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Architectural differentiation on a Trypillia mega-site: preliminary report on the excavation of a mega-structure at Nebelivka, Ukraine

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Abstract

For over a century, excavations on Trypillia sites in Ukraine and Moldova, as well as on Cucuteni sites in Romania, have revealed few obvious signs of architectural differentiation among the huge numbers of domestic houses. Now, for the first time, a new generation of geophysical prospection methods used to investigate mega-sites has revealed uncommonly large Trypillia structures which merit the name 'mega-structures'. The first three such mega-structures were identified in geophysical prospection in 2009 at the mega-site of Nebelivka, Kirovograd Domain, Ukraine. This article provides a preliminary report on the excavation of the largest mega-structure in the summer 2012 season. This building, covering an area of 600m^2, must rank as one of the largest structures ever built in prehistoric Europe.

Introduction

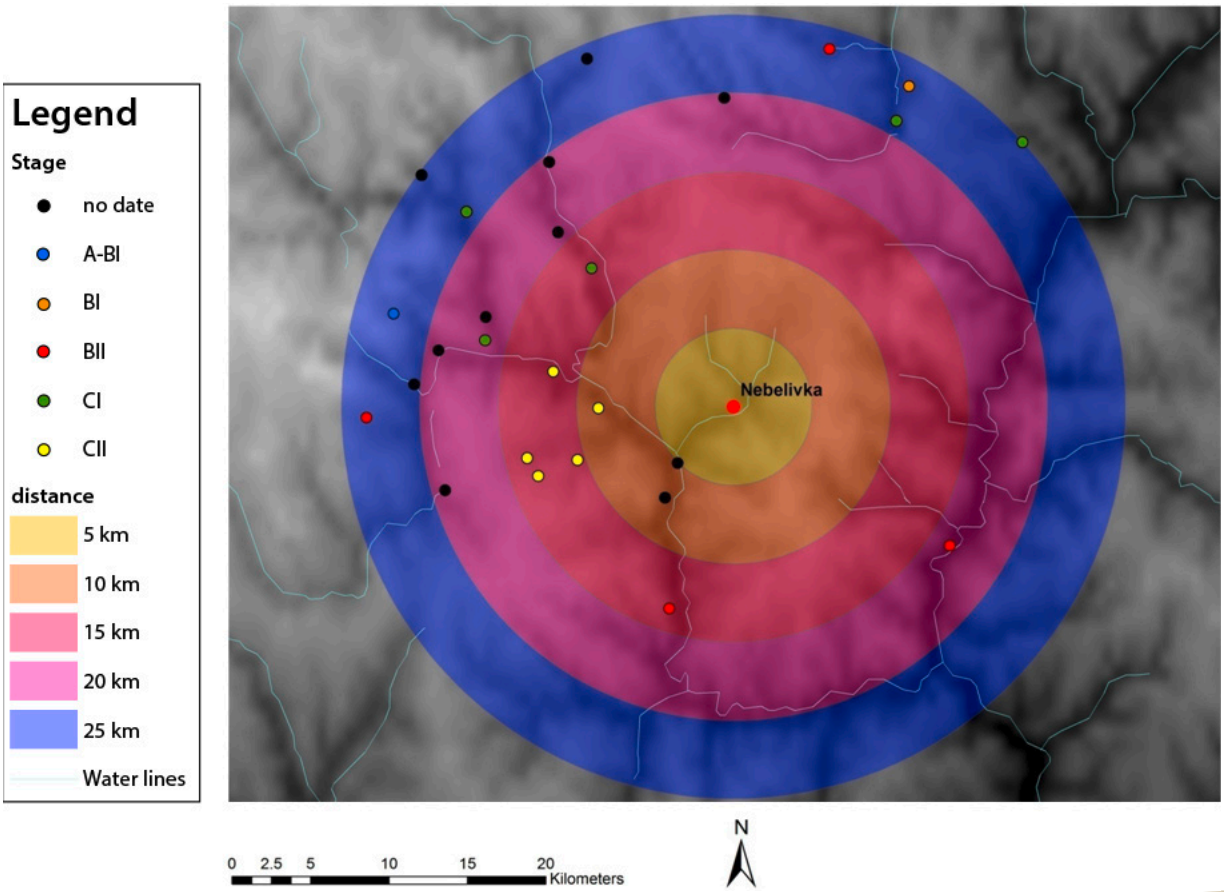
The Trypillia - Cucuteni culture (Fig. 1) of Ukraine, Moldova and North East Romania (aka as 'Tripolye' in Russian) (5300 - 2700 BC) has been termed "the last great civilization of Europe' (Mantu et al. 1997) - a late flowering of 'Old Europe' at a time when settled village life, advances in gold and copper metallurgy and vivid and varied material culture had come to an end a millennium or more earlier in most other regions of South East Europe. Although Gordon Childe introduced Tripillye to mainstream Anglophone archaeology in the 1920s (Childe 1928), the publication of most site monographs and articles in local languages has limited knowledge and the impact of Trypillian discoveries to a small group of specialists. This has led to the neglect of the most striking aspect of Trypillian practices - the development of a series of mega-sites, which were discovered as early as 1971. They covered 100 - 340 ha and were the largest sites in 5-4th millennia BC Europe, the largest being as large as the Early Bronze Age city of Uruk (Mesopotamia). The sheer size of these 'mega-sites' not only prompts questions of the complexity of social structure(s) necessary to sustain such settlements, and the logistics and long-term planning needed to provision them but also makes them very hard to investigate. Investigations of the mega-sites, which started in Ukraine from 1971, have yielded impressive materials, whether ge-

Fig. 1. Location map of Trypillia. Cucuteni groups, showing location of the Nebelivka mega-site (adapted from Google Earth 2012)

omagnetic plans (Maidanetske, Talianky, Glybochok, Fedorivka, etc.), hundreds of excavated objects (houses, pits), a huge amount of finds - pottery, figurines, tools, etc. - which were described in many books and articles. But at the same time many more questions than answers appeared about the nature of this phenomenon (Videiko 2012).

An indication of the global significance of Trypillia mega-sites was revealed in Fletcher's (1995) settlement model, in which the mega-sites constituted the only global exception to Fletcher's settlement limits for agrarian sites. Their size exceeded the global Communication (or C-) Limit, while their estimated population density transcended the global Interaction (or I-) Limit. Nonetheless, the overall importance of the mega-sites led to further research developments in the new millennium.

