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IDENTIFYING AN OLD STONE AGE SITE.
Archaeological and pedological investigations at Szekszárd-Palánk

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Preceding the Neolithic and marking the end of the Old Stone Age, the Mesolithic (corresponding with a transitional period between the Pleistocene and Holocene periods in geological terms) is still one of the blind spots of Hungarian archaeology. Based on available data, Late Epigravettian hunter-gatherers left the Carpathian Basin in the Late Glacial period (at the end of the Pleistocene period). In the following phase, one may only reckon with sporadic inhabitation until the emergence of Mesolithic cultures. As the related sites have only yielded very vague relative or absolute chronological data, clarifying their age and cultural connections is of exceptional importance for the research into the transition of the Paleolithic and Mesolithic periods in Hungary and Eastern Europe. In order to gain a better understanding of this transition, the National Institute of Archaeology of the Hungarian National Museum launched a research project aimed at processing the record of the sites mentioned above and conducting field research on certain sites.

Keywords: Old Stone Age, Mesolithic, pedology, Early Holocene Period

The project focuses on the study of the very end of the Old Stone Age when the relics of Late Epigravettian hunter-gatherers vanished from the archaeological record in the territory of today's Hungary; based on available radiocarbon dates, this happened about 14,700 years ago (Lengyel *et al.* 2021). The few sites in the following period until the onset of the Mesolithic indicate sporadic inhabitation, raising several questions and representing a ca. 3–4000 year-long chronological gap (Gutay & Kerékgyártó 2019; Horváth & Ilon 2017, 162; Kertész 2002; Marton *et al.* 2021; Sajó *et al.* 2015). Nevertheless, several studies refer to these 'Epipaleolithic' sites as 'young cave site assemblages' (Hevesi *et al.* 1983; Vértes 1965, 202–211) unearthed at Hont–Templomdomb (Gábori 1956), Jászberény–Nevada-tanya (Kertész 1997) and Szekszárd–Palánk, Kolping iskola (Vértes 1962). We present the preliminary results of a planned excavation conducted at Szekszárd–Palánk, Kolping Iskola, to shed light on this problematic period.

RESEARCH HISTORY

The archaeological site Szekszárd–Palánk, Kolping iskola is located in the outskirts of Szekszárd, northeast of the town, south of the Sió Channel, on the right side of Palánki Road (*Figs. 1–2*). In a broader geographical context, the site is in the Sárköz microregion (Tolna County), Duna Plain mesoregion, and Great Hungarian Plain macroregion. It is bordered from the west by the Szekszárd Hills, consisting of some conspicuous formations – escarpments – which separate it from the Sárköz Region of Tolna County (Ádám

