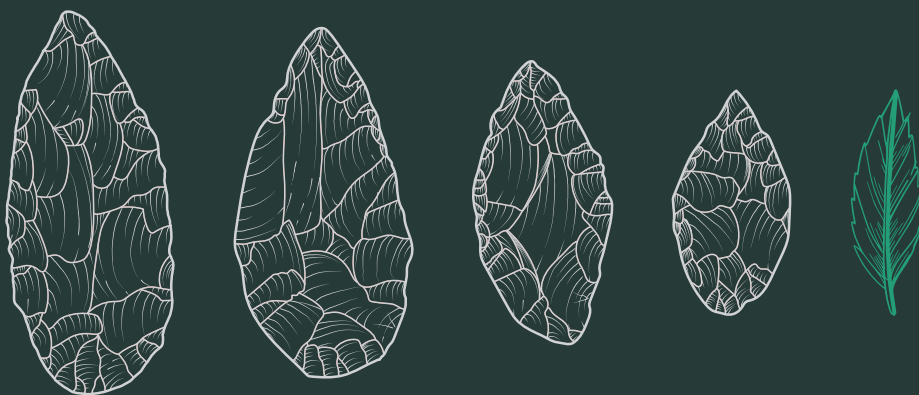




From tea leaves to leaf-shaped tools

STUDIES
IN HONOUR OF ZSOLT MESTER
ON HIS SIXTIETH BIRTHDAY



LITIKUM KÖNYVTÁR 2

EDITED BY
ATTILA KIRÁLY

From tea leaves to leaf-shaped tools

STUDIES
IN HONOUR OF ZSOLT MESTER
ON HIS SIXTIETH BIRTHDAY

Editor:
Attila Király



ELTE
EÖTVÖS LORÁND
UNIVERSITY



LITHIC RESEARCH ROUNDTABLE
INSTITUTE OF ARCHAEOLOGICAL SCIENCES,
ELTE EÖTVÖS LORÁND UNIVERSITY,
BUDAPEST, HUNGARY,

2023



FROM TEA LEAVES TO LEAF-SHAPED TOOLS
STUDIES IN HONOUR OF ZSOLT MESTER
ON HIS SIXTIETH BIRTHDAY

LITIKUM KÖNYVTÁR 2 • LITIKUM BOOKS 2

Publisher:

Lithic Research Roundtable

Institute of Archaeological Sciences,

ELTE Eötvös Loránd University, Budapest, Hungary

Responsible publisher / Felelős kiadó:

Attila Király – editor, Litikum – Journal of the Lithic Research Roundtable

3524 Miskolc, Jósika M. u. 20. • attila@litikum.hu • <https://litikum.hu>

Responsible editor, series editor, layout editor:

Attila Király

ISBN 978-963-489-662-3 (PDF)

ISBN 978-963-489-661-6 (Softcover)

ISSN 2786-3751 (Online)

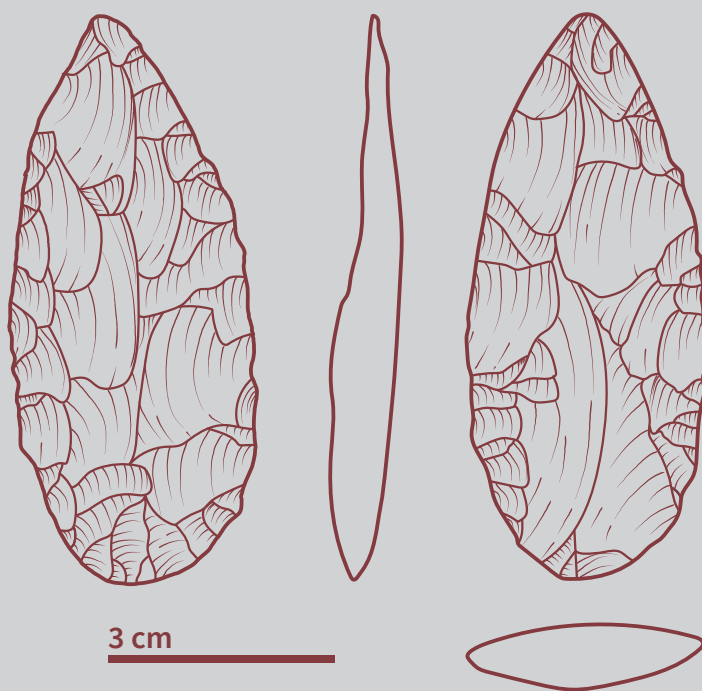
© The editor and the authors, 2023 • This volume is available through Creative Commons License Attribution-Noncommercial-ShareAlike 4.0 International. You are free to copy and redistribute the material in any medium or format, and transform the material, under the following terms: You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may not use the material for commercial purposes. If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. © ⓘ ⓘ ⓘ

The volume was created in FR4 format using the fonts Source Sans Pro and Source Serif Pro, which fall under the SIL Open Font license. | The publication is available in *print-on-demand* form from the responsible publisher or from the Litikum editorial office.

CONTENTS

Celebrating Zsolt Mester TIVADAR VIDA	11
Tabula gratulatoria	13
Publications of Zsolt Mester, 1989–2023 ATTILA KIRÁLY	17
The problematic role of fossilized mollusc shells in the Upper Palaeolithic of Hungary CSABA BÁLINT	31
Etwas tierisch: the <i>chaîne opératoire</i> and animal studies LÁSZLÓ BARTOSIEWICZ	49
The Demjén-Szőlő-hegy III Early Upper Palaeolithic site SÁNDOR BÉRES [†] & DALMA KERESKES	65
Animal “body techniques” – Processing and consumption of animals in a Late Copper Age settlement in Budapest (Hungary) PÉTER CSIPPÁN	79
The Lincombian-Ranisian-Jerzmanowician with new sites in South Moravia and the Initial Upper Palaeolithic record of East-Central Europe YURI E. DEMIDENKO & PETR ŠKRDLA	95
Using geological, geomorphological and soil science description data in archaeological research: Andornaktálya, Gyilkos Hill as a case study ANNA DOBOS	121
Technological observations on the bifacial point from the Copper Age cemetery of Rákóczifalva NORBERT FARAGÓ	141

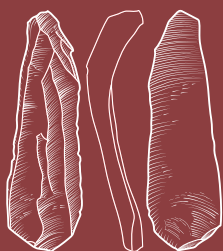
Öcsöd-Kováshalom and the Neolithic ceramic technological tradition in Hungary ANDRÁS FÜZESI	159
Settlement research of the Late Copper Age Baden complex in Hungary: New evidence from the past two decades TÜNDE HORVÁTH	189
Complex study of the Acsa-Rovnya endscrapers: Surface collections in the reconstruction of Upper Palaeolithic land use ATTILA KIRÁLY	231
Mesolithic and Neolithic finds from Zbehy-Dolné lúky site, sectors A0–M10 ADRIÁN NEMERGUT, MICHAL CHEBEN, KLAUDIA DAŇOVÁ, MAREK VOJTEČEK, PETER ŠEFČÍK, JURAJ MAGLAY, & MARTINA MORAVCOVÁ	259
Zsolt Mester and zooarchaeology in the French National Museum of Natural History MARYLÈNE PATOU-MATHIS, STÉPHANE PÉAN, ANTONY BOREL, ÉVA J. DASCHEK, & MARIE SEGUEDY	271
If these stones could talk – An attempt to enlighten a four-variable archaeological problem. Two macro-blades from Paraburdoo (Pilbara Region, Western Australia) ATTILA PÉNTEK	281
The provenance of a forgotten Copper Age spectacle spiral pendant ZSUZSANNA SIKLÓSI, IGOR M. VILLA & STEFANO NISI	297
Bringing social process into lithic studies. Implementing the <i>chaîne opératoire</i> concept into the analysis of Neolithic stone material KATA SZILÁGYI	313
The detachable barbed bronze harpoon heads with a loop JÁNOS GÁBOR TARBAY	335



Szeletian leaf-shaped tool.
After Kozłowski *et al.*, 2009, Planche 11.



Sajóbábony 2021: open-air education at an open-air site, surrounded by a curious crowd. Zsolt's courses and excavations are not only visited by students specializing in the Palaeolithic, the rich knowledge material and methodology have become popular among students and researchers of other periods as well. *Photo: Agnès Lamotte, drawing: after Jean-Georges Marcillaud.*



Settlement research of the Late Copper Age Baden complex in Hungary

NEW EVIDENCE FROM THE PAST TWO DECADES

Tünde Horváth 

Institut für Urgeschichte und Historische Archäologie, Universität Wien, 1 Franz-Klein Gasse, Wien, A-1190 Österreich; E-mail: tundehorvath4@gmail.com

Abstract. In this paper, I summarise the lessons learned from the Late Copper Age settlement archaeology of the last 20 years, largely based on my research. The aim was to revise the existence, distribution and internal chronology of the classical Baden pottery style groups established by János Banner in 1956, using new evidence from modern settlement pattern research.

Keywords: Late Copper Age, Baden complex, Regional pottery groups after János Banner

Cite as: Horváth, T. (2023). Settlement research of the Late Copper Age Baden complex in Hungary: New evidence from the past two decades. In A. Király (Ed.), *From tea leaves to leaf-shaped tools. Studies in honour of Zsolt Mester on his sixtieth birthday* (pp. 189–229). Lithic Research Roundtable & Institute of Archaeological Sciences, ELTE Eötvös Loránd University, Budapest, Hungary. <https://doi.org/10.23898/litikumsi02a09>

To the trailblazer Zsolt Mester to his 60th birthday, who sacrificed almost a lifetime to introduce a new research methodology in Hungarian prehistory research.

1. Introduction¹

I have been engaged in the research of the Late Copper Age since 2001, when I excavated Balatonőszöd, the currently largest excavated and published site of the Boleráz–Baden cultures (Horváth, 2014). Later, in 2005, I investigated a Pit-grave kurgan near Hajdúnánás (Dani & Horváth, 2012), and in the next year, I participated in a Hungarian-Russian research project that focused on the investigation of a kurgan field near Buzuluk in the Orenburg region, Russia (Pető & Barcsi, 2011). In 2016, I received a two-year Lise Meitner scholarship, providing the opportunity to compare Austria and Hungary in the Late Copper Age (Horváth, 2022). In this article, I will describe and discuss my settlement research in Hungary as well as my new research projects undertaken as part of the Lise Meitner scholarship. My excavations and assessments: Balatonőszöd-Temetői-dűlő, Csécse-Nagyréti oldal, Salgótarján-Baglyas-kő, assessments excavated by others: Hódmezővásárhely-Gorzsa-Sandpit V, Ózd-Kőalj-tető, Salgótarján-Pécs-kő, Szombathely-Kőszéri-dűlő, Szombathely-Reiszig erdő alatti dűlő, Szombathely-Újperint, Szurdokpüspöki-Hosszú-dűlő, Tatabánya-Delphi, Vámosgyörk-Motorhajtóanyag-tároló (Fig. 1).

In Hungarian prehistoric studies, the period between 3700 and 2800 BC is called the Late Copper Age, unlike in other European countries where the same period is known as the Late Neolithic, the *Jungneolithikum/Spätneolithikum*, or

the *Jungsteinzeit*. The Baden complex is one of the determinant cultures of this long period, spanning almost a thousand years.

The autonomy of the Copper Age of the Balkans was acknowledged in the wake of Colin Renfrew's studies in the 1960s–1970s (Renfrew, 1969). More recently, a similar advance has been made regarding the independent Copper Age of the Iberian Peninsula (Bartelheim & Krauss, 2012). Irrespectively of the fact that one of the main pillars of the change in terminology was the magnificent metalwork in these regions, Hungarian prehistorians have used this label for the Boleráz and Baden cultures whose metal finds are barely known, from the very beginning, from the 1890's (Pulszky, 1883; Hampel, 1895).

In many respects, Baden is much more than an archaeological culture, a point that was first raised in the 1960s, this is the reason that Baden is designated as a culture complex in several studies written by Vierá Nemejcová-Pavúková, Evžen Neustupný and József Korek (Němejcová-Pavúková, 1981; Neustupný, 1968; Korek, 1983). In fact, early scholars of this period already sensed something of the culture's complexity since, for example, Joseph Bayer, who excavated one of the very first Baden sites at Ossarn (Au), called it a *Mischkultur* (Bayer, 1928). Baden eclipses the average prehistoric archaeological culture not merely owing to its vast distribution from the Black Forest to the Black Sea and its long sequence. The irradiation of its material culture and its impact on other cultures was the most salient feature that led to its designation as a cultural complex (Furholt, 2008, 2009).

Some prehistorians traced this cultural irradiation as far as Troy in Anatolia in the light of the anthropomorphic vessels found at Troy and Ózd-Center (Kalicz, 1963), and the wagon models brought to light at Budakalász-Luppacsárda (Soproni, 1954). It has been suggested that the Baden culture can be linked to immigrants from

1 The oral presentation was given at the ÖGUF (Österreichische Gesellschaft für Ur- und Frühgeschichte) lecture session in 12, December 2017.

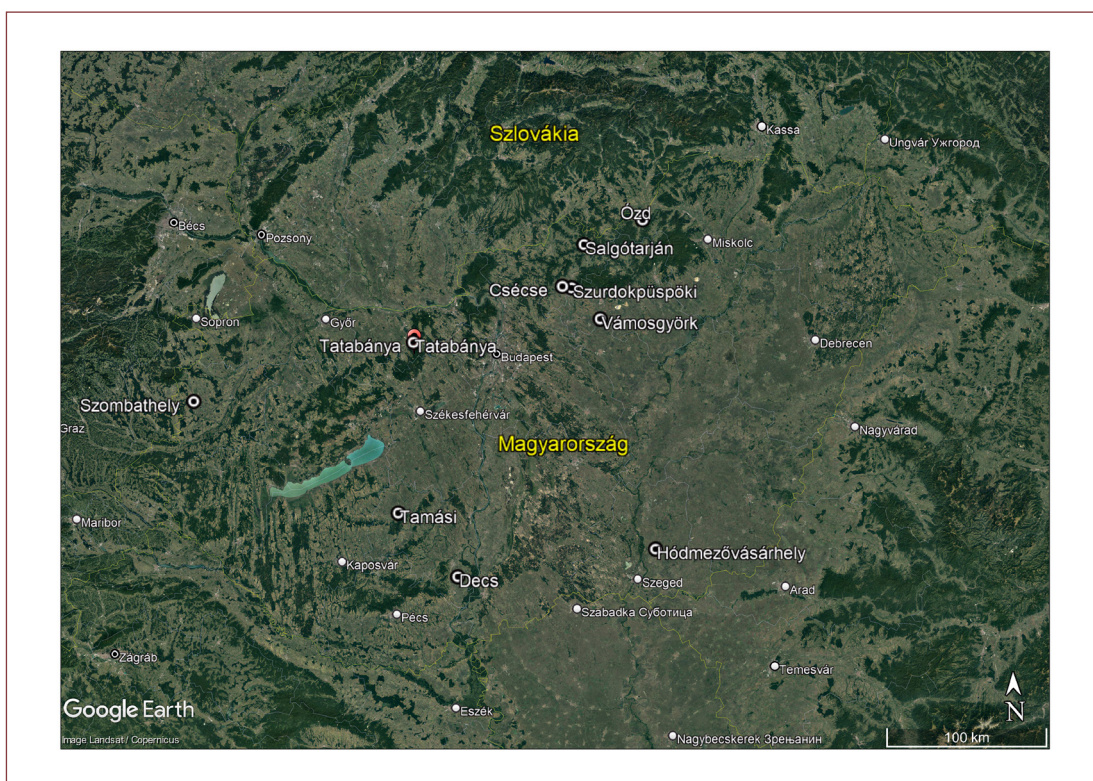


Figure 1. Researched sites/areas mentioned in the text (prepared by the author, basemap: Google Earth).

Troy – conversely, other prehistorians tend to highlight the culture’s local roots in its emergence (Neustupný, 1968). In fact, the culture’s cradle and the circumstances of its emergence are still unknown.

In Hungary, the term Baden complex covers Boleráz, the early Baden phase, the classical Baden phases, as well as the Cernavodă III, Kostolác and Vučedol cultures, which share many similarities with classical Baden and are partly or wholly contemporaneous with it (Horváth, 2016). These cultures and groups are regarded as populations with a material culture that is related to Baden. The archaeological terminology of these cultures is not uniform, reflecting the many uncertainties which, at the current state of research, cannot be resolved or confirmed. Following Martin Furholt,

the more neutral term “pottery style” is used for their designation and for distinguishing between them instead of group, culture or phase.

A wholly intrusive population, the communities of the Pit-grave culture arriving from the Far Eastern steppe, occupied the Great Hungarian Plain during the same period as the cultures of the Baden complex. In the trans-Tisza region, the Pit-grave areas were wedged into the Baden territory, mostly in the grassland unoccupied by Baden (Horváth, 2011).

A clarification of the nature of the interactions between these two markedly different populations remains a task for future research. While the Baden heartland is located inside the Carpathian Basin (mainly Hungary), the core distribution of the Lower Danubian Cernavodă III, Kostolác and

Vučedol cultures as well as of the eastern steppic Pit-Grave culture lies beyond Hungary, and only a small portion of their population infiltrated the region. In their case, their integration into Baden, the autochthonous culture in Hungary, represents one intriguing issue, while another is the changes in the culture of the groups who moved away, split off or simply drifted to the fringes compared to their brethren who remained in the heartlands of their respective cultures.

2. General research history

While the relationship between the period's archaeological cultures, groups, styles and phases, and their chronological position relative to each other has since long been broadly established, much less is known about the sites owing to the small size of the investigated areas and, perhaps even more importantly, because most of these have not been published. Over fifty years elapsed between the excavation and the publication of two unique burial grounds, the Boleráz cemetery at Pilismarót-Basaharc and the Baden cemetery at Budakalász-Luppacsárda, despite their being well known in international scholarship (Bondár & Raczky, 2009; Bondár, 2015a). These circumstances were hardly conducive to Late Copper Age studies.

Meanwhile, the exploration of the settlements has been even less successful. Small details were required by law to be excavated, with no attempt to relate them to a larger picture or to fit them into a contemporary settlement network. More excavations before the 2000s did not even have a topographical field survey, except in a few cases where the excavating archaeologist had a higher-than-average affinity for field survey or drawing. Thus, it is very difficult to evaluate them on their merits from today's point of view.

