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COMPLEX ANALYSES OF THE LATE COPPER AGE BURIALS IN THE CARPATHIAN BASIN

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The quadrennial National Research, Development and Innovation Office research project (K 128413) processing Late Copper Age burials within the Archaeological Institute of the Research Centre for the Humanities of the Hungarian Academy of Sciences (RCH HAS). Principal Investigator Mária Bondár, the project began in September 2018.

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In the framework of our four year research we will examine the burials of the so-called Baden Culture that inhabited the major part of the Carpathian Basin from 3600/3000 BC until 2800 BC. Heterogenous burial practices are characteristic to the Baden Culture; one can find burial grounds with several hundred graves, minor graveyards with 10-30 graves as well as lonely burials. Burials reminiscent of mass graves and the interment of animals are also common. Both cremation and skeletal burial rites are present and symbolic graves contaning no human remains also occur. During the centuries of the Baden Culture major changes occurred in the life of societies who had no literary records of their own; many innovations were made that had lasting effects on the history of humanity. These novities spread fast and wide and further deepened economic and social disparities within communities that were reflected in burials.

THE ARCHAEOLOGY OF BURIAL GROUNDS

The archaeology of burial grounds, studies on funerary rites, i.e. the "archaeology of death", has received particularly great attention in international research, reflected by the immense number of studies that alone would fill a smaller library. Although first applied in the research of ancient high civilisations, the chronological and spatial boundaries of this field of research have been greatly expanded to include also prehistoric periods for which written sources are entirely lacking.[1]

The interpretation of cemeteries as "ritual spaces" only gained ground in Hungarian research during the past few years. The funerary symbols and cultural codes used by prehistoric communities were a perfectly intelligible set of symbols that encoded customs and social relations transmitted from one generation to the next. However, the identification and interpretation of these codes is no simple task after several millennia have passed. One of the difficulties encountered when attempting to decode these symbols is that various liminal rites were performed from the onset of death to the funeral and the community's final farewell to the deceased.[2] Inquiries into these all but forgotten practices have been largely neglected by scholarship, which has begun to show an interest in these issues only more recently. While cemeteries are certainly not the direct continuation of one-time life, they are ritual, mystical spaces that have preserved various imprints of former beliefs, ceremonies and rites.

Traditional archaeological assessments focus on the grave goods, their position in the grave and their analogies. The goal of complex cemetery analyses is to identify the elements of mortuary traditions preserved and passed on in mortuary rites alongside possible changes in these practices, as well as to identify the archaeological imprints of how a community related to its dead, and to draw meaningful conclusions

[1] Ilan 2002, Howard 2008, Borić 2013, Arponen–Ribeiro 2014, Tunia–Wlodarczak 2014.
[2] Gennep 1909 (2007), Durkheim 1912 (2004),

regarding funerary practices from the analysis.[3] The study of human remains can also provide a wealth of information. The social organisation of societies that have left no written records can be reconstructed to some extent by identifying and analysing the finds expressing status and prestige, another field in which major advances have been made more recently. Artefacts expressing status and prestige found in funerary contexts can be studied archaeologically and they are also suitable for discerning possible social differences – this is one of the areas where the research approaches and analytical techniques used in archaeology and cultural anthropology can be fruitfully integrated.[4] In addition to the archaeological interpretation, archaeometric studies can contribute to the reconstruction of the one-time biological condition, the environment and dietary habits, alongside furnishing indirect evidence for the deceased's social status in his/her community. The "dry facts" of the archaeological record and the archaeometric evidence are then interpreted using the modern approaches of the social sciences and by integrating the findings of various disciplines.

THE CARPATHIAN BASIN IN LATE COPPER AGE

The Carpathian Basin played a prominent role in all prehistoric periods: it was the core territory of one cultural complex and, at the same time, the periphery of another, and it also acted as a mediating or transit region. The burial record thus preserves many different types of evidence (the exploitation of various raw material deposits, local ancestry or immigrant populations, artefacts acquired through long-distance trade, animal husbandry and hunting, crop cultivation, etc.).

