29th International Conference on the Early and Middle Bronze Age in Central Europe

Nitra 2025

29th International Conference on the

Early and Middle Bronze Age in Central Europe

13. – 16. 10. 2025, Stará Lesná

Book of Abstracts

Edited by

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Nitra 2025

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Cover: Hoard of bronze artefacts dated to the Middle Bronze Age, found at the site of Streda nad Bodrogom, Malomhomok. The logo uses the detail of the unique axe-head decoration. Photographed by A. Gašpar and Š. Olšav.

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11.30 – 12.00 Sivá Brada and archaeological sites from the Early Bronze Age around

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Abstracts of Presentations

More than Dust – How Ancient Dna from Sediments Can Help to Research Bronze Age Social Structures at the Vráble-Fidvár Site (SW Slovakia)

Benjamin Vernot[1] – Jozef Bátora[2] – Knut Rassmann[3] – Roman Scholz[4] – Lukas Werther[5]

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Every human and other living beings lose DNA daily. This genetic material can be preserved in sediments. Compared to finds such as bones and teeth, sediment is almost always present in large quantities at archaeological sites. Ancient DNA from sediments can serve as forensic evidence, providing clues to past human activities and, for example, mapping socioeconomic structures.

As part of a new research project at the Max Planck Institute for Evolutionary Anthropology in Leipzig, in cooperation with the Archaeological Institute of the Slovak Academy of Sciences in Nitra and the Romano-Germanic Commission of the German Archaeological Institute, genetic, archaeological, and isotopic studies are being combined to investigate socioecological structures, with a particular focus on the multi-phase Bronze Age tell settlement of Fidvár near Vráble. The goal is to explore genetic ancestry and social organizational structures and to connect individuals from their graves to the spaces where they left genetic traces during their lifetime.

Due to the intensive archaeological research conducted at this settlement and burial ground, the Fidvár site near Vráble represents an ideal case study. The lecture will present the current state of research on the site, the objectives of the new project, the methods used, and the preliminary results of the initial investigations, as well as outline the potential for further scientific research.

Ancient Skopelos Survey (ASkoS): First Results and Future Prospects

Anthi Batziou[1] – Agata Ulanowska[2] – Filip Franković[3] – Peter Pavúk[4]

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While Greece is a land known for its rich archaeological heritage, prehistoric Northern Sporades remain still understudied in this context, despite their crucial geographical position for intra- and interregional interaction networks.

The Ancient Skopelos Survey (ASkoS) project seeks to address this gap by focusing on Skopelos, one of the largest yet insufficiently explored islands in the Northern Sporades. Its main objective is to investigate Skopelos' role and history during these two millennia. The ASkoS project is a collaborative effort (synergasia) between the Ephorate of Antiquities of Magnesia and the Polish Archaeological Institute at Athens (PAIA) for the years 2024 and 2025.

To achieve its objectives, the ASkoS project applies a wide range of methodological and theoretical approaches, systematically collecting, analysing, and interpreting archaeological and paleoenvironmental data. While the primary focus is on understanding developments during the Bronze Age, the project's methodology encompasses all periods and types of archaeological material. By adopting a holistic approach, the project aims to shed light on habitation patterns and the broader history of the island.

Beyond Borders: Investigating Early Bronze Age Contacts Between Bohemia and Western Hungary

Eszter Melis[1] – Daniel Hlásek[2] – Michaela Kosová[3] – Nóra Szabó[4] – Michal Ernée[5] – Attila Kreiter[6] – Viktória Kiss[7]

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There is now no doubt that bronze metallurgy led to the mobility of people, and the spread of economic structures and social practices in the 2nd millennium BC in Europe. While scientific methods of the so-called 'third science revolution' have advanced our understanding of these processes, the investigation of material culture remains central to studying connectivity from an archaeological perspective. Within this framework, our research examines the relationship between the territory of Bohemia and Western Hungary between 2000 and 1500 BC. During this period, Bohemia was largely associated with the Únětice culture complex, while Transdanubian Encrusted Pottery culture dominated material culture in Western Hungary. Despite these cultural differences, both regions – linked by the Danube drainage system – relied on major copper sources from the Garam (Hron) Valley (Slovakia) and the Alps (modern Austria and northern Italy), as well as on the assumed exploitation of tin deposits in the Erzgebirge (Krušné hory) Mountains, which were essential for bronze alloying. Our study focuses on the presence of foreign pottery and metal types, with particular attention to their analogies and degrees of similarity among the finds from these two regions. By analysing these artefacts within their most accurate contexts and dating, we aim to outline the spatial and temporal distribution patterns of foreign objects. This approach helps identify potential hubs of interaction and reveal the dynamics, main directions, and changes in interregional connections. Beyond exploring long-distance contacts in Central Europe during the 2nd millennium BC, our analysis contributes to understanding the changes that occurred between 1700 and 1500 BC within the Únětice culture complex and at its southern frontiers.

Überlegungen zur Verbreitung, Chronologie und möglichen Funktion der „Brotlaibidole“ (tavolette enigmatiche, loaf bread idols) der späten Frühbronzezeit

Wolfgang David

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Ihre im Vergleich zu anderen frühbronzezeitlichen Fundgattungen überaus weite Verbreitung zwischen dem Mittelrheingebiet und Südwestrumänien bzw. Nordwestbulgarien sowie zwischen Kujawien und Korsika weist die sogenannten Brotlaibidole als Zeugen eines frühen europäischen Kommunikationsnetzes zwischen ganz unterschiedlichen Kulturgruppen aus.

Das Verbreitungsgebiet der „Brotlaibidole“ erstreckt sich in südöstlich-nordwestlicher Richtung über fast 1500 km von Südwestrumänien/Nordwestbulgarien bis ins Mittelrheingebiet, sowie in südwestlich-nordöstlicher Richtung über fast 1400 km von der Insel Korsika bis nach Kujawien.

Bei den Brotlaibidolen handelt sich um ein weiträumig verbreitetes, aber ein letztlich doch nur vorübergehendes Phänomen, das an eine bestimmte historische Situation gebunden zu sein scheint. Ihre hauptsächliche Verwendung fällt in die Zeit der vollen Entfaltung der altbronzezeitlichen Kulturen Mitteleuropas (Füzesabony-Otomani, Maďarovce-Věteřov-Böheimkirchen, Sengkofen-Jellenkofen, Landsberg-Arbon).

Noch immer wird über die ursprüngliche Funktion der „Brotlaibidole“ gerätselt. Die charakteristischen „Verzierungen“ in Form von Linien und Eindrücken, deren Anordnung und Kombination offenbar nicht zufällig oder in beliebiger Weise erfolgte, sondern zumindest in einigen Fällen einer bestimmten Systematik zu folgen scheint, lassen an ein Zeichensystem denken. Diente dieses möglicherweise zur Darstellung von Mengenangaben, Zahlen oder anderen Informationen? Kann es sich zuweilen sogar um eine Vorform der Schrift handeln? Handelt es sich bei den Brotlaibidolen um rituelle Objekte, um Talismane oder Amulette?

Soweit die Fundumstände gesichert sind, stammen sie fast alle aus Siedlungen. Die Fundkontexte weisen sie als Gegenstände des täglichen Gebrauchs aus. Mit kultischen Aktivitäten lassen sie sich nirgends unmittelbar verbinden.

Ein wichtiges gemeinsames Merkmal der Siedlungen, in denen „Brotlaibidole“ entdeckt wurden, ist ihre Lage an Verkehrswegen von regionaler und überregionaler Bedeutung. Die verkehrsgeographische Bedeutung der

meisten Fundorte lässt an eine Verwendung der „Brotlaibidole“ im Zusammenhang mit Gütertausch oder Fernhandel denken. Könnten sie im Warenverkehr als Zahlungsmittel, „Lieferschein“ oder zur Übermittlung von Nachrichten gedient haben?

Vielleicht stellten manche von ihnen Zählsymbole dar, die je nach Art der Güter im Hinblick auf Form oder Zeichen formal differenziert waren.

Dienten die Brotlaibidole zur Dokumentation der Anzahl und Art von Wirtschaftsgütern? Könnte es sich um eine Art „Warenbegleitschein“ gehandelt haben?

Gebrauchte man sie etwa zur Speicherung von Informationen oder gar zur Übermittlung von Nachrichten in codierter, nur von einem bestimmten Personenkreis zu entschlüsselnder Form über größere Entfernungen?

Oder aber fungierten sie zur Legitimierung mündlicher Nachrichten im Sinne von Erkennungszeichen bzw. „Identitätsscheinen“?

Die Vermehrung des Fundbestandes und die Ausweitung des Verbreitungsgebietes in den vergangenen zwei Jahrzehnten ermöglichen es, neue Aspekte in die Forschungdiskussion einzubringen.

Bronze Age Tells and Mega-Sites in the Carpathian Basin Around 1500 BC – Decline, Cultural Change and Rise

Rüdiger Krause

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In the middle of the 2nd millennium, drastic changes took place in the rich Bronze Age culture of the Carpathian Basin. These changes can also be seen in the settlement structures, which within 100 years show a comparatively rapid transition from tell settlements along river courses to large fortified settlements (mega-sites) in the open country. This is associated with changes in population size and economic pratices.

In the 16th/15th centuries BC, after the end of the tell settlements and the transition from the Middle to the Late Bronze Age with the large mega-sites, the ecological conditions seem to have changed. On the one hand, overexploitation of the ecosystem is blamed for making the ‚tell' economic and social model unsustainable; on the other hand, a deterioration of the climate is blamed for the decline in agricultural production, which ultimately led to the collapse of the existing cultural and social system.

From the 15th century BC onwards, huge fortified mega-sites emerged on the eastern edge of the Carpathian Basin, whose origin, significance and function remain largely unexplained. Our investigations show that seasonal to prolonged droughts were now common, which may have been a possible reason for the shift of settlements from the river courses to the plateaus. In the subsistence economy, the variety of cultivated plants increases, with millet in particular being new compared to the Middle Bronze Age and gaining central importance. In terms of domestic animals, the high proportion of horses in the tell settlements declined sharply. The proportion of sheep and goats decreased and cattle became increasingly dominant. The reasons for these far-reaching changes have led to an intensive discussion of the socio-economic bases and forms of social organisation. Questions about the development and size of the population and the role of elites in these large settlements remain largely unanswered.

The Development of Amber Craft Between the Neolithic and the Bronze Age (4000 – 2000 BC) in Light of New Research

Mateusz Cwaliński[1] *– Eryk Popkiewicz*[2]

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Against the widespread processes of mechanization and automation, amber craftsmanship has largely retained its non-industrial, artisanal character. To this day, amber is processed using time-honored and proven methods, with knowledge traditionally transmitted from master to apprentice across generations. However, like most crafts, amber working has undergone gradual evolution over time. This evolution has involved both the refinement of techniques for working the material and the introduction of increasingly sophisticated tools.

Despite the relatively extensive knowledge of amber working, it remains difficult to precisely identify the moments at which significant innovations occurred in this domain. It may be assumed that one of the earliest major 'technological leaps' was the introduction of metal tools – made of copper and bronze – likely around the transition between the Neolithic and Bronze Ages (at the turn of the 3rd and 2nd millennia BC). Compared to the flint drills and knives commonly used during the Stone Age, metal allowed for the production of tools with more varied and exact shapes, thereby offering craftsmen potentially greater precision and control in the amber-working process. Nevertheless, it remains uncertain whether bronze tools became widespread as early as 2000 BC and immediately supplanted flint, which had been in use for millennia.

The presentation will introduce the initial findings from research conducted by the author within the framework of the project 'Amber and Copper in the Early and Middle Bronze Age in Polish Lands: Acquisition, Processing, Circulation, and Use' funded by the National Science Centre of Poland. One of the main objectives of the project is to document the transformations in amber-working styles and technologies between the Late Stone Age and the Bronze Age in Central Europe. This represents the first comprehensive attempt to reconstruct Bronze Age amber-working tools and techniques through a research approach that integrates archaeological, historical and ethnographic knowledge with experimental methods.

Early and Middle Bronze Age Roots of the Paternal and Maternal Lineages of the Lusatian Culture Population

Edvard Ehler[1] – Adam Nógell[2] – Anna Juras[3] – Maciej Chylenski[4]

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During the Bronze Age, several major cultural complexes have been documented to occupy Poland and Czech Republic. Únětice culture in Early Bronze Age, followed up by Trzciniec-Komaróv-Sośnica complex in Middle Bronze Age. Another major cultural complex of the Middle Bronze Age was the Tumulus culture, which was spread from the West into Central Europe. These cultural complexes were replaced at the end of Middle Bronze Age by a novel major cultural complex of Lusatian culture, which itself was part of the rising Urnfield systems of the Late Bronze Age Europe. But what happened with the people, with the populations connected to these cultures remains to be properly described.

In our archaeogenetical project we have gathered skeletal samples not only of the above-mentioned populations, which allow us to analyze the aDNA variability of the Bronze Age populations. We have assembled a unique collection of more than 200 human skeletal samples (and over 2000 comparative samples from the literature) from the archaeological sites located in Upper Silesia (Poland), Moravia and Bohemia regions (Czech Republic). The aDNA sequences of our samples have been acquired using the Illumina NovaSeq X platform. Our aim is to assess the genetic backgrounds of populations associated with these cultures, gene flow between populations favoring inhumation practices. Kinship analysis among densely sampled archaeological sites will offer further insights into marriage patterns, social structures, and inheritance practices. To achieve these objectives, we employ a multidisciplinary approach, integrating ancient DNA (aDNA) analysis, radiocarbon dating, and isotopic measurements ($\delta^{15}N$, $^{87}Sr/^{86}Sr$, $\delta^{18}O$, and $\delta^{13}C$).

