1RST MEETING
UISPP COMMISSION BONE ARTEFACT

2 & 3 MARCH 2017, UNIVERSITY OF TRNAVA, SLOVAK REPUBLIK

organized by

ÉVA DAVID (CNRS, NANTERRE, FRANCE)
ERIK HNRČIARIK (UNIVERSITY OF TRNAVA, SLOVAK REPUBLIK)

on

"CONTACT, CIRCULATION, EXCHANGE IN PAST SOCIETIES:
APPROACHES FROM THE BONE ARTEFACTS"

Department of Classical Archaeology, Faculty of Philosophy and Arts,
University of Trnava, Hornopotočná 23, 91843 Trnava, Slovak Republic
http://www.truni.sk/
AGENDA

THURSDAY, THE 2ND OF MARCH 2017

9:30-10:00 - REGISTRATION
10:00-10:10 - WELCOME (ERIK HRNČIARIK / UNIVERSITY TRNAVA)
10:10-10:20 - OPENING SESSION (ÉVA DAVID)
10:20-12:30 - SESSION

LUNCH BREAK

14:30-16:30 - SESSION
18:00 - EXHIBITION
19:00 - GALA DINER

FRIDAY, THE 3RD OF MARCH 2017

10:00-12:30 - SESSION

LUNCH BREAK

14:30-17:00 - SESSION

17:00-17:10 - PRESENTATION OF THE NEXT MEETING (CLAIRE HOUMARD & ULLA ODGAARD)

PARIS 3-9/06/2018
This paper outlines the aims and methods of a new project, undertaken under the EU-funded ArchSci2020 programme. Building upon past research on Viking-Age combs and combmaking, typochronology, and technology, it focuses in particular on raw material analysis, and applies the ZooMS (Zooarchaeology by Mass Spectrometry) technique to large numbers of North European early-medieval combs. This high-throughput, low-cost biomolecular technique allows us to rapidly identify species or species-groups in objects of worked bone or antler. In the study of early-medieval hair combs, it allows us to answer a number of bigger issues relating to long-range trade, communication, and population movement. It thus has the potential to position worked-bone analysis more centrally in the study of the Middle Ages.

steve.ashby@york.ac.uk
University of York, York, England

* * *

FAUNAL TURNOVER AT THE END OF THE LATE GLACIAL AND TECHNO ECONOMIC SYSTEMS: AN ATTEMPT TO CONSIDER THEIR INTERPLAY AND IMPLICATIONS FOR THE ARCHAEOLOGICAL RECORD

Anne BRIDAULT

Faunal turnover is the result of local extinction, immigration and competition. At the end of the Late Glacial, in France, large herds of migrating reindeer were replaced by smaller herds of more territorial red deer, elk and roe deer. Red deer became the predominant species hunted by Azilian groups and remained one of the principal game during the Mesolithic. How might have cervid turnover affected the procurement and exploitation of antlers during the Azilian and Mesolithic periods? This presentation is a preliminary attempt to consider the interplay of several key variables and their implications for the archaeological record.

anne.bridault@mae.u-paris10.fr
CNRS-Laboratoire ArScAn UMR 7041 Équipe Archéologies environnementales, Nanterre, France
TWO CASES OF REPLICATIONS OF ARTEFACTS SHOW
CIRCULATION OF PEOPLE AND KNOWLEDGE IN THE MAGLEMOSSIAN AREA

Éva David

From regularities found in the manufacture and morphological aspects of material implements associated to a specific chronological phase, archaeologists highlight human cultural groups of the past. Manufacturing traditions are characterized then on the basis of recording these over a long time span, regionally. Now that Early Postglacial traditions have been characterized for the northern Europe (XI-XIIth millennia cal BC), issues on similarities in industrial productions emphasize 1/ the consistency of material cultures, regardless groups of Stone Age hunters, and 2/ the significance of irregularities to work on idiosyncratic variations, for eventually show interactions between groups and/or individuals. From exceptions found in terms of shape and technique in the series concerned, it was possible to distinguish particular aspects of transmission within a group (circulation of knowledge) as well as a form of network or contact (knowledge of a foreign technology) between distinct groups. Based on our previous technological studies of prehistoric bone industries, this applies to two cases concerning specific combinations within the traditionally made equipment that will be discussed in the paper:

1) The case of particularism—an unusual form of artefact

This case concerns the form of a tool type that has been made following the original manufacturing tradition but for some reason does not display the same kind or level of achievement in its manufacture as other artefacts of its type. It seems to indicate particular technical skills, or lack thereof, regardless of the style of production. For instance, different-looking bone items could perhaps be interpreted as examples of child performance (David 1999, Pl. 22:5).