Fig. 2. 25-km micro-region of Nebelivka, showing earlier, contemporary and later sites (source: Marco Nebbia)



One of several international research teams working with Ukrainian partners in the late 2000s was the Durham - Kyiv team, based on an inter-disciplinary research project, jointly organised by Durham University (John Chapman) and the Kyiv Institute of Archaeology (Mikhail Videiko) (Fig. 2). Since 2009, the Anglo-Ukrainian team has pioneered a dual methodological revolution in Trypillia mega-site studies through the successful application of a new generation of advanced magnetometers and the use of Total Station recording (Hale et al. 2010). During the 2009 summer field season, the creation of a plot of 15 ha. of the mega-site of Nebelivka, Kirovograd Domain (Fig. 3), led to the identification of all of the major, and well-known, features of a mega-site plan but in much greater detail than before, as well as a number of new features (Fig. 4) (Chapman et al., 2014: 2014a). The most striking finds comprised the identification of three magnetic anomalies which we have interpreted as burnt structures much larger than the 'usual' anomalies interpreted as burnt houses (Fig. 4). The largest of these formed an anomaly 66m long and 22m wide, with most of the Western half strongly burnt and the remaining, Eastern part unburnt but enclosed. It was oriented North – South and carefully placed in the wide break between the two concentric rings of houses, in an area devoid of other structures. These three mega-structures are currently the largest structures known from the Trypillia-Cucuteni group; the *prima facie* interpretation would be that they were some kind of 'public' building, performing integrative functions for several parts of the Nebelivka mega-site. Could this kind of structure contribute to a better understanding of Fletcher's (1995) conundrum - the mega-sites' anomalous position in his settlement model?

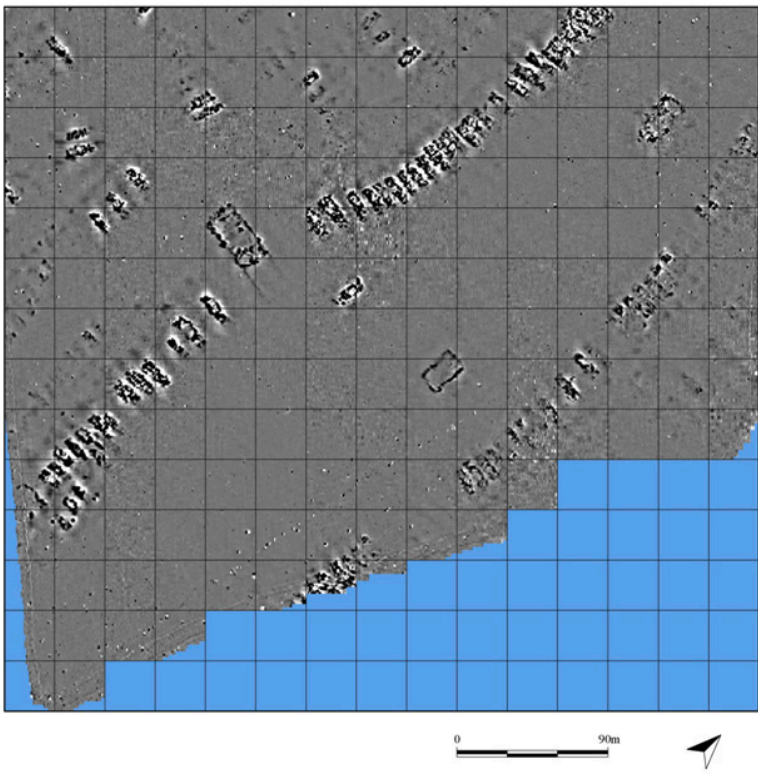


Fig. 3. Geophysical plot, 2009 season, with the mega-structure in the gap in the outer line of burnt houses (source: Archaeological Services, Durham University)

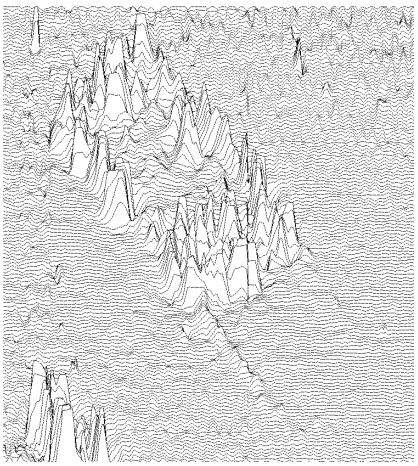


Fig. 4. Geophysical anomaly, mega-structure (source: Archaeological Services, Durham University)

Since these anomalies represented very rare buildings, it was decided to explore the largest example through excavation in summer 2012. In the remainder of this article, we present a preliminary description of the mega-structure, some of its associated finds and an initial attempt at its interpretation. Finally, we make an assessment of the meaning of such mega-structures for overall mega-site settlement order.

Excavation practice and documentation

The excavation of the largest of the three large structures identified in the geophysical investigations in summer 2009 at Nebelivka (Chapman & Videiko 2011) took place over eight weeks in the summer of 2012[1] . The large bi-partite structure (Fig. 5) covered an area of 1200m^2, with 800m^2 represented by burnt remains. The stratigraphy of the mega-structure can be divided into four Phases:- Phase 1 – pre-mega-structure; Phase 2 – use of mega-structure; Phase 3 – deposits representing the destruction of the mega-structure; and Phase 4 – the soil fill above the destruction deposits.

The differences between the parallel documentation systems adopted by the two teams can be summarized in three ways:- (1) the Ukrainian team relied on traditional procedures to record much of the finds, relating their 'features' to a 2 x 2m grid based on Eastings (letters A – L) and Northings (numbers 1 – 28); the British team recorded most of their contexts in terms of a numerical Eastings / Northings system, starting at the SW corner of Trench 1 (100/200). The Ukrainian insistence on the use of grid squares for the location of finds led to a major task in the Nebelivka lab for the British team, who saved all TSt points within the 2 x 2m grid system; (2) the UK system of single-context recording was tailored to the TSt recording but allowed greater flexibility than the Ukrainian system of 'features' – the main features in Phase 2, including fired clay raised areas and bins, the 'podium', door thresholds and finds concentrations. The Ukrainians objected to single contexts which crossed into several grid squares, correctly observing that parts of large features could be coded for several grid squares. The British system incorporated sufficient TSt points to define parts of a large context with great accuracy; and (3) the Ukrainian method of recording all finds discarded on the surface of the destruction deposits in an overall site photograph led to a large number of 'pillars' with finds well above their original context. This was also common with clusters of potentially re-fitting sherds, removed after the excavation of related contexts. This led to some problems with the identification of the correct contexts for TSt recording. Nonetheless, with goodwill and sharing of data, there is nothing in principle to prevent the integration of the two documentation systems.