In the meantime, the growing number of radiocarbon dates and the advances made in radiocarbon dating led to a wide gap between the period's

absolute and relative chronological position. The gap between the two spanned some 1500 years in terms of the Baden culture, whose onset was traditionally dated between 2200 and 2000 BC – the emergence of Baden was pushed back to 3700 BC in the light of the dates from Arbon Bleiche 3 (Leuzinger *et al.*, 2002) and other new sites.

While the clash between the short and the long chronology ultimately ended with the adoption of the long chronology, prehistorians largely failed to address the implications of this chronological shift. For a very long time, any discussion of the impossibility of any contact between Baden and Troy was studiously avoided. (Given that the occupation of Troy began around 3000 BC, Baden could hardly be synchronised with Troy levels II–V between 2200 and 2000 BC if the culture emerged in 3700 BC and terminated in 2800 BC.)

Neither was it examined how, in the wake of the period's changed chronological position, the late Middle Copper Age cultures preceding Baden may have impacted the emergence of Baden, or how Baden faded into Early Bronze Age cultures succeeding it. This chaos principally affected the Balkans and Anatolia, until Joseph Maran clarified the main issues in a comprehensive study (Maran, 1998).

The large-scale excavations from the 1990s onward in Hungary (and the changes in the legal climate) finally enabled the investigation of previously unimaginable extensive areas with various techniques that had not been employed earlier as well as the primary assessment of the finds. Although a final report on most of these excavations is still unavailable, some patterns could nevertheless be identified regarding the nature and internal layout of the sites, as well as the overall settlement network and the complex's lifeways and chronology. In this study, I do not discuss the proto-Boleráz (Phase Ia) sites because I am convinced that these are multicultural sites from the previous Middle Copper Age (see, for exam-

ple, Horváth & Svingor, 2015, pp. 22–30), the integration of which into Baden would mislead fundamentally well-defined trends. The single Late Copper Age site that has been fully assessed and published is Balatonőszöd-Temetői-dűlő (Honti & Horváth, 2013; Horváth, 2014).

In the first part of my work, I shall describe and discuss my excavations at Balatonőszöd, a site that differs and stands out from the other known Baden sites in terms of both its size and its nature. I shall focus on those cardinal points that have significantly changed our perception of the Baden complex and can be set against the so-called Fonyód group, the Baden group distributed in the southern Balaton region.

In the second part of this presentation, I shall review the preliminary findings from various special Late Copper Age sites that will probably advance our understanding of this period.

3. The Balatonőszöd-Temetői-dűlő site

The Balatonőszöd site lies some two km from the current southern shoreline of Lake Balaton. The stable isotope analysis of the molluscs from the site revealed that Lake Balaton had covered a much greater area in the Late Copper Age and that its extent was about one and half times larger than today, meaning that the settlement had lain directly on the lakeshore, beside a smaller river – currently an artificial canal – flowing into the lake. This would suggest that the Late Copper Age was wetter than today and this influenced the region's permanent and intermittent hydrological system (Horváth, 2014, Sections 3.3.6–7).

It is therefore hardly surprising that the extensive lake and the rivers flowing into it represented a marked environment that offered favourable conditions for the communities settling here and, at the same time, also determined their culture that was shaped by adaptation to the specific conditions.

The number of Baden sites in Hungary has been estimated as being around 2000 sites (Horváth, 2016, p. 53: database of the national register). However, my estimates, based on the published data that can be checked, indicated a figure of around 600 (Horváth, 2016, p. 83). Only in the case of ten sites identified during the past decades could it be assumed that a Baden building had been uncovered – however, as it turned out during the review of the evidence, these sites could all be assigned to another period. Contentions regarding the lifestyle of the Baden culture were all based on this paradoxical picture: on the one hand, the high number of Baden sites compared to previous periods suggested a population growth or a more intensive settlement pattern, while on the other, not one single building was found on any of the settlements, which rather implied a more mobile or a semi-sedentary population often on the move. This, then, was the main argument behind the conceptualisation of the Baden culture as a stockbreeding, semi-nomadic population from the 1950's onward.

The Balatonőszöd site was the first and currently still is the only Baden site where any buildings have been brought to light. The four buildings had a similar size and groundplan, three were arranged in a row and they had been erected on the site's highest point, on the hill ridge. The house type uncovered during the excavation recurs among the site's archaeological finds: house models representing the same building type can be found among the ritual devices, while the refuse pits beside the houses contained burnt daub from the building's one-time floor, walls and roof. Back in 2001, however, the house plans uncovered during the excavation came as a surprise because similar structures had never been uncovered in Hungary. During the site's assessment, when I searched for possible parallels, I realised the similarity between these buildings and pile-dwellings, and in my discussion of the Baden lakeside

dwellings, I reviewed the evidence from southern Germany, Switzerland and Bulgaria, as well as from Austria, although the latter had no connections with Baden. Considering the prominent spatial and geographic role of Lake Balaton, the appearance of this building and settlement type is immediately quite understandable. It seems likely that similar buildings had been uncovered on another Baden site near Esztergom on the Danube, in a location similarly characterised by capriciously fluctuating water levels, the implication being that it proved possible to demonstrate the presence of a special waterfront settlement type of the Baden culture and its typical buildings in Hungary too (Horváth, 2014, Section 3.1.1).

We investigated an area of roughly 100,000 m² at Balatonőszöd, which is outstanding even among the large-scale excavations (most of which cover an area of 10,000 to 20,000 m² on average). Luckily for us, the greater portion of the excavated features could be assigned to the Late Copper Age, another unique trait of the site since most of these large-scale excavations are conducted on sites occupied during various periods. However, the other sites were not dominated by Baden features. The nature of the features uncovered at Balatonőszöd is much more diverse than on other known Baden sites: some 1000 pits of various forms and fills, suggesting different functions, roughly 100 hearths and ovens of various types, the already mentioned 4 buildings, 2 wells, human and animal deposits, as well as a destruction layer covering the greater part of the settlement, which contrast markedly with the other average Baden sites made up of pits (Horváth, 2014, Chapter 3.1).

Quite amusingly, the truly interesting aspect of the site was its cultural duality, which might seem quite obvious at first sight. Although Boleráz was recognised as the first, initial phase of Baden already in the 1960's and assigned to the Baden complex, this significant cultural ordering was based on meagre data from field surveys. Not one

single site occupied by both Boleráz and Baden was excavated in Hungary and thus any assertions concerning the relationship between them were essentially based on observations and data from Slovakia and the Lower Danube region, and not on Hungarian archaeological evidence. Unbelievable as it may sound, the first jointly occupied Boleráz–Baden sites were uncovered in this century at Balatonőszöd and a few other sites investigated along the planned line of the M7 Motorway – of these, only the data from the completely excavated and assessed Balatonőszöd site can be seriously considered in a site- or culture-level critical overview.

A very interesting occupation pattern was noted at the site. We identified a Boleráz occupation area in a lower-lying area closer to the lakeshore, which we initially believed to be earlier, and a classical Baden occupation slightly farther from the lake on somewhat higher-lying ground, which was believed to be later, according to the conventional relative chronological framework. The assessment of the finds revealed that there was some interaction between the two settlement parts: we found a few Baden sherds in Boleráz pits and a few Boleráz vessel fragments in Baden pits, suggesting that the communities we labelled Boleráz and Baden had interacted and had co-resided in some form. I did not initially have any doubts because I assumed that this horizon would be what is labelled the IIa Baden phase, representing the Boleráz–Baden transition. However, a closer look at the site's spatial organisation revealed that there was a 70-meter-wide zone between the two occupation areas or villages, even though the two lay extremely close to each other and could easily have merged. What we have here is a striking paradox: while the Late Copper Age settlement continued both spatially and chronologically, a spatial divide conforming to the Boleráz and Baden pottery styles could nevertheless be observed.

The series of dates obtained from the systematic sampling of the site further complicated this issue, for the dates indicated that the IIa transitional phase was not a brief period as earlier believed, but a rather long one falling between 3350 and 3000 BC, characterised by a chronological overlap between Boleráz and Baden at this site. Our two communities with their differing identities were neighbours during this 350-year-long period, they adapted to each other during their interactions, as a result of which Boleráz, which had settled at the site around 3500 BC, gradually ceased to exist, while Baden, which appeared around 3350 BC, continued to thrive until 2800 BC, until the close of the Late Copper Age and even after it. The settlement model elaborated for Balatonőszöd was the first to describe the genuine spatial and chronological relation between the two pottery styles on one particular site, which yielded a rather surprising picture compared to the previous cultural tableau (Horváth, 2014, Sections 3.3.14–15).

The most intriguing issue was to determine what had taken place between the neighbouring Boleráz and classical Baden villages, and whether there are any archaeologically visible traces of the interaction between the two communities. In other words, how did Boleráz evolve into Baden? Was it a peaceful transition, a voluntary submission, or, conversely, an unavoidable surrender coerced by brute force, an aggressive seizure of power? The striking proximity of the two villages would suggest that their communities were close to each other not only spatially, but in other respects too. Similar subsistence practices are indicated by the raised domestic species, which only differ in their finer details: for example, pig, a species more widespread during wetter periods, had a higher proportion in Baden than in Boleráz (Horváth, 2014, Section 3.3.3). At the same time, the growing proportion of pigs could also be a reflection of a more sedentary lifestyle. It also became clear that the co-residence of the two communities was fair-

ly long, a favourable circumstance in the sense that this long period saw more activities, actions, reactions and interactions, which have a greater chance of including ones that would leave a trace in the archaeological record that we can detect even after five thousand years using the modest tools of basic archaeological research.

Is it possible to paint a picture of a 5000-year-old settlement based on the excavation record? Although this might seem somewhat bold, the evidence provided by this site warrants an attempt. The most prominent and noteworthy features, artefacts and phenomena, which in my view most saliently express human nature and conflicts between individuals, can be found in the ritual sphere – and if anything, this site was extremely rich in ritual locations and ritual devices (Horváth, 2014, Chapter 3.2).

The remains of 76 human individuals were recovered from 46 settlement features; compared to the number of graves in the culture's formal cemeteries, more Baden burials were recovered from settlement pits than in the completely excavated Alsónémedi cemetery which had 43 graves (Korek, 1951).

This was the first site where we tried to identify and carefully distinguish between the funerary customs of the Baden complex. The few formal burial grounds such as the Baden cemeteries uncovered at Budakalász-Luppacsárda and Alsónémedi, and the Boleráz cemetery at Pilismarót-Basaharc, represent but one, and not even the largest dimension of the culture's funerary rites. Additionally, these burial grounds are spatially isolated in the sense that they are not associated with any settlements and cannot be easily interpreted on the level of the one-time settlement network. At least as many or even more burials have been uncovered on the partially excavated settlements of the Late Copper Age as in the formal cemeteries, the implication being that the analysis of cemeteries is insufficient for Late

Copper Age population estimates or for modelling funerary customs.

At the same time, the burials found at Balatonőszöd show an astonishing diversity. Some of the dead were accompanied by grave goods and were interred in grave pits dug specifically for this purpose and carefully laid to rest. These interments probably shared a similar ritual background as the cemetery graves, but since they were uncovered in settlements, they nonetheless differ from each other. I have termed these burials as settlement burials.

Some burials lacked grave goods and were deposited in pits whose primary function was not funerary but of another nature, meaning that these burials were secondary. I have termed these burials bloody sacrifices and I also strove to identify the sacrifice type, if possible, based on the nature of the sacrifice. The first instance when we could be quite certain that the deceased individual had met a violent death came to light at Balatonőszöd: a chipped stone arrowhead found lodged in-between the vertebrae of female skeletons No. 37 in the mass grave No. 1489. We identified traces of clashes or violence on the male skull from Burial 41. Mass graves and single or multiple burials suggesting kinship or family ties could be distinguished, in whose background we can assume social or kinship conflicts, or even perhaps sudden mass deaths (caused by an epidemic or a battle). Traces of burning in a pit can be associated with white or celestial magic, while the dark, wet depth of the well 1099 suggests black or chthonic magic (Horváth, 2014, Sections 3.2.1–2).

Given that the majority of the interments were child and female burials, one possible explanation is that they were not accorded a place in the cemeteries owing to their social position – they had perhaps not attained the necessary status in life, or the circumstances of their death diminished the status achieved in life. It seems to me that this was the case because some sort of patho-

logical deformation could be noted on most of the interred individuals, both among the settlement burials and the bloody sacrifices – although these were not the cause of death, the individuals were in all likelihood stigmatised because of these physical disabilities (for example lameness, pigeon-breastedness, humpbacked, bucktoothed, blindness, deafness: Horváth, 2014, Section 3.3.1).

The inarticulate bodily parts are particularly noteworthy. Arms, legs and skull fragments came to light in isolation, in pits, sometimes with traces of burning. The post-mortem manipulation of the body perhaps also involved some kind of smoking ritual, which ensured the preservation and conservation of the body, perhaps because it was not interred immediately after the onset of death. There were additional manipulations of the body after the primary interment: the head and limbs of certain individuals were removed and then used in other rituals, indicated by the incidence of various types of ritual vessels and ritual devices in or beside sacrificial pits containing human and animal deposits (Horváth, 2014, Section 3.2.4). In one case, we also uncovered a complex ritual area with a sacrificial pit, fireplaces, postholes and refuse pits.

The funerary rites involving the manipulation of the head and the limbs show a surprising correlation with certain ritual devices, among them the distinctive headless figurines of the Baden complex which were modelled without arms or legs, and have an opening, or several openings, for inserting one or more heads, which are assumed to have been made from some organic material, explaining why they have not been found (Horváth, 2014, Section 3.2.5). The post-mortem manipulation of the dead specifically affected the head and the limbs, perhaps as part of an initiation rite, and since traces of this manipulation are generally found in settlements, it seems obvious that these rites were conducted on the settlement and not in the cemeteries.

The Balatonőszöd settlement was the first site where interments from the Boleráz period were also brought to light. These were all settlement burials. In contrast to the cremation cemetery uncovered at Pilismarót-Basaharc, these were, at long last, the first inhumation burials, meaning that they were suitable for demographic and metric comparative analyses, and for describing the Boleráz population, an undertaking for which cremations are unsuitable. Compared to the gracile, leptodolichomorphic, Mediterranean anthropological type of the classical Baden, the Boleráz burials represented an Alpine-Dinaric brachycranial type, whose survival in Baden reflects the continued presence of this anthropological component as well as its increase, suggesting a slow, continuous infiltration from the Alpine region (Horváth, 2014, Section 3.3.1).

In addition to their incidence in human burials, animal remains were recovered from 87 other features, some together with human remains, which I interpreted as appeasing sacrifices repeatedly presented by the community, and some without any human remains. Several types could be distinguished among the latter too, in part according to species, and in part according to the animals' age, sex and body placement. The cattle sacrifices share the most similarities with human interments, mirroring the body placement of human burials and the grave goods accorded the dead, the implication being that as one of the most important livestock species of the Baden complex, cattle were equal to humans, for whom they could be substituted in the case of certain bloody sacrifices. Anthropologists have reported similar practices among several cattle-breeding African peoples. In other cases, the age of the animal indicates the sacrifice of the firstborn, while its sex is possibly a reflection of whether it was sacrificed in the course of a male or female fertility rite. Most animal sacrifices can be assigned to fertility rites, and agrarian and calendrical rites,

again reflecting a colourful diversity (Horváth, 2014, Sections 3.2.1, 3.2.3, 3.2.6).

It is very telling that human and animal sacrifices, in other words, bloody sacrifices, are only documented in classical Baden, but not in Boleráz. How should this be interpreted? It is possible that Boleráz lacked bloody sacrifices, that there were no conflicts which called for these types of rites, or that, unlike Baden, conflicts were resolved peacefully. It is also possible that the victims of the human sacrifices uncovered in the Baden settlement part had been chosen from the neighbour Boleráz community, which eventually led to the disappearance of Boleráz and its assimilation into Baden. Unfortunately, the basic archaeological and physical anthropological analyses are unsuitable for resolving this issue – further isotope and DNA studies are needed to obtain meaningful results.

The large size of the settlement is quite surprising and singular, especially considering that the occupants were part of a mobile community characterized by non-sedentary arable farming, they were stockbreeders rather than peasants. Although the excavations did not uncover the settlement's entire territory, we estimated that some 60% was investigated – even so, the discovery of such a large settlement occupied by a population regarded as having a mobile lifestyle was highly unusual and surprising.

The most recent excavations suggest that Balatonőszöd was not an isolated case, but a typical dispersed Baden settlement. It seems likely that there were several similarly large settlements of which only a much smaller portion fell into the excavated area than at Balatonőszöd.

Despite the settlement's astonishingly large size, no more than four buildings were uncovered, all of which had a small floor area and had been occupied by four nuclear families, who were perhaps related to each other, forming an extended family or clan. The settlement attained its gi-

gantic extent not owing to the high number of its occupants, but because of the long duration of its use-life.

Although the only Baden site where four buildings with internal structures were excavated, the life of the settlement was not organized around the buildings but around the sacral spaces. It was not possible to delineate the external work area belonging to the house or the row of buildings consisting of three buildings, and with the help of this, the rules of household archaeology could be applied.

The settlement's relative chronology shows that it remained occupied until the onset of the latest Baden IV phase, but did not see the end of that phase (IVb?). However, contradicting the relative chronology, the absolute chronological dates indicate that the settlement was occupied even after 2800 BC, the date marking the close of the Copper Age, during the transitional period between the Copper and the Bronze Age, and that its use-life extended into the Early Bronze Age, making it the first settlement where the post-Copper Age survival of Baden and its relation to the subsequent Early Bronze Age cultures could be studied.

It would appear that in this region, the emergence of the Somogyvár-Vinkovci culture between 2750 and 2550 BC, had possibly coincided with a few post-Copper Age Baden groups – the real question is whether there was any interaction between them, for example on one particular site, or whether any interaction can be wholly ruled out (Horváth, 2014, Chapter 5).

In terms of its relative chronology, the site lies on the territory of the northern transdanubian so-called Fonyód-Úny group, including the southern shore of Balaton after Banner (Banner, 1956, pp. 40–42, Abb. 35) (Fig. 2: 1). Later Fonyód territorial group was correlated with the Ila transitional phase in her conventional typo-chronological schemes (“Fonyód/Tekovský Hrádok”:

Němejcová-Pavúková, 1981, p. 262), while the associated group Úny was placed into the Phase IVa.

As we can see, the large-scale excavations have revealed that the ceramic inventories from several sites lying close to Balatonőszöd include vessels not only from Phase Ila but from Phases Ib to IVa, calling for a critical re-assessment of the Fonyód-Úny (territorial or chronological?) group(s).

