

TO RAISE A TELL AND RAISE IT WELL: SOME ODD REGULARITIES OF THE EARLY CHALCOLITHIC CONSTRUCTION TECHNIQUES AND THE BUILDING STRATEGIES AT TELL PETKO KARAVELOVO

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Abstract

The paper discusses three burnt houses from the earliest levels of the tell site at Petko Karavelovo. The site is situated on the left bank of the old Yantra River bed and the early inhabitants lived not just close to, but in direct contact with the river, which affected their building strategies.

The three burnt houses belong to different occupation phases; although unique, they display striking similarities. They were built using a similar technique, burned in an almost identical manner, and later collapsed following the same pattern. It is therefore the main purpose of this paper to summarize and emphasize the similarities, rather than to describe architecture details.

Built in the same manner, the three houses were destroyed similarly by severe fires. Whether this was the result of their similar construction and combustibility or because the cause of the fires was the same, they produced almost identical debris. The early Chalcolithic building strategies were subjected to the pursuit of rapid growth of the tell, while the later stages display certain slowdown of this process at the expense of gaining stability for the entire mound structure.

The first inhabitants started a long-term project of tell formation, and during the middle and the late Chalcolithic, this 'project' was extended and carefully maintained. The process of tell formation was deliberate, desired and controlled by the community, rather than just an accumulative effect of long living at the same place.

Keywords: tell formation – house construction, fire & destruction – early Chalcolithic – north central Bulgaria.

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The village of Petko Karavelovo (known before as Sashevo and Odaite) is located in the central part of north Bulgaria and is situated 27 km north of Veliko Tarnovo (fig. 1). The archaeological site lies 1.5 km south of the village and 1.5 km west of the modern bed of the Yantra River, in visual proximity to the E85 International Road and Ruse–Gorna Oryahovitsa Railway. It is relatively small, rising just 3 m above the surface, but its cultural layer is 4.10 m thick.

The tell site is situated in the middle of the vast valley of the river Yantra, but within an older bed, rather than on a terrace (figs. 2 and 3). The river now flows at the eastern end of the valley, after the construction of corrections and a system of dykes in the second half of the last century. Before that, the Yantra periodically changed its course, and the land between the river and the tell was claimed for long-term agriculture only after the corrections.

The altitude at the highest point of the mound is 48.6 m asl. The altitude of the modern river bed is almost the same as that of the mound's early layers, which are the subject of this report. Despite the lack of a detailed geomorphological survey, the section of the terrain shows that the early inhabitants lived not just close to, but in direct contact with the river (fig. 4). The Yantra has the fifth largest drainage basin in Bulgaria and is the most meandering. In the past, the river often caused floods, and that is why now almost the entire left bank (the lower one) is dyked. Petko Karavelovo, although geographically belonging to the Yantra's downstream, is almost in the middle of the Danubian Plain, lying ca. 40 km both from the Danube River and the Balkan Range. The site is the only known Chalcolithic tell so close to the Yantra River; all the other sites in the area are situated along its tributaries.

The settlement itself had been frequently flooded throughout its existence, and the cultural layer was later repeatedly exposed to water due to its proximity to the river, which displayed an odd eccentricity of overflowing. This fact definitely influenced the building strategies of the settlers there, especially the pioneers. Indicative of environmental conditions in the past is the description when first recorded, as 'the settlement mound south of the village of Odaite in the "Blato" [*swamp* in Bulgarian] locality' (Mikov 1933, 63f; No 82). It is interesting to see how the recent transformations of the environment had reflected in the toponymy; the newly gained land between the river and the tell is now called *Srednik* (*the middle land*) while the Muslim locals call the vicinity around the tell *Suk çalı* (*dry bushes*) and the others, simply *Mogilata* (*the mound*)¹.

The archaeological site had an unfortunate fate. The entire eastern half of the tell was destroyed during the construction of dykes and is now wetlands overgrown with low vegetation (fig. 4, see the areas numbered as 1). Through the highest part of the tell, a farming dirt road was made that was recently abandoned but heavy machinery has moved on it for decades (fig. 5). The western half was cultivated intensively for half a century (fig. 4, see the areas numbered as 2), and in 1972, an irrigation pipe was dug into the tell (figs. 8 and 16) intersecting the entire area B from south to north.

¹ For the different names of the locality, see Chohadzhiev 2013, 72.

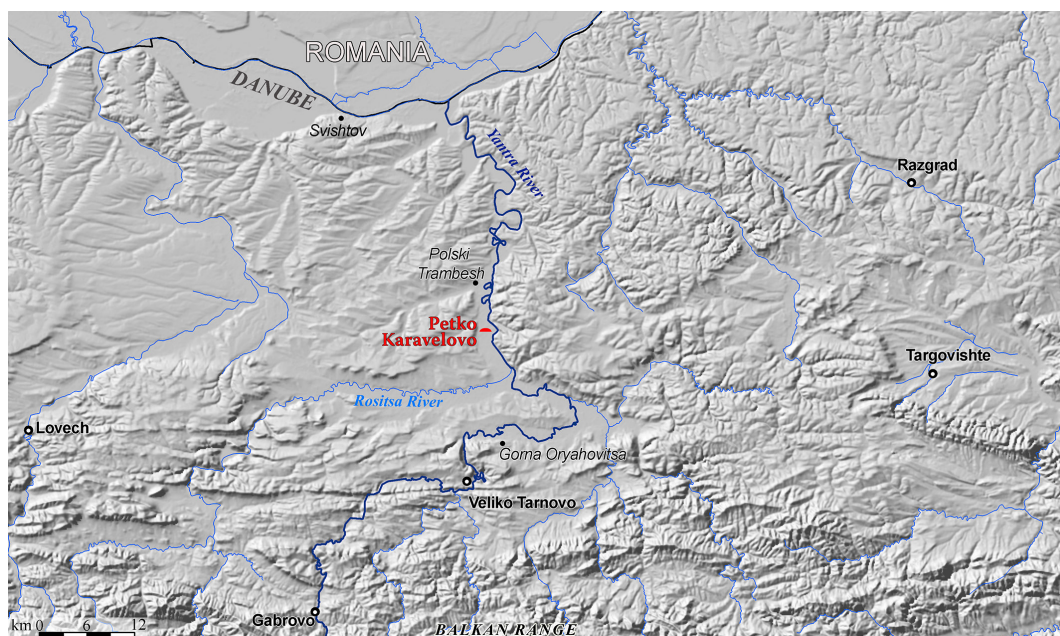


Figure 1. Map of north central Bulgaria showing the location of Petko Karavelovo (source: MRRB-GIS, <http://gis.mrrb.government.bg>).

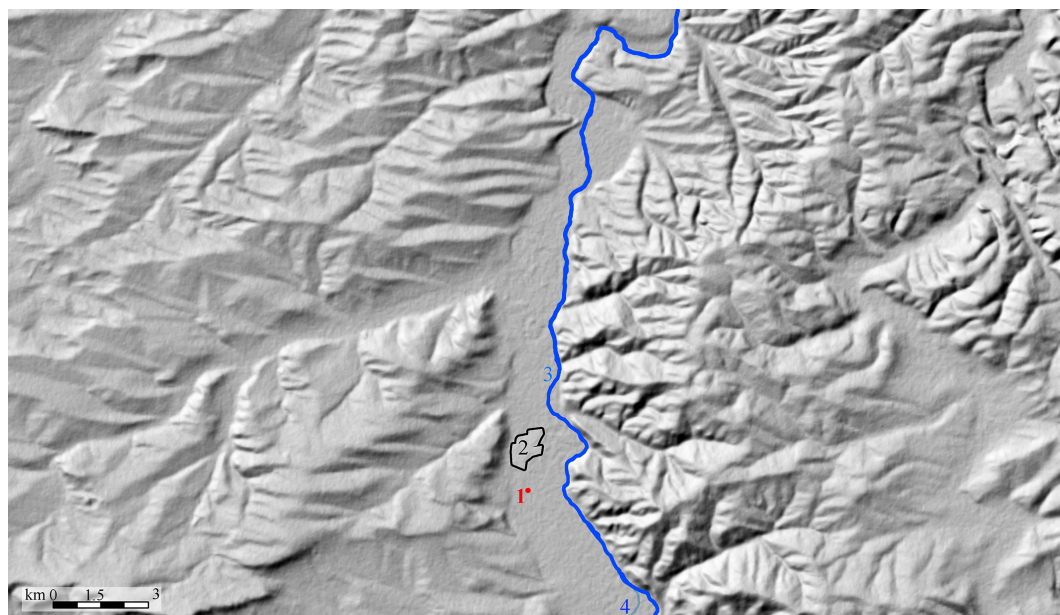


Figure 2. Map of the vicinity of Petko Karavelovo: (1) PK tell site; (2) modern village of Petko Karavelovo; (3) modern bed of the Yantra River; (4) the Rositsa River (source: MRRB-GIS, <http://gis.mrrb.government.bg>).

