

ARCHAEOLOGICAL AND BIOARCHEOLOGICAL STUDIES ON LATE COPPER AGE BURIALS

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Our research project, ‘Complex Analysis of the Late Copper Age Burials of the Carpathian Basin’, focusing on the mortuary realm of the Late Copper Age, was launched in September 2018 (NKFIH Grant K 128413). Under the direction of Mária Bondár as its Principal Investigator, the project was based at the Institute of Archaeology of the Research Centre for the Humanities. We first described the main goals of this project in a previous issue of Hungarian Archaeology (BONDÁR 2018). The implementation of the project and its main findings are presented here.

Keywords: Late Copper Age, burials, archaeology, bioarchaeology

THE IMPLEMENTATION OF THE RESEARCH PROJECT

Following the publication of two major Late Copper Age cemeteries, Budakalász-Luppa csárda (BONDÁR & RACZKY 2009) and Pilismarót-Basaharc (BONDÁR 2015), this project focused on smaller burial grounds and small burial groups or solitary burials (Figs. 1–2). One of the main questions on our agenda was whether any differences existed in health status, diet, and funerary customs between the elite interred in the large formal cemeteries and the rest of the population. The excavated burials, burial grounds, cemetery parts, and their broader environment were genuine goldmines of information in this respect. Burials can be regarded as time capsules preserving a wealth of both visible and invisible information for many millennia, even after their deposition. After the painstaking study of the visible contexts and artefacts, we were curious to learn what could be gleaned from the invisible information that can be recovered using the analytical arsenal of bioarchaeology.

The visible imprints in the archaeological record—such as the deceased, the grave, and the articles deposited in the grave (or their lack), as well as the offerings placed on the grave—coupled with the invisible biological data provide a broader base for assessing the personal status of various individuals and the general conditions within a particular community. The primary information is recovered and meticulously documented by archaeologists with the utmost attention to the tiniest details. Much of the invisible information can now also be retrieved by sampling the human remains and examining them using a wide range of analytical techniques (such

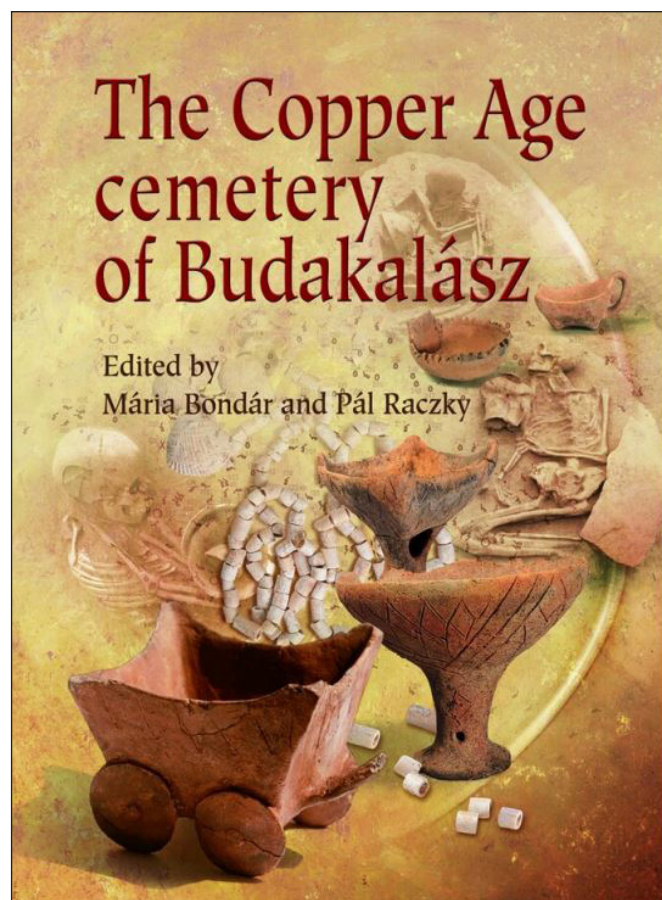


Fig. 1. Bondár, M. & Raczky, P. (eds.). *The Copper Age cemetery of Budakalász*. Budapest: Archaeological Institute of HAS, Institute of Archaeological Sciences of ELTE, 2009

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as radiocarbon dating, isotope analyses, archaeogenetics, etc.) that shed light on the health status, the environment, the diet, and an individual's origins based on the water sources available in his or her place of birth.