In our talk we will introduce the first results from sequencing screening of our sample set, and we will discuss our approach, including authenticity and contamination measurement of the aDNA samples. We will focus on presenting the preliminary results of the analyses of the uniparental genetic marker – mitochondrial genomes and Y chromosomal SNP markers. We will pay special attention to the populations that may have been the parental population of the Lusatian culture population, especially the Únětice and Trzciniec culture populations.

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Discussion Comments on Early Bronze Age Settlements

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With the exception of various central and enclosed sites, the issue of settlements in the Early Bronze Age is often perceived as an area of low research potential. At the same time, however, it is one of the most common components in some regions, recorded to varying extents on an almost daily basis. The long-term supply of data allows us to reconsider some important aspects of the settlement network of the Early Bronze Age and its changes over time, using the example of southern and central Moravia. Very little progress has been made in the understanding of the internal structure of settlements, which is mainly due to taphonomic reasons such as the construction of houses, which are difficult to trace. However, the findings of a specific type of houses are multiplying, which allows for a retrospective reinterpretation of some earlier notorious sites. Conversely, there is increasing information on the areal extent of settlements and their spatial relationship to burial components. It is abundantly clear that, in sharp contrast to the later periods, there is a dynamic intermingling of small-scale community burials and settlement complexes in the Early Bronze Age, including a superposition of burial sites and houses. Another illustration of the absence of a categorical dichotomy is the common deposition of human bodies in settlement features. We still have little knowledge of the form, function and significance of enclosures, which are probably more numerous than we have assumed until recently. Related to these, then, is the question of the archaeological manifestations of the elite, which are rather sporadic. By far the largest input of data is related to the spatial distribution of settlements in the landscape, at a number of levels. It is clear that settlements can form regional concentrations in the form of clusters and, in contrast, there can also be empty areas with minimal traces of activity. It is the form of the settlements themselves and the whole settlement network that largely reflects a distinctive regionalisation that is arguably more important than the basic cultural orientation of larger spatial units that has been emphasised to date. It seems that the definition of basic regions will not be entirely trivial, nor will it correspond to older ideas based on simple spatial clusters of sites.

Early and Middle Bronze Age Multi-Layered Fortified Settlements – Differentiated Communities or Differentiated Space?

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Early and Middle Bronze Age multi-layered fortified settlements are complex archaeological environments shaped by subsequent generations of inhabitants re-arranging their space according to everyday practices and random events. The existence of spatial differentiation has been conventionally associated with structured social differences between contemporary inhabitants, suggesting the existence of strong internal tensions surrounding access to the fortified areas. While this model has been challenged by findings in Northeastern Hungary and Northwestern Romania its validity in Central Hungary remains largely unquestioned.

In our paper, we present preliminary findings from the on-going analysis of stratigraphic sequences and associated material culture from Kakucs-Turján, a tripartite multi-layered fortified site in this region. Here, we argue that spatio-temporal differences in settlement history between occupation zones correspond to the iterative actions of a single community, rather than reflect persistent multi-generational social structure. Our findings reenforce the importance of high-resolution analysis of settlement contexts for modelling social organization of Central European communities in the second millennium BCE.

Economy in Space: Spatial and Economic Patterns in the Early Bronze Age Settlement of Lochenice (Únětice Culture, Bohemia)

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The investigation of the Únětice culture in Bohemia has traditionally been dominated by the rich funerary record. However, settlements offer crucial insights into prehistoric daily life, economy, and production practices and are equally well represented in the archaeological record. The Únětice settlement at Lochenice, excavated in 2017, represents the largest known lowland agricultural site of its kind in the Hradec Králové region. It includes five longhouses and approximately 300 settlement features over an excavated area of ca. 33,000 m². The site is particularly valuable due to its excellent preservation and limited disturbance in later periods.

Rich assemblages of artefacts – such as bone and antler tools, loom weights, macrolithic tools, flint tools, remains of fireplaces, pottery making clay – indicate on-site manufacturing and domestic activities. The presence of both domestic and wild animal remains, including a notable quantity of fish bones, further informs on diet and exploited resources. Our study will focus on selected features that have yielded evidence of specific manufacturing processes, with detailed analyses of raw materials, use-wear traces, and spatial distribution.

This targeted approach not only enhances our understanding of the economy and social organisation of Únětice communities, but also offers a methodological framework for interpreting large, complex settlement assemblages. Through this case study, new perspectives emerge on production, resource management, and daily life in Early Bronze Age Central Europe.

An Enclosed Early Bronze Age Settlement at Plotiště Nad Labem (Eastern Bohemia): Its Rise, Life and Decline

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In the early 1970s, excavations in Plotiště nad Labem (Eastern Bohemia) revealed an Early Bronze Age settlement enclosed by a massive ditch with a flat bottom. This site remains the only known fortified site from the Early Bronze Age in the entire region of Eastern Bohemia. Based on the structure of the surrounding settlement network, it is evident that this site served as a central hub for the entire region. This is demonstrated, for example, by the presence of imported items as well as by evidence of metallurgical activities. However, despite its key significance, the site has neither been thoroughly analyzed nor published.

Moreover, in 2023, a revision excavation of the ditch was conducted to reevaluate its stratigraphy using modern geoarchaeological and interdisciplinary methods to better understand its function, chronology, and relationship with the surrounding landscape. Even today, the ditch reaches a depth of nearly 4 m and a width of 10 m. Its well-preserved state allowed for the collection of samples not only from horizons dated to the Early Bronze Age but also from layers associated with periods following the decline of the fortification, up until the ditch was completely filled in during La Tène period. Samples from individual ditch horizons included micromorphological, geochemical, grain-size, total organic carbon, magnetic susceptibility, malacological, archaeozoological and botanical analyses. The chronology of individual horizons is further refined by numerous radiocarbon and optically stimulated luminescence dates. By combining these methods, along with traditional archaeological ones, this contribution provides a more precise understanding of the construction and lifespan of the fortification and its role in regional social dynamics. Additionally, it offers valuable insights into ecological conditions of the site.

The Town of Znojmo and the Early Bronze Age

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On the territory of the town of Znojmo, especially in its historical core, there are a number of sites from the Early Bronze Age. There are burial sites, settlements and depots. Since 2009, a number of important archaeological excavations have been carried out in the city centre, during which a large settlement was uncovered. This settlement formed the economic background for the highland settlement situated on a promontory rising above the river Dyje, which can be found in the literature under the name Znojmo-Castle or Brewery. It is a site that J. Palliardi began to focus on in the 1880s. Palliardi was followed by a number of archaeologists, but it was not until the excavations carried out by the Institute of History of the Institute for Archaeological Heritage between 2017 and 2019 that a system of fortifications from the Eneolithic and early Bronze Age was uncovered. This confirmed our suspicion that the Znojmo hillfort from the Early Bronze Age was also heavily fortified. In addition to presenting the latest excavations, the paper will summarize a complete overview of the Early Bronze Age settlement in the cadastre of Znojmo.

Budkovice Hillfort and Its Function in the Early Bronze Age

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The Budkovice hillfort, situated on a promontory above the Rokytná river, is a polycultural site known mainly for its findings from the Early Bronze Age and the Hallstatt period. We have knowledge about it from a series of excavations carried out by the then AÚ ČSAV in Brno under the leadership of J. Ondráček and J. Stuchlíková. In recent years, new data have been obtained from the excavations of the MZM in Brno. The last synthesis on its significance was written by the two above-mentioned authors in 1982, but it covers only the first three research seasons. In recent years, the site has been the subject of intense interest in the dissertation work of the author of this paper, and we have a number of new data that give us new insights into the site and its significance.

The key question is the reason for the creation of the hillfort, which, according to our current information, functioned at the end of the Early Bronze Age at the time of the so-called Věteřov group, and was then used almost 1,000 years later in the Hallstatt period. We have found some small evidence of metallurgical production, a processing area for chipped industry, textile production and probably also material for pottery production. The findings are complemented by a collection of bone and antler industry, including the discovery of a semi-finished horse bridle. The site lies at the very edge of the settlement oikumena and the analysis of settlement in the broad hinterland of the site is one of the important factors for its possible interpretation. At the same time, new ^{14}C data were obtained, comparing the duration of the settlement with that of Moravský Krumlov, approximately 5 km away. The ceramic material was also processed (macroscopically, petrographically and using XRF) in order to understand the production processes of this commodity within the settlement and the possible exchange between other sites.

Could the hillfort have served as a central location for the surrounding communities? Was it created for better access to raw materials, for example for the production of chipped stone industry? Could it have had a defensive function, or does all of the above apply or nothing? We will probably never be able to safely understand its significance, but we can study the behaviour of extinct communities and try to understand their motives using the example of a given micro-region.

Hoards of Únětice Culture from Southwest Slovakia

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During 150 years of research, approximately 16 hoards related to the Únětice culture were obtained from the territory of southwestern Slovakia. The information about them has different scope, quality and degree of reliability.

Based on the representation of the copper and bronze industry, we can divide them into three groups:

The *first combination group* of eight single-type 'pure' depots consists of hryvnia-shaped neckrings with ends rolled into an eye, but also roughly processed raw hryvnias in the shape of a neckrings with curved ends.

In the *second combination group* consisting of five depots, there are hryvnia-shaped neckrings together with various types of ornaments.

The *third combination group* consists of three hoards, consisting of ornaments and clothing parts.

The set of axes and daggers from Jelka, and the hoard of wire ornaments from Bojná, differs from the three previous groups.

Based on the dating of the represented copper and bronze industry, the mass finds belong mainly to the classical stage of the Únětice culture, the youngest can be associated with its postclassical stage. Some artifacts reveal contacts in the western (Moravia, Lower Austria) and southern (Transdanubia in Hungary) directions.

Based on the typological dating of the finds, the mass finds belong mainly to the classical grade of the Únětice culture. The youngest can be associated with its postclassical grade. Some artifacts reveal contacts in the western (Moravia, Lower Austria) and southern (Transdanubia in Hungary) directions.

A Unique Bronze Hoard from Streda nad Bodrogom (Southeast Slovakia)

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Even though we already know about quite a lot of bronze hoards from the Koszider Horizon, the one found in Streda nad Bodrogom is truly special. In the Carpathian region, we often see large collections of weapons from this period. But in Slovakia, weapons have mostly turned up alone or as small parts of other hoards. That‘s why the recent discovery at Streda nad Bodrogom is so exceptional. During an archaeological survey, we uncovered the largest known group of hammer-axes from the early Middle Bronze Age.

This hoard was found at the highest point of the Malomhomok site in Streda nad Bodrogom, a well-known multi-period hilltop settlement that was most active during the early Middle Bronze Age (part of the Otomani-Füzesabony Cultural Complex). The way the hoard was placed suggests it had a ritual purpose. It‘s also one of the few important hoards found *in situ* by archaeologists, which means we can do many detailed scientific studies. For precise dating, we performed radiocarbon analysis on charcoal found in the same layer as the hoard. We‘re also identifying the types of wood from these charcoals. To understand the ancient environment, we‘re doing pollen analysis on residues from the bronze items. We have also used chemical analysis and X-ray imaging to study how the metal was made. Traceological examination and experimental archaeology (like casting and using replicas) help us figure out how the objects were finished and what they were used for.

This discovery significantly adds to our knowledge of Koszider Horizon hoards in the region. It also highlights how important fortified centers were in the Lower Zemplín area, a place that has not had much systematic archaeological research. The hoard may also provide valuable insights into the decline of tell cultures during the Middle Bronze Age in the northeastern Carpathian Basin.

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Der Hortfund aus Kvačany, Katastergemeinde Dlhá Lúka, Bez. Liptovský Mikuláš

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Im November 2021 wurde dem Denkmalamt in Žilina eine neue Höhle namens Daniela gemeldet. Bei den Untersuchungen mit einem Metalldetektor (Dezember 2021) in der Umgebung (ca. 30 m des Höhleneingangs) wurde ein Depot gefunden. Bei der zweiten Untersuchung (April 2022) wurde der zweite Teil des Satzes, oder (nach M. Furman) der zweite Hort, der etwa 50 m von ersten Bronzen entfernt war, entdeckt. Die gesamten Sätze von Bronzen, die aus zwei getrennten Teilen stammen, bestehen ausschließlich aus dekorativen Gegenständen. Sie wurden aus Draht oder Stab hergestellt. Bei den meisten handelt es sich um langzeitig bekannte Artefakte, ohne eine engere chronologische Begrenzung. Einige von ihnen sind Fragmente aus eingerollten Spiralen mit Überresten von Textilien. Die nächsten häufigen Funde solcher Art sind aus dem ungarischen Transdanubien bekannt. Sie ermöglichen eine Einordnung in die Vor- und Koszider-Zeit (*Jankovits 2021*). Für die zeitliche und kulturelle Bestimmung des Vorkommens von langen Halsketten sind die begleitenden ankerförmigen Anhänger wichtig. Die einzigen Vertreter dieser Art aus der Slowakei sind die Exemplare aus dem Eipel-Tal (*Pichlerová/Tomčíková 1993*). Ein Ausgangspunkt bei der Interpretation und Datierung des älteren, des Vor-Koszider- zeitlichen, waren die Horte vom Typ Tolnanémedi. Sie stellen ein Produkt der lokalen Metallproduktion, die mit der späten transdanubischen Kultur mit inkrustierter Keramik verbunden war, dar. Von den anderen, teilweise jüngeren Funden, unter denen sich auch Reste von Halsketten und trichterförmigen Anhängern befanden, sind die Horte aus Dražice (*Novotná 1970*) oder aus Zvolen-Pustý hrad (*Balaša 1946*) zu nennen. Einige Komponente dieser Horte lassen eine Datierung auf die Stufe R BD zu.

