

## ARCHAEOLOGICAL INVESTIGATIONS AT PECICA “ȘANȚUL MARE” 2006–2009

*John O’Shea\**, *Alex Barker\*\**, *Laura Motta\*\*\**, *Alexandru Szentmiklosi\*\*\*\**

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### Archaeological Investigations at Pecica “Șanțul Mare” 2006–2009 (Abstract)

This paper summarizes the results of area excavations conducted at the Bronze Age settlement of Pecica “Șanțul Mare” during the years 2006 through 2009. The work of the international collaborative team represents both the largest contiguous area ever opened on a settlement of the Periam-Pecica culture, and the most rigorously controlled and documented. This effort has yielded a new and striking view of life during the Middle Bronze Age along the Mures, documenting the settlement’s phenomenal rise in regional prominence as a major distribution point for Bronze metalwork and the domestic horse, and its precipitous decline a mere two hundred years later. Here we provide a summary not only of the settlement’s later chronology, but also details of the domestic economy, site architecture, and ritual activity at the site.

### *Introduction*

Pecica “Șanțul Mare” is among the most important Bronze Age tells in the Carpathian Basin, and as befits this importance, it has received considerable archaeological attention. Early work at Pecica (Pécska) and at the nearby site of Periam (Pérjamos) by Marton Roska<sup>1</sup> established the base line chronology for the regional Bronze Age, which was adopted by Childe and given international prominence as the Pérjamos Culture.<sup>2</sup> Roska’s stratigraphic levels were also employed by István Bóna as the basis for his highly influential ceramic chronology of the Szőreg (Pecica-Periam) Group.<sup>3</sup> This typological system served as the main chronology for all of the settlements and cemeteries of the lower Maros until the advent of radiocarbon dating, and still provides the basic chronological outline for the region today.

Roska’s work is itself a landmark in archaeological technique and recording, and bespeaks the

high level of technical competence that was in evidence in the region at the beginning of the 20<sup>th</sup> Century. Pecica was tested on a number of occasions subsequent to Roska’s work, most notably by the major area excavations undertaken at the site by Crișan in the early 1960s.<sup>4</sup> While Crișan opened a substantial portion of the site’s surface, the focus of his work was on the Dacian occupation of the site. The very top of the Bronze Age deposits were exposed in a number of his excavation blocks, and the span of the Bronze Age occupation was demonstrated in several deeper soundings. Unfortunately, the documentation of the earlier Bronze Age layers is limited, and was not anchored by radiocarbon dates.

In 2005, a consortium of Romanian and American investigators with funding from the National Science Foundation (USA), returned to the site of Pecica for a more focused study of the Bronze Age occupation of the settlement. The research consortium included Florin Drașovean and Alexandru Szentmiklosi of the Muzeul Banatului Timișoara; Peter Huegel and Pascu Hurezan of the Muzeul Județean Arad, John O’Shea of the Museum of Anthropology, University of Michigan; and Alex Barker of the Museum of Art and Archaeology, University of Missouri. The initial goal of this research was to

\* Museum of Anthropology, University of Michigan, Ann Arbor, Michigan, USA, e-mail: [joshea@umich.edu](mailto:joshea@umich.edu).

\*\* Museum of Art & Archaeology, University of Missouri, email: [barkeraw@missouri.edu](mailto:barkeraw@missouri.edu).

\*\*\* University of Michigan, Ann Arbor, Michigan, USA, e-mail: [lmotta@umich.edu](mailto:lmotta@umich.edu).

\*\*\*\* Banat Museum Timișoara, Huniade square 1, 300002, e-mail: [szentmiklosi@yahoo.com](mailto:szentmiklosi@yahoo.com).

<sup>1</sup> Roska 1912; Roska 1914.

<sup>2</sup> Child 1929, 216

<sup>3</sup> Bóna 1975.

<sup>4</sup> Crișan 1978.

record and date the Bronze Age profile of the site. To do this while minimizing damage to surviving Dacian deposits, the investigation focused first on relocating Crișan's backfilled excavation units, and then excavated two stratigraphic trenches within these previously excavated areas where the back-fill could be quickly removed exposing the intact Bronze Age layers.<sup>5</sup>

The investigations in 2005 mapped archaeological profiles in both trenches of near three meters in depth. Geo-archaeological investigations showed that an additional two to three meters of deposit remained below these levels. The profiles revealed detailed sequences of burned and unburned house floors, ovens, and deep storage pits in both portions of the site. These investigations also demonstrated that well preserved faunal and floral remains were present throughout the deposits. Based on these findings, the consortium sought and obtained additional funding from the National Science Foundation to conduct a multi-year excavation over a continuous site block. This work, conducted over the years 2006 through 2009, is the subject of this report.

