



ANALYSIS OF THE ECONOMIC FOUNDATIONS SUPPORTING THE SOCIAL SUPREMACY OF THE BEAKER GROUPS

PROCEEDINGS OF THE XVII UISPP WORLD
CONGRESS (1–7 SEPTEMBER, BURGOS, SPAIN)

Volume 6 / Session B36

Edited by

**Elisa Guerra Doce and
Corina Liesau von Lettow-Vorbeck**



**ANALYSIS OF
THE ECONOMIC
FOUNDATIONS
SUPPORTING THE
SOCIAL SUPREMACY OF
THE BEAKER GROUPS**

**PROCEEDINGS OF THE XVII UISPP WORLD
CONGRESS (1-7 SEPTEMBER, BURGOS, SPAIN)**

Volume 6 / Session B36

Edited by

**Elisa Guerra Doce and
Corina Liesau von Lettow-Vorbeck**

ARCHAEPRESS ARCHAEOLOGY

ARCHAEOPRESS PUBLISHING LTD

Summertown Pavilion
18-24 Middle Way
Oxford OX2 7LG

www.archaeopress.com

ISBN 978 1 78491 307 6
ISBN 978 1 78491 308 3 (e-Pdf)

© Archaeopress, UISPP and authors 2016

VOLUME EDITORS: Elisa Guerra Doce and Corina Liesau von Lettow-Vorbeck

SERIES EDITOR: The board of UISPP

SERIES PROPERTY: UISPP – International Union of Prehistoric and Protohistoric Sciences

The editing of this volume was funded by the Instituto Terra e Memória, Centro de Geociências UID/Multi/00073/2013, with the support of the Fundação para a Ciência e Tecnologia FCT/MEC)

KEY-WORDS IN THIS VOLUME: Bell Beaker – Prestige Items – Social Differentiation – Exchange Networks

UISPP PROCEEDINGS SERIES is a print on demand and an open access publication,
edited by UISPP through Archaeopress

BOARD OF UISPP: Jean Bourgeois (President), Luiz Oosterbeek (Secretary-General),
François Djindjian (Treasurer), Ya-Mei Hou (Vice President), Marta Arzarello (Deputy Secretary-General).
The Executive Committee of UISPP also includes the Presidents of all the international scientific
commissions (www.uispp.org)

BOARD OF THE XVII WORLD CONGRESS OF UISPP: Eudald Carbonell (Secretary-General),
Robert Sala I Ramos, Jose Maria Rodriguez Ponga (Deputy Secretary-Generals)



This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/> or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.

This book is available direct from Archaeopress or from our website www.archaeopress.com

Contents

List of Figures and Tables.....	ii
Foreword to the XVII UISPP Congress Proceedings Series Edition Luiz OOSTERBEEK	iv
Introduction..... Elisa GUERRA DOCE and Corina LIESAU VON LETTOW-VORBECK	v
Graves of metallurgists in the Moravian Beaker Cultures Jaroslav PEŠKA	1
Bell Beaker funerary copper objects from the center of the Iberian Peninsula in the context of the Atlantic connections Concepción BLASCO BOSQUED, Ignacio MONTERO and Raúl FLORES FERNÁNDEZ	19
Bell Beaker connections along the Atlantic façade: the gold ornaments from Tablada del Rudrón, Burgos, Spain Andrew P. FITZPATRICK, Germán DELIBES DE CASTRO, Elisa GUERRA DOCE and Javier VELASCO VÁZQUEZ	37
Prestige indicators and Bell Beaker ware at Valencina de la Concepción (Sevilla, Spain) Ana PAJUELO PANDO and Pedro M. LÓPEZ ALDANA	55
Some prestige goods as evidence of interregional interactions in the funerary practices of the Bell Beaker groups of Central Iberia Corina LIESAU VON LETTOW-VORBECK	69
Salt and Beakers in the third millennium BC Elisa GUERRA DOCE	95
The role of flint arrowheads in Bell Beaker groups of the Central Iberian Peninsula Patricia RÍOS MENDOZA	111
El Peñón de la Zorra (Villena, Alicante, Spain): change and continuity in settlement pattern during Bell Beaker Gabriel GARCÍA ATIÉNZAR	129
Elements for the definition of the Bell Beaker horizon in the lower Ebro Valley: preliminary approaches Anna GÓMEZ, Patricia RÍOS MENDOZA, Marc PIERA and Miquel MOLIST	141

List of Figures and Tables

J. PEŠKA: Graves of metallurgists in the Moravian Beaker Cultures

FIGURE 1. METALLURGIST'S GRAVES OF CWC AND BBC IN EUROPE	3
FIGURE 2. METALLURGIST'S GRAVES OF CWC (BLUE) AND BBC (RED) IN MORAVIA	4
FIGURE 3. DISTRIBUTION OF METALLURGIST'S GRAVES OF BBC IN BOHEMIA.....	4
FIGURE 4. LUDĚŘOV, DIST. OLOMOUC. EQUIPMENT OF METAL FOUNDER GRAVE OF BBC	5
FIGURE 5. SZIGENTSZENTMIKLÓS – FELSŐ ŪRGE-HEGYI DŪLŐ, DIST. BUDAPEST. GRAVE 346	6
FIGURE 6. NECHVALÍN, DIST. HODONÍN. GRAVE 15.....	7
FIGURE 7. HULÍN 1 – U ISIDORKA, DIST. KROMĚŘÍŽ. GRAVE 73.....	8
FIGURE 8. EXAMPLES OF METALWORKER'S BURIALS IN MORAVIA AND BAVARIA.....	9
FIGURE 9. PROSIMĚŘICE, DIST. ZNOJMO. GRAVE 1A.	10
FIGURE 10. PŘEROV-PŘEDMOSTÍ, DIST. PŘEROV. GRAVE OR GRAVES 1/57 AND 2/57	11
FIGURE 11. HULÍN-PRAVČICE 2, VIŠŇOVCE, DIST. KROMĚŘÍŽ. GRAVE 54	12
FIGURE 12. HULÍN-PRAVČICE 2, VIŠŇOVCE, DIST. KROMĚŘÍŽ. GRAVE 54	13
FIGURE 13. HULÍN-PRAVČICE 2, VIŠŇOVCE, DIST. KROMĚŘÍŽ. GRAVE 54	14
FIGURE 14. PŘEROV-PŘEDMOSTÍ, DIST. PŘEROV. GRAVE 1/57	15
TABLE 1. SUMMARY OF ACCOMPANYING FINDS OF METALLURGICAL EQUIPMENTS.....	12

C. BLASCO BOSQUED, I. MONTERO AND R. FLORES FERNÁNDEZ: Bell Beaker funerary copper objects from the center of the Iberian Peninsula in the context of the Atlantic connections

FIGURE 1. LOCATION MAP OF THE THREE SITES UNDER STUDY	21
FIGURE 2: FEMALE BURIALS WITH COPPER AWLS AMONGST THEIR GRAVE GOODS	22
FIGURE 3: MALE BURIAL WITH A PALMELA POINT AS ONE OF HIS GRAVE GOODS	23
FIGURE 4. FEMALE BURIALS WHICH INCLUDED AN AWL AND A COPPER DAGGER AS THEIR GRAVE GOODS.....	24
FIGURE 5. DETAIL OF A MULTIPLE BURIAL AT HUMANEJOS (U 455 Ex.).....	25
FIGURE 6. DETAIL OF A DOUBLE BURIAL AT HUMANEJOS (U 1853 Ex.)	26
TABLE 1. COMPARISONS OF THE COPPER GRAVE GOODS FROM THE SITES UNDER STUDY	27
TABLE 2. XRF ANALYSIS OF THE METAL OBJECTS FROM THE PANOPLY FOUND IN TOMB Ue1853 AT HUMANEJOS.....	30
TABLE 3. WEIGHT IN GRAMS OF THE METAL OBJECTS PRESENT WITHIN THE GRAVE GOODS OF THE UEX1853	31

A. P. FITZPATRICK, G. DELIBES DE CASTRO, E. GUERRA DOCE AND J. VELASCO VÁZQUEZ: Bell Beaker connections along the Atlantic façade: the gold ornaments from Tablada del Rudrón, Burgos, Spain

FIGURE 1. TABLADA DEL RUDRÓN: LOCATION AND SITE PLAN	38
FIGURE 2. TABLADA DEL RUDRÓN: GOLD ORNAMENTS	39
FIGURE 3. EXAMPLE OF GOLD ORNAMENTS FROM ENGLAND: BARROW HILLS, RADLEY	41
FIGURE 4. GROUPS WITHIN THE ATLANTIC SERIES OF BELL BEAKER GOLD ORNAMENTS.....	42
FIGURE 5. GOLD ORNAMENTS FROM 'IRELAND'	43
FIGURE 6. GOLD PLAQUES AND DIADEM FROM BELLVILLE	44
FIGURE 7. THE ORBLISTON ORNAMENT AS AN EARRING.....	45
FIGURE 8. DIMENSIONS OF ATLANTIC SERIES GOLD ORNAMENTS.....	47
FIGURE 9. DISTRIBUTION OF LATER THIRD MILLENNIUM BC GOLD ORNAMENTS.....	49
FIGURE 10. CABECEIRAS DE BASTO LUNULA AND DISCS.....	50
TABLE 1. RADIOCARBON DATES FOR GRAVES WITH GOLD BASKET ORNAMENTS IN ENGLAND AND SPAIN	44