As part of our 2018–2019 project, we collected as comprehensive data as possible on still unpublished burials from excavation reports, museum yearbooks, and information kindly received from colleagues. We chose Somogy County as our case study area because all burial types have been documented there, and most of the Late Copper Age sacred locations are known from that region. We had no way of knowing at the time that we had made an excellent choice: the pandemic, which reached Hungary in the spring of 2020, almost ruined our chances of completing the project in time owing to the lockdowns and the switch to home office work for a long time afterwards.

In autumn 2020, Krisztina Somogyi brought to our attention a new cemetery with many burials uncovered on the outskirts of Balatonszentgyörgy in 2017. To our great fortune, the osteoarchaeological material was transported to the Institute of Archaeology in late January 2021, before the next lockdown, where we could proceed with the sampling, while the archaeological finds were photographed and drawn in collaboration with illustrator Edit Ambrus in the Kaposvár museum.

The greater part of the sites examined in the current project yielded burials that can be regarded as the interments of 'ordinary' people found near or inside settlements.

A general distinction between normative (regular) and non-normative (atypical) burials has been drawn. In this research project, we predominantly focused on normative burials, which can be defined by the co-presence of two elements, namely human remains and the observable traces of associated funerary activities represented by various artefacts and other evidence (DUDAY *et al.* 1990; BOULESTIN 2012).

After classifying the period's different burial types, we determined the archaeological criteria, according to which we began sampling the human remains for various analyses. We thus continued our work in two separate areas: traditional archaeological assessment and bioarchaeological research.

The collection of samples from Late Copper Age burials and settlements for radiocarbon dating and archaeogenetic studies had already been undertaken during previous research projects, including international ones, which brought an awareness of the potential pitfalls of sampling and the problems that could be encountered regarding the samples destined for various analyses. As it turned out, some samples were unsuitable for addressing archaeological issues due to the sample containing DNA in insufficient amounts.

The sampling of the burials was conducted and documented by János Jakucs according to a protocol with a set of predetermined criteria, and he also supervised the dispatch of the samples to the laboratories. He registered the sample IDs, the received analytical results, and the sites in a QGIS database, from which the maps were assembled.

Besides typochronology, absolute dating was one of our prime concerns, and we strove to obtain as many radiocarbon dates as possible for the different burial types, particularly in cases when the available