#### *Methods:*

Beginning in 2006, a ten by ten meter block, located immediately adjacent to stratigraphic trench 1, was excavated (figure 1). The block was divided into a series of 2 × 2 meter squares for the purpose of data recording and flotation. Excavation was conducted on a layer by layer basis, working systematically across the site surface. Excavation was conducted with small hand tools, with the total volume of deposit excavated being recorded. Within each 2 × 2 meter square, 10% of the soil removed was dry sieved through screens with a mesh size of 0.65 cm. Additionally, two 10 liter samples from each square level were collected for flotation. All sediments recovered from site features were either floated or dry screen. Flotation samples were processed using a Flote-tech automatic flotation system. All significant finds were mapped in three dimensions with a Sokkia total station, as were the starting and ending elevations of each unit, and the tops, bases, and perimeters of all features. Throughout the period of excavation, daily three dimensional maps of the excavation were constructed, as were layer photo mosaics. A series of 'micro-morphological' samples were also collected over the course of the block excavation. These samples, when completely analyzed, will

provide important information on the creation and composition of the site's micro-stratigraphy.

#### *Overview of Results:*

While it is premature to offer final conclusions for the work completed so far at the site, it is possible to offer some preliminary results of the excavations which yield important new insights on the dating and the character of the later half of the Bronze Age occupation at Pecica. It is also worth noting that the results of the recent work broadly support and amplify the findings reported from earlier excavations. Research conducted since 2005 has confirmed the basic stratigraphic organization of the settlement and the description of excavations conducted at the site by Crișan. Using the published reports as a starting point, we were able to relocate and trace the earlier excavation units, and to identify the areas beyond the tell proper where additional Bronze Age deposits are located (and where they are not). As will be apparent below, we can also support issues relating to the distribution and forms of Bronze Age architecture and to the overall sequence of deposition at the site.

#### *Chronology and Site Phases:*

To date, 49 radiocarbon dates have been run for the site. These dates bracket the later Bronze Age occupation of the site (figure 2), as well as providing several determinations relating to the later Dacian occupation (not shown on the figure). The Bronze Age dates are consistent with those previously reported for Maros sites in Hungary and Serbia<sup>6</sup> and reflect the later half of the Bronze Age occupation at Pecica. The tight clustering of these dates also indicates that the site deposits at Pecica accumulated rapidly, with the two plus meters of Bronze Age deposit excavated so far being accumulated in a time span no longer than 400 years.

The carbon dates are complemented by a series of archaeomagnetic age determinations. The Pecica samples were collected using standard field procedures established by the Archaeomagnetic Laboratory at Colorado State University and analyzed at the Illinois State Museum by Dr. Stacey Lengyel.<sup>7</sup> In order to ensure comparability all samples were collected by the same individual; this individual also collected previous Archaeomagnetic series at Maros sites in southeastern Hungary, and Lengyel agreed to re-analyze these samples from Klárafalva-Hajdova at the same time and using the same procedures.

<sup>5</sup> This work is summarized in O'Shea *et alii* 2005; O'Shea *et alii* 2006.

<sup>6</sup> cf. Gogáltan 1999; O'Shea 1996.

<sup>7</sup> Lengyel 2010.

While there is presently no reference curve for Romania, the relative sequence of archaeomagnetic samples can be established and compared to the radiocarbon results, as well as assessing any evidence of contemporaneity between either the Pecica samples or equivalent samples collected at Klárafalva-Hajdova in Hungary. The three Pecica samples dated two cultural features (F29; ISM-219 and F82; ISM-22) and a burned zone found in an extramural soil pit (Pit 3; ISM-220) excavated to recover geoarchaeological samples. No radiocarbon samples were associated with this offsite burned horizon, although immediately above this burned horizon was a gray Aeolian deposit similar in appearance to the strata overlying the end of the Middle Bronze Age (MBA) sequence both at Pecica and Klárafalva-Hajdova. The archaeomagnetic series collected from the burned horizon in Soil Pit 3 appears to be contemporary with the archaeomagnetic series recovered from F12 at Klárafalva-Hajdova (Sample 23105 1670 BC +/- 80). The archaeomagnetic readings from the two Pecica cultural features are not contemporaneous and that the Soil Pit 3 date is temporally intermediate to these readings (Lengyel 2010:6).

These results confirm that the MBA occupation at Pecica Șanțul Mare extended outside its eponymous ditch, and that these occupations were contemporary with the MBA occupations at Klárafalva-Hajdova, which also overlap based on radiometric dates. They also suggest that the radiometric dates maybe somewhat compressed, with the associated dates for Features 29 and 82 actually lying toward the opposite ends of their respective calibration ranges. As additional series are collected from Bronze Age contexts within the region it should be possible to develop a reference curve allowing direct calendrical dating of archaeomagnetic samples.

When the dates are placed into the context of the site stratigraphy and episodes of architectural construction, five distinct phases of activity can be identified. These are summarized with their approximate age ranges in table 1. A representation of the architecture in each phase is shown in figure 3.

The latest Bronze Age occupation represented at the site occurs at the base of the Layer B strata, which was termed Dacian B in Crișan's report (1978). The Layer B deposit is a thick, homogeneous deposit of windblown sediments, which has been hypothesized to represent a period of drought and environmental degradation in the Maros region (Sherwood et al in prep). The base of this

layer dates later than 1600 BC. The Bronze Age occupation represented at the base of this layer is relatively scattered and of light intensity. No identifiable structures were observed in this period, although fragments of architectural debris and pits were recorded.