A. PAJUELO PANDO AND P. M. LÓPEZ ALDANA: Prestige indicators and Bell Beaker ware at Valencina de la Concepción (Sevilla, Spain)

FIGURE 1. LOCATION VALENCINA-CASTILLEJA.	56
FIGURE 2. SITES WITH BELL BEAKER EVIDENCE OF VALENCINA.....	57
FIGURE 3. GOLD SHEET, DOLMEN MONTELIRIO, GOLD SHEET TOMB 1 'SEÑORÍO DE GUZMÁN'	58
FIGURE 4. BELL BEAKER FROM 'C/ TRABAJADORES'	60
FIGURE 5. BELL BEAKER SHERDS FROM 'PABELLÓN CUBIERTO'	60
FIGURE 6. BELL BEAKER SHERDS FROM 'CERRO DE LA CABEZA'	61
FIGURE 7. BELL BEAKER FROM TOMB 1 'SEÑORÍO DE GUZMÁN'	62

FIGURE 8. BELL BEAKER FROM TOMB 5 ‘SEÑORÍO DE GUZMÁN’	62
FIGURE 9. HYPOTHETICAL RECONSTRUCTION: NECKLACE TOMB 5 ‘SEÑORÍO DE GUZMÁN’	63
FIGURE 10. CHEMICAL ANALYSIS DENDROGRAM.	64

C. LIESAU VON LETTOW-VORBECK: Some prestige goods as evidence of interregional interactions in the funerary practices of the Bell Beaker groups of Central Iberia

FIGURE 1. BELL BEAKER SITES IN CENTRAL IBERIA DISCUSSED IN THIS STUDY	71
FIGURE 2. FTIR SPECTRUM OBTAINED FROM BEADS MADE OF FOREST ELEPHANT IVORY	73
FIGURE 3. PARTIAL RECONSTRUCTION OF THE SKELETON OF A FOREST ELEPHANT	74
FIGURE 4. OLIVE-SHAPE AND BICONCAL BEADS MADE OF FOREST ELEPHANT IVORY	75
FIGURE 5. TYPES OF IVORY BUTTONS FROM CENTRAL IBERIA.....	78
FIGURE 6. IVORY, ANTLER, SPERM WHALE, OR BONE BUTTONS/TOGGLES FROM BELL BEAKER CONTEXTS	80
FIGURE 7. CINNABAR IN BELL BEAKER TOMBS	84

E. GUERRA DOCE: Salt and Beakers in the third millennium BC

FIGURE 1. MAP OF EUROPE SHOWING THE LOCATION OF REMAINS OF SALT EXPLOITATION.....	96
FIGURE 2. BRINE BOILING AREA AT MOLINO SANCHÓN II (VILLAFÁFILA, ZAMORA, SPAIN)	99
FIGURE 3. LARGE BELL BEAKER FOUND AT MOLINO SANCHÓN II (VILLAFÁFILA, ZAMORA, SPAIN).....	99
FIGURE 4. SALT BOILING IN THE EARLY MODERN PERIOD	101
FIGURE 5. BASKETRY IMPRINTS ON SOME POTTERY SHERDS FOUND AT MOLINO SANCHÓN II.....	102
FIGURE 6. SALT TRADING ROUTES IN EUROPE IN MODERN TIMES	103
FIGURE 7. MAP OF EUROPE AROUND 2500 BC.....	105

P. RÍOS MENDOZA: The role of flint arrowheads in Bell Beaker groups of the Central Iberian Peninsula

FIGURE 1. EXAMPLES OF THE WARRIOR AND ARCHER CHARACTER OF BELL BEAKER MEN	115
TABLE 1. SITES IN THE REGION OF MADRID WITH BEAKER GRAVE GOODS IN WHICH CERAMICS	119

G. GARCÍA ATIÉNZAR: El Peñón de la Zorra (Villena, Alicante, Spain): change and continuity in settlement pattern during Bell Beaker

FIGURE 1. LOCATION OF STUDIO AREA AND THE MAIN SITES CITED IN THE TEXT.....	132
FIGURE 2. PUNTA DE LOS CARNICEROS.....	133
FIGURE 3. PEÑÓN DE LA ZORRA. LOCATION OF THE SETTLEMENT.....	133
FIGURE 4. PEÑÓN DE LA ZORRA. PLANIMETRY OF BUILDINGS	134
FIGURE 5. PEÑÓN DE LA ZORRA. POTTERY ASSEMBLAGE	135
FIGURE 6. ACCUMULATED VIEWSHED FROM THE PUNTA DE LOS CARNICEROS AND PEÑÓN DE LA ZORRA.....	135
FIGURE 7. METALLIC GRAVE GOODS FROM THE WESTERN CAVE OF THE PEÑÓN DE LA ZORRA.....	136
FIGURE 8. RADIOCARBON DATING FOR BEAKER CONTEXTS IN THE STUDY AREA	137

A. GÓMEZ, M. PIERA, M. MOLIST AND P. RÍOS MENDOZA: Elements for the definition of the Bell Beaker horizon in the lower Ebro Valley: preliminary approaches

FIGURE 1. SITUATION OF THE LOWER EBRO VALLEY IN THE IBERIAN PENINSULA.	143
FIGURE 2. DATINGS FROM NORTHEASTERN PENINSULA BELL BEAKER CONTEXTS.....	145
FIGURE 3. MAP WITH MAIN LATE NEOLITHIC, CHALCOLITHIC AND BRONZE AGE ARCHAEOLOGICAL SITES	147
FIGURE 4. GENERAL VIEW FROM <i>EL MOLLÓ</i> DURING THE ARCHAEOLOGICAL WORKS.....	149
FIGURE 5. POTTERY SHERDS FROM <i>EL MOLLÓ</i>	150

Foreword to the XVII UISPP Congress Proceedings Series Edition

Luiz OOSTERBEEK
Secretary-General

UISPP has a long history, starting with the old International Association of Anthropology and Archaeology, back in 1865, until the foundation of UISPP itself in Bern, in 1931, and its growing relevance after WWII, from the 1950's. We also became members of the International Council of Philosophy and Human Sciences, associate of UNESCO, in 1955.

In its XIVth world congress in 2001, in Liège, UISPP started a reorganization process that was deepened in the congresses of Lisbon (2006) and Florianópolis (2011), leading to its current structure, solidly anchored in more than twenty-five international scientific commissions, each coordinating a major cluster of research within six major chapters: Historiography, methods and theories; Culture, economy and environments; Archaeology of specific environments; Art and culture; Technology and economy; Archaeology and societies.

The XVIIth world congress of 2014, in Burgos, with the strong support of Fundación Atapuerca and other institutions, involved over 1700 papers from almost 60 countries of all continents. The proceedings, edited in this series but also as special issues of specialized scientific journals, will remain as the most important outcome of the congress.

Research faces growing threats all over the planet, due to lack of funding, repressive behavior and other constraints. UISPP moves ahead in this context with a strictly scientific programme, focused on the origins and evolution of humans, without conceding any room to short term agendas that are not root in the interest of knowledge.

In the long run, which is the terrain of knowledge and science, not much will remain from the contextual political constraints, as severe or dramatic as they may be, but the new advances into understanding the human past and its cultural diversity will last, this being a relevant contribution for contemporary and future societies.

This is what UISPP is for, and this is also why we are currently engaged in contributing for the relaunching of Human Sciences in their relations with social and natural sciences, namely collaborating with the International Year of Global Understanding, in 2016, and with the World Conference of the Humanities, in 2017.

The next two congresses of UISPP, in Melbourn (2017) and in Geneva (2020), will confirm this route.

Introduction

Elisa GUERRA DOCE and
Corina LIESAU VON LETTOW-VORBECK

The Bell Beaker phenomenon is one of the most fascinating horizons in European Later Prehistory, due to its vast geographical distribution, the intrinsic value of some of the artefacts comprising the Beaker package, or its supposed links to certain kinds of ritual ceremonies as shown by the frequent deposition of Beaker items in burial contexts.

At present, the idea that the Beaker package is best interpreted as a symbol of power common to socially-prominent individuals by the mid-to-late third millennium BC is widely acknowledged by scholars in this field. From this point of view, the Beaker phenomenon is seen as the archaeological evidence representing an ideology which was shared by a number of prehistoric societies geographically scattered throughout much of Western and Central Europe, or, more specifically, was only shared by elite individuals within these territories.

The strategies employed by these individuals to attain such privileged statuses, however, are poorly known. Therefore, in the framework of the XVII World UISPP Congress, held in September 2014 in Burgos (Spain), a session entitled '*Analysis of the economic foundations supporting the social supremacy of the Beaker groups*' (B36) was organised by this volume's two editors. The session focused mostly on examining this issue at a European level, and less on the study of the Beaker package itself, as a way of looking at the economic foundations that helped these individuals attain their higher social statuses.

The proximity of Beaker sites to natural routes of communication highlights the importance of exchange networks through which people, objects and ideas may have circulated through Europe during this time. The Amesbury Archer in southern England is one of the best examples of interaction within Beaker territories. Having said this, considering that Beaker pots themselves were not exchanged over long distances attention, however, must be paid to other mechanisms of diffusion.

