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Attila Király

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REVIEW ARTICLE

Lithic Research Roundtable 13, 2023

Edited by Attila Király[a] & Tamás Sági[b]

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Abstract. The 13th annual meeting of Hungarian lithic specialists was held on December 8, 2023, from 9:00 a.m. to 5:00 p.m. at the Eötvös József Collegium's Tibor Mendöl Geography-Earth Science-Environmental Science Workshop, Budapest, organized by Tamás Sági and Attila Király. The abstracts of the presentations and posters are as follows.

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A re-evaluation of the Szekszárd-Palánk industry

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The paucity of Late Glacial archaeological sites in the territory of Hungary presents a significant gap in knowledge about the busy settlement history of East-Central Europe following the Last Glacial Maximum. Szekszárd-Palánk is one of the handful of in situ excavated sites from this period and region which is also supported by radiometric dating. However, the considerable time that has passed since its discovery and publication by László Vértes, necessitates a revision of his findings according to our current knowledge, a topic of this paper. Szekszárd-Palánk was located on the edge of the gallery forests accompanying the Danube and a more open hilly region, at the intersection of several ecological niches, which ensured multifaceted resource utilization. The excavated phenomena display a coherent spatial organization, and traces of several activities, based on which we consider Palánk as a base camp of a residentially mobile community. The lithic toolkit contains mostly processing tools, among them, end-scrapers. In addition, armatures are present, although the types suitable for cultural comparative studies are underrepresented. The microlithic industry was opportunistic, exploiting the available raw materials exhaustively. The technotypological analogues of the assemblage are Late Epigravettian - Early Mesolithic sites of the Northern Balkans to the south, and the small number of Epimagdalenian sites of the Moravian Basin in the Czech Republic to the north. The pronounced presence of Bakony, Cserhát and other northern lithic raw materials also draws attention to the connections to this direction. The southern location of the site and the northern raw materials of the collection support two previous hypotheses: the survival of the Epigravettian traditions in the northern part of the Balkans and the southern part of the Carpathian Basin, and the pivotal role of the Danube in the communication between East-Central Europe and the Balkans in the Late Glacial–early postglacial. The site is thus identified as a regional Final Epigravettan Late Palaeolithic or Early Mesolithic transitional industry.

The results of the year 2023's archaeological research of the Szekszárd–Palánk site

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Szekszárd-Palánk is an iconic site of the Hungarian Old Stone Age research. Based on the stratigraphy of excavation conducted in the 1950s and his typological observations, László Vértes placed the lithic assemblage at the very end of the Palaeolithic, while by later research it was classified as early Mesolithic based on its stone raw material and techno-typological composition. However, the absolute chronological date reported by László Vértes (calibrated 13.2–10.7 thousand years ago) gives the site too broad a time frame. Based on this date, it was not possible to decide whether the human presence can be attributed to the late glacial period or to the beginning of the Holocene, which began 11.7 thousand years ago. To solve the chronological questions, the chipped stone material was reevaluated from a typological point of view, an AMS radiocarbon measurement was performed on the remains of animal bones from the excavation of the 1950s, and then the layer sequence of the site was verified during excavation in 2023. Our new data will be presented during the presentation.

Red sandstone groundstone tools along the Danube River

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Red sandstone research in Hungary goes back to the end of the 1800s, but at that time such investigations were carried out mainly from a geological perspective. At first, the Permotriassic material of the Balaton Uplands and the Mecsek Mountains, from which the first analysis was mapped and geologically investigated. Later, from the middle of the 20th century, ore and radioactive material research also became a focus of interest, under the leadership of the 'Mecseki Ércbányászati Vállalat' ('MÉV'). Thanks to this, numerous research boreholes were prepared to study the appearance and occurrence of sandstones, their stratigraphical positions and composition. Later, the investigation of surface occurrences of red sandstone also began (Majoros, 1983; Csernussi, 1984; Fazekas, 1987; Barabás & Barabás-Stuhl, 1998). The archaeometric examination of the material started only much later (Szakmány & Nagy, 2005; Palágyi et al., 2006; Péterdi, 2012) and continues today (Péterdi, 2020; Miklós et al., 2021, 2022a, 2022b).