The long life-span both in terms of relative and absolute chronology does not, in itself, explain the appearance of these huge sites, often conglomerates of sites or settlement networks, in the southern Balaton region in the case of small communities organised along nuclear families and kinship ties. An alternative explanation was necessary, which raised the possibility that the lack of archaeologically visible buildings can perhaps be attributed to the fact that the Balatonőszöd site and other settlements had not been permanently occupied. An intermittent occupation and the periodical return to these settlement sites according to some cycle not known to us led to the growth of these settlements and their “chaotic” conditions in terms of their excavation, with many features cutting each other already during their occupation because the community that periodically returned to the site no longer remembered or was no longer familiar with the layout of the abandoned settlement. It seems likely that only a few more significant features had been marked such as the wells and the repeatedly renewed areas of the major community rituals, and possibly the locations of the houses designed for portability that could be easily dismantled and re-assembled again.

A look at the distribution of the sites reveals that settlement chains or networks were established along watercourses and that the settlements were spaced three to five km apart. The sites within a drainage network may represent links in a chain of settlements used by a community of smaller families that was continuously on

the move along the watercourse with their large stock of animals, rather than separate, individual communities (Horváth, 2014, Chapter 4). Thus, the seemingly high number of Baden sites compared to the preceding Middle Copper Age and the ensuing Early Bronze Age is grossly misleading because the number of Baden sites cannot be correlated with the number of Baden communities occupying them. The high number of sites does not reflect a population growth, but rather a specific lifestyle.

For a broader model of this phenomenon, the other Late Copper Age sites in the Balaton region should by all means be incorporated into the model, which should then be extended to the entire territory of Hungary to discern patterns, if any, on the cultural level. What was the nature of this cyclical movement pursued by the Baden communities along the watercourses flowing into the lake along the southern shore of Lake Balaton? How mobile were the communities of the Baden complex compared to the genuinely mobile and migrant Pit-grave population, whose settlements are not known from the Great Hungarian Plain, only their burial places? Based on the Russian and Hungarian archaeological record, the Pit-grave population is assumed to have had a migratory range of some 50 km and a seasonal movement conforming to a transhumance model. Are there archaeological or other approaches with which this issue can be explored in the case of the Baden complex?

In his monograph on the Baden culture published in 1956, János Banner outlined a regional Baden group which he labelled the Fonyód-Úny group after a smaller cemetery section with nineteen cremation and two inhumation burials uncovered in modern Fonyód in 1935. Unfortunately, it remains unclear from what is known about the excavation whether the site represents part of a formal cemetery, whether it lay on the fringes or immediately adjacent to a settlement, or whether

the burials were settlement burials. The Late Copper Age sites uncovered along the planned track of the M7 Motorway using modern field techniques yielded finds of both Boleráz and Baden and all sites were occupied over considerably more phases than Baden IIa. In this sense, the concept of the Fonyód group as defined by János Banner can be discarded (Horváth, 2014, Section 4.2; the re-assessment of the Úny group: Bondár, 2015b, Horváth *et al.*, 2020). The newly identified sites outline the shoreline zone of Lake Balaton during the Late Copper Age, although there are a few sites farther inland along the smaller watercourses flowing into the lake.

Returning to Balatonőszöd, the sites along the watercourse beside which the settlement is located outline a closed settlement network. Much more detailed studies and a meticulous assessment of all excavated sites would be necessary to confirm that these were established by the same community as the one settling at Balatonőszöd and to determine whether there was any hierarchy between them. Some of the sites in the settlement network could have been formal cemeteries or animal pens without any settlement features, while others could have functioned as seasonal, intermittent or permanent settlements.

A targeted search strategy possibly would yield refitting artefacts from different sites within the network, probably not among the utilitarian objects of daily life, but among the more remarkable, and therefore more easily identifiable ritual devices or unique objects such as the Balatonőszöd mask, one of the culture's and the period's unique finds, of which only one half was found. Where can its other half be? If it came to light, it would provide conclusive evidence for the incontestable interaction and maintenance of relations between the two communities. Is there any chance of it ever being found, or is it an illusion to hope for its discovery (Horváth, 2002, 2004, 2010, 2015)?

Unlike in the earlier Neolithic cultures, the mask was not a frequently used ritual device – at least, there is no evidence whatsoever for the use of masks in the currently known voluminous Baden find material. The modelling of the Balatonőszöd mask differs from the other prehistoric masks in that is unusually detailed, to the extent that even the anthropological type depicted by it could be identified. Curiously enough, the mask does not portray the average gracile Mediterranean Baden type, but a robust Cro Magnon type, which during that period was frequent among the burials of the Pit-grave population (Horváth, 2014, Section 3.2.5).

How did an individual of the Pit-grave population from their settlement territory in the trans-Tisza area come to be portrayed in a Baden village in Transdanubia? The realistic, almost portrait-like details suggest that its creation was inspired by a personal encounter because its creator could hardly have rendered the face so accurately based on someone's description. It remains unknown whether this personal encounter took place in the Baden village or a Pit-grave settlement. The mask was carefully broken in two, suggesting, on the strength of various analogies, that its other half was intentionally kept by someone. Similar examples can be cited from better documented prehistoric periods such as the Minoan Palatial period on Crete, where various artefacts were used as tokens for personal identification. An individual identified himself or herself by presenting the other half of a particular, usually special artefact and thereby gained access to some important thing such as information, some special right, or admittance to a prominent individual. The identity of the Kurgan-type man portrayed on the mask in the distant Baden society living by Lake Balaton is not known: his status could have a conqueror, an overlord, a high-status religious leader or an individual on par with the Baden people (a merchant or a military strategic thinker,

perhaps a craftsman), or, conversely, a subjugated person, a slave or even a prisoner. The cultural contacts in the background of the mask nevertheless suggest that the mask's other half should not be sought in another Baden settlement but in the Pit-grave distribution of the trans-Tisza region.

4. Southern shore of lake Balaton

For roughly fifty years after János Banner's publications of the urn cemeteries and a few sporadic settlement traces in the Fonyód area, the so-called Fonyód horizon or Fonyód group (Fonyód/Tekovský Hrádok IIa after Němejcová-Pavůková) distributed in the Fonyód-berek (marshland) along the lake's southern shoreline was assigned to the Baden IIa transitional period based on the finds from these sites (Banner, 1956, pp. 28–33, Sites 37–41; and Table 1 in Horváth, 2014, Chapter 4). There was an ongoing debate on whether the sites represent a transitional phase or whether they should be assigned to Boleráz or Baden, with most Hungarian scholars adopting István Torma's view that the Fonyód horizon represented the final phase of the Boleráz sequence (Torma, 1977, p. 55).

Four other sites of the southern Balaton region must be highlighted which can provide information by Balatonőszöd for modelling the Late Copper Age settlement network.

One of these is the site on the outskirts of Balatonlelle, extending along the opposite banks of a former watercourse, the Forró-árok (Nagy, 2006, 2010; Sófalvi & Nagy, 2007; Sófalvi *et al.*, 2007). The excavated area with 36,554 m² on one side was a Boleráz–Baden settlement with cultural layer, settlement burials and sacrifices as at Balatonőszöd, while the site on the other side of the watercourse was a separate formal cemetery with 22 Boleráz and Baden graves, obviously associated with the settlement. Unfortunately, only the report on the cemetery has been published to date (Nagy, 2010), but even so, the preliminary

data shed some light on a recurring pattern: some settlements had a separate community cemetery, usually located on the bank of a watercourse opposite the settlement. A similar situation was documented at the sites of Vámosgyörk (Farkas, 2004; see later). The implication for future research is that formal Baden cemeteries can perhaps be more successfully searched for in the light of this pattern, and a rise in their number can be expected.

The other interesting region is represented by the sites in the Balatonszemes (at Balatonszemes-Szemesi-berek a large classical Baden settlement was excavated on 42,000 m²) and Balatonlelle-Balatonboglár area (e.g., Honti, 1981; Bondár *et al.*, 2007; Fábíán, 2014, pp. 408–415), which were perhaps part of a huge conglomerate of sites. In this case, we are faced with the problem that in the lack of an association between the excavated areas, we are not always capable of determining whether the investigated site portions lying strikingly close to each other were part of the same huge continuous site, or whether they were the independent, nearby links of a network along a watercourse. The sites at Szemesi-berek and Egyenes-dűlő in the Balatonszemes area were quite certainly the continuations of the same site (Fábíán, 2014, pp. 408–414), and the continuity between the sites at Balatonlelle-Rádi út mellett, Rádi-domb and Rádpusztá-Temetői-dűlő too seems quite probable (Fábíán, 2014, pp. 415–431).

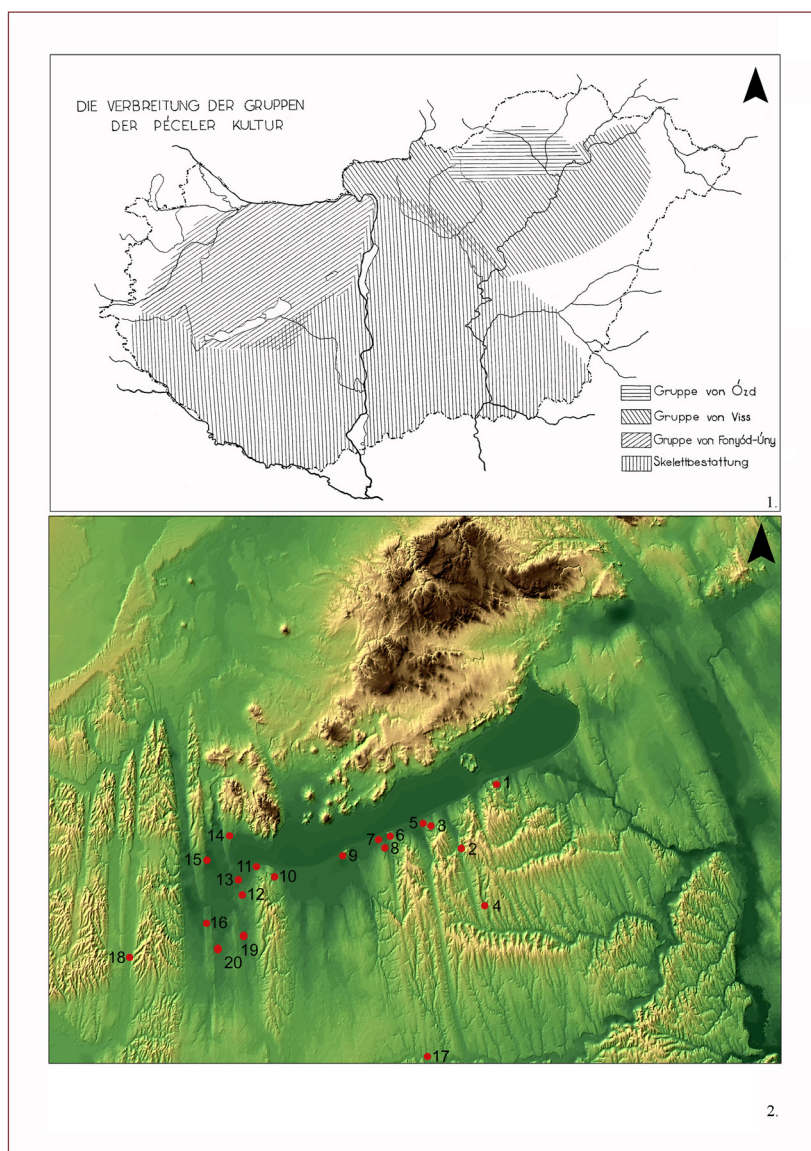
The third highly promising site is Balatonkeresztúr-Réti-dűlő, which lies slightly farther from Lake Balaton, in the wetland along the River Zala. Unfortunately, the assessment of the site is incomplete. The occupation pattern of this settlement differed from the Balatonőszöd settlement since the Baden and the Boleráz features lay among each other across the settlement's entire territory, while the radiocarbon dates confirmed a relative chronology in which the successive phases followed each other fairly

rapidly. There was no indication of a post-Copper Age survival. If the preliminary report can be believed, the significance of the site lies in that it indicates an entirely different occupation pattern than at Balatonőszöd, with a full spatial mixing between Boleráz and Baden, while its chronological range has an entirely different dynamism than that of the Boleráz and Baden communities at Balatonőszöd, where the two co-resided for a long time, but in isolation from each other (Fábíán, 2013, 2014, pp. 103–397).

A long chain of sites was discovered in the Fonyód-berek during the investigations preceding the construction of the M7 Motorway (Horváth, 2014, Chapter 4, Fig. 5). The sites were occupied for varying lengths of time, but overall, they span the period from Balaton-Lasinja/*Furchenstich* through Boleráz to Late Baden (up to the appearance of Kostolác), indicating that these sites do not represent a separate chronological phase or a regional group. At the same time, they share numerous similarities with the settlements found elsewhere along the lake's southern shoreline such as Fonyód-Vasúti-dűlő Sites 1, 2 and 3, Fonyód-Bézsény-pusztá, Fonyód-Fehér-bézsény and Fonyód-Tüskés, excavated by Krisztina Somogyi and Zsolt Gallina (Honti *et al.*, 2004; Honti *et al.*, 2007, pp. 23–26, 35–42).

The Fonyód-Ordacsehi region differs slightly from the region between Balatonszemes and Balatonőszöd. A glance at the region's historical maps shows that aside from the zone of the few meters high sandbars and bluffs along the lake's shoreline in the Keszthely, Fonyód, Boglárlelle, Balatonföldvár, Zamárdi and Siófok area, in the area between Balatonvilágos and Balatonkenese, as well as in the Balatonfüred and Tihany area, a high water level resulted in a single constantly or intermittently water-covered huge area and that only the basalt cap of Mount Fonyód rose above the water. In other words, hardly any settlements can be expected in the shoreline zone in this area

Figure 2. 1 (top): The Baden pottery styles after Banner (1956, Abb. 35). 2 (bottom): The southern Balaton region with the Late Copper Age sites. The sites are: 1 – Zamárdi, 2 – Szólád, 3 – Balatonőszöd, 4 – Andocs, 5 – Balatonszemes, 6 – Balatonlelle, 7 – Balatonboglár, 8 – Ordacsehi, 9 – Fonyód, 10 – Balatonkeresztúr, 11 – Balatonberény, 12 – Tükös, 13 – Vörs, 14 – Keszthely, 15 – Sármellék, 16 – Balatonmagyaród, 17 – Kaposújlek, 18 – Nagykanizsa, 19 – Sávoly, 20 – Szőkedencs. Prepared by the author.



or considerably less than east of Balatonboglár and Balatonlelle.

It follows from the above, that the Fonyód/Tekovský Hrádok horizon cannot be treated as an independent regional or chronological group in southern Transdanubia or as a separate chronological phase representing the IIa transitional period between Boleráz and Baden.

The geographic boundaries of the southern Balaton region are also slightly blurred (See: Horváth, 2014, Chapter 4, Fig. 1): it is uncertain whether there was a meaningful connection between the northern Balaton shoreline to the northern or southern Transdanubian region, the Pécs area and the Danubian region (Cp. Horváth, 2014, Chapter 4, Fig. 2). A similar pattern of sites

located on the ridges running parallel to the watercourses can be noted in the Rábaköz region, in the Marcal Basin, in the Kemenesalja region and the Göcsej (Kerka Valley region).

The southern Balaton region is characterised by the north-west to south-east meridional valleys extending the southern shore of Lake Balaton, the Sió/Sárvíz rivers in the east, the Zala river in the west and the closed drainage system of the Völgyiség, Hidas and Kapos rivers in the south (in the Dombóvár–Kaposvár–Nagykanizsa line). There is a break in the distribution of Baden sites in County Zala: a single site (Hahót-Szartori I) is known in the Kerka Valley, while none have been identified in the adjacent south-eastern Styrian region of Austria and the Prekmurje region of Slovenia, indicating that the western boundary of the Baden distribution lay in this region.

A settlement pattern resembling the one in the southern Balaton region can be discerned along the River Rába and its tributaries in the Little Hungarian Plain down to the River Zala and in the Mezőföld region along the Sárvíz/Móri-víz and the Váli-víz/Benta streams.

The Baden occupation in the Pécs area and the Mecsek Mountains differed: in this region, we find hilltop and tell-like settlements, for example at Pécs-Nagyárpád and Zók-Várhegy, often together or successively with the Vučedol culture. The relation between the Baden and the Somogyvár-Vinkovci culture, often documented on the same sites (Cp. Horváth, 2014, Chapter 4, Fig 2, Chapter 5, Fig. 10) is not known. Although vessels with a similar decoration pattern to Baden's are known from several sites in the South Balaton region (e.g. Vörs-Batthyányi disznólegelő, Pécs-Nagyárpád: Horváth, 2014, Chapter 5, Fig. 6.2–3; Ordacsehi-Kécsi-mező: Kulcsár, 2013, Fig. 4). For the time being, the geographic sub-regions cannot be correlated with the currently known typological and chronological groups of the Baden complex.

Similarly, to the Fonyód group, the other assumed chronological horizons and regional groups identified by János Banner in 1956, Viera Němejcová-Pavúková in 1981 and József Korek in 1983 can probably also be rejected because their separation as distinct units within the Baden complex is not borne out by the current evidence.

The main conclusions – and caveats – that can be drawn from the data are that the regional Baden groups as defined by János Banner, which have been strictly adhered to in prehistoric studies, have practically lost their relevance and that very different cultural and occupational patterns can be discerned even within the same geographic region such as the southern Balaton, meaning that the period was characterised by a mosaic-like cultural patterning. However, this does not mean that we will not encounter recurring patterns, one good illustration of which is the combination of settlements and their associated cemeteries. It is also quite evident that the settlement layouts and settlement networks of the Baden complex can hardly be described with a single model.

However, a single site such as Balatonőszöd, or even an entire region such as the southern Balaton region is insufficient for constructing models on the country or on the culture level, for which a much larger sample is necessary. This can be achieved by the re-assessment of older assemblages and the assessment of the new excavations to broaden our overall picture as much as the evidence permits.

Following the details above the suggested label for this territory is the Southern-Balaton group of classical Baden, but it is cannot extended to the whole territory of Transdanubia. The chronological position of the Southern-Balaton group extended to the classical Baden II–III–IV Phases (Fig. 2: 2).



Figure 3. 1: The examined sites in the environment of Szombathely. 2: Mug decorated with incised labrys motif on its base (Úny-type). 3: Fragments of a bowl decorated with a seated human figure, large mammals and an Ózd-type handle from Bükkábrány (Photos: L. Fekete). Made by T. Horváth.