2) The case of imitation—a foreign copied form of artefact

This case concerns the form of tool types that are made following a foreign conception but used in situ and made using local manufacturing tradition. An example of this is the case of a pseudo Maglemosian point found in the south-eastern Baltic, made using north-eastern techniques. In shape, it resembles a Maglemosian point, but it has been made with the same techniques used on the site to produce other items, rather than with Maglemosian techniques (David 2006a, Fig. 19).


eva.david@cnrs.fr
CNRS-Laboratoire Préhistoire et Technologie UMR 7055, Nanterre, France
HOW REINDEER ANTLER PROCUREMENT AND EXPLOITATION STRATEGIES CAN DOCUMENT SETTLEMENT PATTERNS IN LATE PALAEOLITHIC HUNTER-GATHERER SOCIETIES?
THE CASE OF THE FRENCH MASSIF CENTRAL MAGDALENIAN

Laure FONTANA
François-Xavier CHAUVIÈRE

Circulation in mobile hunter-gatherers societies is particularly highlighted by transport of resources, such as lithics and animal hard material, and seasons of site occupations. Studying the annual cycle of nomadism is especially interesting in regions where the majority of siliceous material is allochtonous and where there are many faunal remains and antlers to document seasonality and procurement/exploitation patterns. Regarding the Magdalenian societies of the French Massif central, the challenge of our on-going studies is to identify the patterns of Reindeer antlers acquisition and exploitation. Integration of data stemming from the zooarchaeological and technological analysis allows us to document such strategies, at the scale of the site as of an annual cycle of nomadism within a geographical area whose boundaries remain to be defined. This was demonstrated by the study of a northern Magdalenian site (Les Petits Guinards, Allier) that required a specific method of faunal remains and Reindeer antlers (raw material, waste products, weapons and tools) and raised focused questions. It allowed us to identify procurement and exploitation patterns that support the rare data gathered at a few other sites. It documents for the first time the transport of objects (more or less finished) and even of shed antlers (e.g. the male shed antler), from manufacturing sites currently unknown, which might be located in the northern source area of procurement of the allochthonous flint and occupied during the cold season, still not documented in the Massif Central sites.

For both authors:
laure.fontana@mae.u-paris10.fr
CNRS-Laboratoire ArScAn UMR 7041 Équipe Archéologies environnementales, Nanterre, France

*  *

SEARCHING FOR PALAEOLITHIC TERRITORIES AND NETWORKS BOUNDARIES THROUGH THE CONCEPT OF MOBILITY AND NON-MOBILITY OF OBJECTS

Pascaline GAUSSEIN

Defining one’s culture and identity seems tricky from the ethnologist and ethnoarcheologist’s point of view, even though whole of its material and immaterial aspects are known (Amselle, 2010 ; Gallay, 1986 ; Izard, 2000 ; Mac Eachern, 1998 ; Peelo, 2011). In the case of archaeological societies, hoping to interpret such a minimal part of a culture’s remains seems even more unreachable and utopian. Indeed, according to some studies, what archaeologists are most likely to figure out concerns interactions, exchange and influences networks between human groups (Mac Eachern, 1998). One would argue that culture is no more than the result of a long and complex history of influencing, sharing innovations and cultural features, besides
maintaining some singularity between each. Here appears the actual issue: it gets rather difficult to distinguish a relative stable cultural identity - resulting from a long history of networks, from networks in itself being maintained by the same populations at a specific period in time ((Cuche, 2010 ; Descola, 2005 ; Izard, 2000 ; Mac Eachern, 1998).