The presence of several archaeological cultures or cultural complexes (Coţofeni, Kostolac, Yamna, Baden) can be demonstrated in the Carpathian Basin during the study period (3500–3000/2800 BC); several burial grounds and graves of these cultures are known, whose overall assessment and coverage varies.

The Baden complex dominated the greater part of the Carpathian Basin: most of the period's burials can be assigned to this cultural complex, a conglomerate of various traditions and of various mortuary practices and customs, reflected also in the diversity of its mortuary symbolism, behind which we can assume a host of different traditions and communities with different cultural backgrounds, diverse ancestries and social organisations as well as different regional contact networks. This diversity is hardly surprising, given that many important innovations,[5] leading to profound socio-economic changes,[6] were diffused over extensive regions during the Late Copper Age. These innovations and novelties were precipitated by radical social and economic changes. New innovations and inventions as well as new subsistence practices were only born or adopted in regions where environmental conditions and the available economic resources were conducive to this, and where a definite social demand for these innovations emerged. Most of these innovations were initially linked to the cradle of civilisation, to Mesopotamia and Anatolia. More recent research has persuasively demonstrated the existence of three major centres of innovation: in addition to Mesopotamia and the Ancient Near East, there is evidence that the Maikop culture[7] of the Caucasus and the Baden complex of Central Europe were the two other cultural milieus, where new inventions and innovations regularly appeared, leading to hypotheses that the Central European region, and in particular the Baden complex, were centres of innovation in their own right.[8] These changes also led to the consolidation of existing hierarchies within communities. The imprints of one-time social dynamics, reflected in social status for example, can best be identified in cemeteries, where the material expressions of economic and social differences (prestige) associated with individuals can be documented.

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3 Rassamakin 2011, Turek 2013.

4 Morgan 1877, Hodder 1982, Renfrew 1984, Furholt 2009, Siklósi 2010, Furholt 2011.

5 Such as the wheel, wheeled vehicles, the secondary exploitation of animals (milk, wool, harnessing of traction power) known also as the Secondary Products Revolution (SPR innovation: Sherratt 1981, 1983, Greenfield 2010), wool sheep, domesticated horse, certain metal alloys, tumulus burials and stone steles.

6 Hansen 2014, Schier 2014.

7 Ivanova 2012, Kohl–Trifonov 2014.

8 Bondár 2012, 91–101: that this region may have been a centre of innovation in the case of wheeled vehicles is indicated by the growing number of finds whose date has turned out to be quite early: Čufar Et Al. 2010.

THE BURIALS OF THE BADEN CULTURE

The burials of the Baden complex reflect extremely diverse mortuary practices. The complex's graves include both inhumation and cremation burials. Very often, a grave contained several burials, but skull burials and symbolic graves (the latter often empty or containing but a few artefacts, for example a wagon model) are also known. Some graves contained both human and animal burials. The deposition of the ashes in urns modelled on the human body represents a most singular mortuary rite. On many sites, complete or partial human remains were found dumped into a pit alongside "ritual animal burials". The interpretation of vessel hoards still eludes scholarship, and it yet remains to be confirmed that these represent cremation burials. Many sites have yielded "mass graves" containing partial or complete human burials, or animal burials deposited in the same manner, or the burials of both humans and animals. These "mass burials" are generally found in settlement pits. In addition to analysing various dimensions of mortuary rituals, we also seek an answer, principally through archaeometric analyses, to the question of whether these unusual burials of human and animal remains can perhaps be traced to some disease or epidemic.

Compared to the period's over 2000 currently known settlements, the number of burial grounds and burials of the Baden complex is extremely low: 847 individuals from 143 sites, disregarding the vague descriptions in the preliminary excavation reports.[9] This number is strikingly low and can probably be explained by the inadequacies of previous research. This research project aims to collect unpublished burial grounds of the Baden culture. Through complex analyses it aims to answer questions on diverse aspects of the past society deducted from the archaeological, biological, chemical differences observed between diverse burials.