There were systematic differences in methods used to excavate the deposits at the mega-structure. The Ukrainians' use of spades and shovels to remove Phase 3 or 4 deposits, with spatulae and hooks used to excavate the more subtle Phase 1 and 2 deposits, contrasted with the British teams' use of trowels to remove all deposits except Phase 4 deposits outside the burnt area of the mega-structure (use of shovels). It has been difficult to quantify the effects of these systematic differences in excavation techniques on artifact recovery but the impact of these differences would have been reduced

1 In the 8-week period, the Ukrainian side prepared the site by stripping topsoil in Week 0, there was a joint six-week excavation by a large part of the UK and Ukrainian sides (Weeks 1 – 6) and a final week after the departure of the UK side, conducted solely by the Ukrainian side (Week 7). This division of working times has led to a certain variation in the methods of excavation favoured by each side, which should be taken into account in the final interpretation of finds and, especially, the comparison of finds excavated in Weeks 1 – 6 and Week 7. The UK system of single-context recording allowed for sub-divisions in any of the Phases, perhaps most significantly in the case of Phase 2. The Ukrainian team was also fully committed to Total Station (henceforth 'TSt') 3-D recording of architectural details and finds, although less so to the single-context recording that is part-and-parcel of TSt recording.

by dry-sieving two 10-litre sacks from each context, with flotation of 10 litres per context - the first such flotation operation on a burnt Trypillia structure (p.c., Galina Pashkevitch).

Fig. 5. Kite photo of excavated mega-structure, 2012, with North to bottom of image (photo: Mark Houshold); principal features in purple: long feature in SW corner – podium; rectangular feature in N Central area – fired clay bin; oval and sub-rectangular features – raised areas.

The stratigraphic sequence of the mega-structure: construction and destruction

The mega-structure was divided into two large areas – an unburnt area and a burnt area. In the former, there were relatively few features, which could not be differentiated into earlier or later phases. By contrast, the latter was defined primarily by a mass of burnt daub normally interpreted as the remains of the deliberate burning of the structure. The unpicking of the sequence of construction remains and destruction debris proved to be the principal challenge in the excavation. In this report, we discuss first the unburnt area, followed by a consideration of each of the four Phases identified in the burnt area.

Unburnt area: According to the 2009 geophysical investigations, the Eastern half of the mega-structure was defined by linear anomalies suggestive of burnt walls or ditches filled with daub. The removal of the upper 50 – 60cm of soil deposit in this area[2] revealed no traces of internal or external features at all but, at a depth of 0.50m, traces of linear daub scatters were identified on the South and North sides, defining an area 30m in length and 22m in width. Excavation to a greater depth also confirmed no obvious ditch profiles in the excavated sections. There were also no traces of ditches in the Eastern most sector of this area. However, the absence of any traces of ditches adjacent to the daub scatters may have been caused by removal through over-excavation. Preliminary sorting of all artifact types recovered in this area indicates a much lower level of discard than in the burnt areas.

Burnt area: Phase 1: This Phase comprises all of the contexts found from what appears to pre-date the construction of the mega-structure. There are currently few contexts indicating prior deposition in the area subsequently covered by the mega-structure. Context 222 is a fill beneath the level of the base of the podium, Context 274 is a foundation deposit under a raised area, while Context 367 is a post-hole below the central open area. In addition, there are several instances of contexts outside the burnt area of the mega-structure which may date to Phase 1, e.g., Context 264 – a possible pit West of the building. In Week 7, the Ukrainian team defined three areas of finds concentrations outside the North, East and West walls of the mega-structure respectively. However, it is not yet clear whether these finds concentrations belonged to Phase 1 (pre-mega-structure) or Phase 2 (contemporary with the construction of the mega-structure). Targeted AMS dating of animal bones from these finds groups may help to answer this question.

Burnt area: Phase 2 – the construction of the mega-structure: There is a fundamental divergence in interpretation between the two teams concerning many aspects of this Phase (Table 1):

2 A programme of laboratory phosphate analysis is being undertaken by Mr. Ed Treasure to ascertain the extent of phosphate variation both within the unburnt area and between the unburnt area and samples within the burnt mega-structure.

Table 1:
contrasting interpretations of the deposits of Phase 2 in the burnt part of the Nebelivka mega-structure

