

Rediscovering the Final Palaeolithic-Mesolithic Settlement at Pabartoniai, a Site on the River Neris

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In this article, the primary results of the latest archaeological investigation in Pabartoniai site are represented. The site, in which the earliest finds could be dated to Final Palaeolithic and Mesolithic, was rediscovered in 2014 and has been excavated for two seasons. Prehistoric structures, flint find assemblage and some archaeobotanical remains provide an opportunity to discuss some questions considering the occupation of the site. However, at the same time, some problems regarding the reconstruction of the first settlement of the river Neris lower reaches are raised, as the archaeological finds are mixed with the material of the later settlement.

Keywords: Swiderian, River Neris, Final Palaeolithic, Mesolithic, first inhabitants.

Straipsnyje pristatomi naujaisi Pabartonių akmens amžiaus gyvenvietės tyrimų rezultatai. Ši vėlyvojo paleolito–mezolito gyvenvietė buvo iš naujo atrasta 2014 m. ir dvejus metus tyrinėta. Kasinėjimų metu atrastos struktūros, titnaginis inventorių ir archeobotaninė medžiaga leido tyrinėti šio archeologinio objekto pirminį apgyvendinimą. Deja, gyvenvietėje apsisota ne vieną kartą, skirtingų laikotarpių radiniai yra susimaišę smėlingame grunte, tad tiksliai rekonstruoti jos apgyvendinimo eigą ir pobūdį yra nelengva. Vis dėlto kasinėjimų metu pritaikyti įvairūs tyrimų metodai leidžia atsakyti į kai kuriuos klausimus.

Reikšminiai žodžiai: Svidrių kultūra, Neries upė, vėlyvasis paleolitas, mezolitas, pirminis apgyvendinimas.

INTRODUCTION

The site of Pabartoniai is situated on the right bank of the River Neris, where the second terrace above the floodplain of this broad river intersects with a small tributary Želmena. It is one of some tens of stone age sites along the lower reaches of the river Neris, in Central Lithuania (Fig. 1). Soon after the first flint finds were discovered on the sandy surface in this place eighty years ago, it was apparent that this region was probably inhabited in the Final Palaeolithic. Back then, the banks of the River Neris were not so urbanized and yielded plenty of archaeological artifacts, which could have been found by collectors. Unfortunately, to this day the region has changed and the well-known Final Palaeolithic Swiderian sites as Eiguliai, Drąseikiai, Skaruliai (Taute, 1968; Rimantienė, 1984, pp. 25–30; Girininkas, 2009, pp. 57–62) were destroyed by gravel mining, urban expansion and building.

The lower-reaches region of the River Neris covers a territory of around 300 km² and overwhelms the part of the river from the intersection with a big tributary Šventoji in the northeast till the inflow into Neman,

the biggest river in Lithuania, in southwest. The territory is on the northern border of the flinty zone of southern Lithuania (Rimantienė, 1984, p. 42). Therefore, this part of the river basin is only some tens of kilometers away from the mining places of flint, yet itself it is a non-flinty area. The relation of the first inhabitants to this specific peripheral non-flinty ecozone and the organization of the first settlements in the area are the main topics of concern. The maintenance of flint and other raw materials and the accessibility to the resources, the means of the human migration northwards in Final Palaeolithic and Early Mesolithic, and the multiple resettling of the same spots in the river valley after thousands of years are subjects of great importance in reconstructing the colonization of the area. The River Neris basin, as a contact zone of flinty and non-flinty areas, might give us the answers to these and other questions considering the earliest founders of this land. However, among some tens of sites discovered on the banks of the River Neris so far, only few can still be excavated and provide informative archaeological material. The site at Pabartoniai is one of these exceptions.

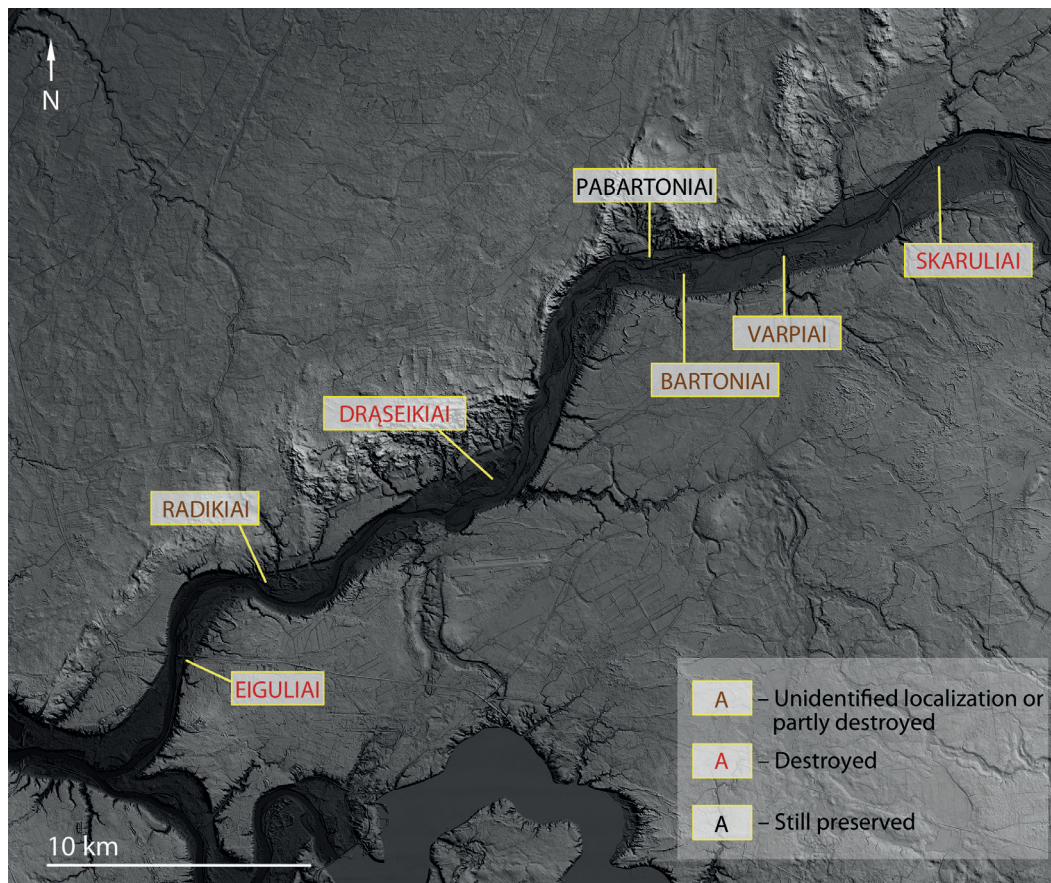


Fig. 1. Lower reaches of the river Neris in Central Lithuania and the distribution of various Stone Age sites.

1 pav. Žinomos akmens amžiaus gyvenvietės Neris žemupyje

HISTORY OF RESEARCH

The first time archaeologists set foot in Pabartoniai village was in 1909, when two archaeology amateurs of their period – Tadeusz Dowgird and Ludwik Krzywicki – travelled along the River Neris by boat and decided to stop and look around the sandy bank (Dowgird, 1909). They collected a handful of archaeological finds on the first terrace of River Neris and put some notes regarding the site in a diary. It took almost thirty years for archaeologists to come back to the village and to make another survey. This time it was an academician Konstantinas Jablonskis and his teenage daughter Rimutė Jablonskytė, who used to have long walks along the river banks together while searching for archaeological finds. Back then, the place was not overgrown by pines and the artifacts were laying on a sandy surface. Once they have got onto the second river terrace in Pabartoniai, they have recovered some

flint finds and pieces of early pottery close to the small tributary called Želmena. According to the writings found in K. Jablonskis' notebook, on both sides of this little river, two Stone Age settlements were discovered (Jablonskis, 1947; Rimantienė, (no date)). Yet it was not the same spot where their predecessors collected archaeological material, but a place around 100 m to the north-northeast, on a higher terrace. However, T. Dowgird's diary was still cited for many years when writing about the latter sites, although the sites found by him were never rediscovered again.

After more than three decades, when Lithuanian archaeological material was summarized and published in the Lithuanian Atlas of Archaeology (Rimantienė (ed.), 1974), short information about two Stone Age sites found in 1938 in Pabartoniai was also included and a supposed dating was given. The work was done by Rimutė Rimantienė, who quite accurately guessed that the flint finds and pottery are of some different

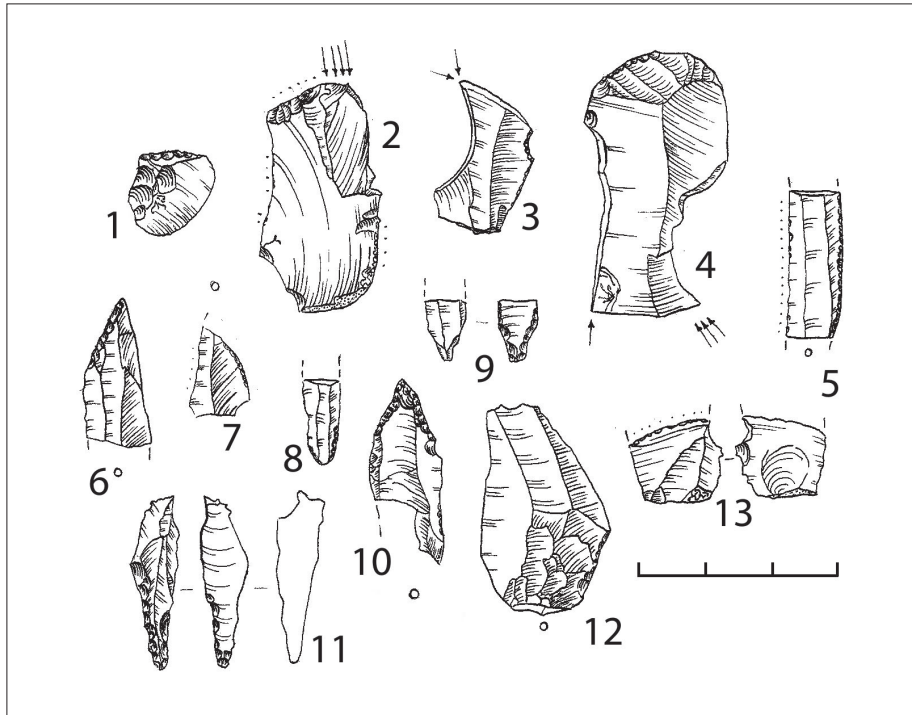


Fig. 2. Pabartoniai site I stone tool assemblage found in 1938.