The second phase is associated with distinct built structures, including houses and ovens. This phase, which occurs in the upper levels of Layer C, includes two structures, Structure 0 and Structure 1 (Structure 0 was belatedly recognized as a structure and was located in an area that was heavily impacted by prior excavation). Both structures were visible only as fragments, and Structure 1 had been severely burned. Despite their incomplete representation, there is the suggestion that they were oriented along the east-west site axis. In addition to the structures, a number of deep storage pits also originate in this occupation phase. This phase of construction dates in the range of 1600 to 1650 BC.

The third phase of occupation is associated with midden deposits in the lower levels of Layer C and architecture in the upper levels of the D Layer. The phase dates in the range of 1650–1750 BC and presents the most complex use of the site within the area of the excavation block. This phase of occupation included two structures (Structures 2 and 4 (upper)), along with the construction of a large central platform. This platform is a remarkable feature that is unknown from any previously investigated Maros settlement. The two reported structures appear to be oriented on a north-south axis of the site, and parallel to the western edge of the central platform.

The fourth architectural phase, dating in the range of 1750–1850 BC, again consisted of two structures. Both were found beneath respective phase three constructions; Structure 3 was partially covered by Structure 2, and lower Structure 4 was immediately beneath the upper Structure 4. The phase four houses had architectural details that contrasted with their superimposed structures, which confirmed them as distinct constructions. These houses appear to immediately pre-date the construction of the Phase 3 platform.

In addition to the structures, a line of features was observed, comprised of the long bone of large animals, primarily horse, fragments of heavy braziers (portable hearths), and large chunks of concretion. All were placed in narrow cylindrical pits, with the animal bones oriented vertically. The line of features ran parallel and to the east of the structures and occupied an area between the structures

Table 1. Architectural Phases and Site Dating at Pecica

Construction Phase	Site Layer	Date (cal BC)	Architecture	Ceramics	Comments
1	B1:3	Post 1600 BC	Fragments only	Baroque styles, Classic Maros vessels	Final BA occupation, possibly deteriorating environment
2	C (upper)	1600–1650 BC	Structures 0, 1	Baroque styles, Classic Maros vessels	
3	C3–5/D0–2	1650–1750 BC	Platform, Structures 2, 4 (upper)	Baroque styles, Classic Maros vessels	Intensive metallurgy and horse rearing.
4	D2–3, top of E	1750–1850 BC	Structures, 3, 4 (lower) Horse bone features.	Baroque styles, Classic Maros vessels	Intensive metallurgy and horse rearing.
5	E	1850–2000 BC	Structures 5–8	Classic Maros vessels, Latest ‘rusticated’ wares	

and the western face of the Phase 3 platform. It appears that these features are associated with Phase 4, and immediately predate the central platform of Phase 3. Given the specific arrangement of these features, the vertical placement of high value animal bones, and the association with braziers, it seems most likely that the features had a social, as opposed to architectural, significance.

The final architectural phase represented in the excavated portion of the site occurs within the Layer E levels. This phase dates in the range of 1850–2000 BC and consists of fragmentary house floors designated Structures 5, 6, 7, and 8. Structure 5 is located in the southwest corner of the site block, and partially covered by Structure 3. Structures 6, 7, and 8 are found beneath the debris of the Structure 4 complex. These house floors are extremely fragmentary which makes their description difficult, but there is the suggestion that they had an east-west trending orientation, similar to that seen in the second architectural phase.

*Site Architecture and Construction:*

While no complete houses have been documented in the Pecica excavations, the sequence of structures do provide considerable information on the basic form and construction of houses, along with providing interesting technological details and evidence of experimentation.

The houses observed in the Pecica levels were similar in basic form and construction to the houses reported from the lower Maros region,<sup>8</sup> and consisted of rectangular structures in the range of 3–4 m wide and roughly 8m in length, with plastered floors, relatively light wattle and daub

walls, interior divider walls, and a relatively light roof made of reeds or wood. The floors and walls of the structures were repeatedly renewed with fresh layers of plaster which were readily discerned during excavation. The structures typically also have a substantial hearth/oven placed internally at one end of the structure. An idealized example of the house is presented in figure 4, based on the plan of Structure 4 (upper).

Like Maros houses elsewhere, the Pecica structures rarely suffered catastrophic destruction from fire (at Pecica only two of the structures were seriously burned), and when they were destroyed by fire the destruction does not result in the kind of hard baked firing of walls and floors observed in Late Neolithic structures. This probably reflects the relatively light roof and walls of the houses which would have tended to burn rapidly with much of the heat being dissipated upward.

While all of the Pecica structures were built on the same basic plan, differences in construction technique were observed that suggest ongoing experimentation in house design. The clearest example of experimentation is observed in wall construction. Most structures employed walls based on a single row of posts (Structures 0, 1, 2, 3, 5, and 6), although the posts varied in average diameter between structures, with the posts associated with Structure 2 being the heaviest. Structure 2 also exhibited an unusual density of large wall posts, but this seems to be the result of a major house rebuilding episode rather than a single architectural feature.