5. Regional pottery styles in Hungary not after János Banner

There are indeed regional variations in the classical Baden pottery assemblage in Hungary, as János Banner was the first to publish. This can often be seen in the decoration of the ceramic forms, sometimes in the different shaping methods of the same types. A similar phenomenon has not been reported for a long time from other countries in the area of classical Baden, although it may exist (*cf.* Furholt, 2009).

To what can this divergence in ceramic styles be attributed? Does it have any other characteristics than territoriality (e.g. chronological, set-

tlement aspects, possibly a cultural background from the end of the Middle Copper Age)?

Research on settlement history over the last twenty years has convinced me that regional variations in ceramic style are linked to geographically and topographically determined settlement history.

In other cases, they show the influence of the cultures of the preceding, terminal Middle Copper Age period. The paradox is that this influence is not on the Boleráz culture that immediately followed the Middle Copper Age, but on Baden after a time gap (or, the terminal Middle Copper Age cultures survived and lived in the Boleráz-period, at the beginning of the Late Copper Age). In these

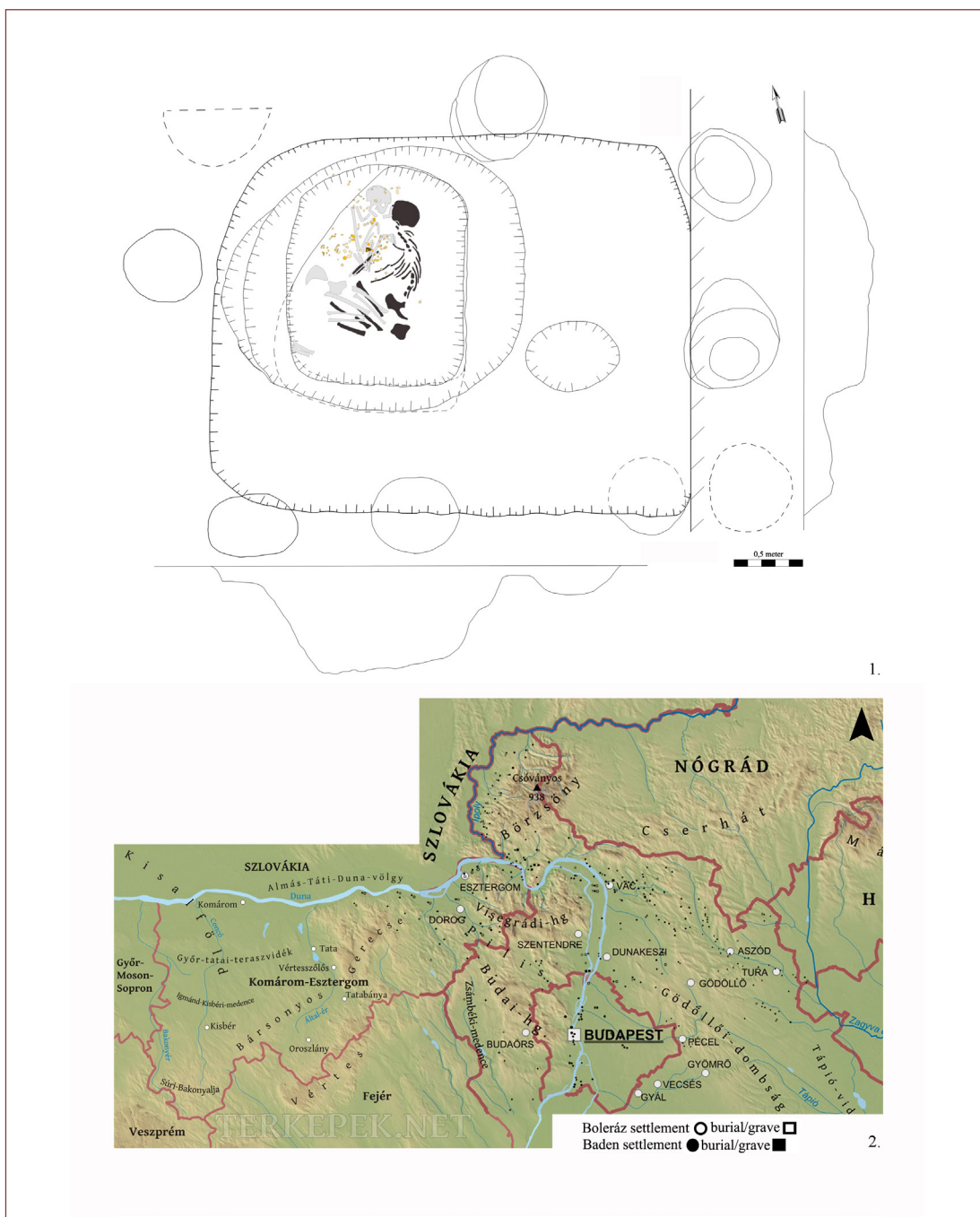


Figure 4. 1. The double human burials from Tatabánya-Delphi. 2. The distribution of Boleráz and Baden sites in the Komárom-Esztergom and Pest Counties. Prepared by the author.

areas, there is either no or a noticeably sparser network of Boleráz settlements compared to the total area of distribution. This process is particularly marked in areas where the cultures of the terminal Middle Copper Age were stronger and more homogeneous, and where the geographical conditions made deposition more difficult (e.g. mountainous regions with limited places of settlements at NE-Hungary, Pest County, Transdanubia; or regions with extensive water network e.g. Southern-Balaton region).

In the next, I shall briefly discuss my preliminary findings regarding the sites analysed as part of my Lise Meitner scholarship. I made every effort to cover the entire territory of Hungary, bearing in mind that I only had two years at my disposal (Fig. 1). I therefore had to make a few compromises. I did not find any evaluable material in southern Transdanubia (Decs-Dög-kút and Tamási-Csikó-legelő are two Boleráz–Baden settlement parts, the excavations of Géza Szabó, which I am processing) or in the country's central region, in the Danube-Tisza interfluvium and the central part of the Great Hungarian Plain. As an alternative, I undertook a critical review of the monographs on Budakalász-Luppacsárda, the one cemetery lying in this region (Horváth, 2017a).

I assessed three new sites in the Szombathely area, in north-western Hungary bordering on the Burgenland (Au), one site in Tatabánya-Delphi in north-western Transdanubia, one site on the outskirts of Hódmezővásárhely-Gorzsa-Sandpit V in the southern Hungarian Plain, one site on the outskirts of Vámosgyörk-Motorhajtóanyag-tároló in the piedmont area in the northern Hungarian Plain, and I also undertook the critical re-assessment of several already published sites in the Salgótarján (Pécs-kő) and Ózd (Center, Kőalj-tető, Szentsimon) areas as well as the assessment of a newly excavated sites at Szurdokpüspöki-Hosszúdűlő, Csécse-Nagyréti oldal and Salgótarján-Baglyas-kő in the country's north-eastern region

(Nógrád and Borsod-Abaúj-Zemplén Counties). These sites are either well-known iconic sites of the Baden complex, which largely determined our perception of the culture, or are the key sites of a regional Baden group as defined by János Banner, and thus play a prominent role in the study of a region's site network or the critical review of a Baden group.

5.1. Environment of Szombathely (NW-Hungary, Transdanubia)

I undertook the assessment of three sites in Szombathely (Fig. 3), which can be regarded as the region's first Late Copper Age sites found since the 1900s, after a long research gap.

A Boleráz pit was found during the construction of Road 89 bypassing the town (Site 2: Kőszerdűlő: Horváth, 2017b); two other pits and part of a Kostolác settlement came to light slightly north of the Boleráz pit (Site 5: Reiszig-erdő alatti dűlő: Horváth & Wild, 2017). The water washed out an assemblage of Baden vessels in a former gravel pit inside the city (Újperint: Horváth, 2017c, 2018c).

The three sites along the Gyöngyös-Perint drainage represent three different cultures and periods of the Late Copper Age, although, unfortunately, not on the same site that would have enabled a study of the transition between them.

The vessel types of the Boleráz sites and their ornamentation have much in common with the Boleráz material from Austria, and the site's very early date, falling between 3700/3600 BC, similarly compares well.

The assemblage of Baden vessels washed out by the water in the Újperint gravel pit included a highly remarkable vessel: a mug bearing an incised labrys on its base. This motif represents the double axe, a formerly unencountered artefact type, which is a reflection of the culture's far-ranging contacts.

The Kostolác site is rather unusual in Hungary because it lacks Baden material; instead, this site

yielded genuine Pivnica-type late Kostolác material without any Baden. Its radiocarbon date assigns this Kostolác settlement part to after the Late Copper Age, to the Copper Age/Bronze Age transition between 2800 and 2600 BC.

The classical Baden pottery types and decoration (Úny group) show similarities with the adjacent territory toward Burgenland (Austria).

5.2. *Tatabánya-Delphi (Transdanubia)*

A small portion of a Baden settlement was uncovered in the inner city area of Tatabánya on the bank of the Szent-György stream, where only the lower sections of the various features could be observed owing to later disturbances and natural erosion. Only a more deeply dug settlement burial containing two skeletons survived undisturbed (Fig. 4: 1). One unusual feature of this double burial containing a man and a woman embracing each other was that the woman was interred in a funerary garment covered with *Dentalium* beads. An arrowhead was found in her abdomen, suggesting a violent death. According to the field observations, there were no similar traces or finds suggesting an unnatural death in the case of the man, who had been interred at a much earlier date (Horváth *et al.*, 2020). The slight difference in the radiocarbon dates confirms that the two bodies had not been interred at the same time, confirming the observations made at Balatonőszöd regarding the diversity of burial rites, violent death and the post-mortem manipulation of the bodies.

This double burial offers an opportunity for a critical look at Banner's Úny group and for the reconstruction of how *Dentalium* adornments were worn.

The vessel hoard that is now treated as a stray find was found at Úny-Diósz-Bózzay ráta in 1936 (Bondár, 2015a). This depot of 12 posts is the eponymous site of the northern Transdanubian regional group of Úny.

The Fonyód and Úny groups were first identified and described as separate units by Banner in his monograph, but with partly overlapped distribution (Banner, 1956, 40–42, Abb. 35, Taf. XV/1–2, 5–16, Taf. XVI/1–10, Taf. XVII/14, 18–21; 186; Fig. 1.3). In later scholarship, the two groups were conflated and the Fonyód-Úny group was used to denote a regional distribution as well as a chronological period, although opinions varied as to whether this should be equated with the early Baden Phase IIa, the transition from Boleráz in the light of the Fonyód burials, or Phases IIb, III or IV of the classical Baden period on the testimony of the vessel assemblage from Úny.

Of the group's diagnostic traits, only the applied plastic ornamentation on the neck of large amphorae is acceptable today, which is attested in the Vienna Basin too (Vienna, District 22, Seestadt Aspern, cf. Penz, 2014, Abb. 13). If the Úny group does exist, it spanned the entire classical Baden sequence in time, and in the Northern Transdanubia toward Austria/Burgenland in space.

The Ludanice and the Balaton-Lásinja cultures can both be found in northern Transdanubia. It is possible that this duality persisted during the Late Copper Age and was reflected in small regional variations in ceramic style and/or ornamentation in the classical Baden culture. In areas lacking an occupation during the terminal Middle Copper Age, there is a cultural hiatus during Boleráz, i.e. during the initial period of the Late Copper Age.

The radiocarbon dates for the Boleráz cemetery at Pilismarót-Basaharc indicated that the cemetery's use began between 3645 and 3500 BC, during the average classical Boleráz Ib–Ic phases. However, the cemetery has a later section extending into the classical Baden II–III Phases between 3370–2930 BC, and perhaps a third phase of use during the post-Late Copper Age Baden IV Phase, suggested by two dates falling between 3100–2920 and 2860–2490 cal BC (Hamilton, 2015). Unfortunately, this radically new chronology was

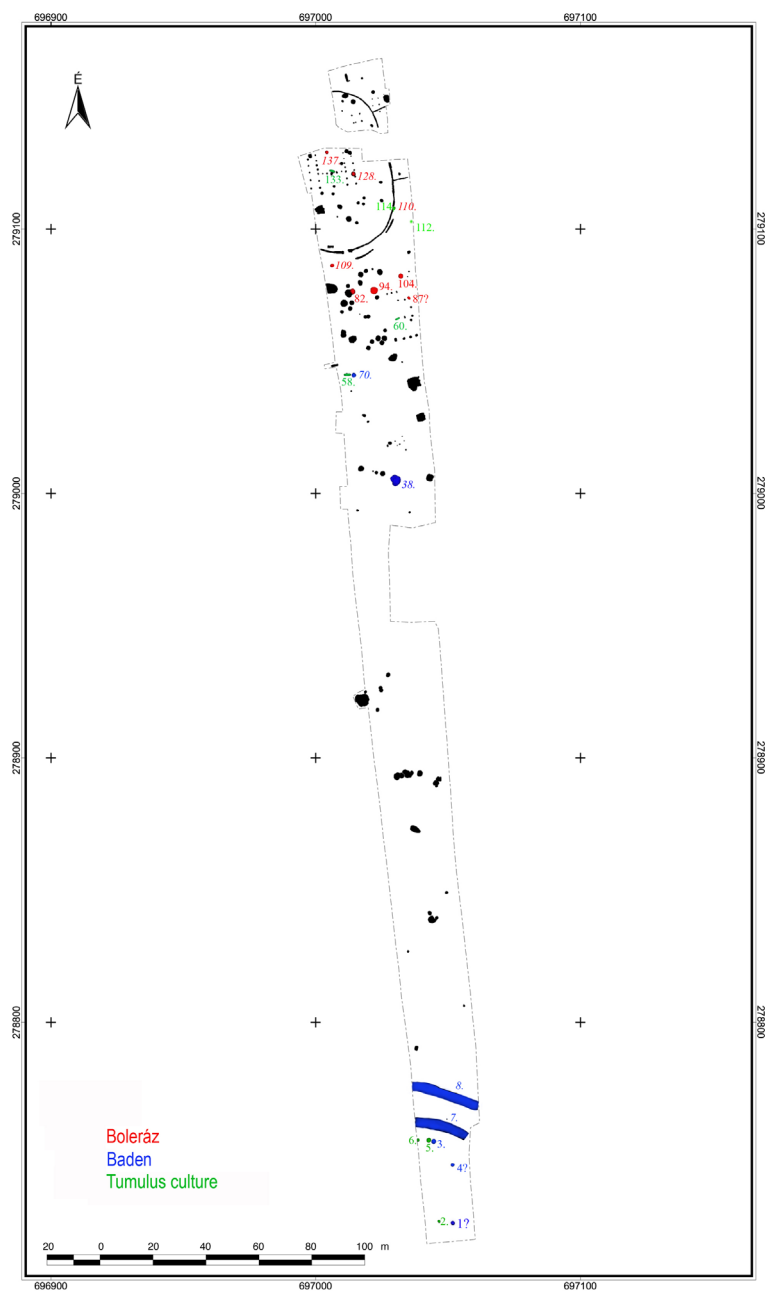


Figure 5. The ground plan of the excavations at Szurdokpuszki-Hosszú-dűlő. Prepared by the author, after the groundplan of the excavation, made by N. Larsson.

not explained at all in the section evaluating the site by M. Bondár, sticking to the conventional chronology of Boleráz before 3350 BC (Bondár, 2015a).

This would imply that although the Boleráz culture appeared in the county between 3700 and 3500 BC, its presence spanned a longer period than previously assumed. This implies an entirely different status quo than what we have hitherto conceptualised of the Boleráz–Baden sequence. A comparison of the new radiocarbon dates for the double Baden burial at Tatabánya with the dates for the Boleráz cemetery at Pilismarót indicates that Boleráz and Baden overlapped in time during the entire duration of the Late Copper Age from 3350 BC until 2800 BC, and perhaps toward in the transitional period between Copper and Bronze Age (Fig. 4: 2).

5.3. Szurdokpüspöki–Hosszú-dűlő (NE-Hungary, Great Hungarian Plain, foreleg of the Northern Mountain Range/Cserhát–Mátra)

The excavation reports by two teams described a Boleráz–Baden–Kostolác settlement part with peculiar features, namely two enclosures near each other and post-framed structures inside the ditches at Szurdokpüspöki, an enormous multi-cultural site lying on the bank of the River Zagyva in the piedmont between the Mátra and Cserhát Mountains (the excavated part is 35,000 m²).

The assessment of the find material indicated that the smaller enclosure at the northern part of the excavation can be dated to the Lengyel culture, while the larger one at the south is unknown (Baden or Middle/Late Bronze Age periods). The so-called Kostolác finds can be assigned to the Late Bronze Age Tumulus culture (Fig. 5).

Settlement parts of both the Boleráz and the classical Baden culture were uncovered at the site, which can play a key role in the research of the Late Copper Age in this region: No Boleráz, or Boleráz–Baden sites have so far been found in

the Northern Mountain Range. The so-called Ózd-Piliny and Salgótarján groups were previously described as representing the latest Baden groups in this region (although without hard archaeological evidence or radiocarbon dates to substantiate this claim).

Despite its small size, the occupation patterns of Boleráz and Baden observed at the Szurdokpüspöki site, their find material (and especially their separation from the Tumulus culture finds) and their relationship to each other in the Late Copper Age yielded important new insights. Amongst the pottery we can not find Ózd-Piliny or Salgótarján forms, they belong to the classical Boleráz Ib–c and Baden II–III phases (Viss type after Banner), the radiocarbon data support this (Horváth *et al.*, 2018). The archaeologists of the Dornyay Béla Museum (Salgótarján) carried out further salvage excavations in 2021–2022, which covered the southern enclosure. After processing, its cultural classification and function will finally be known.

5.4. Vámosgyörk–Motorhajtóanyag tároló telep (NE-Hungary, Great Hungarian Plain, foreleg of the Northern Mountain Range/Mátra)

Several excavations have been conducted on the outskirts of Vámosgyörk lying in the area where the Hungarian plain grades into the piedmont. Some 50,000 m² of the site has been investigated since 1997 by Csilla Farkas: one part is made up of a settlement of which fifty features have been uncovered, while the other is the settlement's burial ground, where fifteen burials have been unearthed, lying on the opposite bank of the Gyöngyös Stream (Fig. 6). We have inventoried some 4,000 artefacts from this site to date (Ongoing project with Csilla Farkas since 2016).