When the term 'red sandstone' comes up in archaeological research, everyone thinks of one of the previously mentioned locations, within which two sandstone occurrences are usually highlighted, as potential raw material for stone tools. These are the 'Balatonfelvidék Sandstone', 'Kővágószőlős Sandstone' and the 'Jakabhegy Sandstone' Formations. By "suitability" we mean that the material must be sufficiently solid, i.e. resistant to the mechanical effects that the tool experiences during processing and use-wear, i.e. human activity and work (e.g. grinding, polishing, milling). Our ancestors had an extremely high level of knowledge regarding the quality of possible raw materials, but at the same time, the general belief that tool stones always come from nearby raw material deposits is not true in all cases. This is influenced by many factors, such as the location of the settlement (in a geographic sense), as well as the distance and quality of the available raw materials, etc.

In this work, five sites will be investigated. Out of these four sites are located along the Danube: 1) 'Perkáta, sand mine'; 2) 'Paks-Gyapa, Szelelő-hegy, TO-16'; 3) 'Palotabozsok, Szarvas-hegy' and 4) 'Lánycsók, Gata-Csotola, TO-67 Site'. Additionally, a more distant one, located on the southern shore of Lake Balaton, 5) 'Balatonendréd, Öreghegy, Vaklápa'was also chosen. During the macroscopic observation, a selection of different sandstone types was made from each site. Our goal was to set up a selection of different types of sandstone raw materials, so thin sections were prepared from the selected nearly 40 samples. Based on our petrographic tests, 68% of the selected finds were classified as 'red sandstone', which term expresses the origin of the raw material and not the actual colour of the sandstone. Four different 'red sandstone' types could be differentiated, out of which three correspond to the Permotriassic material of the previously presented areas and can be classified into the 'Balatonfelvidék'-, 'Kővágószőlős'-, and 'Jakabhegy Sandstone' Formations. The fourth raw material type is a significantly younger one. It can be associated with the material of the 'Hárshegy Sandstone' Formation, formed 34-23 million years ago.

The research was funded by the NKFIH 131814 project.

Exploring a grinding stone concentration in a ditch at the Late Bronze Age enclosed settlement of Gradište Iđoš

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The fortified settlements in the Southern Great Plain are the imprint of the changes in settlement structure that occurred in the middle phase of the Late Bronze Age (ca. 1400-1200 BC). Nearly 100 are known in the Serbian part of the Banat alone, according to recent research. Among the fortified settlements, the so-called mega-forts are outstanding in size, being at the top of the settlement hierarchy and covering hundreds of hectares. Gradište Iđoš (Tiszahegyes) is the largest settlement of the Serbian system of fortifications. Systematic research at the settlement, surrounded by multiple ditches, started in 2014 and is ongoing. Excavation in 2021 revealed a deposit of 106 macrolithic objects at the terminal of a ditch surrounding a small enclosure in the centre of the fort. The stone tools were recovered from several layers, from the bottom to the top of the ditch, in the same location. In this presentation, we will discuss the primary results of the study of the macroliths, the possibility of interpreting the stone tool finds as a structured deposit and the next steps in the investigation of the tool stones.

Szirák-/Vanyarc-Balogi-tábla: an open-air Palaeolithic site in the Cserhát Mountains (Northern Hungary)

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The site, crossed by a about 10 m wide line of trees planted on the border of the settlements of Szirák and Vanyarc, was located by PA in the summer of 2003 after the previously fallow area had been ploughed deeply. The site was available for surface collection for four years, until 2007. Afterwards, the western part of the site (BT01), belonging to Vanyarc, was fenced off and turned into pasture, while the eastern part (BT02), belonging to Szirák, became a neglected, weedy mowing field. In 2009, part of the collected finds was transferred to the Kubinyi Ferenc Museum in Szécsény, where they were studied for the first time in autumn this year, thanks to the kindness of archaeologist Szilvia Guba. Near the site, at a distance of 2.5–3 km, two smaller Palaeolithic concentrations are known (Vanyarc 8, Vanyarc-Kis-Újság-hegy), but these were inhabited and partly disturbed by younger prehistoric, Neolithic sites. In the area of the Balogi-tábla (Balogi Plateau) itself, there are also several smaller Neolithic concentrations. Of these, a Neolithic concentration was settled on the Palaeolithic concentration marked BT05, located about 100–150 m from BT01.