Structure 4 (upper), as represented in figure 4, was built immediately on top of a prior structure (Structure 4 lower). This follows a pattern seen at Klárafalva Hajdova in which the ruins of

<sup>8</sup> cf. Horvath 1985; Girić 1987, O’Shea 1996.

a structure were used to provide a stable foundation for a newer house. The building employed a doubled wall post construction, supplemented by larger diameter single posts at each corner. Large, horizontally oriented, animal bones were placed in the base of each corner post hole to provide added support for the post.

Structures 4 (lower) and 8 present alternative methods for wall support. In Structure 8, wall trenches were constructed and logs were placed in the trenches. The logs were stabilized within the trench via packing with dense unfired clay wedges. The upright wall posts were set into the top of the log in an apparent effort to spread the weight of the wall supports and minimize subsidence. Structure 4 (lower) also exhibited wall trenches, although these appeared to have been shallower, and to have accommodated relatively thin horizontal planks rather than whole logs.

Structure 3 employed the normal single post type wall construction. It did, however, provide evidence for a distinctive type of interior divider. The divider had a curved form, stood roughly 10 cm high, and had a flat upper surface which did not have post holes cut into it. Presumably some manner of wooden sill was laid cross the upper surface and with uprights bedded on this sill (in a manner similar to the placing of posts in the wall trenches previously described). Within the area defined by the curved divider, the floor was lower and created a smooth sided shallow basin. The basin area was filled with burned earth rubble. A similar feature was recorded in Structure 5.

Since the base and sides of the feature exhibited no evidence of burning, and as the rubble extended only to the level of the sill and was not observed above it, or outside of the basin, the most likely explanation for the rubble is that it represents a post use filling of the basin. This probably served to bring the basin to level with the remainder of the house floor. This would most likely have occurred when the house underwent major reconstruction, or when the floor was used as a foundation for the construction of an entirely new structure. During the actual use life of the structure, the basin and divider most probably represented an internal storage enclosure within the house.

The one other feature which varies among the Pecica structures encountered so far is the presence or absence of an internal hearth/oven. Where these are clearly visible in the more northerly structures (Structures 0, 1, 4 (upper and lower), and 8) no such construction was reported for any of the south complex houses (Structures 2, 3, and 5). The

ovens are highly visible archaeological features at the site so it is unlikely that they would be missed during excavation, but it is possible that they are present in the unexposed portion of the southern structures. Alternatively, the presence of internal storage facilities and ovens may have been mutually exclusive and reflect real functional differences between the northern and southern structures. Only further excavation will enable us to choose among these different possibilities.

In addition to house structures, during Phase 3 a large platform covered the entire eastern half of the Pecica excavation block, and limited coring beyond the block suggest it had surface dimensions in the range of 22 × 14 meters. The platform was constructed from pre-existing midden deposits that were burned at extremely high temperatures, and then fired again in situ. All soil contacts beneath the platform exhibited black scorching. The platform was situated on an extremely irregular surface at the top of the E Layer with no evidence of leveling prior to construction, and because of this the platform varied considerably in thickness, from as much as a 65cm to as little as 4 cm, and with an average thickness of 50cm. The upper portion of the platform was level, although it tended to slope downward from the northeast. The surface was compact and exhibited a number of post molds. While some of these were shallow and represented the downward continuation of posts from later layers, a significant number of posts appear to have originated at the surface of the platform and suggest that one or more wood constructions topped the platform.

The exposed western edge of the platform sloped downward at about a 40 degree angle to the Layer E surface, and scorching was not observed along this edge, suggesting that at the time of construction it was not covered. Although the contact area is badly disturbed by Dacian era storage pits, a high central tongue of Layer E material extended to the edge of the platform in the central portion of the excavation block. It is not clear whether this represents the remnant of an earlier site feature that the platform covered, or whether it served as an entry ramp to the platform.

#### *Subsistence and Economy:*

The analysis of recovered plant and animal remains from the excavations is currently underway, but a few preliminary comments can be made regarding the subsistence economy at Pecica, and how it changed over the course of the Middle Bronze Age. Dr. Laura Motta, in the ethnobotanical



laboratory of the University of Michigan, Museum of Anthropology, is directing the analysis of carbonized plant remains from the site. To date, the analysis of plant materials has focused on the core Bronze Age portion of the sample, and represents primarily remains from construction phases 2, 3 and 4.

Most of the cereal grains identified to date are einkorn wheat (*Triticum monococcum*). Barley (*Hordeum vulgare*) is also observed and appears to represent six row and hulled forms. Traces of emmer wheat (*Triticum dicoccum*), free threshing wheat, and millet have also been identified. Among the samples examined most contain a very low density of crop remains. Cereal caryopses (seeds) are sparse and there is a striking scarcity of chaff. There is also a surprising absence of pulses, with only one pea specimen being identified so far. There are a few exceptions, however, including two samples that are relatively rich in cereal caryopses, and another that is rich in *Triticum sp.* glume bases and spikelet forks.

The most abundant taxon identified so far is *Chenopodium album*, a common crop weed. *Polygonum sp.* and other polygonaceae are also represented. Grass family shows variety, including *Bromus sp.* and *Lolium sp.* but occur only rarely. Elderberry (*Sambucus ebulus*) is common but occurs in small numbers within each sample.