Topic figs refer to pp	The Ukrainian view	The British view
No. of storeys / main vertical supports	The mega-structure is a two-storey building with a complex wooden framework, consisting of vertical posts connected by horizontal beams. The spaces between the posts were filled with wooden branches. The wooden floors of both levels and the attic were coated with clay filled with chaff. Impressions of the wooden parts of the floors were partially preserved on the clay floor plasters, which were burnt when the mega-structured was burnt. The ground floor had five to six layers of clay plaster, which remained unburnt. Above its timber and clay, the upper floor had up to seven layers of coloured plaster, which lacked temper. The uppermost later of imprints on clay represented the attic floor. The variations in the intensity of burning across the mega-structure represent differences in the process of burning occurring in a large building but not often in usual houses.	In the absence of large post-holes, the alternative to a log-cabin style is the use of sleeper beams into which to affix vertical load-bearing timber posts. The large number of daub impressions plotted with the help of the Total Station indicates both rounded posts (the majority) (Fig. 6) and squared-off planks for more precise carpentry (Fig. 7).
	The condition of the daub under excavation was caused by three factors in decreasing importance: (1) the burning of the building; (2) post-depositional changes in building debris, also related to soil processes and animal activities; and (3) 20th – 21st century ploughing, erosion and animal activities.	Linear daub concentrations indicated the place of walls – whether external or internal (Fig. 5). The North wall consisted of a series of narrow daub scatters separated by gaps without significant daub deposits. While part of the West wall revealed clear fired clay 'slots' which would have supported vertical planks (Fig. 8), other parts consisted of narrow, patchy daub deposits. The East wall showed an intensive concentration of daub.
Roof	There was no evidence for a roof during the excavation. Whatever roof was present was supported by vertical posts 4m apart. The evidence from clay house models (Burdo 2005) suggests three variants: (i) a two-gable structure; (ii) a four-gable structure; and (iii) an arched structure. The third is more often found in this region for 'temples'.	It remains doubtful that a roof or rooves covered the whole of the mega-structure; it is doubtful that trees as high as 22m would have been available to span the total 20-m width of the mega-structure; thus, a building without a continuous vertical division, in which segments in each of the 'walls' could have supported a roof.
Internal walls or partitions	There was no internal division of the Eastern part of the mega-structure at the ground floor level, with the possible exception of four lines of posts. At the upper floor level, the space was divided into five areas according to the thresholds found in excavation (see Table 2): (a) entrance corridor from the East side; (b - c) two rooms leading off the corridor to left and right; (d) large hall; and (e) Western room. Near the North, South and West walls were probably open areas at both levels, whether corridors or galleries. The Central part (20 x 20m) was an open courtyard, surrounded by partially-surviving galleries on both floor levels.	The Eastern end is by far the most densely structured, with a series of partitions, including one with a dark fired clay threshold, which would have formed five or six small 'rooms'. These spaces could conceivably have been roofed. In comparison with the East end, the Central part had fewer partitions – perhaps two from the South wall and one from the North wall. Its relatively open nature means that it is hard to imagine that the central area was roofed over. The West end differs from the other areas, with an open area stretching towards the equally open Central area and a series of contrasting spaces along the Western wall – a long, thin 'room' and two small square rooms. There may have been a lean-to roof covering the rooms linked to the West wall.

The excavation data and the kite photographs of Phase 2 of the mega-structure (Fig. 5) showed several significant interior features. In the middle of the Eastern part was a dark-fired clay threshold, stretching over 2.0m in length (Context 243: Fig. 9). Massive daub fragments lying inside the East wall threshold probably represented a fired clay superstructure forming the monumental frame of a door (Context 242: Fig. 9). In all, five such door frames were identified by the Ukrainian side, together with one additional threshold (Context 278) (Table 2). The single most impressive feature was the fired clay 'podium' built along the inside edge of the South wall over a length of cca. 10m (Contexts 29, 90, 219 & 223: Fig. 10). The surface of the podium had been raised off the floor to a height estimated to be cca. 0.30m, with a filling to stabilize it. However, sections cut at different places across the podium have revealed marked variation in the construction of this feature, on which both pottery and

Fig. 6. Daub with rounded impression (photo: Mikhail Videiko)

Fig. 7. Daub with rectangular impression (photo: Mikhail Videiko)

Fig. 8. Fired clay vertical slots supporting plank-built partition walls (photo: John Chapman)

animal bones had been deposited in the last phase of the podium's life. The Ukrainian view is that the painted upper surface of the podium shows that it was used under a roofed structure. Similar podia, if smaller in size, have been found at sites of the Tomashevka subgroup (e.g., Talljanky House 40: Chernovol 2012: 187 and Fig. 8.3), as well as in Cucuteni sites (e.g., Drăguşeni Dwelling 1: Marinescu-Bîlcu 2000: 31). Podia were also represented in fired clay house models (e.g., Burdo, 2005: figs.1, 3, 5 and 8).

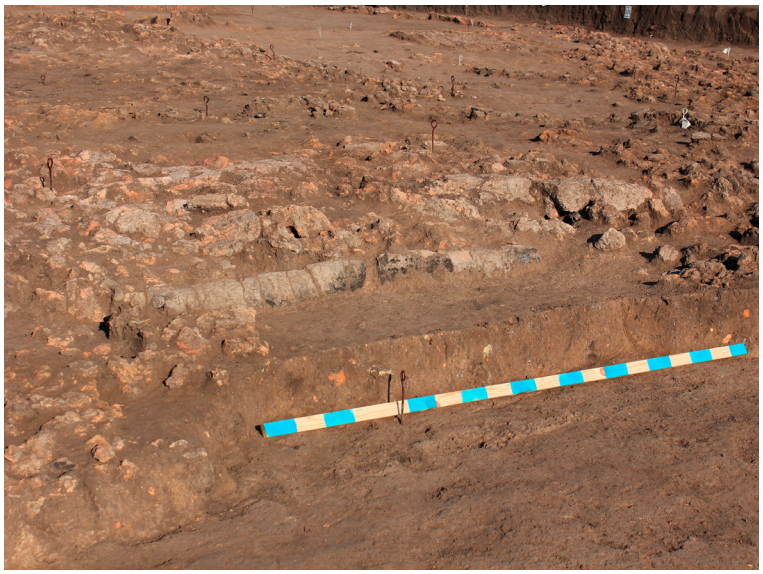


Fig. 9. Threshold, East end, with fallen 'monumental setting' (photo: Mikhail Videiko)

Fig. 10. View of podium from West (photo: Mikhail Videiko)

Table 2:
Thresholds*

Thresholds	Width of transit space (measured; interpreted)	Location	Material
1. Western	0.7m ; 1.3m	4m from Western edge of building, on upper floor	Vegetable-tempered clay, stucco and paint
2. Eastern	1.7m ; 1.7m	At Eastern end of building, on upper floor	Vegetable-tempered clay, remains of stucco and probably painted
3. Left	1.5m ; 1.5m	4m from Western threshold, on left side on upper floor	Vegetable-tempered clay, remains of stucco, red painted and possible remains of door
4. Right	0.3m ; 1.5m	As 3., but on right side	Vegetable-tempered clay, stucco and red paint
5. Entrance to Large Hall	2.2m ; 2.2m	10m from Eastern threshold, at the end of the corridor, on upper floor	Vegetable-tempered clay, remains of stucco and probably painted
6. East rooms (Context 278)	1m in width, with a raised 'step' 0.15m high	Between two small rooms in the East end	Fired clay, with no additional decoration

* Remains of daub have been preserved, which coated the wooden constructions of passages, which may have been entrances or thresholds between rooms.