The archaeological material of the site consists only of flaked stones, the number of which is 890. The raw material use is dominated by the local limnic silicite of relatively poor quality, resulting in a very high number of fragments and sherds, but an unusually low number of tools. Local limnic silicite is followed by erratic flint, a long-distance raw material, of which the proportion of tools is much higher compared to the local limnic silicite. Based on the small number of cores found, technological conclusions cannot be drawn, but blades and retouched blades are also present among the finds. From a typological point of view, based on the bifacially worked pieces and side-scrapers, the lithic assemblage of the site can be considered relatively Early Upper Paleolithic, in our opinion, a manifestation of the sensu lato Aurignacian technocomplex. Although few, similar lithic finds characterize the above-mentioned smaller Palaeolithic concentrations as well.

Lower Palaeolithic artefacts from the Castle Cave at Buda (poster presentation)

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In the 1930s Ottokár Kadić and Mária Mottl were the first to report about manufactured pebbles of the Mosbachian age, according to the terminology of that time, from the Castle cave (Vár-barlang) in Buda. In the 1960s, when the only authentic site complex securely dated to the Lower Palaeolithic in Hungary was discovered in Vértesszőlős, due to the priority, the excavator László Vértes proposed the name of 'Buda industry' for the archaeological entity dating back to the Middle Pleistocene, using small pebbles.

In the following decades, partly during the complex investigations of the Castle Cave, partly as part of paleontological studies or during speleological investigations, seemingly chipped stone artefacts were reported from several places.

In the summer of 2023, we had the opportunity to document the locations of the lithics known from the cave. The classical Uri and Országház utca occurrences are no longer accessible, however, based on the published data, the pieces were collected from alluvial sediments. Moreover, no clear traces of manufacture can be recognized on the rolled fragments made of hornstone and dolomite stored in the collections.

In the ceiling limestone of the 'Elephant-tooth chamber' Mihály Gasparik found several lithic artefacts. During our work, we were able to identify the site in the ceiling of cellar No. 137, lying beneath house No. 21 on Uri Street, from a topographical point of view.

During the 2000s, the Ariadne cave research group mentioned bone remains and chipped stone tools from the 'Turkish well chamber' of the cellar under houses 151 and 153 Szentháromság Street. Perhaps the same site was identified in 1964 by Péter Szablyár and János Haas, then students at the Tata Geological Technical College, and Kálmán Barátosi, who collected siliceous pebbles embedded in limestone tuff. (According to the data of the inventory book, however, the site was located at the northern end of Castle, at the cellar nr. 200 under 20 Országház street).

The occurrences of stone tools documented this year will enable further investigation of the archaeological sites below the surface in the central part of Buda's Vár-hegy in the future.

Preliminary Results Of The Petrological Examination Of A Gneiss Grinding Stone (Boleráz Culture, Mödling–Jennyberg, Austria) (poster presentation)

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In our poster, we present the results of the petrological (polarization microscopic) examinations of the orthogneiss grinding stone found at the previously presented Mödling–Jennyberg site, comparing the characteristic microscopic features of the raw material with similar features of a probable raw material source, the orthogneiss belonging to the Grobgneis series of the Lower Eastern Alps.

Mödling–Jennyberg (Péterdi et al., 2022; Horváth et al., 2023) is a hilltop settlement of the Boleráz culture in the vicinity of Vienna, located about 2 km from the hilltop settlement of the Jevišovice culture (Maria Enzersdorf–Hirschkogel). The two sites have settlement layers of the same age (from 3400/3300 BC to 2900/2800 BC) (Horváth et al., 2023).