When these results are compared with other Maros sites, a similar set of species are observed but with significant differences. At the contemporary Bronze Age settlement of Klárafalva Hajdova<sup>9</sup> there is a higher density of and ubiquity of caryopses and chaff, and free threshing grains are more common. Several taxa of pulses are also represented. At the nearby Maros culture settlement at Semlac Șanțul Mic (aka Semlac Livada Iui Onea) (Oas 2010), *Triticum monococcum* predominates in primary contexts, while other depositional contexts are characterized by a mix of barley, einkorn, cereal chaff, and some millet. As analysis proceeds, it will be interesting to determine whether the rather narrow spectrum of grain varieties continues for all of the Pecica site deposits, and particularly to determine whether the absence of threshing residues characterizes the entire site.

A preliminary assessment of the animal economy at Pecica during the later portion of the Bronze Age occupation is presented by A. Nicodemus in the accompanying contribution (Nicodemus 2011). It is sufficient to note here, that the Bronze Age economy at Pecica is overwhelmingly dominated

by domestic livestock. Despite its location adjacent to the Mureș River, there is only very limited evidence for fish utilization, a situation that is in striking contrast to the contemporary settlement at Klárafalva Hajdova, and which also contrasts with the Dacian patterns of consumption at Pecica.

The other major finding is the startling quantities of horse present on the site. As Nicodemus notes, during the florescent period of the Pecica settlement, there is a greater density of horse remains found than at any other known Bronze Age site in the eastern Carpathian Basin. This suggests a major role of the Pecica settlement in the regional spread and trade of horses into Central Europe which must have rivaled the site's importance as a major trade and manufacture node in bronze metallurgy.

#### *Ceramics and Metallurgy:*

While a number of craft activities are in evidence in the materials recovered from Pecica, of overwhelming importance are ceramics and metallurgy. The ceramics from Pecica have long been important as a chronological indicator, but they can also provide important information on craft production, food consumption, regional connections, and trade. To date, more than 4,000 diagnostic rims, bases, handles and decorated sherds have been photographed and measured. Many of these diagnostic ceramics were also piece plotted during excavation and provide an unrivaled record of their use and deposition within the site (figure 5). A central goal of the initial analysis is to identify the functional categories of vessels represented (such as food storage, preparation, serving) as a means of understanding the distribution of these activities within the structures and the settlement.

An important avenue for investigation is whether the Pecica ceramic assemblage, both fine wares and coarse wares, are being produced locally and if there is any evidence for the specialization of production. Michelaki, in her analysis of the lower Maros villages of Klárafalva Hajdova and Kiszombor Új Élet, demonstrated that despite the standardized forms and proportions of the Maros fine wares, they were manufactured locally in each community.<sup>10</sup> It will be interesting to see whether this is similarly the case at Pecica and neighboring Bronze Age settlements.

It is also clear from a preliminary examination of the ceramic assemblage that a number of regional fine ware styles are represented at Pecica. Foremost among these are designs associated with

<sup>9</sup> G. Jones personal communication, 2010.

<sup>10</sup> Michelaki 2008.

the Vattina Group to the south and lime encrusted wares from Trans-Danubia. Numerous other regional styles are also present in lesser quantities. In addition to fine wares, the ceramic assemblage includes a wide range of domestic ceramics used in food preparation and storage, and specialized ceramic utensils, most notably the heavy portable hearths, and spindle whorls and loom weights associated with cloth production. The site has also produced a number of specimens representing wheels; presumably used with models of carts and chariots.

Metallurgy at Pecica is represented by a modest number of bronze tools and ornaments (principally tubes and spherical beads), stone molds, clay crucibles, and enormous quantities of casting slag. The quantities of slag, in particular, speak to the industrial level of metal production that occurred at the site. A pilot sample of the slag is currently being analyzed by Dr. Christopher Papalas to determine both the sources of the metal and the pyro-technologies being used by the Pecica smiths, and to provide a basis for comparison with metallurgical practices observed among the lower Maros villages.<sup>11</sup> As with the horse remains, mentioned previously, metallurgical production reached a definite crescendo during the 3–4 construction phases at the site.

In addition to the sourcing of metallurgical debris, five obsidian artifacts from the 2008 season were analyzed using non-destructive energy-dispersive x-ray fluorescence (EDXRF) spectroscopy using the University of Missouri Research Reactor Archaeometry Laboratory's Elva-X spectrometer. All five obsidian artifacts were sourced to the primary Carpathian 1 (C1) source.<sup>12</sup> Rosania et al.<sup>13</sup> have isolated chemically distinct subareas within the C1 source; based on concentrations of rubidium (Rb), strontium (Sr), iron (Fe), zirconium (Zr), zinc (Zn) and manganese (Mn). All five artifacts appear to derive from the C1a subsurface near Vinicky, Slovakia.<sup>14</sup>

#### *Future Directions*

The recent excavations at Pecica Santual Mare have produced a number of startling new results, ranging from the site's importance as a central distribution point for the domestic horse, to the presence of a large central platform. Yet, many fundamental questions remain unanswered. Most

important among these is when was the settlement established? And what was the relationship between the core of the Pecica settlement and outlying areas, both in the immediate vicinity of the settlement outside its great ditch, and to contemporary settlements such as the nearby site of Semlac. The answer to these questions will enable research to gain a fuller appreciation of the factors that led to the spectacular rise of the Pecica site during the Middle Bronze Age.