The key stone of this study lies on the anthropological fact that some objects are to be exchanged between human groups to maintain exogamic, political alliances and pooling risk strategies (Gamble, 1986 ; Whallon, 2006 ; Wiessner, 2002), while others are to be kept and transmitted within the group (Godelier, 2007). The last being consequently considered as identifier objects. How to distinguish the former from the last? Which features are significant in this specific context? Various studies have suggested certain characteristics which could be relied on (Féblot-Augustins, Perlès, 1992 ; Wiessner, 1997 ; Wobst, 1977). This research aims at investigating several of these characteristics by testing them on portable art data from Magdalenian Centre-France archaeological sites (ca. 12 to 17 ky B.P.). Afterwards, the plausibility of the territorial areas hereby defined is confronted to other archaeological data. At the end, several cultural territories and network areas may be worth considering as plausible, allowing to broaden our hypothesis and expectations of Magdalenian populations' social and cultural behaviours.


pgaussein@hotmail.fr
Université Paris X, Nanterre, France
ARE THERE ANY CULTURAL REFLECTIONS ON ROMAN BONE HAIRPINS?

Ayça GERÇEK

The most used objects are in fact the most valuable ones. The everyday objects which were touched, felt and became as a part of person in time, reflect the character and the pleasure of a person. As the Roman Empire within the broadest boundaries ruled over a geography reaching from Asia to Northern Europe, many nations lived as their subjects. In this composite context, the local beliefs and regional features manifest themselves in every area from architecture to small artifacts, but also they present the Roman characteristics. This synthesis is a feature of the power of Roman Empire and the indicators of freedom and centralism. As it is examined in detail, it seems that the everyday objects display the same characteristics. Almost all of them have a similar form, but the ones appear rarely in various forms according to the person’s inclination, the fashion of its period, the imagination of its craftsman. Bone, horn and the other related materials were typically used to product the everyday objects of human-beings during the historical process. These materials which appear typologically in a wide-range scaled production were mostly preferred as cheap materials to the metal ones.

An outstanding group of everyday objects, which were well-known from the ancient times, forms the hairpins. The hairpins, which were used by the women from every social classes in the different geographical contexts, have various meanings beyond their essential functions. They also reflect the fashion and the social preferences which the period they belong to. This study essentially aims to reevaluate the published materials in accordance with the concepts as the cultural identity and interaction. In this context, the figured hairpins from the various locations of Roman Empire, dated to the Roman Imperial Period, will be examined in a typological manner. Within this scope, it will be dwelt on a number of questions as how much important are some aspects such as the cultural identity, the cultural values that were imposed by sovereign authority and the interactions of societies in the preference of types of the hairpins.

aycaozcan@yahoo.com
Korkut Ata Üniversitesi, Osmaniye, Turkiye

* * *

THE CIRCULATION OF ORNAMENTS IN AURIGNACIAN CONTEXTS:
AQUITaine AND THE SWAREian JURA

Claire HECKEL
Sibylle WOLF

Among artifacts made of hard animal materials, personal ornaments are particularly relevant to issues of contact, circulation, and exchange. The assemblages of ivory and shell beads from the Aurignacian of Aquitaine and the Swabian Jura present a number of insights and challenges related to these issues among early populations of Homo sapiens in these regions.
The small, standardized ivory beads found in each of these regions, though different in morphology, present strikingly similar approaches to manufacture that raise challenging questions about the origins of these practices and culture contact in the Aurignacian. Recent evidence from the close examination of these assemblages and their contexts of production and use also suggest very different patterns related to their circulation: while the ivory beads in Aquitaine circulated briefly in a wide regional network of exchange, counterparts in the Swabian Jura seem to have had a longer period of use in a more restricted geographic range.