One intriguing aspect of the site is that an Early Bronze Age Makó occupation could also be documented, meaning that the cultural trajectory of a longer period can be studied here,

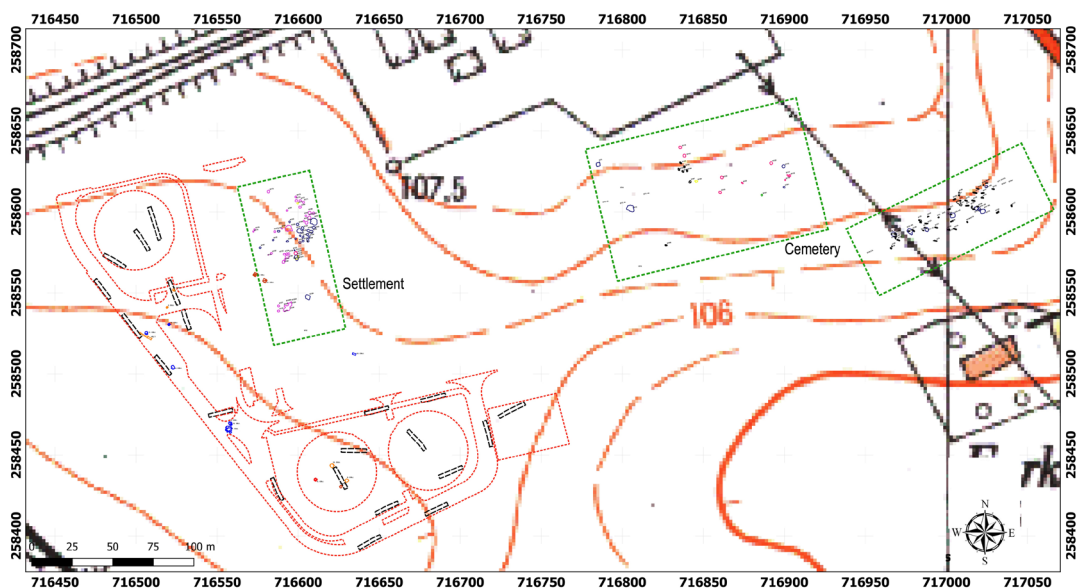


Figure 6. The ground plan of the excavations at Vámosgyörk-Motorhajtóanyag-tároló. Prepared by the author.

while the burial ground also contained five mixed Bodrogkeresztúr–Ludanice graves of the terminal Middle Copper Age.

The site can be assigned to János Banner's Viss group, whose most distinctive features are the grooved strap so-called Viss-type handle and the ornamentation of vessel surfaces with stabbed patterns. A Boleráz presence has not been documented either at the site or in its broader region.

5.5. Csécse–Nagyréti oldal (NE-Hungary, Great Hungarian Plain, foreleg of the Northern Mountain Range/Cserhát)

At the foot of the Cserhát, at the confluence of the Csécsei and Szuha streams, we excavated an area of 300 m² with a wall plane consisting of post-framed construction (house or fence?) and a few pits from a Baden (Viss) settlement. In two pits there were cattle sacrifices, and in one pit there was a pottery depot that could be valued as kitchen equipment of a nuclear family that fell into the

wall plane of the house. We were the first to realistically make household archaeological observations at this site. Unfortunately, the excavation area was so small that we could not estimate parameters for the full extent of the site in space and time (Fig. 7) (Horváth *et al.*, 2022).

I have to note here how much I disagree with the use of so-called household archaeology in some of the work of my Hungarian colleagues dealing with late Copper Age sites. The fundamental flaw in the approach is that no houses were found at these sites. Assuming the location of houses on empty excavation surfaces is not scientific, especially not about reconstructing a household (Cp. Bondár, 2010; Fábíán *et al.*, 2013; Fábíán *et al.*, 2018; Fábíán & Rajna, 2021). The application of theoretical archaeology in a basically „homeless” archaeological culture like the Baden, forced by the faculty of the Department of Archaeology at the Eötvös Loránd University, takes the research in an unrealistic direction,

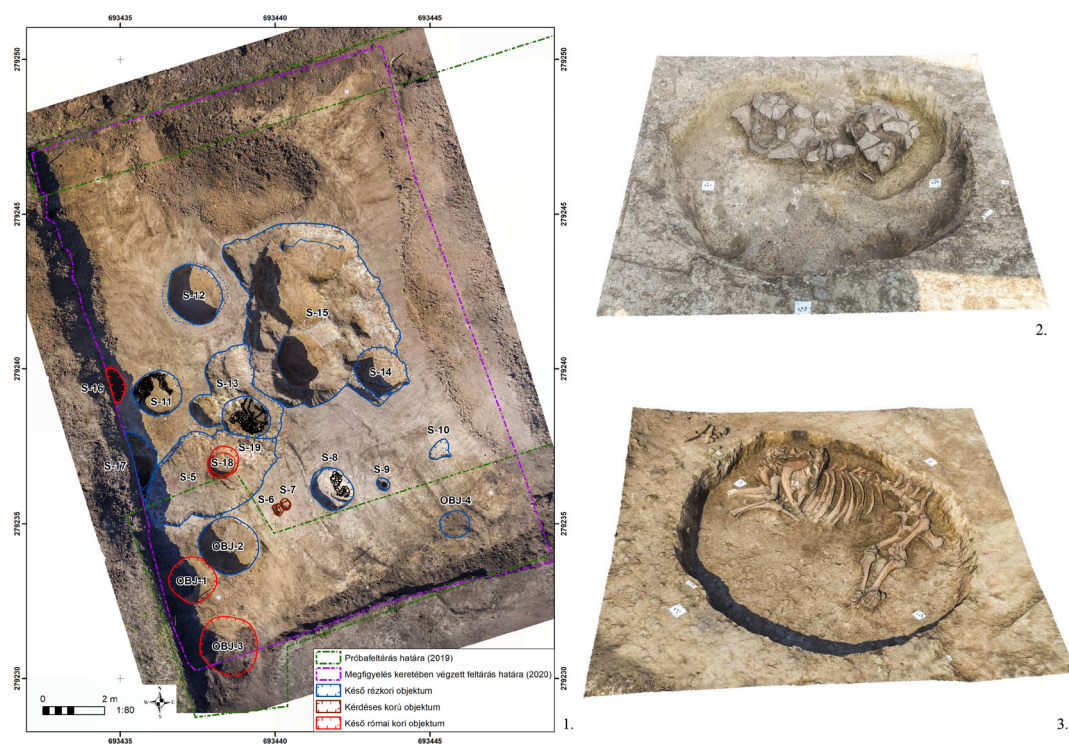


Figure 7. 1: The ground plan of the excavation in 3D at Csécse-Nagyréti oldal. 2: Vessel depot in Pit 8 in 3D. 3: Cattle depot in Pit 11 in 3D. Prepared by the author after the excavation groundplan and the 3D photogrammetry of Pits 8 and 11, by K. Tóth.

whereby reconstructing the excavation data falsifies the reality. We should focus more on finding the houses at the sites, because if they are at one site (Balatonőszöd), they should be at more sites, too. The application of excavation techniques, the urgency and unenforceability of the deadlines set, and last but not least the inadequacy of those who carry out the excavations, lead us primarily to a little knowledge of the Baden buildings.

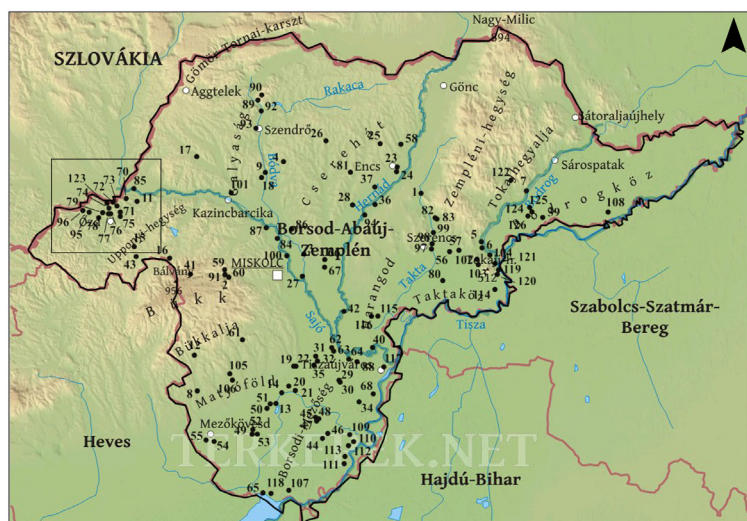
5.6. Environment of Ózd and Salgótarján (NE-Hungary, mountain region)

The sites hallmarking Phase IV, the latest phase of the Baden culture, lying in the Ózd area and at Salgótarján-Pécs-kő, have all been known for a long time from their publications. Following

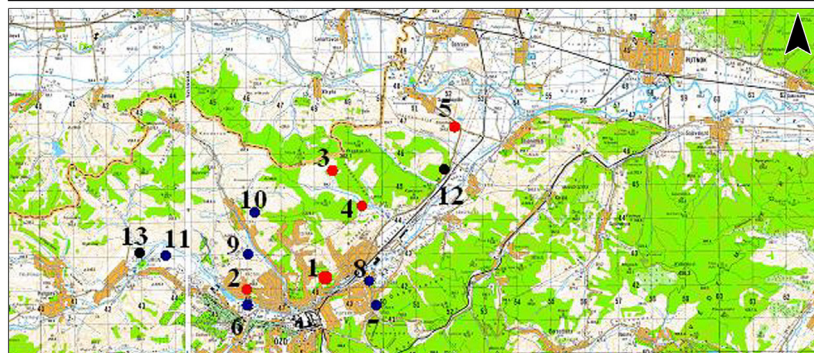
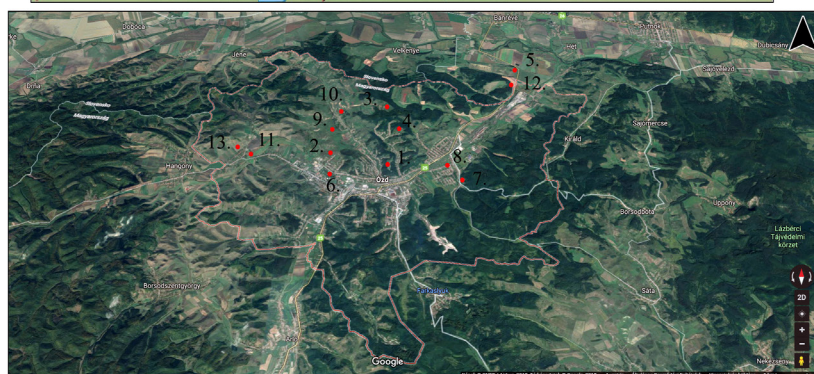
the discovery of the anthropomorphic funerary urns containing cremation burials deposited under funerary mounds at Ózd-Center, Nándor Kalicz argued in 1963 that these Baden finds can be associated with the face urns from Troy level II–V and that the Baden culture emerged under the influence of groups who had migrated to the Carpathian Basin from Troy.

The sites in the Ózd area were recently revisited in a doctoral thesis written in 2014, which confirmed the previous scholarly consensus (György, 2014).

However, my research yielded radically different conclusions. The change was effectuated by a modern excavation on the outskirts of Szurdokpuszpöki-Hosszú-dűlő, where, in addition



1.



2.

Figure 8. 1: Late Copper Age sites in Borsod-Abaúj-Zemplén County (after György, 2014, Vol. 1, Fig. 11). 2: Late Copper Age settlement network in the environment of Ózd, along the drainage of Hangony stream (after György 2014, Vol. 1, Fig. 46, base maps: Google, Topographic map of Hungary). Prepared by the author.

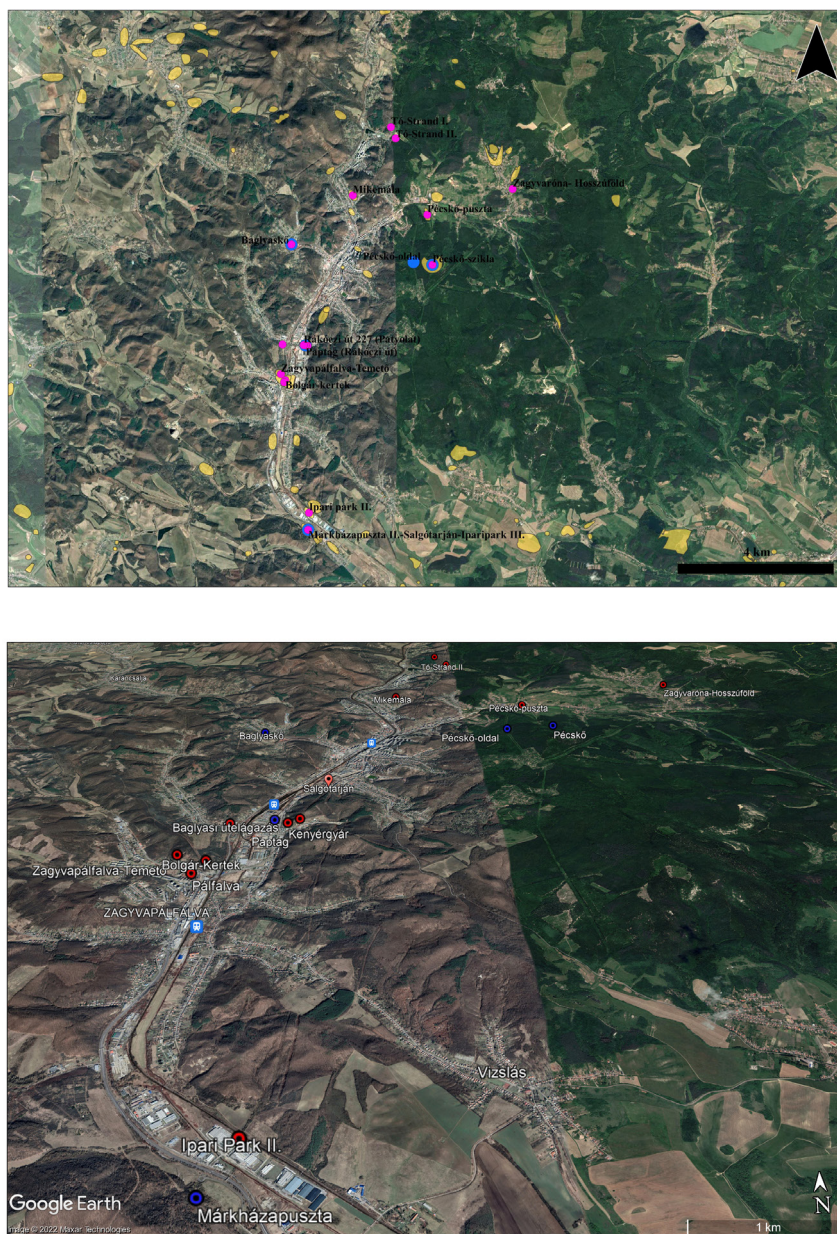


Figure 9. Late Copper and Bronze Age network system in the environment of Salgótarján (Base maps: Google, Google Earth 3D). Key: yellow: archaeological sites, blue: Baden, red/purple: Bronze Age. Prepared by the author.

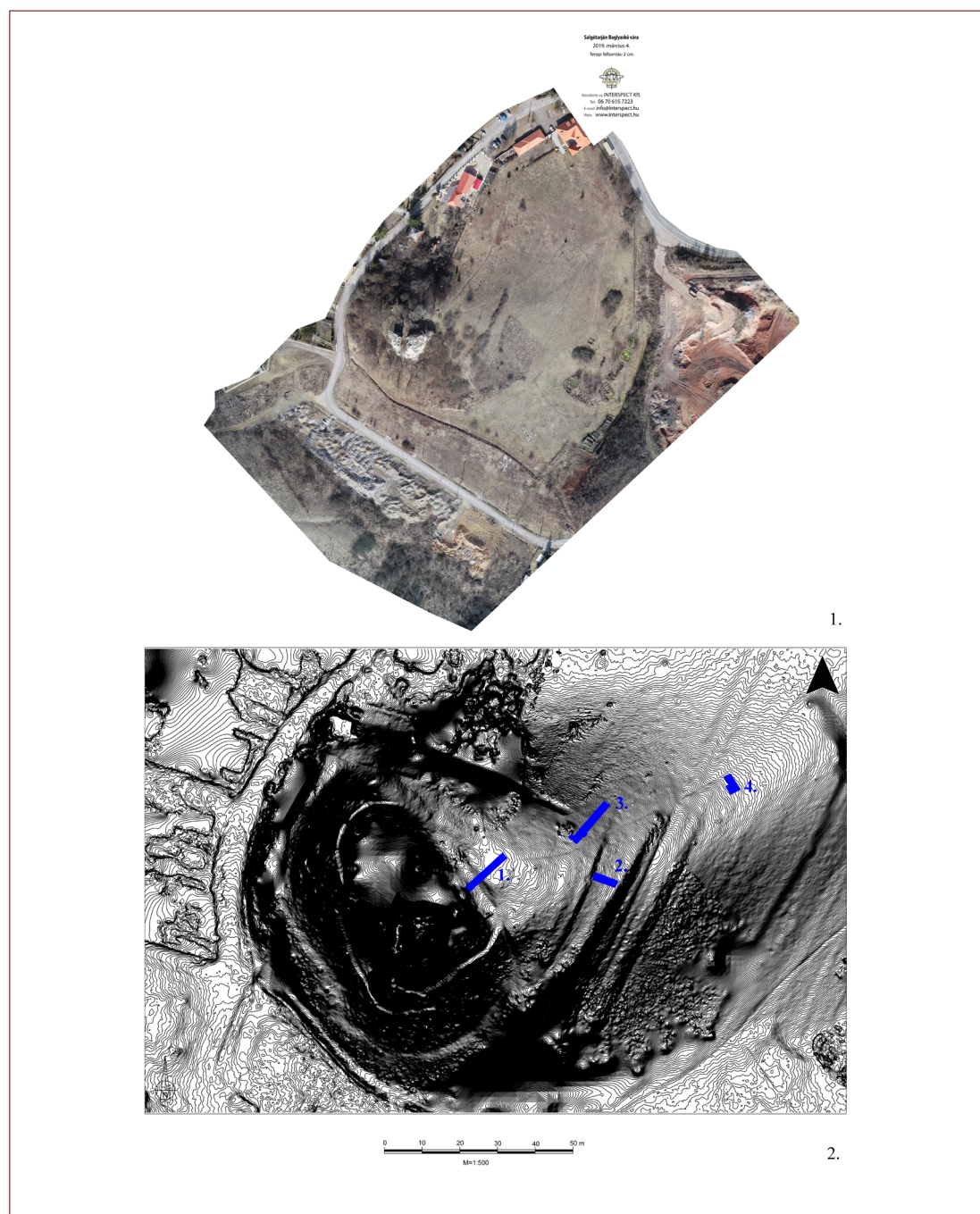


Figure 10. 1. The Salgótarján-Baglyas-kő site (orthophoto). 2. Contour map of Baglyas-kő showing the excavation trenches. Prepared by the author.

to the portion of a jointly occupied Late Copper Age Boleráz and Baden settlement, part of a Late Bronze Age settlement was also uncovered. This enabled the separation of the finds described as reflecting Kostolác, Bosáca and Coțofeni influence designated as Baden IV from the genuine Baden finds in the assemblages from the sites in the Ózd and Salgótarján area. As it turned out, the finds previously described as late Baden or as reflecting the impact of other cultures (Kostolác, etc.) could be assigned to the Late Bronze Age Tumulus culture (Horváth *et al.*, 2018).