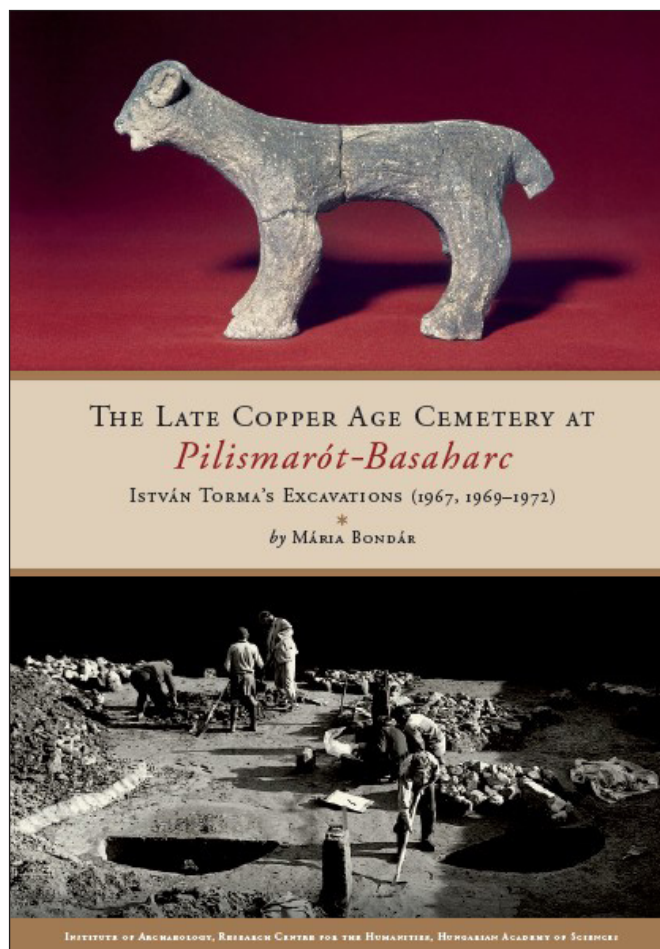


Fig. 2. Bondár, M. *The Late Copper Age Cemetery at Pilismarót-Basaharc*. Budapest: Archaeolingua, 2015

archaeological information was insufficient to determine whether a burial of the Baden culture had actually been found on one or another site. Previously, when preparing the final report on a Baden cemetery, I selected the richly furnished burials or the interments containing unusual and extraordinary grave goods, alongside the burials containing identical vessels or artefacts in order to obtain secure dates that would also enable the more accurate dating of burials with similar finds in other cemeteries.

In this project, we selected unfurnished burials and interments whose grave goods were not objects with a secure dating value that had been omitted from previous studies. One of our priorities was that in addition to the few existing radiocarbon-dated double and triple burials, all similar new burials should be included in the current sampling, and samples from all the individuals found in the mass graves should be sent for radiocarbon dating. Another priority was the collection of samples from the atypical burials and from at least some of the furnished settlement burials interred according to one or another mortuary rite. We also submitted samples from settlement pits containing human and animal remains. Most new radiocarbon measurements were performed in Glasgow (Scottish Universities Environmental Research Centre) and Poznań. While waiting for the radiocarbon dates from these two laboratories, which we finally received in autumn 2022, we worked on assembling a catalogue of the period's burials in Hungary. Owing to the pandemic, the project's deadline was extended until December 31, 2023.

THE RESULTS OF THE RESEARCH PROJECT

The successful project yielded a wealth of new results and insights that were made available in various conference presentations, journal papers, posters, and the project's homepage during the implementation period.

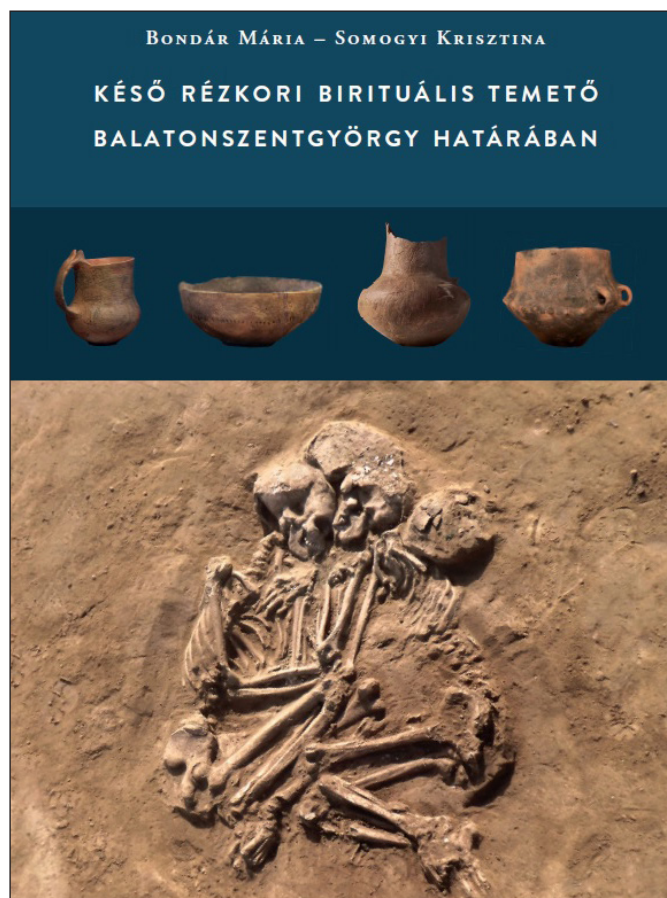


Fig. 3. Bondár, M. & Somogyi, K. *Késő rézkori birituális temető Balatonszentgyörgy határában*. Budapest: Bölcsészettudományi Kutatóközpont Régészeti Intézet, 2022