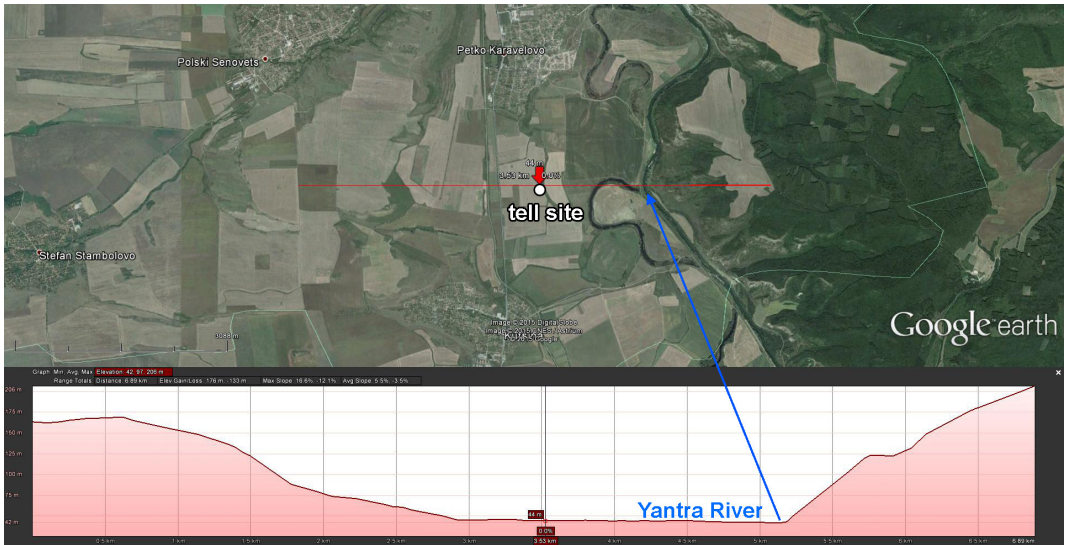
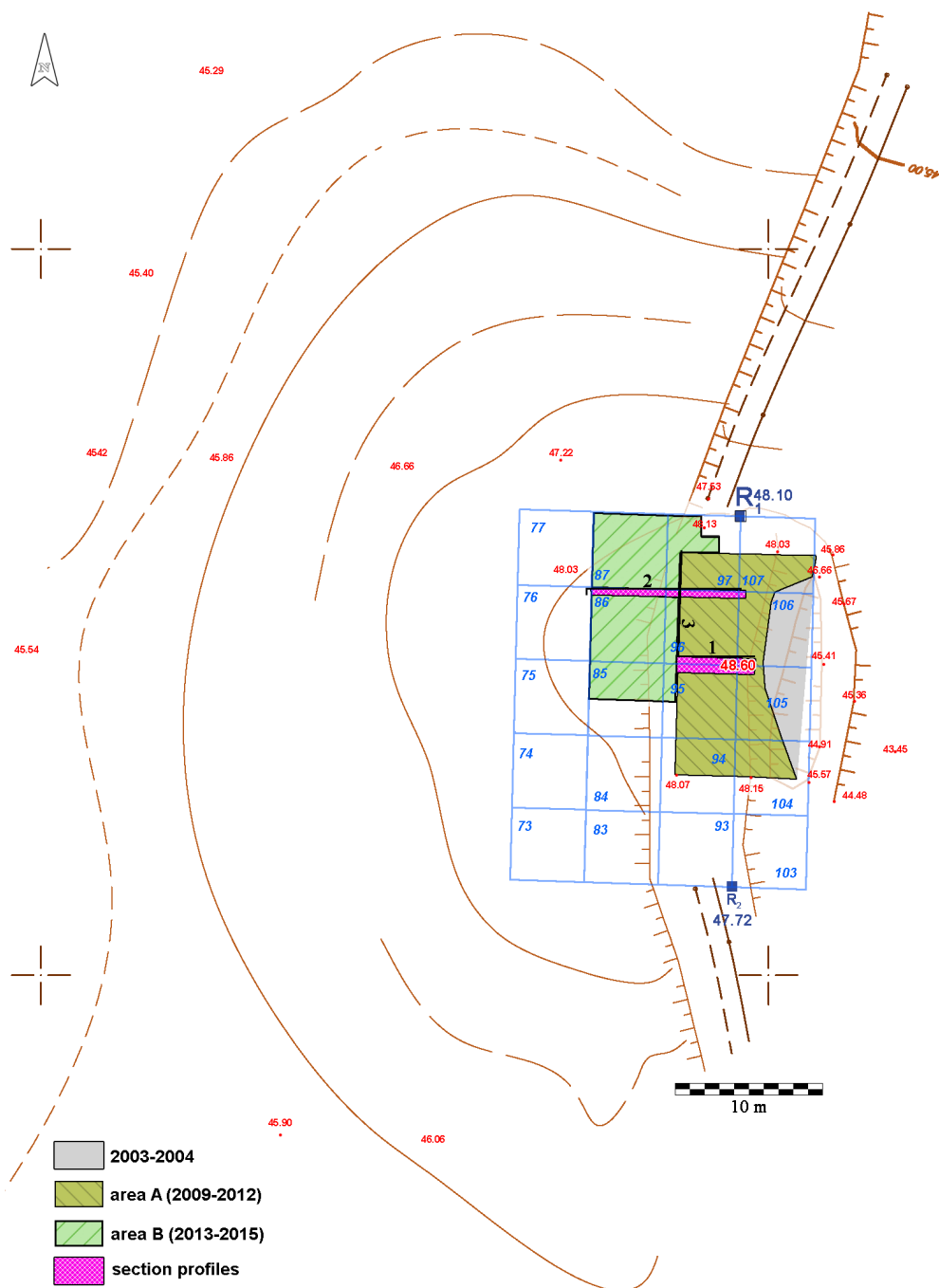


Figure 3. Satellite image of Petko Karavelovo vicinity, with a section through the Yantra River plain and the position of PK tell (source: Google Earth).



Figure 4. Satellite image of PK vicinity, with a section between the modern river bed and the tell: (1) wetland overgrown with low vegetation; (2) cultivated field (source: Google Earth).



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In 2003 and 2004, two short rescue campaigns were carried out after the excavations of looters. As a result, the cleared eastern profile of the tell proved the perspective of further excavations (Chohadzhiev et al. 2004 and 2005). The systematic excavations started in 2009 and the first area (area A) was completed in 2012 (fig. 5) (Chohadzhiev 2010, 2011, 2012, and 2013). In 2013, a new trench was started (area B): a westwards extension which is not yet completed (fig. 5; Chohadzhiev et al. 2014 and 2015). It is ironic that the 'absence' of the eastern part of the tell, although regrettable from the point of view of cultural heritage preservation, proved to be useful from an archaeological perspective. Because the exploration areas are open to the east, it was possible to excavate the entire cultural deposit in area A in four seasons. The tragedy of the tell thus became its advantage; Petko Karavelovo seems to be the only Chalcolithic tell with a full stratigraphic sequence (from the native terrain to the top on a certain area) that has been excavated in Bulgaria in the last decades.

Three structures are the subjects of this report (fig. 6): feature 72 (building 1, excavated at first in the 2003–2004 seasons and later in 2012); feature 67 (building 15, excavated in 2012 and 2014, and completed in 2015); and feature 50 (building 10, excavated in 2011–2012 and 2014). They date to the early phase of the tell (Petko Karavelovo A / PK–A) that in Bulgaria is labeled as early Chalcolithic (Karanovo V). In terms of material culture, Petko Karavelovo A layers show similarities both to the Boian and Polyanitsa cultures. Regarding the detailed stratigraphy, the houses represent building periods II, III, and IV. The earliest of the three is feature 72¹. Its precise stratigraphic position is not yet fully clarified. Although raised on the sterile ground, it may not represent the initial occupation level. This initial level is represented by feature 127, an unburnt house (excavation in 2015 and ongoing). There are two possible explanations of this stratigraphic problem: (1) feature 127 represents an earlier building phase, while feature 72 is a somewhat later stage, after a development of the settlement eastwards; (2) both structures represent a single building level, but two different destruction periods. In the latter scenario, feature 72 outlived feature 127 and again must be considered as a second stage of the settlement (fig. 7).

Beyond this, the stratigraphic sequence is less problematic. Feature 67 was built after feature 72 at 3 m to the west, on the unburnt remains of feature 127. The archaeomagnetic measurements suggest close times of destruction for the two burnt features² as does the material culture. On the other hand, the detailed stratigraphic observation indicates an

¹ This feature was first recorded in the rescue dig in 2003 and was labeled only as building 1. In 2012, when it was excavated, it received the feature number 72 according to the accepted labeling procedure since the start of the regular excavations in 2009.

² The archaeomagnetic analysis was done by Maria Avramova-Kostadinova in 2012 (Palaeomagnetic Laboratory of the National Institute of Geophysics, Geodesy and Geography, Bulgarian Academy of Sciences). The following dates were obtained: for building 1, 5119–4905 BC (57.5% probability) and 4639–4463 BC (37.5% probability); for building 15, 5121–4854 BC (81.4% probability) and 4656–4461 BC (13.6% probability).