Drawing by G. Gudaitienė.

2 pav. 1938 m. Pabartonių akmens amžiaus gyvenvietėje surinktas titnaginių inventorių. G. Gudaitienės piešinys

periods, although interpreted all the flint assemblage as belonging to Neolithic. Though she identified some epi-Swiderian type arrowheads, microliths, a scraper, a flint striker and a piece of a polished stone axe (Fig. 2). Adjacent to the stone tool collection were some pieces of weakly dashed pot.

Later, Pabartoniai village was revisited for few times and some test pits were dug on both banks of a small tributary; however, almost no flint artifacts were found (Žalnierius, 1996; Brazaitis, 2004a, 2004b). As time passed, the prehistoric sites were erased from the Lithuanian protected heritage objects list (Gudaitienė, 2016). Only in 2014, when the reconstruction project of the Western part of the River Neris basin first inhabitants was initiated, scientific research was started anew. On the first stage of the project, test pits were excavated in order to localize the Pabartoniai I site on the right bank of the tributary Želmena and the Pabartoniai II site on the left bank. It took two seasons of survey to finally determine the exact places of the sites found in 1938 and to make a more detailed investigation in Pabartoniai I site, where an area of 64 m² has been excavated (Gudaitienė, 2015).

RESEARCH METHODS

As the archaeological sites in the lower reaches of the river Neris were investigated mostly by collecting flint assemblage from the sandy surface along the river banks, and only one site in Skaruliai was thoroughly excavated (however, previously heavily destroyed), there were almost no comparable data from this region except of flint tool assemblage until 2014 (Marcinkevičiūtė, Štavičius, 2011, pp. 102–113; Marcinkevičiūtė, Štavičius, 2013, pp. 23–26; 2014, pp. 23–27; 2015, pp. 57–62). Moreover, no C14 dating was done in any of the sites, and the chronological assumptions were previously based only on flint find morphology and tool types. Therefore, an excavation in the Pabartoniai site was conducted with a perspective to find some prehistoric structures which could be dated and relate the finds to the chronology based on C14 AMS dates. A presumption was made that if some Final Palaeolithic–Early Mesolithic flint tools and structures can be found in the site of Pabartoniai, this material could be directly compared with the data

of other sites from the region. The outcome of this method would be a reconstruction model of the first settling and a provisory chronology of this process in the lower reaches of the River Neris.

In the case of uncovering some early structures, a further investigation was foreseen. Although the possibility of finding some organic material in the sandy soil dated to Preboreal or earlier periods was very small, the samples from most of the structures were taken and floated. Archaeobotanical remains were separated to distinguish the plant species, if there were any. The analysis was considered to help in the reconstruction of the Pabartoniai site settlers' diet, and probably be useful in unraveling the structure function. Another outcome of the archaeobotanical examination was information about the environment which surrounded the Pabartoniai site when it was inhabited. The structure ground samples of 10–30 liters were floated through a 300 µm sieve and yielded few hundreds of grams of organic remains which were studied under the microscope.

Also, ground samples from each structure's center, periphery and surrounding ground were taken for geochemical analysis, so as to provide information that can help in interpreting the function of the prehistoric installations. This research is currently in the process and is being done by two specialists of geochemistry, Laura Gedminienė and Ričardas Taraškevičius, at the Nature Research Center.

Another method applied in the research was the precise recording of each artifact and data analysis in the Geographic Information System. Nevertheless, the finds shifted in the sandy ground and lost their exact location through time, some find concentrations could be distinguished and their correlation with some prehistoric structures could be seen. The research was supposed to reveal certain data needed to clarify the function of the structures and chronological questions as well as to investigate flint material. Spatial artifact distribution was important for refitting and other analyses of flint knapping techniques. Finally, it was necessary for the determination of some different occupation moments and activity zones in the site.

In this paper, the planigraphy and stratigraphy of the excavated area and primary archaeobotanical results are represented in correlation with the distribution of flint and other finds in Pabartoniai site.

GEOMORPHOLOGY

During the two year excavation of the Pabartoniai site, the cross sections of 8 m NW-SE direction and 12 m SW-NE direction were unearthed. The stratigraphic layering was examined with the help of the geologist Prof. Petras Šinkūnas, and after the correlations between find horizons and different color and fraction layers were found, the probable geomorphology of the site was reconstructed.

The bed of the river Neris was formed soon after the Weichselian glaciation retreated northwestwards from the territory. The melted water cumulated into a large stream, running from northeast to southwest along the moraine hills, shaped by the retreating glacial. After some time, the water washed in and formed a riverbed – an old lateral valley of proto-Šventoji river – which was later linguistically dissociated into few sections and named as three separate hydronyms: the river Šventoji, which runs into the lower reaches of the river Neris, which finally flows into the biggest river Neman.

The second terrace of the River Neris, situated above the recent floodplain level, has formed after some time, probably in the very end of the Pleistocene. Back then it was a middle-grained gravel and sand shore of the river and the third 20 m height terrace was already arisen around 120–330 m away from the shoreline, in the northwest. The climate was quite dry and cool, and the tundra landscape was probably rich in *Betula* and small bushes (Kabailienė, 2006). The river has constantly flooded the terrace and left silty and very fine-grained sand on the shore. All the while aeolian processes have also took part in the formation of the first postglacial ~20–30 cm thick light yellow-white, fine-grained silty sand layer now seen in the profile. It can be predicted that the first inhabitants probably came to camp on this sandy River Neris terrace in the lower reaches region in the very end of the Younger Dryas or in Preboreal (Fig. 3, 4). However, by then it was a few hundred meters away from the river bank, as a lower terrace has probably already existed. This assumption is supported by the fact that some of the Final Palaeolithic and Early Mesolithic sites along the river Neris were found on the lower terrace, so it must have formed earlier than in Preboreal period. It may therefore be presumed that the river

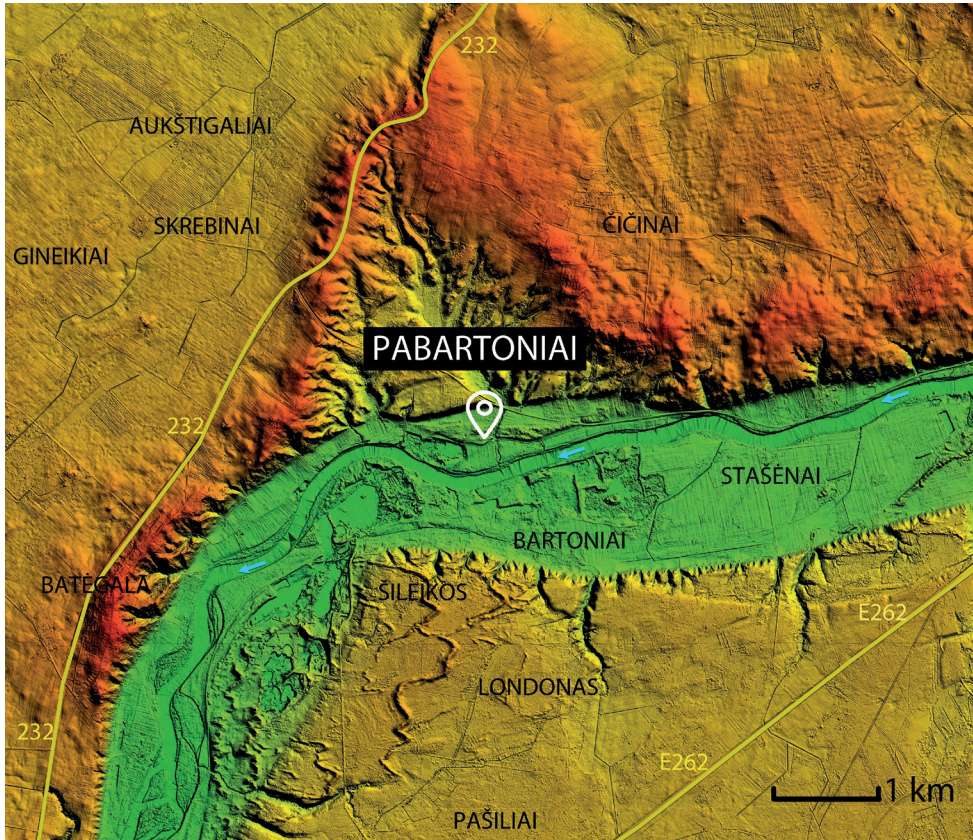


Fig. 3. The site of Pabartoniai, situated on the second non-flooded terrace (right bank) of the River Neris (LiDAR).

3 pav. Pabartonių akmens amžiaus gyvenvietė ant antrosios viršsalpinės Neries terasos, dešiniajame upės krante (LiDAR pagrindu)



Fig. 4. Stratigraphy in the Pabartoniai site. Photo by G. Gudaitienė.

4 pav. Stratigrafija Pabartonių akmens amžiaus gyvenvietėje, G. Gudaitienės nuotrauka

level at the time Pabartoniai was first inhabited was similar to that of today.

Later, the archaeological finds of the first founders of this land were covered by post-depositional, mostly aeolian processes. The sand on the first terrace was blown and drifted to and fro, the artifacts have moved because of various bioturbations: animal and human trample, plant root and small fauna nuzzle. Throughout the first part of the Holocene, people have come to settle this site for a few times in Mesolithic and maybe in the first part of Neolithic. After some time, the next stage of settling can be recognized in Late Neolithic or Bronze Age. The aeolian processes have continued; therefore, the yellow fine-grained sand and light brown sand layers formed another 30 cm thick layer.

The turning point can be seen in the transition from light brown sand to a dark brown sand (subsoil) layer. Probably at that time – in the middle of the Holocene – the vegetation of the second terrace took over the other processes and, as a result, the layer of the darkest color sand mixed with the more organic material. It may be presumed that a forest cover started to appear in Pabartoniai site.

The next change is the transition from a non-inhabited sandy forest to a grey, humus-rich soil, which probably correlates with it being settled in the past few millennium and the start of agricultural activity on the site. The area was probably cleaned from trees and ploughed for a while, until, due to the openness, it was again affected by aeolian processes: the sand dunes in the area were blown (a sand covering of the ploughed ground is noticeable). It is obvious that for some time people have tried to continue farming, yet after a while they had to give in. The wind has covered the area with a 20–30 cm thick aeolian sand layer.