The present volume comprises the papers presented at this session suggesting that Beaker groups may have controlled certain products and technologies. There seems to be a strong link between Beakers and metalworking, as the papers presented by Jaroslav Peška, Concepción Blasco, Ignacio Montero and Raúl Flores point out. Jaroslav Peška's work discusses the technological equipment needed for metalworking found deposited in several male graves in Moravia; archaeometric studies indicate that these items were used prior to being placed in the graves. These graves, together with other attributes, reveal the high social status of these males. As a result of recent excavations in Madrid, Blasco *et al.* present new data on the significance of copper objects in burial contexts. Like other grave goods, in Bell Beaker funeral rituals copper items follow a strict social code with regard to gender. This, therefore, confirms that the scheme followed here was identical to that of continental Europe. Otherwise, the finding of an Atlantic type of halberd in an undisturbed tomb in Madrid would indicate the existence of contacts with the British Isles, although the piece may have been produced at a regional workshop. In any case, it represents one of the most ostentatious signs of prestige so its presence is noteworthy.

Gold ornaments were symbols of high status during the Bell Beaker phenomenon. A number of types frequently found in Beaker tombs suggest that networks existed along the Atlantic façade, as Andrew Fitzpatrick, Germán Delibes, Javier Velasco and Elisa Guerra's contribution shows, which focuses on the examination of basket-shaped gold ornaments in the Bell Beaker record.

Prestige goods, however, were not limited to metal objects, and also included goods produced on non-local materials. Beakers in south Iberia were frequently associated with exotic and prestige items both in burial and non-burial contexts. According to Ana Pajuelo and Pedro López Aldana's contribution to the present volume, this would indicate an attempt by Beaker groups of legitimising their social standing by exhibiting symbols of power in moments of crisis.

The intentional selection of 'exotic' dentines such as elephant ivory and sperm whale teeth, including fossil ivory, to produce beads and buttons, seems to be a more exclusive practice than previously thought. Corina Liesau argues that these pieces might have been circulated along the Atlantic and Mediterranean, and Beaker groups might have controlled their circulation as well as that of cinnabar in Central Iberia. Similarly, Elisa Guerra's study indicates that there is strong evidence supporting the links between Beaker groups and salt production and distribution across Central and Western Europe. According to Patricia Ríos' contribution, even though the deposition of flint arrowheads within male graves was not as frequent in Iberia as elsewhere, Beaker groups might have controlled their production.

All this seems to suggest that elite exchange networks were developed within Europe by the third millennium BC. Consequently, control of these networks would have been crucial to Beaker groups. Recent research projects point towards the deliberate location of Beaker sites in the vicinity of natural routes of communication in Iberia (chapters by Gabriel García Atiénzar, and Anna Gómez, Patricia Ríos, Marc Piera and Miquel Molist). Therefore seems that these exchange networks were not only used to circulate goods, raw materials and mineral resources, but were also the travel routes of ideas and technologies. Beaker groups, thus, would have managed to control the production and circulation of prestige goods and certain technologies, so this may help them to attain their social status. In addition, understanding the diversity of their burial costumes and their grave goods reveals the existence of a type of behaviour that precedes several funerary traditions of some Bronze Age societies.

Finally, we would like to thank the organizers of the XVII World UISPP Congress for including our session in the programme, and also the authors for making this volume possible. We hope these contributions inspire their readers and provide them with food for thought on the Beaker phenomenon and ideas on how to best further this fascinating area of research.

Graves of metallurgists in the Moravian Beaker Cultures

Jaroslav PEŠKA

Archaeological Centre Olomouc, Palacký University Olomouc,
Křížkovského 8, 771 47 Olomouc, Czech Republic
peska@ac-olomouc.cz

Abstract

Despite advanced skills of the Beaker people as regards metalworking and metallurgy of all available metals (copper, gold, silver, electrum) in the third millennium BC, archaeological contexts yielded only little exact evidence of these technological processes. Technological equipment is lacking and individual components of metalworking tools (mould, nozzle, hammers, anvils) are most often found as parts of prestigious artefacts of grave goods in forms of symbolic packages in clearly defined deposits. It is significant that they were fixed to rich male burials (even cenotaphs!), often at a leading position within the burial ground between England (Amesbury) and the Carpathian Basin (Szigetszentmiklós) and they significantly accumulated on the territory of the Czech Republic, particularly in Moravia (around 20 graves CWC and BBC). New microscopic analyses (SEM) have brought further evidence confirming the function and practical use of these tools (high presence of gold, silver and copper) prior to their deposition in graves. Together with other attributes, they strengthened and emphasized the social level, position, power and identity of their owners, they could reflect the ritualised control over important technologies through the high position within the hierarchising society, leading – in the case of the early Bell Beaker Culture – to the creation of regional élites.

Keywords: Metallurgist graves, Metalworking tools, Corded Ware Culture, Bell Beaker Culture, Moravia

Résumé

Même si les véhicules des cultures des Gobelets au cours du troisième millénaire avant notre ère ont dominé traitement et métallurgie de tous les accessibles métaux (cuivre, or, argent, électrum), nous avons assez peu de démonstrations exacts de ces processus technologiques dans les contextes archéologiques. Il nous manque des dispositifs technologiques et différentes espèces d'outils métallurgiques (moule, tuyère, marteaux, enclumes) deviennent partie d'artefacts de prestige d'équipement funéraire, à savoir sous la forme de paquets symboliques comme l'objet déposé, nettement délimité. Ils sont remarquablement fixés sur les riches enterrements d'hommes (parfois cénotaphe), souvent avec une position principal dans le cadre d'aire funéraire – entre l'Angleterre (Amesbury) et le bassin des Carpates (Szigetszentmiklós) avec concentration marquante sur le territoire de la République Tchèque et notamment en Moravie (environ 20 tombes de la culture de la céramique cordée et de la culture campaniforme). Les nouvelles analyses microscopiques (scanning electron microscope, SEM) donnent les nouvelles preuves, qui confirment la fonction et l'usage pratique des artefacts (haute présence d'or, d'argent, de cuivre) avant de leurs enterrement. En commun avec les attributs suivants ils renforcent et soulignent le niveau social, la condition dans la société, le pouvoir et l'identité de l'appartenance social des enterrés, ils peuvent refléter une contrôle ritualisée de technologies importantes, qui donnent justement une haute condition dans une société hiérarchisée, et qui mène (en ancien culture campaniforme) à naissance d'élites régionales.

Mots-clés: Métallurgistes tombes, outils métallurgiques, culture de la céramique cordée, Culture des gobelets campaniformes, Moravie

1. Introduction

The first true specialisation in the history of human civilisation occurred with the implementation of metals and metalworking. This technologically and organisationally demanding and sophisticated activity encompasses a wide range of special operations, beginning from prospecting over extraction, smelting, casting/forging up to manufacturing of final products (inclusive of distribution?). The knowledge of craft and special skills had first to be experienced and mastered. The realisation of production procedures, but also exchange or trade in finished artefacts have taken place on a

trans-regional level and contributed considerably to establishment of wide-reaching trade and communication networks. They also positively influenced the rise of technological, economic and social level of the then society. Considering the low number of finds associated with metallurgy (compared to the number of final products in several periods – a contrast can be observed in, for example, the Únětice Culture) we can only speculate, how many people were occupied with this special activity. Everything suggests that in this regard only a small group of specialists – metallurgists – has formed, whose social prestige rose very quickly since they have mastered new technologies and offered original products.

2. Metallurgist's graves in Final Eneolithic

In Central Europe, metallurgists occur for the first time in a greater measure at the end of the Eneolithic with the onset of the Beaker Cultures, which were distinctly dominated by the people of the Bell Beaker Culture (BBC). However, the finds of metallurgical gear intended for both metal casting and metalsmithing are even known from settlements (Vučedol, Sarvaš, Zók-Várhegy, Ig) and burial grounds (Velika Gruda) of an earlier period (first quarter of the third millennium BC), but so far outside the proper core of Europe. The arrival of the Bell Beakers does not signify any interruption of existing development; older metallurgical traditions continued even though new ideology has been adopted. No evidence is known that the BBC population would have coordinated the access to resources, extraction or distribution of copper (or other metals) (Merkl, 2013). Although metallurgy was not a catalyst for the Bell Beaker Phenomenon, in this period we can observe a clear increase in quality and quantity of metal products along with an extended variety of their types.

Despite an advanced level of metallurgical technology and processing of all available metals (copper, gold, silver, electrum) during the third millennium BC, only a very sparse evidence of these technological procedures is known from archaeological contexts. Unlike Ross Island or the Iberian Peninsula with direct proof of metalworking (Newgrange, Zambujal), in our territory we lack any evidence of extraction and technological facilities. Individual components of metallurgical equipment occur sporadically in settlements (Vila Nova de São Pedro, Cerro de la Virgen), but much more frequently they are found among funerary equipment in graves of craftsmen – metallurgists. The origins of depositing metallurgical implements in graves have been sought in the eastern parts of Europe in the area to the north and east of the Pontus (Bátora 2002, 2003; Kaiser, 2003, 2005) where this phenomenon has a much longer tradition (Maykop Culture). From there it has most probably been distributed in the form of the 'Yamnaya Package' (Harrison & Heyd, 2007) to Central Europe in the second/third quarter of the third millennium BC, still before the adoption of BBC (Fitzpatrick, 2011: 213, 217).