Den nachfolgenden Koszider-Horizont stützte K. Jankovits auf einen Satz aus Ráksi, der zu einer Grabausstattung für eine weibliche Person bestimmt war. Zur Grabbestattung u. a. gehörten zwei Sichelnadeln, zwei Blecharmreife, ein Scheibenanhänger – Typ Ráksi. Außergewöhnlich ist eine Waffe: ein Dolch oder ein Kurzschwert. Die erwähnten Gegenstände – mit Ausnahme der Waffe, finden Parallelen in den Horten aus Dunajská Streda, Vyškovce, die aus dem Gebiet der mitteldanubischen Hügelgräberkultur stammen. In dieselbe Zeit gehört auch das neuere reiche Grab aus Šamorín, Teil Šámot (*Godiš/Haruštiak 2020*). Einige Bronzen aus dem Gräberfeld in Svätý Peter

sind teilweise identisch. *B. Hänsel* (*1968*) und später *S. Hansen* (*2005*) haben sie in den Horizont MD I – II aufgenommen. K. Jankovits fand die Unterschiede zwischen den beiden Depotfundhorizonten, die die Fundsätze aus Pusztasárkánytó und Ráksi repräsentieren, auch in der Qualität des Kupfers.

Zu den Kleinfunden aus Kvačany gehören auch kleine trichterförmige Anhänger, als Variante B bezeichnet. Sie kommen in der Zeit des Koszider-Horizontes (Hodejov; *Furmánek 1980*), sowie in jüngeren Fundsätzen der Pilíny-Kultur in der Zips (Žehra-Dreveník, Hort II), vor. Einer der besonderen, in der Slowakei seltenen Funde, ist der spiralschiebenförmige Drahtschmuck, der wahrscheinlich als Brustgehänge getragen wurde. Es besteht aus zwei wechselseitig gedrehten, durch eine Spirale miteinander verbundenen Spiralscheiben. Ein vollständig erhaltenes Exemplar aus dem Hort von Košické Olšany (*Miroššayová 1999*) wird in BD – HA1 datiert. Parallelen zu dem erwähnten Spiralschmuck findet man in Ungarn. Die Begleitfunde, unter denen sich Armspiralen, trichterförmige Anhänger des Typs B, mit Rillenbändern verzierte offene Armringe, kleine Zierbuckel und im Fall von Abaujúszantó sogar Waffen befinden, wurden schon von *A. Mozsolics* (*1973*) in den Horizont Ópályi, der mit der ungarischen Bronzezeit B IVb übereinstimmt, eingeordnet.

Den Inhalt aus Kvačany ergänzen 14 Exemplare von Ringschmuck. Typologisch und ihrer Abmessungen lassen sich mehrere Funktionsgruppen unterscheiden. Es ist anzunehmen, dass ihre Hersteller zunächst die Werkstätten der Pilinyer-Meister gewesen sind und erst später wurden sie durch heimische Produkte ersetzt. Der Durchmesser der Ringe deutet meist auf Armringe für eine Frauen- oder Mädchenhand.

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Der Bronzehortfund aus Komjatná – Valaská Dubová, Bez. Ružomberok

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Ende Oktober 2022 erhielt V. Struhár eine Information über einen Depotfund aus der Region Liptov (Liptau). Im September 2023 gelang es ihm, zusammen mit einem Vertreter des Denkmalamtes in Žilina, anhand Fotos und GPS-Koordinaten die Fundstelle zu lokalisieren. Sie befindet sich am westlichen Fuß eines namenlosen Hügels an der Grenze der Katastergemeinden von Komjatná und Valaská Dubová. Ursprünglich wurden die Bronzen vermutlich in einem oder zwei Gefäßen deponiert. Die erhaltenen Scherben ermöglichen keine nähere Datierung. Der Hortfund umfasst 65 Gegenstände, die als Körper- und Kleidungsschmuck interpretiert werden können. Die meisten von ihnen sind Bronzeperlen, vertreten durch mehrere Formen. Zum Kleinschmuck gehört ein Knopf mit Öse, Brillenanhänger und Teile von einer Spiralhalskette. Interessant sind die acht Spiralen, die dem Typ Pucov nahestehen. Der Unterschied, der sich auf die Funktion beziehen kann besteht darin, dass der Typ Pucov kuppelförmige oder konisch aufgerollte Spiralen aufweist. Bei den Exemplaren aus Komjatná handelt es sich um flache kreisförmige Scheiben. Bei sieben Stücken ist das Ende des Drahtes nur durch eine kurze Spirale abgeschlossen. Hier bieten sich zwei Möglichkeiten ihrer Interpretation an. Die erste ist sie für Variante des Typs Pucov zu halten. Die zweite ist, sie war Teil eines Schmuckstücks aus zwei Spiralrosetten, die durch eine Spirale verbunden waren. Zu ihrem seltenen Vorkommen während der Stufen BD – HA1 gehört auch ein Exemplar aus dem Hort Košické Olšany (*Miroššayová 1999*, Abb. 8).

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Archaeology of the undiscovered? Metal hoards of the Middle Bronze Age in South Bohemia

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In contrast to the Early Bronze Age and the Urnfield Period, the hoards from the Tumulus culture of the Middle Bronze Age (BB2 – BC2) from South Bohemia were practically unknown until recently. The presentation will demonstrate that this is largely the result of the current state of research. Currently, almost 20 metal hoards are known in the South Bohemian region, which can be dated into the above-mentioned period. The presentation will focus not only on their typological-chronological analysis, but also on their topographical characteristics, their relationship to contemporary settlement, and also on their interpretative possibilities. Due to the chronological insensitivity of some artefacts in these hoards (e.g. fragments of copper ingots), a number of assemblages may remain chronologically unclassified. Some of these hoards contained artefacts that are still unique in South Bohemia, which help to understand the long-distance contacts of the inhabitants of this region. The presentation will re-evaluate this type of source, which has been greatly underestimated in this region.

Is Gold an Indicator of a Bronze Age Centre?

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By the middle of the 2nd millennium BC, a complex and diverse settlement pattern had developed across the Carpathian Basin. The communities that emerged during this period often organized themselves into partially regular, even centralized, settlement structures. However, these systems did not follow a uniform pattern: regional variations in the organization of inhabited space reflect differing strategies of adaptation and internal social organization. This variability can be traced not only in how communities adapted to local environmental conditions, but also in the deliberate, often large-scale transformation of the landscape. Features such as ditches, ramparts, and the overall extent of settlements may all contribute to our understanding of spatial hierarchies and political organization.

This raises a key question: are such morphological characteristics sufficient to determine the social or political role of a settlement? Can the status of a site be reliably reconstructed based on the scale of its fortifications or its spatial extent? What other indicators might be considered – such as the functional diversity of features, the quality and composition of material culture, or the finer aspects of spatial organization? Should these elements be viewed as interchangeable proxies, or is their simultaneous presence necessary to identify a central place?

In our presentation, we examine a long-known but rarely studied Bronze Age settlement in the Tápió region of Hungary from a new perspective: Tápióbicske (Pest County). A site where a unique gold artefact with celestial bodies motifs – the Tápióbicske armlet – was discovered in recent years. Together with comparable jewellery from Bilje (Croatia) and Dunavecse (Hungary), these objects not only present the highest level of craftsmanship at the time, but may also be interpreted as elite insignia, supposedly held by distinguished individuals within contemporaneous society. Through the integrated analysis of available spatial data, the results of a magnetometer survey, and metal detecting, we aim to assess the site's spatial and social

significance. Particular attention is given to key elements such as the layout of architectural features, the distribution of the metal finds – including the remarkable gold armlet recovered from the site – and their relationship to both intra- and extra-settlement space.

Our goal is to explore the connections between the physical environment, material culture, and settlement structure, and to evaluate how these relationships may contribute to identifying central places in the Bronze Age landscape.

Raw Material Supply of Early Metallurgy in the Carpathian Basin – Old Questions and New Answers?

Viktória Kiss

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This presentation summarises state-of-the-art studies of early copper and bronze metallurgy in the Carpathian Basin. Several research groups investigate the Copper and Bronze Age metal finds from Central Europe. The Bronze Age jewellery, weapons and tools discovered in hoards, settlements and cemetery sites have recently been the subject of various research projects. Compositional and isotopic analyses of copper and tin ores aims to determine the provenience of the material of artefacts and the chaine operatiore of prehistoric metal production. The multidisciplinary study of Copper and Bronze Age metal finds provides new results and raises new questions in connection with available natural metallic mineral associations in and around the Carpathian Basin. The data suggest strong interregional trade links between different parts of the mentioned area and Central Europe as far as Scandinavia. The results also underline the exceptional importance of the exploitations of copper ore deposits in the north-western Carpathian area, mainly in the Hron/Garam Valley. These interactions are confirmed by the most recent collection of Bronze Age amber finds in present-day Slovakia and Hungary. The paper will briefly discuss cross-cultural networks related to metal production and exchange.

New Discovery of a Cuff Bracelet from the Early Bronze Age in Central Moravia and Its Analysis

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In 2024, an interesting discovery was made in a field in the municipality of Brodek u Prostějova in Central Moravia with the help of a metal detector: a heavily deformed hammered cuff bracelet from the Únětice culture. The production technology, engraved decoration, and motifs are very similar to cuff bracelets of the Borotice type, but differ in some aspects (size, decoration pattern) to such an extent that we propose to define it as a new type Wartberg, within the 'family' of Borotice bracelets. This is its only known exact analogy to date, coming from a hoard together with a single-armed axe from the Lower Austrian site of the same name. The two bracelets differ only in details.

The Wartberg deposit and the bracelet from Brodek u Prostějova were subjected to available comparative analyses (paleometallurgy, production technology, traceology, analysis of corrosion products) with a number of interesting findings, which are the subject of this paper. In the case of the long-known Wartberg deposit, they even debunk previously published myths (bronze and cast bracelet, silver plating, etc.). The affiliation of both specimens to the Únětice culture and the production environment of Borotice bracelets is evident, which also implies the dating of the artifact. Among other things, this is evidenced by the Únětice culture deposit with a fragment of a Borotice-type bracelet within sight of the location of the new bracelet in the cadastral area of the same municipality.

Technological and Raw Material Analysis of Early Bronze Age Hatvan Culture Ceramics from Včelince, South-Central Slovakia: A Geoarchaeological Approach

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The archaeological site of Včelince, located in the Rimavská kotlina basin of south-central Slovakia, contains a well-preserved stratified sequence comprising seven layers, representing five successive Bronze Age cultural phases: Hatvan, Hatvan-Otomani, Otomani-Füzesabony, Piliny, and Kyjatice (*Furmánek/Marková 2008*). This study focuses on the earliest phase – the Hatvan culture – radiocarbon dated to 3710 ± 38 BP (*Görsdorf/Marková/Furmánek 2004*), and presents a comprehensive analysis of 40 ceramic samples attributed to this cultural horizon. The primary aim is to investigate technological practices in ceramic production and the provenance of raw materials, contributing to a broader understanding of Early Bronze Age craft specialization and resource use in the region.

A multidisciplinary analytical approach was employed, combining macroscopic and petrographic observations with Scanning Electron Microscopy coupled with Energy-Dispersive Spectroscopy (SEM-EDS), Electron Probe Microanalysis with Wavelength-Dispersive Spectroscopy (EPMA-WDS), and X-ray Diffraction (XRD). These methods enabled the characterization of ceramic fabrics in terms of inclusion types, matrix texture, elemental composition, mineral phases, and firing conditions.

The fine ware samples were mostly reduced-fired and showed signs of controlled manufacturing techniques, while coarse wares displayed more heterogeneous firing, higher porosity, and frequent microfractures – patterns consistent with regional functional differentiation between tableware and utilitarian ceramics (*Petřík 2017*).

Three compositional groups were identified. The dominant group featured granitoids, gneiss, and sandstones/siltstones consistent with local geology (*Vass/Elečko/Pristaš 1989*). A second group included biogenic silica and calcite, pointing to the use of regional Paleogene or Neogene sediments, possibly altered post-depositionally (*Fabbri/Gualtieri/Shoval 2014*).

A third group, containing rhyolitic tuff and pumice, suggests access to non-local materials and long-distance exchange.

These results indicate primarily local production with regional resource exploitation and connections to broader exchange networks. The findings provide a baseline for comparative analyses with ceramics from later cultural phases at Včelince and other similarly processed pottery assemblages from the same era and region.

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Ceramic Materials of the OFCC and Socio-economic Dynamics in the Košice Basin

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This interdisciplinary study explores Bronze Age ceramic production within the Otomani-Füzesabony Cultural Complex (OFCC), a Carpathian cultural entity that thrived between approximately 1900 and 1400 BCE. Renowned for its distinctive pottery styles and hierarchical settlement system centered around fortified sites. The study of ceramic itself offers valuable insights into prehistoric socio-economic structures. This research focuses on Nižná Myšľa, a strategically located fortified site in eastern Slovakia that served as a major regional hub for trade and cultural exchange. Archaeological investigations at Nižná Myšľa have revealed two occupation phases: an early hilltop settlement and a later, larger fortified complex that incorporated an earlier cemetery. This study aimed to determine the provenance of ceramic samples from both phases, as well as from local sediments and nearby sites including Barca and Táborisko, about 10 km to the northwest. These culturally connected sites offer comparative material essential for understanding regional ceramic production.