Due to the bioturbations, the archaeological finds from various periods have mixed and shifted both vertically and horizontally. Some flint finds were even exposed on the surface in the early 20th century, so that the discoverers of the Pabartoniai archaeological site could find them laying on the ground. In the middle of the previous century, some new vegetation began growing in the area and a thin dark grey forest soil layer has formed on top. Until now, the terrace of the River Neris became the second non-flooded terrace and is situated 180–260 m away from the water flow.

The river itself now is 130 m wide at the point where Pabartoniai site is located, while the archaeological site is in a grown-up pine tree forest.

ANALYZING THE PLANIGRAPHIC AND STRATIGRAPHIC DATA OF THE SITE

After excavating 64 m² of Pabartoniai site, more than twenty various objects have been uncovered, which should be related to the Final Palaeolithic–Bronze Age period. However, the excavated area seems to be only a small northern part of the site, and yet it is not clear if the most intensively inhabited spot – the so called “central part” of the site – was already uncovered in the southern part of the trench or not. Further investigation will reveal the answer to this question, while some implications on the site’s planigraphic and stratigraphic data can already be done.

Most of the distinguishable objects were uncovered in the 70–120 cm depth, in light brown, small-grained sand, followed by yellow, fine-grained sand (Fig. 5). The difference between the top elevation of the structures, or the point where they began to appear, might seem very slight. However, some chronological insights should be mentioned. First of all, the higher the top of the object (stain) was, the more intense was its color. At least two objects were of quite dark grey or even black color, and were taphonomically interpreted as being dated to a later period than those which had appeared lower and had a lighter color and more blurred contour (Fig. 6). These stains had also vanished relatively higher, some of them even higher than the other objects had started to appear. This feature shows that the same area was inhabited repeatedly at least for few times.

Even if the upper stratigraphic layer of objects could be disregarded as not belonging to the earliest inhabitants, there are still more than a dozen structures which were uncovered deeper. The question arises if all of them could correlate and be of the same chronology and if some more horizons should be distinguished. As these objects were all the of more or less same color intensity and significantly reached the bottom ground – white small grained sand with limonite inclusions – and even intervened into it, they can be ascribed as belonging to the earliest period of the site

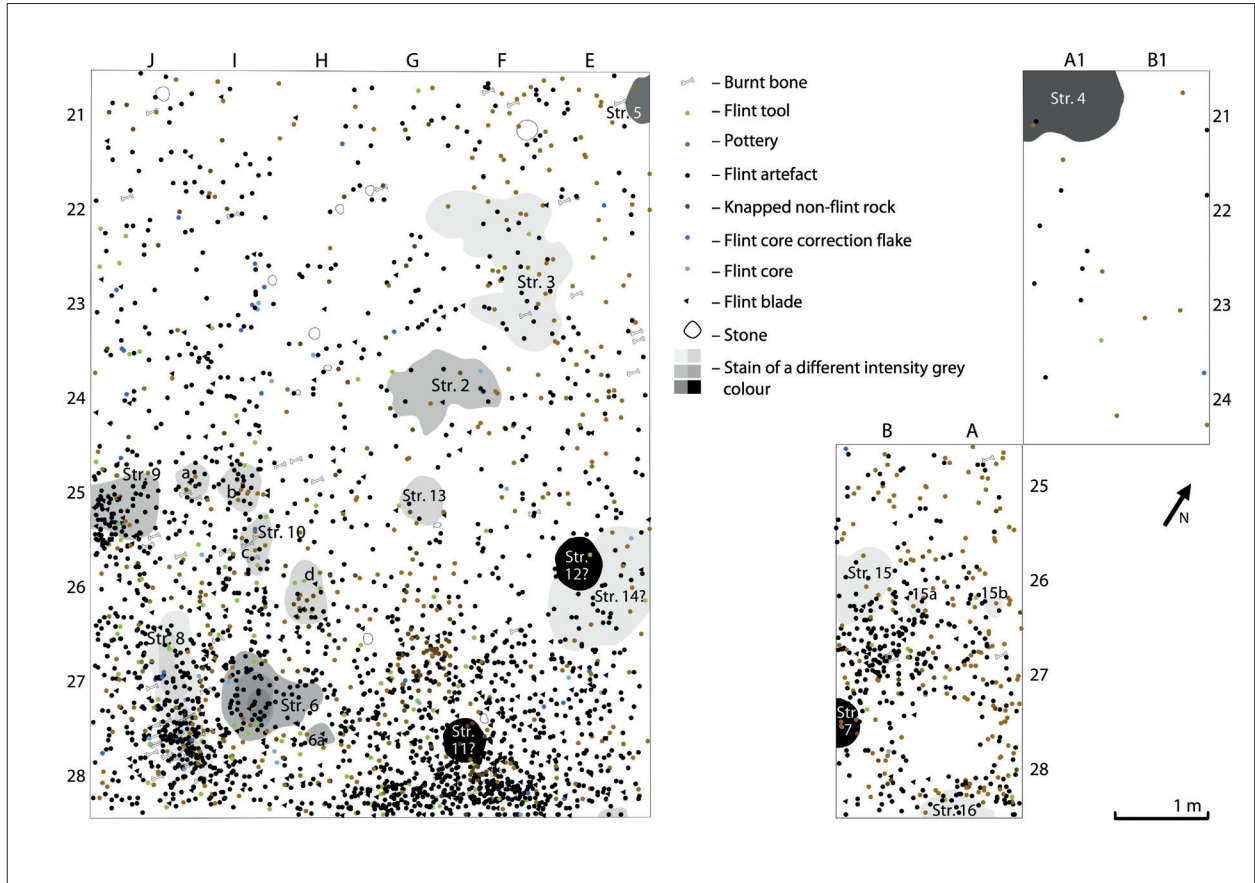


Fig. 5. Planigraphy of the Pabartoniai site and find distribution in all the layers. Drawn by G. Gudaitienė.

5 pav. Radinių pasiskirstymas ir perkasos planigrafija Pabartonių akmens amžiaus gyvenvietėje. Braižė G. Gudaitienė

settlement, whenever it might have happened, until the samples from all of them are dated by C14 AMS dating. For the moment, four objects were dated in Pabartoniai site: structures Nos. 2, 8, 9 and 10d. The dating results have shown that the site was inhabited at least for few times in the Mesolithic (Fig. 8). All of the structures in site had different forms and most of them changed contour in the process of excavating. This is due to the post-depositional processes, mostly bioturbations. However, as they were distributed close to each other, but did not intersect or overlay, they should belong to one or few separate (yet closely dated) horizons, e. g., the Middle and Late Mesolithic.

The objects differed in size and form, and only some of them had a clearly describable contour (oval or circle). Some of the structures are likely to have been recessed into the ground. No stone structures were found, only some single stone pebbles and little boulders were uncovered. However, one stone-related Middle Meso-

lithic structure No. 10d was outstanding: it was a grey stain in the lowest sand layer in which a sandstone core and fitting flakes were found (see sections *Non-flint Stone Artifacts* and *Find Distribution Analysis*).

Another archaeological object became a topic of discussion. Structure No. 2 was a greyish non-regular form stain, uncovered in 90 cm depth. It went deep and ended in almost 200 cm depth and changed the intensity of its grey color. The feature of concern is a little (around 20 cm wide) stain of an ochre-mixed ground in the center of this structure with a little piece of ochre. Due to the form of the structure, it could be interpreted as a tree stump burnt by lightning. However, the previously mentioned feature did not correlate with this theory. Therefore, it was interpreted as a prehistoric structure, probably recessed into the ground (Fig. 6) (also see sections *An Analysis of the Archaeobotanical Remains, Flint Artifact Typology and Dating*).

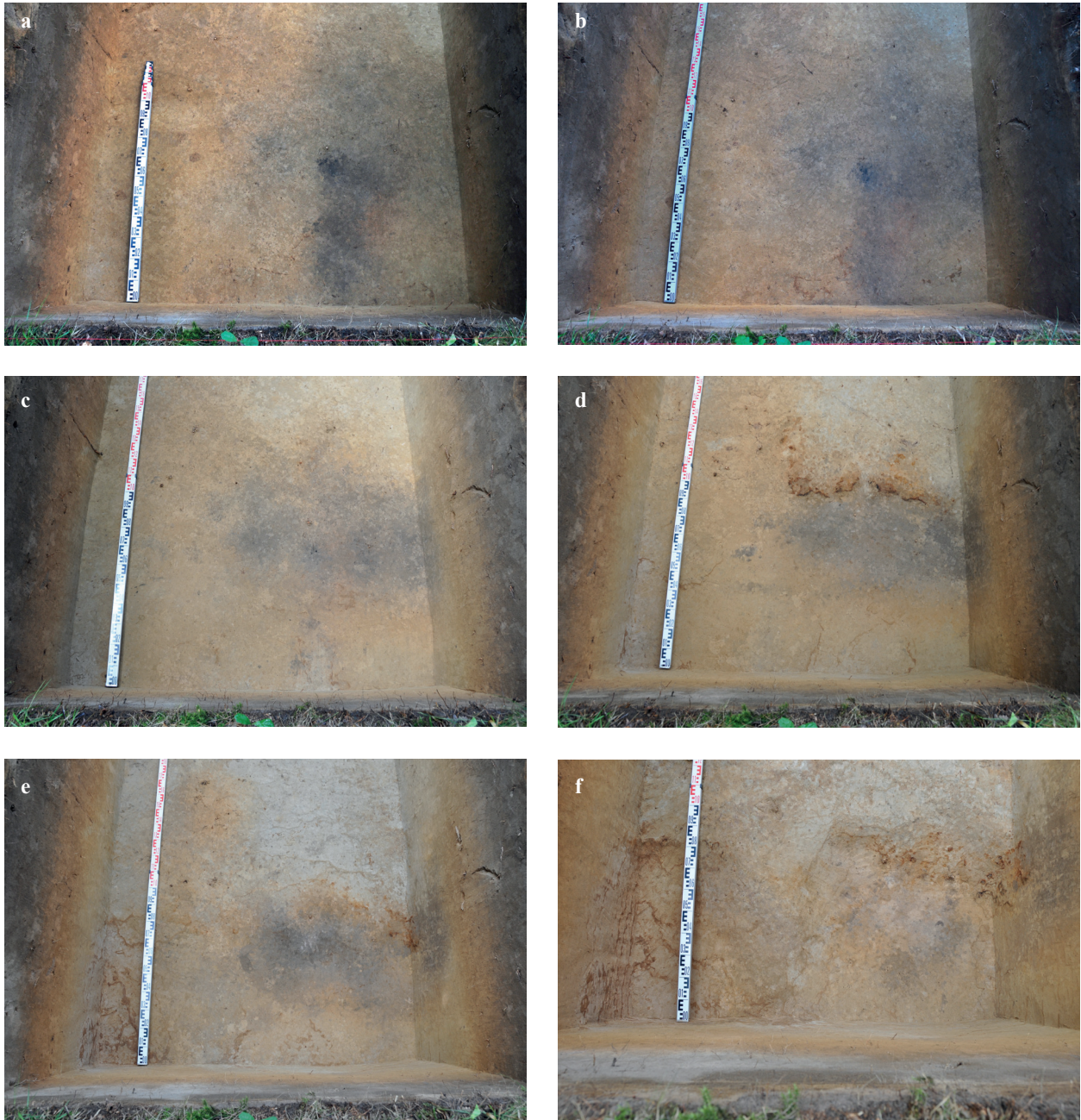


Fig. 6. Structure No. 2 in various depths (a – 95 cm depth, b – 105 cm depth, c – 115 cm depth, d – 130 cm depth, e – 150 cm depth, f – 180 cm depth). Photo by G. Gudaitienė.

