



International Council  
for Archaeozoology



**12th Meeting of the Worked Bone Research Group**  
**23-27 May 2017**  
**Granada, Spain**

12 Reunión del Grupo de Investigación sobre Hueso Trabajado  
23-27 de mayo de 2017  
Granada, España



**PROGRAM**

**ABSTRACTS**

## Organised by:

Organizada por:

**GEA.** *Cultura material e identidad social en la Prehistoria  
Reciente en el sur de la Península Ibérica*

## In collaboration with

En colaboración con:

**Dpto. de Prehistoria y Arqueología de la Universidad de Granada  
y  
Facultad de Filosofía y Letras  
Universidad de Granada**



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## Acknowledgements

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**Cover:** *Anthropomorphic ivory idol from the Chalcolithic site of El Malagon (Cúllar, Granada) / Ídolo antropomorfo de El Malagón, asentamiento de la Edad del Cobre*



# PROGRAMME

## Programa

### Schedule of Presentations

#### Organización de las Ponencias

#### TUESDAY, 23rd / MARTES 23

"José Palanco" Conference Room / Sala "José Palanco"  
Facultad de Filosofía y Letras, Ground Floor/Planta Baja  
Campus de Cartuja s/n 18071 Granada

16:00-17:00	<b>Registration of participants / Recogida de documentación</b>
17:00-17:30	Welcome words by the Chancellor of the University Mrs. Pilar Aranda Ramírez, the Director of the Dept. of Prehistory and Archaeology, Mr. Francisco Contreras Cortés, the Director of the GEA Research Group, Mrs. Margarita Sánchez Romero, and the organiser of the 12 WBRG Meeting, Mr. Manuel Altamirano García, . <i>Bienvenida a cargo de la Rectora de la Universidad, Dña. Pilar Aranda Ramírez, el Director del Dpto. de Prehistoria y Arqueología, D. Francisco Contreras Cortés, la Directora del grupo GEA, Dña. Margarita Sánchez Romero, y D. Manuel Altamirano García, miembro del WBRG.</i>  A look back at WBRG by Dr. Alice Choyke, (CEU, Budapest) Pasado y presente del WBRG. <i>Dra. Alice Choyke (CEU, Budapest)</i>
<b>ORAL PRESENTATIONS / PONENCIAS</b>	
17:30-17:50	<i>The earliest tools made on bones in the southern Levant from Revadim Quarry</i> Rabinovich, Rivka; Bello, Silvia; Marder, Ofer.
17:50-18:10	<i>Human and natural modifications on three Gravettian objects: Case study from Dolní Věstonice II (Czech Republic)</i> Sázellová, Sandra; Hromádová, Bibiana; Ray Perri, Angela; Polanská, Michaela.
18:10-18:30	<i>The Badegoulian bone and antler toolkit: current state of knowledge</i> Pétillon, Jean-Marc; Chauvière, François-Xavier.
18:30-18:50	<i>Osseous technology in the Magdalenian of Parpalló (Valencia, Spain)</i> Borao Álvarez, María.
19:00	<b>Visit to Granada's old quarter: Albaicin, Mirador de San Nicolás, Carrera del Darro, Renaissance Cathedral (optional)</b> <i>Visita guiada al barrio antiguo de Granada</i>

**WEDNESDAY, 24th / MIÉRCOLES 24**

"José Palanco" Conference Room

Facultad de Filosofía y Letras, Ground Floor

<b>ORAL PRESENTATIONS / PONENCIAS</b>	
9:00-9:20	<i>Exploitation of Cervus elaphus antler during the Mesolithic in the Iron Gates</i> Margarit, Monica; Boroneant, Adina; Bonsall, Clive.
9:20-9:40	<i>The contribution of the osseous material production to the understanding of the Neolithic occupations at Piccioni Cave (Abruzzo-Italy).</i> Fuggi, Angela; Grifoni Cremonesi, Renata.
9:40-10:00	<i>The worked osseous assemblage from the Early and Middle Neolithic site of Cueva de la Pastora (Caniles, Granada, Spain).</i> Martínez Sevilla, Francisco; Altamirano García, Manuel.
10:00-10:20	<i>Characteristic manufacturing techniques at the Late Neolithic site Őcsöd-Kováshalom (Hungary).</i> Toth, Zsuzsanna.
10:20-10:50	<b>Coffe Break / Pausa Café</b>
10:50-11:10	<i>Hunting traps or fishing hooks? Osseous "barbed hooks" from Neolithic-Chalcolithic sites from Southeast. Europe and their possible function.</i> Savu, Mihaela.
11:10-11:30	<i>Vinča bone industry: Preliminary observations regarding craft production.</i> Koldžić, Vuk.
11:30-11:50	<i>The appearance of ivory in the 4th millennium in the Levant.</i> Sidéra, Isabelle; Guyot, Frédéric
11:50-12:05	<b>Break / Pausa</b>
12:05-12:25	<i>Settled and Unsettled: Bone working in the late fourth millennium in the Southern Caucasus</i> Choyke, Alice M.
12:25-12:45	<i>Tooth and shell ornaments from the Neolithic through the Bronze Age: diachronic supra-regional patterns.</i> Zidarov, Petar.
12:45-13:05	<i>Objects of personal use made of osseous materials in the Late Neolithic and Early Bronze Age of southern Poland.</i> Winnicka, Kinga.
13:05-15:00	<b>Lunch Break / Pausa Almuerzo</b>
15:00-15:20	<i>A Comparative Techno-Typological Approach to the Ivory of the Valencina de la Concepción (Seville) Copper Age Site: the Montelirio and 10.042-10.049 Tholos-Type Structures.</i> Luciañez Triviño, Miriam; Provenzano, Nöelle; García Sanjuán, Leonardo; Schuhmacher, Thomas X.
15:20-15:40	<i>Bone artifacts from Chalcolithic funerary contexts in the Eastern and Southeastern Iberia. The pointed flat rods.</i> López Padilla, Juan Antonio.
15:40-16:00	<i>Bronze Age antler and bone spindle whorls in the Southeast of Iberia.</i> Basso Rial, Ricardo E.; López Padilla, Juan Antonio.
16:00-16:20	<b>Break / Pausa</b>
16:20-16:40	<i>Bone and antler objects used as grave goods in Bronze Age Poland.</i> Baron, Justyna; Diakowski, Marcin; Nowak, Kamil.
16:40-17:00	<i>The Antler Raw Material Using in the Hunno-Sarmatian Period in North Altai</i> Borodovsky, A.P.; Michalczewski, K.; Oleszczak Ł.
17:00-17:30	<i>Figural Roman bone handles from Mursa</i> Kovac, Marina.
20:30	<b>Gala dinner/Cena de Gala at Carmen de la Victoria, placed in Cuesta del Chapiz, 9, 18010 Granada.</b>

**THURSDAY, 25th / JUEVES 25**

"José Palanco" Conference Room

Facultad de Filosofía y Letras, Ground Floor

**FREE MORNING / MAÑANA LIBRE**

<b>ORAL PRESENTATIONS / PONENCIAS</b>	
16:00-16:20	<i>The Witnesses of Cultural Continuity in Tatarlı Höyük: The Bone Artifacts.</i> Gerçek, Ayça; Girginer, K. Serdar; Oyman Girginer, Özlem; Gerçek, Hakan.
16:20-16:40	<i>Raw material selection and the technological choices in the Early and Middle Neolithic in the Central Balkans</i> Vitezović, Selena.
16:40-17:00	<i>Bone artifacts from Roman cremation burials: methods, results and conclusions.</i> Deschler-Erb, Sabine.
17:00-17:20	<i>Late Roman bone and ivory carvings from Jerusalem</i> Shatil, Ariel.
17:20-17:40	<b>Break / Pausa</b>
17:40-18:00	<i>Artefact Geographies of the Viking Age: new answers to old questions.</i> Ashby, Steve; Muñoz Rodríguez, Mariana.
18:00-18:20	<i>Learning from cattle scapulae: the process of islamisation and arabisation of medieval iberia (8th-10th centuries).</i> García, Marcos; Rafael M. Martínez; Casal, M <sup>a</sup> . Teresa; Fuertes, M <sup>a</sup> . del Camino; Moreno-García, Marta.
18:20-18:40	<i>Worked bones from the medieval Castle of Buda.</i> Font, Agnes.
18:40-19:00	<i>Bone and antler working in the Vilnius Castle complex in the Late Middle Ages and Early Modern Time</i> Luik, Heidi; Piličiauskienė, Giedrė; Blaževičius, Povilas.