Understanding the geological composition of the Košice Basin was essential for determining the provenance of ceramic raw materials. The region's varied geological makeup, including ancient marine sediments, volcanic ash, some aeolian, and various fluvial deposits, directly influenced the range of raw materials available to Bronze Age potters. A broad selection of ceramic types (pots, bowls, amphorae, jugs, cups, etc.) from different contexts was analyzed. This provided insight into raw material choices and the production techniques linked to specific ceramic forms. To study their composition and provenance, advanced methods were employed: Energy Dispersive X-Ray Fluorescence (ED-XRF), thin section petrography, X-Ray

Diffraction (XRD), and Scanning Electron Microscopy with Energy Dispersive Spectroscopy (SEM-EDS).

Findings from the earlier phase show notable diversity in raw materials, firing conditions, technological choices, and functional requirements across ceramic types, indicating flexibility among potters. Later phase ceramics continue to reflect material diversity, with greater variability in some manufacturing practices. Grog tempering and surface polishing were common techniques. This research enhances our understanding of Bronze Age ceramic technology, economy, and cultural interactions in the Carpathian region. It demonstrates how potters adapted to the geological variability of the Košice Basin while maintaining ties to wider regional networks.

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Traceology in Pottery: Methods and Limits – Case Study of Przecławice, SW Poland

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This presentation explores the potential and limitations of applying traceological methods to the analyses of ceramic vessels, using a series of finds from Przecławice (SW Poland) as a case study. Przecławice is a cemetery dated to the Únětice culture (2300 – 1700 BC), where, alongside ceramic vessels, graves also contained artefacts made of animal bone, alabaster, and copper.

Use-wear analyses of ceramic vessels is a relatively new method for studying these artefacts. The analyses focuses on identifying microscopic use-wear traces – mechanical and chemical – on a variety of vessel shapes and forms. Among the mechanical traces, abrasion, and scratches can be distinguished. Their location and orientation provide insights into how the vessels were used. Chemical use-wear traces – such as carbonisation, pitting, and spalling – offer valuable information about the vessel's function, shedding light on whether it was exposed to direct heat during cooking processes or used to store or ferment, e.g. alcoholic substances. These alterations' presence, distribution, and intensity can reflect specific activities and contribute to broader interpretations of past culinary and storage practices.

Specifically, the analysed assemblage of vessels (n = 8) includes three cups, three jugs, a scoop, and a vessel. The ceramics originate from excavations conducted in the 1970s and 1980s. They were reconstructed, with missing fragments supplemented using plaster. Consequently, these restoration activities have resulted in the loss or obscuring of surface traces, hindering their interpretation due to secondary surface damage. Considering the vessels in terms of form, the most severely damaged surfaces were observed on the cups, jugs, and the scoop, whose exteriors and interiors display various types of abrasion, scratches, and chemical traces. The vessel exhibited no discernible use-wear traces.

The research addresses interpretative challenges, including post-depositional alterations and difficulties related to vessel reconstruction. The results demonstrate both the informative potential of traceological analyses and the necessity of building a comparative reference collection for meaningful interpretation.

More than *Erzatz*. On Bone and Antler Objects in Early Bronze Age Contexts

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Bone objects from Bronze Age contexts often remain outside the primary realm of research, primarily due to their limited applicability in typology, chronology, and provenance studies that dominate Bronze Age archaeology in various regions of Europe. However, they serve as a valuable resource for understanding complex everyday crafting practices related to the processing of different materials. These practices were entangled with the local communities' technological traditions, which did not necessarily have to be driven by access to metal tools only. Use wear studies have demonstrated that most osseous materials were primarily worked with flint tools throughout the Bronze Age. Such observations challenge the prevailing linear evolutionary perspective on replacing every tool with a metal tool by the end of the early Bronze Age around 1700 BCE. Processing bones with likely very simple ad hoc flint tools is evident even in areas rich in local metallurgy, as reflected in regional styles of metal products, their deposition patterns, etc. Apparently, metal tools we find in hoards, although often identified as heavily used before deposition, were rarely applied for bone and antler working.

Furthermore, in the Early Bronze Age funerary contexts, bone or antler objects were not merely inferior substitutes for metal; instead, they carried distinct cultural significance relating to their owners, users, and the communities they belonged to. In the presentation, we will focus on a series of objects made of osseous raw materials from the contexts located in today's south-western Poland, which are usually, and mostly by metallurgy, connected with the Únětice culture tradition (2300 – 1700 BCE).

Fossil Finds and Beads from the Cemetery of the Únětice Culture in Senica

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The presentation deals with a brief presentation of the burial ground of the Únětice culture in Senica (head of research Z. Farkaš SNM-AM). The finds also included fossils and beads used as jewelry.

This presentation will cover the paleontological dating, species identification, and possible origin of the fossils. It also presents the rescue archaeological research of the SNM-AM archeologists from the Borský Mikuláš site in the Borský Peter – Hliníky location, which is a surface deposit of tertiary fossils, which the the Únětice culture people from the Senica site collected. It turns out that the malacological finds from the Early Bronze Age burial grounds were not evidence of long-distance trade with contemporary maritime cultures, but they are fossils that were collected relatively locally within a radius of several tens of kilometers from the settlement, which may prompt further questions of paleoecological research.

The presentation focuses on the possible gender link of fossil artifacts to the sex or estimated age of the buried, however, a complete anthropological evaluation of the burial site has not yet been completed. At the same time, some symbolic aspects of the malacofauna will be presented.

The burial site also contains beads of an as yet undetermined type or types of material. Preliminary Raman spectroscopy measurements do not yet indicate the materials traditionally used in archaeological papers such as antler, bone, shell or faience.

Evidence of Birch Tar Production at an Early Bronze Age Settlement Hosty

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During the processing of the extensive find assemblage from the significant Early Bronze Age settlement at Hosty (Southern Bohemia), dated to approximately 1800 BC, ceramic fragments with residues of a black substance have been discovered. This substance has been chemically identified as birch tar residue. Some of these ceramic shards have been secondarily perforated, which most likely relates to the technology of birch tar production through dry distillation in ceramic vessels.

Although evidence for the use of birch tar in prehistory is relatively common, traces of its production are exceptionally rare, or perhaps have not received sufficient attention. Spatial analysis suggests a specific area within the site where birch tar was produced during the Early Bronze Age.

The functionality of a reconstructed procedure, based on our archaeological evidence, has been experimentally confirmed. This has helped determine what archaeological traces can be expected following tar production. The research is still ongoing.

Gathered and Harvested. The Early and Middle Bronze Age Plant-Based Diet in Eastern Austria

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The Bronze Age represents a period of agricultural changes, the majority of which were already completed in the Late Bronze Age. The Early and Middle Bronze Age therefore play a key role when it comes to the adoption and spread of these new agricultural techniques. Thanks to several new archaeobotanical analyses, it is now possible to reconstruct the agriculture and plant-based diet of the Early and Middle Bronze Age in Eastern Austria for the first time. The hulled wheat species einkorn (*Triticum monococcum*), emmer (*T. dicoccum*) and spelt (*T. spelt*) are the main cereals and are the foundation of the starch-rich diet. The identified weeds are evidence of winter and summer cereal cultivation. In the Middle Bronze Age, broomcorn millet (*Panicum miliaceum*) arrived in Central Europe and quickly became a main cereal in Eastern Austria. As a new plant protein source, the faba bean (*Vicia faba*) expands the range of crops. The value of this new crop plant is illustrated by the storage find from Zendorf, Lower Austria. The frequent presence of wild fruits in the samples suggests that gathered plants also played an important part of the Bronze Age human diet. This is illustrated by the mass find of thousands of charred acorns (*Quercus sp.*) at Ratzersdof an der Traisen, Lower Austria.

C_4 Crops and Cultural Frontiers: Perspectives on the Introduction of Millet in Northern Central Europe

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Since the early 2020s, it has become increasingly evident that the cultivation and consumption of Europe's first domesticated C_4 plant, common millet (*Panicum miliaceum*), began in the second half of the 2nd millennium BC. This conclusion is primarily supported by an extensive series of direct radiocarbon dates on charred millet grains, marking a turning point in understanding millet's role in prehistoric Europe. The crop's unique physiological traits, including high drought and heat tolerance, salinity resistance, and superior water-use efficiency compared other cereals, suggest it was well-suited to the changing environmental conditions and diverse cultural settings of the Bronze Age.

Evidence for dietary change, and by implication economic reorganisation, has been derived from stable carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) isotope analyses of human bone collagen. When paired with radiocarbon dates for individual skeletons, these data enable the reconstruction of millet consumption trends with relatively high temporal precision, despite the inherent uncertainties of radiocarbon dating.

In regions with poor plant macroremains preservation, isotopic signals serve as proxies for millet's presence in local diets. These signals, detectable in organic collagen or the mineral fraction of skeletal tissues – particularly bone and dental enamel – provide indirect but reliable evidence of millet's role in subsistence practices.

The mechanisms driving the rapid incorporation of millet into local agricultural systems remain not fully understood. This paper presents preliminary observations on the correlation between the emergence of millet and broader cultural transformations, with a particular focus on mortuary practices. It also considers the interpretive potential and methodological constraints of archaeological and bioarchaeological approaches.

Special attention is given to the regions of present-day Poland and eastern Germany, examined in relation to broader changes within the Danubian cultural area. Two hypotheses for the route of millet spread are evaluated: one posits direct transmission from the steppe and forest-steppe zones north of the Carpathians; the other suggests introduction via the Tumulus culture from the south-west. The methodological opportunities and challenges involved in testing the latter hypothesis are critically assessed.

Bell Beaker Culture Burial Ground in Mochov (Prague-East district): 60 Years Later

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In 1961 the burial site of Bell Beaker culture was excavated near Mochov, Prague-East district. This burial site was for a long time one of the largest burials sites of this culture in Bohemia and its impact was essential in forming current knowledge of this period in our territory. However, until now this burial site has not been evaluated and except for inventory list from 1960s the excavation results were not published and made available for studies. The presentation partially rectifies this old debt, together with the addition of new analyses.

In the Shadow of the Barrows: Early Bronze Age Cemeteries at Michaľany and Hatalov in the Eastern Slovak Lowland

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Excavations conducted at the Final Eneolithic barrows in Michaľany, Trebišov district (Barrows 1 and 2) and Hatalov, Michalovce, district (Barrow 1) revealed cemeteries of the Košťany culture, dating to the Early Bronze Age (2000 – 1700 BC), situated around the mounds. The graves were placed beyond the original extent of the barrow constructions. At Hatalov, they were partially inserted into the barrow's surrounding ditch, whereas at Michaľany Barrow 1, they were located outside the ditch encircling the mound. In the case of Michaľany Barrow 2, the graves likely formed a ring around the mound itself, although no ditch remains were identified.

The deceased were interred in accordance with prevailing burial customs: males positioned on their right side, females on their left. The orientation of the grave pits was influenced by their spatial relation to the barrow mound. Grave goods typically included faience beads, isolated copper artefacts, and pendants made from wild boar tusks. The spatial arrangement of the graves within these cemeteries deviates from the patterns commonly associated with burial grounds of the early 2nd millennium BC.

Children and Adults of the EBA Community in Mikulovice

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The Early Bronze Age cemetery with 109 inhumation burials in Mikulovice is well known thanks his very rich burial equipments containing a huge number of so called exotics, foremostly baltic amber, present in 28 burials. The Mikulovice cemetery was a subject of multidisciplinary international project analysing all archaeological and anthropological finds and informations (including, e.g. ^{14}C dating, diet and mobility isotop, many archeometric analyses, etc.) and was completely published in 2020 (*Ernée/Langová et al. 2020*). After that also the complex archaeogenetic research was done. As a result a large amount of information to the biological and social organisation of the whole community were gained, including the biological sex of most children. This make possible to discuss questions related to their role in the community, their possible biological and social relations to their siblings, parents, grandparents as far as the spatial relations of their burials to each other, etc. Very important is also the possibility to compare their burial equipments to each other, in the single families or between individuals, etc. During the following years the complex multidisciplinary analyses of all datasets from Mikulovice will continue.

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Buried but Not Forgotten: Grave Manipulation and Human Remains in Settlement Pits from the Early Bronze Age Site of Ulrichskirchen in Austria

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Placing bodies not only in graves within cemeteries, but also in settlement pits is a recurring practice in the Early Bronze Age Únětice culture. However, the reasons that led the society to bury some individuals in burial groups and to place other individuals in settlement pits are rarely discussed. Why are these differences evident in the burial rite? To what extent can differences be identified between the various deposition and burial activities in the archaeological context? The site of Ulrichskirchen in Lower Austria contains 12 graves and five settlement pits with human remains, which were analysed using archaeological, osteological, and archaeothanalogical methods. Additionally, all available individuals were sampled for ancient DNA, and amelogenin peptide analyses were performed. All graves show massive traces of ancient re-openings indicating the manipulation of the burial. Almost half of the graves are missing skulls. This study examines the funerary practices, as well as the activities that took place after the body was deposited in a grave or in a settlement pit, and how people interacted with and manipulated the human remains and the grave context. The variety and complexity of funerary rites and practices during the Únětice culture are not yet fully understood, making it necessary to discuss activities before, during, and after the deposition of the deceased in the funerary context.

Leithaprodersdorf, Edelseeäcker. Die eponyme Fundestelle der Leithaprodersdorfer Gruppe

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1950 – 1951 wurden von Alois Ohrenberger etwa 70 Gräber der frühesten Bronzezeit in Leithaprodersdorf Flur Edelseeäcker an der südlichen Grenze der Gemeinde Leithaprodersdorf (Burgenland) zu Loretto am Fuße der Leithaberge aufgedeckt. Nur wenige Informationen sind darüber publiziert worden (*Hicke 1984*; *Neugebauer 1994*, 49–56; *Ohrenberger 1959*; *1967*; *Schubert 1973*). Seither schlummern die Funde und die Grabungsdokumentation im Burgenländischen Landesmuseum, die Skelettreste im Naturhistorischen Museum Wien. In den vergangenen Jahren wurde die vorhandenen Quellen gesammelt und besichtigt, um detailliertere Informationen ans Tageslicht zu bringen. Über die Fortschritte und Teilergebnisse soll in dem Vortrag berichtet werden.