The complexity of procedures and skills associated with metalworking has soon found its reflection as an indicator of social stratification within the meaning of desired social demand – supply, and this to such an extent that people who have mastered these special skills moved rapidly up on the then social scale. This was undoubtedly evident during their life already, but from an archaeological point of view we are able to identify this phenomenon mainly in burial rites.

Metallurgical gear (hammers, anvils, whetstones, polishers etc.) usually became part of prestigious funerary equipment in the form of symbolic (metalsmithing) kits in a clearly distinguished and delimited deposit (originally in a container – a bag?). Significant attribute of these grave goods is their tight connection to sumptuous graves of males in the age of adultus (less frequently maurus, never senilis or child) with intricate grave construction and symbols of prestigious social status, often in a prominent location within the funeral area. Some of them can be referred to as symbolic graves (Velešovice, Hulín-Pravčice 2). We class them among a small but very important group of graves of craftsmen. According to F. Bertemes (2010: 153), the share of identified graves of this type in BBC is less than 1% and in the Corded Ware Culture (CWC) even less than 0.1%. They are known on a vast territory from England (Amesbury) and the Iberian Peninsula over Netherlands and along the

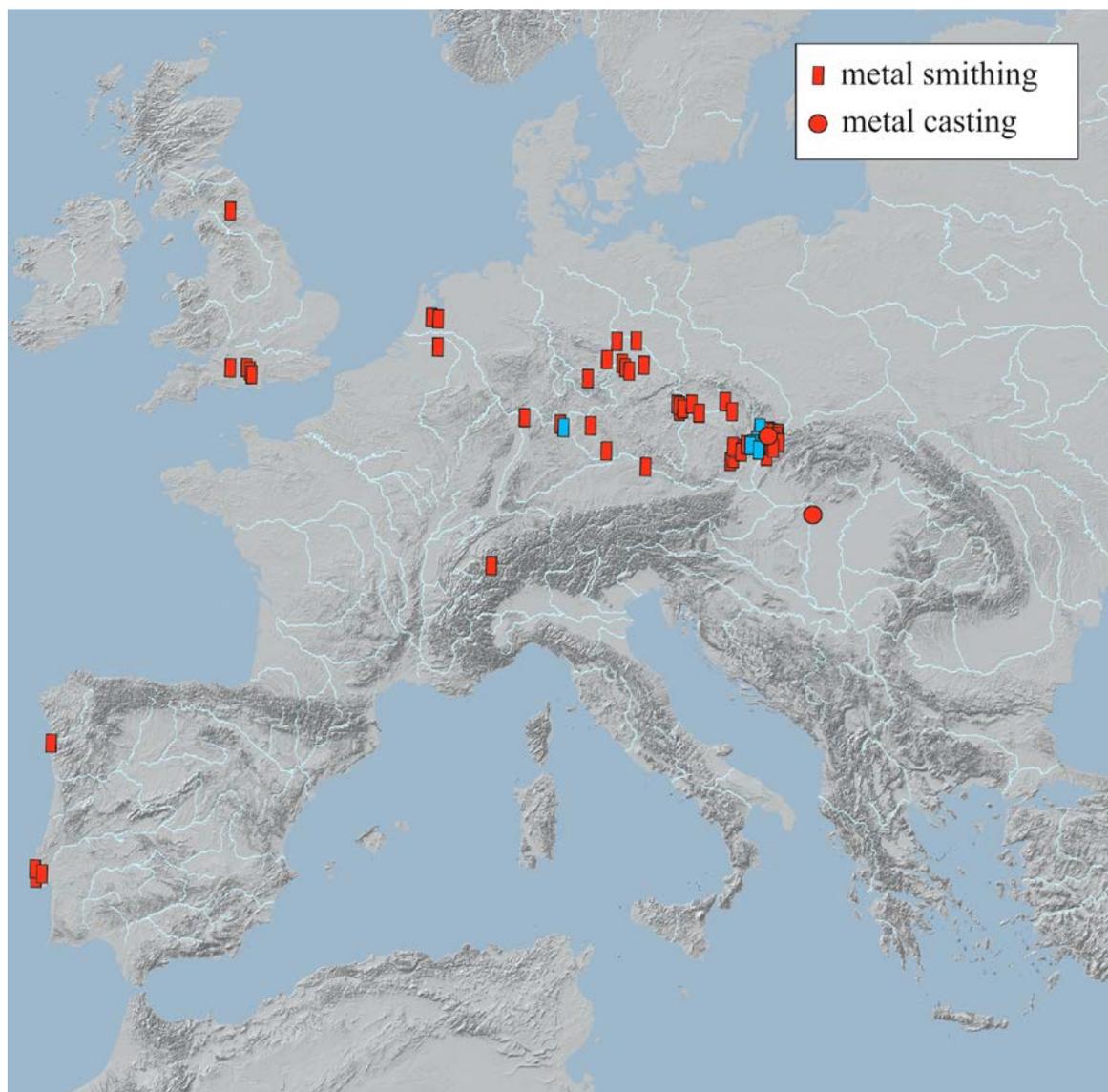


FIGURE 1. METALLURGIST'S GRAVES OF CWC AND BBC IN EUROPE (MAP BY P. GREJAR).

Danube to as far as the Carpathian Basin, with a distinct accumulation on the territory of the Czech Republic and mainly in Moravia (Fig. 1).

In BBC they occur with essentially each noticeable regional group of finds – province. In Moravia (Fig. 2) they are clustered in two distinct groups. One of them is distributed in Central Moravia, inclusive of the so-called group of East Moravian barrows (10x), and the other is situated in South or Southwest Moravia (5x). Isolated occurrence of graves in the Brno Region and in Southeast Moravia, however, indicates that further new finds of the graves of metallurgists may change this picture.

Much fewer of these graves (9x) are known from Bohemia (Fig. 3). They mainly concentrate in Central Bohemia. The remarkable twin grave from Svobodné Dvory (Moucha, 2003) and a burial from Hrochův Týnec-Stíčany are already located in East Bohemia.

In Eastern Europe can mostly be found graves containing clay nozzles and casting moulds, that is graves of metal founders, and a combination with metalsmithing equipment is also common. Much

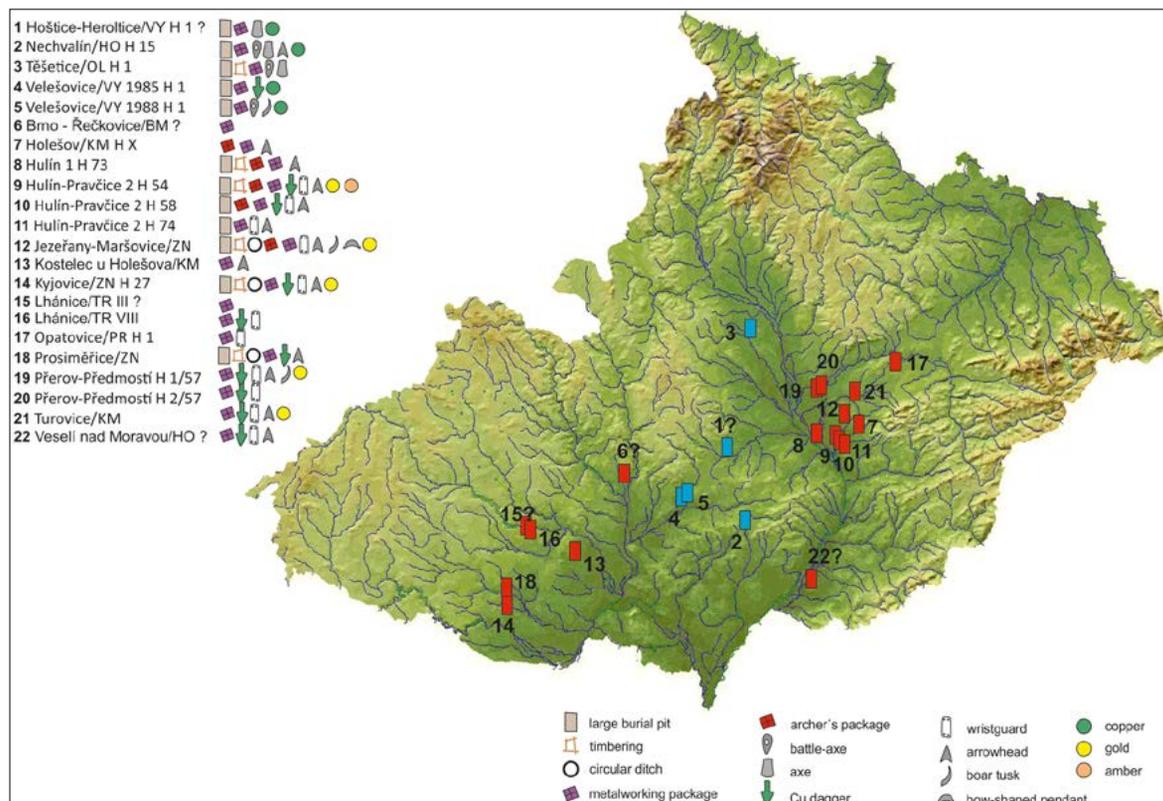


FIGURE 2. METALLURGIST'S GRAVES OF CWC (BLUE) AND BBC (RED) IN MORAVIA AND OVERVIEW OF THEIR INVENTORY (EXCLUDING CERAMICS) (MAP BY P. GREĀAR).