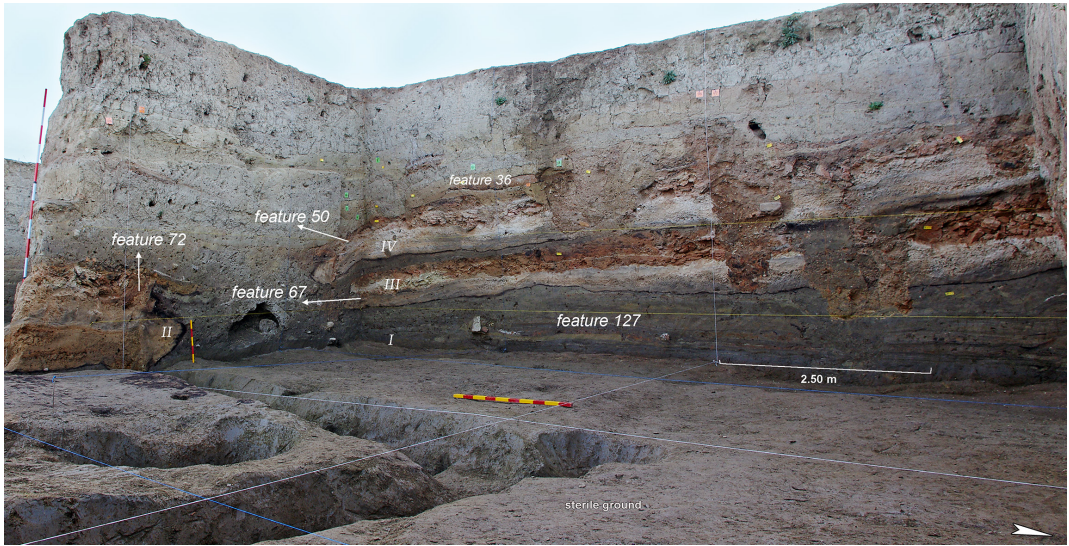


Figure 6. The north part of area A, 2012. South and west profiles show building periods from I to IV.

earlier date for the construction of feature 72. The problem with the early stratigraphy of Petko Karavelovo is rooted in the homogeneity of the early Chalcolithic off-house layer. It is gray, with green tints, full of charcoals, unburnt wood remains, and a large number of ceramic sherds and animal bones (figs. 7, 8, and 12.9). At certain places, it is up to 2 m thick. There are almost no markers to allow reliable sub-division of this layer, except for several ash strips and rocks. Nevertheless, there are enough observations of this type already accumulated to suggest that the early Chalcolithic ‘gray layer’ consists of at least 4 sub-layers, and they could be connected to some of the currently discussed features (fig. 7). Thus feature 72 represents an earlier building period than feature 67, but both were destroyed at the same or close time and represent the same destruction level.

Feature 67 (building 15) was partially built on the remains of feature 127. It preserves the east–west width of the earlier house but extends to the south. Feature 50 (house 10) is the immediate successor of feature 67 (figs. 8 and 9) and was built directly on its debris, preserving the east–west width and expanding southwards (fig. 10). Feature 50 is larger than the underlying feature 67, and therefore a certain leveling of the surface was required. It was performed by adding of greenish clay on the sunken parts, instead of scraping the debris from the higher ones (fig. 9).

Belonging to different occupation stages, the three burnt houses, although unique, have striking similarities¹. They were built in similar technique, burnt in almost identical manner, and later collapsed following the same pattern. Thus, the main goal of this paper

¹ Feature 127 is not included in this report for two reasons: its excavation is still ongoing, and it was not burnt. This structure offers another perspective towards the understanding of the early architecture of Petko Karavelovo, but it will be the subject of further publications.

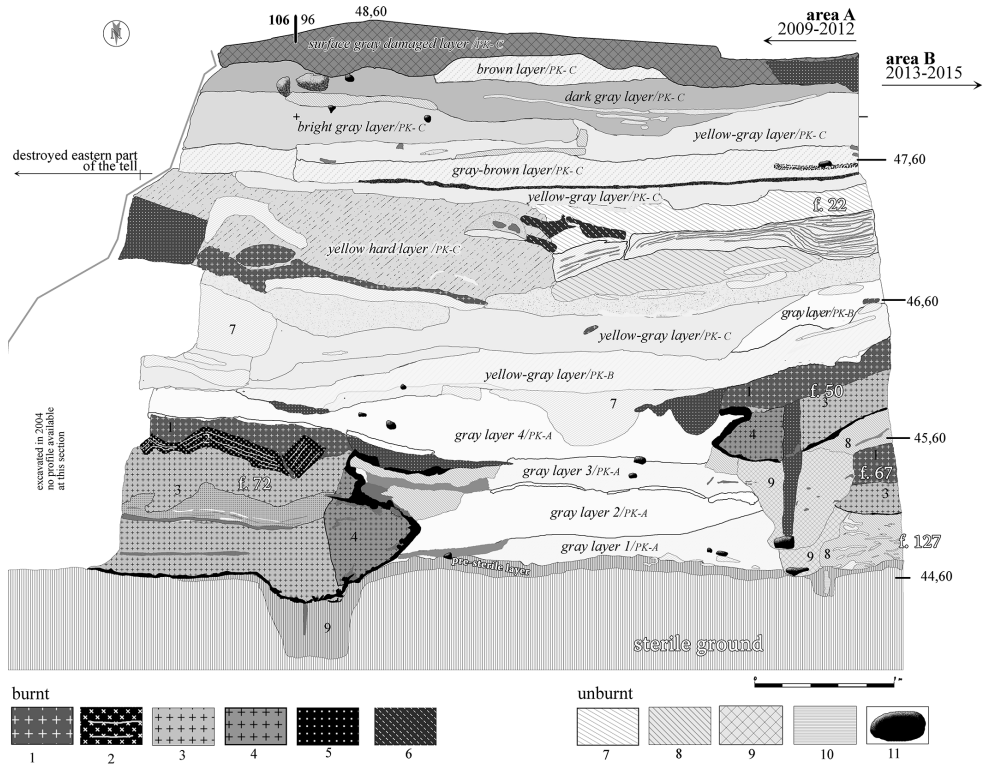


Figure 7. South section profile in area A (fig. 5, note the part numbered as 1): (1) highly burnt house debris; (2) burnt clay platform; (3) white grainy burnt layer (lower floor); (4) pale orange grainy burnt layer (walls of the lower floor); (5) highly burnt spread house debris; (6) oven; (7) yellowish pure clay; (8) greenish pure clay; (9) section of a foundation trench; (10) preserved wood; (11) stone.

is to summarize and emphasize the similarities rather than to describe the architecture in detail.

The first common element for the three burnt houses is their north–south orientation. Their long axes are slightly shifted from the north to the east. Another common aspect is their large size of over 100 m², and consequently, the vast amount of debris remaining after the fire. Unfortunately, none of the three houses is fully excavated (fig. 10); the eastern half of feature 72 was destroyed, while the northern parts of features 67 and 50 are situated out of the trench but there is a chance for them to be explored in the future. Nevertheless, some conclusions about their sizes can be drawn.

Feature 72 has a length of 12.5 m (N–S). Although the eastern part of this house was destroyed when part of the tell was used as material for the dykes, there are still enough clues to suggest that the width of the house was about 8 m. This means that its total built area was ca. 100 m². Feature 72 (building 1) is the most massive structure, not

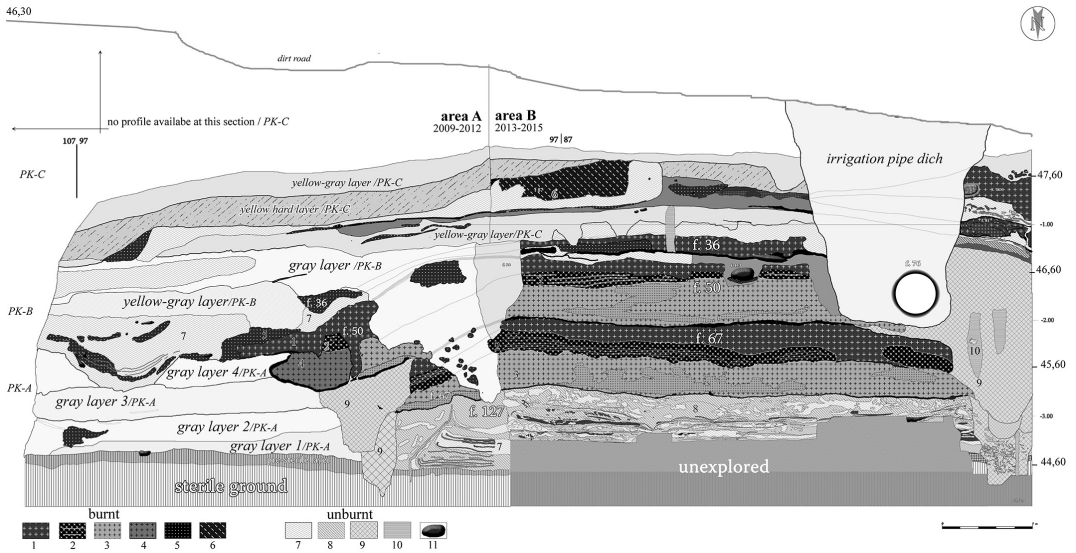


Figure 8. North section profile in areas A and B (fig. 5, note the part numbered as 2): (1) highly burnt house debris; (2) burnt clay platform; (3) white grainy burnt layer (lower floor); (4) pale orange grainy burnt layer (walls of lower floor); (5) highly burnt spread house debris; (6) oven; (7) yellowish pure clay; (8) greenish pure clay; (9) section of a foundation trench; (10) preserved wood; (11) stone.