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#### BIBLIOGRAPHY

- Biró *et alii* 1986  
 Biró, K., Pozsgai, I. & Vladár, A., Electron Beam Microanalysis of Obsidian Samples from Geological and Archaeological Sites. *Acta Archaeologica Academiae Scientiarum Hungaricae*, 38, (1986), 257–278.
- Biró *et alii* 1988  
 Biró, K., Pozsgai, I. & Vladár, A., Central European obsidian studies. *Archaeometrical Studies in Hungary (Budapest)*, 1, (1988), 119–130.
- Bóna 1975  
 Bóna, I., *Die Mittlere Bronzezeit Ungarns und Ihre Südöstlichen Beziehungen*, Budapest, Akadémiai Kiadó, (1975).
- Childe 1929  
 Childe, V., *The Danube in Prehistory*, Oxford, Clarendon, (1929).
- Crișan 1978  
 Crișan, I. H., *Ziridava. Săpăturile de la "Șanțul Mare" din anii 1960, 1961, 1962, 1964*. Arad, (1978).
- Girić 1987  
 Girić, M., Naselja Moriške culture. *Rada Vojvođanskog Muzeja* 30, (1987), 71–83.
- Gogâltan 1999  
 Gogâltan, F., Bronzul timpuriu și mijlociu în Banatul Românesc și pe cursul inferior al Mureșului: Cronologia și descoperirile de metal. *Bibliotheca Historica et Archaeologica Banatica* XXIII, (1999).

<sup>11</sup> cf. Paplas 2008.

<sup>12</sup> Williams Thorpe *et alii* 1984; Biro *et alii* 1986, Biro *et alii* 1988.

<sup>13</sup> Rosania *et alii* 2008.

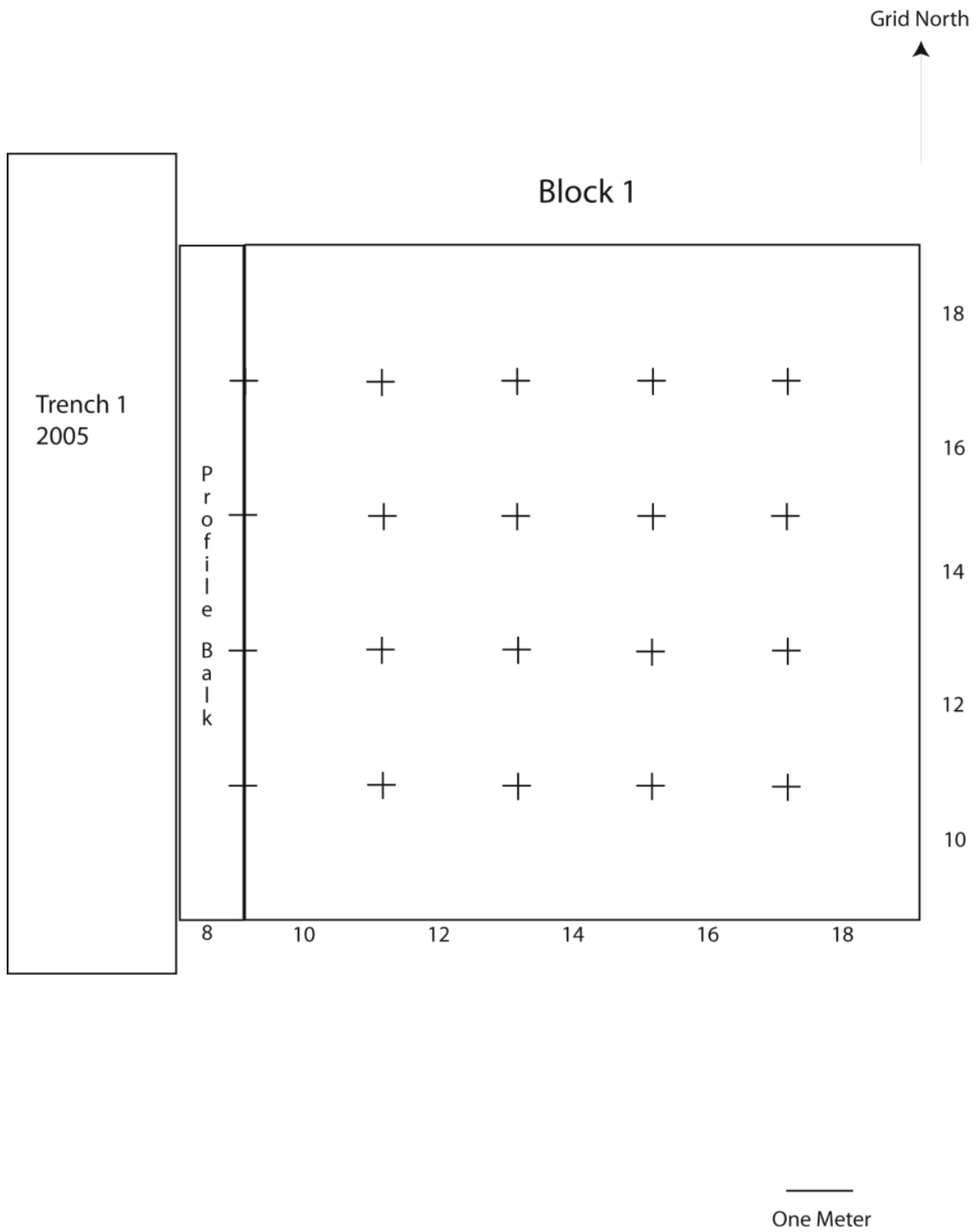
<sup>14</sup> Rosania and Barker 2010.

