

PREFACE

The articles in Volume 28 of *Archaeologia Baltica* are quite diverse in their content. Articles published in the chapter 'Investigations in Archaeometallurgy and Ceramics' present the results of spectrometric analysis of artefacts made from copper alloys and silver. Even though spectrometric analysis is used to study the chemical composition of copper alloys and precious metals, this method can also be applied to the study of ceramics. Various spectrometric methods are used to determine the elemental composition of the copper alloys themselves, and the different coatings on the outer surfaces of artefacts. Spectrometric methods have shown that jewellery and different parts of horse trappings, even if they are made of copper alloy, are often covered with a thin layer of tin, or with plates produced from silver or gilded silver. The spectrometric studies presented in this volume were performed using spectrometric methods, from X-ray fluorescence spectrometry (XRF) to particle-induced X-ray emission (PIXE) and wavelength dispersive X-ray fluorescence (WD-XRF) spectroscopy. As we can see, the spectrometric analyses were performed with both stationary and portable spectrometers.

According to the archaeological material, the people of Cherniakhov culture had quite close contact with the east Baltic, despite the fact that Cherniakhov culture and the lands of the east Baltic were separated by a considerable distance. The distance in this case may mean that long-distance contact went through an exchange network of several intermediaries. In the article 'Non-Destructive Analyses of Copper Alloys and Silver Items from Voitenki. The Recycling of Metal in Cherniakhov Culture', Mikhail V. Liubichev, Oleksandr M. Buhay and Erdmute Schultze present the results of spectrometric analyses of 44 artefacts from the settlement and cemetery at Voitenki (east Ukraine). The most important insights in the research in this article are the assumptions that jewellers might have used the any copper alloys available at the time to manufacture ornaments, and that Roman silver denarii were used as raw material in the manufacture of silverware. The use of Roman coins, especially sestertii and denarii, as raw material, was characteristic of tribes living far from sources of metal. Remelting Roman coins accounted for a significant share of the metal in the east Baltic region,

and this feature was recorded by German scholars as early as the beginning of the 20th century. Therefore, it is very important that the fact of remelting coins is confirmed by modern spectrometric methods.

The aim of the article 'New Results on Horse Trappings from the Hunnic-Period Carpathian Basin Based on Non-Destructive Archaeometric Analyses', by Réka Ágnes Piros, Viktória Mozgai and Bernadett Bajnóczi, was to determine the chemical composition, gilding technique, decoration method and stylistic features of horse trappings.

The next article in this chapter was written by Audronė Bliujienė, Gediminas Petrauskas, Jurga Bagdzevičienė, Evaldas Babenskas and Tomas Rimkus. Their study 'Essential Changes in the Composition of Copper Alloys Reveal Technological Diversities in the Transition from the Earliest Iron Age to the Early Roman Period in Lithuania' presents the shift in the elemental composition of copper alloy from bronze-based alloys to brass ones during essential changes in archaeological material which happened at the turn of the Earliest Iron Age (500–1 BC) to the Early Roman period. Chronologically, this change might have happened between the 1st century BC and the middle of the 1st century AD.

The article by Maarja Lillak and Marcus A. Roxburgh 'Head-Shield Brooches of the Roman Iron Age from the *Tarand* Cemeteries of the Eastern Baltic' investigates Oscar Almgren's 100 type or head-shield brooches from the *tarand* cemetery area in Estonia, northern Latvia, and the lands west of the Izhora plateau. The highlight of this article is confirmed by the X-ray fluorescence spectrometry tin layer found on the surface of the brooches. It is important not only to identify the tinning technology, when pieces of jewellery produced from copper alloy were covered with a thin layer of tin, but also to understand the extent of this technological process, because it was widespread in the Barbaricum. Simultaneously, by the 2nd century AD, tinning technology had also reached the Baltic rim, and spread further north.

The first chapter, dealing with questions of archaeometallurgy, is completed by the article by Vanda Visocka, Alise

Gunnarssone, Mārcis Kalniņš and Eduards Plankājs entitled 'Between Mighty Hillforts: A Multi-Method Study of Laukskola Bronze Age Settlement Pottery'. This paper presents the results of a multi-method study of the Laukskola Late Bronze Age open-air settlement pottery assemblage. Macroscopic analysis, ceramic petrography, reflective transformation imaging, and wavelength dispersive X-ray fluorescence spectroscopy, were conducted in the analysis of the pottery. It is significant that the authors of the article point out that the results of the study show that Laukskola pottery was locally produced, using highly plastic sandy moraine clay tempered with granite rock and quartzite.

The next chapter 'New Investigations – New Approaches' contains only three papers. However, all of them are linked by research conducted in recent years or decades. The archaeological material found during the research has allowed the authors to formulate new and important scientific insights. Two articles in this chapter present new investigations carried out by Tomas Rimkus and Algirdas Girininkas. The first article, 'The Final Palaeolithic in the Coastal Part of Lithuania with the Technological Emphasis on Aukštumala Stone Age Sites', presents the latest archaeological material from the Final Palaeolithic in the Lithuanian coastal area, based on the three sites at Aukštumala upland bog, and stray finds from the area. The article focuses on technological and typological aspects of lithics relating the Aukštumala sites to Swiderian culture. On the other hand, the investigations in the Aukštumala upland bog area are especially significant, because they deepen our understanding of Lithuanian coastal settlement structure in the Final Palaeolithic, and the livelihood strategies of the people who appeared there.