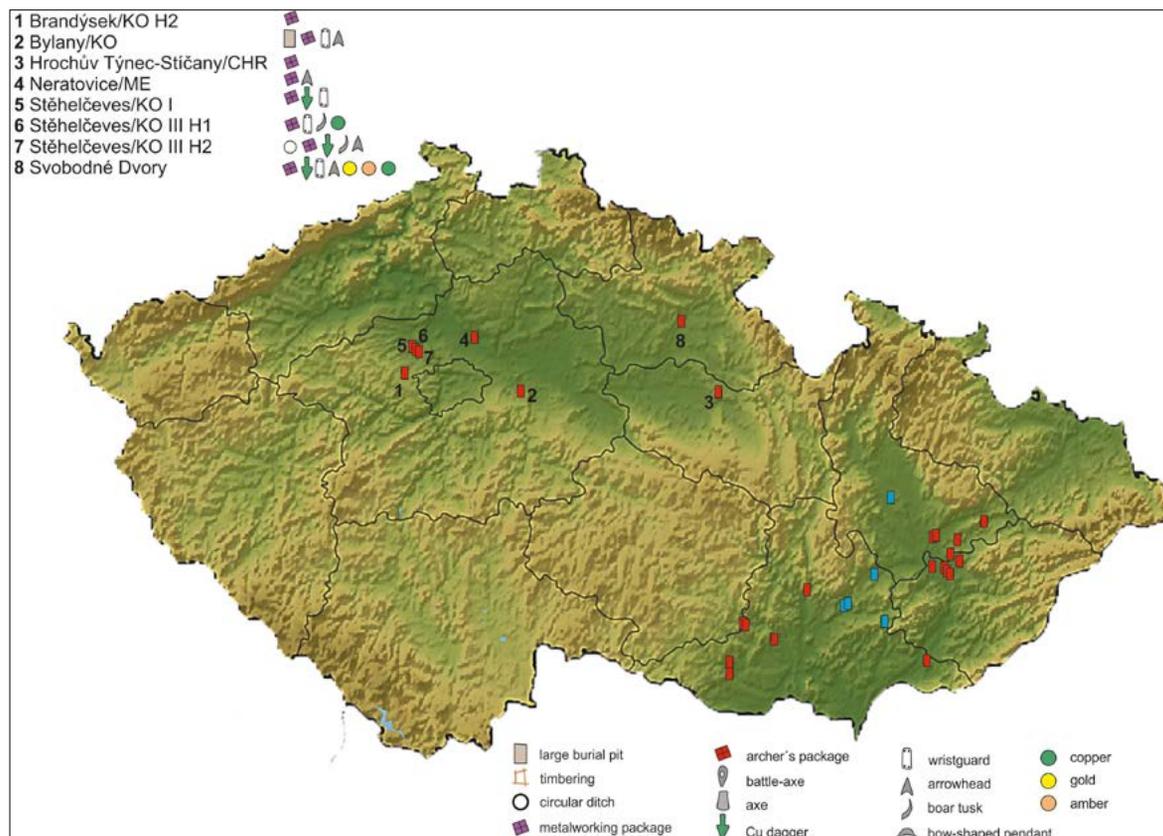


FIGURE 3. DISTRIBUTION OF METALLURGIST'S GRAVES OF BBC IN BOHEMIA AND THEIR INVENTORY (EXCLUDING CERAMICS) (MAP BY P. GREĀAR).

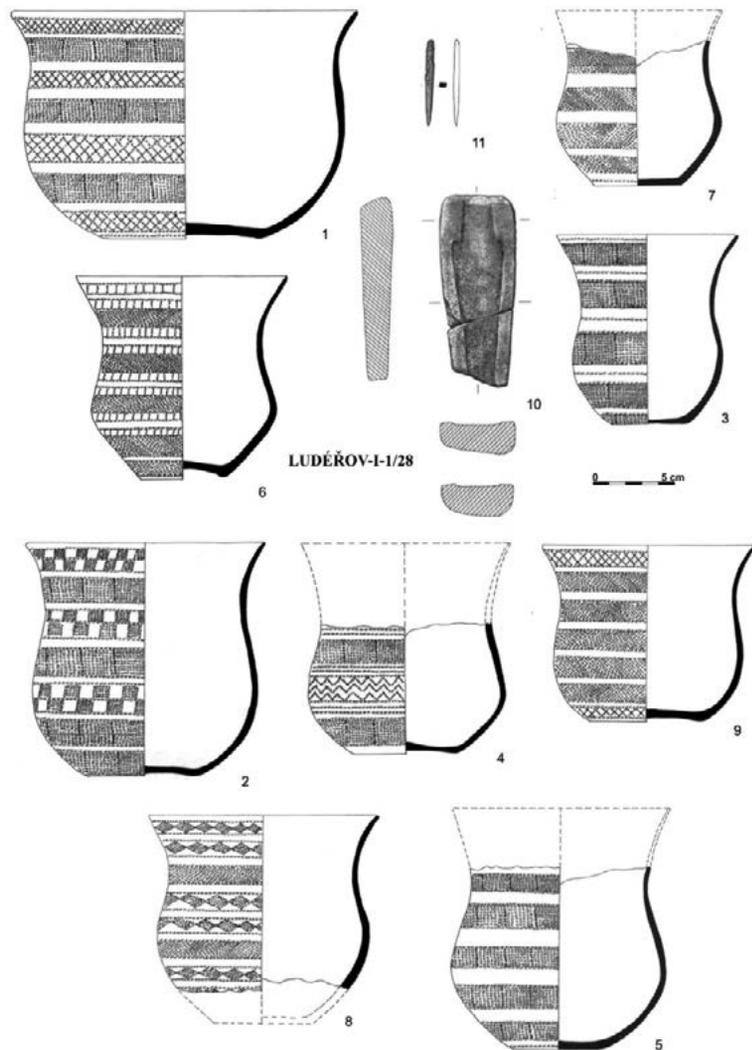


FIGURE 4. LUDĚŘOV, DIST. OLOMOUC.
EQUIPMENT OF METAL FOUNDER
GRAVE OF BBC (AFTER ŠEBELA *ET AL.*,
MANUSCRIPT).

more frequent with Central Europe, on the other hand, are hammers, anvils and various whetstones, that is implements for cold metalsmithing.

Evidence of metal casting is rare in our area. An older amateur find of 9 decorated beakers, a copper awl and a casting mould for tanged daggers (type I after Kuna & Matoušek, 1978; type BB1/BB2 Zimmermann, 2007) from Luděřov (Böhm, 1929; Hájek, 1966) (Fig. 4) was recently supplemented with a ring-ditched cremation burial of the Csepel Group from Szigentszentmiklós Felső Ūrge-hegyi dűlű (Grave 346) containing a clay nozzle and allegedly also ‘slag (?) remains’ (Patay, 2013: 300, fig. 18) (Fig. 5). In Moravia, just as in the rest of Europe to as far as the Iberian Peninsula and England, graves with metalsmithing gear clearly dominate.

Moravia is also exceptional by the fact that metalsmithing tools occur not only with BBC graves (clear predominance) but repeatedly also with CWC (Fig. 6). According to F. Bertemes (2004, 2010), this custom was borrowed by CWC population from BBC, but did not achieve here as distinct position as with the Bell Beaker Phenomenon. Currently we know in Moravia of more than 20 graves with such equipment (5 x CWC; 17 x BBC).

Recent large-scale rescue excavations by the Archaeological Centre in Olomouc have increased their number in Central Moravia (Hulín 1 1x; Hulín-Pravčice 2 3x; Opatovice 1x) (Fig. 7). The CWC

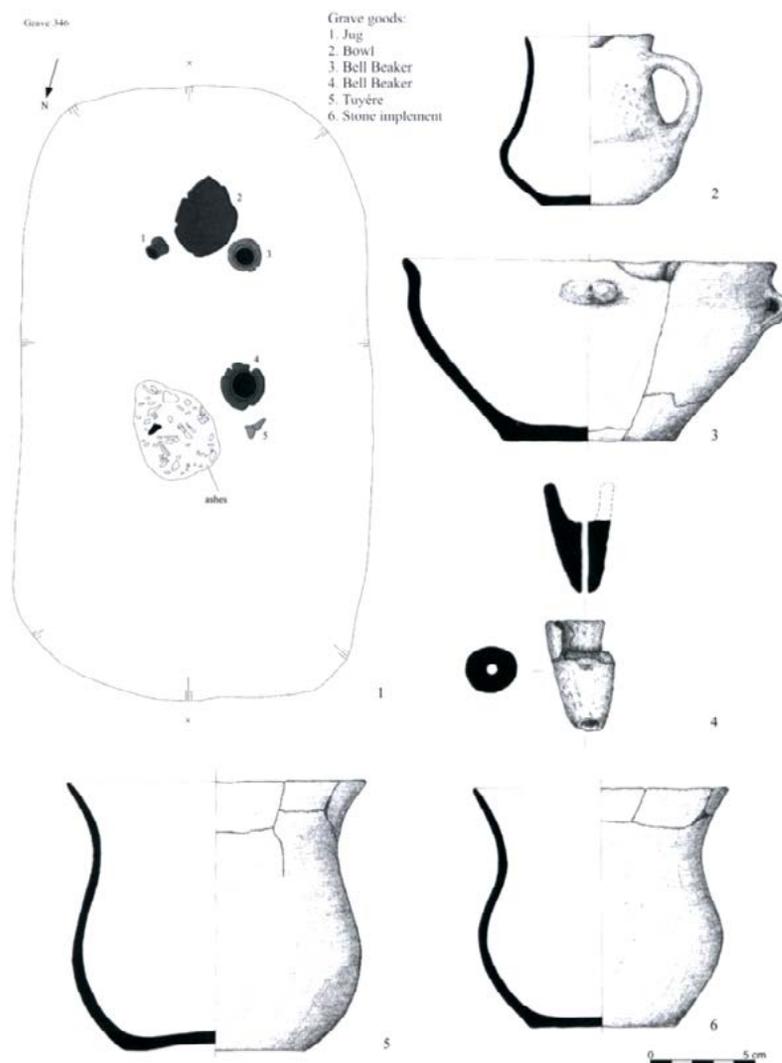


FIGURE 5. SZIGENTSZENTMIKLÓS – FELSŐ ÜRGE-HEGYI DŰLŐ, DIST. BUDAPEST. GRAVE 346. METAL FOUNDER GRAVE OF BBC CSEPEL-GROUP (AFTER PATAY, 2013).