6 pav. Archeologinė struktūra Nr. 2 įvairiuose gyliuose: a – 95 cm, b – 105 cm, c – 115 cm, d – 130 cm, e – 150 cm, f – 180 cm. G. Gudaitienės nuotrauka

Three of the objects (structures 7, 11 and 12), were interpreted as being previously grown tree stumps because of their intense dark brownish color, a very regular rounded form and an indication of being not related to the flint find concentrations or even characterized as containing almost no finds in their extent (Fig. 5, 7).

Finally, some remarks should be done on the wider context of the Stone Age sites in the River Neris basin. As most of the sites, if not all, are on the first or the second river terrace, they are all situated on sandy fluvio-genetic ground, formed after the last glacial and a few thousand years later. Through time some sand layers came to cover the archaeological site surface

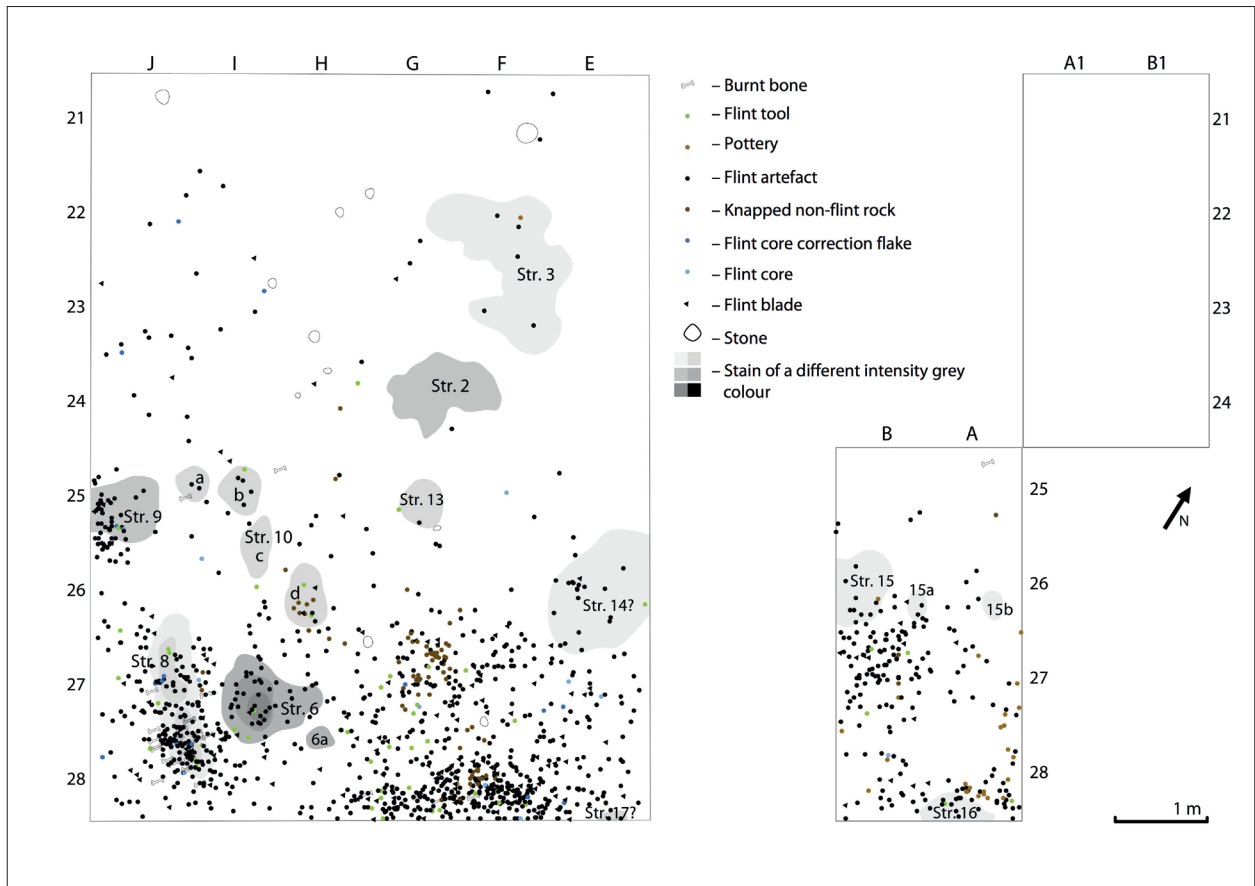


Fig. 7. Planigraphy of the Pabartoniai site. Correlation between the earliest structure stains and find distribution in the light brown, yellow and white fine-grained silty sand layers, 80–140 cm depth. Drawn by G. Gudaitienė.

7 pav. Perkasos planigrafija Pabartonių akmens amžiaus gyvenvietėje: ankstyviausios archeologinės struktūros ir radinių pasiskirstymas šviesiai rudo, geltono ir balkšvo smulkiagrūdžio smėlio sluoksniuose, 80–140 cm gylyje.

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by aeolian and aliuvian processes; therefore, the prehistoric site is buried under an approximate 60–80 cm thick sand cover. This feature connects the Pabartoniai site with other sites on the river bank a few tens of kilometers away: most of them were found in sandy areas. Therefore, it could also be an argument for comparing the sites, making hypotheses on their similarity and giving presumptions that they could have been all inhabited in some similar periods of time and could have functioned in a similar manner.

FIND DISTRIBUTION ANALYSIS

When discussing the usefulness of a precise find distribution analysis, the sandy geomorphology of the sites on the banks of the river Neris and a certain stratigraphic layer formation should be kept in mind

again. Nevertheless, there is a quite clear stratigraphic distinction of the Stone Age artifact horizon between light yellow-white, fine-grained silty sand and light brown sand layers (Fig. 4), it still being relatively thick, and the impact of post-depositional processes to the find dispersion both vertically and horizontally is quite obvious. As it was seen from the analysis of the planigraphic and prehistoric structure distribution, at least two different settlement stages should be diffused within this 30–50 cm thick horizon.

In general, flint finds and most of the structures concentrate in the southern part of the trench, so it could be interpreted as the center of the settlement, whereas the northern part would be a periphery. However, if the structures that are supposed to be of a later period and the tree stump stains were not taken into account and only the so called “earliest” horizon would be left, the

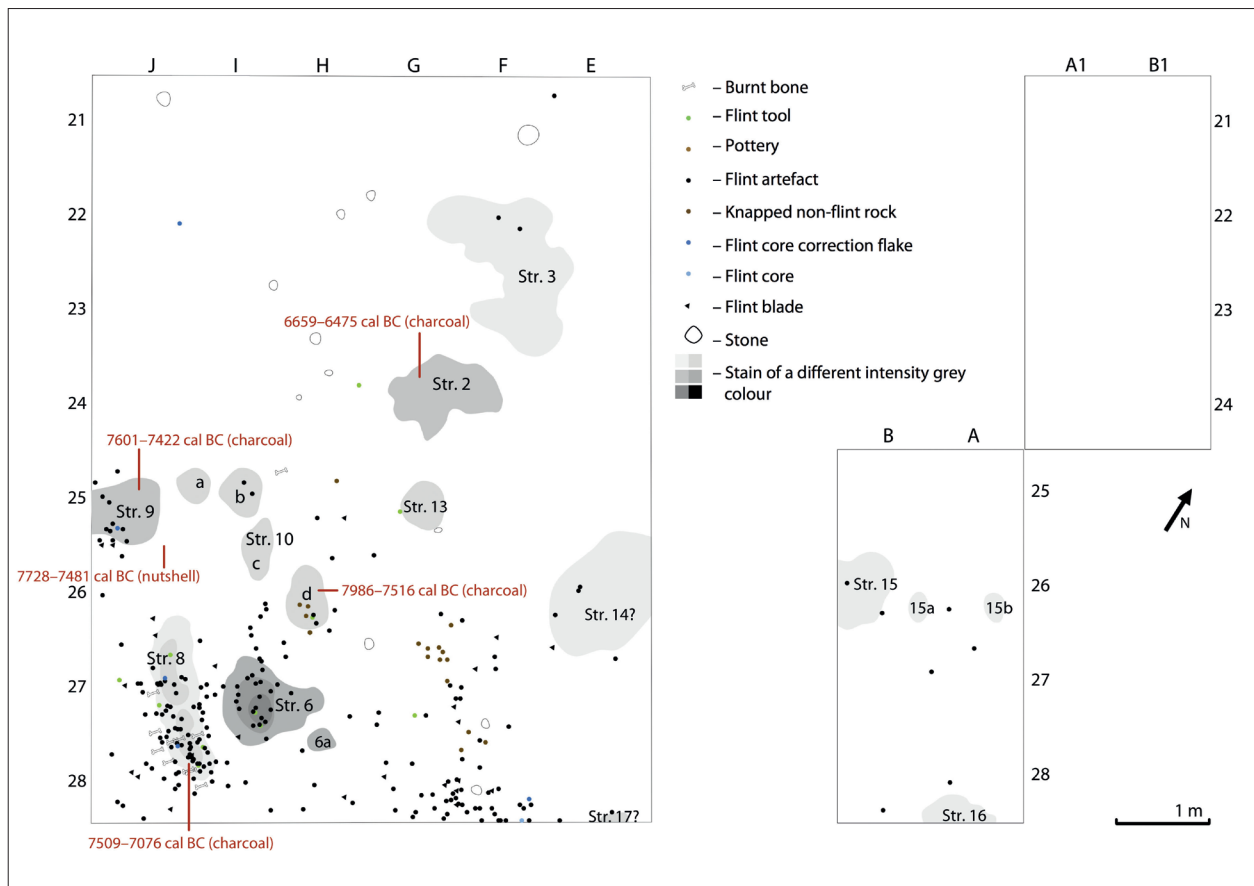


Fig. 8. Planigraphy of the Pabartoniai site. Correlation between the earliest structure stains and find distribution in the deepest white fine-grained silty sand layer, 100–140 cm depth. Drawn by G. Gudaitienė.