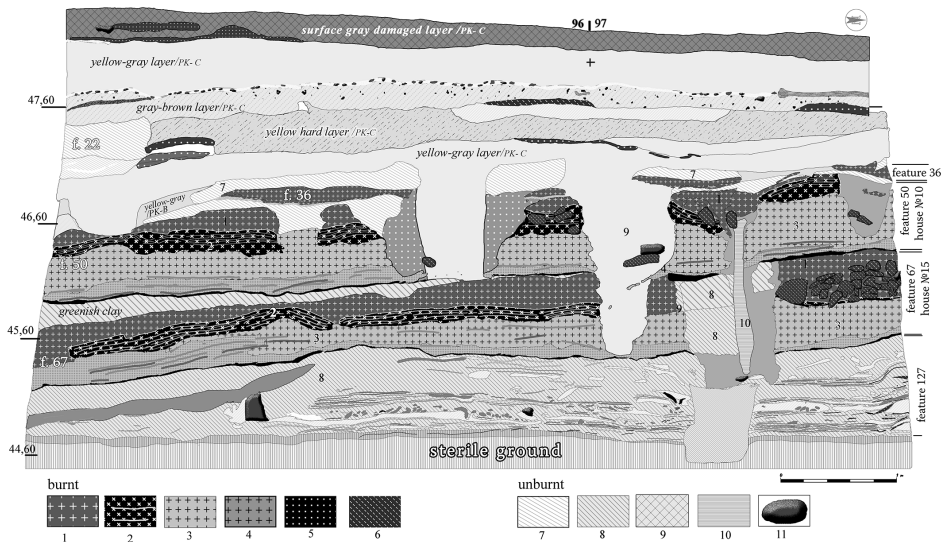


Figure 9. West long section profile in area A (fig. 5, note the part numbered as 3): (1) highly burnt house debris; (2) burnt clay platform; (3) white grainy burnt layer (lower floor); (4) pale orange grainy burnt layer (walls of lower floor); (5) highly burnt spread house debris; (6) oven; (7) yellowish pure clay; (8) greenish pure clay; (9) section of a foundation trench; (10) preserved wood; (11) stone.

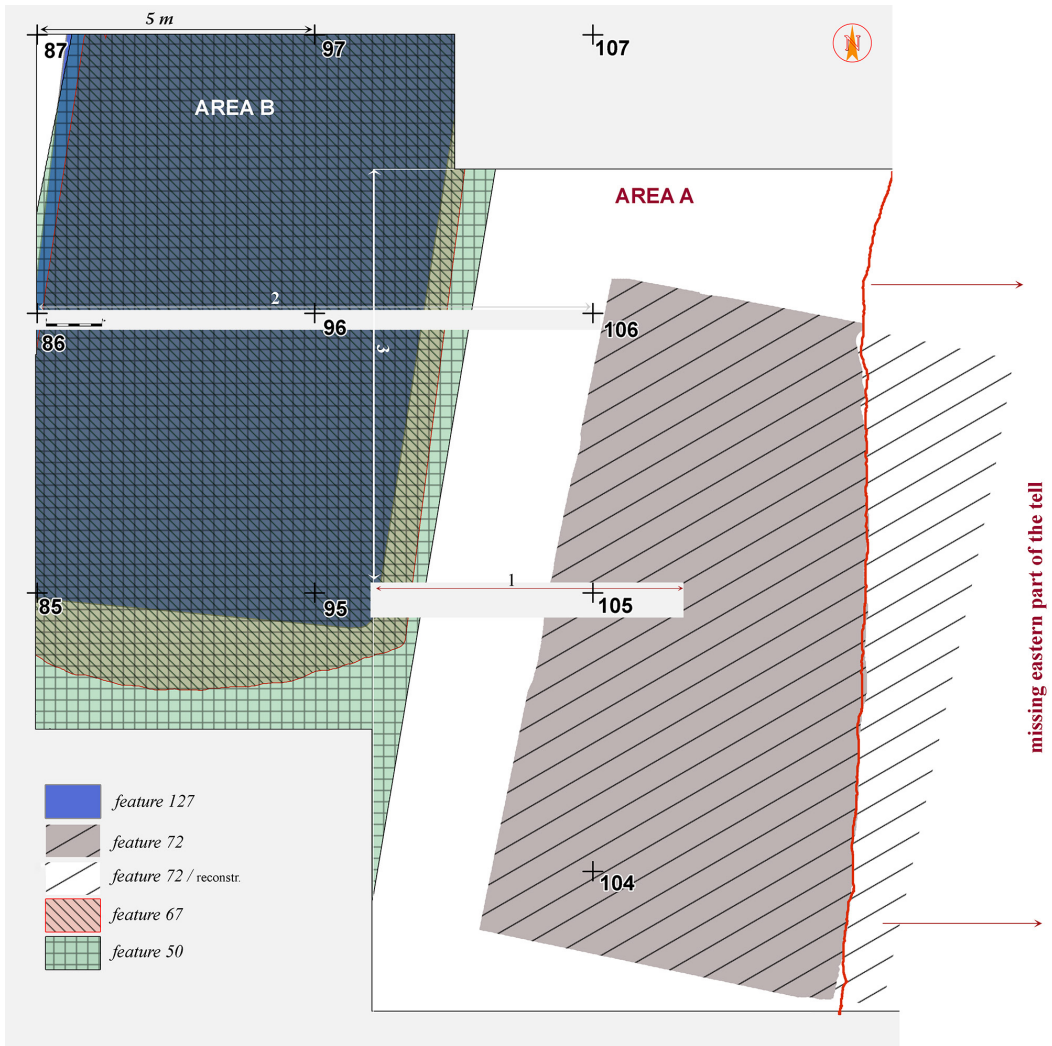


Figure 10. Idealized sketch of house debris by features: (1) section profile in area A (fig. 7); (2) section profile in areas A and B (fig. 8); (3) section profile in area A (fig. 9).

only among the three, but for the entire excavated area of the tell site. The thickness of the burnt debris extends to 1.40 m at some places, but the average thickness is 1.20 m. Thus, the burnt debris of this house alone is more than 120 m^3 (which is roughly about 1/83 of the entire tell's volume).

Feature 67 is at least 12 m long; its northern side is not yet recorded as it lies out of the excavated area. According to the observations at the northern profile, the length of this house exceeds 13 m; this measure will be used for the calculations. The width of the structure is about 7 m (more likely about 7.5 m but the long side walls were completely destroyed and overlapped by the foundation trenches of the upper house; figs. 8 and 11).

Thus, the built area of feature 67 is at least 91 m² (apparently more than 100 m²). The average thickness of the burnt debris is 0.75 m which means that the preserved volume of burnt debris is at least 68 m³ (more likely over 75 m³).

Feature 50 is at least 15 m long; its northern side has not yet been recorded as it lies out of the excavated area. The width of the building is 8 m, which makes a total built area of at least 120 m². With an average thickness of 0.85 m, the total volume of burnt debris exceeds 102 m³.

The already mentioned feature 127 has similar dimensions, and although it was not burnt, it produced similar amount of debris. I have to add here that the debris of the houses later than feature 50 are much thinner; none of them exceeds 0.35 m thickness (fig. 12, see the layers labelled as 1–3). It can thus be generalized that the thick levels of house debris are common only for the PK–A period of the tell site.

A direct succession is identified between features 67 and 50. Feature 50 was built almost immediately and directly on the remains of the earlier structure. The long walls of the new house intersect those of the earlier one. The leveling between the two structures was not done by scraping but by laying additional clay in the sunken parts (fig. 7, see the layers labeled as 8 and 9). It seems that the builders of the later house were familiar with the interior topography of the earlier one as the elements of the interior are situated roughly at the same places.

The succession between feature 50 and the next one, feature 36 (building 8) (figs. 8 and 9) seems almost immediate. The layout of the latter partially repeats the former, but



Figure 11. Area A (2012), northwest corner.

there is much more clay added for the leveling of the surface. Being only 20 cm thick, the debris of feature 36 is much thinner than all of the earlier houses. It represents the fifth building period and belongs to the middle Chalcolithic PK-B period of the site. It shows a change in the building strategy. On the one hand, it demonstrates the topographic continuity of the earlier features 50, 67, and 127, but on the other hand, the shape and thickness of its debris are similar to all the houses of the later PK-C period. The walls are thinner, and the foundation trenches are narrower and deeper. Feature 36 marks an important moment for the tell. Due to the decade-long strategy of keeping the debris of earlier structures and building new ones on it, the surface outside the houses became unstable. The peripheries of the underlying massive houses sank down and the layers of the unbuilt spaces compressed, which led to the formation of large sunken areas in the tell (fig. 11). This case is very well illustrated in the eastern periphery of feature 50 that had sunk more than a meter from the level of the rest of the house (fig. 11). In addition to the instability of the lower levels due to their heterogeneous character, the reason for this major collapse might have been tectonic. Having in mind that this event happened somewhere in the mid-fifth millennium BC, it would be reasonable to link it to the strong earthquake (ca. 4550 BC), which has been identified during the excavations at Tell Provadia-Solnitsata (Rangelov 2009, 110). The ‘earthquake scenario’ is just a reasonable speculation, but the collapse was a fact the dwellers had to deal with. The middle Chalcolithic collapse recorded at Petko Karavelovo (PK-B) most probably was a single event with later consequences rather than a permanent process of tell instability. This event led to a major change in the building strategy. The practice of building massive structures was abandoned and never used again at the site. The sunken areas were filled with soil and clay to level the surface. The first late Chalcolithic houses (PK-C) were built in the space