graves from this category contain well-equipped, but not the richest, male burials, and metallurgical production is limited to only a few artefacts. Several BBC tombs, however, can without exaggeration be considered very rich, representing the social elites of that time (Amesbury, Předmostí, Hulín-Pravčice 2, Svobodné Dvory). The metallurgical equipment is very variegated, from symbolic occurrence of a single piece up to whole sets of 5-7 stones (Künzing, Zwenkau, Jezeřany-Maršovice, Hulín-Pravčice 2), deposited often together with other artefacts (bilateral grinders for arrow shafts, chipped lithics, antler retouchers, boar tusks etc.) within the so-called metalsmithing kits (Fig. 8).

Sometimes they are part of smaller or larger (Budakalász) group burial grounds, in some other places there are true solitaires or pairs of distinct graves (Prosiměřice, Jezeřany-Maršovice, Künzing, Amesbury, Předmostí). According to present knowledge, the role of metallurgists is only associated with burials of adult males (the 5 stones in a female Grave H III from Lhánice in Třebíč Region cannot be identified due to being lost), which are characteristic by some common distinct traits and attributes:

1. Funerary architecture: size, depth, internal adjustment and an intricate wooden construction (5x: Jezeřany-Maršovice, Prosiměřice, Kyjovice, Hulín 1, Hulín-Pravčice 2) with dominant occurrence in burial grounds;
2. Ring ditches around graves (3x: Jezeřany-Maršovice, Prosiměřice, Kyjovice) (Fig. 9);

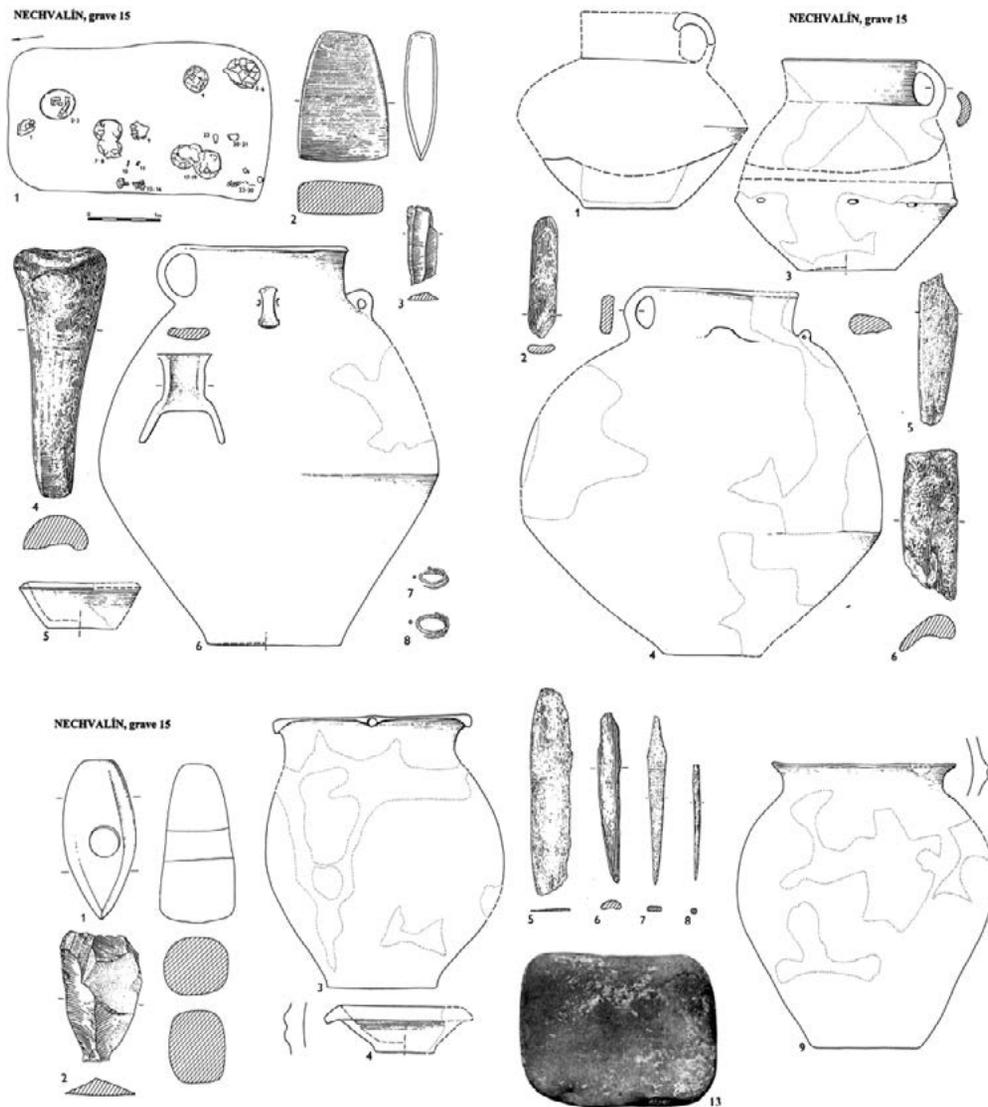


FIGURE 6. NECHVALÍN, DIST. HODONÍN. GRAVE 15. EXAMPLE OF METALSMITHING'S GRAVE OF CWC (AFTER ŠEBELA, 1999).

3. Rich funerary equipment (sometimes multiple grave goods of the same type) signifying social status, comprising archery and metalsmithing kits, metal artefacts from copper, gold, silver and electrum, amber (1x) (Fig. 10).

Several categories of finds exhibit a strong affinity for graves of metallurgists. Some of them are integral part of the funerary kits: boar tusks, arrowheads, chipped lithics, bone retouchers, grinders for arrow shafts (not in Moravia). These objects are supposed to have been used with metalworking (boar tusks and retouchers for final polishing of the surface). The tools are sometimes deposited either upon or inside ceramic vessels (mostly a decorated beaker).

In general, a small statistics (Tab. 1) can be made with BBC in Moravia (17 graves). Among the other lithic grave goods we can observe a frequent occurrence of wrist guards (12x=70.5%) and flint arrowheads (11x=64.7%). Also frequent (10x=58.8%) are chipped lithics (tools and flakes), whose role in metalworking was not yet specified. Boar tusks were found so far in 4 graves (23.5%) where they may have even had three purposes (ornaments, tools and polishers for metal artefacts).