In addition, there were seven fired clay Raised Areas of varying sizes (Fig. 11 - 12 & Table 3). These features were built up with two, three or four layers of fired clay, which were fragmented into the Neolithic equivalent of Roman *tesserae* (Fig. 11). There are at least two possible reasons for the cracking of the clay surface:- the intense heat of the burning of the mega-structure and the lengthy exposure of the clay surface to the elements. The cracking of all three layers of fired clay in Raised Area Context 46 supports the cause as intense heat.

Fig. 11. The largest Raised Area (Context 46) inside the mega-structure (photo: John Chapman)

Fig. 12. Location of Raised Areas / Altars, Nebelivka mega-structure (photo: Mikhail Videiko)

Table 3:
Dimensions of the Raised Areas in the Nebelivka mega-structure

No. of raised area (context)	Length (m.)	Width(m.)	No. of clay layers	Decoration	Notes
1 (46)	4,3	4,3	Up to 7	Incised lines (circles); probably paint	Resembles a cruciform design
2 (6)	5,3	5,3	4	Incised lines along the edges	? circular
3 (58)	1,4	1,5	3	-	Destroyed edges
4 (89)	0,7	0,8	3	Incised lines	Partially preserved
5	1,3	1,3	2	Incised lines; paint	Cruciform
6	1,2	1,3	3	-	Destroyed edges
7	0,5	0,6	3	Incised lines	Partially preserved

In some areas, the fired clay surfaces had been painted with a red wash. Three different interpretations have been proposed: as 'altars', as 'hearths' and as 'platforms' (NB this is not the same as the Romanian term '*platforme*', used to describe the burnt clay mass of a house, or '*ploschadka*'). The notion of 'altars' presupposes some ritual function and would be supported by differential concentrations of figurines, or other so-called ritual objects. However, there is no such concentration of ritual finds. The expected evidence to support the notion of 'hearths' would be the identification of burnt fired clay fragments, allied to concentrations of charcoal and/or ash close to the features. The absence of burning near these features diminishes the likelihood that they were 'hearths'. Nonetheless, short-term, low-temperature fires in the middle of a raised seating area for ritual participants may well have left few traces of ash or charcoal. The term 'raised area' is a more neutral term, indicating a proper concern with a feature that is raised from the ground-surface of the mega-structure, on which people could have sat or ritual objects could have been placed for short-term performances - objects which were then removed to other contexts, as was the case with the podium and the fired clay bin. The fired clay raised areas in the mega-structure can be paralleled on other Trypillia sites (e.g., Talljanky House 33: Kruts et al. 2005: 8 – 10 & Ris. 5) and in other groups (Lazarovici C.-M. 2003), but all of a much smaller size. These features were also added to fired clay house models (e.g., Vladimirovka, with a cruciform shape: Burdo, 2005:fig. 6). The largest raised area in the mega-structure currently appears to be the most massive in the Trypillia group.

The final feature in the interior of the mega-structure is a large fired clay 'bin' (Contexts 80 & 255: Fig. 13). Careful excavation revealed a long and complex biography of the bin, beginning with the clearing of the area and the creation of low fired clay walls, and ending with the deposition of an upturned grinding stone after the destruction of the mega-structure (Context 81: Fig. 14). The bin was placed in the Central area, close to the largest platform but most probably in an open area. No special deposits had been made in the bin until after the burning of the mega-structure. The parallels for smaller fired clay bins on other Trypillia sites (e.g., Talljanky Houses 35 & 40: Cherno-

vol 2012: 190 – 191), as well as in other groups (e.g., the Late Neolithic Tisza tell at Gorzsa: Horváth 1987), suggest the use of bins for the storage of cleaned grain. The total absence of grain during the flotation of over 50% of the fired clay bin fill is very puzzling, implying another function perhaps not related to grain processing (cf. at Zayets: Ryzhov, 1992: fig. 6). Alternatively, any stored grain could have been removed from the bin before the burning of the mega-structure.

Fig. 13. Fired clay bin (photo: Mikhail Videiko)

Fig. 14. Cracked grindstone deposited in final phase of use of fired clay bin (photo: John Chapman)

The living surface inside the mega-structure also raises complex issues of interpretation. The most convincing areas of fired clay 'paving' comprise the seven raised areas. Much of the daub that covered the living surface of the mega-structure was too irregular to be considered to form a floor. It is therefore possible that, just as we can identify variation if the form of different parts of the mega-structure, so it may be assumed that different kinds of floor covering were used for the different parts of the great building, including stamped earth surfaces for much of the Central area.

One notion not so far been adequately discussed is that the variability in both exterior and interior construction was related to chronological differences. In the British view, there are several arguments substantiating the notion that Phase 2 contained at least

two sub-phases: (a) the multiple sub-phases of some of its principal features (e.g., the podium (Contexts 90, 112, 157, 219 and 223) and Raised Area Context 46); (b) the long 'biography' of the fired clay bin prior to the burning of the mega-structure; and (c) the closure of the door threshold between two 'rooms' in the East end with a fired clay step (e.g., Context 278). Only further detailed study of the micro-stratigraphies of the interior and walls of the mega-structure can help us to evaluate the structure's chronology.

The finds associated with the final phase of use of the mega-structure may be divided into three main categories: special deposits, deposits of large, potentially re-fitting sherds and sherd scatters. The former is far rarer than the latter; in fact, before further analysis of the finds, we can be sure of only one major special deposit – a concentration of 21 miniature vessels, with a number of larger pots, in an area of cca. 3 x 3m just to the West of the Western partition of the East end (Context 232: Fig. 15). These miniature vessels may have fallen off a shelf onto a sloping surface outside one of the East end 'rooms'. If that was the case, these vessels would have been accessible to the open area in the centre of the mega-structure rather than the 'closed' rooms in the East end. A moderate number of sherds – in the hundreds rather than the thousands – was deposited in living floor deposits, sometimes forming clusters of re-fitting sherds and sometimes as 'orphan sherds' (Schiffer's 1976) term for sherds that did not re-fit to any other sherd on site). There are also several cases of sherds re-fitting from many metres apart.