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At the Foot of the Golden Hill – A Middle Bronze Age Settlement and Cemetery at Bátonyterenye (North Hungary)

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In 2022, a large-scale excavation was undertaken at a Bronze Age site located on the right bank of the River Zagyva near Bátonyterenye, Northern Hungary, at the foot of the long known elevated site of Aranyhegy ('Golden Hill'). The site was occupied during multiple periods, with the earliest finds attributable to the Middle Neolithic. However, the most intensive phase of occupation is associated with the Middle Bronze Age Hatvan culture, from which both settlement features (such as pits, clay extraction pits, and ditches) and a cemetery were uncovered.

A section of the Middle Bronze Age settlement revealed an area dedicated to intense craft production, primarily metalworking. The workshop area, covering approximately 1000 m^2, contained 17 ovens, at least one workshop with a stamped floor, numerous stone and clay moulds, bronze droplets, metalworking tools of bronze (including punches and chisels) and smelting pits. Notably, a gold droplet or nugget weighing 2.3 g was discovered in the debris layer of this area – representing one of the earliest known pieces of evidence for gold processing in the Carpathian Basin.

The Middle Bronze Age cemetery, which partially overlapped with settlement features, contained some twenty graves. Of these, one was an inhumation burial, sixteen were cremation burials (including both scattered and urn types), and one was a symbolic or cenotaphic burial. A further burial was identified as a pithos interment, containing the skeleton of an infant.

Two graves featured circular stone structures measuring six metres in diameter, each enclosing a central burial chamber. These were likely originally covered by earthen mounds (tumuli). Both graves are of outstanding significance, not only due to their architectural features but also on account of the wealth and diversity of the associated grave goods.

The excavated portion of the site can largely be attributed to the Hatvan culture. However, the presence of certain grave types – hitherto unknown in the region or in association with Hatvan cultural contexts – suggests external contact or influence. The results of the excavation will be presented, and the implications of these findings for understanding the Hatvan culture will be discussed.

Trenčín Castle: Early and Middle Bronze Age Hilltop Settlement

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This paper presents both older and newly acquired data related to the settlement on the castle hill in Trenčín (western Slovakia) during the Early and Middle Bronze Age. The rocky outcrop, later used as the foundation for the medieval Trenčín Castle, forms part of the Strážov Hills and occupies a strategically important elevated position, offering excellent visual control over key communication routes along the Váh River.

Although the site of Trenčín Castle has long been known to Bronze Age scholars, previously published data have been fragmentary and insufficient for developing a clearer picture of its prehistoric occupation. This is primarily due to extensive later construction activities – especially during the medieval and modern periods – which led to the destruction of most prehistoric cultural layers and features.

A few characteristic artefacts dating from the Early to Middle Bronze Age were published by Tamara Nešporová in 1983, based on her systematic excavations at the site (*Nešporová 1983*). Within the recovered assemblages, she correctly identified settlement evidence attributable to the Únětice culture and its successors, the Maďarovce and Věteřov cultures. In addition, she published at least two ceramic vessels that can tentatively be dated to the Middle Bronze Age.

This paper revisits selected data from earlier excavations relevant to the Early and Middle Bronze Age occupation of the site. Furthermore, it presents the latest findings from archaeological research, including a settlement feature which contained ceramic material attributed to the Tumulus culture, uncovered during research excavation conducted in 2023.

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Settlement Area of the Únětice Culture at a Multi-Period Site in Dobrovice (Mladá Boleslav District)

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A rescue archaeological excavation carried out in 2023 at the Terreos sugar factory site in Dobrovice (Mladá Boleslav District) took place in connection with the planned construction of a new 1.5 ha handling area. The investigation uncovered an extensive multi-period site documenting continuous occupation from the Neolithic through the Bronze Age to the Migration Period. The most prominent and best-preserved component of this complex is a settlement and burial area associated with the Únětice culture, dated to the Early Bronze Age.

Within the settlement area, six longhouses were uncovered, all oriented east – west. One of these structures was preserved in its entirety, with a ground plan measuring 50 m in length, making it the longest Únětice house currently known in Bohemia.

The burial area comprised a row cemetery with multiple burials, oriented along a north – south axis. Among the regular graves, one exceptional burial stood out – a separately located grave with a stone chamber. On one of its walls, a unique lime incrustation bearing the imprint of a honeycomb was preserved, interpreted as the remnant of an organic grave offering.

The excavation also included various scientific analyses focusing on ceramic materials, anthropological evaluation of human remains, and archaeobotanical and chemical analyses of collected samples. The results of these analyses provide valuable insights into the lifestyle, dietary habits, and environmental conditions in which the site›s inhabitants lived.

Tumulus Culture Settlement in Hronovce-Domaša (Southern Slovakia)

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In 2019, the archaeological company AA Terra Antiqua, s. r. o., carried out preventive rescue excavation led by Ján Haruštiak on the construction site of the new detention institute in village Hronovce, part Domaša (Levice district). Several settlement features from the Middle Bronze Age were identified on the periphery of the excavated area bordering the present-day woodland. The absence of archaeological finds in the large rest of the surveyed area can be attributed to past landscaping, which apparently seriously damaged the site. This is evidenced by references made by J. Eisner and Š. Janšák in 1930s about numerous artifacts from various periods discovered during clay mining in former Damaša, which likely originated from this very site.

The fill of two neighbouring unusually large sunken rectangular settlement features, probably of residential function, discovered in 2019, was significantly reduced by the levelling of the area, which had previously been used also for equestrian events. Despite this, there were diagnostic pottery shards from a few vessels with engraved and plastic decoration found in these sunken features. The degree of fragmentation, minimal abrasion of the sherds, and their find position at the bottom of the features indicate that this was primary waste that had been minimally affected by post-depositional processes. Recovered settlement pottery reflects the post-Koszider ceramic style of the (Carpathian) Tumulus culture, which is relatively poorly known from the southern Slovakia, or rather, the material from the excavations remains unpublished.

The most outstanding discovery from the excavation is a large amphora-shaped vase with a compressed, slightly vertically flattened bulbous body and a cylindrical neck (more than 70% of the vessel was preserved in fragments), whose upper part was richly decorated with complex white encrusted geometric ornamentation. This is the first such exceptionally well-preserved find of this type from Slovakia, with the geographically closest analogies in northern Transdanubia and eastern Austria, but the decoration of the vessel consists of the peculiar elements (hatched triangles, hourglass

or butterfly motif, zigzag bands, etc.) combined in a way, to which we can find exact analogies mostly in the milieu of Tumulus culture in western Czechia. It is assumed that this culturally specific vessel-type and its slightly modified forms represented an important ideological artifact linked to the distribution of the Tumulus culture traditions into the Middle Danube region, as it began to appear in Bronze B stage across a vast area from Bavaria, Bohemia, Upper Austria up to the Carpathian Basin in features attributed to the early (i.e. older) phase of this archaeological entity. Surprisingly, a bronze socketed spear/javelin head was found in the one of these settlement features too. To precise the dating of the settlement, samples were taken from scarce animal bones for radiocarbon analysis.

The detailed evaluation of this sparse but highly diagnostic material recovered in 2019, together with earlier accidentally discovered finds from the site associated with the Tumulus culture, is another step that will contribute to the still insufficient research of the Middle Bronze Age settlements in the eastern Danube Lowlands in Slovakia.

Settlement of the Middle Danubian Tumulus Culture in Oslavany-Stará Hora Field in the Light of Radiocarbon Dating

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During the rescue excavation in Oslavany (Brno-Country District) an open lowland settlement was discovered on the slopes of Stará hora hill dated to the Middle Danubian tumulus culture. The excavated area exceeds four hectares. The research discovered remains of various cultures from the Neolithic to the Late Bronze Age. The Middle Bronze Age settlement, partly unearthed, consists of several features and at least five houses. The radiocarbon dating indicates longer duration starting from the transition between the Early and the Middle Bronze Age. The dates are based on the animal bones samples from the features related to the houses such as trenches, postholes, or pits. All houses are above-ground with timber-framed or posthole construction. Wattle-and-daub walls were covered with one or several layers of the white plaster. The research found out that houses were destroyed by fire set intentionally since the middle post, which the roof rested on, was firstly removed and the posthole was filled with the items of the ordinary use and after that burnt. This manner has been recognized on several sides in Moravia and seems to be commonly used in this period. The study also discusses a generous pottery collection, which is mainly represented by the sherds. Its unique style and typology bare the elements of the Early Bronze Age production, especially Věteřov group. We see the influence from the Carpathian Basin and the southern Alföld area. And finally new forms of engraved and plastic decoration are used. The study describes ceramic inventory in the light of radiocarbon data. Unfortunately, it contains just an insignificant portion of the whole vessels, which does not allow to elaborate a sufficient typology. We also lack the bronze artefacts. Just a single pin was found. For that reason we focused on the organization and activities inside the society of the settlement, than creating a precise chronology model.

Objects from the Middle Bronze Age from the Opava-Vávrovice Site and Their Significance for Understanding the Settlement Structure of Czech Upper Silesia

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The settlement development of Czech Upper Silesia during the Middle Bronze Age remains an open question in research. The existence of the Tumulus culture in this region was long perceived as a faint settlement horizon, representing a developmental gap between Early Bronze Age groups and the subsequent Lusatian Urnfield culture (*Juchelka 2014*, 12). Nevertheless, even earlier literature contains isolated finds attesting to this phase – for example, a bowl from Vávrovice (*Wiegandová 1974*, pl. II: 5) or an amphora from Malé Hoštice (*Juchelka/Moravec 2003*, fig. 3: 1).

A rescue archaeological excavation conducted in 2019 – 2020 by the Institute of Archaeology of the Czech Academy of Sciences under the leadership of K. Papáková at the Opava-Vávrovice site brought new evidence of settlement from this period. In the so-called Sector D, two features (556D and 557D) were investigated, which can be roughly dated to the Middle Bronze Age phases BB1 – BC1 based on ceramic assemblages. The features contained fragments of overfired pottery, daub, clay weights, and other components. Special attention is warranted by a boat-shaped tray vessel with a spout and a side handle – so far the first evidence of this form in Czech Upper Silesia. Analogous forms appear, for instance, in Uherský Brod (*Kučera 1902*, 87 – 92) or in Witów near Koszyce (*Gawlik/Godlewski 2010*, fig. 8: 5). Across a broader European context, these vessels are known from the tell cultures of the Carpathian Basin, where they are interpreted as fish containers (*Trajković 1991*, 117 – 119). Some researchers view them as reflecting southern influences and draw parallels with Minoan larnakes from the Minoan period (*Spurný 1988*, 37).

The ceramics from Vávrovice site show typical features: plastic ridges with dimples, S-curved rims, handles at the junction of neck and body, coarse fabric with quartz temper. This morphology corresponds to finds from Kravaře (*Hlas 2016*, pl. 5: 3, 4). The presence of overfired layers, base impressions, and weights may indicate an economic function, although a ritual use cannot be ruled out.

The cultural classification of these finds remains open. According to some authors, the area fell under the Věteřov culture at the end of phase BB1 and gradually transitioned into the Lusatian cultural sphere (*Stuchlík/Kolbinger 1993*, 150, 151). *V. Spurný* (*1982*, 121 – 133) defines a transitional Proto-Lusatian horizon (BB2 – C2), whereas *J. Nekvasil* (*1978*, 90) places the beginning of the Early Lusatian phase as early as stage BC. Other scholars refer to an independent Oder variant of the Tumulus culture (*Hrubý 1950*, 54; *Jisl 1955*, 12 – 16). The new finds from Opava-Vávrovice thus significantly expand our knowledge of Middle Bronze Age settlement in Czech Upper Silesia and open new questions concerning cultural continuity in this region.

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Back to Branč – A New Multidisciplinary Analysis of Anthropological Data

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The cemetery at Branč remains one of the most significant Early Bronze Age funerary sites in present-day Slovakia. Excavated in 1962 – 1963 and published by Jozef Vladár in 1973, the site yielded 308 graves and has since served as an important reference point for archaeology in Central Europe, particularly in relation to the Nitra and Únětice cultures. Remarkably for its time, most of the skeletal remains were anthropologically examined by M. Hanulík (Comenius University, Faculty of Natural Sciences, Bratislava) as part of his 1970 dissertation. As a result, the Branč skeletal collection has been preserved in good condition at Comenius University – a rare circumstance for remains excavated in the 1960s.

This paper presents a new multidisciplinary project focused on the Branč cemetery, aiming to generate updated insights into the chronology, mobility patterns, and diet of the local population. By combining bioarchaeological approaches with modern scientific analyses (e.g. radiocarbon dating, stable and strontium isotope studies), we seek to deepen our understanding of the social and cultural dynamics of Early Bronze Age communities in the Central Danube region.

Transformations of Diet in an Early Bronze Age Society Using the Example of the Burial Ground in Jelšovce (SW Slovakia)

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This study examines the transformative processes of human diet and animal management strategies in the Early Bronze Age society of Jelšovce (district Nitra, SW Slovakia) through stable isotope analysis of Carbon ($\delta^{13}C$) and Nitrogen ($\delta 1^{5}N$). By analyzing a dataset of 82 human and 24 animal samples, the research highlights shifts in dietary practices and resource management among three distinct archaeological groups – Nitra, Únětice and Maďarovce cultures – over a period spanning 2300/2200–1600 BCE. These transformations visible in the isotope data reveal significant changes in subsistence strategies, likely driven by cultural and environmental adaptations.