The genuine Baden finds do not have any traits typical for Phase IV – although it must be borne in mind that the salient features of Phase IV have not been determined yet owing to the lack of sites and finds. The Baden sequence has only been elaborated up to Phase IVa, and thus we do not know what the Baden IVb Phase actually looks like. It yet remains to be determined whether Baden IVb is “missing” because the culture does not have this typological phase or whether it is lacking because only its onset was defined, and now that the finds previously attributed to this phase have been assigned to other periods, we are at a loss as to how to fill up Baden IV, what types should be ordered here. Since we are unable to fill the period with types, we cannot single them out either.

The finds remaining in the Late Copper Age are Baden II and III Phases types, which are mixed with genuine Kostolác and Kostolác-type finds. However, the old excavations do not provide sufficient information to enable an assessment on a settlement level. As we have seen, relative typochronology is of no use in this case, while an absolute chronology could only be confidently employed in the case of securely identified Baden cemeteries – it seemed senseless to even attempt to select samples from settlement material mixed up with the finds of other periods.

The first radiocarbon measurements for the cremation burials in the anthropomorphic urns

from Ózd-Center and the formal cemetery at Szentsimon–Kender-földek gave dates between 3100 and 2800 BC, confirming that they fall into younger Baden, the later classical Baden period (Phase IV), which is still well within the Late Copper Age, meaning that, for the time being, a post-Copper Age Baden survival cannot be demonstrated in this region (Horváth, 2018a, Chapter 1).

Following the critical review of the material from the stratified, fortified, tell-like hilltop Baden settlement at Salgótarján–Pécs-kő, I found that no more than 16 of the roughly 600 finds previously assigned to Baden could be assigned to the Late Copper Age, while the other finds dated from other periods. As a consequence, the site can hardly be regarded as a fortified hilltop or even a stratified tell-like Baden settlement since it was predominantly occupied by the Hatvan, Tumulus and Piliny Bronze Age cultures and most of the occupation levels can be associated with Bronze Age cultures and not with Baden. Moreover, there is no evidence that the site had been fortified (Horváth, 2017d, 2018a, Chapter 2).

There are no significant regional, typological or chronological differences between the find assemblages from the Nógrád region and the Borsod region; moreover, its sites and distribution are part of the so-called Ózd-Piliny and Salgótarján groups. At the same time, the use of the label Ózd-Piliny variant instead of Ózd-Piliny group seems more appropriate.

The classical Baden group of the Baden complex north-east of the Danube is the Viss group after Banner (A deposit of pots and some stone tools found at the Viss-Szőlő-homok in 1938 is the eponymous site of Viss group, among the pots, a breast pot and a saucer represent the special shapes: György, 2014, vol. 2, pp. 270–272), while Ózd-Piliny is a regional variant of Viss because it has typical elements of the Viss group alongside Ózd-Viss combinations. Its distribution can be located in the Northern Mountain Range, making it

a kind of mountain region variant – in contrast to the Viss group distributed on the northern plains across a much larger territory.

Its slight divergence from Viss and Ózd-Piliny can probably be explained by the lingering influence of the terminal Middle Copper Age cultures (Ludanice, Hunyadihalom, Lažňany, Bodrogkeresztúr cultures) on its territory during the Late Copper Age. At the same time, there are no visible traces of similar, separate groups during the Boleráz period. The only logical explanation for this apparent paradox would be the survival of Middle Copper Age cultures at the beginning of the Late Copper Age, Boleráz-timespan.

The Ózd-Piliny variant of the classical Baden culture flourished in the basins and hill country of the Northern Mountain Range during the Late Copper Age between 3350 and 2800 BC, while a Boleráz presence can be demonstrated in addition to Baden in the piedmont region before 3350 BC (e.g., Szurdokpüspöki-Hosszú-dűlő) and in the mountain caves lying above 400 m. The Boleráz settlement network in the mountain region of the Northern Mountain Range between 3700 and 3350 BC is not known.

In addition, classical Baden built micro-regional settlement networks in the Ózd (Fig. 8) and Salgótarján area (Fig. 9), where we were able to investigate in detail, similar to the Southern Balaton region. The sites around Ózd follow a main valley of Hangony stream and its tributary valleys in an approximate NW-SE direction, with two cemeteries at the end points (Ózd-Center and Szensimon-Kender-földek). The sites at Salgótarján follow the main valley running roughly north-south, dominated by two hilltop settlements at approximately the same latitude in the north: the Pécs-kő in the east and the Baglyas-kő in the west.

The critical review of the settlement excavated at Salgótarján-Pécs-kő, whose material was formerly described as a separate group of the late Baden culture (the Salgótarján group) indicated

that the find assemblage from the site contained several finds other than those of the Baden culture (mostly from Late Bronze Age Tumulus culture). There is nothing to justify the continued use of the label Salgótarján group since the critical review of the finds revealed that the majority of the decorative traits regarded as distinctive to the group can be assigned to other cultures.

In addition, however, the site contains some Kostolác, Vučedol and Neusiedl-type finds that can be dated to the Transitional period between the Copper Age and the Bronze Age. Given that the site represents an unbroken continuity, I would suggest the use of the label *Salgótarján facies* for the post-2800 BC period following the Late Copper Age until the appearance of the independent Early Bronze Age Makó culture, probably sometime around 2600/2550 BC, although this can only be confirmed with future radiocarbon dates.

Even though it was not possible to sample finds from the settlements for radiocarbon measurements, the data from the settlements in the Ózd area (e.g. Kőalj-tető) and from Szurdokpüspöki indicate that neither the Ózd-Piliny group regarded as embodying late Baden since 1956, nor the Salgótarján group assigned to this period in 1986, actually represent surviving Baden after 2800 BC; instead, both fall into the classical Baden period spanning the Late Copper Age between 3350 and 2800 BC (Phases II–III–IV).

5.7. Salgótarján-Baglyas-kő

The Baglyas-kő is a smaller, dyke-like pass among the small basalt cones of the Karancs Hills at the NW outskirts of the city of Salgótarján, which, unlike the volcanic cones of the Nógrád region, lies not on a mountain, but on one of the low hills on the eastern margin of the hill range. The core of the stronghold dates from the Árpadian Age, the irregularly shaped basalt outcrop with steep sides (except on the northern side). The medieval stronghold's north-eastern, terraced fore-

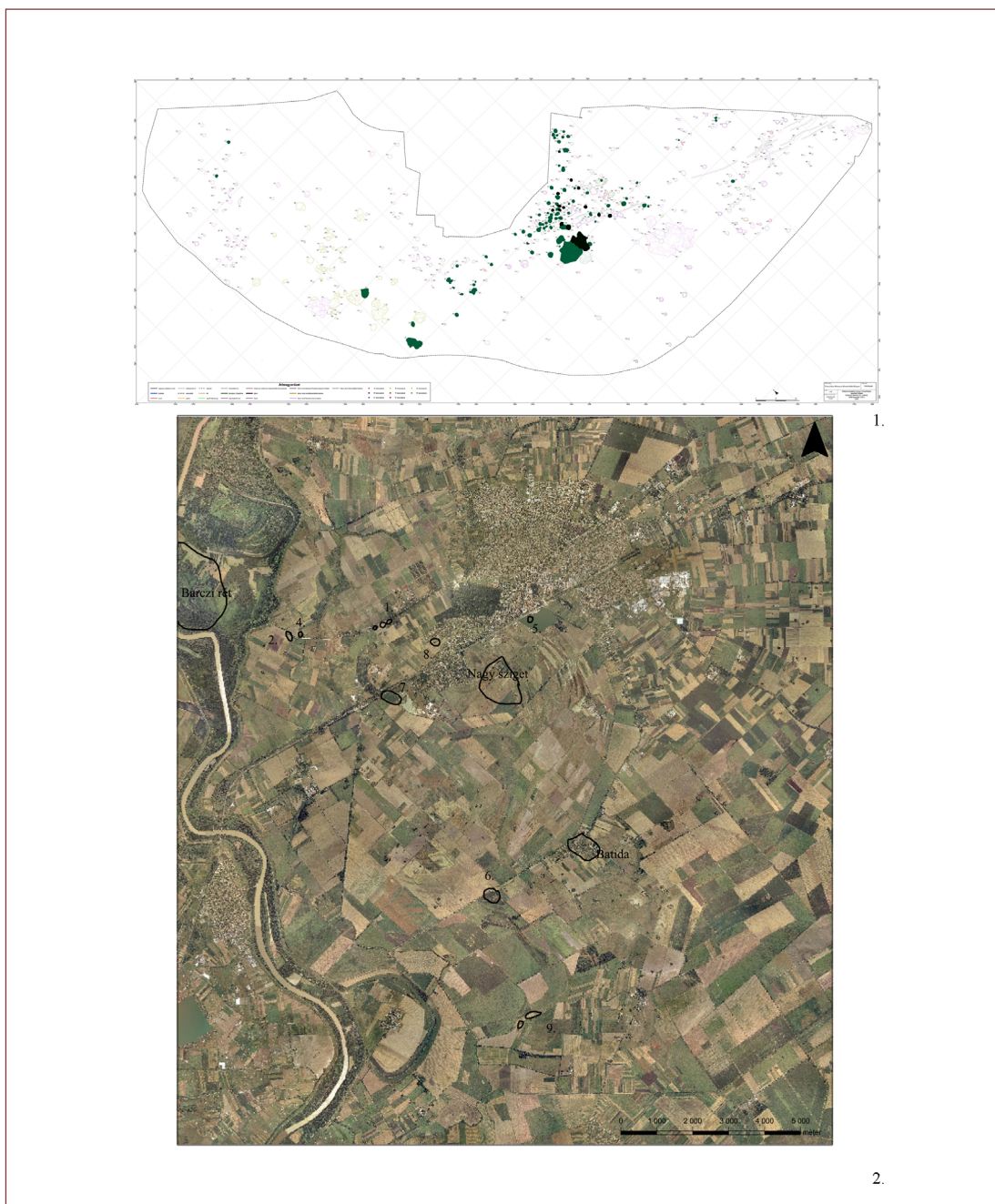
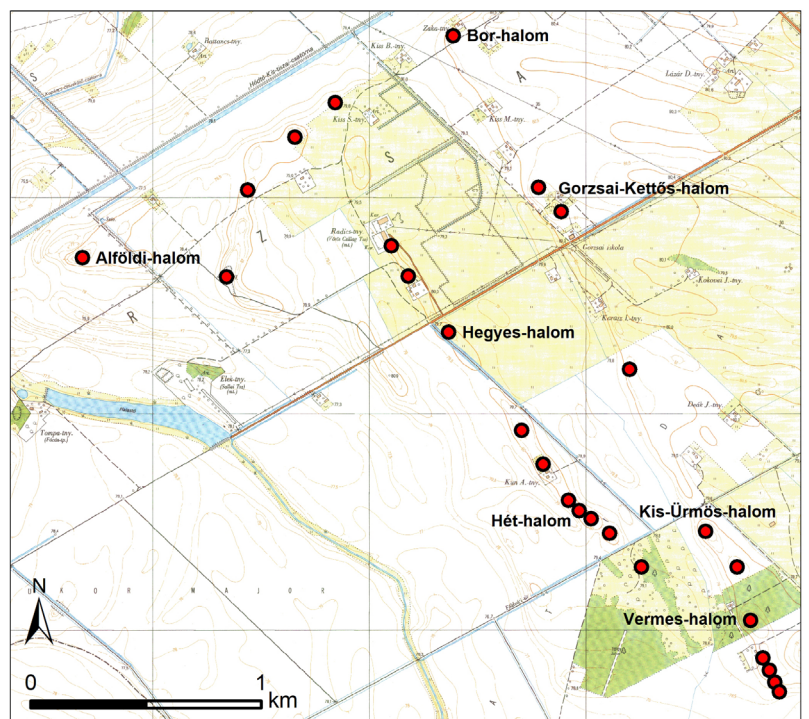
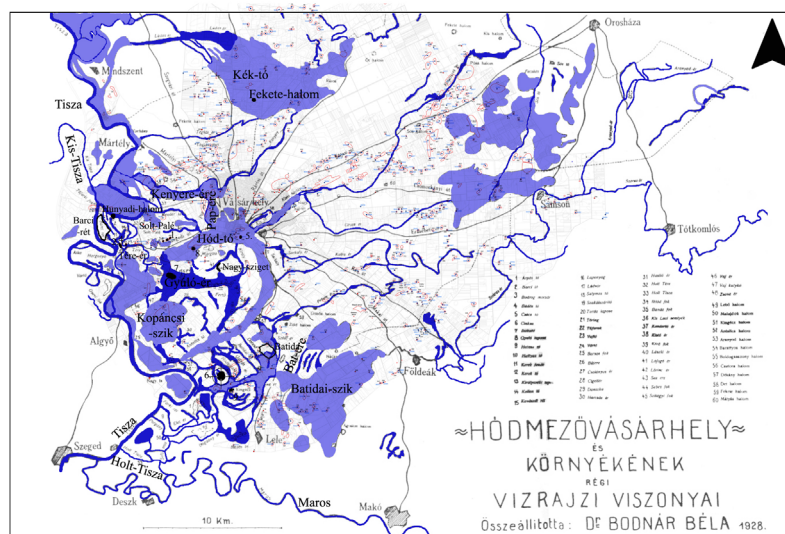


Figure 11. 1: The ground plan of the excavation at Hódmezővásárhely-Gorzsa-Sandpit V. 2: The Baden sites in the environment of Hódmezővásárhely (Base map: Orthophoto). The sites are: 1 – Bodzás-part, 2 – Szakál-hát, 3 – Nagy-sziget, 4 – Solt-Palé, 5 – Laktanya, 6 – Gorzsa-Sandpit V, 7 – Kopáncs-Sandpit IX, 8 – Kis-Homok, 9 – Kingéc-Site V. Prepared by the author.



1.



2.

Figure 12. 1. Pit-Grave kurgans in the environment of the Gorzsa–Sandpit V Baden settlement (The Baden settlement is on the same hill as the Alföldi-halom kurgan) 2: The water system of the environment of Hódmezővásárhely in 1928. (The numbers of the Baden sites are the same as Figure 11.2. Gorzsa-Sandpit V is no. 6). Prepared by the author.

ground, currently covered with grass, was suitable for excavation. We opened trenches in these areas across an 80 m²-large area (Fig. 10).

The prehistoric features uncovered in Trenches 3 and 4 attested to the presence of an extensive settlement occupied during both the Baden and the Hatvan periods. The finds and the features indicate that the hillside was artificially terraced during the Late Copper Age and that the storage pits and other features were established in this area. These terraces were levelled during the Early and Middle Bronze Age – although natural erosion probably also played a role – and the community settling here then cut its installations, such as the ovens, into this layer. The occupation layers of possibly different cultures accumulated to a thickness of almost 2 meters in Trench 3. The fill layers dating from different periods and the outlines of the superimposed features of different cultures could not always be clearly distinguished, not least because of later disturbances, which poses difficulties in dating.

Pál Patay made similar observations on several sites in the region, for example at Ózd-Kőalj-tető, Salgótarján-Pécs-kő, Piliny-Vár-hegy and Sőreg-Vár-hegy (Patay, 1999, p. 50). Unfortunately, these are all old excavations that lack proper field documentation or none was made and were excavated according to spade spits. This type of hill-top settlement with its tell-like occupation layers – differing markedly from the average scattered Late Copper Age Baden settlements – and the barely visible natural humus levels separating the occupation layers led to a general scholarly consensus according to which the Ózd-Piliny group, one of the late groups of the Baden complex, had retreated to the mountain region of north-eastern Hungary where it survived as a relict and lived to see the arrival of the Bronze Age tell cultures (specifically of the Early and Middle Bronze Age Hatvan culture in this region) – moreover, this group acted as a substrate of the Bronze Age cul-

tures or its population blended with latter (Kalicz, 1968, pp. 133, 166–167, 172, 174; for a discussion of the purported Baden–Hatvan continuity, see Horváth, 2019, Chapter 4.7).

The assumed survival of the Baden culture into the Bronze Age and the cultural impulses from its early cultures would have explained a settlement strategy and occupation pattern that has much in common with the Bronze Age tell cultures. In addition to the uncommon settlement features, the abundance of Baden pottery with an entirely differing ornamentation would have again bespoken the late date of the Ózd-Piliny group and its survival into the Bronze Age.

The lack of clearly distinguishable occupation layers separated by naturally deposited soil layers dating from different periods, specifically from the Baden and Hatvan periods at Baglyas-kő, can be explained by that the space suitable for settlement was limited and the nature of the site – not being a level area – invariably led to spatial re-organisations during later periods before a new community's settlement and any building activity, whereby the natural soil layer(s) accumulating over previous occupation layers was destroyed or disturbed together with the underlying layers and their features, rather than by the site's continuous occupation.

Although the excavation and the associated non-invasive surveys were completed in spring 2019 alongside the conservation and inventorying of the finds as stipulated by the grant conditions, our understanding of the site remains tentative until the full assessment of the excavation and the finds (The investigation of the site was undertaken as part of the INTERREG V project (within the framework of the Slovakian-Hungarian Collaborative Project, Grant SKHU/1601/1.1/267, Living Heritage-Presentation of the cultural heritage transcending borders and ages in historic County Nógrád).

We considered the publication of the preliminary results important because the gap and discontinuity between the Copper Age and the Bronze Age that was previously conjectured and convincingly demonstrated on other sites (critical re-assessment of find assemblages, radiocarbon chronology: Horváth, 2018a) now could be proven through an excavation (Horváth & Szilasi, 2020) and, even more importantly, specifically in the mountain region of north-eastern Hungary, on a site lying a few kilometres away from the iconic Ózd-Kőalja-tető and Salgótarján-Pécs-kő sites.