Fig. 15. some of the group of 21 miniature pots found associated with larger vessels in the Eastern end of the mega-structure (photo: John Chapman)

Burnt are: Phase 3 – the destruction of the mega-structure: There is a fundamental assumption that Trypillia houses have been burnt down deliberately at the end of their lives (Burdo, 2003; Kruts, 2003; Burdo et al. 2013). The experimental burning of smaller-than-usual 'houses' of the Tripillia-Cucuteni type (Burdo 2011: 44 – 47) has shown that the creation of the heaped mass of fired clay known as '*ploshchadka*' in Russian is directly related to the burning of the house, in which construction daub was fired at high temperatures and fell onto the surface, to be fused together to form the *ploshchadka*.

However, as we have seen already at the mega-structure, the distribution of fired clay daub across the building is by no means continuous nor massive, revealing patches of dense, often vitrified daub (e.g.,

Context 125), zones of medium density daub with little or no vitrification (e.g., Context 120), and areas of low-density daub with no traces of vitrification (e.g., Context 129). There seems little doubt, even at this preliminary stage of investigations, that there were major variations in the temperature at which different parts of the mega-structure burned down. This may have been a by-product of the conditions of the fire or perhaps the different burning strategies designed to burn different areas in different ways.

One significant piece of stratigraphic evidence noted by the British team in over ten contexts, including some major features, consisted of the covering of the living surface of the mega-structure with a thin layer of dark soil prior to the first daub destruction deposits. This thin soil layer was found above the podium (Context 112), Raised Areas (Contexts 6 and 58) and the fired clay bin (Context 88). It seems probable that this soil was derived from the local soil (perhaps a chernozem) and blew into the mega-structure over a period of time whose duration is currently difficult to assess. The suggestion is that a mega-structure that was relatively open may have been abandoned for a period of time before it was burned down. A similar sequence of deposition was noted for Dwelling 12 at Drăguşeni (Marinescu-Bîlcu 2000:36). An even more intriguing question is whether there was more than one phase of burning at the building.

Elsewhere, the Ukrainian team has published evidence for the deposition of artifacts – including figurines – at various stages of house abandonment (summarized in Burdo et al. 2013). Half of the figurine fragments were found in the area covered by destruction daub, as well as almost half of the total mega-structure pottery assemblage (over 1,800 sherds) (figures supplied by Mr. Ed Caswell). The contextual and spatial study of the pottery dating to Phase 3 is still incomplete but such studies should help in an assessment of depositional strategies during and after a house-burning. One interesting 'late' deposit concerned the upturned grindstone (Context xx), placed over a layer of soil within the area of the fired clay bin (Fig. 13), as the final episode in a long narrative of the life of the fired clay bin.

In summary, there were three final stages in the biography of the mega-structure: (1) the cessation of social practices inside and perhaps outside the building; (2) a period of as yet unknown duration when the mega-structure was not used, allowing the build-up of thin levels of chernozem-derived soil layers within the mega-structure[3] ; and (3) the final burning of the building to produce the *ploshchadka*.

Burnt area: Phase 4 – after the destruction of the mega-structure: The main characteristic of the period after the burning of the mega-structure was a period of soil formation indicating an absence of cultural activity above where the mega-structure once stood. It will be important to use pollen analysis to verify the level of local activities, if any, on what was once the 'mega-site' in the late 4th and 3rd millennia BC. One can suppose that this period of soil formation was, at the same time, a period of little local deposition of artifacts or ecofacts.

The ploughing of the soil above the mega-site in general, and the mega-structure in particular, was so deep as to leave traces of fur-

3 For the Ukrainian side, it is worth noting the possibility that the 'chernozem' deposition could have been an integral part of the destruction of the mega-structure (viz. Phase 4).

rows in the top of the *ploshchadka*. It is this modern ploughing that, in the British view, has removed a large quantity of Trypillia pottery from its original location and created a large and varied plough-zone ceramic assemblage of at least 1,500 sherds with Total Station recording. The best guess that we can make for the source of this plough-zone assemblage is supposedly near the top of the *ploshchadka* – a notion that would lend support to Burdo's view that there was much deposition on the burnt remains of Trypillia houses, viz., on the top of the *ploshchadka*. The alternative is that much pottery fell from the second floor of the mega-structure onto the growing mass of burnt daub during the course of the destruction by fire.

The spatial analysis of the Phase 4 pottery will doubtless provide some general clues to the origins of this plough-zone assemblage. However, since some of these sherds were excavated in Week 0, they were not subject to Total Station recording protocols.

In summary, the British view is that it seems probable that large quantities of Trypillia pottery (Fig. 16) were placed on, or fell onto, the top of the *ploshchadka* after the destruction of the building by fire. Over the ensuing millennia, but most probably in the Modern period with the increasing depth of ploughing, the sherds placed on or near the top of the *ploshchadka* were transformed into a plough-zone assemblage, with the sherds distributed throughout the A horizon between 0.20 – 0.50m in depth.

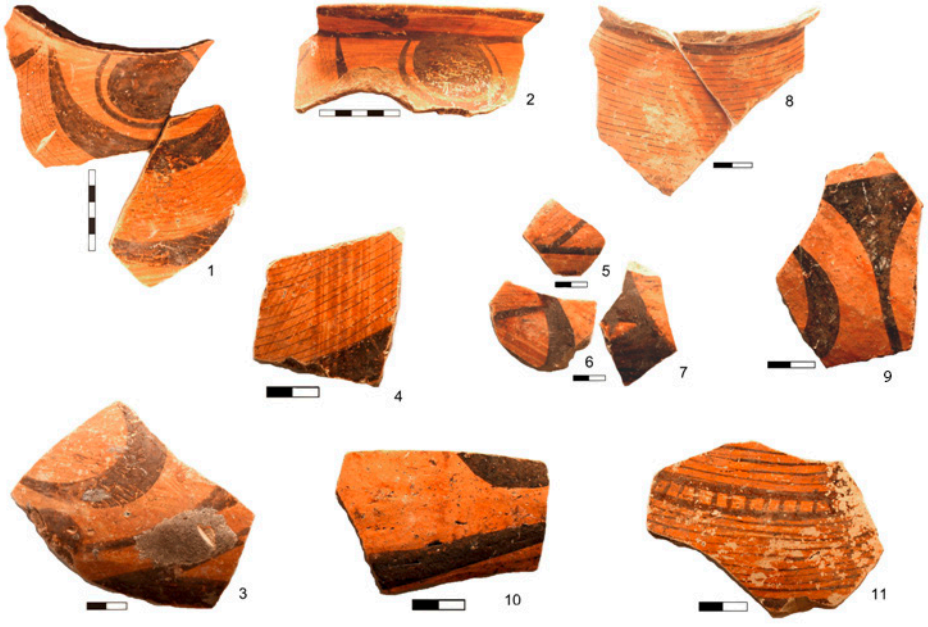


Fig. 16. Painted pottery (photo: Mikhail Videiko)