These similarities and differences in ornament use among Aurignacian societies that were broadly contemporary indicate that the mechanisms that drove investment in personal ornaments were complex and variable, even within the Early Upper Palaeolithic of Europe. We present here a brief comparison of the ornamental assemblages in these two regions followed by a discussion of the implications that they have for issues of cultural contact, contexts of circulation, and networks of exchange in the Early Upper Paleolithic and beyond.

ceheckel@gmail.com
American Museum of Natural History, New York, United States of America

sibyllle.wolf@ifu.uni-tuebingen.de
Eberhard Karls Universität, Tübingen, Germany

* * *

CONTACTS, CIRCULATIONS AND EXCHANGES IN THE EASTERN ARCTIC:
THE THULE CULTURE

Claire HOUMARD

The Inuit and pre-Inuit societies are known to be highly mobile and to entertain long-distance communication networks in the whole Arctic world. Human movements mostly depend on climatic and environmental conditions. Seasons also give rhythm to the migrations warm and cold seasons influencing the means of transportation. Sea ice favors long-distance sledge trips while the summer open water permits boat costal navigation either on collective embarkation (called umiaq) or individual kayak. Whatever the means the amount of personal belongings must always be minimized. Sizes and weights of the pieces being restricted information on long-distance movements as reflected by the objects’ circulation is somewhat limited. Arctic resources, such as the fauna, are widespread but their distribution often changes through space and time. How human and object circulations in this context could be traced and how contacts and exchanges could be evidenced with such fluctuating parameters?

clairehoumard@yahoo.fr
CNRS-Laboratoire Préhistoire et Technologie UMR 7055, Nanterre, France
THE KISKEVÉLY TYPE OF CAVE BEAR TOOTH-BLADES: REMARKABLE FINDS FROM THE DZERÁVÁ SKALA CAVE (SLOVAKIA)

Bibiána HROMADOVÁ
Sandra SÁZELOVÁ

A large amounts of cave bear remains preserve in Upper Palaeolithic layers from several western and southern Slovakian caves, which represent then the most typical animal species coming from this archaeological context. A specific place between all these finds bears flaked cave bear teeth or their fragments. This peculiar objects attracted attention of various researchers for many decades and thus belong to the most typical archaeological finds from Early Upper Palaeolithic/Middle Upper Palaeolithic layers in Hungary and Slovakia. Furthermore, some specific morphological features of these pieces called the debate about their antropogenic origin. The series of flaked cave bear teeth from Dzeravá skala cave allows us to focus on understanding of these objects and why they finally fall to be forgotten, although such topic may again arise concrete questions about the possibilities in pseudotools and tools identification and determination of their role in archaeological context.

bibiana.hromadova@gmail.com
Masaryk University, Brno, Czech Republic

Academy of Sciences, Dolní Věstonice, Czech Republic

*     *
*     *

EXCHANGE OF POLITICAL POWER AND COMMUNICATION WITH ANCESTORS THROUGH HUMAN BONE ARTEFACTS IN PRE-HISPANIC EAST MEXICO AND GUATEMALA

Jennifer KERNER

In Mesoamerica, many cultures practise intensively the transformation of the body - dead or alive – and the scattering of skeletons in order to face major societal and spiritual challenges. The handled and manufactured bones became powerful semiotic artefacts linked to communication with the ancestors and the gods. They were used to maintain cosmic renewal and the handover of political power. Thanks to analysis of the diffusion of shapes and through techno-functional studies of human bones artefacts, we will highlight cultural exchanges between Zapotec and Mixtec populations, taking account of intra-cultural variations.

kerner.jennifer@gmail.com
Université Paris X, Nanterre, France

*     *
*     *
Continuity from Colonisation?  
New Evidence for >46,000-Year-Old Osseous Technology in Australia

Michelle C. Langley  
Sue O’Connor

Osseous technology in Australia was long believed to have a time depth of only 20,000 years. Thought to have been somehow ‘lost’ during the journey from Africa to Australasia, the Modern Humans colonists of this great southern land were said to have ‘re-invented’ bone implements in the southeast corner of the continent some 30,000 or more years after arrival. A discovery at Carpenter’s Gap 1 (CG1) rockshelter, in the Kimberley region of northern Western Australia, however, has turned these notions on their head. Here we present the oldest shaped and utilised bone implement recovered from an Australian context. Dated to beyond 46,000 years cal. BP, this artefact demonstrates not only that Australian osseous technology has a time depth almost 25,000 years older than previously believed, but that bone technology was present in the opposite corner of the country from which it was proposed to have been innovated. Interestingly, comparison of this artefact with ethnographic implements found that the CG1 point was most consistent with an awl or a ‘nose-bone’ — typologically identical tools recorded for numerous areas across the continent in recent times. We explore the implications of tool form/use continuity in light of the CG1 find for both Australian and international archaeological dialogues.