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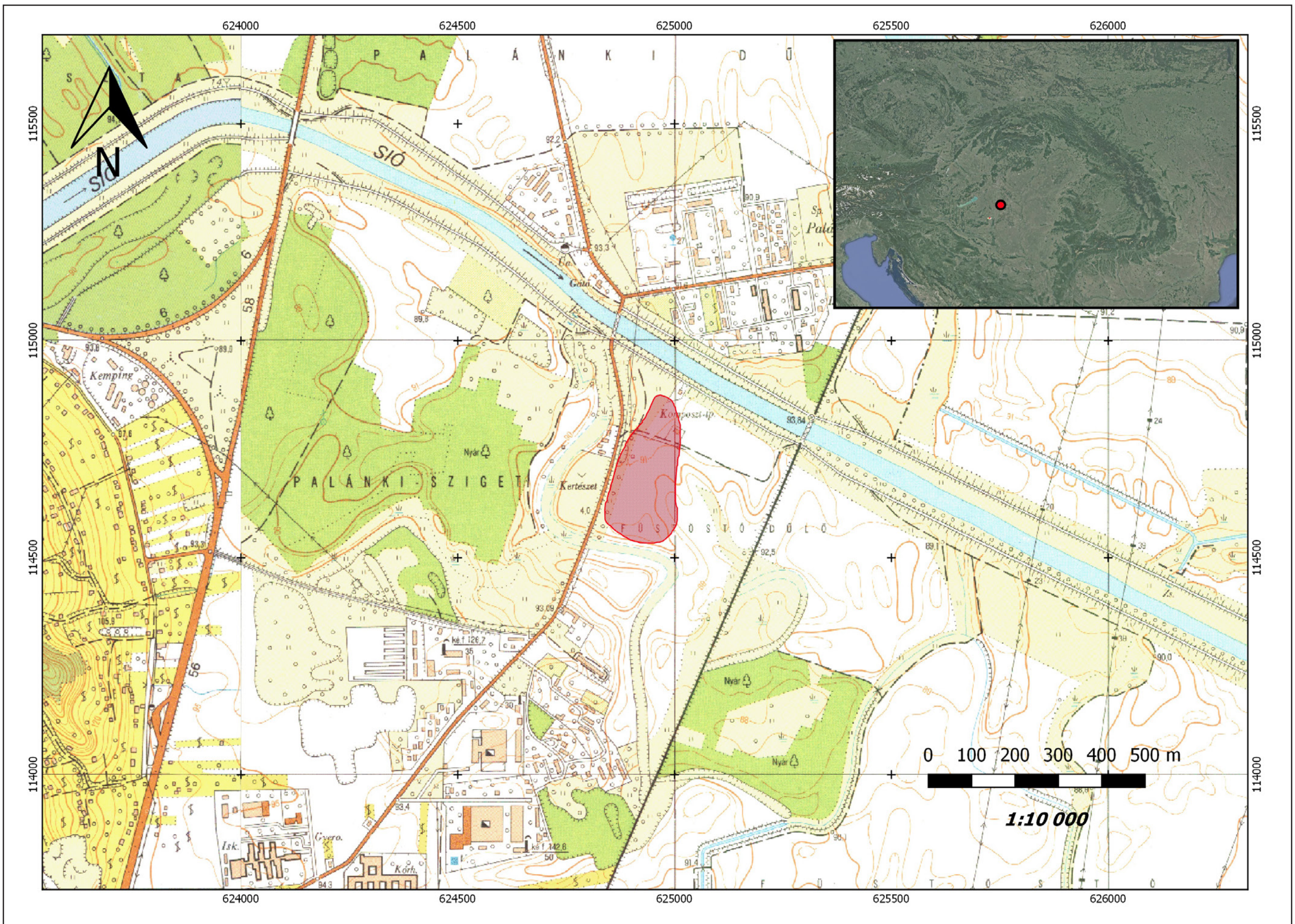

Fig. 1. Szekszárd–Palánk, Kolping iskola (66322). The site's extents (map by Kristóf István Szegedi)

1981). The Sárköz Region of Tolna is a subsiding alluvial plain on floodplain level, between 88.1 and 162 m a.B.s.l. (Dövényi 2010, 47).

The site was discovered during the construction of the embankment of the Sió Channel in 1957. First, 253 northwest-southeast-directed Avar Period burials were unearthed there, and then prehistoric and Hun graves and medieval furnaces came to light (Salamon 1968). Upon discovering chipped stone objects in a soil layer under the Avar burials, the archaeologists on the site notified László Vértes, who then conducted rescue excavations between 1957 and 1960. Based on a relative chronological and typological evaluation of the site's lithic record, Vértes dated it to the very end of the Paleolithic, as it contained both micro-Gravettian points and geometric microliths (tiny geometric stone tools) (Vértes 1962). His argumentation was partly supported by the results of scientific analyses, the most important of which were a geochronological evaluation by Pál Kriván and a radiocarbon measurement by Karl Otto Münnich in Heidelberg.