The only gneiss grinding stone found in the material we examined was discovered during the 1970-1971 excavations in Jennyberg and is kept in the Natural History Museum in Vienna (Naturhistorisches Museum Wien, Inv. number: 77952).

The large lower grinding plate found in two matching pieces (445x300x70 mm, grinding surface: 410x280 mm) has a slightly convex, worn grinding surface, the lower part is smooth, while the upper side plate is only roughly carved.

During the examination of the artefacts, we did not use destructive techniques, however, the cutting remains of the samples taken in the first half of the 1970s were available, so we managed to make a new thin section from the material of the studied grinding stone, which is examined with a polarizing microscope (Nikon ECLIPSE LV100N POL). Microscopic images were taken with NIS Elements software.

The raw material of the grinding stone is macroscopically white, pinkish (with a light red weathering colour), coarse-grained, with a deformational fabric (foliation). Its main constituents can be identified with the naked eye: quartz, feldspars and mica (muscovite).

Based on its microscopic characteristics, the raw material of the grinding stone is orthogneiss, its main rock constituents are quartz, feldspars (potassium feldspars and plagioclase) and mica (muscovite). In addition to traces of metamorphic transformation (deformational fabric, polycrystalline quartz grains, albitization), signs of the original magmatic formation (euhedral quartz grains, perthitic potassium feldspars, rutile forming a sagenite lattice, myrmekites) are also preserved.

Orthogneisses, similar in texture and mineral composition to the studied find, are also found relatively close to Mödling–Jennyberg, primarily in the Sopron Mountains and Lower Austria (Grobgneis series, e.g. Draganits 1998; Török 1998). Determining the exact raw material source requires further investigations.

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Preliminary results of the archaeometric examination of metadolerite polished stone tools (Mödling–Jennyberg (Boleráz culture) and Maria Enzersdorf–Hirschkogel (Jevišovice culture) sites, Austria) (poster presentation)

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In our poster, we present the results of the archaeometric investigation of kaersutite-bearing metadolerite polished stone artefacts found in the previously presented (Péterdi et al., 2022; Horváth et al., 2023) two hilltop settlements near Vienna: Mödling–Jennyberg (Boleráz culture) and Maria Enzersdorf–Hirschkogel (Jevišovice culture). The two sites located about two km apart have settlement layers of the same age (from 3400/3300 BC to 2900/2800 BC), Horváth et al., 2023). Systematic excavation took place at the Hirschkogel site in 1926 and at Jennyberg in 1970-71, but the material of the long-researched sites mainly comes from undocumented, sporadic, amateur excavation activities.

Most of the macrolith finds in Maria Enzersdorf–Hirschkogel are polished stone tools, while in Mödling–Jennyberg mostly ground stone tools and pebbles have come to light.

The number of artefacts with metadolerite raw material is small at both sites: 6 pieces at the Maria Enzersdorf–Hirschkogel site (out of the 67 macroliths we examined), 1 piece at the Mödling–Jennyberg site (out of the 59 macroliths we examined).

No destructive techniques were used during the examination of the finds: in addition to macroscopic inspection, the magnetic susceptibility of the finds was measured (with a kappameter (type KT-5), see Bradák et al., 2005, 2009 for necessary corrections), as well as with scanning electron microscopy and energy dispersive X-ray spectrometry from the original surface (OS-SEM-EDX, Bendő et al., 2013) we determined the mineral composition and the texture of the rock.

Macroscopically, the findings classified as metadolerites are made of dark grey, black, fine or very fine-grained rock, in which feldspars and mafic constituents can also be identified with the naked eye. In the case of several finds, the grouping is made uncertain by the advanced surface weathering.

The magnetic susceptibility (MS) of the studied finds is varied, lower than serpentinites and higher than contact metabasites: 0.790-15.435 SI units.