m.langley@griffith.edu.au  
Griffith University, Brisbane, Australia  
sue.oconnor@anu.edu.au  
Australian National University, Canberra, Australia

*   *   *

The Significance of Using Osseous Materials in Paleolithic Technology

Marcel Otte

The use of osseous materials to make tools has always been within the scope of Neandertal practices in Europe. Yet their use only became widespread with the more recent migrations of modern humans. A chronological time lag between their exploitation corresponds to a tenth of the respective durations: from 300 to 30,000 years. Geographic conditions were, however, identical in the development of these two opposed behaviours. The use of osseous materials thus reflects neither capacities nor environment.

Clearly, it is a traditional behavioral ensemble that dictates when such materials were used. However, this practice is today especially attested in the steppic landscapes where bones make up for the lack of wood. These are inventions and practices developed outside Europe and transported during migrations.
Nonetheless, this exploitation of faunal remains is in agreement with an aggressive approach of humans to the natural world. It is here the only and real significance of osseous materials: humans defy the animal and battle it with their own weapons. Beyond this existential threshold, the rest of the history of osseous materials developed exclusively as mechanics were mastered.

marcel.otte@ulg.ac.be
Université libre, Liège, Belgium

* * *

TRANSMISSION OF CRAFTSMANSHIP AND CIRCULATION OF CRAFTSMEN IN IRON AGE OF IBERIAN PENINSULA

Lucía SORIA-COMBADIERA
Marta BLASCO-MARTÍN
Eva COLLADO-MATAIX
Mercedes FUENTES-ALBERO
Elena MORA-GARCÍA

The study of craft specialization is an important aspect of societies everywhere as is the case of the Iberian peninsula during Iron Age. In precedent papers, we proposed the existence of almost two ivory comb workshops based on analysis of the decoration. Now we want to explore a new way emphasizing in the technological practices.

Within technology studies, a distinction has been made between an artifact and the knowledge base. The artifact includes the raw materials, properties, manufacture and use. Instead, the knowledge base is associated with a technological practice. The key for a successful study of technology is to develop methods and theoretical approaches that include both artifact and knowledge base. One of the theoretical approach explicitly including gender with considerations of technological practice is the agency theory. Besides, some examples of gender archaeology incorporate gender into craft specialization in complex societies. The goal of an engendered agency approach to protohistoric technologies acknowledges the influence gender has on technological practices and attempts to focus on the social dynamics of artifact production. Furthermore, cultural inheritance theory offers a framework to help identify social dynamics in the craft productions by characterizing the transmission of the cultural knowledge between and among individuals.

The evolutionary approaches to technological studies are based on the individual behavioral: behavioral variation, the accumulation of individual people’s choices, persists differentially resulting in change through time. It is on the individual level that the evolutionary processes operate, and the aggregate effects are visible on the population level. Technologies that people use are handed down to them from previous generations.
Cultural transmission is cumulative in nature. In addition, cultural inheritance produces population level feedbacks: the frequency of a particular cultural trait within a population will depend in part on its frequency in the preceding time. The agency theory, the evolutionary approach and the cultural inheritance seeks to identify the contexts in which individuals learn. The cultural transmission could be vertical (between parents and offspring), horizontal (between members of the same generation) or oblique (between generations but not in a parental relationship). The consequences over the material artifacts of those process of cultural transmission will be different. The variation in artifact attributes will vary according with the relative importance of those processes. This, in turn, could be used to investigate relative levels of standardization (e.g., variation) within and between groups. Studies of cultural transmission must the focus on identifying patterns of repeated co-occurring attributes while also measuring the effect of transmission on the production of variation.

In this study, we will use an evolutionary-based approach in order to understand the degree of standardization in two different crafts (ivory combs and bone loom plates) during the Iberian Iron Age.