Fig. 4. Bondár, M. (szerk). *Késő rézkori temetkezések régészeti és bioarcheológiai elemzése (Archaeological and bioarchaeological studies on Late Copper Age burials)*. Budapest: Bölcsészettudományi Kutatóközpont Régészeti Intézet, 2023

In 2021, the National Research, Development and Innovation Office (NKFI) announced that it accepted applications for various grants, including publication subvention grants for books with a clear conceptual framework and a realistic deadline. I successfully applied with plans for two volumes (Grant NKFI MEC-K-140620). This enabled, possibly for the first time in Hungarian archaeological scholarship, the publication of the results of a research project simultaneously with its termination in the form of a final report in a monograph of one of the period's cemeteries and a collection of studies detailing the project's main findings. A few remarkable burials from Balatonlelle-Rádpusztá, Site 67/5 and Kaposújlak-Várdomb dűlő Sites 61/1 and 61/29 were published separately (BONDÁR 2020; BONDÁR & SZÉCSÉNYI-NAGY 2020; BONDÁR *et al.* 2021; BONDÁR & SOMOGYI 2021; BONDÁR & GÁL 2022). The assessment of the 73 graves of the third largest cemetery of the Late Copper Age uncovered at Balatonszentgyörgy-Faluvégi-dűlő, Site 2, was undertaken jointly with Krisztina Somogyi (*Fig. 3*; BONDÁR & SOMOGYI 2022).

We published the catalogue of the period's burial sites, the assessment of the different samples, and the archaeological and bioarchaeological analysis of the burials and cemeteries in a collection of studies published in late December 2023 (*Fig. 4*; BONDÁR 2023). The first chapter, by Mária Bondár, reviews the period's research history spanning between the Age of Reforms in the nineteenth century and the present from a novel perspective, with a focus on a particular period's accepted research practices and the available analytical procedures that were ultimately determined by the progress in industry and technology during the twentieth and twenty-first centuries.

The next major section presents the data on the currently known burial sites gathered and recorded using the traditional, time-tested methods of archaeology: the *Catalogue* contains a brief description of the sites, the burials, the grave goods, and the observations made during their excavation (by Mária Bondár and Krisztina Somogyi).

Following the different archaeological analyses (by Mária Bondár), the ensuing chapters cover the osteoarchaeological (by Piroska Rácz) and zooarchaeological assessment of the sites (by Erika Gál), as well as the chipped stones recovered from the burials (by Tibor Marton). These studies have greatly advanced our understanding of this period.

The pathological lesions noted on the human remains indicated various locomotor disorders as well as infections. The analogies to a few unusual animal bone artefacts recovered from the burials (such as the ornament created from thirteen dog canines, bone projectile points, and a thong-smoother made from a cattle mandible) reflect connections with more distant regions. The thong-smoother offering new insights into the period's leatherworking will be published in a separate study (GÁL, RÁ CZ & BONDÁR 2024).

Based on the position of the chipped stones deposited in the burials, Tibor Marton was able to reconstruct a wooden sickle with stone inserts and a bundle of arrows with stone arrowheads. The raw material of the chipped stones was most likely procured from the central regions of Hungary, while the manufacturing techniques reflect connections with the eastern Alpine region.

The sampling of the burials discussed in the volume was conducted and documented by János Jakucs. His study offers a detailed description of the sampling procedure and the amount of samples submitted for different analyses.