Fig. 2. The archaeological site from the east, with the Szekszárd Hills in the background (photo by Attila Király)

Based on the stratigraphic sequence, Pál Kriván assumed that the site is located on a lower terrace of the Danube, on a lower fluvial stratum that formed during the Bølling–Allerød Interstadial (14.7–12.9 thousand years ago based on current data) and became covered by a thin layer of loess in the younger Dryas (12.9–11.7 thousand years ago based on current data). Next, fluvial sand was deposited on the loess during the Preboreal (11,700–10,200 years ago based on current data) and, finally, soil formation began during the Holocene Period (Kriván 1960). László Vértes interpreted the sequence somewhat differently: the uppermost layer (humus and accumulation stratum B) covered a silty loess-like layer with increasingly sandy character (Vértes 1962, Abb. 4). He mentioned in his excavation diary in 1958 that a stratum of manganese precipitation with high gastropod content but no archaeological finds were found in the lower part of the layer sequence (Vértes 1958). Chipped stone finds were associated with the lower loess stratum. The conventional radiocarbon date 10,350±500 BP (408 c + b, #371), published in 1962, also confirmed the dating to the end of the Pleistocene (Vértes 1962, 162).

This date (corresponding with a 13,200–10,7000 BC calibrated dating) is too imprecise, offering no decisive evidence of whether the human presence could be assigned to the Late Glacial Period or the beginning of the Holocene Period 11,700 years ago. This and the published record question the correctness of the site's dating to the final phase of the Paleolithic, especially as Gravettian points (a find group identified by László Vértes at Szekszárd) practically disappear from Hungarian Upper Paleolithic records after the Late Gravettian Phase (30–26,000 years ago) (Lengyel 2016; 2018; Wilczyński *et al.* 2020).

The current interpretation of the stratigraphic sequence raised questions about the correctness of the radiocarbon date. The existence of the young loess layer that contained the chipped stones at Szekszárd-Palánk is subject to debate because of recent scientific results, which have proven that loess formation in the Carpathian Basin ceased 15,000 years ago at the latest (Novothny *et al.* 2009). The end of the loess formation and the improving climate were both marked by the intensive diffusion of elm (*Ulmus*) and common hazel (*Corylus*), two tree species typical to temperate mixed forests, 14,700 years ago (Magyari *et al*. 2019).

DATA COLLECTING AND DESIGNING THE EXCAVATION

Prior to the planned excavation, the researchers involved in this project had studied the find assemblage in the Old Archaeological Collection of the National Institute of Archaeology of the Hungarian National Museum. It indeed comprised geometric microliths, including two segments and a trapezoidal piece. The latter are often considered important age marker types in the Mesolithic (Kozłowski 2001). The assemblage also contained burnt bone tools, one of which yielded a new radiocarbon date (measured in the Hertelendi Ede Laboratory of Environmental Studies in Debrecen). Based on the result, the site could be dated to the beginning of the Holocene (the date will be published in a subsequent study). To assess the relevance of the radiocarbon data from 1962, we contacted the laboratory in Heidelberg that did the analysis. Based on the available documentation, the weight of the carbon sample, prepared chemically with sodium hydroxide and hydrochloric acid, was only 50% of the required amount, and it became boosted with ^{14}C-free carbon dioxide; this explains the higher uncertainty of the conventional radiocarbon data.

Prolonged GIS-based preparations preceded the field research because most of the hilltop of the site was extracted at the end of the 1950s, and modern utility lines also disturb the area so extensively that we were sceptical about whether any soil and sediment layer have been preserved. We relied on the 1962 and 1968 maps by László Vértes and Ágnes Salamon, an aerial photo from 1966 (source: fentrol.hu), and satellite images by Google Earth. Using cartographic data – including the location of a one-time psychiatric hospital and some still-functioning farm buildings (*Fig. 3*) –, we managed to georeference the boundaries of the trenches by Vértes and Salamon in the outskirts north-east of Szekszárd. However, as the outlines of the trenches were drafted on former cadastral maps at the end of the 1950s, redrawing them could not yield a perfect result. Their approximate positions indicated that soil layer sequences may have remined intact in the western and north-western fringes of the site, now under agricultural cultivation, even after the excavations. Old excavation photos with unearthed Avar burials in the northeast-southwestern front wall of the mine and Palánki Road, running towards Szekszárd on the embankment, in the background, also corroborated our hypothesis.