For all authors:
Consuelo.Mata@uv.es
Universidad Castilla – La Mancha, Albacete, Spain

*  
*  

**MAKING GODS IN ANCIENT GREECE: RITUALS, CULT IMAGES AND IVORY**

Lucia NOVAKOVA

Agalma, a broad term, which is commonly translated as cult image, played an important role in Greek religion. Ivory was employed in the manufacture of agalmata since Orientalizing period at the latest, highly prized on account of its exotic origins, aesthetic quality and reputed magical properties. Its physical characteristics allow it to be worked by a variety of techniques, as carved in relief, cut into veneers or inlays, turned on a lathe or moulded. Most ivories were ultimately polished, painted or gilded. Manufacturing techniques, but also the form and use of cult images gradually changed during antiquity. Acrolithic and later chryselephantine statues adorned interiors of major temples and became objects of various ritual activities, including coating, dressing up, bearing in procession, adorning or immersion in the water. Smooth creamy-white surface and warm lustre of ivory statues required a special care, including maintaining proper housing conditions and oil polishing. Even if almost none of cult images survived until these days, numerous references of ancient authors and representations in other media attest their technical, stylistic and iconographic changes. Tracing ivory in sculptural tradition not only from Near East or Anatolian coast, but also Greek mainland shows multiple uses of this material in religious sphere.

lucia.novakova@truni.sk
University of Trnava, Trnava, Slovak Republic
Ornaments made from osseous materials from two Middle Bronze Age cemeteries in present-day Vojvodina (northern Serbia), from the sites of Mokrin and Ostojićevo, consist of pendants made from animal teeth and mollusc shells, applications from diverse materials, beads from long bones, decorative needles made from bones, etc. The deposition into the graves represented the final stage of their life, and their life biographies display interesting patterns and modes of circulations on different levels – on the level of raw materials and finished objects, short-distance and long distance exchanges. Some of the raw materials were obtained locally, within the settlement (such as dog canines or diverse bones), in the vicinity of the settlement (red deer canines, for example) or from long distances (Dentalium, Glycymeris shells, etc.). The objects themselves also display diverse life biographies – while some were heavily worn, even repaired several times, some display very little usewear, and appear almost new. The former may have been inherited, while the latter were almost new at the moment of deposition. These patterns of circulation and exchanges create multiple inter-crossing networks and their place within these communities, importance, later meaning and social significance will be discussed.

s.vitezovic@ai.ac.rs
Institute of Archaeology, Belgrade, Serbia

*  *

**MICRO-COMPUTED TOMOGRAPHY FOR THE ANALYSIS OF SMALL ORNAMENTS MADE OF OSSEOUS MATERIAL:**
**A STUDY OF CULTURAL CHANGE BETWEEN LATE NEOLITHIC AND EARLY BRONZE AGE IN SOUTH-EASTERN POLAND**

Kinga WINNICKA

This paper aims to present micro-computed tomography 3D imaging and morphometric analysis as a technique that can be successfully applied to material studies of archaeological artefacts made of osseous materials. This technique is especially useful in regard to small and heavily eroded objects which, for different reasons, can only be analysed using non-destructive methods.

Micro-computed tomography (microCT), or X-ray micro-tomography, is a high resolution CT scan (0.5 μm at highest resolution) creating 2D cross-section images which can be used to create 3D models of scanned objects. Combined with dedicated software microCT can also be used for morphometric (densitometric) analysis of parameters such as bone volume and tissue volume ratio, number of trabeculae, porosity, and anisotropy of the analysed osseous object.
This can be of use for the assessment of artefact preservation and analysis of bone morphology, e.g. for differentiating between bone types (compact, spongy; dentine). Nowadays, microCT is an established technique used for the study of bone properties mainly in biomedical research (e.g. biomechanics) or dentistry. MicroCT was first applied to the studies of fossilised material by paleoanthropologists investigating the morphology of hominin skulls and other skeletal elements but the application of microCT in archaeology for the analysis of material culture is fairly recent.