In the next paper 'An Attempt to Link a Lithic Complex with the Late Palaeolithic *Rangifer Tarandus* Antler Axe from the Parupė Site in Northern Lithuania', T. Rimkus and A. Girininkas discuss the flint and antler artefacts found in the east and southeast Baltic region. The authors focus on reindeer (*Rangifer tarandus*) antler axes, and their prevalence in the Late and Final Palaeolithic osseous toolkit. One of the oldest reindeer antler axes was discovered in 2014 in the village of Parupė, on the left bank of the River Nemunėlis in northern Lithuania. The complex of individual flint finds that was found at Parupė was attributed to Bromme culture, associated with reindeer antler axe technology, on the basis of their typological and technological features.

Andrejs Vasks' article 'The Lower Reaches of the Daugava in the Bronze and the Earliest Iron Age (1800–500 to the 1st Century BC)' discusses the role of the lower reaches of the Daugava in the Mesolithic and Neolithic, when the area was sparsely populated, and changes happened in the 14th century BC when the process of Neolithisation was over and the local communities switched completely to

animal husbandry and agriculture. The author discusses the conditions that promoted the economic prosperity and social development of societies in this area, which was involved in a long-distance exchange network between Scandinavia and the Volga-Kama region. This insight of A. Vasks into the long-distance exchange network between Scandinavia and the Volga-Kama region also supports conclusions proposed by A. Bliujienė, G. Petrauskas, J. Bagdzevičienė, E. Babenskas and T. Rimkus in their paper presented in this volume of *Archaeologia Baltica*. The elemental composition of copper alloy artefacts also reveals the same long-distance directions. A. Vasks also points out that, with the spread of local iron metallurgy in Eastern Europe and Scandinavia, the long-distance exchange of bronze lost its former importance, due to the spread of iron smelting in the region and the local production of ironwork tools and weapons. Consequently, the main bronze processing centres in the lower reaches of the Daugava also declined, and a collapse occurred in the existing socio-economic system.

The final chapter in Volume 28 of *Archaeologia Baltica* is 'Giving Modern Life to New and Old Investigations'. The authors of this chapter present materials from the cemeteries at Groß Ottenhagen (on the Sambian Peninsula) and Perdollen (in Natangia) in the former East Prussia. Many cemeteries dating from the first millennium AD were excavated by German archaeologists before the Second World War. Due to the highly complicated history of their investigation, and the political changes following the war, all these sites have one big problem: even if they have been excavated, the results have never been completely published; and, in addition, the finds and original documentation have been lost for ever, or by a lucky chance, for half a century. All the above-mentioned circumstances are a consequence of war. However, the ongoing cross-border cooperation between scientists and large-scale projects is changing the situation somewhat for the better. Some archival documentation has been found scattered across various institutions, and there is an opportunity to identify archaeological sites known in prewar times, and to finally conduct archaeological research. Evidence of one good practice is the current scientific collaboration; and the archaeological research projects between German and Russian archaeologists at Groß Ottenhagen (now Berezovka, Gvardeiski district, Kaliningrad oblast) cemetery, conducted in 2003 and 2004, bring to light a lot of new archaeological material. In their paper 'The Early Medieval Graves of Groß Ottenhagen (Berezovka). On the Way from Sambia to the Middle Reaches of the Niemen', Roman Shiroukhov, Konstantin Skvortsov and Timo Ibsen present all the known information on Groß Ottenhagen as a long-lasting cemetery, and its graves and burial rites. It is important to note that 'double layer' burial features, with human cremations on top of horse burials, were common

in Prussian culture in Early Medieval times, and this burial rite has analogues in the lower reaches of the Nemunas (Niemen) and in central Lithuania.

A different fate befell Perdollen cemetery, excavated by German archaeologists, and local people who liked prehistory in interwar times. According to Agata Chilińska-Früboes' article 'Looking for Lost Pieces of a Puzzle: The Dollkeim-Kovrovo Culture Cemetery at Perdollen', working on the material was like trying to put together a puzzle that had fallen apart and many pieces had been lost, because the cemetery was badly damaged by agricultural work and the extraction of sand and gravel. Most of the artefacts discovered there came from excavations carried out by Carl Engel in the 1930s. However, apart from one fibula, probably a Roman import, all the artefacts have been lost. The sources of knowledge about the state of the research are almost exclusively archival materials and some daily newspapers. Therefore, the material from Perdollen cemetery published in *Archaeologia Baltica* is important, because it shows clearly some differences between western and eastern parts of Dollkeim-Kovrovo or Sambian-Natangian culture, during the Roman and Migration periods.

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