The first radiocarbon dates and the ceramics place the settlement between 3350 and 2800 BC (classical Baden II–III–IV). There is a surviving between 2800 and 2600 BC with new cultural elements of this microregion (with a new label: *Salgótarján facies*, Transitional period between Copper and Bronze Age).

5.8. Hódmezővásárhely-Gorzsá-Sandpit V (SE-Hungary, Great Hungarian Plain)

A 58,000 m² large area on a hill overlooking a former Tisza meander was investigated on the southern outskirts of Hódmezővásárhely in 2009. Of the 700 features uncovered at this site, 100 can be assigned to the Late Copper Age Baden and Kostolác cultures. The features of the classical Baden culture uncovered in the four adjacent trenches showed a concentration in the site's central area, with scarcer scatter in a 50-meter-wide zone, followed by a 100-meter-wide zone lacking any features, after which various features were again documented. The separate cluster of features and the zone reflecting a scarcer occupation can perhaps be interpreted as indicating a dispersed settlement layout or perhaps as independent links within a settlement chain (Fig. 11–12).

Most of the uncovered features were pits, alongside two wells and several animal and human deposits. One peculiar trait of the site is that the neighbouring sites yielding similar material

were described as representing Baden IV Phase, so-called “*Skelettbestattung*” by János Banner (Banner, 1956, p. 184.) and Bodzáspart group after József Korek (Korek, 1983, pp. 26–27). However, the assessment of the finds revealed that the material can be assigned to the classical Baden II–III phases, while the vessels earlier identified as representing Phase IV are Kostolác or Kostolác-type ceramics. This relative chronology is confirmed by the radiocarbon dates, none of which fall beyond 3000 BC. The meticulous field observations allow the conclusion that the three archaeologically distinguishable pottery styles, namely classical Baden, genuine Kostolác and Kostolác-type, are contemporaneous because they occurred jointly in closed, undisturbed features.

There was no trace of Boleráz at the site and thus a Boleráz–Baden sequence can be rejected in this region too. One reason for this may be the strong network of sites from the Middle Copper Age (Hunyadihalom, Bodrogheresztúr, Cernavodă III?). However, a dense network of classical Baden sites can be reconstructed in the marsh-wetland region, interspersed with the burials of the Pit Grave kurgans of a similar age.

This site, lying in the country's south-eastern corner, confirms the conclusion drawn from the critical review of the north-eastern region that the finds hitherto ordered into the Baden IV Phase can be typologically assigned to Kostolác, and that they do not succeed the classical Baden II–III Phases, but are contemporaneous (Horváth, 2018b).

The skeleton burial group (*Skelettbestattung*) was named after Banner in the southern parts of Hungary, so this group was not named after a style of pottery but after a burial method. Skeletal burials are found throughout the Baden area. The question now is whether they are within the settlement (sacrifices, burials in settlements, post-mortem manipulations) or outside, in graves excavated in cemeteries. In the southern lowland region,

József Korek used the name Bodzáspart but did not develop the group characteristics. What is certain is that the typical Viss group handles are not found here, so another name will have to be chosen for the region southeast of the Danube. However, it is still questionable whether this area can be merged with the southern Transdanubian region, so the choice of name would be put on hold until suitable sites are found to provide a meaningful answer to the question.

6. Conclusion

No matter how much we would like to, we cannot describe a period characterised by intense population movements and communities with diverse material cultures such as the Late Copper Age and the Baden complex with a single model. Unlike Einstein's concise and elegant general world model condensed into a simple equation, any attempt to do so for the Late Copper Age is beyond our current knowledge.

Nevertheless, we have made significant advances in several respects, for example by discarding Baden IV Phase, described as reflecting Kostolác, Bosáca and Coțofeni impacts, which turned out to date from the Bronze Age or imported Funnel Beaker (Cp. Horváth, 2018a, pp. 145–146; Horváth *et al.*, 2019–2020).

1) By eliminating the Baden IV Phase as a surviving Baden after 2800 BC, we have simplified the classical part of the existing typological sequence into an earlier IIb between 3350 and 3000 BC, and a later III Phase until 2800 BC. Together with my earlier conflation of the classical Boleráz Ib and Ic Phases, this makes the existing, extremely complicated Němejcová-Pavůvková typological system much more manageable.

2) Regarding the Banner-ceramic style groups, the new name of the Fonyód IIa group is the Southern-Balaton group, and its chronology covers the whole of the classical Baden.

3) We do not yet have sufficient data for analysis of the South Transdanubian region and the Danube-Tisza Interfluve with the central part of the Great Hungarian Plain.

4) The Úny group of North Transdanubia may be similar to Southern-Balaton, only the settlement patterns differ. In style, it spreads further west towards Austria.

5) In the northeastern area from the Danube, the Viss group is present throughout the classical Baden period, toward Slovakia, in the northern and central part of the lowland and piedmont region.

6) Its northeastern, mountainous sub-group is the Ózd-Piliny variant, toward NE-Slovakia and Little Poland.

7) In the southern part of Hungary (Southern Transdanubia and southern Great Hungarian Plain) was the Skeleton burial group after Banner. This label does not cover the reality of today's research, nor do we know whether the areas west and east of the Danube can be linked, so the name Korek's Bodzáspart cannot be applied to the southern lowlands. For the time being, we must leave this question open pending the evaluation of further Baden sites in South Transdanubia. What is certain is that the Viss handles are not found in the Southern Great Hungarian Plain, and therefore cannot be included in that regional group either.

Although the boundaries of the regional groups of the Baden pottery styles in Hungary are not yet clearly defined everywhere, certainly, the stylistic differences do not have a chronological aspect. All of the groups shown here cover all known phases of classical Baden.

I attribute the formation of the different spatial groups to the determinacy of geographical differences and the strong influence of the preceding Middle-Copper Age cultures.

In a small area around Salgótarján, we found strong evidence of the existence of multicul-

tural communities surviving the Late Copper Age in the Transitional period between the Copper Age and the Bronze Age (2800–2600 BC). A similar Transitional period settlement trace was found near Szombathely, but here we uncovered a Late Kostolác settlement fragment. Kostolác were found in the Ózd, Salgótarján and Hódmezővásárhely areas too, but without radiocarbon dates their age is questionable: they can be within the frame of the Late Copper Age until 2800 BC, or beyond it, in the transitional period between the Copper and Bronze Age.

We have also managed to identify recurrent patterns in the site chains along former water-courses and the spatial organisation of sites combining a settlement and a cemetery.

Currently, we can distinguish four basic, but fundamentally different settlement and occupation patterns in the Boleráz–Baden domain, as a result of the large-scale excavations over extensive areas.

The first one lacks Boleráz sites as in the Hódmezővásárhely, Salgótarján, Ózd area, the greater part of County Pest and Komárom-Esztergom and the overwhelming part of the Northern Mountain Range. It seems quite certain that in these regions Baden was not preceded by Boleráz and neither can it be regarded as the antecedent of Baden in any sense because it is not documented here during the Late Copper Age. Thus, we witness a cultural hiatus between 3700 and 3350 BC, excluding any contact between the two cultures. In these regions, there was a strong Middle-Copper Age site network.

In some regions, Boleráz and Baden both occur, but always separately, on separate sites, none of which reflect any signs of co-residence between the two. Their chronological position relative to each other shows some overlap between 3350 and 3000 BC. These regions include large tracts of Counties Komárom-Esztergom, Pest and Southern-Balaton region. In these cases, there is

no archaeologically visible interaction between Boleráz and Baden. Their sites sometimes lie quite close to each other, no more than one km apart, and thus despite the separateness, contact between them cannot be wholly excluded, but there are no jointly occupied sites (e.g., Pilismarót-Basaharc Boleráz cemetery and Pilismarót-Szobirét Baden settlement).

Yet a third one indicates the same long overlap as in the previous case, but with a radically different occupation pattern as could be observed at Balatonőszöd-Temetői-dűlő, where Boleráz and Baden occupied the same site. A closer interaction can be noted, which is visible to us too, but despite the co-residence, a spatial separation persists. A similar settlement and occupation pattern could be noted in the north-eastern piedmont region too, where no jointly occupied Boleráz–Baden sites were previously known. The settlement layout at Szurdokpuszpöki-Hosszú-dűlő again shows a clear separation between the areas occupied by Boleráz and Baden, although the two radiocarbon dates reflect a closer overlap and linearity compared to Balatonőszöd. However, I have only assessed a small part of the settlement and we currently only have two radiocarbon dates, and thus any conclusions are tentative at best, while at Balatonőszöd, the available data was considerably larger.

The fourth pattern represents a spatial and chronological variant of the joint Boleráz and Baden occurrence, which could be observed at Balatonkeresztúr-Réti-dűlő and perhaps Balatonlelle, where Boleráz and Baden were mixed, and the Boleráz I and Baden II–III Phases followed each other linearly and in rapid succession. This pattern involves the highest degree of interaction between Boleráz and Baden.

In light of these observations, we can perhaps predict that Boleráz will eventually be divorced from Baden and will be treated as an independent culture, similar to Kostolác and Vučedol. It will no

longer remain the organic initial Baden phase, although Boleráz will be retained in the Baden complex owing to its interaction with Baden and their shared contacts. It will continue to represent the early phase of the complex, similarly to Cernavodă III, viewed as a related culture, but Baden will not be regarded as having evolved from Boleráz. In other words, it seems likely that while Boleráz will “survive” within Baden, it will not be regarded as the *par excellence* substrate to the emergence of the Baden culture either in terms of its material culture or in terms of its chronology and the distribution of its sites.

Another important issue regarding occupation patterns and the chronology of settlements is their assumed periodic/intermittent/seasonal occupation, the genuine spatial extent of settlements, their internal periodisation, the rhythm of their occupation and their layout.

In the case of the Pit-Grave communities, their subsistence patterns and their burials enabled the reconstruction of the direction of their migration, its duration and the distances covered, while regarding the Boleráz/Baden culture, neither the features nor the finds or the currently used analytical procedures have proved sufficient for reconstructing occupation patterns on the so-called periodic settlements, i.e., the rhythm of their occupation, their abandonment and intermittent re-occupation. It remains to be proven that the apparent lack of a coherent layout, the apparent chaos, and the presence or lack of houses and house rows do in fact indicate an intermittent occupation. Perhaps the lack of houseplans from earlier excavations in Hungary can be simply explained by the existence of previously unencountered buildings that were not known from publications and most archaeologists were unprepared for structures of this type. The structure and type of the houses uncovered at Balatonőszöd conform to a type which was specific to Late Copper Age

cultures (lakeside settlements) and they formed rows on the highest point of the settlement.

A more sedentary lifestyle and the immense number of finds would suggest that the Boleráz/Baden communities did not pursue a nomadic cycle resembling that of the Pit-Grave population, despite being similarly engaged in stockbreeding. It seems more likely that after the exhaustion of the resources available to a settlement, the community moved to the next settlement, lying some 1–3 km away, leading to the emergence of a network of settlement chains along watercourses (however, we cannot even make an educated guess as to the duration of a cycle along the entire length of a particular watercourse, or as to when at what intervals a site in the chain was re-occupied).

What seems certain is that the emergence of intermittently occupied settlements typical for the Late Copper Age can be explained by a climate change and conditions unsuited to permanent settlements, to which every culture responded diversely. Small mobile communities engaged in stockbreeding are reconstructed across the greater part of Europe from the close of the Middle Copper Age onward, and there is evidence for open animal pens from several sites, as well as for the increased use of cave sites (for a comprehensive overview of Hungary, see György, 2009), interpreted as indications for transhumant pastoralism. Vertical pastoralism between lower-lying plains and uplands is assumed during the summer months for the Polish, German, French and Greek Copper Age sites mentioned above (e.g., Arnold & Greenfield, 2006; Walsh & Mocchi, 2011), only involving a part of each community moving from one place to another with the livestock, while the other part of the community remained in the villages. This may be the reason that despite their long use-life, Late Copper Age settlements are never as “orderly” or have as intensively occupied buildings as settlements inhabited permanently by one community (such as tells). Cultural

anthropological studies suggest that poorer communities paid for the temporary use of pastures if the summer pastures were controlled by other communities (Milisauskas *et al.*, 2012, p. 140). A similar transhumant pastoralism can be conceptualised between the lower-lying plains along the Balaton shoreline and the higher lying, more forested and more diverse landform of the Somogy Hills, or, the environment of Ózd and Salgótarján.

Studies on the movement patterns of animals have shown that in the case of restricted or shared resources, the best strategy is the so-called Lévy flight or Lévy random walk, characterised by a random combination of many small steps and an occasional big leap. This is a special variant of random movement which differs from a random walk owing to the power-law degree distributions. However, this universal movement pattern, followed by most animals during foraging, cannot be applied to human cultures. In Lévy-flights, there is little chance that the individual will return to an earlier location, meaning that the movement of human communities cannot be described using the Lévy-flight pattern because they would rarely or never return to their homes (Barabási, 2010, pp. 173–180).

One of the greatest problems in the application of the model is that the movement of human communities is usually conceptualised as a unidirectional or back-and-forth movement between two points. An alternative model would be one in which only the period's formal cemeteries are regarded as permanent community places, and the smaller, seemingly haphazard, intermittently occupied settlement points without a regular internal layout inhabited during a certain period that forms smaller closed networks along watercourses as permanent, organised, but less intensively occupied habitations on which there was a continuous interchange of occupants and their livestock. In this model, herders and their herds move from one settlement point to the next, without return-

ing to the previous one. This movement implies a forward motion along a circular path in space. A mobility pattern along a watercourse system seems logical in the case of a smaller community of mobile stockbreeders linked by blood ties (such as an extended family made up of a handful of nuclear families) engaged in pasturing their herds on meadows and in forests with little arable farming, the type of economy usually posited for the Boleráz/Baden culture. However, until we have conclusive evidence that can be evaluated, this system can only be described with a large-scale entropy, i.e., one with multiple interpretations.

In sum, we may say that Late Copper Age studies still lack meaningful economic and settlement data because the excavations on most settlements were small-scale affairs and most of the evidence comes from burials (“scanty economic and settlement data ... almost pure burial archaeology” Milisauskas & Kruk, 2011, pp. 294–295, quoting Ian Hodder).

Acknowledgements and statements

Data availability statement. The author confirms that the data supporting the findings of this study are available within the article.

Disclosure statement. No potential conflict of interest was reported by the author.

Funding statement. This work was supported by the Austrian Science Funds/Fonds für wissenschaftliche Forschung Österreich (FWF) [Lise Meitner Fellowship M 2023-G25, 2016–2018].

Copyright statement. This is an open access article distributed under the terms of a Creative Commons Attribution-NonCommercial-ShareAlike International Public License (CC BY-NC-SA 4.0). You are free to copy and redistribute the material in any medium or format, and transform the material, under the following terms: You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may not use the material for commercial pur-

poses. If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. ©

References

- Arnold, E. R., & Greenfield, H. J. (2006). *The Origins of Transhumant Pastoralism in Temperate South Eastern Europe: A Zooarchaeological Perspective from the Central Balkans*. Archaeopress. <https://doi.org/10.30861/9781841719702>
- Banner, J. (1956). *Die Pécelér Kultur*. Akadémiai kiadó.
- Barabási, A. L. (2010). *Villanások. A jövő kiszámítható (Bursts. The Hidden Pattern behind everything we do)*. Nyitott könyvműhely.
- Bartelheim, M., Krauß, R. (2012). Sense and Non-Sense of the Term 'Chalcolithic'. In M. J. J. Allen, J. Gardine, & A. B. Sheridan (Eds.), *Is there a British Chalcolithic? People, Place and Polity in the Later 3rd Millennium*. *Prehistoric Society Research Papers*, 4, 85–98. <https://doi.org/10.2307/j.ctv13pk8h7.16>
- Bayer, J. (1928). Die Ossarner Kultur, eine äneolithische Mischkultur im östlichen Mitteleuropa. *Die Eiszeit*, 5, 60–93.
- Bondár, M. (2010). The Late Copper Age Settlement at Nagyút–Göböljárás II. (Questions on the periodisation of the Baden Culture). *Antaeus*, 31–32, 303–374.
- Bondár, M. (2015a). Nyomozás a badeni kultúra únyi csoportja névadó leleteinek előkerüléséről (The hunt for the Úny group of the Baden culture). *Ősregészeti levelek*, 14, 45–53.
- Bondár, M. (with contributions by K. T. Biró, E. Gál, D. Hamilton, K. Köhler, I. Torma), (2015b). *The Late Copper Age cemetery at Pilismarót-Basaharc. István Torma' excavations (1967, 1969–1972)*. Archaeolingua.
- Bondár, M., & Raczky, P. (Eds.) (2009). *The Copper Age cemetery of Budakalász*. Pytheas.
- Bondár, M., Honti, Sz., Márkus, G., & Németh, P. G. (2007). Balatonszemes–Szemesi-berek. In K. Belényesi, Sz. Honti, & V. Kiss (Eds.), *Gördülő idő. Régészeti feltárások az M7-es autópálya Somogy megyei szakaszán Zamárdi és Ordacsehi között – Rolling Time. Excavations on the M7 Motorway in County Somogy between Zamárdi and Ordacsehi* (pp. 123–138). Somogy Megyei Múzeumok Igazgatósága – Magyar Tudományos Akadémia Régészeti Intézete.
- Dani, J., & Horváth, T. (with the contribution by Barcsi, A., Bucsi, T., Joó, K., Logan, M., Penksza, K., Pető, Á., Pospieszny, L., Cummings, L. S., Sümegi, P. K. Zoffmann, Zs.) (2012). *Őskori kurgánok a magyar Alföldön. A Gödörsíros (Jamnaja) entitás magyarországi kutatása az elmúlt 30 év során. Áttekintés és revízió*. Archaeolingua.
- Farkas, Cs. (2004). Rézkori sírok a Mátra déli előteréből (Vámosgyörk–Motorhajtóanyag tároló telep) (Kupferzeitliche Gräber aus dem südlichen Vorland der Mátra (Vámosgyörk–Motortreibstoff Lagerstation). In G. Ilon (Ed.), *ΜΩΜΟΣ III. Őskoros Kutatók Összejövetelének konferenciakötete, Halottkultusz és temetkezés, Szombathely–Bozsok, 2002. október 7–9* (pp. 139–157). Vas Megyei Múzeumok Igazgatósága.
- Fábián, Sz. (2013). A Preliminary Analysis of Intrasite Patterns at Balatonkeresztúr–Rétidűlő, a Late Copper Age Site on the Southern Shore of Lake Balaton in Hungary. In: A. Anders, & G. Kulcsár (Eds.), *Moments in Time. Papers Presented to Pál Raczky on His 60th Birthday. Ősregészeti tanulmányok/Prehistoric Studies I* (pp. 613–627). L'Harmattan.
- Fábián, Sz. (2014). *A badeni kultúra településtörténete a dél-balatoni régióban az újabb kutatási eredmények alapján (The settlement history of Baden culture in the South–Balaton region on the base of the new research)* (PhD. dissertation). ELTE BTK. <http://doktori.btk.elte.hu/hist/fabianszilvia/diss.pdf>