We are in the lucky situation that the lead researcher, Mária Bondár and her team have already published

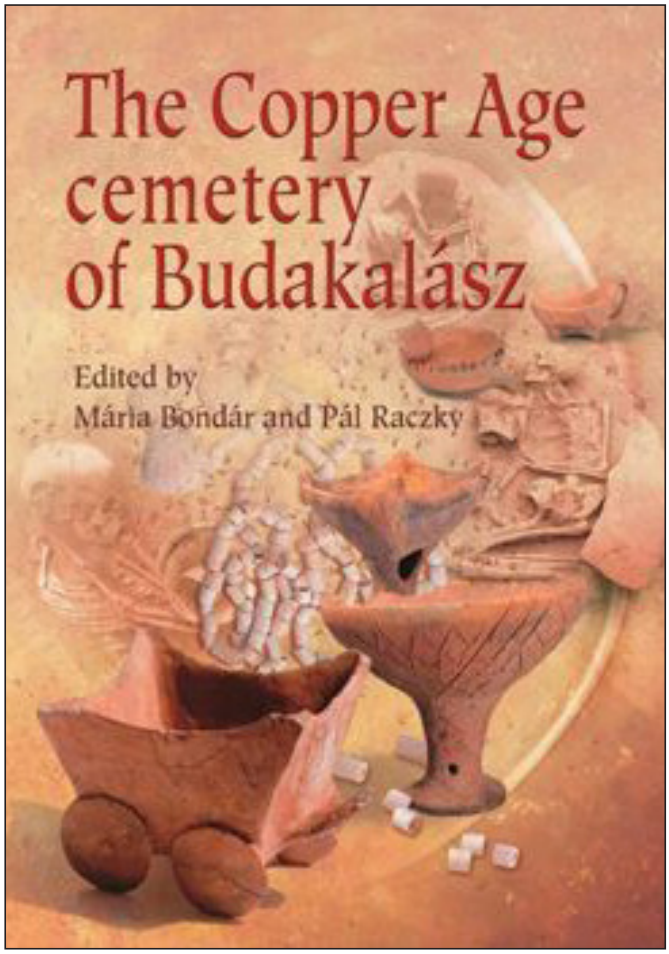

Fig. 1. The monograph of the cemetery of Budakalász (Bondár – Raczky (eds): The Copper Age cemetery of Budakalász, Budapest 2009)

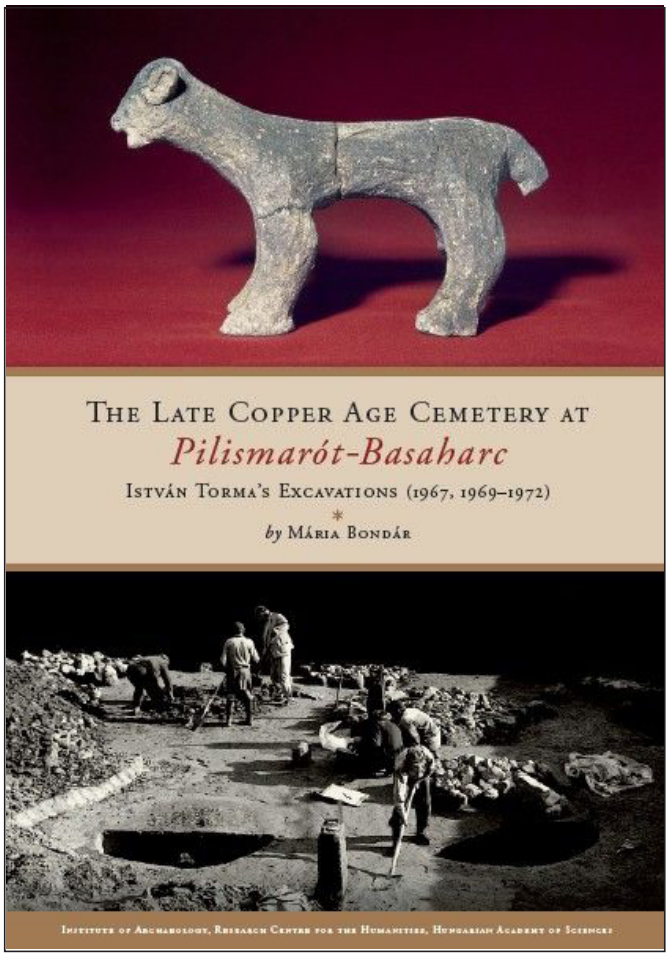

Fig. 2. The monograph of the cemetery of Pilismarót-Basaharc (M. Bondár: The Late Copper Age cemetery at Pilismarót-Basaharc, Budapest 2015)