Based on the OS-SEM-EDX results, the main rock constituents are feldspars and amphiboles. In addition to feldspars of varied composition (andesine, anorthoclase and albite), the rock contains cummingtonite (already started to transform), cummingtonite with a high titanium content and ferri-kaersutite. Ferri-kaersutite appears both independently and on the rim of cummingtonite (already started to transform). In addition to the main components, quartz, ilmenite and a small amount of biotite are also found in the rock, as well as ulvöspinel and apatite as accessories.

Kaersutite-bearing metadolerites can be found in several areas further away from the studied archaeological sites (e.g. in the Western Sudetes in Poland, and the Juvavic Nappe System of the central and eastern Northern Calcareous Alps), but a more precise definition of the source area of the examined raw material requires further investigations.

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Magyarnándor: evaluation of a Late Middle Palaeolithic site and the assemblage (poster presentation)

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During the spring of 2021, a new Late Middle Paleolithic open-air site was identified near Magyarnándor, in the northern part of the Cserhát Mountains. The agricultural cultivation of the area was abandoned that year, so further surface collection was essentially not possible. During the summer of the present year, the Béla Dornyay Museum, the Ferenczy Museum Center and the University of Szeged carried out a stratigraphic sound excavation on the site.

Rather unexpectedly, the layer-sequence observed on the hilltop proved to be intensively eroded. In the present-day brown forest soil, only very scattered Palaeolithic artefacts and a feature, dated to the Neolithic was observed. In the Pleistocene level with loam of reddish colour, dated probably to the Pleistocene, several natural fragments of siliceous pebbles were found, and finally, the yellow loamy loess proved to be sterile in archaeological point of view too.

The lowermost layer of the extremely reduced sequence, a chalk-white/ash-grey shallow-sea or brackish water laminated sediment (most probably “Budafok Sand Formation”) without fossils dated to the Paleogene was documented. Our stratigraphic data can be compared with surface observations made at the nearby Debercsény–Mogyorós site, where the ploughing brought to the surface both the small number of lithic artefacts dated to the same period as the Magyarnándor tools and the coarse gravels, of Paleogene age.

The small surface-collected assemblage from Magyarnándor contains several interesting technological features: leaf-shaped implements with opposite orientation and alternating retouch, as well as end-scrapers made on transversal flakes and core-edge flakes, also known from the Debercsény site. As a total, the distribution of tool types shows connections with the industry rich in end-scrapers found in the artefact-bearing layer of the Szécsénke-Kis-Ferenc-hegy site.

Concerning the raw material types used on the site, the assemblage shows similarities with the “pioneer community” found in the artefact-bearing layer of the Galgagyörk-Csonkás-hegy site, In the case of the Magyarnándor assemblage, siliceous pebbles of local provenance was used in larger quantities instead of andesite, known from the southern part of the Cserhát region.

Archaeological research in Demjén-Szőlőhegy

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The site of Demjén-Szőlő-hegy, discovered in 1974 by Viola T. Dobosi, is mostly known to the profession thanks to the tireless field research work of Sándor Béres starting from the 2000s. During the research carried out in cooperation with Krisztián Zandler and Dalma Kerekes, the Szőlő-hegy area was divided into three separate sites marked with different numbers, based on the density of surface scatters. Based on the collected lithic material, Demjén - Szőlőhegy I and III sites are dated to the early period of the Aurignacian cultural complex, while Szőlőhegy II site was classified as the initial phase of the Upper Paleolithic. During August of 2023, we tried to learn and clarify the stratigraphic conditions of the site within the framework of a test pit excavation. We opened trenches close to all three sites to the best of our ability, however, we were unable to observe or identify the cultural layers of the sites, mainly due to soil erosion. During the fieldwork, soil and charcoal samples were taken from the strata for OSL dating, C14 dating, and micromorphological evaluation. In the absence of find material from the archaeological context, the results of the sample measurements are expected to give us clues about the stratigraphic and chronological relationships of the sites, from which we can conclude a palaeolithic settlement.