The modelling of the radiocarbon dates, a significant milestone in Late Copper Age research, was undertaken by Krisztián Oross. His study is based on the radiocarbon dates obtained within the framework of the current project and during our previous projects, as well as on the data of the burials in our database, alongside the published reports of the radiocarbon dates provided by various laboratories and the information contained in the archaeological literature. A total of 120 dates obtained for 22 sites were available for modelling, which were conscientiously double-checked before running different chronological models in the OxCal program. One immense merit of the study is that the seven chronological models based on the selected 91 dates from 21 sites provide a secure foundation for determining the duration and the chronological boundaries of the Late Copper Age. Another great merit is that readers are guided through the complicated process of how radiocarbon dates are interpreted and modelled, including the potential pitfalls.

The past two decades have seen major advances in the procedures for extracting DNA from various samples. Dániel Gerber's methodological study outlines previous archaeogenetic research in Hungary and the progress made in analytical methods. He demonstrates how the originally high number of samples decreases after each screening and preliminary examination and what remains suitable for interpretation and publication after each analytical process.

Additional information can be extracted from the human remains through stable isotope and geochemical analyses, which were performed on the skeletal remains by the specialists of the Institute for Geological and Geochemical Research of the Research Centre for Astronomy and Earth Sciences and the Institute of Nuclear Research of the Hungarian Research Network. The overall goal of the analyses, the analytical techniques and protocols employed, and the new results are described and discussed by Attila Demény and his colleagues. For the first time, strontium isotope measurements and their interpretation were undertaken solely by Hungarian researchers.

The analysis of a remarkable burial (Balatonlelle-Rádpusztá, Site 67/5, Grave 415) highlights what stable isotopes can tell us about individual lives: the case study presented here is the boy in the Rádpusztá burial. The interpretation of the C, N, O and Sr values shed light on whether he had been born locally or had arrived from another region, while the $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ isotopes yielded valuable information on his diet, also revealing the proportion of plant and animal components. Attila Demény examined the unusual black bead worn by the child interred in the burial, whose material was identified as a jet-like substance in light of the results of stable isotope and geochemical analyses. At present, this bead can be regarded as the earliest jet find in the Carpathian Basin. The provenance study indicated that it showed similarities with comparable finds from Western Europe (DEMÉNY *et al.* 2024).

The immense diversity of Late Copper Age mortuary practices reflects the many hues making up the colourful world of the later fourth millennium. The appearance and diffusion of countless innovations, the period's population growth, and the extensive network of cultural and other contacts all find their reflection in the burials. Compared to the preceding periods, the unmistakable elements of the Late Copper Age paradigm shift can be clearly traced in the archaeological record. We witness the decline of the strict mortuary rules, the disappearance of sidedness according to sex in body placement and the differential selection of grave goods. The Late Copper Age saw the emergence of a new set of values, among which a certain measure of frugality also played a role. Instead of genuine animals, their small downscaled versions modelled in clay were deposited in the burials as part of the mortuary rite; some burials contained unique vessels or a miniature object deposited beside the deceased as part of the grave goods made of non-perishable materials. At the same time, high numbers of animals, principally cattle, were slaughtered in some settlements, most of which were not killed for purposes of human consumption (BONDÁR 2023a).

Most settlements have yielded multiple burials: the deceased were usually carefully deposited in a settlement pit, sometimes accompanied by a few grave goods. Leprosy and tuberculosis were among the diseases afflicting the communities living during the Late Copper Age. The eight individuals interred in the mass grave uncovered in Feature 745 of the Kaposújlak-Várdomb site were perhaps victims of an epidemic or infectious disease who were buried at roughly the same time. The genetic analysis of the pathogens is currently in progress in collaboration with the respective specialist at the Max Planck Institute of Leipzig, and the results will be published in a separate study.

The assessment of the three large cemeteries, the smaller burial grounds, and solitary burials has shed new light on the diverse contacts of the Late Copper Age communities and the many cultural impacts on mortuary practices. Previous research has demonstrated the presence of southern elements in the material record and burial rites; one result of our project was identifying eastern and western elements in the mortuary realm and among the grave goods.

The final reports of the three major Late Copper Age cemeteries and the collection of studies detailing the results of our research project can be downloaded from the homepage of the HUN-REN Institute of Archaeology of the Research Centre for the Humanities (follow the links in the respective figure captions).

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