; interestingly, this type of incised decoration was rare in House B-17.

The pit to the North of House B18 held fewer finds but was even larger than the B17 pit, although only an 8m-long section was excavated to a depth of 2.5 m. The upper fill, to 1.2m depth, was a chernozem; under this layer, the cultural layer shared the same properties as in the B-17 Pit.

It is clear that the initial use of both pits was to extract clay for house construction. Both pits were filled in at the time of dwelling. The pits were still visible as negative features at the time of the end of the settlement: the upper fill consisted of a lower layer of soil mixed with cultural material, and an upper layer formed by chernozem.

The linear pits were dug on three sides of House B17 but were much more shallow than the B17 or B18 pits. The primary use of all of these pits could have been to produce soil for mixing with clay in house construction, as in the LBK system of digging pits close to houses (Bickle 2013, pp. 167–9). These pits were much more shallow than the pits at the short end of the houses – usually no more than 30cm depth. The further the linear pit was laid out from the house, the fewer the finds that were discovered. Unlike the larger pits, by the time of the house-burning the linear pits had completely filled up to the general surface level.

Mykhailo Videiko & Natalia Burdo

4.7.4 The 'Industrial Structure' and Its Pit[62]

One of the most interesting developments in Trypillian megasite archaeology in recent years has been the discovery of high-intensity, concentrated geomagnetic anomalies which, upon excavation, turned out to be pottery kilns (Korvin-Piotrovskiy et al. 2016). The discovery of such geomagnetic features at Taljanki in 2013 prompted the question as to whether there were similar kilns at Nebelivka. Duncan Hale is of the view that, using criteria of size, orientation of anomaly, strength of anomaly and location, none of the geomagnetic anomalies at Nebelivka is entirely consistent with what would be expected of a kiln anomaly (see above, Chapter 4.2).

Nonetheless, the Ukrainian side tested three features with strong, concentrated magnetic anomalies in the North-East part of the megasite. In the first Sondazh (Sondazh 7), modern iron-working was found in the upper levels, mixed with Trypillia pottery. In Sondazh 8, a pit-like feature containing a high concentration of Trypillia pottery was also a modern feature, with metal finds at a depth of 0.50 m. A historical map of the Nebelivka area shown to the Project indicates how a village street

62 See Burdo & Videiko (2016); https://doi.org/10.5284/1047599 Section 5.5.

extended Northwards from the main village focus, crossing the Eastern edge of the megasite. It is believed that the modern pits were associated with this street. Although the prehistoric finds were 'contaminated' with recent material, this experience is noteworthy in indicating that we cannot automatically make the assumption that all of the features identified on the megasite geophysical plot are datable to the Trypillia occupation.

The most successful Ukrainian trench was Sondazh 9, in which an enigmatic daub feature was found close to a pit. This Trypillia feature was a 2m × 2m fired clay platform with four walls forming three channels (0.20–0.25m in width, 0.25–0.30m in height) (Burdo & Videiko 2016, Figs. 4–6) (here: Fig. 4.58). The walls were protected by fire-proof plaster and the whole complex was covered by destruction daub fired to a green colour mixed with soil, pottery and bones. The green colour indicates the presence of ferrous oxide (Fe_2O) in the clay (see below, Section 4.9), which had been fired to a high temperature. Near the feature were found fragments of fire-hardened clay which have been interpreted as the mobile covers for the channels. Currently unexplained daub lines projected to the NW and SW from the main feature.