8 pav. Perkasos planigrafija Pabartonių akmens amžiaus gyvenvietėje: ankstyviausios archeologinės struktūros ir radinių pasiskirstymas balkšvo smulkiagrūdžio smėlio (žemio) sluoksnyje, 100–140 cm gylyje. Braižė G. Gudaitienė

site view would be a bit different: the most intensively inhabited area would be in the southwest (Fig. 8). So the first occupation of this site could have been a bit more to the West and be more compact, while the later occupied site was wider, more scattered and its center could have been somewhere in the southern part of the excavation trench.

After the examination of the find distribution in various ground layers, some remarks can be given. If all the finds are taken into account, some differences between their distribution in separate layers is seen. All the finds (flint, stone, burnt bone), which were found deeper than in a depth of 70 cm, were more or less scattered in the southern part of the site, but only after eliminating the finds found in 80–70 cm depth some actual concentrations were noticed. They were even more distinguishable only when the finds

found in the deepest level – a depth of 90 cm or deeper – were taken into account. Four major concentrations were recognized and only two of them could be related to prehistoric objects (structures No. 8 and 9) (Fig. 8, 9). These results also correlate with the distribution of the finds typologically ascribed to the Final Palaeolithic or Mesolithic period – they were also found in the southern part of the excavated area; however, no significant concentrations were visible. The same result is seen with the distribution of blades and blade fragments – they are also scattered, though mostly found in the same area. There were more blades in the yellow, fine-grained sand layer than in the deeper layer of light yellow-white, fine-grained silty sand. However, these two layers can probably be considered as a more or less single, continuous find horizon.

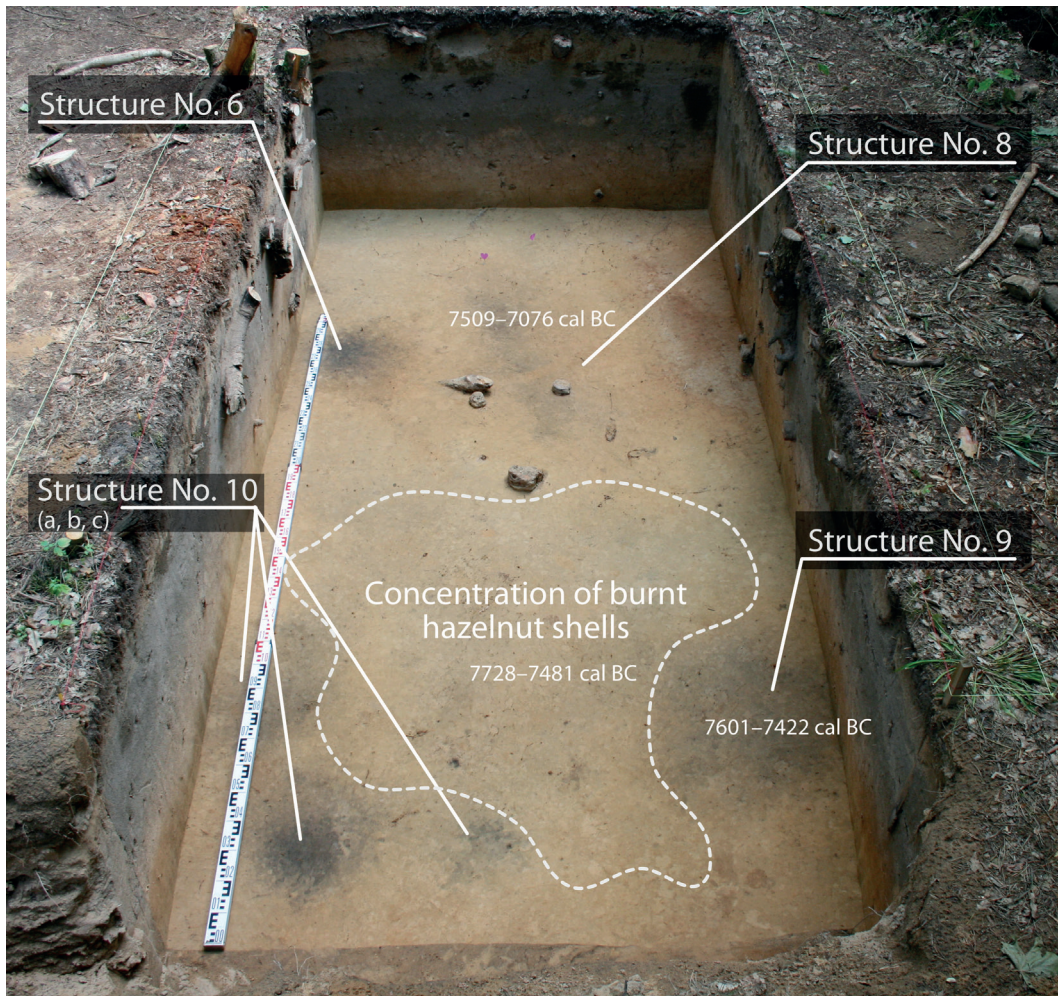


Fig. 9. South-western part of the trench, light yellow-white fine-grained silty sand layer, 100 cm depth. Photo by G. Gudaitienė.

9 pav. *PV perkasos dalis, šviesiai geltono-balkšvo smulkiagrūdžio smėlio sluoksnis, gylis – 100 cm. G. Gudaitienės nuotrauka*

The **flintknapping zones** can already be distinguished by the blade and flake accumulation. For example, structure No. 9 yielded a lot of regular blades and therefore it could be interpreted as a unipolar core, a knapping-regular blade producing activity zone. However, the distribution of flint cores or their parts is also important: they were found in the same areas, where the blades and flakes were most common, yet also another concentration of core fragments was noticed in the western part of the trench, in the deepest yellow, fine-grained and light yellow-white, fine-grained silty sand layers (14 artifacts). As such, it is more likely that the site of Pabartoniai contains some flintknapping places, where the core was prepared and the blades were produced, yet it also includes one area

where the debitage of the core repairing was thrown. A more precise refitting analysis of the flint cores might clarify this interpretation.

The production of **flint tools** would probably correlate with the main flint flake concentrations in the southern part of the excavated area, as very tiny flakes were numerous. All the while the activity zones, where the tools were used, were not so visible until the distribution of these artifacts was analyzed layer by layer. Only in the deepest layers the concentration of tools and tool fragments was noticeable around structure No. 8, dated to 7509–7076 cal BC. However, if all the stratigraphy was taken into account, the tools did scatter in the southern part of the trench without any cumulation. Therefore, only one clear working activ-

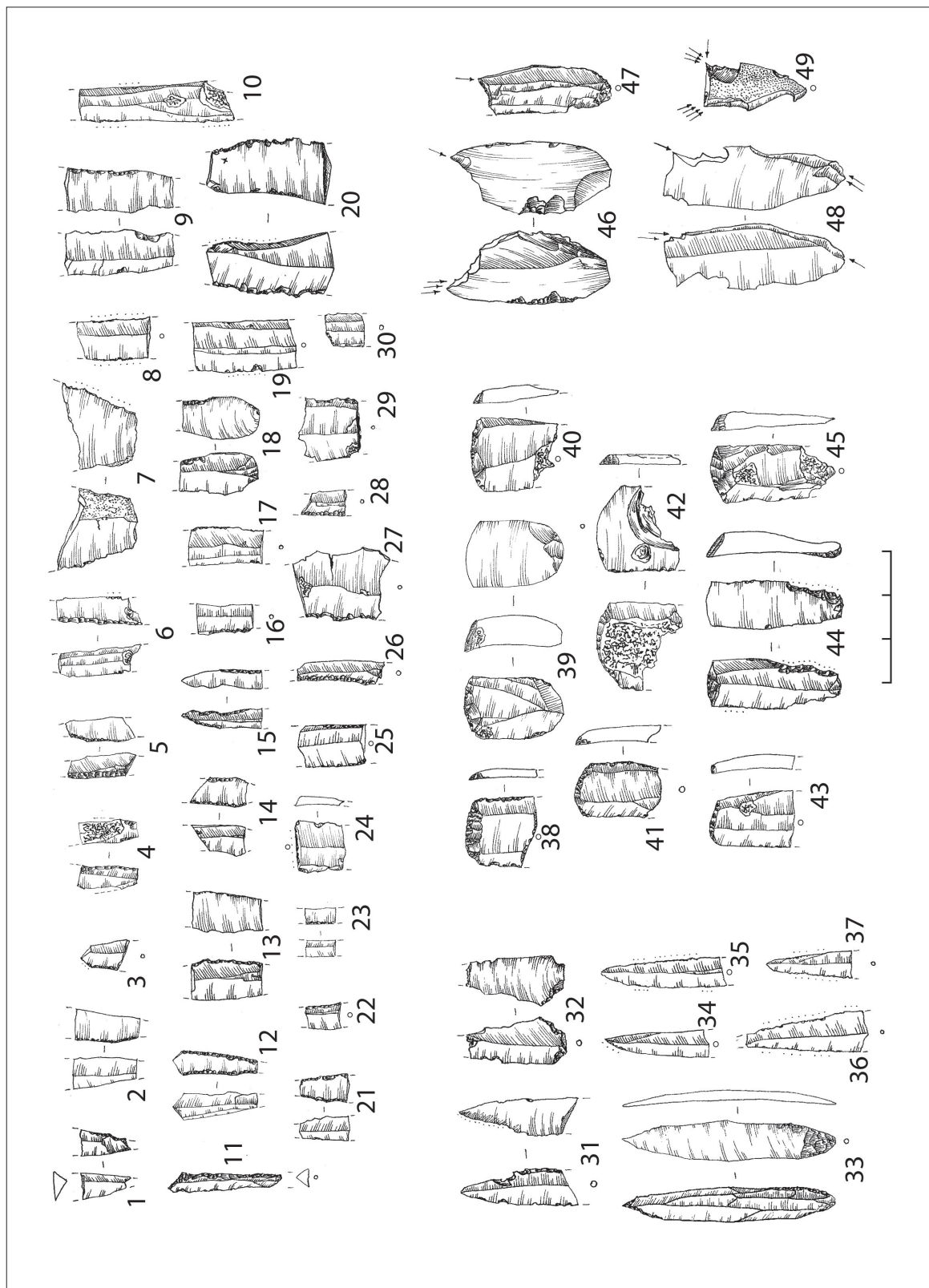


Fig. 10. Flint assemblage found in the Pabartoniai site. Drawing by G. Gudaitienė.