The lithic assemblage of Andornaktálya-Marinka

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The region of Eger became the subject of palaeolithic research after World War II, but more significant results emerged with the onset of intensive field surveys in the 1980s-1990s onwards. Thanks to these efforts, numerous archaeological sites of different periods and cultures are known around the area, such as Andornaktálya-Marinka. The site is located southeast of Eger at a distance of 7 kilometres, on the top of a 234-meter-high elevation between the villages of Andornaktálya and Ostoros. It was discovered in 2014 by Cserpák Ferenc, who conducted continuous field surveys in the area. Subsequently, in the summer of 2018, a two-week-long excavation was carried out at the site, primarily prompted by the raw material composition of the continuously increasing assemblage. Our research began in December 2020, which included both the surface findings and the excavated artefacts. A variety of methods were used to document each lithic artefact, including raw material, typological, and technological examinations. Based on our research and the previous results, the site yielded two kinds of archaeological material distinguished by the use of different raw material sources. One is predominantly composed of quartz porphyry (metarhyolite), while the other is characterized by Silesian erratic flint. The technological and typological differences further substantiate the existence of these two materials on the site. In our presentation, we aim to provide a detailed overview of the assemblage, complemented by previous information.

Analysis of the obsidian blade from Csongrád-Kettőshalom, Southeastern Hungary

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In 1962, Katalin Nagy, archaeologist of the János Tornyai Museum, Hódmezővásárhely, excavated a grave in the Kettőshalom sand pit near Csongrád. Gyula Gazdapusztai compared the burial with the Yamnaya circle. István Ecsedy, who analysed the archaeological material in detail, compared to the finds known from the cemetery of Decea Mureşului (Marosdécse, County Alba, Romania). This classification was later supported by the results of the radiocarbon dating (5470 ± 40 BP, 4442–4243 cal BCE).

Next to the skeleton, a lump of red ochre, several shell and copper beads as well as an obsidian blade was found. The first non-destructive, but, due to the facilities of the eighties, not completely accurate examination, of this later piece made probable that its provenance can be traced in the Carpathian Basin.

Recently, it has become possible to obtain more accurate data concerning the raw material provenance with the help of the non-destructive prompt-gamma activation analysis (PGAA) and later, hand-held X-ray fluorescence (pXRF). As a result, the Central European origin of the obsidian having a distinct brown shade and translucent material, different from each variant known from the Carpathian basin, can be ruled out.

The burial rite and the composition of the grave goods of the Csongrád grave point to the area lying north of the Black Sea and the Caucasus. As the raw material is macroscopically similar to the obsidian varieties known from Georgia (Gruzia in Russian), but based on the recent analyses, the chemical composition of the samples is different too. The provenance studies carried out in a wider geographical range, suggested that the possible source area of the raw material is found at the lava flow of Göllü dağ East (Kömörcü) in Anatolia with the greatest reliability.

Thus, the recent results based on independent raw material analyses suggest a clear connection between an Early Copper Age site in Hungary and the source of raw material over a distance of more than 1,700 km.

Pebble Gravettian locality at Vác

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The Palaeolithic research of the Danube bend goes back a century and a half. However, the majority of the known and excavated sites are mostly located along the right bank of the river, between Esztergom and Csillaghegy. At the same time, along the opposite bank scattered finds were collected by a teacher from Nagymaros, János Adolf Horváth mainly before World War II, and until now only two localities have been excavated.

The third site, which potentially can also be examined by excavations, was identified on the hilltop near Vác by our friend and colleague, Sándor Béres. The lithic assemblage collected by himself has already been published; in the presentation, we will discuss the material that was found partly together with Szása but has not been published yet. Importantly, during the surface collections, we found a relatively large number of fossil reindeer or wild horse long bone fragments, as well as a few fragments of young mammoth tooth lamellae.

During the field surveys, two find concentrations could be documented until now. Among the lithic raw material groups, the presence of the limnic silicite and silicified limestone variants of (largely) local origin, as well as the presence of the siliceous pebble and radiolarite also collected from secondary sources, and, finally, the obsidian and especially a long-distance lithic raw material, erratic flint from present-day Poland are noteworthy.