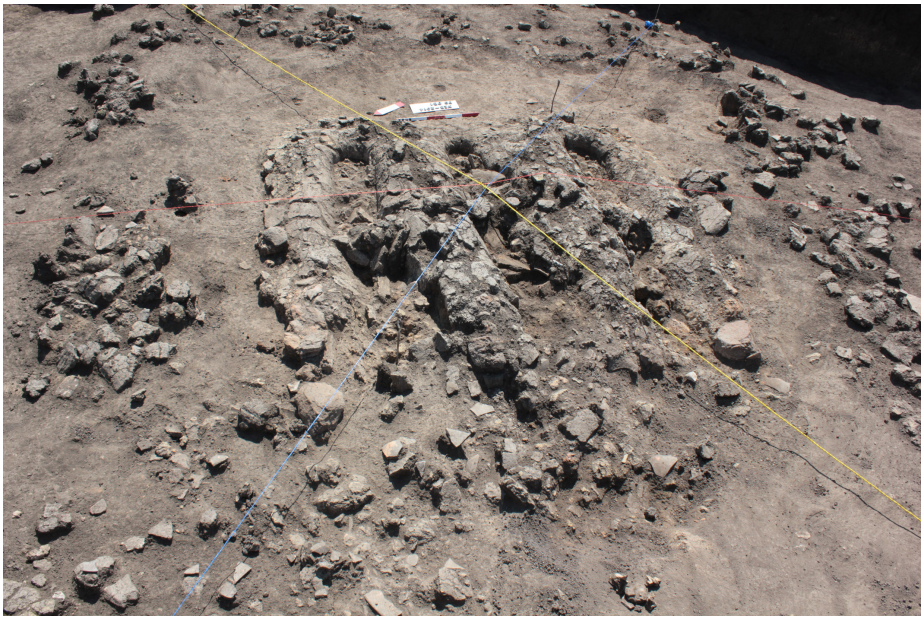

Figure 4.58: General view of Industrial feature, Nebelivka (by M. Videiko).

The daub feature was sub-rectangular, with some granite lumps built into the outside edges of the corners. Three channels some 25–30cm in depth and width were cut into this feature. Many of the daub fragments had a greenish tinge, marking the greatest concentration of greenish daub on the whole megasite (e.g., one or two greenish daub fragments have been encountered on test pits). In the post-abandonment phase of this feature, many small sherds were found on the upper surface of the feature – perhaps the kind of placed deposit found sometimes on the *ploshchadka* of the Mega-structure.

There has been a difference in the interpretation of this feature, with the Ukrainians proposing that this was indeed a pottery kiln (Burdo & Videiko 2016) and the Durham team suggesting that there was no signs of a separation of fuel from pots and that this feature was more likely to be the remains of a communal food preparation area. By analogy with excavated features at Taljanki and Majdanetske (cf. Korvin-Piotrovskiy et al. 2016, Figs. 17 and 32), the three channels have been interpreted as a three-chambered firebox or combustion chamber under a firing chamber with a dome. Burdo & Videiko (2016) interpret this feature as the poorly-preserved remains of an updraught kiln. Several metres to the North of the 'kiln' was a 5m × 4m pit whose total depth was not established. The pit was cut from a depth 0.40–0.60m below the current ground surface. Mixed into all of the four layers, which sometimes contained charcoal lenses, were sherds, figurines, animal bones, stone, a few flints and fragments of 'channel cover'.

The strongest argument for the interpretation of the Nebelivka feature as a kiln comes from the Majdanetske and Taljanki analogies. However, the Nebelivka channels were far shallower than the other examples, showing that there was little space for fuel for a kiln. Moreover, there was a striking absence of vitrified daub or secondarily burnt pottery at Nebelivka, as was found at the kilns of the other megasites. On this basis, there remains the possibility that the 'industrial' feature at Nebelivka was not so much a pottery kiln as a communal cooking place for the provisioning of the periodic feasts whose animal bone remains were often discarded in adjacent pits (e.g., the Pits near House B17 and in Sondazh 1). The channel covers would have functioned just as well in a communal oven as in a kiln and the former interpretation would explain the absence of vitrification and pottery 'wasters'. The closest analogy found so far comes from Hungarian Mediaeval brick ovens with their triple flues (Jakab 2011) (Fig. 4.59). However, these ovens have two essential elements both missing at Nebelivka – a floor separating fuel from bricks and a domed superstructure. A second structural parallel for the Nebelivka feature is the integrated set of three corn-drying ovens excavated at the Keston Romano-British villa in Kent, UK (Philp et al. 1991, pp. 87–88, Figs. 21 & 22 & Plates XI–XIV) (here Fig. 4.60). The best-preserved – the South Oven – was dug into the chalk and had three parallel-sided channels, with a stoke-pit outside the oven providing hot air to the central channel from which it passed to the side channels by means of lateral vents. The surface area of the platform above the ovens of