One important process requiring clarification is the source of the build-up of over 0.60m of post-destruction soil. An interesting proposal has been made by Professor Li Ping Zhou concerning Holocene re-deposition of aeolian loess (p.c., Li Ping Zhou, 4th March 2012, Durham). Zhou has found evidence of continuing loess re-deposition in China, which had been previously overlooked because of the masking effect of Holocene soil development (Pye & Zhou 1989). The wide extent of donor aeolian loess deposits in South West Ukraine make this hypothesis feasible, requiring field testing in 2013.

Interpretation of the mega-structure

In summary, the architectural remains of the Nebelivka mega-structure, together with its associated artifact assemblage, pose an intriguing problem of interpretation (Videiko et al. 2013). Before our excavation, the teams shared an expectation of a large public building with a range of special finds indicating some kind of administrative or ritual central place serving, at the very least, a cluster of houses in the South East part of the mega-site. The size of the structure is not in doubt and the excavated remains provided a close match to the 2009 geophysical plan. However, there was only one part of the mega-structure with anything resembling monumental architectural features – the East threshold with possible monumental wall features. The architectural emphasis on the Eastern end of the mega-structure is heightened by the difference in level between the East threshold and the surface of the unburnt area of at least 50 – 60cm. This means that anyone approaching the mega-structure from the East side would have been confronted by a high wall, with a possibly monumental entrance, on a stepped slope.

Table 4:
different overall interpretations of the Nebelivka mega-structure

The Ukrainian overall interpretation	The British overall interpretation
A building of 60 x 20 m consisting of two parts – an Eastern and a Western. The Western part (40 x 20m) was two-storey. At the level of the ground floor, there was no division of internal space, except for four rows of posts, with seven raised areas/altars. On the upper floor, there were five rooms, shown by the occurrence of thresholds. Perhaps, there were open galleries near the Northern, Western and Southern sides at both levels. The Eastern part (20 x 20m) consists of an open courtyard, surrounded by galleries on both levels. The mega-structure was a public building, most probably a sanctuary, as indicated by the high number of 'altars', the size of the rooms accommodating hundreds of people, the wide passages and some specific features of the finds assemblage. In view of the lack of heating facilities, the mega-structure was not meant to be a permanent dwelling-area.	a loosely integrated structure which was partly roofed, partly open and with markedly different kinds of local 'spaces' – large open areas, small open areas, larger 'rooms', smaller 'rooms' and 'box rooms' (cf. separate rooms divided by daub walls at Peschane House 2: Chernovol & Ryzhov 2006: 374)

The different overall interpretations of the interior of the mega-structure are presented above (Table 4). Further contextual and spatial analysis of the finds in the mega-structure interior is needed before we can understand the function of areas possessing such different qualities. But the overall impression of the finds from the mega-structure is that there are few finds that differ greatly from the 'typical' Trypillia house assemblage. The most obvious special find is the group of 21 miniature vessels near the West partition of the East end. Part of them had burnished surfaces decorated with either a graphite wash or with painted graphite motifs – a feature unique not only at Nebelivka but for the whole of the Tripillia B2 phase.

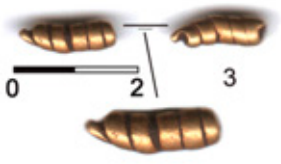


Fig. 17. gold hair-ornament, East end room (photo: Mikhail Videiko)

There was also the discovery of a tiny gold hair-ornament from one of the smaller 'rooms' in the East end (Fig. 17) – one of the very few gold ornaments from the entire Trypillia – Cucuteni distribution. But the overwhelming mass of finds was ceramic, with a high proportion of fine wares, many with painted decoration (Fig. 16). The total of 12 figurines (Fig. 18) is by no means impressive for such a large structure and the lithic assemblage of both chipped, ground and polished

stone tools is small in comparison to other Trypillia house lithic assemblages. The group of over 20 small fired clay cones is perhaps a sign of an administrative practice (Videiko 1987:32-33), but may also be interpreted as gaming pieces (Fig. 19). In general, there is little to make the mega-structure objects stand out from the typical artifact assemblage from a Trypillia house.

Several principal features (e.g., podium, cruciform Raised Area) of the mega-structure are also similar to the features well known from Trypillia houses – but the Nebelivka examples are much larger (the podium, the aised Areas) and more numerous (the Raised Areas). Preliminary research suggests that the fired clay bin, the largest Raised Area and podium are the largest examples of their type so far known in the Trypillia culture. It would appear that the basic elements of the Trypillia house have been borrowed and adapted to fit the great size of what remains a public building but one without the depositional characteristics of a ritual or administrative centre. The layout of the rooms and internal features in both interpretations of

Fig. 18. Fired clay figurines (photo: Mikhail Videiko)

Fig. 19. Fired clay cones (photo: Mikhail Videiko)

the mega-structure does not fit any of the 'typical' domestic house layouts as defined by Chernovol (2012: Fig. 8.8). The mega-structure would have been a monumental building, visible from several km on the South part of the micro-region.

In short, the Nebelivka mega-structure is, in a sense, much more interesting than a ritual centre with all the trappings of a Late Neolithic temple (cf. Parţa: Lazarovici et al. 2001); it is a massive building with large versions of domestic features – 'mega-features' - but with few objects differentiating the building from 'typical' Trypillia houses. Those expecting the architectural and artifactual reflections of a hierarchical society with elites ruling over thousands of inhabitants in a Trypillia mega-site will be disappointed. The resultant interpretation of the Nebelivka mega-structure requires a much more subtle model of site depositional practices than we have so far managed to create. There is also the question of the number of sub-phases in Phase 2 – the main occupation phase of the mega-structure. It may also be possible that there was more than a single phase of burning of the building. Much further detailed work on the site records is required before we can posit satisfactory answers to these questions. What is undeniable is that the mega-structure at Nebelivka was burnt down towards the end of its life, perhaps after a period of time when the building was partially or wholly abandoned. It is possible that an earlier phase of burning precipitated the abandonment of the mega-structure, which was totally destroyed after a period of time.