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**FRIDAY, 26th / VIERNES 26**

**“José Palanco” Conference Room**

**Facultad de Filosofía y Letras, Ground Floor**

<b>ORAL PRESENTATIONS / PONENCIAS</b>	
9:00-9:20	<i>Bone hoes from the Middle Iron Age, Limpopo Province, South Africa</i> Bradfield, Justin; Antonites, Annie.
9:20-09:40	<i>Multidisciplinary study of bone tubes with Tiawanaku iconography excavated in cemeteries of San Pedro de Atacama, Chile</i> Horta, Helena; Sidéra, Isabelle; Figueroa, Valentina; Echeverría, Javier; Legrand-Pineau, Alexandra.
09:40-10:00	<i>Worked bone from the site of La Montesita (Aguascalientes, Mexico)</i> Blasco Martín, Marta; Schulze, Niklas; Herrera Buenrostro, Kenia; Pérez-Roldán, Gilberto.
10:00-10:30	<b>Coffe Break / Pausa Café</b>
10:30-10:50	<i>Statistical image analysis of use-wear of experimental bone tools. First results.</i> Rodríguez-Santos, F.J.; González-Urquijo, J.E.
10:50-11:10	<i>Use-Wear Analysis of Bone Tools from Arnhem Land, Australia.</i> Basiaco, Adriana.
<b>POSTER SESSION / SESIÓN DE POSTERS</b>	
11:20-12:45	<p><i>Late Magdalenian art from Poland – a case of ornamented antler piece from Krucza Skala Rockshelter (Kroczyckie Rocks)</i> Orłowska, Justyna; Cyrek, Krzysztof; Krajcarz, Magdalena; Osipowicz, Grzegorz</p> <p><i>Equid “idols” from Tepecik-Çiftlik, southern Cappadocia, Turkey</i> Campana, Douglas V.; Crabtree, Pam J.</p> <p><i>Productions steps of anthropomorphic bone figurines – examples from the Chalcolithic tell settlement of Pietrele (RO)</i> Müller, Michael; Savu, Mihaela</p> <p><i>First data about the bone and antler exploitation from the prehistoric lakeside settlement Anarghiri IXb, Western Macedonia, Greece</i> Arabatzi, Christopher</p> <p><i>The life of Neolithic pointed tools. The reshaping incidence on their typology at Colle Santo Stefano (Abruzzo-Italy).</i> Fuggi, Angela.</p> <p><i>Antler work in two well-dated Copper Age contexts of Middle Guadalquivir Basin (Southern Iberia).</i> Martínez Sánchez, Rafael M.</p> <p><i>The adornment objects in shell and animal bone of the hypogeum of Padru Jossu ( Sanluri, Sardinia, Italy).</i> Pau, Claudia</p> <p><i>Thong smoothers from Early Bronze Age sites in South-western Hungary.</i> Gál, Erika</p> <p><i>Processing of the osseous materials in Linear Band Pottery Culture societies from the area of Poland. Technological, archaeozoological and use-wear approach.</i> Osipowicz, Grzegorz; Sobkowiak-Tabaka, Iwona; Szeliga, Marcin; Makowiecki, Daniel; Kuriga, Justyna.</p> <p><i>Cylinders, discs and terminals: Composite bone objects from Roman Funerary Deposits</i> Greep, Stephen. University of Amsterdam. Rijkeljkhuizen, Marloes.</p> <p><i>Possible antler mining tools from the Eneolithic mine on the mountain Rudnik (central Serbia)</i> Vitezović, Selena. Antonović, Dragana.</p> <p><i>The Production of Antler Objects during the Bronze Age in the East and Southeast of the Iberian Peninsula. El Cabezo Redondo (Villena, Alicante, Spain)</i> López Padilla, Juan Antonio; Barciela González, Virginia; Hernández Pérez, Mauro S.; García Atiénzar, Gabriel</p> <p><i>Los Millares’ bone industry</i> Maicas Ramos, Ruth</p> <p><i>On the track of bone anvils in Mallorca</i> Valenzuela Oliver, Alejandro</p> <p><i>Use-wear analysis of harp seal penis bone scrapers from Sventoji sites (3500-2500 cal BC)</i> Piličiauskienė, Giedrė; Zhilin, Mikhail; Schmölcke, Ulrich.</p>



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	<i>Bone tools used for spinning and weaving from Stobi</i> Kovancaliev, Zlatko  <i>Worked bone and antler from the Vettonian (Iron Age) settlement of Las Cogotas (Cardenolas, Ávila, Spain)</i> López-Romero González de la Aleja, Elena.  <i>Bone extraction: A Methodological summary</i> Dominguez Fernández, David; García Herreros, María Luz
12:45-13:30	Closing of the meeting (conclusions and discussion about next WBRG meeting).

**SATURDAY 27th / SÁBADO 27**

*Post-conference excursion to Cordoba and Antequera*

The trip includes the guided visit to the Mosque-Cathedral of Cordoba built by the Ummayyad Dynasty between the VIIIth and Xth centuries (Unesco World Heritage, 1984) and the Antequera Dolmen Site (Unesco World Heritage, 2016).

It is a round trip. We will leave from Jardines del Triunfo (Granada city centre) at 7:00, have a typical lunch in Cordoba (*tortilla de patatas, salmorejo cordobés, and flamenquín*) at *Federación de Peñas* Restaurant. Then we will visit Antequera in the afternoon. We expect to be back in Granada around 20:00h.

Please, note that it is possible to take your luggage with you and stay in Cordoba instead of coming back to Granada (although those people will miss the visit to the Dolmen Site), just in case you are flying back from Madrid-Barajas and wish to take the High Speed Train (AVE) from Cordoba to Madrid (1:50 h).

-7:15: Meeting point at Jardines del Triunfo (between Avenida de Constitución and Gran Vía Street). Please, BE PUNCTUAL, we need to get to Cordoba on time or we will miss the guided visit.

-10:00: expected arrival to Cordoba.

-11:00: guided visit to the Ummayyad Great Mosque.

-12:00-13:30: walk around the Old Jewish Quarter.

-13:30: typical lunch at *Federación de Peñas* Restaurant (placed nearby the Mosque).

-15:15: departure towards Antequera.

-16:45: expected arrival to Antequera Dolmen Site. Guided visit to the dolmens.

-18:00: departure towards Granada.

-19:30 expected arrival to Granada (Jardines del Triunfo).

# ABSTRACTS

## Oral presentations / Ponencias (in order of appearance / en orden de aparición)

### The earliest tools made on bones in the southern Levant from Revadim Quarry

**Rabinovich, Rivka.** Ph.D. National Natural History Collections, Institute of Earth Sciences, Institute of Archaeology, The Hebrew University of Jerusalem

**Bello, Silvia.** Ph.D. The Natural History Museum, Earth Sciences, London, United Kingdom.

**Marder, Ofer.** Ph.D. Ancient Near East and Department of Bible and Archaeology, Ben-Gurion University of the Negev, Beer-Sheva, Israel.

At the site of Revadim Quarry (late Lower Paleolithic, Israel) we witness for the first time in the southern Levant the usage of bones as raw material. In spite of earlier reports on the usage of bone as tools from Africa, in the southern Levant such phenomenon is not yet known. The site of Revadim Quarry is very rich in flint implements and has the largest elephant postcranial representation in the area. During the analysis of the fauna several tools made on bones were uncovered. Bone points made on middle size mammals bear clear signs of usage, in addition to "handaxes" knapped in similar ways as flint tools on large mammal's bones. Thus we witness at least two different techno-typological ways (Chaîne opératoire) of bone usage as raw material.

We had to overcome partially encrusted surfaces, exfoliation of the outer surfaces and falling apart fragments while dealing with the techno-typological analysis of the bone made implements. Combining delicate methods of conservation and high definition methods we hope to decipher the role of each group and its usage in the late Lower Paleolithic of the southern Levant.

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### Human and natural modifications on three Gravettian objects: Case study from Dolní Věstonice II (Czech Republic)

**Sázlová, Sandra.** Ph.D. Department of Anthropology at Faculty of Sciences, Masaryk University, Paleolithic and Paleoethnology Research Center Dolní Věstonice, Instit. of Archeology Brno, Acad. of Sciences of the Czech Rep.

**Hromadová, Bibiana.** Ph.D. Associated UMR 7055 - Préhistoire et technologie, Maison René Ginouvés 21

**Ray Perri, Angela.** Ph.D. Department of Human Evolution, Max Planck Institute for Evolutionary Anthropology

**Polanská, Michaela.** Ph.D. Panthéon-Sorbonne University, Paris UMR 7041 - ARSCAN - équipe Ethnologie Préhistorique, Maison René Ginouvés 21

Naturally, the organic material surface changes and possible anthropogenic origin (or exclusion of non-anthropogenic factors) presents the most frequent taphonomic problem. In our case study we selected three objects excavated at Dolní Věstonice II site: a beaver tooth from the unit K7 at Hilltop excavated by Bohuslav Klíma in 1986 and wolf canine and raven femur founded by Jiří Svoboda in unit S1(with burial DV16) in 1987. According to the first naked-eye examination all three objects display traces after modification. The beaver incisor's surface is clearly separated with parallel grooves in dentine running under the occlusal part of tooth. On the raven bone several different traces such as cut marks, depressions and remains after bone modification with specific micro-relief were detected. The traces analyzed on wolf canine are connected to the crown and neck modification; practically, the whole enamel was removed from crown (resembling cut offs on pencil) and residual coronal part represents pointed dentine projection affected by longitudinal fissure extending from the occlusal down to its apical part with absence of the rest of tooth). After closer microscopic examination we can conclude that first object was modified naturally by beaver itself while gnawed heavy object before its death; the second objects bare traces after human defleshing activities on raven; and general morphology of fracture formation on wolf canine, should be perhaps assigned to pressure by pointed extremity and further experimental work will be needed.