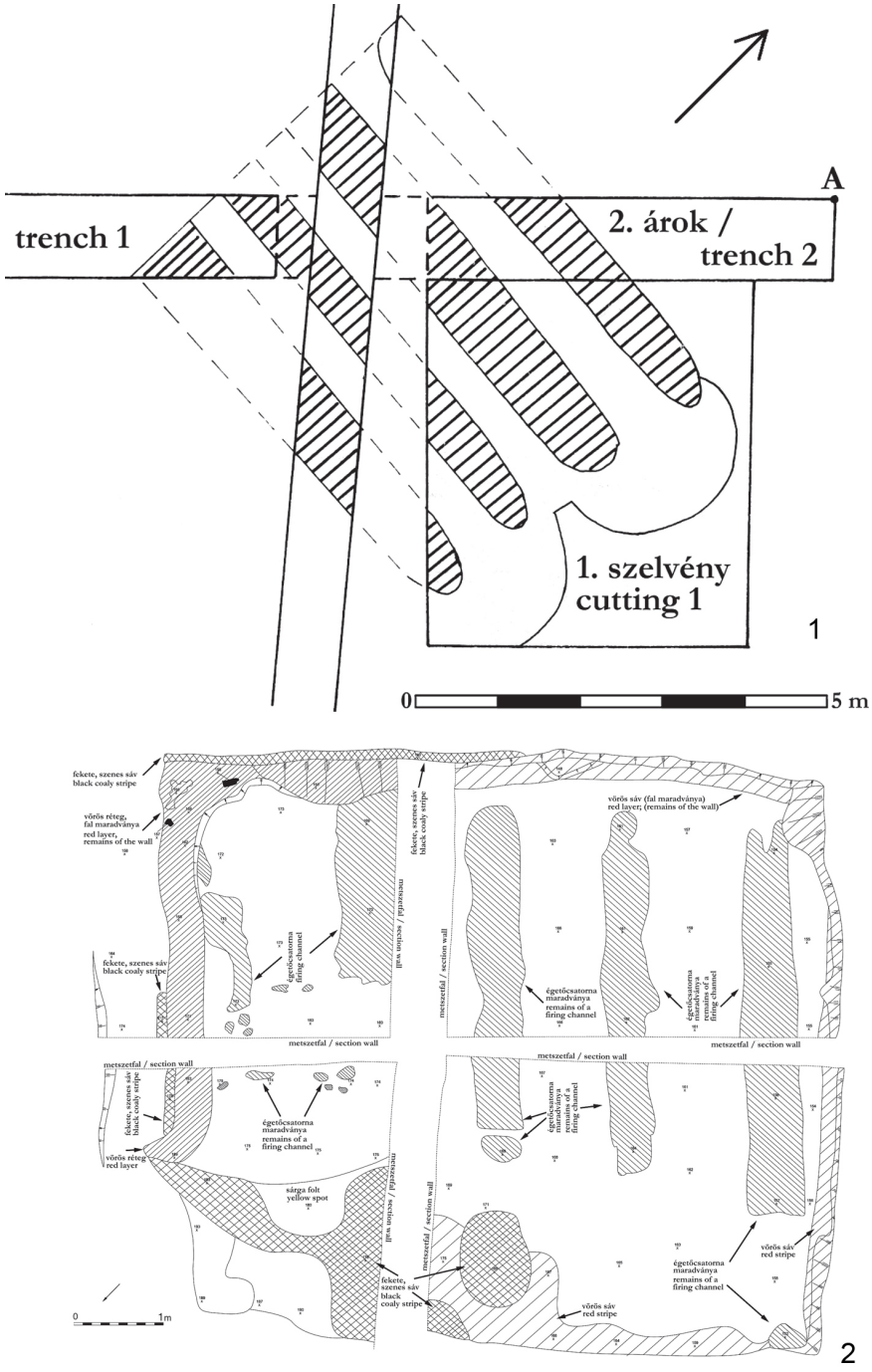

Figure 4.59: Hungarian Mediaeval brick kilns as analogies for Nebelivka 'industrial' feature; (1) Békéscsaba–Mezőmegyer; (2) Debrecen–Józsa Pláza (by B. Gaydarska, based upon Jakab 2011).