10 pav. *Tinginis inventorių, rastas Pabartonių akmens amžiaus gyvenvietėje. G. Gudaitienės piešinys*

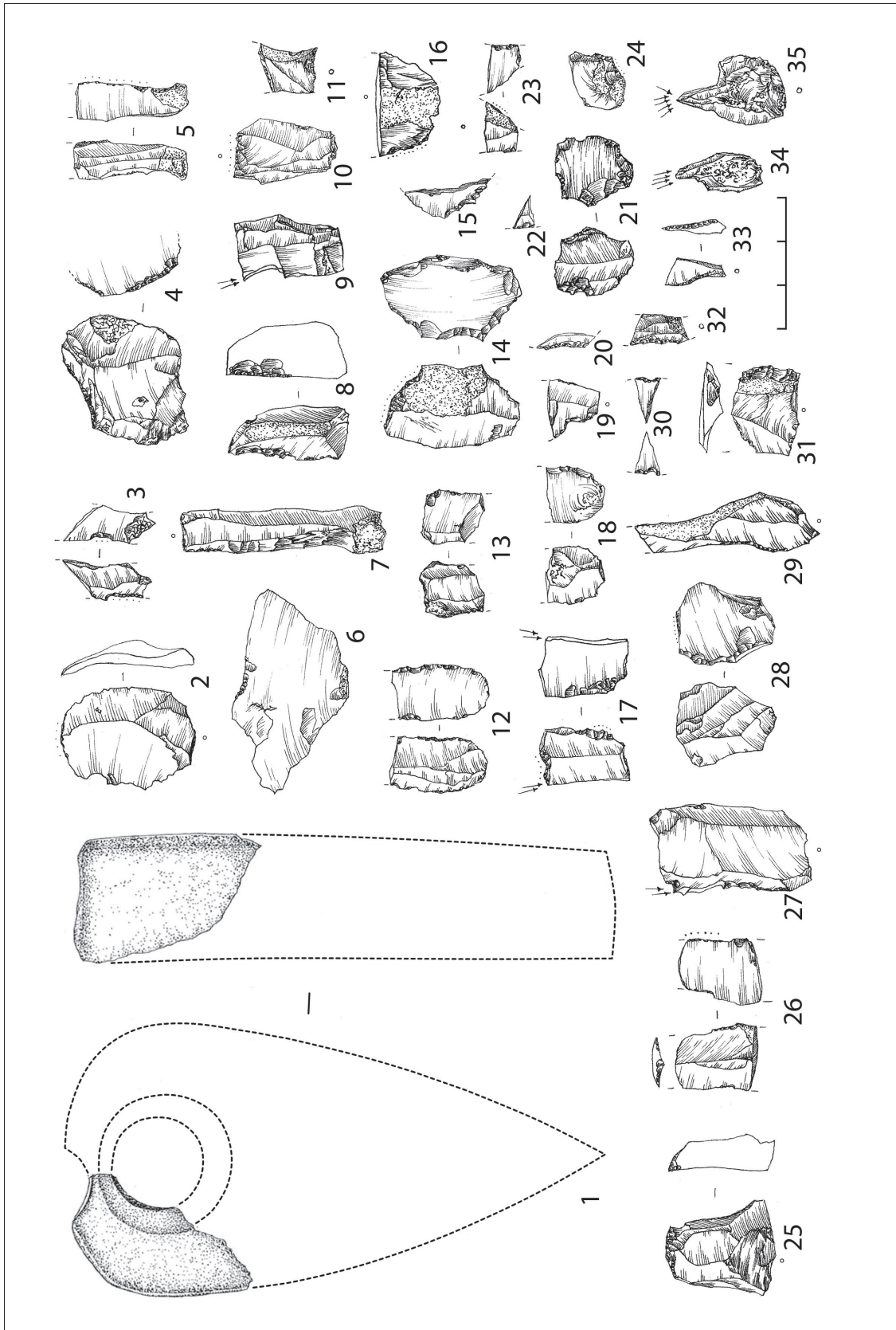


Fig. 11. Finds found in the Pabartoniai site. Drawing by G. Gudaitienė.

11 pav. Pabartonių akmens amžiaus gyvenvietėje rasti radiniai. G. Gudaitienės piešinys



Fig. 12. Fragments of the lightly dashed hand-built pot. Photo by G. Gudaitienė.

12 pav. Mažai brūkšniuotos keramikos fragmentai. G. Gudaitienės nuotrauka

ity zone, occupying around 9 m², was distinguished in the excavated area which yielded more than 30 tools or tool fragments. Moreover, as it was unearthed in the lowest layer and the structure No. 8 was also uncovered almost in the ground level (100 cm deep), in the light yellow-white, fine-grained silty sand, this zone can be considered as belonging to one of the earliest settlements of Pabartoniai site.

The activity zone around structure No. 8 appeared to be also important when investigating the distribution of **burnt artifacts**. There was a clear concentration of burnt bone fragments in the deepest layer (around 30 pieces), though these finds were scarce elsewhere in the same yellow, fine-grained sand and light yellow-white, fine-grained silty sand horizon. Whilst another group of burnt artifacts – burnt flint finds – were also worth to pay attention to. Statistically, more than 37% of the flint artifacts were burnt or had endured contact with strong heat. Their distribution has shown the same correlation with structure No. 8 in the deepest layers, although they were much more numerous in the yellow, fine-grained sand, 10–20 cm higher, where they were scattered more or less all over the southern part of the excavated area. Some burnt flint find cumulations were also distinguished next to object No. 11

(a probable tree trunk), where the flintknapping zone was determined, and in structure No. 9 (western part of the trench).

Non-flint rock knapping was also detected in the archaeological site at Pabartoniai. Although all the knapped or crushed stone artifacts were relatively scattered all around the southern half of the excavated area, few concentrations could be discerned. The cumulation of crushed granite pebble was found in yellow, fine-grained sand and mostly in the light yellow-white, fine-grained, silty sand layer and was not related to any of the prehistoric structures. However, there is quite a high probability that this stone has eroded and crumbled due to the natural processes and all the split off fragments should not be interpreted as artefacts. Still, it can be ascribed as a crushed granite material for pottery mass preparation. In this case, it would be dated to Neolithic or later periods, though as it was found in the lowest layers, the correspondence to the earlier periods is more reasonable.

Another concentration of non-flint stone artifacts should be related to one of the earliest structures found in the site, dated to 7986–7516 cal BC. It was a greyish stain – structure No. 10d – uncovered in the light yellow-white, fine-grained silty sand layer, in 100–

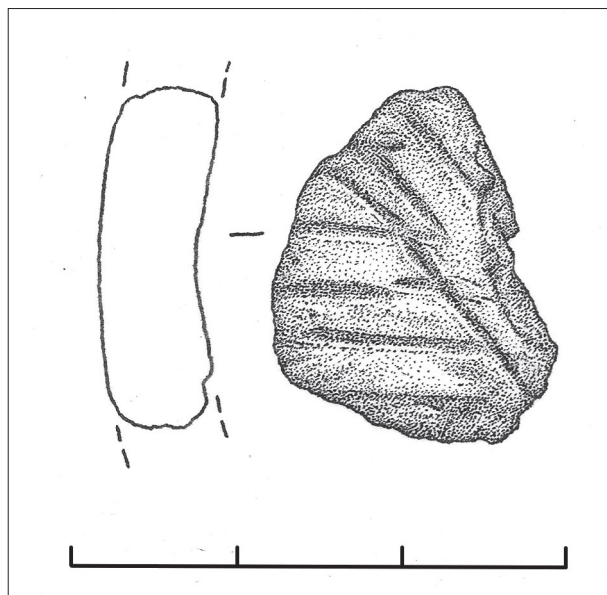


Fig. 13. A fragment of the earliest pottery found in Pabartoniai. Drawing by I. Maciukaitė.

13 pav. Ankstyviausios Pabartonių akmens amžiaus gyvenvietėje rastos keramikos šukė. I. Maciukaitės piešinys

130 cm depth, which yielded sandstone flakes and a flint scraper, typical for the Final Palaeolithic or Early Mesolithic periods (Fig. 8 & 10:44). The low scattering of the sandstone debitage helped to refit it easily. Further examination of these finds is given in a separate section (see *Non-flint Stone Artifacts*).

Pottery fragments were also found in Pabartoniai site, though mostly in the mid-upper layers (up to 50–60 cm deep). The distribution of these finds gives almost no information when analyzed in all the stratigraphic layers at once. However, one concentration of rather early hand-built lightly dashed pottery pieces was noticed in the eastern part of the excavated area, in 75–90 cm depth (Fig. 12). These potsherds were probably of the same pot dated to the Late Neolithic or Bronze Age. They could relate with some other finds, found in Pabartoniai site: a twice-perforated stone axe fragment as well as with a small part of the flint find assemblage (Fig. 11). The dashed pottery shards were not associated with any of the structures, although some of the stains uncovered in Pabartoniai site should stratigraphically belong to the same horizon (e.g., structure No. 6). Almost no pottery fragments were found in the lowest yellow fine-grained sand and light

yellow-white fine-grained silty sand layers, so this feature also corresponds with the distinction of at least two periods of settling: the earlier, reaching 90–140 cm depth, and the later, detectable in 50–80 cm depth.

What is more, another hand-built ornamented pottery fragment has to be mentioned as the earliest pottery piece found at the site of Pabartoniai. It was found in the northwestern part of the trench and could not be directly related to any of the structures or other finds. Typologically, this pottery piece could be dated to Neolithic as it is made of clay mixed with organic matter and has a fir branch shaped ornament (Fig. 13). It differed from the previously described dashed pottery; therefore, it might be possible that there were two separate settlements in the Neolithic-Bronze Age period, although none of these phases were expressed by significantly numerous finds and no structures have been dated to this period as well.