Acknowledgement: We thank to Professor J. Svoboda for access to the material and comments; funding for this research was provided by the by the Specific University Research Grant No. MUNI/A/1279/2016 provided by Ministry of Education, Youth and Sport of the Czech Republic.

## The Badegoulian bone and antler toolkit: current state of knowledge

**Pétillon, Jean-Marc.** Ph.D. CNRS, laboratoire TRACES  
**Chauvière, François-Xavier.** Ph.D. CNRS, laboratoire TRACES

The Badegoulian is an Upper Paleolithic culture contemporary with the Last Glacial Maximum and dated ca. 23.5-21 ky cal BP in Western Europe. Since the pioneering work of Allain and his colleagues in the 1970s, and its confirmation by more recent studies, the bone and antler industry of the Badegoulian is first and foremost characterized by the absence of the groove and splinter technique: bone and antler blanks are manufactured only by knapping, before being shaped by scraping into their finished state. However, besides this technological trait, the typology and variability of the bone and antler equipment manufactured during the Badegoulian remains poorly described and understood. What we know about this equipment relies mostly on ancient excavations and studies, and an admixture with Magdalenian material can rarely be excluded. This is why, in these last years and within the context of several collective research projects, the authors have studied or reassessed several Badegoulian assemblages of bone and antler industry from southwestern France, direct 14C dates being done on this industry at all sites. This presentation will show how this recent research has changed our perception of the Badegoulian bone and antler toolkit. These results will then be put in the broader perspective of the evolution from the Solutrean to the Magdalenian in Western Europe.

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## Osseous technology in the Magdalenian of Parpalló (Valencia, Spain)

**Borao Álvarez, María.** Ph.D. student, Dep. de Prehistoria. Universidad de Valencia

Parpalló is one of the most important sites in the Upper Paleolithic in the Iberian Mediterranean area, where Gravettian, Solutrean, Badegoulian and Magdalenian layers are documented. The Magdalenian layers have an abundant and rich toolkit made on bone and red deer antler (*Cervus elaphus*) with a varied typology of tools and weapons as spear points, rods, harpoons, hooks, awls, chisels or needles.

We present in this work, the technological study of this collection in order to establish how this toolkit was made, identifying operational schemes from the different product categories as waste, blanks, preforms and objects.

Different transformation methods are identified in relation with the kind of blank obtained. So we observe a clear predominance of extraction to manufacture flat blanks, segmentation for blanks in volume and an occasional use of other transformation methods that we will discuss.

All this information will be put in relation with other sites of the same culture in order to observe common patterns and differences between them.

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## Exploitation of *Cervus elaphus* antler during the Mesolithic in the Iron Gates

**Margarit, Monica.** Ph.D. University "Valahia" of Targoviste, History Department.

**Boroneant, Adina.** Ph.D. Institute of Archaeology "Vasile Parvan", Romanian Academy.

**Bonsall, Clive.** Ph.D. University of Edinburgh, School of History, Classics and Archaeology, United Kingdom.

The Mesolithic settlements on the left bank of the Danube in the Iron Gates yielded a significant number of artefacts made of *Cervus elaphus* antler. The aim of the present study is to determine whether a unitary chaîne opératoire and raw material acquisition strategy existed for all investigated sites, or whether some intra-site variability existed. A common feature to all sites is the predilection for volume of blanks exploitation, with very few examples of longitudinal debitage. Moreover, products and sub-products of the chaîne opératoire were identified, suggesting *in situ* manufacture of the finished products. The typological repertoire is also quite similar: bevelled objects are predominant, reflecting a specialization in certain activities, such as wood processing. Exploitation of both unshed and shed antler is characteristic of some settlements (e.g., Ostrovul Corbului, Alibeg) suggesting two raw material acquisition strategies: both hunting and raw material gathering expeditions. At other settlements (e.g., Icoana), the absence of the basal portion suggests the antlers were segmented outside the site and only the segments that were to be transformed into tools were brought in. Within the overall unitary picture, there are also specific elements to each site, though whether these were triggered by economic or cultural factors remains to be determined by future research.

### Acknowledgment

This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS – UEFISCDI, project number PN-II-RU-TE-2014-4-0519.

## **The contribution of the osseous material production to the understanding of the Neolithic occupations at Piccioni Cave (Abruzzo-Italy)**

**Fuggi, Angela.** Ph.D. student. Aix-Marseille Université, UMR 7269 LAMPEA.

**Grifoni Cremonesi, Renata.** Professor at Università di Pisa, Dpto. di Civiltà e Forme del Sapere

This presentation assess changes in the exploitation of osseous raw material during the early (5476-4855 cal. BC) and middle (3891-3137 cal. BC) Neolithic at Piccioni Cave. The site is located on the hydrographic left bank of the Orta river at about 300 m asl, in the Abruzzo region (central-Adriatic Italy). Archaeological investigations, carried out between 1957 and 1977 by A. Radmilli and G. Cremonesi, revealed a discontinuous occupation spanning from the early Neolithic (Impressed Ware Culture) to the historical period. Over the time, the cave displays different uses both for short-term occupations, probably linked to hunting activities, and for ritual and funerary practices. The aim of this communication is to investigate techno-economic behaviours applied to osseous raw material exploitation, in order to detect how these technocomplexes reflect the human exploitation of the cave and the neighbouring area.

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## **The worked osseous assemblage from the Early and Middle Neolithic site of Cueva de la Pastora (Caniles, Granada, Spain)**

**Martínez Sevilla, Francisco.** Ph.D. Dpto. Prehistoria y Arqueología. Univ. de Granada.

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The archaeological record and absolute dating of Cueva de la Pastora shed an occupation as an inhabitation site spanning from the Early to the Middle Neolithic. Research has shown the absence of human remains, a large amount of fauna with evidences of consumption, as well as clear evidences related to the manufacture of both stone and bone artifacts. Regarding the worked osseous assemblage, a set of 26 tools and ornaments has been analysed focusing on three main aspects: the identification of the raw material, and both technical and functional approaches. Wild and domestic animal bones were used, with a predominance of *Cervus elaphus* and caprids. Splitting and fracturation were the two main processes to get the blanks, being subsequently shaped by abrading the surfaces in order to get a vast majority of pointed tools, although bevel tools and ornaments made from wild boar tusks have also been documented. The microscopic analysis of their active surfaces has shown that at least part of the assemblage might have been possibly used in textile production.

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## **Raw material selection and the technological choices in the Early and Middle Neolithic in the Central Balkans**

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In this paper will be presented a synthesis of osseous industries from several Early and Middle Neolithic sites from the region of Central Balkans (Starčevo-Grad, Donja Branjevina, Divostin, Velesnica, etc.), with special focus on the technological traits. The predominance of bones may be observed at most of the sites, but with some exceptions, such as high ratio of antlers in the Iron Gates region. Mollusc shells are not numerous, yet present at several sites. The analyses of manufacturing techniques revealed some techniques that may be considered as characteristic and even chrono-cultural markers: for example, production of metapodial awls by abrasion only, making of large holes, transversal grooving, etc. Finally, there are techno-types characteristic for this period and for the region, such as spatula-spoons, some types of decorative items, etc. Regional variations, as well as interesting mixture of Mesolithic traditions and innovations of Near Eastern origin may be observed.

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## **Characteristic manufacturing techniques at the Late Neolithic site Öcsöd-Kováshalom (Hungary)**

**Toth, Zsuzsanna.** Ph.D. Eötvös Loránd Science University, Institute of Archaeology, Dep. of Archaeometry and Archaeological Methodology.

The Late Neolithic tell settlement of Öcsöd-Kováshalom is an important archaeological site at the Great Hungarian Plain. The worked hard animal material assemblage is worth and suitable for studying characteristic manufacturing processes and techniques used at the site and compare with the characteristics observed at other sites of the same time period. The raw material and skeletal element preference such as the processes and techniques used during manufacturing are strongly embedded in the manufacturing traditions of the hard animal materials of the time period,

but besides this differences can be observed between each site. These can be due to variances in weather and natural environmental conditions, but due to different customs of each community. I would like to show the particularities of the community lived at Öcsöd based on the hard animal manufacturing characteristics. These can be detected basically on almost all tool types used in everyday life, such as the different awl types giving the most numerous typological group at each site, the rib burnishers or the hide beamers.