- Horváth 1985  
 Horváth, F., Contributions to the Early and Middle Bronze Age of Southern Alföld. *A Móra Ferenc Múzeum Évkönyve*, 1982–83, (1985), 55–72.
- Lengyel 2010  
 Lengyel, S. “*Archaeomagnetic Laboratory Results for Three Samples from Pecica Șanțul Mare*”, Illinois State Museum Landscape History Program Technical Report 2010–000–6.
- Michelaki 2008  
 Michelaki, K., Making pots and potters in the Bronze Age Maros villages of Kiszombor Új-Élet and Klárafalva Hajdova’, *Cambridge Archaeology Journal* 18 (2008), 3, 355–380.
- Oas 2010  
 Oas, S. 2010 “*Maros Macrobotanicals: An Archaeobotanical Analysis of Bronze Age Agriculture in the Maros Site of Semlac “Șanțul Mic”*”. Honors Thesis, Department of Anthropology, University of Michigan, (2010).
- O’Shea 1996  
 O’Shea, J., *Villagers of the Maros: A Portrait of an Early Bronze Age Society*. New York, Plenum, (1996).
- O’Shea et alii 2005  
 O’Shea, J., Barker, A., Sherwood, S. and A. Szentmiklosi, New archaeological investigations at Pecica “Șanțul Mare”, *AnB*, S. N., *Arheologie–Istorie*, XII–XIII, (2005), 81–109.
- O’Shea et alii 2006  
 O’Shea, J., Barker, A., Nicodemus, A., Sherwood, S. and A. Szentmiklosi, “Archaeological Investigations at Pecica “Șanțul Mare”: The 2006 Campaign”, *AnB*, S. N., *Arheologie–Istorie* XIV, (2006), 1, 211–228.
- Nicodemus 2011  
 Nicodemus, A., 2011 The Bronze Age and Dacian Fauna from New Excavations at Pecica “Șanțul Mare”, *AnB*, S.N., *Arheologie–Istorie* IX (2011).
- Papalas 2008  
 Papalas, C., *Bronze Age Metallurgy of the Eastern Carpathian Basin: A Holistic Exploration*. PhD dissertation, Arizona State University, Tempe, (2008).
- Rosania et alii 2010  
 Rosania, C., and A. Barker, Obsidian procurement at Pecica Santul Mare, Romania. *Muse* 43, (2010), 19–30.
- Rosania et alii 2008  
 Rosania, C., Boulanger, M., Biró, K., Ryzhov, S., Trnka, G., and M. Glascock, Revisiting Carpathian Obsidian. *Antiquity* 82, (2008), 318 (<http://antiquity.ac.uk/ProjGall/rosania/index.html>)
- Roska 1912  
 Roska, M., Ásatás a pécska-szemlái határban levő Nagy Sáncczon. *DolgCluj* 3 (1912), 1–73.
- Roska 1914  
 Roska, M., Ásatás a perjámosi sáncczhalmon. *Múzeumi és Könyvtári Értesítő* VIII, (1914), 74–104.
- Sherwood et alii in prep.  
 Sherwood, S., Windingstad, J., Barker, A., and J. O’Shea, “*The potential for regional aridification at the close of the Bronze Age in the Eastern Carpathian Basin: Preliminary results from the Mureș River Valley, Romania*, (in prep).
- Williams Thorpe et alii 1984  
 Williams Thorpe, O., Warren, S., and J. Nandris, The Distribution and Provenance of Archaeological Obsidian in Central and Eastern Europe. *Journal of Archaeological Science*, 11, (1984), 183–212. (doi: 10.1016/0305–4403(84)90001–3)