AN ANALYSIS OF ARCHAEOBOTANICAL REMAINS

The ground samples of some tens of liters were taken from almost all structures unearthed in Pabartoniai site. As a first trial experiment to use flotation and to detect archaeobotanical remains, ground samples of 20 liters from structures No. 2 and 3 were floated through a 300 µm sieve. The organic material was separated and dried. Afterwards, it was analyzed under a microscope lens.

The sample of structure No. 2, which was considered to be a hearth (Fig. 6), mostly yielded pieces of charcoal. Some of them were discussed as being similar to stone-fruit or other plant tuber (root), or *parenchyma* tissue, since they had a spongy structure and looked a bit melted. The pieces were small, mostly not reaching 10 mm. However, wood charcoal sometimes can look very similar to parenchyma tissue, so the samples should be analyzed under a SEM microscope to prove or deny the hypotheses that the material is of some starchy plant remains. Therefore, only a plausible list of plants which could have grown in the Preboreal-Boreal period in the region was drawn up to see the variety of the possible species which might have left remains of burned parenchyma (Fig. 14) (based on the

Eatable part	Species (Latin)	Species (English)	Species (Lithuanian)
Turnip / Stalk / Rhizome	<i>Allium ursinum</i>	Wild garlic	Meškinis česnakas
	<i>Arctium</i>	Burdock	Varnalėša
	<i>Brassica</i>	Non cultivated form of mustard/ cruciferous plants	Bastutinių šeimos nekultivuoti augalai
	<i>Butomus umbellatus</i>	Flowering rush	Skėtinis bėžis
	<i>Campanula trachelium</i>	Nettle-leaved bellflower	Dilgialapis katilėlis
	<i>Cirsium</i>	Thistle	Usnis
	<i>Conopodium majus</i>	Pignut	Žemės riešutas
	<i>Equisetum</i>	Horsetail	Asiūklis
	<i>Nuphar lutea</i>	Yellow water lily	Paprastoji lūgnė
	<i>Phragmites</i>	Reed	Nendrė
	<i>Polygonum</i>	Knotweed	Rūgtis
	<i>Ranunculus ficaria</i>	Lesser celandine	Pavasarinis švitriešis
	<i>Sagittaria sagittifolia</i>	Arrowhead	Strėlialapė papliauška
	<i>Schoenoplectus</i>	Club-rush	Meldas
	<i>Scirpus</i>	Wood club-rush	Viksvameldis
	<i>Taraxacum</i>	Dandelion	Kiaulpienė
	<i>Tragopogon</i>	Goatsbeard	Pūtelis
<i>Typha</i>	Bulrush	Švendras	
Stone fruits	<i>Hippophae</i> (?)	Sea-buckthorn	Dygliuotasis šaltalankis
	<i>Prunus padus</i>	Bird cherry	Paprastoji ieva
	<i>Prunus spinosa</i> (?)	Blackthorn	Dygioji slyva
	<i>Viburnum</i>	Nannyberry (?)	Putinas
Seeds	<i>Atriplex</i>	Saltbush	Balandūnė
	<i>Chenopodium album</i>	White goosefoot	Baltoji balanda
	<i>Glyceria fluitans</i>	Floating Sweet-grass	Paprastoji monažolė

Fig. 14. A list of plausible plants which could be preserved as remains of burnt parenchyma.

14 pav. Augalų, kurių parenchima galėtų išlikti archeologiniame kontekste, sąrašas

data given in Kubiak-Martens, 2016; The Euro+Med PlantBase). Another interpretation of this material is that it could be remains of burned bark. Supposedly, other methods applied to this research will give a more objective answer to this question in the future.

As there was almost no way to determine the exact species of the burnt plants, only a conclusion was made that fire was burnt to a quite high temperature in this prehistoric structure. Most of the burnt wood pieces were smaller than 10 mm. This feature showed a very fine and probably controlled burning of wood in the fireplace: this kind of tiny fine remains are usually left after a fire which was under control by humans who took care of the fuel burning by shoving unburnt bigger pieces in the fire center. The small size of the charcoal pieces was nearly unsuitable for distinguishing the wood species; however, an analysis of some bigger fragments has shown that structure No. 2 contained charcoal of *Pinus sylvestris* (pine).

The archaeobotanical samples from the fireplace also yielded few fragments of burnt *Corylus avelana*

(hazelnut) shell (Fig. 15). At first it was thought that the structure could be related to some nut eating activity. However, further excavation in 2015 has shown that there was a much bigger concentration of *Corylus avelana* shells to the south from structure No. 2. It could more likely be related to some other structures, namely to No. 9 or 10 (a-d), which were relatively closer to the nut shell concentration and were dated to the Middle Mesolithic (Fig. 8). Therefore, the few fragments of hazelnuts found in the fireplace probably got in accidentally or due to the bioturbations and should not be ascribed as a feature of this archaeological object.

Ground samples from structure No. 2 also contained some unburnt organic material which was attributed to the recent times. Some seeds of *Rubus idaeus* (raspberry) and needles of *Pinus sylvestris* (pine) were too fresh to be related to as early a period as Mesolithic.

Another sample given for archaeobotanical analysis was taken from structure No. 3. In spite of this struc-



Fig. 15. Hazelnut shells found in the same yellow fine-grained sand layer as the flint finds. Photo by G. Gudaitienė.

15 pav. Degusių lazdyno riešutų kevalų fragmentai, rasti geltono smulkiagrūdžio smėlio sluoksnyje kartu su titnaginiais radiniais. G. Gudaitienės nuotrauka

ture being quite close to the fireplace (structure No. 2) – around 1 meter away from it – the structure yielded almost no informative organic material. The ground of this structure contained only small charcoal pieces of undistinguished species of wood. As the ground sand around the structure had no chemical or physical impact of heating, it is still unclear if the structure was related to fire making.

The upcoming investigation of other structure samples will provide some more information about the settlement of the site and structure function. For now, primary results have shown that the archaeobotanical analyses are important and worthy as they may give additional knowledge about the behavior of Stone Age inhabitants of Pabartoniai site.

FLINT ARTIFACT TYPOLOGY

During the excavations conducted in Pabartoniai site in 2014–2015, more than 2700 flint artifacts were found, mostly of flintknapping debitage. 141 item (a bit more than 5% of all flint finds) were determined as flint tools, their fragments and blades with utilization. They should typologically refer to at least a few differ-

ent periods. The earliest phase could be Final Palaeolithic or Early Mesolithic, because a Late Swiderian (or Epi-, Post-Swiderian) leaf-form arrowhead was found in structure No. 2 (Fig. 10:33). Some scrapers made of blades, arrowhead fragments and utilized semi-regular blades, which were found in the deepest layers, could be added to the earliest inhabitant's tool kit as well (Fig. 10). A big part of the flint finds might be ascribed to the Middle or Late Mesolithic, these are as follows: utilized and retouched regular blades, lancets, unipolar cores, perhaps some of the scrapers made of regular blades. The latest flint find collection could be some unclear form implements made of less good quality flint flakes and nodules, as they differ from the earlier tool types made of fine flint material. Some other stone and pottery finds show that there was at least one Late Neolithic-Early Bronze Age settlement phase in Pabartoniai site, and the flint finds of lower quality flint material would be most likely ascribed to this period.

After analyzing the flint debitage, some notes about the knapping techniques used to produce tools can be given. Blades are mostly regular or semi-regular, detached from unipolar cores. Non-regular blades with intersecting double-direction knapping negatives



Fig. 16. Sandstone core and flake refit. Photo by G. Gudaitienė.

16 pav. *Jotnio smiltainio skaldytinis ir nuo jo nuskeltos nuoskalos.*
G. Gudaitienės nuotrauka

are rare. Therefore, it is most probable that either the bipolar knapping technique was used only on some very small number of cores, or bipolar cores were later formed into unipolar shapes and knapped on one direction. It is obvious that high quality flint material was scarce, if existent at all, in the River Neris basin; therefore, the Final Palaeolithic or Mesolithic inhabitants should have used it very economically. The later re-use of the cores in the Neolithic or Bronze Age should not be disclaimed as well because of the same reason. However, the bipolar and unipolar core knapping technique was common to the Early Mesolithic period and could possibly correspond with both Late Swiderian and Mesolithic archaeological horizons.

The numerous flakes with surface cortex remains found in Pabartoniai site reveal that flintknapping activity took part in site from the very beginning of pebble turning into core shapes. So a presumption can be made that the flint nodules were brought into the site without or with very little pre-shaping. Having in mind the distances from flint material sources (at least few tens of kilometers away to the south), it shows a quite high level of mobility that people possessed in the territory in the earliest stages of site settlement.

NON-FLINT STONE ARTIFACTS

The most outstanding non-flint stone artifacts in all the archaeological data found in Pabartoniai site were the knapped sandstone debitage collection and the twice perforated stone axe. These two finds deserve some additional attention.

The knapped sandstone pebbles (or cores) were also found in other places in the River Neris basin, excavated by Dr. Egidijus Šatavičius: e.g., in Pasioniai 1 (75 km to the southeast from Pabartoniai) or Sudota 2 site (120 km to the east from Pabartoniai) dated to Final Palaeolithic-Mesolithic (Šatavičius, 1998; 2000, p. 74; 2001, p. 22; 2002, p. 35; 2012a; 2012b; 2016, p. 31). The finds were interpreted as non-skilled, amateur trial knapping products (Rimkutė, 2012, pp. 53–65). Hence, a recurrent tendency of stone-knapping is apparent in Mid-Eastern Lithuania and especially in sandy river bank settlements. After the refit done on the **Pabartoniai sandstone core and its debitage** (Fig. 16), a sequence of intentional actions, such as “struck off, check, struck off” (after Wynn, 1985) could be seen, although no further use of the flakes was determined and almost no flakes were lacking. It seems that

the individual in charge of knapping had stopped the core formation process, maybe because the material appeared to be unsuitable. These features show that sandstone flake producing activity was the last action in the *chaîne opératoire* sequence before putting all the debitage to an object (structure No. 10d). Despite that, the purpose of this action is not clear yet, the sandstone material use for flake producing is a feature which links some of the earliest sites in the river Neris basin and has to be analyzed more precisely.