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## **Hunting traps or fishing hooks? Osseous "barbed hooks" from Neolithic-Chalcolithic sites from Southeast Europe and their possible function**

**Savu, Mihaela.** PhD student, Christian-Albrechts-Universität zu Kiel (Germany), Graduate School Human Development in Landscapes

The category of artifacts to be treated in this paper encompasses items shaped as hooks with a large spread and presenting a barb on the exterior side of the bow, close to the distal end. They are made on antler and bone supports with varying sizes, studied examples measuring from 6 cm to 14 cm in length. The cross-section is typically flat-convex and, although the shape of the distal end may fluctuate, one or more perforations are in most of the cases present in this region.

The function of this type of artifact is controversial. An early theory based on ethnographical examples that continues to be postulated is that they were elements of a type of hunting trap, designed for small mammals and birds, although a thorough documentation with actual examples is missing. Other ideas carried forward are that they could have served as belt buckles, or as fishing hooks. The latter hypothesis led to the examination of some of these artifacts coming from Neolithic and Chalcolithic sites on the Lower Danube region, within the frames of a project treating the prehistoric fishing activity in this area. Though not as frequent as the barbed points or common hooks, these implements occur in several sites in Romania (e.g. Pietrele, Căscioarele) and Bulgaria (e.g. Vinitsa, Ruse, Telish), with analogies coming from sites in Hungary and Turkey. This study aims at discussing the morphological features and the raw material choice for these objects, with a focus on the possibilities to interpret their function.

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## **Vinča bone industry: Preliminary observations regarding craft production**

**Koldžić, Vuk.** Ph.D. Institute of Prehistoric Archaeology, Freie Universität Berlin, Germany

Vinča – Belo Brdo, the eponymous site for the late Neolithic and early Eneolithic Vinča culture, is being excavated for more than one century, giving us some of the finest examples of this culture's products. The material coming from the most recent series of excavations has recently been analyzed for a publication about the bone industry, coincidentally with the ongoing research dealing with the presence of the specialized production early in the Balkan prehistory. Since it has been suggested that some elements of the craft specialization could be recognized in some spheres of activities at Vinča sites, in this presentation I will discuss whether the same can be said for the aforementioned assemblage as well, based on the information available at the moment. Contextual data will be considered, along with the attributes of the material itself. Some methodological issues will also be addressed. Although the question of Vinča crafts is probably going to remain open for some time, its relevance will be shown.

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## **The appearance of ivory in the 4th millennium in the Levant**

**Sidéra, Isabelle.** Ph.D. Directrice de recherche au CNRS, Directrice de l'UMR 7055 Préhistoire et Technologie Responsable scientifique et technique du Labex Les Passés dans le Présent, France

**Guyot, Frédéric.** Ph.D. Institut Français d'Archeologie Orientale (IFAO)

Different types of ivory item will be presented, among which some impressive figurines with human traits. In general, the items are very elaborated and this contrasts with the technical treatment of bone. At the site of Safadi, in Beersheva, the conditions of the deposit of the ivory items are very specific and may correspond to a ritual aspect. The communication will present the first results of the study in the context of the site.

## **Settled and Unsettled: Bone working in the late fourth millennium in the Southern Caucasus**

**Choyke, Alice M.** Ph.D. Medieval Studies Department, Central European University

A land of mountains and lush valleys bordering Iran and the great civilizations of the near East, the region comprising southern Armenia and the autonomous republic of Nakhichevan in Arzerbajan was inhabited by pastorlists driving their herds up into the mountains during the late Spring and Summer months and then retreating to more settled surroundings in the valleys. The patterns of bone exploitation at this time period remains relatively unknown. In this paper, the material from three contemporaneous sites of very different character will be compared and contrasted to see the extent to which these groups were isolated or had contacts far beyond the smaller world of their towns, villages and camps. The three, largely late fourth millennium site materials include: the great tell site of Arslantepe in eastern Turkey (levels VIII and VII corresponding approximately to the late Ubaid and Late Chalcolithic), the small pastoralist campsite of Godezor in southern Armenia (corresponding to the very end of the late chalcolithic and partially the very tenuous beginnings of the Kura Araxis Early Bronze Age in the region) and finally Oviçular Tepesi, a semi-permanent settlement from the Late Chalcolithic in the autonomous republic of Nakhichevan, Azerbaijan. The material is still in the process of being studied but already the similarities and contrasts begin to reveal themselves reflecting both connections and disconnects in the way hard osseous materials were used in the region.

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## **Tooth and shell ornaments from the Neolithic through the Bronze Age: diachronic supra-regional patterns**

**Zidarov, Petar.** M.A. Tübingen University, Institut für Ur- und Frühgeschichte und Archäologie des Mittelalters, Jüngere Abt.

The distribution of specific tooth and shell ornaments are sometimes considered as proxies for identification of ethnographic and even linguistic groups during the Upper Paleolithic and the Mesolithic of Europe. In the following periods of the Neolithic and the Bronze Age their diversity is seemingly reduced but also unified across much broader geographic and cultural zones posing a challenge to most traditional models used to define modes of social interaction, status and identity in the archaeological record.

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## **Objects of personal use made of osseous materials in the Late Neolithic and Early Bronze Age of southern Poland**

**Winnicka, Kinga.** Ph.D. student. Institute of Archaeology, University of Wrocław, Poland

During the last WBRG meeting in Iași, Romania in May 2016 I had the opportunity to present an introduction to my PhD dissertation *Early Bronze Age Objects of Personal Use Made of Bone: Their Materiality and Meaning* and some of the preliminary results regarding 'pointed objects' originating from two SE Polish sites. In this paper, I would like to provide a broader context to my research and place the materials within the Stone Age/Bronze Age transition period in Poland. I intend to focus on objects of personal use made of bone, antler and teeth (shell is only mentioned) found in burials of different cultural entities, mainly Corded Ware, Bell Beaker, epi-Corded Ware (Mierzanowice and Strzyżów) and Únětice. I am foremostly interested in continuity/discontinuity in regard to form, raw material selection and bone technology. In my presentation I will address the issue of beads – whether their abundance or scarcity, shape and material they were made from, can be socially and symbolically significant. I will also tackle the problem of function based on use-wear analysis and change in the raw material chosen for the manufacture of pins. In conclusion, I hope to reflect on cultural change and continuity in regard to bone objects of personal use from sepulchral context.

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## **A Comparative Techno-Typological Approach to the Ivory of the Valencina de la Concepción (Seville) Copper Age Site: the Montelirio and 10.042-10.049 Tholos-Type Structures**

**Luciañez Triviño, Miriam.** Ph.D. student. Dpto. de Prehistoria, Universidad de Sevilla.

**Provenzano, Nöelle.** Ph.D. CNRS, Lattes, France.

**García Sanjuán, Leonardo.** Ph.D. Dpto. de Prehistoria, Universidad de Sevilla.

**Schuhmacher, Thomas X.** Ph.D. Instituto Arqueológico Alemán, Madrid.



The Copper Age ivory assemblage from Valencina de la Concepción (Seville) is of great scientific value both because of its quantity and exceptionality as well as the information it provides at a technological, functional and contextual level. Valencina has yielded a broad diversity of object types (including vessels, boxes, decorated plaques, handles, combs, figurines, beads, etc.) and with 8.7 kg so far recorded is also the site with the highest quantity of this material in Copper Age Iberia.

In this paper we present the preliminary results of the techno-typological study of the ivory items found in two major tholos-type megalithic constructions: Montelirio and 10.042-10.049. Our ability to understand the technological process involved in these two assemblages is limited by the scarcity of manufacturing debris and other analysis categories, and the prevalence of finished objects in the site. However, looking at the shape of the finished products and the orientation of the ivory structure in them, it has been possible to define and propose two main *forms of transformation* of the tusks: transversal and longitudinal. From this observation it is possible to suggest a typology based on the manufacturing way.

We contend that in the future, the technological approach will make possible a comparison of ivory assemblages from different sites, helping us to distinguish between those choices imposed by the intrinsic properties of the material or functional purposes, and those made by purely cultural or ideological reasons.

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### **Bone artifacts from Chalcolithic funerary contexts in the Eastern and Southeastern Iberia. The pointed flat rods**

**López Padilla, Juan Antonio.** Museo Arqueológico de Alicante MARQ.

One of the most characteristic bone objects in the Late Neolithic and Chalcolithic funerary record of the South-Eastern area of the Iberian Peninsula are the so-called "pointed flat rods". They appear mentioned in that way in many of the papers published from the beginnings of XXth century. However, their identification, description and functional attribution have not ceased to be problematic. This paper focused in the manufacturing techniques employed in the production of these bone artifacts and evaluates the different hypotheses related with their supposed use as hairpins, awls or cosmetic palettes -among others- taken into account the archaeological contexts recorded in some recent excavations and the analysis of ancient collections stored in museums.