I would like to present the results of a small study using microCT for the evaluation of personal adornments made of bone and/or antler, originating from two neighbouring Polish archaeological sites. All samples come from sepulchral contexts: Sandomierz-Zawichost Hill site is associated with the Beaker period (Late Neolithic in Poland) and the Kichary Nowe site is dated to Early Bronze Age (beginning of the 2nd millennium BC). Analysed artefacts consist of four V-perforated buttons and two cylinder-shaped beads conjoined by heavy calcite crust. The two groups of artefacts constitute ‘typical’ small ornaments associated with two connected groups of people – earlier Beaker societies and successive (and partially chronologically overlapping) epi-Corded Ware societies (e.g. Mierzanowice culture of SE Poland). This study shows that adornments reflect change in crafting for which it is argued that is is linked to cultures – in this case assemblages of V-perforated buttons are not found in later (EBA) graves but are replaced by an abundance of cylindrical or discoidal beads (up to thousands per grave).

The artefacts presented hereby have been analysed microscopically (microwear analysis) but it is very difficult to properly examine their perforations – either V-shaped (buttons) or regular with perpendicular walls (beads). The perforations are important because they can tell us more about the technological processes involved in the manufacture of the objects than obvious features (shape and size), which can be then linked to cultural change and its impact on bone technologies. Furthermore, ascertaining whether the objects could have been made of different osseous materials (bone or antler) can also shed some light on the human-animal relationship and its meaning in a given context (Bell Beaker vs epi-Corded Ware, female vs male graves).

The analysis focused on three aspects:

• Assessment of the state of preservation (e.g. inner micro-cracks and fissures);
• Identification of bone micromorphology (diagnostic features or lack thereof; densitometric analysis);
• Identification of microwear, i.e. manufacture and use-wear traces.

Applied technique proved useful especially in regard to the first aspect – even if the artefact appeared solid during macro- and microscopic observations, closer evaluation using microCT could reveal heavy internal erosion (resulting in strong exfoliation in one of the cases). Densitometric analysis applied to four V-perforated buttons established that they are made of a dense material but the 3D imaging did not reveal definite diagnostic microstructures such as haversian system – which might be caused by the applied resolution (ca. 12 µm). Image analysis revealed however that the buttons are made of compact tissue with some remnants of spongy tissue which indicates economic and skillful use of the raw material. Two cylinder-shaped beads
are also made of compact tissue but they seem more dense which can be attributed to different post-depositional conditions and/or to the fact that the objects could have been made of antler (substantiated by macro- and microanalyses).

It was also confirmed that only prominent manufacture-related features, e.g. perforations can be analysed with success – the cross-sections revealed differences in perforating techniques (‘scooping’ vs drilling). Use-wear in the form of striations and other abrasive patterns was not observed, however visual analysis showed that there is a difference in the intensity of use indicated by strong rounding of edges (buttons) vs sharp, ‘crisp’ edges (beads). It can be cautiously attributed to the fact that the V-perforated buttons had been worn extensively before deposition whereas cylindrical beads had been made for the occasion (burial ritual).

Close examination of these two types of small ornaments reveals differences in regard to the raw material, manufacturing techniques and use-life. Archaeological context indicates that V-perforated buttons – usually associated with female graves – do not continue into the Bronze Age. Personal adornments in both male and female graves are now in the form of numerous bone/antler and shell beads; and cylinder-shaped antler beads (largely unworn) seem to be associated more often with male graves. The conclusion is that even though Bell Beaker and epi-Corded Ware societies are geographically and to some extent chronologically overlapping they show interesting discontinuity regarding typical forms of personal adornments, especially indicated by raw material selection, techniques applied to working it and possible social/symbolic meanings of the objects produced from it.

Concerning the application of microCT for the study of archaeological artefacts – it seems especially useful in regard to conservation and even virtual preservation: scanned artefacts could be recorded and stored for future studies. However, there are some drawbacks – the procedure is time consuming and as of now requires a substantial amount of data storage place. MicroCT can also be used – combined with other methods – to identify diagnostic bone microstructures; this requires working with the highest resolution and with a skilled technician. Another application of this technique can be incorporated into microwear studies, especially for the non-destructive analysis of manufacture-related features. In this regard microCT can truly contribute to the studies of bone technologies in the past.

kinga.winnicka@uwr.edu.pl
University of Wrocław, Wrocław, Poland