- Fábián, Sz., & Rajna, A. (2021). 'Where the house has no trace...' Reconstructing of basic cluster of everyday life on the Late Copper Age sites in Hungary. In L. Jallot, & A. Peinetti (Eds.), *Use of Space and Domestic Areas: Functional Organisation and Social Strategies Proceedings of the XVIII UISPP World Congress (4-9 June 2018, Paris, France) Volume 18 Session XXXII-1* (pp. 77–97). Archaeopress.
- Fábián, Sz., Csippán, P., & Daróczi-Szabó, M. (2013). Hajléktalan badeniek? Háztartások lokalizációjának lehetőségei Balatonkeresztúr-Réti-dűlő késő rézkori lelőhelyén (Homeless Baden people? The possibilities of the localization of households on a Late Copper Age site at Balatonkeresztúr-Réti-dűlő). *Ősrégészeti levelek*, 13, 128–162.
- Fábián, Sz., Csippán, P., Rajna, A., György, L., Priskin, A., Serlegi, G., Marton, T., Berente, Z., & Czifra, Sz. (2018). Az anyagi kultúra változó horizontjai: A mindennapi és szimbolikus tevékenységek színtereinek vizsgálata a késő rézkori településeken. *Magyar régészet*, 2018(Tél), 1–18.
- Furholt, M. (2008). Pottery, cultures, people? The European Baden material re-examined. *Antiquity*, 82, 617–628. <https://doi.org/10.1017/S0003598X0009726X>
- Furholt, M. (2009). *Die nördlichen Badener Keramikstile im Kontext des mitteleuropäischen Spätneolithikums (3650–2900 v.Chr.)*. Dr. Rudolf Habelt Verlag GmbH.
- György, L. (2009). Késő rézkori leletek az Ősi-barlangból (Esztergom–Pilisszentlélek). *Ősrégészeti levelek*, 11, 42–49.
- György, L. (2014). *Észak-Magyarország a késő rézkorban. A Baden-kultúra leletei Borsod–Abaúj–Zemplén megyében (Northeastern Hungary in the Late Copper Age. The finds of the Baden Culture in County Borsod–Abaúj–Zemplén)* [PhD Dissertation] ELTE BTK. <https://edit.elte.hu/xmlui/handle/10831/22316>
- Hamilton, D. (2015). The Pilismarót-Basaharc cemetery: radiocarbon dating and Bayesian Modelling. In M. Bondár (Ed.), *The Late Copper Age Cemetery at Pilismarót-Basaharc. Istvan Torma's Excavations (1967, 1969–1972)* (pp. 349–355). Archaeolingua.
- Hampel, J. (1895). *Újabb tanulmányok a rézkorból (New articles from the Copper Age)*. Magyar Tudományos Akadémia, Budapest.
- Honti, Sz. [Szabolcs], & Horváth, T. (2013). *Balatonöszöd-Temetői dűlő (M7/S-10) lelőhely őskori településrészei. Digitális kiadás – dupla DVD/The prehistoric settlement part of Balatonöszöd-Temetői dűlő*. MTA BTK Régészeti Intézete.
- Honti, Sz. [Szilvia]. (1981). Rézkori temetkezés Balatonbogláron. *Somogyi Múzeumok Közleményei*, 4, 25–34.
- Honti, Sz. [Szilvia], Belényesy, K., Fábián, Sz., Gallina, Zs., Hajdú, Á., Hansel, B., Horváth, T., Kiss, V., Koós, I., Marton, T., Németh, P. G., Oross, K., Osztás, A., Polgár, P., Szeőke, J. P., Serlegi, G., Siklósi, Zs., Sófalvi, A., & Virágos, G. (2004). A tervezett M7-es autópálya Somogy megyei szakaszának megelőző régészeti feltárása (2002–2003). Előzetes jelentés III. (Preliminary report III. The preceding archaeological excavations (2002–2003) of the M7 highway in Somogy County). *Somogyi Múzeumok Közleményei*, 16, 3–70.
- Honti, Sz. [Szilvia], Fábián, Sz., Gallina, Zs., Hajdú, Á., Hornok, P., Koós, I., Mersdorf, Zs., Molnár, I., Németh, P. G., Polgár, P., Szeőke, J. P., Serlegi, G., Siklósi, Zs., Sipos, C., & Somogyi, K. (2007). Régészeti kutatások az M7-es autópálya Somogy megyei szakaszán és a 67-es úton (2004–2005). Előzetes jelentés IV. (Archaeological research on the Somogy county section of the M7 highway and on Route No. 67. Preliminary report IV). *Somogyi Múzeumok Közleményei*, 17(A), 7–70.

- Horváth, T. (2002). A unique anthropomorphic representation of Baden culture. *Antaeus*, 25, 423–426.
- Horváth, T. (2004). A new human representation from the Baden Culture: Mask from Balatonőszöd. *Acta Archaeologica Academiae Scientiarum Hungaricae*, 55, 179–237. <https://doi.org/10.1556/Arch.55.2004.3-4.1>
- Horváth, T. (2010). Europäische Maskentradition am Beispieleines spätkupferzeitlichen Fundes. In H. Meller, & R. Maraszek (Eds.), *Masken der Vorzeit in Europa (I). Internationale Tagung vom 20. bis 22. November 2009 in Halle (Saale). Tagungen des Landesmuseums für Vorgeschichte Halle (Saale)*, 4, 109–127.
- Horváth, T. (2011). Hajdúnánás-Tedej-Lyukas halom – The Interdisciplinary Survey of a Typical Kurgan from the Great Plain Region: a Case Study (The Revision of the Kurgans from the Territory of Hungary). In Á. Pető, & A. Barcsi (Eds.), *Kurgan Studies: An environmental archaeological multiproxy study of burial mounds of the Eurasian steppe zone* (pp. 71–131). Archaeopress.
- Horváth, T. (with contributions by Gál, E., Gherdán, K., Gulyás, S., Köhler, K., Kulcsár, G., Kustár, Á., Mihály, J., Nagy, I., Pető, Á., Péterdi, B., Schöll-Barna, G., Sipos, Gy., Svingor, É., Tóth, M., Vörös, I., & Zandler, K.) (Ed.) (2014). *The Prehistoric Settlement at Balatonőszöd-Temetői-dűlő. The Middle Copper Age, Late Copper Age and Early Bronze Age occupations*. Archeolingua.
- Horváth, T. (2015). The mask illusion from the Late Copper Age site at Balatonőszöd. In N. C. Rîșcuța, I. V. Ferencz, & O. Tutilă Bărbat (Eds.), *Representations, Signs and Symbols Proceedings of the Symposium on Religion and Magic* (pp. 25–41). Editura Mega.
- Horváth, T. (2016). 4000–2000 BC in Hungary: The Age of Transformation. In C. Popa (Ed.), *The Carpathian Basin and the Northern Balkans between 3500 and 2500 BC: Common Aspects and Regional Differences* (pp. 51–113). Editura Academiei Române.
- Horváth, T. (2017a). Budakalász, ein besonderer Bestattungsort der Badener Kultur. Kritische Anmerkungen zum Buch: Mária Bondár – Pál Raczkó (Red): *The Copper Age cemetery of Budakalász. Ziridava Studia Archaeologica*, 31, 69–92.
- Horváth, T. (2017b). Szombathely 89. északi elkerülő út, 2. lelőhely (Kőszéri-dűlő) késő rézkori Boleráz leletanyaga (The material of a Late Copper Age Boleráz pit from Szombathely–Kőszéri-dűlő, Road 89). *Savaria*, 39, 79–84.
- Horváth, T. (2017c). A badeni kultúra leletei Szombathely–Újperint–Kavicsbánya lelőhelyen: Labrys a Baden kultúrában? (Finds of the Baden culture from Szombathely–Újperint–Gravel pit – A labrys in the Baden culture?). *Savaria*, 39, 85–12.
- Horváth, T. (2017d). Salgótarján–Pécs-kő: a nem(csak) badeni lelőhely (Salgótarján–Pécs-kő: not just a Baden settlement). *Neograd*, 40, 413–438.
- Horváth, T. (with the contributions by Bernert, Zs., & Buzár, Á.) (Ed.) (2018a). *The Marvelous Land of Ózd. The Ózd–Piliny Variant of Baden culture in North–Eastern Hungary (Ózd csodálatos földje. A Baden-kultúra Ózd–Piliny variánsa Északkelet-Magyarországon)*. Martin Opitz.
- Horváth, T. (with the contributions by Marcsik, A., Szakmány, Gy., & Tugya, B.) (Ed.) (2018b). *Az Alföld egy rézkori zuga. Baden–Kostolác-településrészlet a Hódmezővásárhely–Gorzsa–V. számú homokbánya lelőhelyen (The Copper Age corner of the Great Hungarian Plain. Baden–Kostolác settlement part at Hódmezővásárhely–Gorzsa, Sandpit No. V)*. Martin Opitz.
- Horváth, T. (2018c). Finds of the Baden Culture from Szombathely–Újperint–Gravel Pit – a Labrys in the Baden Culture? In N. C. Rîșcuța,

- I. V. Ferencz, & O. Tutilă Bărbat (Eds.), *Representations, Signs and Symbols Proceedings of the Symposium on Religion and Magic* (pp. 33–50). Editura Mega.
- Horváth, T. (with the contributions by Farkas, Cs., Guba, Sz., & Prohászka, P.) (Ed.) (2019). *Strázsadombi mesék. Főnöki rezidencia a bronzkori Hatvan területén*. Martin Opitz.
- Horváth, T. (2022). The Baden complex in Austria and Hungary – A comparative study. *Ziridava Studia Archaeologica*, 36(1), 41–83.
- Horváth, T., & Svingor, É. (2015). The Spatial and Chronological Distribution of the So-called ‘Baden Culture’. In M. Nowak, & A. Zastawny (Eds.), *The Baden Culture around the Western Carpathians, Via Archaeologica – Special Edition*. Krakow: Institute of Archaeology of the Jagellonian University, Institute of Archaeology and Ethnology Polish Academy of Sciences, Kraków Branch, Archaeological Museum in Kraków (pp. 19–75). Polish Academy of Sciences.
- Horváth, T., & Wild, E. M. (2017). Szombathely, 89. számú elkerülő út, 5. lelőhelyen (Reiszig-erdő alatti dűlő) előkerült Boleráz és Kostolác kultúrák jelenségei és leletei. A késő rézkor időszaka Szombathely városának területén és környékén (Prehistoric settlement parts of Boleráz and Kostolác cultures at Szombathely–Reiszig-erdő alatti dűlő, M89, Site 5. The Late Copper Age in the environment of Szombathely). *Savaria*, 39, 103–148.
- Horváth, T., & Szilasi, A. B. (2020). A Multi-period Prehistoric Site and Medieval Castle at Salgótarján–Baglyas-kő. In A. Kozubová, E. Makarová, & M. Neumann (Eds.), *Ultra Velum Temporis. Venované Jozefovi Bátorovi k 70. narodeninám* (pp. 201–212). Archeologický Ústav SAV. <https://doi.org/10.31577/slovarch.2020.suppl.1.16>
- Horváth, T., Cseh, J. P., Barkóczy, I., Juhász, P., Gulyás, S., Bernert, Zs., & Buzár, Zs. Á. (2020). A double burial of the Baden culture from Tatabánya–Delphi (northern Transdanubia, Hungary) – A case study of the *Dentalium* beads of the Baden culture and their interpretation. *Quaternary International*, 539, 78–91. <https://doi.org/10.1016/j.quaint.2018.09.009>
- Horváth, T., Guba, Sz., & Bácsmegi, G. (2018). Siedlungsteil der Boleráz- und der Badener Kultur aus Szurdokpuszpöki-Hosszú-dűlő (Kom. Nógrád, Ungarn). *Ziridava Studia Archaeologica*, 32, 7–41.
- Horváth, T., Kreiter, A., Viktorik, O. (2019–2020). A Vessel of the Funnel Beaker Culture at Salgótarján–Pécs-kő. *Baltic–Pontic Studies*, 24, 177–203. <https://doi.org/10.2478/bps-2019-0001>
- Horváth, T., Tóth, K., Bajnóczi, B., Bárány, A., & Molnár, M. (2022). Csecse-Nagyréti-oldal késő rézkori és késő császárkori lelőhely. *Neograd*, 45, 259–341.
- Kalicz, N. (1963). *Die Pécel (Badener) Kultur und Anatolien*. Akadémia Kiadó.
- Kalicz, N. (1968). *Die Frühbronzezeit in Nordost-Ungarn*. Akadémia Kiadó.
- Korek, J. (1951). Ein Gräberfeld der Badener Kultur bei Alsónémedi. *Acta Archaeologica Academiae Scientiarum Hungaricae*, 1, 35–54.
- Korek, J. (1983). *Közép–Kelet–Európa a rézkor végén (Mittelosteuropa am Ende der Kupferzeit)* [PhD dissertation].
- Kulcsár, G. (2013). Glimpses of the Third Millennium BC in the Carpathian Basin. In A. Anders, & G. Kulcsár (Eds.), *Moments in Time. Papers Presented to Pál Raczky on His 60th Birthday* (pp. 643–660). L’Harmattan.
- Leuzinger, U., Marti-Grädel, E., & Schibler, J. (2002). *Die jungsteinzeitliche Seeufersiedlung Arbon-Bleiche 3. Funde. Departement für Erziehung und Kultur des Kantons Thurgau*.
- Maran, J. (1998). Die Badener Kultur und der ägäisch-anatolische Bereich. Ein Neubewertung eines alten Forschungsproblems. *Germania*, 76(2), 497–525.

- Milisauskas, S., & Kruk, J. (2011). Late Neolithic/Late Copper Age 3500–2200 BC. In S. Milisauskas (Ed.), *European Prehistory. A Survey* (pp. 293–327, 2nd edition). Springer. https://doi.org/10.1007/978-1-4419-6633-9_9
- Milisauskas, S., Kruk, J., Pipes, M.–L., & Makowicz–Poliszot, D. (2012). *Butchering and meat consumption in the Neolithic. The exploitation of Animals in Bronocice (Ubój i mieso. Aspekty neolitycznej gospodarki zwierzecej. Bronocice – studium przypadku)*. Instytut Archeologii i Etnologii PAN.
- Nagy, B. (2006). *A késő rézkori badeni kultúra temetője Balatonlelle–Felső–Gamászon. (The Late Copper Age Baden Culture's Cemetery at Balatonlelle–Felső–Gamász)* [MA thesis].
- Nagy, B. (2010). Gräberfeld der Badener Kultur in Balatonlelle–Felső Gamász. *Antaeus*, 31–32, 375–498.
- Němejcová–Pavúková, V. (1981). Náčrt periodizácie badenskej kultúry a jej chronologických vzťahov k juhovýchodnej Európe (An outline of the periodical system of Baden culture and its chronological relations to Southeast Europe). *Slovenská Archaeologia*, 29, 261–291.
- Neustupný, E. (1968). Absolute Chronology of the Neolithic and Aeneolithic Periods in Central and Southeastern Europa. *Slovenská Archaeologia*, 16(1), 19–56.
- Patay, P. (1999). A Badeni kultúra Ózd–Pilinyi csoportjának magaslati telepei (Höhensiedlungen der Spätbadener Ózd–Pilinyi Gruppe). *Herman Ottó Múzeum Évkönyve*, 37, 45–56.
- Penz, M. (2014). *Bericht zur Grabung Wien 22, Seestadt Aspern 2014 (Baufeld D18–3) MNr 01651.14.01*. (Manuscript, Stadt Archäologie, Wien).
- Pető, Á., & Barcsi, A. (Eds.). (2011). *Kurgan Studies: An environmental archaeological multiproxy study of burial mounds of the Eurasian steppe zone*. Archaeopress. <https://doi.org/10.30861/9781407308029>
- Pulszky, F. (1883). *A rézkor Magyarországon*. Magyar Tudományos Akadémia.
- Renfrew, C. (1969). The Autonomy of the South–East European Copper Age. *Proceedings of the Prehistoric Society*, 35, 12–48. <https://doi.org/10.1017/S0079497X00013396>
- Soproni, S. (1954). A budakalászi kocsi (Un char cultuel de Budakalász). *Folia Archaeologica*, 6, 29–36, 198–199.
- Sófalvi, A., & Nagy, B. (2007). A badeni kultúra temetkezése Balatonlellén. In K. Belényesy, Sz. Honti, & V. Kiss (Eds.), *Gördülő idő. Régészeti feltárások az M7-es autópálya Somogy megyei szakaszán Zamárdi és Ordacsehi között. – Rolling Time. Excavations on the M7 Motorway in County Somogy between Zamárdi and Ordacsehi* (pp. 162–164). Somogy Megyei Múzeumok Igazgatósága – Magyar Tudományos Akadémia Régészeti Intézete.
- Sófalvi, A., Nagy, B., & Skriba, P. (2007). Balatonlelle–Országúti-dűlő és Balatonlelle–Felső–Gamász. In K. Belényesy, Sz. Honti, & V. Kiss (Eds.), *Gördülő idő. Régészeti feltárások az M7-es autópálya Somogy megyei szakaszán Zamárdi és Ordacsehi között. – Rolling Time. Excavations on the M7 Motorway in County Somogy between Zamárdi and Ordacsehi*. (pp. 151–166). Somogy Megyei Múzeumok Igazgatósága – Magyar Tudományos Akadémia Régészeti Intézete.
- Torma, I. (1977). Rézkori telep Páriban (Kupferzeitliche Siedlung von Pári). *Béri Balogh Ádám Múzeum Évkönyve*, 6–7, 29–59.
- Walsh, K., & Mocchi, F. (2011). Mobility in the Mountains: Late Third and Second Millenia Alpine Societies' Engagements with the High–Altitude Zones in the Southern French Alps. *European Journal of Archaeology*, 14(1–2), 88–116. <https://doi.org/10.1179/146195711798369427>