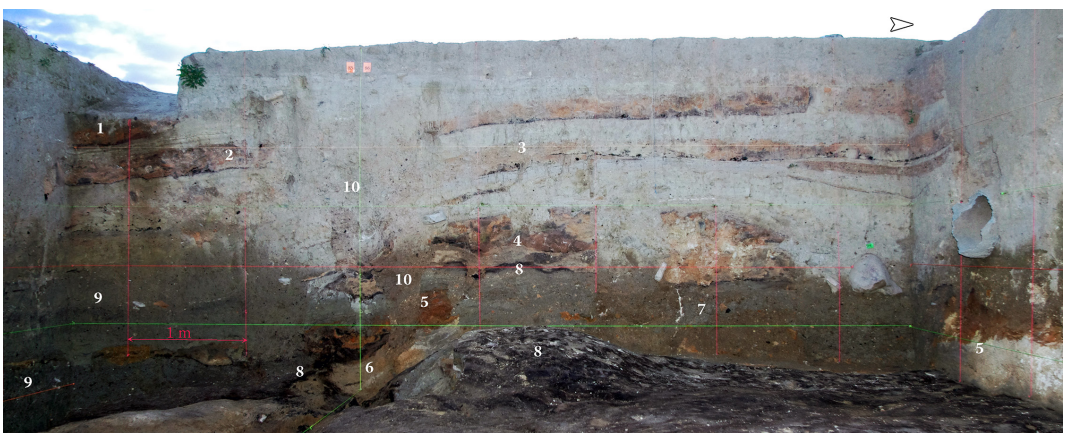


Figure 12. Area B (2014), west profile: (1), (2), and (3) late Chalcolithic burnt houses; (4) feature 50; (5) feature 67; (6) south wall of feature 67; (7) west foundation trench of feature 50 (long section); (8) black streaks; (9) early Chalcolithic off-house gray layer; (10) late Chalcolithic trench.

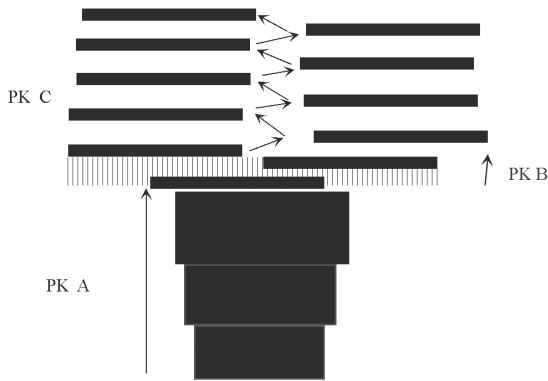


Figure 13. Scheme of the overbuilding concept and the process of tell formation at Petko Karavelovo, from the early- (PK-A), through the middle- (PK-B), to the late Chalcolithic (PK-C).

that was left unbuilt during the early Chalcolithic, partially overlapping the peripheries of the earlier houses. Another remarkable change in the late Chalcolithic was the avoiding of direct ‘overbuilding’ of burnt house debris. The debris of burnt houses were covered with yellowish, almost sterile clay and the next house was then built aside (fig. 13). This approach proved a serious challenge for the archaeological excavation. Sometimes two structures that appeared to be in the same dimensional horizon happened to belong to different chronological horizons (even not subsequent). Therefore, the stratigraphic and chronological picture of the late Chalcolithic levels (PK–C) is not yet fully clear¹.

These three major changes in the building strategies made possible the further life at the tell. Thus far, 14 building periods were identified, but only the first four early Chalcolithic ones had contributed to about one half of the tell’s height. The main reason for such a thick early Chalcolithic layer is the fact that the massive amounts of debris were left almost intact and were later overbuilt². This suggests that the long-term strategy of the dwellers was to raise the occupied level higher. Thus, it can be said that the process of tell formation was *desired and controlled by the people, rather than being just cumulative by nature*. In the time span of only four levels, the site achieved its mound shape, rapidly growing to two meters above the surrounding surface. The above-mentioned changes in building concepts only slowed the process to make the further growth of the tell more stable. This means that the long-term building strategy of the dwellers was *to make a tell*. In this sense, the statement that ‘every stratified site has started as an unstratified one’ (Boyadzhiev 2013, 68) is true only from the viewpoint of formal logic and in view of the accuracy of archaeological recording. In the case of the Petko Karavelovo, I argue that the lower building levels were the initial stage of a long-term ‘*raising a tell*’ project launched by the first dwellers there. The middle and late Chalcolithic levels yielded enough evidence for the maintenance of this ‘project’. The change to smaller and lighter

¹ This is also the reason for the Petko Karavelovo excavation team to avoid using the term ‘building horizon’.

² This is valid only for the sequence of features 127 – 67 – 50. Feature 72 was not overbuilt for a long period of time and its debris was partially blocked with clay maybe in the lifetime of feature 50 (fig. 7).

house constructions has usually been explained with the instability of the cultural layer below them, the clearing of farmland around the sites, the lack of easily accessible timber, and the difficult transportation of building materials on the already accumulated height of the tell type settlements (Boyadzhiev 2013, 81f). The dwellers might have faced these challenges, but for their reasons stayed focused on their project and overcame them, maintaining the tell's growth in smaller but secure steps.

The addition of vast amounts of clay soil for the leveling of uneven surfaces provided not only flat building space but stabilized the lowest layers. Such practice is well recorded at the site of Pietrele (Reingruber et al. 2011). The off-tell surroundings of Petko Karavelovo have not yet been studied for me to speculate on the social and environmental reasons for the tell's creation, but the excavation at the tell has yielded enough evidence to argue that it was more of a man-made and maintained structure, rather than simply a consequence of human activities and natural accumulative processes at a certain place. The reasons for such an assumption are rooted in the regularities of these seemingly odd early houses at the base of the mound. The three burnt houses are so similar to each other because of their similar microstratigraphies, the result of the same building techniques and destruction agencies. From the viewpoint of the archaeological record, at least five major elements are almost identical for the three buildings: (1) the upper burnt layer; (2) the platform; (3) the white grainy layer; (4) the black streak; and (5) the foundation trenches¹.

The upper layer of the debris of the three buildings was burnt at the highest temperatures. It is almost red in color and has an average thickness of 30 cm. This layer includes the entire house inventory (figs. 14–16) and is considered to have been the upper (second), residential floor of the house.

The wall fragments bear traces of thin rods, tied into bundles and then covered with thick layers of daub (fig. 17). There is no evidence of the typical wattle and daub construction.

The rods were tied together with ropes, forming panels that were later covered with clay (daub). A piece of such burnt rope was found that was most likely made of linen. Another construction technique was identified at the short walls of the houses: vertical rectangular planks (20 or 30 cm wide) fixed together by tiny sticks and ropes, and then covered with daub. This technique is very well recorded at the southern wall of the upper floor of feature 72 (fig. 18), where numerous pieces of wall-paintings were unearthed as well. Other houses also yielded clues for wall paintings, but they were more abundant and comparatively well preserved in feature 72. The smooth final plastering of the walls in preparation of the painting is very impressive. Most of the wall-paintings display geometric patterns, but there is one piece that seems to depict a tall house (fig. 19.1). Of

¹ Feature 72 has two more elements that have not been identified in the other two structures: the so called red floor and a second grainy layer. These are the reasons for the debris of building 1 to form a thicker layer.

course, this is just a reasonable speculation as less than a half of the image is preserved, and the reconstruction is based on flipped symmetry (fig. 19.2). Such a guess seems pretty tempting; someone not heavily burdened by the healthy archeological thinking could even see in this wall-painting a burning tall house. The special relationship between houses and fire is identified as a pictorial approach in some Chalcolithic artistic representations as the house models from Căscioarele and Sultana (Gheorghiu 2009, 64). This precise painting displays red, purple, and white colors, but most of the paint used in the decoration of the early houses was red. There is evidence of wall-painting decoration for some late Chalcolithic features, too. All the decorated buildings are houses. Wall-painting is more or less a regularity for Tell Petko Karavelovo, and therefore the connection of the ‘painted’ walls to a special type of buildings such as temples (Todorova 1977, 17) seems unjustified. The same is valid for the wall-paintings in the late Chalcolithic houses at Tell Hotnitsa.

The second common element is the so called ‘platform’: a dense mass of clay with imprints of rods tightly fitted next to each other on the lower side (fig. 21, note the arrow



Figure 14. Burnt upper layer of feature 72 in area A, 2012.



Figure 15. Burnt upper layer and inventory of feature 67 in Area B, 2014.



Figure 16. Burnt upper layer of feature 50 in area B, 2014: (1) preserved inventory in the house; (2) recent disturbance, irrigation pipe ditch; (3) later Chalcolithic foundation trenches; (4) later Chalcolithic disturbances.



Figure 17. Burnt wall fragment with imprints of rods tied with ropes. Detail: preserved rope piece. Upper layer of feature 67 in area B, 2014.