The Jelšovce burial ground provides an exceptional context for exploring these transitions due to its rich interdisciplinary data, including radiocarbon dating, Sr-isotope studies, and anthropological analyses. Previous research (e.g., *Bátora 2000*; *Reiter/Frei 2015*) has established the site as a key reference for Early Bronze Age societal developments. The $\delta^{13}C$ and $\delta^{15}N$ values indicate evolving dietary patterns, with variations linked to the specific practices of the Nitra, Únětice and Maďarovce cultures. These shifts suggest transformations in agricultural production and animal husbandry, reflecting broader socio-economic and cultural changes in the region.

By focusing on transformations processes visible in the isotope data, this study uncovers dynamic interrelations between diet, wealth distribution, and cultural identity in a period marked by technological and societal transition along the rivers Nitra, Váh, Hron, and Žitava.

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Old Graves, New Dates: Revisiting Nižná Myšľa Burial Ground with Radiocarbon Data

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The site Nižná Myšľa, consisting of two fortified settlements and a burial ground containing over 800 excavated skeletal graves to date, is legitimately regarded as one of the crucial sources of knowledge about the development of the Otomani-Füzesabony culture during the Early and Middle Bronze Age in the eastern Carpathian region. Current research efforts have been increasingly focused on the burial ground, employing a more systematic approach. The results published so far support the hypothesis that the spatial organization of graves, predominantly aligned along a W – E axis, reflects a structured chronological development of the cemetery, broadly dated to 1900 – 1600 cal BC. Through multivariate statistical evaluation of chronologically sensitive morphotypes within grave inventories, along with Bayesian chronological modeling of 19 radiocarbon-dated individuals, a three-phase development was identified – comprising the initial A1 phase, the transitional A1/A2 phase, and the final A2 phase.

At this stage, the ongoing research project is implementing a focused interdisciplinary investigation of the initial A1 horizon of the cemetery, dated to approximately 1865 – 1730 cal BC. This phase is of particularly significant as it likely represents the earliest robust appearance of this well-rec-

ognizable material culture style, not only at the site itself but also across the broader region of eastern Slovakia. In that regard, the newly acquired radiocarbon dates, together with ongoing osteological analysis, provide an opportunity to test the proposed hypotheses using both high-quality and high-quantity data. By integrating archaeological typology, anthropological assessments, and radiocarbon chronology, the study will conduct a comparative evaluation of diverse spatial modeling techniques and chronological correction methods in order to refine the resolution of the temporal framework and reassess the validity of earlier interpretations in light of the new evidence.

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Preliminary Results from the Three Excavation Seasons of an Early Bronze Age Cemetery at Jelka

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The Early Bronze Age cemetery at Jelka (SW Slovakia) was discovered only recently. In 2019, local hunters uncovered a human skeleton and notified the The Regional Monuments Board, Regional centre Trnava. Archaeologists from this institution conducted a small rescue excavation and dated the uncovered grave to the Early Bronze Age. Shortly after this discovery, a small-scale scientific excavation was initiated – primarily designed as a field training project for archaeology students at the Faculty of Arts, Comenius University in Bratislava. Over the course of three field seasons (2021, 2023, 2024), several distinctive graves were uncovered, most of which could be reliably attributed to the Nitra culture and dated to the BA1 period.

This paper presents preliminary results from the excavation and post-excavation research. The analytical framework includes stratigraphic observations, geophysical prospection, artefact typology, and initial anthropological assessments, as well as preliminary use-wear analysis, material composition studies, isotopic analysis, and aDNA preparation work. Special attention is given to the integration of traditional archaeological techniques with modern scientific approaches, allowing for more nuanced interpretations of burial practices, demography, and social life within this Early Bronze Age community.

The Jelka site contributes valuable new data to the corpus of Early Bronze Age cemeteries in southwestern Slovakia. In particular, it holds potential for refining our understanding of regional variation and evolution within the Nitra culture and its relationship to broader cultural dynamics in the Carpathian Basin during the late 3rd and early 2nd millennium BC. The presence of mostly well-preserved human remains, along with associated material culture, offers a promising basis for future multidisciplinary studies. The main goal of the paper is to offer an initial interpretation of the site's chronological and cultural context and to outline its potential for further integrative research involving advanced analytical methods.

Reassessing the Genetic Origins of the Trzciniec Cultural Circle: Evidence from Genetic Links to the Otomani-Füzesabony Culture

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In our previous studies, we demonstrated that individuals associated with the Middle Bronze Age Trzciniec cultural circle (TCC) were genetically distinct from preceding Early Bronze Age populations. The primary difference was an increase in hunter-gatherer-related ancestry, which presumably originated in northeastern Europe. Additionally, we showed that the collective burials typical of this culture contained the remains of genetically related individuals, predominantly connected through male lines.

Here, with the addition of new genomes associated with the TCC, as well as high-quality genomes from the Otomani-Füzesabony culture (OFC) from the Nižná Myšľa cemetery, we aim to revisit questions regarding the origins of the TCC.

Initial results reveal a large number of Identity-By-Descent (IBD) fragments shared between the OFC and TCC, challenging our previous assumption of a purely northeastern origin for the TCC. These findings also provide insights into the origins of the OFC, showing, on one hand, multiple connections to preceding populations associated with Epi-Corded Ware cultures, while on the other hand, forming a clearly distinct genetic cluster.

Between Tradition and Change: Burial Practices of the Middle Bronze Age in Austria

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During the Middle Bronze Age Tumulus culture (1600 – 1300/1200 BCE), burial practices in Central Europe underwent significant changes. The shift from inhumation to cremation is the most noticeable transformation. However, further aspects such as grave form (pits, cist graves, mounds), burial form (single, double and collective burials) as well as the use, amount and composition of grave and pyre goods need to be considered as well. Consequently, developments of these aspects raise further questions about how changing ways of treating the dead relate to transformations in social structures and organisation, networks, aspects of a communal memory, and the implications of landscape and topography.

This paper outlines the framework of an ongoing dissertation project that aims to explore changes of Middle Bronze Age burial practices and discuss the social dimensions in the light of Austrian case study sites. A central focus lies in identifying which elements of funerary behaviour, such as grave architecture, body treatment, and material culture, changed over time, and whether these changes occurred gradually or more abruptly. Particular attention is given to the reconstruction of the funerary behaviour, traditional as well as experimental aspects, in order to better understand the investment of resources, time, and labour involved in different burial types.

Through a combined archaeological and bioarchaeological approach, the study seeks to contextualize new data within a broader regional view. Archaeological data focuses on typological and chronological classification and the evaluation of features and finds. Osteological analyses will contribute to a better understanding of demographic structure and health of the buried individuals, and allow for a comparison between funerary aspects and biological profiles.

The paper therefore aims to contribute to the broader discussion of changing burial practices in the Tumulus culture by including new insights of unpublished burial sites in Lower and Upper Austria.

New Isotopic Data from the Cemeteries at Těšetice and Borotice

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The aim of this paper is to present preliminary results of carbon and nitrogen isotopic data, which enable further insights and more precise identification of trends from the sites of Těšetice (*Lorencová/Beneš/Podborský 1987*) and Borotice (*Stuchlík 2006*), district of Znojmo, dating to the Early and Middle Bronze Age. The study of dietary isotopes and radiocarbon data from Borotice and Těšetice brings new knowledge about chronology, cultural changes, and lifestyle during the Bronze Age. These findings are essential for a more accurate reconstruction of the past and for understanding the dynamics of societal development during this period.

New radiocarbon data allow for a better distinction of burial time horizons and a more precise reconstruction of the spatial development of burial rites at both cemeteries. At the same time, they contextualize finds within the region. The increased number of radiocarbon dates enables a more detailed reconstruction of the transition between the Early and Middle Bronze Age.

The source of bioarchaeological information is the analysis of diet and food chains. The values of $\delta^{13}C$ and $\delta^{15}N$ can provide insights into the types of plants consumed, the proportion of animal-based diet, differences between the two cemeteries (chronological or cultural), and, when compared with other processed sites, the overall development of dietary habits in the Bronze Age.

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The First Radiocarbon Dating of Tumulus Culture Burial Mounds in Western Slovakia

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This presentation report the initial results of research conducted at two burial sites in Buková and Smolenice in western Slovakia. Since 2023, investigations within the project '*In the fire of change. Transformation of the burial rite in Middle Bronze Age in the area of western Poland*' have focused on establishing a chronological framework and conducting strontium isotope analyses to assess the mobility and local origin of individuals interred in these bi-ritual cemeteries. In this presentation, we limit our discussion to the newly obtained radiocarbon dating results.

Such sites are rare exceptions within the regional archaeological record when compared to preceding periods. Only few barrow cemeteries attributable to the Middle Danube Tumulus culture have been identified in Slovakia, underscoring their scarcity and potential significance. The new radiocarbon data not only refine our understanding of the local chronological sequence but also contribute to broader debates regarding cultural interactions, funerary practices, and social complexity during the Middle Bronze Age.

Despite their limited number, these sites offer a unique opportunity to examine cultural transformations in the Central Europe. The integration of radiocarbon dating with isotopic mobility studies has the potential to illuminate patterns of migration, local adaptation, and shifts in mortuary ideology, thereby offering crucial insights into the dynamics of Middle Bronze Age societies in this region.

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Abstracts of Posters

Radiocarbon Dates from the First Recognised Prehistoric Field System in Slovakia

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Rectangular linear structures (LiDAR) in Svätý Kríž, dist. Liptovský Mikuláš, are field banks of stones and soil collected from historical local surface. Geophysics, excavations and post-excavation strong multidisciplinary research point to the presence of fields. Only 4 atypical prehistoric pottery fragments were found.

20 charcoals were dated in the Czech Radiocarbon Laboratory. For calibration Bayesian methodology was used. The field bank contained most of ^{14}C samples from Eneolithic and Middle – Final Bronze Age. A single early mediaeval sample might be result of bioturbation or aggradation of the bank. The banks could have been raised during the MBA – FBA (15^{th} – 8^{th} c. cal BC) and gradually enriched by the soil coming from the field/pasture.

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New Site of the Early Phase of the Nitra Culture in Slovakia

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In the spring of 2025, rescue archaeological works began on the area of the future industrial park – Šurany Industrial Park, in the cadastral territory of the town of Šurany. Research has documented several sites from different historical periods. One of them was a burial site from the Early Bronze Age, located in the eastern part of the surveyed area. The burial site is located on a significant terrain elevation. The first graves were discovered and examined along the route of the newly built gas pipeline. So far, only part of the cemetery (31 graves) has been explored. The grave pits were difficult to recognize on the surface. Their identification was primarily aided by pits left after secondary interventions by so-called plunder shafts. All graves were opened secondarily and the human remains and offerings were disturbed. They were also found in various layers of the grave pit fill. Only a few fragments of pottery, bone beads and copper objects (mainly jewellery) have been preserved from the grave inventory. The dating of the burial site to the early phase of the Nitra culture is also indicated by spectral analysis of copper objects as well as one fragment of pottery with cord decoration.

Bone and Antler Dagger from Nitra-Dolné Krškany

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Between 2019 and 2022, the Archaeological Institute of the Slovak Academy of Sciences carried out a rescue excavation at Nitra-Dolné Krškany under the direction of M. Gabulová and K. Daňová. The excavation uncovered a burial site dating back to the Early Bronze Age, comprising 191 burial pits linked to the Nitra culture. Among the grave goods in two burials (nos. 140 and 208), there were two daggers made from hard organic materials. Both objects were found in the pelvic area, on the right side of the deceased's body, indicating right-handed individuals. Based on the body position and grave orientation, the burials are attributed to males. The daggers were recovered in a fragmented condition; thus, their original size can only be roughly estimated.

The dagger from Grave 140 features a T-shaped pommel. Its preserved length measures 171 mm; the maximum width at the proximal part is 54 mm, while the width at the distal part of the blade is 22 mm (terminology according to *Camps-Fabrer/Buisson 1990*) The thickness is 11 mm at the pommel and varies from 4 to 5 mm along the blade. According to the preliminary reconstruction, approximately 15 mm of the blade's body (mesial part?) and pointed tip are missing. The archaeozoological analysis suggests that the dagger was most likely made from deer antler (cf. *Cervus elaphus*). Due to taphonomic effects, the edges of the tool are rounded, and there are no signs of manufacture or use.

The dagger from Grave 208 closely resembles triangular copper blades in overall shape. It was probably attached to a separate handle at its widest point, as indicated by a small perforation in the distal part (measuring 3.33 mm). The perforation could have been used for a rivet or similar fastening. The full length of the artifact is 167 mm; the maximum width of the proximal part is 45 mm, tapering to 2 mm at the tip. The thickness varies from 9 mm at the base to 3 mm along the body and about 1 mm at the tip. This dagger was most likely made from the scapula of a juvenile or adult domestic cattle (cf. *Bos taurus*).

Our poster provides a detailed archaeological and archaeozoological description of these rare artefacts, exploring their possible interpretations within the context of the Nitra culture and Early Bronze Age sites. From Slovakia, daggers made of organic materials are known only from Jelšovce (*Bátora 1986*, Abb. 2: 6) and Branč (*Vladár 1973*, 82, Tab. XXIX: 7).

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Newly discovered Lusatian culture site on the border of Liptov and Orava

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The Liptov region is considered one of the crystallization centers of the Lusatian culture, with the oldest settlements dating back to the end of the Middle Bronze Age. Archaeological surveys, isolated finds, and objects handed over from illegal detectorist activities all show that the Lusatian culture also penetrated the harsher mountain environment, controlling mountain trade routes and passes. Based on this, the presence of fortified settlements or hillforts is presumed in this mountainous.