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### **Bronze Age antler and bone spindle whorls in the Southeast of Iberia**

**Basso Rial, Ricardo E.** M.A. Dpto. de Prehistoria, Arqueología, Hª Antigua, Fª Griega y Fª Latina. Univ. de Alicante

**López Padilla, Juan Antonio.** Ph.D. Museo Arqueológico de Alicante MARQ.

The elaboration of spindle whorls for the manufacture of thread by the use of spindles is attested in the Iberian Peninsula from the end of the Neolithic. However, there are no evidences of the use of other materials than stone or pottery to produce them in this period. In the Southeastern area of the Iberian Peninsula, spindle whorls of bone and antler begin to appear in archaeological contexts from 1700 cal BC. In this paper we analyze the two different types of spindle whorls attested and the manufacturing techniques used in their elaboration. Likewise, we deal with the meanings of its presence in the framework of the textile production of Middle and Final Bronze Age.

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### **Bone and antler objects used as grave goods in Bronze Age Poland**

**Baron, Justyna.** Dr. Hab. University of Wrocław, Institute of Archaeology

**Diakowski, Marcin.** Ph.D. University of Wrocław, Institute of Archaeology

**Nowak, Kamil.** Ph.D. student. University of Wrocław, Institute of Archaeology

We assume funerary patterns were known (learned or rather sensed) and shared by even very small local groups. The rites included the deposition of carefully selected objects made of various materials – ranging from unique and exotic ones to extremely common ones.

Grave goods are a fascinating category of objects and have been studied from the very beginning of professional archaeology. They are considered to be the personal belongings of the deceased person or gifts offered by a community. In this presentation we want to discuss bone and antler objects that were used as grave goods in the Bronze Age (c. 2350-750 BC) in the territory of SW Poland. This area, together with parts of the contemporary Czech Republic, Moravia and Germany were a cultural zone displaying completely different development dynamics compared to other parts of Poland. *This area is believed to have rapidly developed as a centre of bronze working*

*which stands in complete contrast to eastern Poland where metal grave goods were extremely rare, but those of bone and antler were prevalent.* Reference to the studies on early metallurgy is important here as bone objects found in graves in SW Poland have not received much attention. The main focus was placed on metal (copper and then bronze) artefacts and the forms of vessels – both useful in studies on chronology and provenance in the case of so-called imports. Bone grave goods have been considered to be the remains of an older Eneolithic tradition which were rapidly forgotten and replaced by metal objects. We do not agree with this view and instead argue that they played an important role in funerary patterns of Bronze Age communities.

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## **Figural Roman bone handles from Mursa**

**Kovac, Marina.** M.A. Archaeological Department. Museum of Slavonia (Croatia)

This paper deals with four figural handles from the Collection of Roman bone objects of the Museum of Slavonia in Osijek, Croatia. This Collection holds 19 Roman bone handles divided in four different types: Figural handles, Double-sided knife handles, Various full handles and Cylindrical handles. Three figural bone handles are clasp-knife handles (*culltelus*) and anthropomorphic displays are featured on two of them (murmillo gladiator and Heracles). The third one is zoomorphic with a representation of a pig. All three objects are made of compact long bone tissue of large mammals (cattle or horse). The fourth artefact is made of ivory, probably a patera handle with a lion's head ending. Since this last handle was made out of an expensive raw material and it is clearly a high-quality piece, we believe the finding came to Mursa as an import, while the other handles may have been manufactured locally.

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## **The Witnesses of Cultural Continuity in Tatarlı Höyük: The Bone Artifacts**

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**Gerçek, Hakan.** MA. Osmaniye Korkut Ata Üniversitesi Fen-Edebiyat Fakültesi Arkeoloji Bölümü Karacaoğlan Yerleşkesi

Tatarlı Höyük which occupies the east of Çukurova, which is home to fertile soil, and west of Amanos Mountains a noticeable settlement because it is located in the middle of important routes and because of its unique position in the ancient geography. Excavations ongoing since 2007 shows that this site was an uninterrupted settlement from Neolithic Period to Hellenistic Period and it was determined that some parts were used as a graveyard in Byzantine Period.

Small finds are the true reflectors of cultural continuity in Tatarlı Höyük. In the settlement, a large number of finds related to weaving have been unearthed especially in the works carried out on Hellenistic, Iron Age and Early and Middle Bronze Age layers. Terra cotta loom weights and spindle whorls as well as bone weaving tools such as spindle whorls, and needles are among the main groups. It is the evidence of economic importance and continuity of the weaving industry at Tatarlı Höyük. In addition to the weaving tools, bone artifacts with different purposes have an also important place in the find repertoire of the mound. In this article, an assessment will be made about the bone artifacts found in the Tatarlı Höyük.

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## **Bone artifacts from Roman cremation burials: methods, results and conclusions**

**Deschler-Erb, Sabine.** PD. Dr. IPAS, University of Basel.

Among sieved sediments of cremation burials quite often small fragments of calcined worked bones can be found. The types of worked bone differs considerably from contemporaneous settlements finds.

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## **Late Roman bone and ivory carvings from Jerusalem**

**Shatil, Ariel.** M.A. The Hebrew University in Jerusalem / Israel Antiquities Authority

During the past several years excavations in the City of David in Jerusalem unearthed a large urban mansion dating to from the middle of the 3rd to the 4<sup>th</sup> century AD. The building, which stood for less than 100 years, collapsed in an



earthquake in 363AD. In the thick layers of destruction a large assemblage of bone, ivory and horn objects was collected from well stratified contexts. The assemblage includes typical Late Roman period objects, among them a few hundreds of pins, needles, writing implements, spoons, veneer inlays and carved bone and ivory tablets with mythological motifs. The assemblage is important not only because of its large size, but also because of its short and well defined chronological frame, its well stratified context, and because of the fact that it originates from a single building.

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## **Artefact Geographies of the Viking Age: new answers to old questions**

**Ashby, Steve.** Ph.D Dept of Archaeology, University of York

**Muñoz Rodriguez, Mariana.** Ph.D. student. Dept of Archaeology, University of York

This paper will introduce the SAAGa (Sourcing Antler and Artefact Geographies) project. This is a new initiative, funded in part through the EU ArchSci2020 project. Building on previous work (by ourselves and others) on Viking-Age and medieval hair combs, this project will apply biomolecular techniques to track the production, distribution, and deposition of hair combs across the Viking world. As proxies for trade, travel, and migration, these objects have relatively untapped potential to address some of the big questions in Viking-Age archaeology, and push the study of worked bone to the forefront of the field. In this paper, we will lay out the project's aim, objectives and methods, and present some initial results.

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## **The Antler Raw Material Using in the Hunno-Sarmatian Period in North Altai**

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Antler is a specific kind of raw material which was an important part of the traditional manufacture. Every region has some characteristic features which could be observed in the quantity of the available raw material, the way of acquiring it, and in the product assortment in the specific period. North Altai is a broad region where a big variety of antler possessing animals are living. Several seasonal migration routes of the roe cross this territory. Due to the fact that this region is situated in the zone of the active cultural contacts, raw material of yaks from far south regions could be also found. The processing of antler during the Hunno-Sarmatian period (first half of the 1st millennium CE) is well proven on several archaeological sites. All of those sites are situated in the intermountain valley of the Lower Katun, which was used to be the main transport route in antiquity. The assortment of antler products is composed of variety of items i.e. inter alia, different types of the bow elements, arrowheads, horse tack elements, tools and musical instruments. The natural presence and quantity of the specific antler material affects the differences in occurrence of the particular items and influences the accuracy of processing. Especially interesting are the spots connected with the production of bow antler elements and repairing on the Mayma culture sites. Generally, assortment of antler items of the Hunno-Sarmatian period from the North Altai is typical to the broader region of the South Siberia, Central Asia and the forest steppe of Eastern Europe.

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## **Learning from cattle scapulae: the process of islamisation and arabisation of medieval iberia (8th-10th centuries)**

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**Casal, M<sup>a</sup>. Teresa.** Instituto de Historia. CSIC

**Fuertes, M<sup>a</sup> del Camino.** (RECA-Córdoba)

**Moreno-García, Marta.** Ph.D. Instituto de Historia. CSIC

The islamic conquest of Iberia at the beginning of the 8th century was a far-reaching process that implied the profound transformation of the social and cultural structures of former Visigothic Hispania. From 711AD and during the following two or three centuries most part of the Iberian Peninsula –known from that point onwards as al-Andalus– was incorporated into a wider islamic cultural and religious *koiné* that encompassed North Africa, the

Levant and far beyond. Two of the most remarkable historical processes of this period were the islamisation and arabisation of the indigenous population.