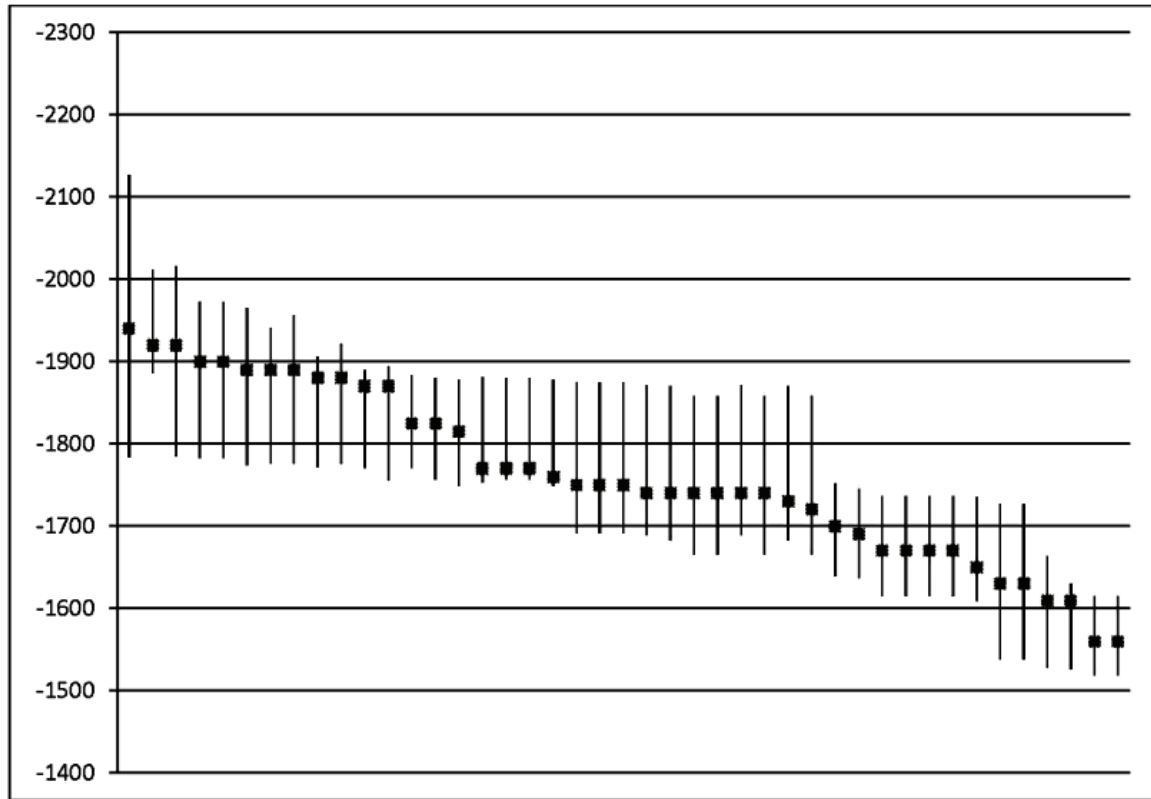
**Figure 1**

Relationship between 2005 Stratigraphic Trench and 2006–2009 block excavations. Coordinate values used to designate grid locations are also shown.



**Figure 2**

Spread of Calibrated <sup>14</sup>C dates from Pecica. Bars represent the high and low values for the 2 standard deviation range of the date, while the box represents the intercept with the calibration curve. If a Sample value had multiple intercepts, these values were averaged while leaving the range unchanged.



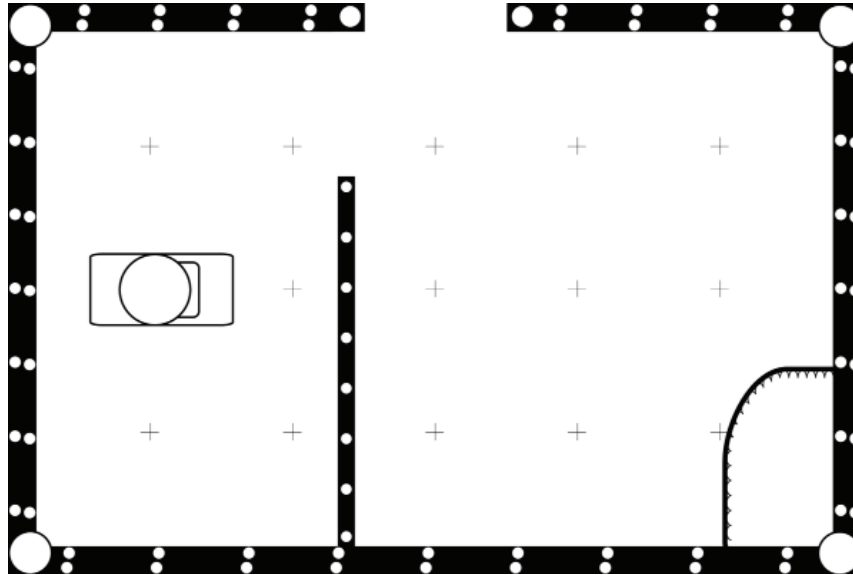
**Figure 3**

Location of Major Architectural Features by Building Phase. No clear structures were associated with Phase 1. Excavation block in this illustration is oriented to magnetic North. The excavation block, following Crişan, employs a grid north that is aligned with the tell's shape, which is 30 degrees East of magnetic North.



**Figure 4**

Idealized Pecica House Plan. Figure is based on Structure 4, although it contains some elements, such as the interior basin, that have been added for illustrative purposes. Solid dark lines represent wall trenches. Tick marks are located at a distance of one meter. Drawing by Steve Sabo.



**Figure 5**

Overview of Piece Plotted Bronze Age Ceramics from the Pecica Excavations. The presence of post-Bronze Age pits is visible as circular areas lacking mapped ceramics.