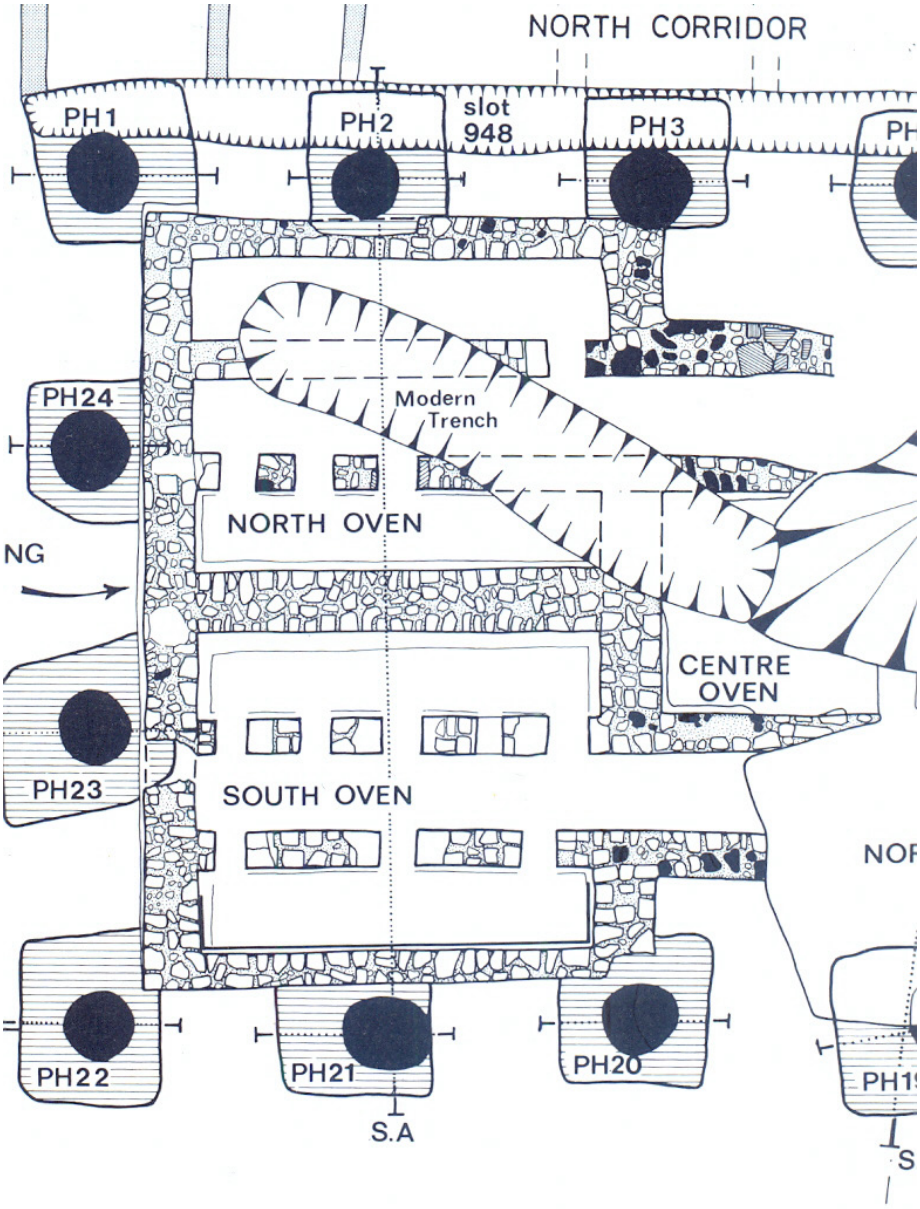

Figure 4.60: Corn-drying ovens, Keston Roman villa (internal width of South Oven – 4.15m) (by B. Gaydarska, adapted from Philp et al. 1991, Fig. 22).

ca. 20m^2 enabled the 'processing of fairly large quantities of grain' (Philp et al. 1991, p. 88). A structural feature essential to the process – in this case, a covered platform separating fuel from grain – was missing from the corn-drying ovens, as it was from the Nebelivka example.

We are still some way from a proper understanding of one of the most enigmatic features found at Nebelivka.

Andrew Millard

4.8 The AMS Dates

4.8.1 Aims

This part of the project at Nebelivka aimed:

1. to develop an internal chronological sequence for the Trypillia BII megasite using a programme of radiocarbon dating and Bayesian modelling; and
2. to use the chronology to estimate the number of coevally occupied houses at any one stage of the megasite's occupation.

Specifically, the four key questions were:

1. how long was the occupation of an individual segment of a circuit?
2. were adjacent houses and segments constructed, occupied, and destroyed sequentially or coevally?
3. how many houses, and segments/groups were constructed, occupied, and destroyed coevally across the whole site? and
4. how do the houses inside and outside the circuit relate chronologically to the circuits?

4.8.2 Initial Dating

Twenty-five radiocarbon dates were obtained from the Kyiv (conventional) and Poznań (AMS) Laboratories on material collected from the excavation of Nebelivka House A9 in 2009 (17 dates), and other burnt houses (8 dates). The use of conventional radiocarbon techniques on daub and pottery containing small quantities of organic material, and on bone led to very poor results. Ten bone dates ranged from 4130±60 BP to 4710±80 BP, seven daub dates from 2740±60 BP to 5970±70 BP and three pottery dates from 3720±180 BP to 4430±180 BP. Only three AMS dates – on bone (5010±40 BP), cereal (5030±40 BP) and daub (5180±60 BP) respectively – fell within the expected date range of 5300 to 4900 BP, while AMS dates on pottery were much younger (3310±35 BP and 4040±35 BP). Even if the expected range for Trypillia BII is