Another stone artefact – the **perforated diabase axe fragment** – should be dated to a much later period, most probably Late Neolithic or Bronze Age (Fig. 11:1). It was the only axe found in the site and it had an unusual feature – double perforation: one hole was probably perforated first and only its residue is seen on the polished axe upper edge, and the second hole, made for a hinge, was formed later, when the previous one was broken or unusable. The artifact did not refer to any of the structures unearthed in the site, yet, if viewed from a stratigraphic perspective, it was found rather deep, in the yellow, fine-grained sand, which mostly corresponds with Mesolithic flint artifacts. However, it was discovered in the same depth as the Late Neolithic or Bronze Age pottery shards found 6–7 meters further. Therefore, it can be presumed that probably the horizon of this settling phase was somewhere between 70 and 80 cm depth, while some of the earlier finds have shifted upwards due to bioturbation processes.

DATING

As the preliminary dating of the archaeological finds according with tool typology was already discussed, it is urgent to date the structures found in Pabartoniai site by the C14 AMS dating method. The first step was made after excavating structure No. 2, which contained a lot of charcoal and few flint finds: an unburnt Late Swiderian arrowhead and a semi-regular blade (similar to the one out of which the arrowhead was formed). A hypothesis was raised that this structure should be relatively early and date to Final Palaeolithic or Early Mesolithic, because Late Swiderian arrowheads in Lithuania were previously described as dating to the second half of Younger Dryas to the very beginning

of Preboreal (Šatavičius, 1997; 2001, p. 113; 2005a; 2005b; 2016, pp. 30–31). This assumption was based on radiocarbon date data from Poland and a presumed arrowhead type evolution from tanged form in an early phase (Younger Dryas) to a leaf form in its later phase (Younger Dryas-Early Preboreal). However, a charcoal sample from structure No. 2 was dated to 6659–6475 y cal BC (COL3261), and it corresponds to the Late Mesolithic, Boreal period. This date contravenes with the former knowledge about Late Swiderian culture chronology and without doubt the discussion on this question cannot be started without first providing more precise dating results. More AMS C14 dates from Pabartoniai site structures and the repeatedly investigated structure No. 2 can provide more accurate data, whilst the relation between the Late Swiderian arrowhead and the structure has to be carefully considered as well. Most probably, the arrowhead shifted into the structure due to bioturbation processes and should not be dated to Late Mesolithic as the structure itself. However, the find can still have relation with other structures nearby, which are dated to a bit earlier period – Middle Mesolithic: structure No. 9, found 3 meters further, dates back to around 7601–7481 cal BC, whereas structure No. 10d, uncovered only 2 meters further, dates to 7986–7516 cal BC. These two structures indicate a separate moment of Mesolithic settling in Pabartoniai. So even if the Swiderian arrowhead does not correlate with the structure No. 2, its chronology still stays undetermined and the probability of its correlation with the earlier period of settling in Mesolithic could be reservedly concerned. Moreover, it can be mentioned that regular blade knapping technology and the use of unipolar cores are common features in the Late Swiderian period (Зализняк, 1989; Šatavičius, 2016, p. 21). Therefore, structure No. 9, which contained a lot of regular blades struck from the unipolar core, and the tools made from these blades could fit to the complex of the Late Swiderian. Therefore, until no earlier structures have been identified in the site, Middle Mesolithic structures and Late Swiderian artifacts, put in one stratigraphic horizon, give a small reason to raise some questions on the chronology of different Pabartoniai site settlement phases and the latest probable dating of the Late Swiderian culture in Lithuania.

DISCUSSION AND CONCLUSION

After applying combined research methods and simultaneously analyzing the primary results, some notes about the first and later Pabartoniai site inhabitants can be given. First of all, a multiple settling of the site is obvious and, on the basis of the collected archaeological data, at least three or four phases of camping/settling can be distinguished before the Iron Age. This feature is common across sandy sites in Lithuania; however, in the case of Pabartoniai, there may be a chance to stratigraphically divide the different finds and structure horizons. Additionally, the precise C14 AMS dates can also help to draw the correlation between some structures and find horizons.

The archaeobotanical analysis of some structures in Pabartoniai site has shown that there was a probable controlled Late Mesolithic fireplace, where high temperatures were reached and pine was used as fuel for burning. Also, a hazelnut eating concentration was determined nearby; however, as it dates to an earlier period of more or less one thousand years, it was interpreted as a feature of a different stage of settlement.

After the find distribution analysis, one of the most interesting objects appeared to be structure No. 8, which refers to the Middle Mesolithic settlers and could be of a household activity function. Flintknapping sites were also distinguished, one of them yielding cores and core fragments specifically. All these prehistoric objects draw a bit complicated yet at the same time interesting and patchy view of the site settling and help to reconstruct an arrangement of the site probably common to most of the founders of the lower reaches of the River Neris basin.

An important link between Pabartoniai site and other Final Palaeolithic–Mesolithic sites in the River Neris basin became the knapped sandstone pebbles and its debitage. The artifact found in Pabartoniai site still needs a more precise interpretation. Nevertheless, it strongly supports the fact that non-flint rocks were also intentionally knapped in the Late Postglacial–Early Holocene period in Lithuania.

Nevertheless, since the dating of structure No. 2, where the Late Swiderian type arrowhead was found, is younger than it was supposed to be, it is reasonable to compare the flint assemblage of Pabartoniai site with other Swiderian sites situated along the river Neris,

as hunting tools are typologically alike. However, the broader issue – the chronology of the latest Swiderian culture existence in Lithuanian territory – may pose more problems than it was thought to have according with the typology of flint tools. Until no structures in the site at Pabartoniai were dated to earlier than Middle Mesolithic period, the correlation between Late Swiderian finds and the settlement objects is under consideration. One of the probable explanations to this point can be that the Late Swiderian people did not leave any traces (except of the flint tools) now visible in the site because of the short-time format of camping.

The features of structure No. 2 also raised questions of its function interpretation. The burnt structure with a stain of ochre and an unburnt Swiderian arrow point have to be carefully discussed. Even though the accidental artifact shift into the structure is possible, still the structure burning process should have been an earlier event, as the artifact had no impact of fire. Therefore, the charcoal dating to the Middle Mesolithic confuses the chronology, and ochre – a feature which usually has a symbolic meaning – makes the interpretation of this structure even more difficult. However, before relating this object to some ritual activity, a more detailed investigation of its chronology has to be done first and the relevance between the archaeological object and the arrowhead has to be reconsidered.

By all means, a further excavation and data examination by applying various research methods is essential to fulfill the reconstruction of the first settling of the Pabartoniai site. The most important part of research must now probably be done on the C14 AMS dating so as to make clarifications on the chronology of the site occupation.

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IŠ NAUJO ATRASTA PABARTONIŲ FINALINIO PALEOLITO–MEZOLITO GYVENVIETĖ NERIES PAKRANTĖJE

Gabrielė Gudaitienė

Santrauka

Pastaraisiais metais kasinėtoje Pabartonių akmens amžiaus gyvenvietėje (Jonavos r.) buvo atlikti įvairūs tyrimai, kurie suteikė naujos mokslinės informacijos, reikalingos Neries žemupio pirminio apgyvendinimo rekonstrukcijai. Archeologinis objektas, esantis ant antrosios viršsalpinės Neries terasos, dešiniajame upės krante, buvo tyrinėjamas dvejus metus, 2014 ir 2015 m. Kasinėjimų metu rasta daug titnaginio inventoriaus, degusios osteologinės medžiagos, skaldyto akmens radinių, keramikos šukių.

Remiantis stratigrafijos, planigrafijos ir radinių išsidėstymo analizėmis, nustatyta, kad šioje vietoje apsisotą keliskart. Ankstyviausieji gyventojai galėjo apgyvendinti Pabartonių jau vėlyvajame paleolite ar ankstyvojo mezolito pradžioje – tai liudija vėlyvajai Svidrų kultūrai būdingas karklo lapo formos strėlės antgalis su plokščiai iš reverso pusės retušuota bazine dalimi. Vis dėlto keturios struktūros Pabartonių gyvenvietėje buvo C14 AMS metodu datuotos viduriniu ir vėlyvuju mezolitu. Tai verčia abejoti šio strėlės antgalio sąsajomis su gyvenvietėje rastomis struktūromis.

Kiti titnaginiai radiniai gyvenvietėje yra būdingi įvairiems laikotarpiams, tad galimas jos pakartotinis apgyvendinimas mezolito laikotarpiu. Dalis titnaginio inventoriaus priklauso ir dar vėlyvesniam – vėlyvojo neolito ar bronzos amžiaus laikotarpiui. Be to, su šiais radiniais koreliuoja ir bent dviejų ankstyvos keramikos rūšių šukės bei diabazo kirvio su skyde kotui fragmentas.

Atskirų gyvenvietės etapų išskyrimą komplikuoja tai, kad archeologinis objektas yra smėlingoje vietovėje, kurią tūkstančius metų veikė įvairūs, ypač eoliniai ir bioturbininiai, procesai. Dėl to radiniai yra sumišę, pasiskirstę per įvairius smėlio sluoksnius iki 100 cm storio siekiančiame akmens amžiaus radinių horizonte. Vis dėlto tiksliai išmatuotų radinių išsidėstymo analizė ir atidengtų gyvenvietės struktūrų tyrimai parodė, kad bent iš dalies skirtingų apgyvendinimo etapų sluoksnius galima atskirti ir analizuoti.

Įdomus ir kartu labai svarbus radinys – skaldyto smiltainio nuoskalų koncentracija ir pats apskaldytas apvalainukas, rastas mezolitinėje struktūroje Nr. 10d. Tai – ne tik pirmųjų Pabartonių gyventojų žaliavos skaldymui pasirinkimo įvairovę liudijantis radinys, bet ir jungiamoji grandis su kitomis Neries baseino panašaus laikotarpio gyvenvietėmis, kuriose taip pat buvo rasta skaldyto jotnio smiltainio.

Tyrimus papildė bioarcheologiniai struktūrų grunte esančių augalų liekanų tyrimai. Pradiniais duomenimis, senovės gyvenvietėje buvo rasta mezolitu datuojama degusių lazdyno riešutų koncentracija, identifikuota struktūroje Nr. 2 deginta pušies mediena.

Tolesni Pabartonių akmens amžiaus gyvenvietės tyrimai, tikimasi, atskleis dar daugiau svarbios mokslinės informacijos, papildys turimus duomenis, o būtini botaninių mėginių C14 AMS datavimo tyrimai padės patikslinti šio archeologinio objekto chronologiją.

Įteikta 2016 m. spalio mėn.