Conclusions: the mega-structure and Eastern European low-density urbanism

The early settlement plans of Trypillia mega-sites constituted the first Trypillia mega-site methodological revolution, with aerial images and basic magnetometry providing an impressionistic view of a class of extraordinary sites – some of the most remarkable in European prehistory. However, since 2009, new research teams have created what may be termed the second 'methodological revolution' (Chapman et al., 2014: 2014a), which has created a new phase of Trypillia mega-site research. The Anglo-Ukrainian Project has been joined in this research by a German-Ukrainian research team, whose banks of GPS-linked caesium magnetometers pulled by four-wheel-drive vehicles have been producing settlement plans from 2010 onwards on a large scale (Burdo et al. 2012). Most of the internal spatial structuring devices observed at Nebelivka in the 2009 and 2012 seasons have also been noted at the three target sites where the Ukrainian - German team has been working (Talljanky, Maidanetskoe and Dobrovody: Burdo et al. 2012). Many new and important conclusions about internal mega-site structuring will be discussed in this exciting phase of research, based upon the increasing significance of modularity at the mega-sites.

Three key elements of mega-sites have emerged that were not apparent in the first research phase. The first was the grouping of houses into smaller or larger groups, whether in radial streets, 'squares' or segments of the main concentric house circuits. This strong degree of spatial patterning created a strong sense of internal structuring in the mega-site settlement space (Fig. 20), allowing us to talk for the first time about 'neighbourhoods' rather than just 'circuits' of houses.

magnetic survey
soil filled / higher magnetic susceptibility
burnt structures
unburnt structures
probable structures
palaeochannel

Fig. 20. Interpretative plot of geophysical investigations, 2009 and 2012 seasons (source: Archaeological Services, Durham University)

The second result concerned the actual size of the mega-sites, as well as the number of houses in coeval occupation. In early calculations of the areal extent of the mega-sites, the site size was calculated by multiplying the length of the oval by its width, producing a calculated size based upon a rectangle rather than an oval. The revision of mega-site sizes now based on ovals rather than rectangles has reduced the size of the largest mega-site – Talljanky – from 450ha to 340ha – a decrease of a quarter. This re-calculation has, *pari passu*, considerably increased the density of dwellings, while the new geophysical prospections at Talljanky and Majdanetskoe indicate an increase in the number of houses by 20% - 25% over past estimates (Kruts et al., 2011). It is not surprising that a fundamental goal of all recent Trypillia projects is to make accurate estimates of the number of coeval houses occupied at their mega-sites.

The third result challenged the similitude of anomalies on the mega-sites. The level of detail on the early magnetometer images was such that an estimation of the varying sizes of individual anomalies was simply impossible. The 'new wave' of geophysical prospection has revealed clear size differentiation of anomalies, with most of the structures falling into a size range no longer than 20m and no wider than 10m (Hale et al. 2010; Chapman & Videiko 2011; Burdo et al. 2012). This pattern was indeed replicated in the 2012 season at Nebelivka and in most of the structures found in the Ukrainian - German surveys. Moreover, the discovery of three mega-structures at Nebelivka in the 2009 season introduced a fundamentally new element into mega-site archaeology – the possibility of large public buildings fulfilling supra-household, integrative functions of some kind or other. This class of structures raised the question of intra-site hierarchy for the first time in Trypillia archaeology.

The excavation of the burnt part of the largest mega-structure so far discovered at Nebelivka raised more questions than answers in terms of the social practices which were carried out there in comparison with those located in family houses. Currently, there are more negatives than positives – relatively little storage capacity in fixed features or ceramics, with only five large storage-jars ('pithoi'); very restricted production of lithics or stone axes; no production of copper or gold objects; no obvious cooking facilities – in particular the striking absence of ovens or hearths, with the possible exception of a circular feature outside the West wall; rare special deposition (with the exception of the miniature pots, which echo the finding of seven miniature vessels in a test-pit on the site in the 1980s: Shmaglij & Videiko, 1992) and little overt evidence for ritual practices. We are left with a building of great size, with a strong element of internal spatial differentiation, but with very few special artifacts. There is still little doubt that this is a public building, where meetings, and even ceremonies, could have taken place. The most obvious place for large meetings would have been the open central area, with its access to four major internal features – the podium, the fired clay bin and the two largest Raised Areas. In addition, there may have been access to a set of small drinking-cups at the East end of the central area. But if those who attended the meetings brought their favourite objects with them, they seemed to have taken many of them away at the end of the ceremonies. However, we should not ignore the possibility of the widespread practice of deliberate ceramic fragmentation, by which fragments of (often) fine wares were deposited in the

mega-structure, while the remaining fragments were removed to the houses. This may also have happened with fired clay figurines, all of which were deposited incomplete. The strong impression at the end of the excavation was of a mega-structure which had imitated the fittings and features of a domestic house on a large scale, without differentiating the mega-structure in an artifactual sense. We can therefore conclude that Trypillia mega-structures did indeed materialise spatial differentiation without the additional elaboration of artifactual differentiation.

This result has interesting implications for our understanding of the question of Trypillia urbanism. Rather than the creation of a completely new form of public buildings, with special functions materialized in dramatic, often monumental ways (e.g., the monumental temple complexes in the Late Chalcolithic and Early Bronze Age of southwest Asia: Matthews 2009; Gates 2011), Trypillian dwellers were content to reproduce their family houses *en gros* at certain strategic points of the settlement, with deposition on the same level as in family houses. It is interesting that three mega-structures were built in the same Southern area of Nebelivka. But the mega-structure was by no means the same as a 'normal house', especially in its paucity of food storage, production, heating and cooking facilities. This is not to say that all mega-structures, whether at Nebelivka or at other mega-sites, will produce identical excavated results. Yet the first excavation of such a mega-structure has provided an intriguing combination of expanded scale and reduced object deposition. Further post-excavation studies will doubtless enable us to add more texture and colour to this provocative initial sketch, which contributes another layer of interpretation to the debate on Trypillia 'urbanism'.

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