This paper deals with the presentation of a set of worked bovid scapulae dated between the 8th and the 10th centuries recovered from two different sites of Madinat Qurtuba, the capital of al- Andalus at that time. While some of them bear parallel lines engraved on the bone suggesting their use as writing supports, one shows an Arabic inscription. Our aim is to review similar findings from other areas of al-Andalus and to provide a sociocultural interpretation of these artefacts as material markers of the religion (Islam) and language (Arabic) imposed by the incomer rulers. From this perspective, they may have been conceived as ideological expressions of the new society that was in the making during the early medieval period in Iberia.

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## **Worked bones from the medieval Castle of Buda**

**Font, Agnes.** B.A. ELTE Institute of Archaeological Sciences

Systematic excavations in the area of the medieval Buda castle started in 1948. This is one of the most important Hungarian medieval archaeological sites, and its research has been conducted for very long time. Although medieval boneworking in Buda is fairly well-known, a comprehensive publication of the worked bone finds has not taken place yet. Most of the objects come from the excavations between 1951 and 1952. The location and the dating of the finds are varying widely both in space and time. Some of them have been imported into the city as finished products (like the ivory combs, knife handles), while some of them seem to be produced locally (for example beads, buttons, tool handles, etc.). The material is interesting not only in quantity, but also in terms of quality; its examination contribute a lot of useful information to the Hungarian bone working traditions.

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## **Bone and antler working in the Vilnius Castle complex in the Late Middle Ages and Early Modern Time**

**Luik, Heidi.** Ph.D. Vilnius Univ, Dep. of Archaeology; Tallinn Univ., Archaeological Research Collection

**Piličiauskienė, Giedrė.** Ph.D. Researcher Department of Archaeology Vilnius University

**Blaževičius, Povilas.** Ph.D. Dep. of Archaeology, Vilnius Univ. / Nat. Mus. the Pal. of the Grand Dukes of Lithuania

Numerous bone and antler working debris and also several unfinished bone and antler objects have been found from the territory of the Vilnius Castle complex – the Upper and the Lower Castle and the Palace of Grand Dukes of Lithuania. Cattle bones were used most often, but horse bones were also quite common raw material. Bone working debris is rather standardised, most numerous among the waste are sawn off epiphyses of metapodial bones. Metatarsals are much more numerous than metacarpals; one reason for such choice could be that the shape of the diaphysis of metatarsal bone was more suitable for turning bone artefacts. Various turned objects are quite common among the bone artefacts from the Vilnius Castle complex. The other type of bone waste comes from manufacturing rosary beads. Most of the bead making waste was found from the area near the Cathedral.

Antler working waste is not as standardised as the bone working waste. All parts of antler – tines, beams, palmates, and burrs – are represented among the waste, both of elk antlers and red deer antlers. Shed antlers as well as antlers of hunted animals were used. Horn cores with sawing marks are not numerous, in addition to cattle horns bison and aurochs horns were also used.

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## **Bone hoes from the Middle Iron Age, Limpopo Province, South Africa**

**Bradfield, Justin.** Ph.D. Evolutionary Studies Institute, University of the Witwatersrand.

**Antonites, Annie.** Ph.D. University of South Africa

We present the first recognised evidence of bone hoes in South Africa. Two bovine scapulae and a portion of a long bone show use-trace evidence that supports our interpretation as ground-working implements. The scapulae were probably hafted onto wooden handles using a combination of plant fibres and sinew, whereas the tool made from the long bone appears not to have been hafted. Bone hoes represent a short-lived technological innovation, although the reasons to account for this remain speculative. The recognition of these agricultural implements poses interesting questions about the extent and variety of bone working among Iron Age agriculturalists in the Limpopo Valley during the 10<sup>th</sup> – 13<sup>th</sup> centuries AD, and potentially also about the nature of women's work in these communities.

## Multidisciplinary study of bone tubes with Tiawanaku iconography excavated in cemeteries of San Pedro de Atacama, Chile

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**Santander, Boris.** Ph.D. Universidad Alberto Hurtado, Departamento de Antropología, Santiago de Chile  
**Sidéra, Isabelle.** Directrice de recherche au CNRS, Directrice de l'UMR 7055 Préhistoire et Technologie, Responsable Scientifique et Technique du Labex les Passés dans le Présent, France  
**Figuerroa, Valentina.** Ph.D. Universidad Católica del Norte, Instituto de Arqueología y Antropología  
**Echeverría, Javier.** Ph.D. Universidad de Santiago de Chile, Departamento de Ciencias del Ambiente.  
**Legrand-Pineau, Alexandra.** Ph.D. CNRS Nanterre.

Our paper intends to disclose an artifact little known and not studied in detail up to here by specialized literature; it is a set of 14 tubes of animal bone, with container function, and which present a very specific Andean iconography. The zooarchaeological analysis indicates that the material used corresponds to camelid humerus, and that the technique of the majority of the sample is not pyrogravure - as had been maintained in the local archaeological literature, but on the contrary, the designs were achieved through the paint application. This type of artifact comes from funerary contexts of different cemeteries of San Pedro de Atacama, and belong to the Middle period or Tiawanaku Horizon (ca. 400-1000 AD). According to the iconography embodied in most of these tubes (Sacrificer with features of feline or Andean deer), it is plausible to raise, its association to the hallucinogenic paraphernalia, which constituted the material basis of the practice of inhaling psychoactive plants among the ancient Atacameños in a strict sense, and among societies Pre-Hispanic of the central-south of the Andes, in a wider sense.

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## Worked bone from the site of La Montesita (Aguascalientes, Mexico)

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**Herrera Buenrostro, Kenia.** Facultad de Ciencias Sociales y Humanidades, Universidad Autónoma de San Luis Potosí (San Luis Potosí, México)  
**Pérez-Roldán, Gilberto.** Ph.D. Facultad de Ciencias Sociales y Humanidades, Universidad Autónoma de San Luis Potosí (San Luis Potosí, México)

We present the study of the bone industry from the archaeological site of La Montesita (Aguascalientes, Mexico). This site is being studied by the project led by Dr. Schulze and Dr. Pérez Roldán. The site is located in the state of Aguascalientes; approximately dated to the Epiclassic, from AD 900 to 1200. The distribution of the settlement is semi-sparse, where the majority of the housing units are located on the Montesita hill, hence the name. We analyzed a set of 27 pieces, made on bone. Within the set stands out the presence of awls. Our analysis will focus both in its typological classification and on technological and functional analysis through of the observation de visu of the pieces, the microscopic study and the comparison with results obtained through experimental archaeology. Likewise, we will emphasize the distribution of the bone tools in the different spacial contexts of the settlement. All this will allow us to obtain a global view on the recovered bone industry at the Montesita site, and therefore, through this material culture, approach a detailed understanding the different ways of life in this settlement of the North-Center of Mexico, the region of great archaeological value to which less attention has been paid by researchers.

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## Statistical image analysis of use-wear of experimental bone tools. First results

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In the last decades, a multitude of new methods of use-wear analysis - qualitative or quantitative - have been applied, generally associated with lithic artefacts. On the other hand, in the case of bone tools there has not been such a wide development of quantitative methodologies.

In this communication, we present a quantitative approach to the treatment of the numerical variables related to formation processes of striae marks. In this first experimental approach, we have used images of the bone instruments surfaces, obtained with a metallographic microscope, during different stages of the work of different materials (clay, skin and plant fibres). By grouping the numerical values and treating them statistically, a more objective description of the superficial characteristics of use-wear is obtained. The first

results evidenced a direct and solid relationship between the characteristic patterns of striae marks and the worked material.

The results of the application of this method are part of a wider program that, once developed, will allow to evaluate the effectiveness of different parameters to increase the objectivity of the functional interpretations on the traces of use of archaeological bone tools.

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## **Use-Wear Analysis of Bone Tools from Arnhem Land, Australia**

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Researchers working in Australia and abroad have shown that bone artefacts, including bone points, benefit from an analysis of archaeological use-wear. These analyses provide information which a sole focus on artefact morphology may not reveal. Ethnographic records from around Australia note that bone points could be used for a variety of activities. These uses included spear tips, fish hooks, awls, processing tools, implements for fibre craft, and items for personal ornamentation. This paper presents archaeological and experimental use-wear data used to investigate bone points uncovered from Holocene deposits of the Madjedbebe (formerly Malakunanja II) rockshelter in Arnhem Land, in Australia's Northern Territory. The assemblage includes incomplete single-pointed pieces and largely intact double-pointed pieces, the majority of which are between 10mm and 50mm in length. Previous analyses of bone points from this region have examined their use as spear tips, shellfish picks, or awls. Generally, detailed experimental and use-wear data have not been a major component of this research. Supported by a broad experimental series, use-wear analysis of the Madjedbebe bone points reveals that these tools may indeed have been used for a range of different purposes – reinforcing and expanding upon previous interpretations of similar assemblages.