In summary, we expected to find an intact area of ca. 1000 m^2. Besides collecting cartographic and GIS data, a team from the Institute of Archaeology of the ELKH conducted a geomagnetic survey at the site, revealing a northeast-southwest public utility line that crossed the reconstructed area of the mine. Consid-

Fig. 3. Area of the site on an aerial photo taken in 1968. Yellow dashed line marks a public utility line, red line marks the reconstructed mining area, and red squares mark Trench 1, 4, and 5 (map by Kristóf István Szegedi)

ering the above, the excavation trenches were marked out west of the utility line and the one-time front wall of the mine.

PRELIMINARY RESULTS OF THE 2023 CAMPAIGN

An area of 12 m^2 was unearthed during the campaign. Trench 1 proved to be of no archaeological interest, as it only contained modern debris – the refilled, mixed content of the former mine pit. With an eye on that, we marked out Trench 4 west of the previous one. Although this trench also contained a disturbed, mixed debris layer, approximately half of it consisted of homogeneous, seemingly natural strata. The upper part of the observed layer sequence was a heavily eroded meadow-chernozem soil, under which we identified parent material. The humic horizon A was ploughed, compacted, and polyhedral in both Trench 4 and Trench 5 (marked out after Trench 4). We perceived effervescence upon dripping concentrated hydrochloric acid on the exposed soil layers, indicating that they are not leached. Simultaneously, rust mottling, manganese nodules, and greying soil matrix in the lower parts of the sequence indicated gleyic formation, perhaps caused by the rise of soil solution by capillary action in more dry period, re-leaching the soil layers. This layer might be the 'gleyic loess' recorded by László Vértes in his diary in 1958 (Vértes 1958). Manganese nodules concentrated in Layer 4C, with more gastropods, which is significant because László Vértes also recorded a similar layer underneath the one with archaeological findings as a substratum of the layer that comprised the artefacts. The material of this stratum seemed colmated on site, with heavily deteriorated aggregates, suggesting it being perhaps a one-time floodplain surface. In conclusion, Layer 4C has proven that the layer sequences unearthed in the 1950s and 2023 are identical. Despite the sequence of Trench