[9] Data based on the database of Mária Bondár.

the two largest cemeteries of the period (Budakalász-Luppa csárda: 436 graves (*Fig. 1*), and Pilismarót-Basaharc: 110 graves (*Fig. 2*). In the present project, the assessment of burials is the primary object. Research history dates back to the 19th century. The first professionally excavated, independent burial of the Baden culture was uncovered at Petőháza in 1892.[10] The first "summary" of the culture's burials was relegated to a mere footnote in two studies.[11] The burial ground excavated by József Korek at Alsónémedi highlighted the need for a comprehensive overview of the culture's then known burials.[12] The investigation of the Budakalász cemetery was begun in 1952,[13] and the same year saw the discovery of the remarkable grave at Vörs, the burial yielding a copper diadem found on the head of the deceased (*Fig. 3*).[14] János Banner's monograph on the Baden culture was published in 1956; however, when analysing the culture's burials,15 he could only rely on the finds from a few sites, most of which had been uncovered by amateurs. In 1958, Nándor Kalicz uncovered the renowned funerary urns modelled on the human body at Center; given the period's scholarship, these finds were chronologically anchored to Troy and they provided one of the main cross-cultural dates for the period's relative chronology.[16] Today, we know that the settlement at Troy had not even existed between 3500 and 3000 BC. The biritual burial ground at Mezőcsát was excavated between 1958 and 1962.[17] During the next three decades, the most important burial grounds were uncovered at Pilismarót–Basaharc,[18] Szigetszentmárton (1972)[19] and Balatonboglár (1980).[20] One of the main results of the large-scale excavations was the impressive growth in the number of human burials found in settlement pits.[21] However, no more than a handful of burials are men-tioned in the preliminary reports presenting the results of the extensive development-led excavations after 2000; the single independent cemetery was found at Balatonlelle–Felső-Gamász (2002),[22] and the same holds true for the neighbouring countries.

Fig. 3. The diadem of Vörs (Photo: Tibor Kádas)

RESEARCH QUESTIONS

No more than a small portion of the customs and rites associated with the mortuary domain can be identified using archaeological methods from the intricate system of mortuary practices and ritual beliefs. When

[10] Bella 1892.
[11] Banner 1940, 53, Banner 1942, 59.
[12] Korek 1951, 41–42.
[13] The final report on the cemetery was published in 2009 (Bondár–Raczky 2009) and was funded by OTKA grants (OTKA T 037503, OTKA T 62689, OTKA PUB 77431).
[14] Banner 1956, Taf. 87. 4, Bondár 2015a.
[15] Banner 1956.
[16] Kalicz 1963.
[17] Kalicz 1999.
[18] The assessment of this cemetery was performed by the grant applicant between 2012 and 2014, funded by OTKA Research grant K 104276. published: Bondár 2015
[19] Kalicz 1976; two graves, one of the burials yielded a wagon model.
[20] Honti 1981 (mass burials)
[21] Horváth 2004.
[22] András Sófalvi's excavation, final report written by Borbála Nagy (Nagy 2010).

archaeologists uncover a grave, they find the remains of a corpse that has been affected by various post-depositional processes in the soil – what they find are human remains (bones or cremains) in various states of preservation. They can document the location of the burial, the grave pit and the artefacts made of durable materials accompanying the burial. In the Carpathian Basin the traces or remnants of "grave goods" made of perishable materials such as wood, textiles, furs and the like are only preserved in exceptional cases. Traditional archaeological assessments of burials were, at most, complemented with a physical anthropological analysis of the human remains and little else was considered, despite the fact that various dimensions of the burials (the choice of burial location, the imprints of rituals, grave goods, artefacts articulating status and social prestige) reveal much about the position of the individual in the community and his/her cultural and other contacts (ancestry, place of origin, trade, etc.) as well as about the community's beliefs about and attitudes to death (grave goods, certain elements of the funerary process).