## ABSTRACTS

### Posters

#### **Late Magdalenian art from Poland – a case of ornamented antler piece from Krucza Skała Rockshelter (Kroczyckie Rocks)**

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The area of Kraków-Częstochowa Upland is an invaluable source of knowledge about Palaeolithic communities in Poland due to large number of archaeological cave sites. Among them the Final Palaeolithic localities are rather rare and one of them is Krucza Skała Rockshelter. The excavations on the mentioned site were conducted in 1989-1992 by the Archaeological and Ethnographical Museum in Łódź under the direction of Krzysztof Cyrek. The Krucza Skała Rockshelter site is mostly known from a very interesting fragmentary preserved object made of antler, covered with complex ornamentation, identified with Late Magdalenian tradition. Most likely it is a part of the so-called baguette demi-ronde, a typical object in Magdalenian. The artefact was directly AMS dated to a middle part of the Allerød oscillation (11920±70 uncal BP, Poz-2974). It was a subject of detailed taphonomic and microscopic analyses, which revealed the subsequent steps of ornament manufacturing.

The goal of the proposed presentation is to present the results of performed technological and contextual analysis of this artefact. The study was supported by National Science Centre, Poland, grant number 2014/15/B/HS3/02472

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#### **Equid “idols” from Tepecik-Çiftlik, southern Cappadocia, Turkey**

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Excavation at the Pre-Pottery Neolithic, Pottery Neolithic, and Early Chalcolithic site of Tepecik-Çiftlik in the Nigde region of Southern Cappadocia, Turkey, have been conducted since 2001 under the direction of Professor Erhan Bıçakçı of Istanbul University. The excavations have yielded a rich assemblage of worked bone objects dating to the Neolithic and Chalcolithic Periods. One of the striking features of the assemblage is the presence of approximately 250 bone “idols”. These objects were made by flattening the dorsal and plantar/volar surfaces of equid first phalanges. Some also show more elaborate decoration. Measurements taken on these bones indicate that wild horse (*Equus ferus*) and hydruntine (*Equus hemionus hydruntinus*) proximal phalanges were used to produce these bone objects. This paper will illustrate how these bone objects were manufactured and how they were distributed within the site.

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#### **Productions steps of anthropomorphic bone figurines – examples from the Chalcolithic tell settlement of Pietrele (RO)**

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Through the researches carried since 2002 at the Chalcolithic (5<sup>th</sup> millennium BC) mound and surrounding flat settlements at Pietrele - “Măgura Gorgana” (Romania) an outstanding possibility is given to study artefacts of all kinds and materials, as well as the technological process involved in their production. Taking as an example only the anthropomorphic representations, a preliminary overview shows that almost 600 complete and fragmentary items were found at the site in Pietrele, of which 160 are made on hard animal material and were usually classified by scholars in three groups (vaulted, flat and prismatic). This paper will focus on the category of the flat bone figurines and on the display of various anthropomorphic features. Based on the presence or absence of some of these elements it can be distinguished between preforms, finished and repaired/transformed items. The study will show the preliminary results in this sense, for which microscopic analysis are considered as the next step in the research. To

sum up, the examination of the flat figurines from the site at Pietrele has the aim to trace the operational sequence in the production of this category of artefacts by comparing with examples from other sites dated to the 5<sup>th</sup> millennium BC, in the neighboring region.

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### **First data about the bone and antler exploitation from the prehistoric lakeside settlement Anarghiri IXb, Western Macedonia, Greece**

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First data about the bone and antler exploitation from the prehistoric lakeside settlement Anarghiri IXb, Western Macedonia, Greece

In the last decade the intensive rescue excavations of the Archaeological Service of Florina unearthed a great number of prehistoric settlements close to the four lakes of the Amideon basin that date back from Greek Early Neolithic (c.6800-5800 BC) to Greek Middle Bronze Age (c.2200/2100-1600/1500).

The ongoing excavation of the Anarghiri IXb settlement yielded an impressive and diverse assemblage (more than 5000) of bone and antler artifacts which shows that, as in the prehistoric lakeside settlements of Central Europe, the osseous artifacts played an important role in the everyday activities of the inhabitants of the wetland sites of the region. In this poster, there will be an attempt to present some of the most important osseous artifact categories of the settlement.

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### **The life of Neolithic pointed tools. The reshaping incidence on their typology at Colle Santo Stefano (Abruzzo-Italy)**

**Fuggi, Angela.** Ph.D. student. Aix-Marseille Université, UMR 7269 LAMPEA.

The early Neolithic site of Colle Santo Stefano, in central-Adriatic Italy, yielded a rich assemblage made from osseous raw material. Caprinae long bones were widely used to craft a broad spectrum of pointed tools showing different manufacturing techniques and degrees of work investment. A techno-functional analysis was carried out on a sample of them obtained by a breaking and partitioning procedure. The study has enabled the individuation of a long life-cycle of a part of the tools, pointed out by a generalised reshaping.

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### **Antler work in two well-dated Copper Age contexts of Middle Guadalquivir Basin (Southern Iberia)**

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As in many sites of north Atlantic strip, antler work is a technology also known since Upper Palaeolithic in the South of Iberian Peninsula. However, apart from the opportunistic use of non-transformed elements as antler-picks, this is a subject barely treated specifically in Neolithic and Copper Age Archaeology of the latter region. This brief contribution focuses on the find of three antler elements from Andalusian sure of La Minilla (La Rambla, Cordoba), which is dated around the middle of the 3rd millennium BC. The other is a modified shed antler beam and basal part associate to collective burial, dated back to the end of 4th millennium Cal BC, and located in the same place where is now the city of Cordoba. In this case interpretation is not easy, and could be viewed as waste terminal material from manufacturing processes or as well as part of an indeterminate tool. These characterise the beginnings and summit of the Copper Age in the Middle Guadalquivir Basin.



## **The adornment objects in shell and animal bone of the hypogeum of Padru Jossu ( Sanluri, Sardinia, Italy)**

**Pau, Claudia.** Ph.D. Departamento de Prehistoria y Arqueología, Universidad de Granada.

In the present work we have examined the personal adornment in shell and in animal bone items from the Bell Beakers period at the hypogeum of Padru Jossu, Sanluri (Sardinia, Italy) currently preserved in the Museo Civico Archeologico Villa Abbas of Sardara. A complete study of this material has been performed (morphologic, technologic, functional) in order to understand the manufacture process, their functional life, their social meaning and role, as well as their provenance.

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## **Thong smoothers from Early Bronze Age sites in South-western Hungary**

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Boomerang-shaped tools with notches were identified at two recently excavated Early Bronze Age (Somgyvár-Vinkovci culture) sites in southern Transdanubia, Hungary. This type of tool was first identified at the Copper Age site of Botai in Kazakhstan, occupied in 3600–3100 BC. Horse remains, dominating at this site by 99%, served as raw material for most of the artifacts, 30% of which were classified as thong smoothers (Olsen 2001). Contrary, the western Hungarian thong smoothers dated to 2570–2470 cal BC and 2480–2340 cal BC, respectively, were made from cattle mandible, similarly to the Early Bronze Age specimens found in central Hungary (Choyke 2013) and Slovenia (Choyke 2010).

Choyke, A. M. 2010. Not the Plastic of the Past: The significance of worked osseous materials in archaeology. In: Gömöri, J. & Körösi, A. (eds) *Bone and Leather*, 19–30, Budapest.

Choyke, A. M. 2013. Hidden Agendas: Ancient Raw Material Choice for Worked Osseous Objects in Central Europe and Beyond. In: O'Connor, S. & Choyke, A. M. (eds) *From These Bare Bones*, 1–13, Oxford.

Olsen, S. L. 2001. The importance of thong-smoothers at Botai, Kazakhstan. In: Choyke, A. & Bartosiewicz, L. (eds) *Crafting Bone*, 197–206, Oxford.

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## **Processing of the osseous materials in Linear Band Pottery Culture societies from the area of Poland. Technological, archaeozoological and use-wear approach.**

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We will present the results of the archaeozoological, technological and use-wear analysis of 20 osseous artefacts, coming from three sites of the Linear Band Pottery Culture (LBPC), located in different parts of Poland: Chelmno Lakeland (Trzciano, site 40), Kuyavia (Bodzia, site 1) and Sandomierz Highland (Tominy, site 6). The collection is morphologically diverse, however particular types of points dominate. In the course of the analyzes conducted, we have observed clear regularities in the manufacturing processes of the stylistically similar artefacts, coming from individual collections, differentiating them from other collections. Therefore, it is possible to speak about discrepancies in the chaîne opératoire used in their production by the LBPC communities living in different areas of Poland. Similar differences were observed in the course of use-wear analysis. We have identified here tools used for many tasks, often very specific. An important conclusion from the studies is a thesis of probably specialized profile of workshops that the analyzed collections come from.

The study was supported by National Science Centre, Poland, grants number: N N109 226140 and 2015/19/B/HS3/01720.