Figure 18. Preserved middle part of the south wall of feature 72 in area A, 2012: (1) vertical plank imprints; (2) horizontal rod imprint; (3) horizontal rope imprint; (4) the platform.

numbered as 1). The platform has two parts: the core, *i.e.* the timber plastered from above with clay, and the heavy layer of multiple thin plasters (fig. 21, note the arrow numbered as 4). In house 1, there are 35 plaster layers, while in the other two structures the number of layers is between 25–27. The wooden part of the construction contains both 10–18 cm long rods with a round section (fig. 20.1) and beams (planks) with a rectangular section (fig. 20.2) up to 20–25 cm wide. The average weight of a square meter from this part of the house is ca. 86 kg (daub only) which means that the entire platform between the two stories weighted more than 10 tons including lumber. Such a weight seems stunning for a non-grounded structure, but feature 72 offered an important clue for the ‘multiple story’ theory. At some places, smooth white daub was found, chalky and heavy, covering the bottom part of the timber (fig. 21, note the arrow numbered as 3). The core is usually burnt much stronger than the part with plasters. This fact can be explained either by the abundance of oxygen from below or by a sort of ‘air tube effect’, providing air after the lumber had been consumed by the fire (Gheorghiu 2006, 158). I must emphasize here that the core of the platform is the element of the houses that yielded evidence of a higher average temperature of burning (only the ‘hot-spots’ discussed below show higher temperatures, but they are not structural elements). There is much evidence of preserved charred timber from the burnt houses, but not a single case from a platform. The color of

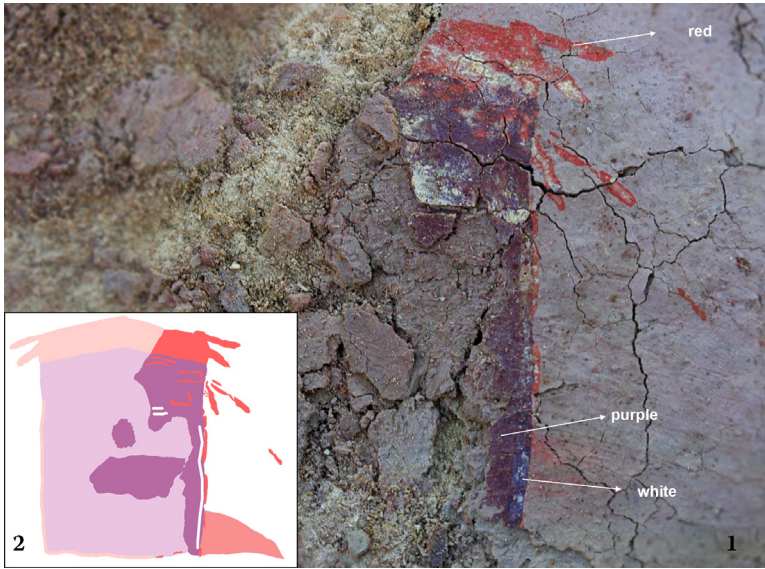


Figure 19. Wall painting from the south wall of feature 72 in area A, 2012: (1) photo; (2) drawing and possible reconstruction based on symmetry.



Figure 20. Burnt fragments of the platform: (1) feature 72, 2003; (2) feature 67, 2014.

the platform core is red, while the plasters on it are brownish. Having been exposed to the highest temperatures, the platforms seem ‘welded’; they became massive ceramic plates that survived the first stages of the fire in horizontal position, even after the supporting wood had been gone. The imprints of the timber acted like air tubes that fed the fire with oxygen, and maintained continuous airflow, thus creating draft (Gheorghiu 2009, 63).

A thick white crumbly layer lies under the platform in all three houses (figs. 7–9, note the parts labeled as 3; figs. 24 and 25, note the parts labeled as 2). It is white in most of its parts but has shades of grey and orange. The grey shading occurs mostly in the lower part, while the orange color appears at the periphery. Its thickness varies, but in some

parts of feature 50 it measures up to 50 cm. This layer yielded almost no materials besides single bone pieces, a few small pebbles and several sherds that all bear traces of fire.

It is noteworthy that at the periphery of the houses, this layer not only changes its color to pale orange but gets much tighter and harder (figs. 7, 8, and 25; note the parts labeled as 4).

These dense areas that are between 70–90 cm wide possibly represent the walls of what was the lower floor. These walls were built in the rammed-earth technique with wooden reinforcing bars inside. The walls were raised between wooden formworks (shuttering). The connection between the earthen walls of the lower floor and the daub and wood walls of the upper floor has not yet been well clarified. There is some strange evidence of common woodwork between the floors (fig. 22). In several places (mostly the eastern wall of feature 72) relatively short and sometimes curved oak stakes were established that linked the walls of both floors but reached neither the ground nor the top of the building. As the lower walls were mostly made of clay and were not exposed to high temperatures, they are badly preserved and very hard to identify. In 2015, the best-preserved wall was studied: the southern wall of feature 67. Organic patchworks (some sort of mats mad) were found there that were placed horizontally and incorporated in the earthen walls (fig. 23).

Another common thing for all houses is the black streak (figs. 6 and 25). This is the most sustained element of the Petko Karavelovo burnt houses. This layer (2–5 cm



Figure 21. Detail of the platform of feature 72, 2003: (1) wood imprint; (2) white grainy layer; (3) white chalky plaster of platform's lower side; (4) clay plasters of the platform; (5) upper burnt layer.



Figure 22. Detail of a curved stake that links the walls of the two floors. Feature 72 in area A, 2012.



Figure 23. Detail of organic 'patchworks' (mats) incorporated in the earthen walls. Feature 67 in area B, 2015.

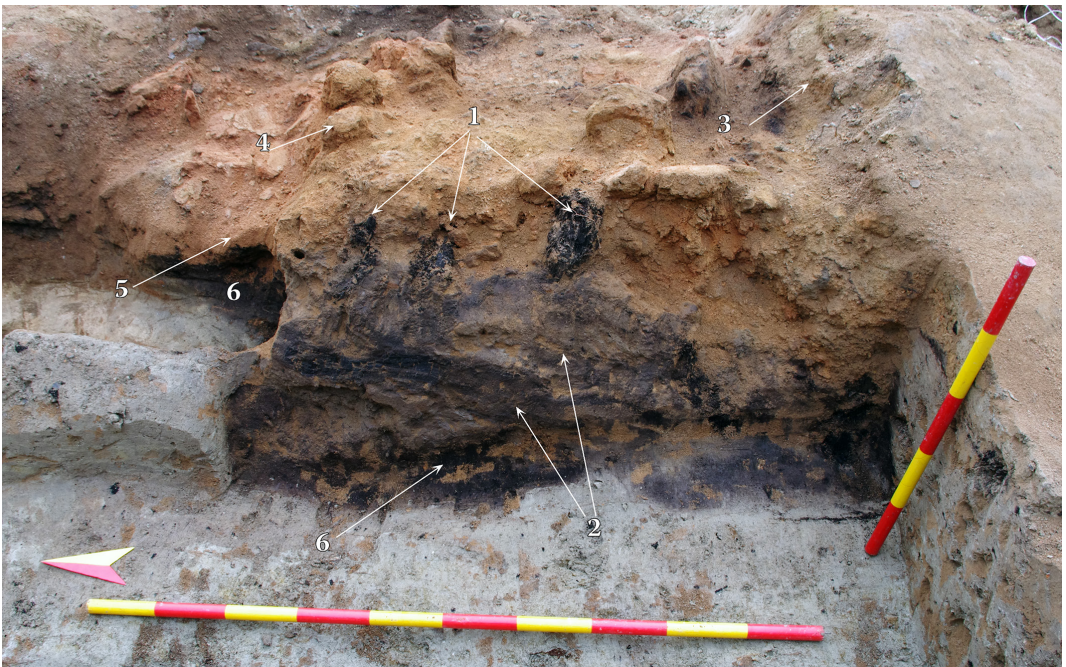


Figure 24. Outside view to the west wall of feature 72 in area A, 2012: (1) vertical rods connecting both floors; (2) horizontal outer planks; (3) upper burnt layer; (4) platform fragments; (5) white grainy layer; (6) black streak.

thick) outlines the mass of burnt debris from all sides. This is the most reliable evidence that these are single stratigraphic packages, and the above described layers don't represent periods of time, but house elements. Passing through the trenches, the black layer is tightly connected with the burnt debris. It resulted from the burning of lumber laid on the floor and outside of the walls. The lack of oxygen on the lower level kept the temperature much lower than the upper floor and preserved the charred wood. The humid condition after the fire degraded the charred wood, turning it to a compressed black mass. Similar

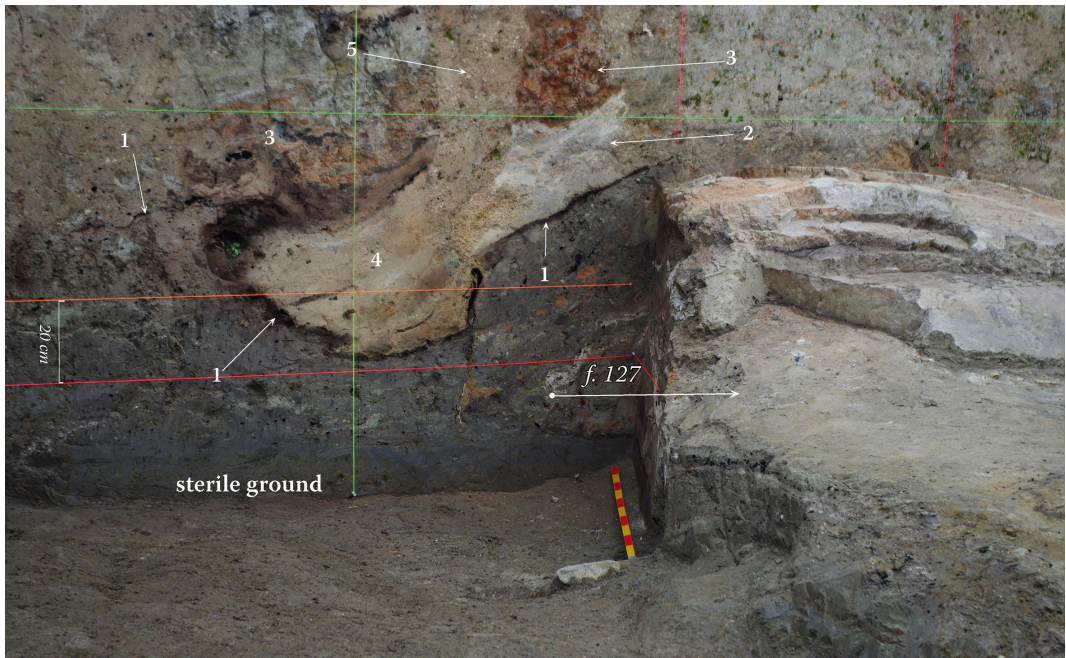


Figure 25. Section of the south wall of feature 67 in the west profile of area B, 2015: (1) black streak; (2) white grainy layer; (3) the upper burnt layer; (4) earthen wall; (5) later disturbance.

description of black streaks has been offered by Henrieta Todorova as a common element of Chalcolithic houses in northeast Bulgaria, but she explained it only with wooden flooring and not with wall paneling (Todorova 1977, 13).