The cadastral area of Lúčky, located in the Ružomberok district, lies on the border of the Liptov and Orava regions, in the southern part of the Choč Mountains, near the mouth of the Lúčanská valley into the Liptov basin. The village of Lúčky itself is situated in the Choč foothills and is significant for its travertine formations and warm springs. The earliest settlement of the area dates to the Eneolithic period, but isolated finds indicate that the territory of the current village and its immediate surroundings were also settled during the Bronze Age. Lúčky serves as a gateway to the mountain route connecting Liptov and Orava, which is still in use today.

An archaeological survey on the border of Liptov and Orava was conducted by the Regional Monuments Office Žilina in cooperation with the SEPTENTRIO Association, members of OZ Hradiská, and members of Archeo Moravia. The survey focused on the Lúčanská Magura location, a distinct, long ridge oriented on a north-south axis. On its west-facing slope, artificial terraces are faintly visible on LIDAR images. The summit ridge on the southern and southwestern sides is characterized by rocky masses that contain cave formations.

During the survey, a relatively large and exceptional collection of bronze artifacts, jewelry, and symbolic or ritual objects was secured. These finds reinforce the position of the Lusatian culture not only in the Liptov region but also in Orava. In addition to the more standard bronze artifacts (pins, miniatures of double-headed hammer-axes, and sickles), whose dating peaks in the BD/HA1 phase of the early Urnfield period and are primarily of

Piliny provenance, unique finds with no parallels in the mountainous environment of northern Slovakia were also discovered. Some of the finds may suggest that the initial settlement of this site dates back to the end of the Middle Bronze Age.

In addition to the metal inventory, fragments of ceramic material were also secured. Although not highly significant on their own, they indicate the presence of a long-term settlement structure. Numerous small fragments of bronze and its alloys, including a piece with slag, point to production activities at the site. The survey has shown that Lúčanská Magura is a hilltop settlement with artificial terraces from the Lusatian culture, which was inhabited at least in the early phase of the Urnfield period. This shifts the entire context of settlement in these mountainous regions to a significantly earlier period.

Pathological Changes and Dental Anomalies on Teeth in the Early Bronze Age Population, Eastern Slovakia

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Background: In the anthropological analysis of dental tissue from historical populations, the presence of pathological changes and other non-pathological variants is examined, allowing for a retrospective analysis of morbidity and lifestyle. Pathological changes in teeth represent a group of disorders that can significantly affect the morphology, structure, and function of the teeth. They provide valuable information about the health status, diet, and living conditions of past populations. At the same time, they serve as important indicators of socio-economic differences, access to food, and hygiene practices within historical populations. Dental anomalies represent an important indicator of biological variability and are a key tool for reconstructing ancestry, kinship relations, and migration patterns within historic and prehistoric populations.

Aim: The aim of the research was to observe pathological changes and other non-pathological variants of teeth in skeletal remains from the Early Bronze Age site Košice-Krásna in Eastern Slovakia.

Material and Methods: The study population included 132 skeletal remains from the Early Bronze Age site Košice – Krásna. For all skeletal remains, the basic characteristics of the biological profile – age, sex and body height – were determined. 83 (62.88%) were adults and 49 (37.12%) non-adult individuals. Pathological and non-pathological changes on the skeleton, including changes on the teeth, were evaluated morphoscopically.

Results: In non-adult individuals, dental caries was the most frequent, occurring in 8 (16.33%) cases. In adults, dental caries was also the most

frequent pathological change, in 18 (21.68%) cases. Also very common were dental wear in 15 (18.07%) cases and calculus in 11 (13.25%) cases. Changes in the number of teeth (hypodontia and synodontia) and in tooth size (microdontia) occurred in one case each. Enamel pearls occurred in two cases.

Conclusion: In the Early Bronze Age, the stabilization of an agrarian lifestyle with diets rich in carbohydrates from cereals and starchy crops created conditions favorable for the development of caries. A higher proportion of dental wear indicates the consumption of unprocessed or minimally processed plant foods such as whole grain cereals (wheat, barley), legumes, nuts and roots. Calculus accumulation is also closely related to the frequent consumption of starchy and fermentable carbohydrates such as cereals. The transition to stable agriculture has led to an increased intake of plant foods, creating suitable conditions for plaque formation and subsequent mineralization.

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Supra-Regional Cultural Exchange in the Carpathian Bronze Age: Import of the Amphora or an Idea?

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The Middle Bronze Age (1400 – 1200 BCE) in the Carpathian Basin saw profound cultural changes following the decline of tell cultures, leading to the emergence of the Tumulus culture, Urnfield cultures, and the regional post-Otomani-Füzesabony cultural complex (OFCC) groups. This study reports the first discovery of a Hajdúbagos/Pişcolt-Cehăluţ amphora in Slovakia, found at a Piliny culture settlement in Seňa. This find is located outside the group's core area, which lies in eastern Hungary and northwestern Romania.

Our research integrated petrographic and chemical (ED-XRF) analyses of ceramic samples from Seňa, including the amphora, to determine their composition, manufacturing techniques, and provenance. Radiocarbon dating provided crucial chronological context, indicating that the final OFCC phase, and the Piliny culture coexisted in the Košice Basin. Stylistic analysis highlighted the amphora's distinct decoratiion of the Hajdúbagos/Pişcolt-Cehăluţ group compared to local ceramics. Results show diverse ceramic provenances within the Seňa assemblage, mostly local or regional. However, the Hajdúbagos/Pişcolt-Cehăluţ amphora stands out due to its unique fine-grained, grog-tempered fabric containing angular limestone and rounded volcanic grains. Its outlier chemical signature reinforces the interpretation of a non-regional origin, as suggested by the petrographic analysis. Furthermore, use-wear analysis indicates that the amphora was used to handle a fermented substance.

The amphora provides evidence of supra-regional exchange and mobility among communities. This long-distance ceramic find at Seňa suggests either the import of a storage-transport vessel or its regional production by a mobile individual who brought a foreign technological and stylistic expression. This study supports a dynamic, interconnected model of Middle Bronze Age society in the Carpathians, highlighting the settlement sites as important nodes of translocal interaction.

Bypass to the Past: Grave Robbery and the Secret of the Storage Pit

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During the rescue archaeological excavation for the planned I/75 Šaľa city bypass road, a total of 16 grave pits were uncovered in the cadastral area of Šaľa, at the Makša I site. These graves likely date to the Early Bronze Age (Únětice-Maďarovce cultural horizon). Evidence of secondary disturbance by so-called robbery shafts was observed in many of the graves and confirmed during the excavation process. Most human remains had been disturbed – either scattered in a non-anatomical manner across the graves or accumulated in compact clusters, with partial intervention into the fill of the shafts themselves.

Interpretation of the burial context was further complicated by the degradation of archaeological layers. Hydrological conditions and soil composition had led to advanced decay of skeletal remains and artifacts, including their deterioration due to mineral encrustation.

Despite the complexity of the site and the challenges encountered during excavation, several noteworthy artifacts – grave goods – were uncovered. Among the finds from the explored section of the burial ground were two nearly intact ceramic vessels, one of which – based on its shape and technological characteristics – may represent an imported item. The grave assemblage also included metal objects, primarily crafted from copper alloys. One of the most remarkable discoveries was a gold Sibinian-type lock rings.

A surprising discovery was the uncovering of human skeletal remains within a settlement feature interpreted as a storage pit. Based on the undisturbed anatomical position – lying on the left side – the individual was likely a woman. Her grave goods included 14 hair rings of varying sizes positioned around the temporal region of the skull, as well as a necklace found around the neck.

Two Late Eneolithic Graves from Bratislava-Jarovce

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The poster presents two Late Eneolithic graves that were examined in 2019 during the rescue research of the Archaeological Agency s. r. o. in Bratislava Jarovce at the Trávniky location. The archaeological research was triggered by the construction of the 'Design Center Jarovce', south of Smaragdová street. The space previously served as the premises of an agricultural cooperative. During the research, 16 objects were uncovered, five skeletal graves and a square-shaped trough surrounding the grave (object 15). The topic of the poster are graves 1 and 2.

Object 1/Grave 1

The ground plan of the grave pit had a circular shape with a diameter of 320 cm at the level of excavation, while at the level of discovery of the skeleton, the pit acquired a rectangular ground plan with rounded corners with dimensions of 230 × 120 cm. The walls of the grave pit were stepped, tapering towards the bottom. Based on the formal properties of the object, we can assume that the primary formation of the pit may not have been related to the burial of the given individual, but to another settlement activity. The skeleton with a W – E orientation was placed on the gravel bed in a stretched position on its back, with its hands folded in the abdominal area. Two vessels were placed in the southwestern corner of the grave pit – a cup with a banded handle and an amphora-shaped vessel with plastic decoration. Animal bones and fragments of a human bone of an immature individual were also discovered in the object. The large amphora with a cylindrical neck and protrusions on the largest bulge represents a typical Late Eneolithic shape in the groups of the Danube region and the western part of the Carpathian Basin. The jug/cup with a hint of sharp profiling is very close to the finds of the younger Nagyrév phase. Based on similar findings from sites in northwestern Transdanubia, we date object 1/grave 1 to the Late Eneolithic period, or the beginning of the Early Bronze Age, at the turn of the II. and III. stages of the Nagyrév culture, which represents a material manifestation of the Somogyvár-Vinkovci and Kisapostág cultures.

Object 5/Grave

At the level of excavation, the grave pit had an almost square ground plan with rounded corners measuring 275 × 223 cm. At a depth of 40 cm, the ground plan of the pit was rectangular with rounded corners measuring 200 × 165 cm. The walls of the grave pit were stepped and narrowed towards the bottom. The skeleton, oriented W – E, was placed on its right side in a crouched position, with the right upper limb bent under the chin and the left upper limb bent at the elbow and resting on the ribs. Grave additions were absent.

The grave is dated to the same period as grave 1 based on the proximity and similar arrangement of the grave pits. Dating by absolute methods may confirm or refute this assumption.

Burial Differentiation Based on Biological Sex in the Otomani-Füzesabony Culture Site Jágerské I at Košice-Krásna

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The theory of strict burial rite differentiation during the Otomani-Füzesabony era in the Bronze Age emerged based on archaeological findings. The deceased were placed in the graves in a flexed position on their side, with strict sex differentiation, even among immature individuals, with males on the right side in the S – N direction and females on the left side in the N – S direction. In both cases, the face always faced east. This strict theory was applied as a hypothesis on the analysed skeletal remains excavated during archaeological research at the Košice-Krásna, site Jágerské I in eastern Slovakia. These remains are dated to the Otomani-Füzesabony culture (1600 – 1450 BC). For the statistical analysis, the 63 adult skeletons and 50 child skeletons were examined, focusing on their burial positions to calculate the statistical validity of the position and the biological sex. Among the adult population, sex-based differentiation was evident: 85.19% of males were lying on their right side, while 70.59% of females were on their left side. However, 7.4% of females were found lying on the right side. In some cases, secondary disturbance of the skeletal remains made it impossible to determine the original burial position. Based on these results, two binomial logistic regression prediction models were used to predict sex in children individuals based on their lying position. For the children individuals which were lying on the left side the predicted sex was set as female with the probability of correct prediction equal to 85.71%, alternatively 100%. For the right-side position, the predicted sex was set from both calculations as male with the probability of correct prediction equal to 91.99% and 92%. If the biological sex of the individuals was not determined the model predicted male with a probability of 56.25%. These results suggest a preference for burial position based on biological sex and possibility of prediction of biological sex in children.

The Beastmaster and the Willow Leaves: The Early Bronze Age Burial Site of Šaľa-Baránok I

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During a rescue archaeological excavation prior to road construction near the town of Šaľa (Nitra Region, south-western Slovakia), in the Veča quarter, a previously unknown Early Bronze Age burial ground was uncovered at the Baránok I site. This poster presents the Burial site and its archaeological context for the first time. A total of 30 graves were documented, most of which had been looted.

Despite widespread looting, several graves remained at least partially intact, with bronze (or copper) artefacts found in situ. These suggest that some disturbances may have been motivated by ritual or symbolic practices rather than by profane or purely destructive intent. Particularly noteworthy is the burial of a tentatively identified adult male (grave 29), found without typical grave goods for the burial site, such as pottery or jewellery, but accompanied by a boar tusk and two fragments of ruminant skulls, possibly indicating ritual significance. Adjacent to this burial was another heavily looted grave, lacking most skeletal remains. Also notable is the burial of a provisionally identified woman (grave 8) accompanied by numerous beads made of Dentalium shells, bones, faience and bronze (or copper), potentially reflecting complex symbolic practices related to personal adornment and ritual. Better-preserved burial features contained chronologically diagnostic finds, such as a willow leaf-shaped ear pendant and Cypriot pins (e.g. graves 11 and 23). Based on preserved grave goods and typological analysis, the burial site is tentatively dated to the Nitra-Únětice cultural horizon of the Early Bronze Age (ca. 2200 – 1900 BC).

A large, probably settlement structure was also discovered above part of the cemetery. Featuring a preserved clay floor, remnants of a furnace, and the presence of several apparently medieval ceramic fragments, this structure likely represents a later phase of site reuse in the medieval or early modern periods. In addition to burial features, several concentrations of postholes were examined on the periphery of the excavated area. Some

postholes formed outlines of structures, but no associated artefacts were found, leaving their function and chronological attribution uncertain.

The excavation at Šaľa-Baránok I highlights a complex funerary landscape characterized by continuity and disturbance, ritual activity, and long-term site use. It is important to note that only part of the overall archaeological context was examined, which should be considered in future interpretations. During the rescue excavation, another Early Bronze Age burial site nearby at Šaľa-Makša I was also partially examined. Future research could explore potential connections between the two cemeteries, including genetic links or similarities in funerary practices. Further analyses of collected samples and additional anthropological study of skeletal remains will be necessary to complete the overall picture. These findings provide valuable initial insights into burial customs, social dynamics, and the broader significance of this newly discovered site within the prehistoric context of southwestern Slovakia.