The remains preserved the biological condition of the once living person (inherited traits, environmental influences, health).

Through the complex analyses incorporating the above-mentioned archaeological and scientific aspects of these burials, we aim to answer the base question of the nature of the biological, original, social, cognitive differences between the peoples of various burial rites of this period without literary records.

The two above-mentioned burial grounds at Budakalász-Luppa csárda and Pilismarót-Basaharc are unique in the sense that archaeological evidence suggests the burial of selected members of several communities. As part of the proposed research project, my goal is to collect the burials of the Baden complex uncovered in Hungary and to analyse them using both a traditional archaeological assessment and archaeometric analyses. The latter would also include sampling already published cemeteries with the aim of performing various analyses that were not employed at the time of their assessment. Finally, the team specialists will collaborate on integrating the findings shedding light on the social, biological, environmental and cognitive elements of the burials. We shall seek an answer to the following questions: Are there any differences between the population groups interred in the analysed burials? What do the cognitive codes preserved in the examined burials reveal about social organisation, are there any differences between the deceased interred in larger cemeteries, smaller burial grounds and solitary graves in terms of genetics, dietary habits, ancestry and place of origin? How do the burial grounds of the elite differ from the other burials?

In order to realise the project goals, it is vital that the Late Copper Age burials selected for analyses be examined using exactly the same analytical procedures (radiocarbon, physical anthropology, DNA, isotope analyses, raw material provenance analyses) because only thus can we gain results that can be meaningfully compared. After identifying the similarities and divergences, we can answer the question of what kind of community used a particular burial ground: the members of a single community, the related members of several communities, or the select few, the social elite, of several communities. Due to my familiarity with the new findings of international archaeological scholarship, I offer a fresh approach to the study of burials that involves the identification of the possible imprints of status and prestige in the archaeological record, in the choice of burial location and in the successive phases of the funerary process. One possible avenue of future research could be the comparison of the social organisation outlined by the mortuary record with the one preserved on settlements (subsistence strategies, reconstruction of households, animal husbandry, craft activities, etc.) that would enable the reconstruction of Late Copper Age societies on a broader scale.

RESEARCH METHODS

Based on accurate data, completing archaeological analyses with purposeful scientific analyses we aim to discover and interpret the most data possible with the systematism of investigators. The first step is a wide-spread burial related data collection: collect and control data from museum inventories and literary records, overviewing funerary finds, circumstances of discovery, the primary sources of excavation documentation to sieve out burials that were determined as Baden by mistake. Our tasks include collecting skeletal remains

from museum sheves that originate from graves belonging to our period of research. A crucial part of data control is the 14C analysis in all cases where the burial cannot be dated by archaeological remains.

In the course of the archaeological analysis of the burials we examine the burial method, whether the body or its cremated remains were deposited. We map elements of the burial process: the choosing of the location, the marking of the grave within the burial grounds, the objects placed next to the deceased and collect data related to events that occurred after the burial. Through geospatial analysis and modelling we discover the spatial characteristics of the burial, relying on data from previous environment reconstructions. Following the analysis of grave goods we create their typology, analyse their raw materials and if possible, determine their origins. We collect and examine the data that sheds light on the role, social status and prestige the individual held during his life. With the help of archaeological and cultural anthropologic parallels we observe all signs of recurring communal customs such as the cyclic disinterment of remains, the visiting of graves on certain dates.

One part of our investigations is aimed at human remains. By determining biological gender, mortuary age and the type of buried individuals physical anthropology provides data on the human components of the period. The pathological mutations marking bones provides information on diseases. The methods of physical anthropology have already been drawn on by archaeological sciences. Nowdays we increasingly use 14C chronology to determine the date of death. However in the last years, owing to the bioarchaeological boom with the increase of methods applicable in archaeology the range of examination and interpretation methods broadened. Bioarchaeological analyses include the largescale radiocarbon dating and statistic analysis of graves, thus determining the date of death, mapping contemporaneous burials and archaeogenetic analysis (the analysis of complete mitochondrial genom and 3000 positions from the DNA of the cytoblast and molecular pathological screening).