The outer wooden paneling of the walls of feature 72 is preserved; it was made of narrow horizontal planks (fig. 24, note the parts labeled as 2). This explains the presence of the black streak around houses, and not only on the floors. The rammed earth walls were grounded by wood, too; the fire and the humid environment that followed it turned the wooden flooring, the foundations of the walls, and the outer ‘paneling’ into a continuous black line. It outlines the debris of every burnt structure, almost without exception. This is a trustworthy indicator that the destruction of a certain structure, from top to bottom, was a single event (fig. 26).

The black layer is a common feature of *all* burnt houses at Petko Karavelovo, not only of the earlier ones (fig. 12, note the part numbered as 8). The difference, however, is that the walls of the later houses were paneled with wood and plastered from the inside. This shift corresponds with the above discussed change in the building strategy. Such indicator is also the presence of the white layer: it has not been recorded in any feature later than the PK–A period.

Another common feature are the foundation trenches. They measure 60 to 80 cm wide, with numerous postholes in clustered lines. They are positioned slightly inwards



Figure 26. Three stages of excavation of the west part of feature 72 in area A, 2012.

from the outer edges of the debris, which suggests that the walls were thicker than the width of the trench. The trenches were therefore used to stabilize the reinforcing bars of the wall construction and were not typical foundation trenches¹. The smaller postholes are usually situated along the inner side of the trench, while the larger ones are on the outer side and lie at a greater distance from each other. The best studied is the trench of feature 72 as it is dug 80 cm into the sterile ground (figs. 27 and 28). It is ca. 80 cm wide at the top and 45 cm at the bottom (*i.e.*, it has a trapezoid section). The trenches were used mostly to stabilize the reinforcing bars. Not a single posthole was identified higher of the first floor walls. Some of the postholes in the trenches do not even reach a half of the wall, while others – from the core of the wall – do not even reach the trench. Circular trench enlargements were identified at the corners (figs. 27 and 28, note the parts numbered as 3). One or two larger posts were placed there, obviously to reinforce the entire construction and to neutralize the corner tensions where two clay walls meet. Features 72 and 67 yielded evidence that the southern walls were most likely founded in large pits rather than in typical trenches (fig. 28, note the part numbered as 7). No small postholes were identified in the southern trenches, but only pits for large pillars. It seems that this construction type might have been somehow connected with the house door. This conclusion is based on the different appearance of the southern walls. In 2015, a southern door has been positively identified for feature 127, but there is no direct evidence for the discussed burnt houses. Regarding trenches, feature 72 is the best explored case of the three, as they are well preserved and easily identifiable. The eastern and the western

¹ The late Chalcolithic foundation trenches are much deeper than the earlier ones (fig. 16, note the parts labeled as 3), which is logical as it corresponds to the described changes in building strategies (Boyadzhiev 2013, 80).



Figure 27. Northwest part of the foundation trench of feature 72 in area A, 2012: (1) inner pits of free supports; (2) smaller postholes in the inner part of the trench; (3) corner enlargement; (4) horizontal remains of the black streak; (5) bigger postholes in the outer wall of the trench; (6) foundation trenches of features 67 and 127.



Figure 28. Southwest part of the foundation trench of feature 72 in area A, 2012: (1) inner pits of free supports; (2) smaller postholes in the inner part of the trench; (3) corner enlargement; (4) horizontal remains of the black streak; (5) bigger postholes in the outer wall of the trench; (7) large pits within the south trench.



Figure 29. Evidence of pits for multiple posts: (1) feature 119, pit for two free supports from the construction of feature 50 penetrating the debris of feature 67 in area B, 2014; (2) feature 116, pit for three free supports from the construction of feature 67 penetrating the debris of feature 127 in area B, 2015.

trench of feature 50 cut those of feature 67. The latter cut the walls and trenches of feature 127. This made the investigation of the western trenches very hard¹, but is a good example of the direct overbuilding concept (fig. 8, note the part numbered as 9). Obviously, the builders of these houses were not acquainted with the theory of the perforated periphery and the weak surface created by earlier trenches (Gheorghiu 2006, 155). Or maybe they were, but there was something more important that made them overbuild directly and make a foundation trench in another foundation trench. I believe that the reason was their desire to raise the level of the surface they occupied.

Round pits for internal supports were identified in all three houses (fig. 28, note the parts numbered as 1). They are of two types: for single posts (a rock is usually placed at the bottom) and for two or three posts close to each other but grounded in the same pit (fig. 29). These posts (or free-standing pillars) supported the wooden platform but not the roof construction, since they don't rise higher than the platform (fig. 30). The system of free-standing pillars is best evidenced by the pits of feature 50 (fig. 31)². Although cutting through the debris of feature 67, they very well display the pattern. There are three rows of

¹ It is noteworthy that the western periphery of feature 50 and part of its foundation trench was partially destroyed by the irrigation pipe ditch and by later Chalcolithic trenches and pits (fig. 16).

² Feature 50 suffered the severest disturbances, both in the Chalcolithic and in recent times. Some of the later pits that cut it also disturb the underlying feature 67. The identification of the system of free-standing support pillars of feature 50 was done analyzing the cuts in feature 67, and removing those later than feature 50.



Figure 30. Evidence of free supporting pillar, feature 72 in area A, 2004: (1) posthole; (2) the pit in the sterile ground; (3) white grainy layer; (4) platform.

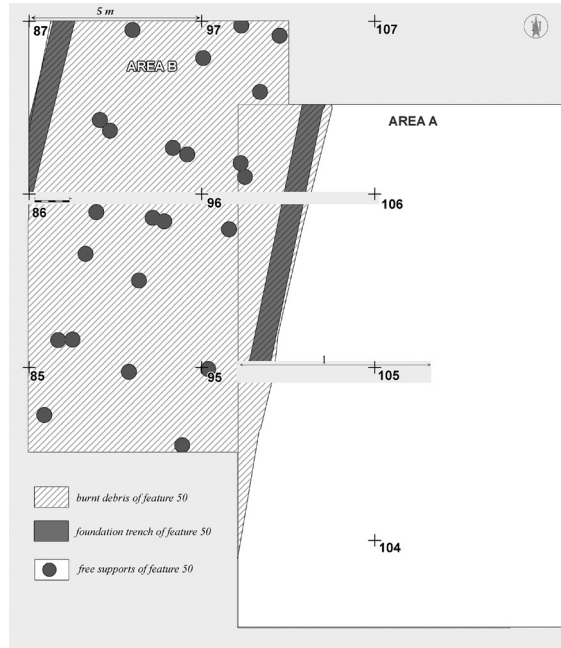


Figure 31. Summarized scheme showing house debris, foundation trenches, and positions of the free supports in feature 50.

pillars, the central one being situated along the central long axis of the building, with the pillars being at about two meters from each other. Both side rows are at about two meters from the respective long walls. Such a distribution makes the lower level uninhabitable but firmly secures the entire platform construction. The rough calculations suggest that every four square meters of the second level (together with the platform) were supported by either four columns or two columns and the wall, and the unsupported distance never exceeds two meters in both directions. The other two houses yielded less explicit evidence of similar supporting systems (fig. 27, note the part numbered as 1; fig 29.2).

There is enough evidence of platform framing of these houses, *i.e.*, each level was framed separately. Such a construction corresponds well to the thick reinforced earthen walls of the first level, and there is no reason to look for clues of what in modern construction business is called *balloon framing*, where the studs (vertical elements) extend to the full height of the building. It seems strange, but for all the years of excavation, no evidence has been found of a hard link between the upper burnt layer and the ground (although such a link was desperately looked for). It seems that the mass of the second floor was grounded entirely on the massive construction of the first level and on the platform. The only elements that can be treated as constructive linkages are the short crooked stakes

(fig. 22; fig. 24, note the parts labeled as 1). Although such a ‘two constructions in one house’ concept is odd and arguable, for now it seems a plausible explanation of the bulk of repetitive archaeological evidence.