Among the formal tools, end-scrapers made on blades, variants of retouched blades and bladelets, as well as burins are characteristic. In the collected assemblage, the cores and the characteristic burin-cores are also found.

Finally, a fossil Dentalium sp. and Melanopsis sp. shell-trinket were also found.

Overall, the stone material from Vác is compared to the typical pebble-working assemblages known from the Mogyorósbánya-Újfalusi-dombok and Szob-Ipolypart sites.

Middle Palaeolithic tools from the Ostoros site in the collection of Sándor Béres

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Thanks to its viticulture, many Palaeolithic sites were discovered in the vicinity of Eger since the end of the 1940s. One among them is Ostoros-Rácpa, which became known in 1966 when László Vértes and József Korek carried out a small excavation, but no cultural layer was found. The find material was published by Viola T Dobosi in 1971, following the perception of the time, as the industry of the Mesolithic Eger culture. During the revisions of the Eger culture in the 1990s, she interpreted the same material as an industry belonging to the Middle-Upper Paleolithic transition. However, the revision only assessed the finds previously included in the museum collection. Field research was not carried out at the site until April 1999, when Sándor Béres visited it for the first time, and then collected there regularly until November 2005. Then, Krisztián Zandler processed the find material that had been found in his MA thesis completed in 2006. Based on typological, technological and raw material usage characteristics, Ostoros-Rácpa was defined as an open-air site of the Szeletian culture. In the following decade, Sándor Béres turned his attention to other Palaeolithic sites, and only from 2016 on did he deal with Ostoros again. From his more recent observations, he concluded that the site contains assemblages of an Aurignacian and an early Upper Paleolithic leaf-tool industry. He was primarily occupied with the separation of the pieces belonging to the two cultural units within the collection. At first, he also considered Middle Paleolithic tools to belong to the leaf-tool industry. He gave these finds with a Middle Palaeolithic character to me for study and review, which I now fulfil as an old debt.

Bulk chemical characterization of Prehistoric polished stone tools: what for? An overview of the interpretation of PGAA data at the end of a 4-year project

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Bulk chemical composition analysis is a key component in the provenance research of archaeological finds. It is known, though, that different methods (due to their different sensitivities) show variable effectivity on different rock types. Our presentation summarizes the interpretation possibilities and the success of prompt gamma activation-based (PGAA) chemical data in material characterization (i.e., the type of the matter) and provenance identification (i.e., the source of the matter). Thus, we provide an overview of experiences collected in a 4-year project (OTKA K-131814) and previous long-term ones (OTKA T 013638; T 023784; T 025068; K 62874; K 100385).

This presentation focuses on the material characterization and provenance identification levels of PGAA data in the case of different rock types. There are cases when they are not possible exclusively based on bulk major and minor element composition. Consequently, further – usually destructive – investigations might be necessary to come to provenance conclusions. PGAA is especially appropriate to characterize the rock type in the case of serpentinite and 'white stone' (discriminative elements are Si, Ti, Al, Fe and Mg). However, clusters of 'greenish metamorphic rocks' and basic volcanic-subvolcanic rocks cannot be segmented properly. For basalt and nephrite, PGAA can discard some of the potential sources (based on concentrations of alkali metals, Al, Fe and Ti) but is not able to exactly determine the locality. Successful provenance research could be done for hornfels, contact metabasite and HP-metamorphites. When investigating other rock types, the methodology has to be completed with further techniques (e.g. magnetic susceptibility, microscopic petrography, scanning electron microscopy).

As a result of the experiences of our more long-term research projects, PGAA got its irreplaceable role in the provenance investigations of polished stone tools. Taking advantage of the rock type characterization, more exact geographic and temporal raw material distribution of polished stone tools can be outlined which is a useful tool in archaeology. By exact determination of the sources, directions of raw material transport can be further understood.

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