In the course of the last years it became evident, that DNA reflecting and recording numerous characteristics can be isolated from bones of people who died several thousand year age. Nowdays in fortunate cases not only matrilinear descendance, but the Y chromosome and recently the entire human genom became examinable.[23]

Isotope analyses help determining if individuals were born locally or were 'immigrants' and furthermore refer to the way of living in many aspects. Stable isotopes incorporated into teeth and bones do not decompose over time, thus oxygen (δ18O) can indicate the composition and origin of water, the composition of drinking water consumed in the last years before death which can help reconstructing habitation. The ration of carbon (δ13C) reflects the vegetal and the ratio of nitrogen (δ15N) reflects faunal nutriment. The ratio of stroncium isotopes (87Sr/ 86Sr) from solid and liquid aliment building into teeth in young age reflects the geological environment (soil) where the individual was born and raised. The environmental data taken from sampes of human teeth should be compared with records from Late Copper Age animal teeth, which could complete our knowledge with other segments (grazing area helps to determine whether they brought animals with themselves or used ones locally raised). The currently draft-like stable isotope map of the broader region of the Carpathian Basin can help determine better the migration period of non-local population with the new data acquired through new research.[24] A new research area of the project is the measurement of C/N ratio (for confirming the perseverance of original collagen). Due to the lab development of the Institute for Geological and Geochemical Research, Research Centre for Astronomy and Earth Sciences, HAS. in the third year of research we can begin the first bone phosphate δ 18O analyses. We expand our database with C/N analyses from collagens and δ13C, δ15N measurements which are currently unique in the research of the Late Copper Age.

The subject of this research programme is unique in the Hungarian research of the Copper Age. Similar national and international projects on Neolithic and Bronze Age necessitate that one examines the intermediary Late Copper Age population and society with present-day scientific approach.

[23] Lipson et al. 2017.

[24] Kohán–Kern 2012; Kern Et Al. 2014.

EXPECTED RESULTS

A deceased buried in a certain age in accordance with contemporary customs is a 'time capsule' that provides answers to numerous biological and social questions. The burial conserves the archaeological context documenting the role the defunct played in the late society as well as 'proofs' of his former health and physical condition as well as his enviroment. Bioinformation referring to nutrition, water consumption and environmental elements indirectly reflect the social status of the individual as well as offer help in the spatial reconstruction of the system of cultural relations. We can use this data to deduct the places of origin of members from diverse groups of the Late Copper Age population and the environmental characteristics of these places as well as the social status of individuals. Quality nutrition (protein consumption) can be a result of improved life circumstances which is supposed to be the privilige of a few. Alongside archaeological finds nutrition data can be used in determining whether one belonged to the social elite or not. Deficiency diseases can be characteristic of low class individuals, grave goods discovered in their graves (or their lack) can uncover previously unknown connections. Newest research can detect epidemic bone alterations more precisely.

Following the evaluation and interpretation of closely interrelated analyses we can rely on exact facts for social reconstruction and hopefully establish patterns and trends among burials. As a result of the research project we can obtain scientific data to better understand former landscape, social disparity, migration topography, the spreading of innovation and we can better define elements of beliefs, thus to questions that at present can only be answered vaguely by the archaeological sciences.

At present we do not possess a complex database on (neither) the Late Copper Age which contains results from different natural sciences as well. One goal of the research is creating a common databank for archaeological, anthropological, chronological, bioarchaeological, material analysis and spatial data of the results achieved and published during the course of the project. Based on the joint results of these analyses a population reconstruction and sociodemographical analysis can be made on the population of the burial grounds.

As the closing of the project we will present our results on a workshop held in Budapest and the monography of Late Copper Age burials will be completed by a collaboration of all researchers involved.

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