The system of densely positioned free standing supports on the lower level makes it hard for us to imagine the life there. But there is evidence that this space was heated: hearths were found within the lower part of the white layer of the first floors of the three houses (fig. 32). They are at the same level of the black layer, but there is no black streak below them. They are so thin that they are almost indistinguishable, and were not maintained as carefully as the ovens and hearths on the upper level; more likely, these were just fireplaces rather than real hearths. And if the supports are too dense for a living space, but that space was occasionally heated, and still there is no household installations in the white layer, it is reasonable to suggest that this level was used only to shelter livestock in the winter.

The three houses were built in the same manner and were destroyed similarly: by severe fires. Whether because they were built uniformly and were equally combustible or due to the similar results of the fires, they produced almost identical debris. The layer of the upper level is usually covered by fine organic ash that maybe is all that is left from the roof. Apparently, the abundance of wood and oxygen on the upper level resulted in higher temperatures there. The examination of the clay elements of the houses and of the damages of house inventory shows that the fire’s temperatures were between 600 and 700°C. But each house has several ‘hotspots’ that could be linked with blazes over 1200°C. These vitrification zones mostly appear near ceramic vessels (fig. 33.1), which got deformed and even lost some of their weight; in some cases, they are irreversibly incorporated within clay wall remains (fig. 33.2). The argument that the presence of more than one vitrification point per house is a reliable clue for a deliberate fire (Stevanović 1997, 376) excludes the possibility that flammable substances such as animal fats or natural oils, resins, animal or human dung, etc., could have been stored in vessels in the houses. Houses 1 and 15 yielded evidence not only of high temperatures, but also of an explosion wave. The careful investigations show that the fire was the reason for the explosions and not vice versa. The



Figure 32. Evidence of first floor fireplaces: (1) feature 72, 2004; (2) feature 67, 2014; (3) feature 50, 2014. Note topographic continuity between 2 and 3.

other vitrification points appear on wall and platform fragments with imprints of wooden elements. This could be explained more plausibly by air draft created in the channels rather by adding of extra fuel (Gheorghiu 2009, 63f).

Recently, there has been a tendency in Bulgarian prehistoric archaeology to 'sanctify' a 'cherished' temperature of 1200°C (see Nikolov, this volume). Such a theory, although logically constructed, bypasses some conventional pyrotechnic postulates. The cooler flames produce more smoke. Because of the lack of enough oxygen in the room and therefore incomplete combustion, the flame temperature is low, producing a lot of carbon monoxide (which is flammable gas). When for some reason oxygen gets into the room, the combustible gasses do combust, reaching temperatures of 2000°C. Such an event in firefighting is usually called 'backdraft': '*a dramatic event caused by a fire, resulting from rapid re-introduction of oxygen to combustion in an oxygen-depleted environment; for example, the breaking of a window or opening of a door to an enclosed space...*' (<https://en.wikipedia.org/wiki/Backdraft>). To apply this definition to a prehistoric scenario, it will be enough to imagine what could result in oxygen penetration into an already burning house after, for example, a partial collapse of the roof. In the case of Petko Karavelovo, there are several contexts that display specific fire burn path, and they can be explained as the outcomes of backdraft.

I don't want to enter the 'accidental vs. intentional' debate here (or if deliberate, are there any rational reasons or can everything be easily explained with ritual 'domicide'? See Tringham 2005 for an extensive bibliography). I will only present certain observations and clues offered by the site of Petko Karavelovo. Although the early Chalcolithic houses have different (consecutive) stratigraphic positions, the abundance of similarities between them shows patterning both in the construction and destruction processes. Because of the recurrence of similar debris from different houses, logic requires us to consider the destruction process as equally deliberate, controlled and targeted to a specific result such

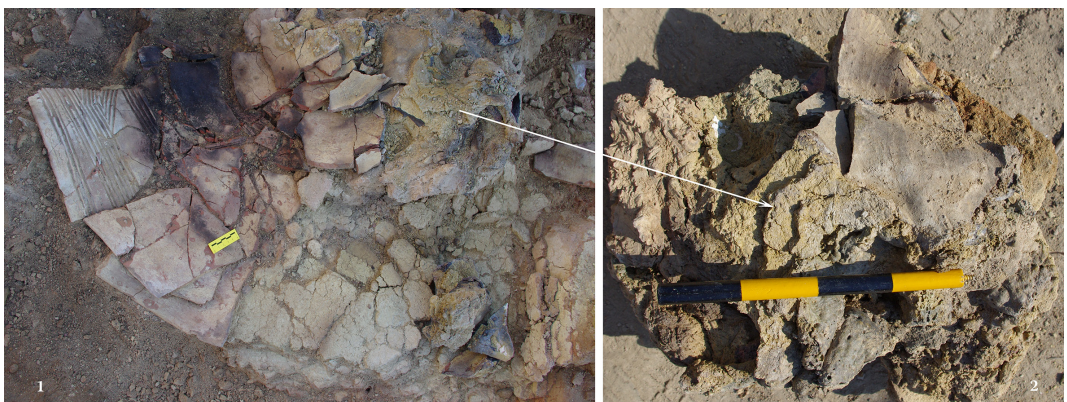


Figure 33. Evidence of 'hot spots', feature 72 in area A, 2012: (1) ceramic vessel in situ; (2) lower side of vitrified house debris with integrated pieces of the same vessel.

as was the building process. Of the vast amounts of house debris left after the fire, the burnt daub is the most abundant. Moreover, it is quite usable, unlike the charred organic material and the irreversibly damaged pottery, bone and stone tools.

Sintered daub doesn't occur in nature but is produced by the combination of natural materials as daub (clay and straw) and wood in fire. Burnt house rubble is material that can be provided only through house fire. This material has extremely useful properties: it absorbs water, accumulates heat better than raw clay, and provides excellent thermal insulation being fire resistant at the same time; it is very good temper; it is lighter than clay, sand or soil, and doesn't decay. Tell Petko Karavelovo yielded numerous examples of sintered daub reuse: as drainage under the roof eaves or under the floors, in oven platforms and domes, in different types of house daubs. Several querns were found at the site that were used to grind burnt daub. More than 90% of the pits at the tell disturb burnt houses and were backfilled with ordinary soil. Even though they are of different types (for posts, rituals, garbage or storage), most of them had produced a certain amount of sintered daub, which was not used to backfill the pits. The same holds true for the foundation trenches; if they had disturbed a burnt house (and they mostly had), they were later backfilled with ordinary soil and contained just a small amount of burnt house debris. A well-documented practice at Petko Karavelovo is that the builders of the new houses put back in the trenches the objects they had dug out during the building process. There are numerous ceramic vessels and loom weights, pieces of which were found both in a burnt house and the foundation trench of a later structure. The only cases of house debris deposition in trenches are those of large burnt daub pieces, usually from the clay core of the platforms, and they were always used to support posts within the trenches (fig. 34). Stone is abundant material in the area, but there was a sustained and preferred tendency of using large chunks of burnt daub dug out from earlier houses for such purposes. And this should not be surprising as the tell offered plenty of it.

Smaller sintered daub pieces were never put back. Some of the pits at Petko Karavelovo are simply extraction pits for burnt daub; they lack any deposits besides ordinary soil, and there is no evidence of posts embedded. Such pits were usually filled back very soon after they had been dug out, and all of them disturb burnt houses. The generations that occupied the tell site were thus fully aware of what lied below and used it when needed. The idea that massive house fires were aimed at producing sintered daub, though not new (see Shaffer 1993; Kruger 2015, among others), has been much neglected in the debate on 'burned house horizon in Neolithic Europe' (Stevanović 1997; Tringham 2005). The root of such disregard is that Neolithic house-fire studies have mostly been focused on the reasons and direct results of house fires rather than on the long-term sustained outcomes and the regularities that occurred much later. Tell Petko Karavelovo has yielded abundant evidence in support of such a theory. I am fully aware that this cannot be the only reason for burning a house, but it was certainly a factor that one has to consider.



Figure 34. Example of reuse of burnt daub as post support in a late Chalcolithic foundation trench cutting through early Chalcolithic burnt features. Feature 90 in area B, 2013.

Even though house fires are not common only for the PK-A period, it seems that fires were milder in the later levels. This regularity can be explained with the absence of white layers and platforms in the PK-B and C houses. The easiest conclusion would be that two-story structures burned in higher temperatures. However, the ‘two story theory’ is somehow problematic because the interpretation of the white layer as a lower floor has not yet been conclusively proven. The problem is that this layer is too thick to be the result only of the disintegration of massive earthen walls. It is reasonable to consider it as a filling of the space between the platform and the ground. I have not yet come across any reliable explanation of this type of layers. But still, there are some clues that support its interpretation as a lower floor, and they seem much stronger, such as the fireplaces and the white plastering under the platform of feature 72. The black layer below it and its presence around seem to be hard arguments in favor of the lower floor interpretation as is its physical resemblance to massive earthen walls. The strongest argument is the presence of free supports that penetrate only the white layer but not the platform; they would have been useless in case the white layer represents some sort of filling. Even though the white layer is the weak link in the interpretation, I consider the arguments for a lower floor stronger and more explicit.

Although its explanation is problematic, the white layer took important part in the tell’s raising; these of feature 50 and 67 cumulatively account for more than 1/4 of the

entire cultural deposit. And this is not the only example of the early Chalcolithic concept of producing mass for the site. The entire building strategy seems based on the 'grow and raise' concept. Thus, it seems that for the first dwellers of this marshy area there was no other way to settle there but to set a tell.

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