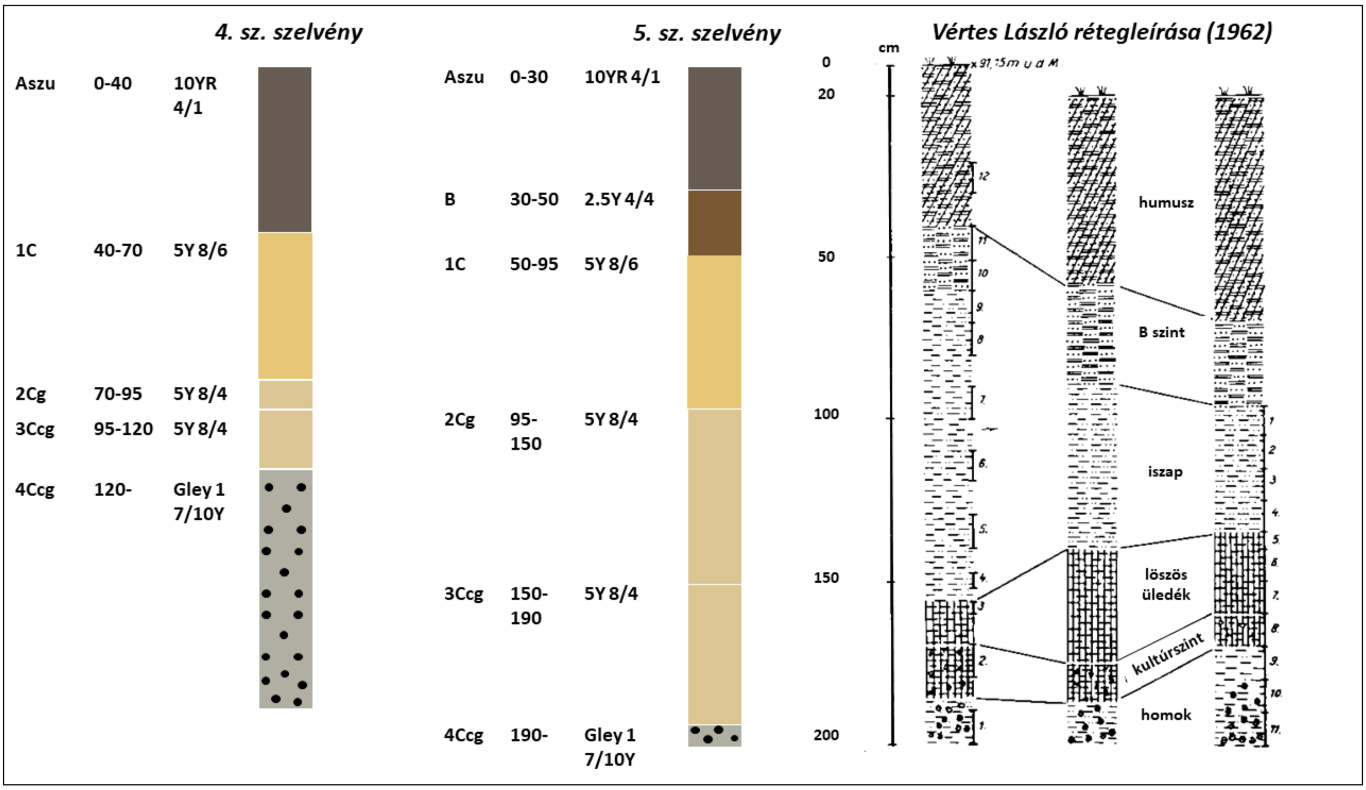

Fig. 4. A comparison of the 2023 year profiles and the stratigraphic sequence published in 1962. Capital letters mark the main layers in the soil profiles, and lowercase letters refer to the secondary properties of these. Aszu: ploughed horizon rich in organic matter and including anthropogenic pollutants; B: transitional horizon with lower humus content; 1C: parent material; 2Cg: gley layer, a result of waterlogging; 3Ccg: gley layer with calcium carbonate precipitation, a result of waterlogging; 4Ccg: gley layer with calcium carbonate precipitation, a result of waterlogging (graphics by Kristóf István Szegedi)

Fig. 5. The unearthed Avar Period burial (photo by György Lengyel)

4 consisting mainly of loamy sand/sandy loam layers, we could not identify the characteristic loess layer recorded by Pál Krizsán.

Trench 5 was opened north of the previous one (*Fig. 4*). The meadow-*chernozem* soil was less eroded there, and its transitional horizon B had a more defined, crumbly character. The four layers identified under that were virtually identical to those observed in Trench 4, also of loamy sand/sandy loam character and featuring marks of reduction-oxidation processes. Also, Level 4C was characterised by a relatively high gastropod content, manganese nodules, and colmated floodplain material.

Albeit we could identify the sequence, we did not find chipped stone artefacts, perhaps because our trenches were located slightly west of the ones by Vértes and, thus, the excavated Early Stone Age settlement.

In the trench, we also found a Late Avar Period grave (*Fig. 5*), which can be associated with the 253-grave cemetery partly excavated between 1957 and 1960. The deceased was presumably interred in a coffin in the rectangular grave pit with rounded edges. The burial has been disturbed in the area of the skull and the torso, and most bones were scattered in the northern part of the pit. Only four objects were found in the burial: fragments of an iron object and an iron buckle pin at the pelvis between the thighbones, while in the southwestern corner of the grave pit, an iron buckle in a secondary position and a complete, small, red-brown, grit-tempered slow-wheeled vessel with soot stains and combed wave decoration on the rim and shoulder (*Fig. 6*). Based on its finds and orientation, Grave 6, excavated in 2023, fits the late horizon of the cemetery (Salamon 1968).

Fig. 6. Late Avar Period vessel found as a grave deposit in the burial pit (photo by Zoltán Ferenc Tóth)

SUMMARY

During the 2023 campaign, we verified the site as the unearthed soil layer sequence proved identical to those unearthed by Vértes and Kriván; the discovered Late Avar Period burial in Trench 5 also corroborated the match. We plan further pedo- and sedimentological analyses, which may provide a better understanding of the surface formation and chronology of the site and contribute to a more accurate dating of the chipped stone assemblage stored in the collection of the Hungarian National Museum.

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