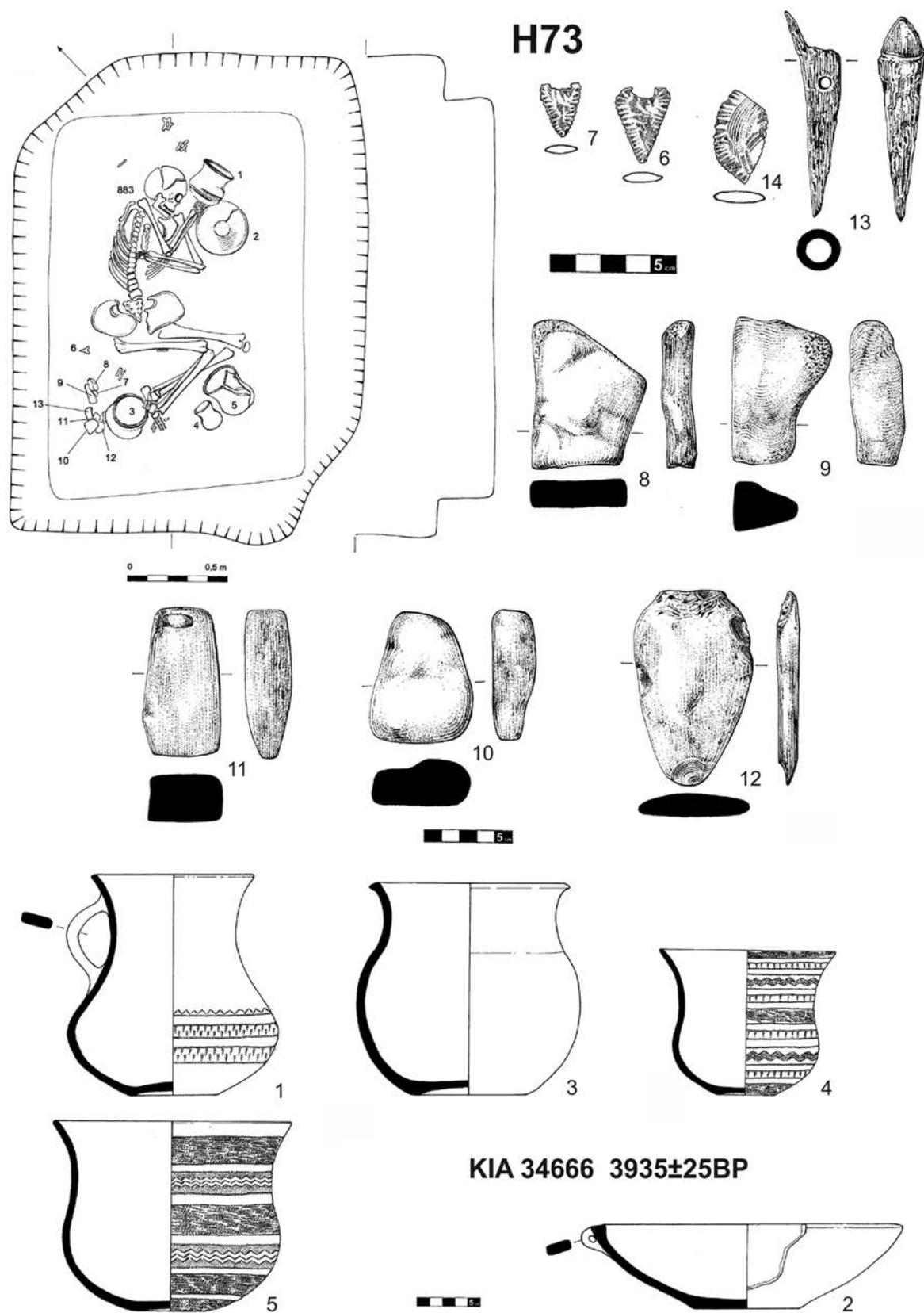


FIGURE 7. HULÍN 1 – U ISIDORKA, DIST. KROMĚŘÍŽ. GRAVE 73 (MALE, 35-45). GRAVE OF METALSMITH OF BBC WITH METALLURGICAL PACKAGE NEAR FEET (DRAWING BY A. PEŠKOVÁ).

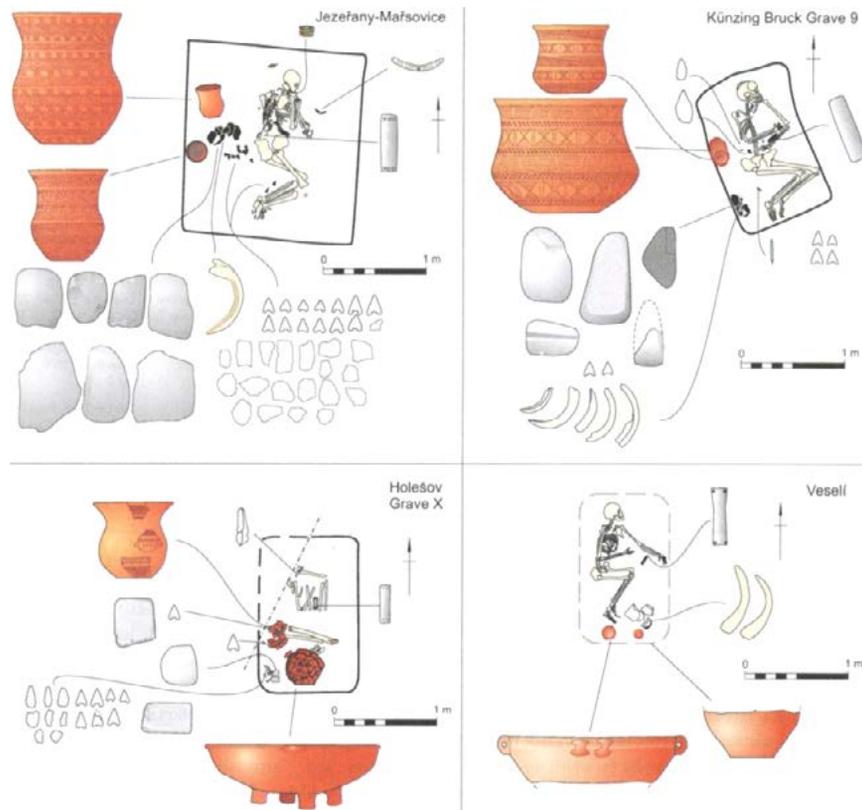


FIGURE 8. EXAMPLES OF METALWORKER'S BURIALS IN MORAVIA AND BAVARIA (JEZEŘANY-MARŠOVICE, KÜNZING, HOLEŠOV, VESELÍ NAD MORAVOU) (AFTER FITZPATRICK, 2011).

Moreover, in Jezeřany-Maršovice they may have been used as a bow-shaped pendant, which is generally considered a typical male attribute (Růžičková, 2008). The above categories (tusks, arrowheads, wrist guards) are indicative of military and hunting equipment of the BBC males and by being placed among grave goods they accentuate this social part of identity of the deceased.

An important position among metal objects have the tanged copper daggers (8x=47%), which in BBC also occur with rich female graves containing a gender-unspecific funerary equipment (Turek, 2003, 2006; Peška 2013; in print). In CWC, the dagger is replaced by a stone axe-hammer, which also shows a strong affinity for burials of metallurgists (in Moravia 4 out of 5 graves). Frequent occurrence is recorded with metal artefacts serving as personal ornaments (hair ornaments, spirals, hair rings, appliqués) or tools (knives, awls) made from all available metals. Not every grave containing a metallurgical kit is equipped with rich grave goods. This also applies to Moravia, where CWC graves from Těšetice in the Olomouc Region, and BBC graves 2x Lhánice, Veselí nad Moravou and Brno-Řečkovice contained an only modest funerary equipment. BBC burials associated with metallurgy in Central Moravia are always exceptional and give evidence of a gradual singling out of a wealthy group of people who were familiar with strategic and progressive technologies.

A case in point is the recently explored BBC burial ground at Hulín-Pravčice 2 (Peška & Kalábek, 2009, 2012; Peška, 2013; in print) in East Moravia with a clearly distinguished group of several spacious, deep and very rich graves with internal construction. They are arranged in a row one behind the other and contain a distinct accumulation of specific grave goods inclusive of metallurgical kits (Peška, 2013: Fig. 8). The most striking example is grave H 54 (Fig. 11), the main in a group, containing an entire set of metalsmithing tools, complete equipment of a warrior-archer together with four silver hair ornaments, a large piece of silver sheet, a set of 71 miniature pieces of electrum sheet with bent edges, and originally an entire amber necklace. The spatial distribution of individual finds, observing all rules of the standard BBC funerary customs, does not exclude female burial (Fig.