Study of Climatic Conditions in an Early Bronze Age Agricultural Agglomeration: The Model Site of Vliněves

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Natural conditions create a framework for the existence and development of settlements based on agricultural farming. While ideas about changes in natural conditions are usually framed as long-term trends, information about their short-term changes and variability is only vaguely understood. The isotopic record preserved in the livestock teeth provides unique insights into environmental conditions and annual fluctuations in living circumstances. This record can also be used to reconstruct temperature profiles for the first two to three years of an animal's life. The poster presents the analysis and results of a study on the $\delta^{18}O$ isotopic composition of tooth enamel of selected cattle (*Bos taurus*) recovered from the Early Bronze Age settlement in Vliněves, Mělník district.

Applying the Bioarchaeological Analyses to Reconstruct Origins and Mobility of Human Populations in the Late Bronze and Early Iron Age Central Europe: Project Introduction

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During the Late Bronze Age and Early Iron Age, the widespread practice of cremation in Central Europe – characterized by the Urnfield phenomenon – has led to significant gaps in our understanding of the genetic history of the Lusatian, Knovíz-Štítary, and Hallstatt cultures. To address this gap, we have assembled a unique collection of human skeletal samples, primarily from biritual archaeological sites where inhumations predominate, located in Upper Silesia (Poland), and Moravia and Bohemia regions (Czech Republic).

Our primary aim is to elucidate the genetic backgrounds of populations associated with these cultures, thereby addressing questions regarding their origins and relationship. In addition, we will assess gene flow between populations linked to the Lusatian and Knovíz-Štítary cultures, exploring the extent to which genetic patterns align with the cultural differences observed in Urnfield-related phenomena. Furthermore, we will investigate potential migrations within Lusatian culture populations from regions favouring inhumation practices. Kinship analysis among densely sampled sites, including common and multiple burial pits, will offer further insights into marriage patterns, social structures, and inheritance practices in these populations. To achieve these objectives, we will employ a multidisciplinary approach, integrating ancient DNA (aDNA) analysis, radiocarbon dating, and isotopic measurements (strontium and oxygen isotopes). Specifically, we plan to analyse over 160 individuals for aDNA, and more than 70 individuals for isotopic analysis (radiocarbon dating, and $\delta^{15}N$, $^{87}Sr/^{86}Sr$, $\delta^{18}O$, and $\delta^{13}C$).

This report introduces the research project focused on Bronze Age – Iron Age transition and human populations in Central Europe, as well as the first results from sequencing screening of majority of our target samples. These results will significantly advance the field of bioarchaeology by providing new insights into migration patterns, gene flow, and population structure during the pivotal period in Central European prehistory. Our research will fill critical gaps in our understanding of the genetic and cultural dynamics of populations associated with the Lusatian, Knovíz-Štítary, and Hallstatt cultures, contributing to broader discussions about human mobility and cultural exchange in prehistory.

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Tracing the Lost Myth. A Philosophical-Anthropological Analysis of the Mythical Human in the Bronze Age

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Through mythology, we can understand important aspects of the functioning and hierarchy of the earliest prehistoric societies. Bronze Age mythology has the potential to reveal the evolution of ideas, spiritual and everyday life of Bronze Age cultures. Currently, there is a complete absence of philosophical and cultural-anthropological reflection on humans and their lives in the Bronze Age. Yet, a hermeneutic analysis of naturalistic philosophy, Indo-European mythology, and archaeological material culture can uncover and bring closer the overall picture, changes, and transformations of the society of that time, including its representation in Eastern Slovakia. Despite increased interest in critical philosophical reflection on mythology and Bronze Age societal life, this potential has remained unnoticed by the academic community, opening space for comprehensive interdisciplinary scientific research.

Halberds of Power: an Early Bronze Age Hoard Discovered in Muszkowo, Poland

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In 2021, a remarkable Early Bronze Age metal hoard was discovered near Muszkowo in western Poland, following a report by a local farmer. Subsequent archaeological investigations uncovered a group of 15 artefacts, including five halberds, a dagger fragments, a chisel, an axe, a battle axe, a tubular shaft, and five rivets. Radiocarbon dating of a wooden socket fragment places the hoard in the later phase of the Early Bronze Age (1886 – 1694 BC at probability 95.4%).

This poster focuses on the whole assemblage, with an emphasis on five halberds, distinctive and symbolically charged weapons of the European Bronze Age. A multi-method approach was employed to investigate their manufacturing technology, use-wear, and alloy composition. Techniques included microscopic examination, x-ray imaging, computer tomography (CT), portable X-ray fluorescence (pXRF), and inductively coupled plasma mass spectrometry (ICP-MS).

Our analyses reveal that the halberds differ significantly in morphology, construction, and chemical composition. All exhibit high-quality craftsmanship, with careful surface finishing. The compositional analysis revealed a wide range of copper-tin alloys, with varying levels of impurities, including arsenic, silver, antimony, and nickel. These results indicate that the halberds were not cast in a single production episode, but rather represent multiple casting events. The presence of both low- and high-tin bronzes is consistent with other halberd assemblages from Europe and points to diverse metallurgical practices.

Use-wear traces, including notches, abrasions, and impact damage to sockets and blades, suggest that these halberds were not merely ceremonial objects. Evidence of hafting and blade wear indicates they were used before deposition.

The Muszkowo hoard demonstrates a high level of metallurgical knowledge. It contributes important new data to the study of weaponry and technological variability of halberds in the Early Bronze Age of Central Europe.

The Oldest Vessels in Slovakia

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Only a very limited number of wooden boats made from a single piece of wood have been found in the territory of Slovakia. These so-called monoxyls, or logboats, were made from the Mesolithic period up to the 20th century. In the absence of associated finds, their age can be determined only with the help of natural science methods. In addition, ceramic models of boats and ships from various periods of prehistory are also known, providing indirect evidence of river navigation in the country's earliest history.

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Morphometric Study of the Tibia in the Early Bronze Age Population

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Background: The tibia is a weight-bearing long bone of the lower limb, essential for locomotion and support. Like all long bones, the tibia receives its main blood supply from nutrient arteries that pass through the nutrient foramen. Nutrient arteries are essential for bone growth, healing, and metabolism, as they provide the main blood supply to the inner layers of long bones. Although the position of the nutrient foramen is relatively consistent within populations, but the variations exist across ethnic groups and geographic regions. The differences are important in forensic anthropology, where tibial morphology and the position of foramen nutricium are used to determine stature, sex, and ancestry in unidentified remains.

Aim: The aim of the research was to observe the dimensions of the tibiae and to analyze the position and number of foramen nutricium in skeletal remains from the Early Bronze Age cemetery in Eastern Slovakia, site Košice-Krásna.

Material and Methods: The study population included 21 adult human tibiae (12 right and 9 left). A total of 13 morphometric parameters were obtained using an osteometric board, a digital caliper, and a measuring tape. The number of nutrient foramen present and their location were recorded. The foramina index, cnemicus index, length-thickness index and cross-section index were calculated from the obtained data.

Results: A single nutrient foramen was present on the posterior surface in all tibiae. In 61.9% of cases, the foramen nutricium was located in the middle third of the bone. The average index values indicate a robust bone structure adapted to mechanical stress, which is typical of populations with

active lifestyles and hard physical work. No statistically significant differences were found between right and left tibiae in morphometric dimensions and indices.

Conclusion: The observed values reflect a study population morphologically adapted to harsh environmental conditions, consistent with archaeological evidence associated with the Early Bronze Age. Since the distribution of the nutrient foramen varies among populations, our study contributes to research on the health status and lifestyle of historical populations in Slovakia.

Acknowledgments: We would like to thank the archaeologists and collaborators from the Slovak Archeological and Historical Institute (SAHI o.z.) who were helpful in the exhumation of skeletal remains at the archaeological site Košice-Krásna.

Updating the study on pottery technology at the Early Bronze Age fortified settlement in Spišský Štvrtok

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The preliminary results of macroscopic technological analysis, chemical composition (ED XRF) and thin-section studies of pottery assembladge from the Early Bronze Age fortified settlement at Spišský Štvrtok indicates a mixed mode of production, combining household manufacture with minor specialized variants, patriculary within the fineware cathegory.

Within 19 pottery thin-sections, distinct fabric groups were identified, with the dominant group comprising vessels made from local material sourced from nearby riverbeds. Along with that, the spatial distribution presumed of non-local fabrics, suggests that the most active contact radius of the Spišský Štvrtok settlement extended roughly 10 km. A single jug fragment with petrographic characteristics linked to Neogene volcanites likely represents an import from the Košice Basin. Such evidence suggests that the local communities of the Otomani-Füzesabony culture communicated intensively and lived in a symbiotic trade network within the broader macroregion.

Building on this research, we are testing the robustness of the preliminary conclusions by incorporating additional evidence. This is being pursued through further thin-section analyses of pottery, with the potential to provide a more precise verification of the technological and provenance interpretations presented.

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Use-Wear Analysis of Metal Artefacts: Limitations of Observation of Copper-Based Weapons and Tools from the Early Bronze Age

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Over the past thirty years, use-wear analysis of metal artefacts – also known as Metalwork Wear Analysis (*Dolfini/Crellin 2016*) – has established itself as a vital method in archaeological research. By examining and interpreting the unique surface marks left on artefacts, this technique provides valuable insights into how objects were used. It helps archaeologists understand the functional roles of tools and weapons, revealing details about their practical applications. Additionally, use-wear analysis contributes to understanding the entire life cycle of objects, from creation to disposal. When integrated with other analytical methods, it enables researchers to reconstruct the biographies of artefacts, offering a deeper glimpse into the daily lives, practices, and cultural behaviors of the people who made, used, and discarded these artefacts.

The aim of this study is to identify the limitations of use-wear analysis of copper-based artefacts, focusing on weapons and tools from various contexts of the Early Bronze Age in Bohemia (Central Europe).

The interpretative power of the method is limited by several factors, including the material properties of the metal and alloy, the archaeological context of the artefacts, their preservation conditions, the find circumstances, and the restoration process. This study therefore aims to identify the most problematic factors affecting the reliability of use-wear analysis. Building on the general limitations outlined above, these may include:

Surface Alteration and Corrosion: Over time, copper artefacts undergo corrosion and patination, which can obscure or erase original use-wear traces. This makes it challenging to distinguish between wear caused by use and that resulting from environmental degradation.

Ambiguity of Wear Patterns: Similar wear patterns can result from different activities or handling methods. For example, scratches or abrasions might indicate cutting, grinding, or even post-depositional processes, leading to potential misinterpretation.

Contextual and Experimental Limitations: Reconstructing the original use of artefacts often relies on experimental archaeology, which may not perfectly replicate ancient techniques or materials. Without well-documented experimental analogies, interpretations remain tentative.

Sample Size and Preservation Bias: The number of artefacts available for study may be limited, and preservation conditions can bias the sample toward better-preserved objects, potentially skewing understanding of typical use-wear patterns.

Overlapping Wear Types: Multiple activities can produce overlapping or similar wear features, complicating efforts to assign specific functions to artefacts solely based on use-wear analysis.

Temporal and Cultural Variability: Use-wear patterns may vary across different regions and cultures within the Early Bronze Age, making it difficult to generalize findings without extensive comparative data.

In summary, while use-wear observation is a powerful tool for understanding artefact function, its limitations necessitate cautious interpretation and often require corroboration from other analytical methods such as residue analysis, contextual study, and experimental archaeology.

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The Metallurgy of Bronze Artefacts from the Late Bronze Age ‚Mega Site' of Sântana-Cetatea Veche, Romania

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The following discourse concerns the metallurgy of bronze artefacts from the Late Bronze Age site of Sântana-Cetatea in western Romania. The large fortification of Santâna is located on the eastern edge of the Hungarian Plain, north of the Mureş River and the Banat region. The site is considered to be one of the largest Late Bronze Age fortifications in Europe, a category that is often referred to as 'mega sites'. The majority of these fortifications are located on the former alluvial fan of the Mures River. Their location in the foothills of significant copper deposits in the Apuseni Mountains and in Transylvania is associated with the distribution of goods, particularly metals and salt, mainly along the Mureş River to the Carpathian Basin.

The ^{14}C radiocarbon data from the 2009 and the 2018 – 2022 excavations in Santâna date back to the 14th century BC. The metal artefacts are mostly younger and, based on typo-chronological characteristics, belong to the Late Bronze Age stages BD and HA, i.e. the 13th/12th century BC.

A significant number of metal artefacts (approx. 70) were recovered, primarily as stray finds, but also from regular excavations. The substantial quantity of metal artefacts discovered at the site, serve to distinguish this fortification from other similar mega sites. The presence of a casting mould indicates the potential for local metal production. A total of twenty artefacts, including arm rings, sickles, spearheads, socketed axes, ingots and belt plates, were selected for analysis. The artefacts were sampled from the museums of Arad and Sibiu and analysed by energy dispersive X-ray fluorescence spectrometry (EDXRF) at LEIZA in Mainz. All artefacts are typical Late Bronze Age binary tin bronzes, with tin contents ranging from 4 – 10%. However, it is noteworthy that the sheet metal work exhibited consistently higher values of tin. The copper shows the usual fahlore biased impurity pattern with the characteristic advent of lead from a few per mill to the percentage range. Interestingly, the compositions of the ingots deviate significantly from that of the objects.

The analyses and metal compositions are evaluated against the background of a larger database of analysed artefacts from the Carpathian Basin with regard to the metal distribution and economy.

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