## **Cylinders, discs and terminals: Composite bone objects from Roman Funerary Deposits**

**Greep, Stephen.** University of Amsterdam.  
**Rijkelikhuizen, Marloes.** MA University of Amsterdam.

Several fragments or elements of well made, composite bone objects have been excavated in funerary contexts from the Roman period in Northwestern Europe; early work suggests that these forms belong primarily to the later second and third century. Throughout the years, researchers have described different possible functions of these collections of associated objects, but none of them were satisfactory. The objects in question were made of several bone elements – a cylinder, a disc and small knob or terminal. These elements have been found together, but also separately. Only a few complete finds are known, which gives us a unique insight into the appearance of the staffs. In this poster presentation we discuss the interpretations that have been given thus far and describe the staff finds from Northwestern Europe.

Despite different research problems, such as unclear contexts or the question if certain excavated elements are part of these forms, we are trying to answer research questions, such as the possible chronology, the function of the objects, or whether they were symbolic objects only. Were these objects specifically manufactured as grave objects? Were they elements of furniture or even objects of female symbols as sometimes has been suggested?

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## **Possible antler mining tools from the Eneolithic mine on the mountain Rudnik (central Serbia)**

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**Antonović, Dragana.** Ph.D. Institute of Archaeology, Belgrade, Serbia

The mountain of Rudnik in central Serbia, near the town of Gornji Milanovac, is famous for its rich resources in ores, and also for its rich remains from the past, mainly from Medieval and pre-Modern period. Archaeological evidence show that ores were exploited during the Roman and prehistoric times as well. Recent excavations at the location on the mountain top of Mali Šturac revealed traces of mining activities which can be dated into the Eneolithic period. Majority of finds are stone tools used in ore extraction. Due to unfavourable taphonomic conditions, namely chemical composition of the soil, the finds of organic materials are extremely rare. In this poster will be presented finds of rare, severely fragmented antler tools, last one recovered in 2016 season. Due to their bad preservation, very little can be said on their techno-typological features. However, these finds are important for analyses of prehistoric mining techniques and prehistoric technology in general.

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## **The Production of Antler Objects during the Bronze Age in the East and Southeast of the Iberian Peninsula. El Cabezo Redondo (Villena, Alicante, Spain)**

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Antler is a material profusely used during the Prehistory. Since 1700/1600 cal BC., with the transformations leading to what we know as Late Bronze Age in this territory, there is an extraordinary increase in the exploitation of the antler as a material to create very varied productive objects. In a context related to the rise of artisanal activities, with an improvement of metallic tools -made of authentic bronze- and the techniques, which allowed to obtain diverse supports and, subsequently, utensils with a wide range of functions.

The archaeological site that allows us to document this process the best is Cabezo Redondo: a settlement characterized by a proto-urban organization on a hillside, whose chronology comprehends a substantial part of the II millennium cal BC. In this site, a wide variety of instruments made of this raw material has been documented. Moreover, the productive process of devices made of antlers has been registered almost completely, since the supply of raw material until its rendering in certain spaces, or its final consumption in others.

This overview can be extrapolated to other sites in the Southeast, such as the sites in the Cerro de la Encina or in Castellón Alto, in Granada, even though the records are fewer. The diversification of the production and the increase of products made of antlers since 1700 and more particularly in 1500 cal BC, could be therefore related to the former argaric territory and its surroundings, where there would be a larger availability of metal.



## Los Millares' bone industry

**Maicas Ramos, Ruth.** Ph.D. Departamento de Prehistoria, Museo Arqueológico Nacional (Madrid)

Los Millares is a very famous place in Late Prehistory of Iberian Peninsula, but there are many poorly known aspects of this site, bone industry are one of them. A preliminary study of osseous materials from Siret's collection is presented. The worked bones from Millares in the Museo Arqueológico Nacional are formed by approximately one thousand and a half pieces made with bone, ivory or shell resources. In contrast to other ensemble from the rest of necropolis in Almería, Millares' bone industry is characterized by a great number of symbolic items and ornaments and few pointed tools.

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## On the track of bone anvils in Mallorca

**Valenzuela Oliver, Alejandro.** Ph.D. Investigador postdoctoral Juan de la Cierva. Universitat de Barcelona - Departament d'Història i Arqueologia.

The triangular-shaped marks of the bone anvils have been a very active topic in the archaeological literature for years. Having established the ultimate function of the bone anvils through ethnographic studies, the research has begun to focus on the establishment of the origin, chronological framework, and dispersal patterns of these implements. According to the last data summarized, the temporal and spatial distribution of the bone anvils is very wide, but there are still some regional gaps in the data. Following this path, this paper presents the results of a general survey in the island of Mallorca (Western Mediterranean) focused on the location and study of new bone anvils. The artifacts recovered were made from the diaphysis of long bones of cattle and horse and are mainly dated between the 11th-18th centuries AD.

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## Use-wear analysis of harp seal penis bone scrapers from Sventoji sites (3500-2500 cal BC)

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The Sventoji sites are the best known Subneolithic-Bronze Age (3900-500 cal BC) sites on the west coast of Lithuania. Sites are of supra-regional significance and importance of the underline the partly brilliant preservation conditions. Sventoji is being explored by archaeologist since 1967. May of ca. 60 sites are wetland sites with waterlogged archaeological layers. Large quantities of pottery as well as wooden and bone artefacts, fishing gears were unearthed during the excavations. Most bone tools found at Sventoji (approximately 250 pieces) could be dated to period between 3500-2500 cal BC and come from the sites of Narva and Globular Amphora Cultures. Previous studies show that the most used animal species in bone artefacts making was elk (*Alces alces*), however seal bones were often used as well. In our poster, we will present results of use-wear analysis of bone scrapers made from harp seal (*Phoca groenlandica*) penis bones. Distinct use-wear traces were observed with the help of a stereomicroscope MBS-9 with magnifications from 6x to 70x. They consisted of "hide" polishing and striations indicating use of the bone as a side scraper for hide treatment. Areas at both ends of bone exposed traces of handling the bone with hands during work. Besides these, traces of smoothing of one end of the bone for accommodation purposes with a flint scraper were also observed.

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## Bone tools used for spinning and weaving from Stobi

**Kovancaliev, Zlatko.** M.Phil. National Institution for Management of the Archaeological Site of Stobi – NI

The poster presents the analysis of 31 bone objects from the Roman city Stobi, the capital of the late Roman province Macedonia Secunda. The site is located in the central part of the R. of Macedonia, at the confluence of the rivers Crna and Vardar (ancient Erigon and Axios).

Numerous movable finds were discovered in almost a century of excavations. Among the vast bone assemblage, there are 19 objects identified as tools used in the process of spinning and 12 objects used in the weaving techniques. Greater part of the tools is comprised of spindles, spindle whorls, distaffs, pin beaters, and weaving tablets. Some

tools have traces of use wear preserved, which offers additional information for the way they were used. Of special importance, as rare finds are the set of weaving tablets and the rigid heddle. Drawings reconstructing the suggested method of tools for weaving strips, belts and bordures are illustrated.

Similar objects are discovered at various sites around the Roman Empire as they were indispensable tools of the two essential processes for producing textiles. The presented tools, were totally neglected in previous publications, and the current results, allows a glimpse of the spinning and weaving techniques at Stobi in the period between the 1<sup>st</sup> and 6<sup>th</sup> century A.D.

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## **Worked bone and antler from the Vettonian (Iron Age) settlement of Las Cogotas (Cardeñolas, Ávila, Spain)**

**López-Romero González de la Aleja, Elena.** M.Phil. Instituto de Historia, Dpto. Arqueología y Procesos Sociales, CSIC.

The Vettonian site of Las Cogotas is one of the most important Iron Age settlements in the Castilian Meseta (Cardeñosa, province of Ávila) which occupation expands from the 4th to the 2nd centuries BC. The large assemblage of faunal remains recovered in excavations on the wall that surrounds the settlement. Although domestic species (cattle, caprines, pigs and equids) dominate the assemblage, red deer constitutes the main wild species exploited. Based on their typology, traces of use and parallels with contemporary Iberian sites we propose some hypothesis on their manufacture process and use.

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## **Bone extraction: A Methodological summary**

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In this session, firstly, we are going to expose a brief historiographic review about methods that are used to recover bones remains in each archaeological site. In addition, we are going to review possible problems caused by the lack of knowledge of an appropriated method for the those extraction.

On the other hand, it is proposed to sum up all the information referred to the extraction of bones remains to summarize it through a specific methodology considered to be less intrusive with these archaeological remains. The aim of that summary is to provide more information to the following archaeometric studies.

To put this methodological summary into practice, we are going to classify some techniques for each type of archaeological complex (caves, shelters, outdoors sites, architectonic structures, urbans interventions, etc.), as well as a general proposal for emergency interventions.

In conclusion, with this session we would like to push up the value of this first step inside the process of archaeometrical analysis. There is a need of enhancement because it was push into the background, where each archaeologist decides about the remains extraction, instead of following a certain patterns.

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