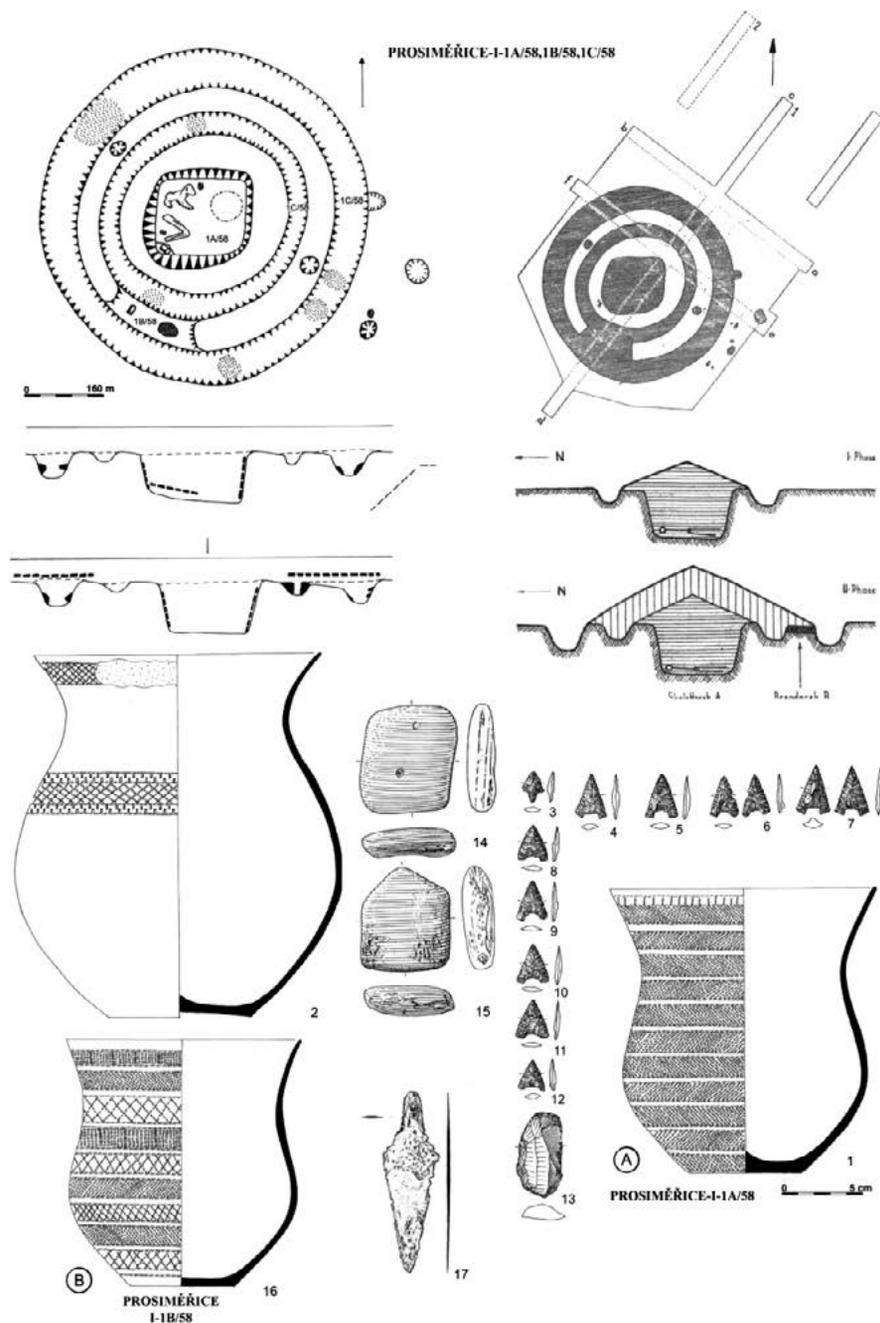


FIGURE 9. PROSIMĚŘICE, DIST. ZNOJMO. GRAVE 1A (MALE, 30-50). BBC GRAVE WITH DOUBLE RING DITCHES AND BURIAL CHAMBER EQUIPPED WITH METALSMITHING TOOLS (AFTER ŠEBELA ET AL., MANUSCRIPT).

12), or possible deposition of two bodies in a wooden chamber (skeletal remains are not preserved due to aggressive environmental conditions). The former alternative would class the burial among the category of wealthy females with gender-unspecific funerary equipment and demonstrate their elite social status.

The well-known example of Grave 9 in the burial ground of Künzing-Bruck, Bavaria, where the analysis of working surface of a hammer on a raster electron microscope has revealed the presence of copper (25%) and mainly gold (75%) (Bertemes *et al.*, 2000; Bertemes, 2010: Fig. 8), was followed by further analyses of anvils from Těšetice (CWC) and Turovice (BBC) with traces of copper and a

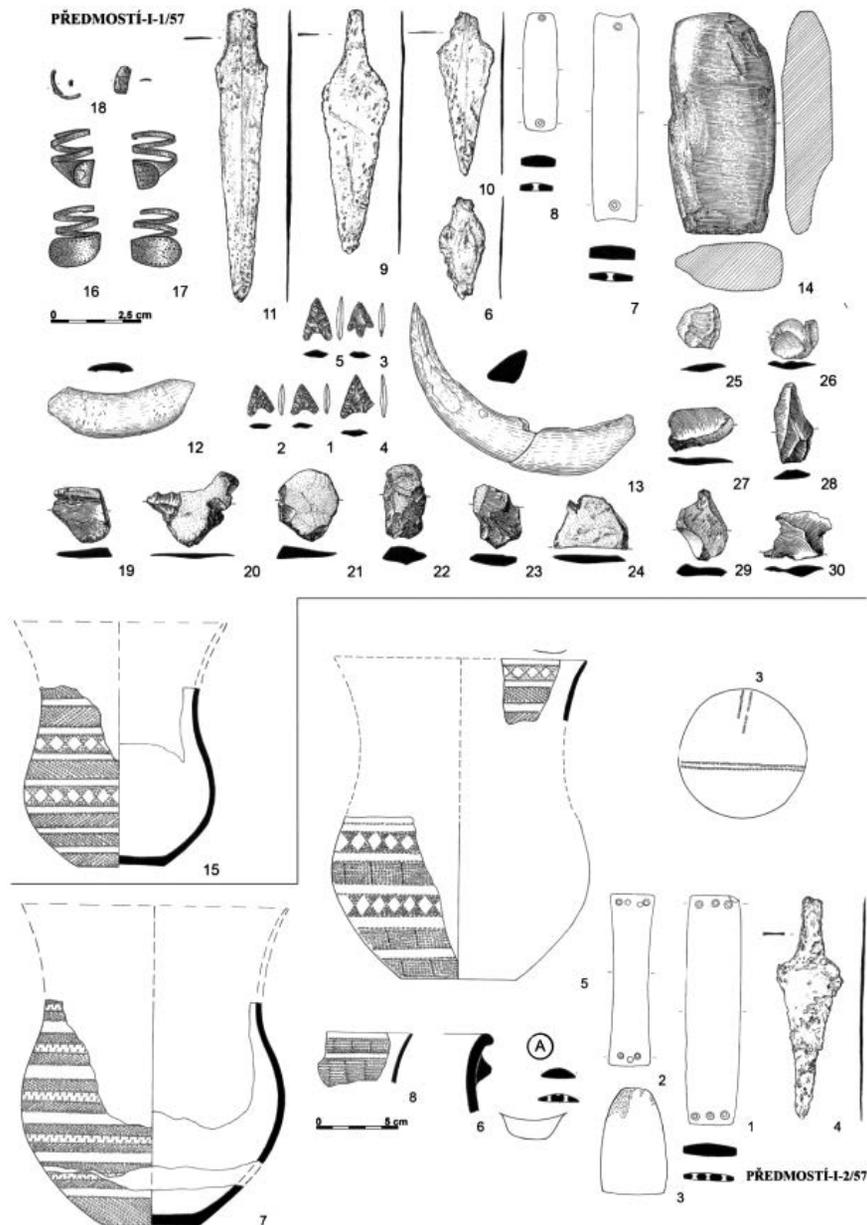


FIGURE 10. PŘEROV-PŘEDMOSTÍ, DIST. PŘEROV. GRAVE OR GRAVES 1/57 AND 2/57. RICH EQUIPMENT GRAVE/GRAVES OF BBC. ON THE SURFACE OF BOAR TUSK FOUND TRACES OF COPPER (AFTER ŠEBELA *ET AL.*, MANUSCRIPT).

rare alloy containing gold (Bátora, 2002: 199, 205; personal communication by L. Šebela). Similar procedures (scanning electron microscope with EDX microanalyser) were also applied to new finds of metallurgical kits from Hulín 1, Hulín-Pravčice 2 and Opatovice. All of them surprisingly yielded traces of copper, gold and silver (the analysis was carried out by J. Štelcl from the Faculty of Science, Masaryk University Brno) on both hammers and working surfaces of anvils (Fig. 13). It is really the first time when metal (copper) were detected on the boar tusk from Přebrov-Předmostí (Fig. 14) which confirmed their predicted role when metal artefacts were being finished. The use-wear analysis revealed further macroscopically observable traces (a. o. blow marks, analysis by M. Moník), so that we rightly suppose multifunctional use of several stones from the metalsmithing kit. Herewith is clearly evidenced the purpose and practical use of stones before their being deposited in

Accompanying finds of metallurgical equipments

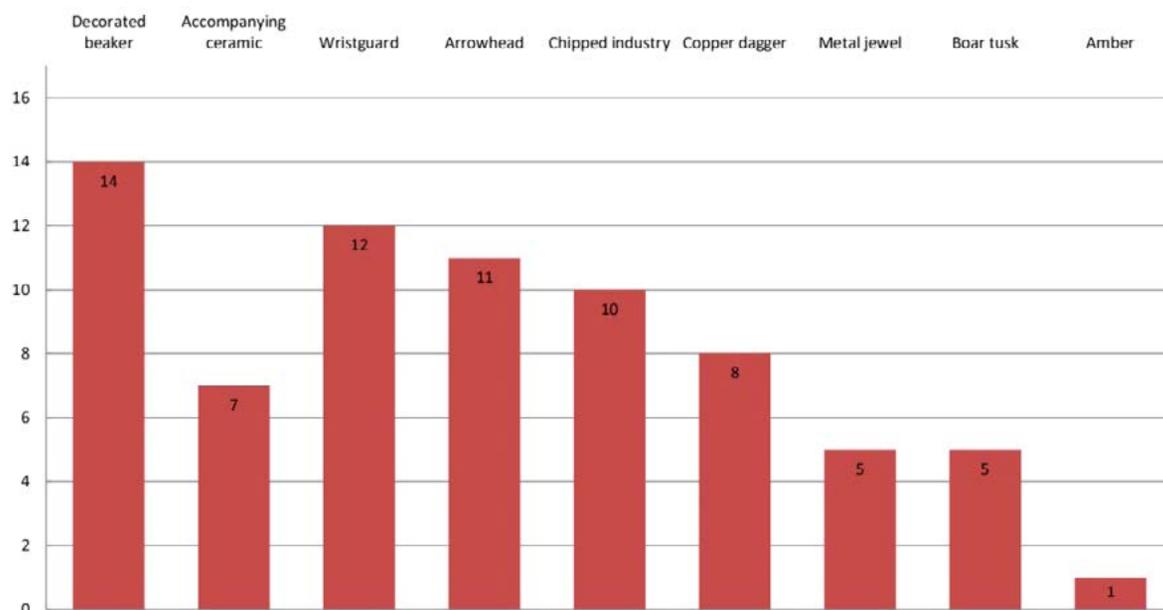


TABLE 1. SUMMARY OF ACCOMPANYING FINDS OF METALLURGICAL EQUIPMENTS (BBC IN MORAVIA).

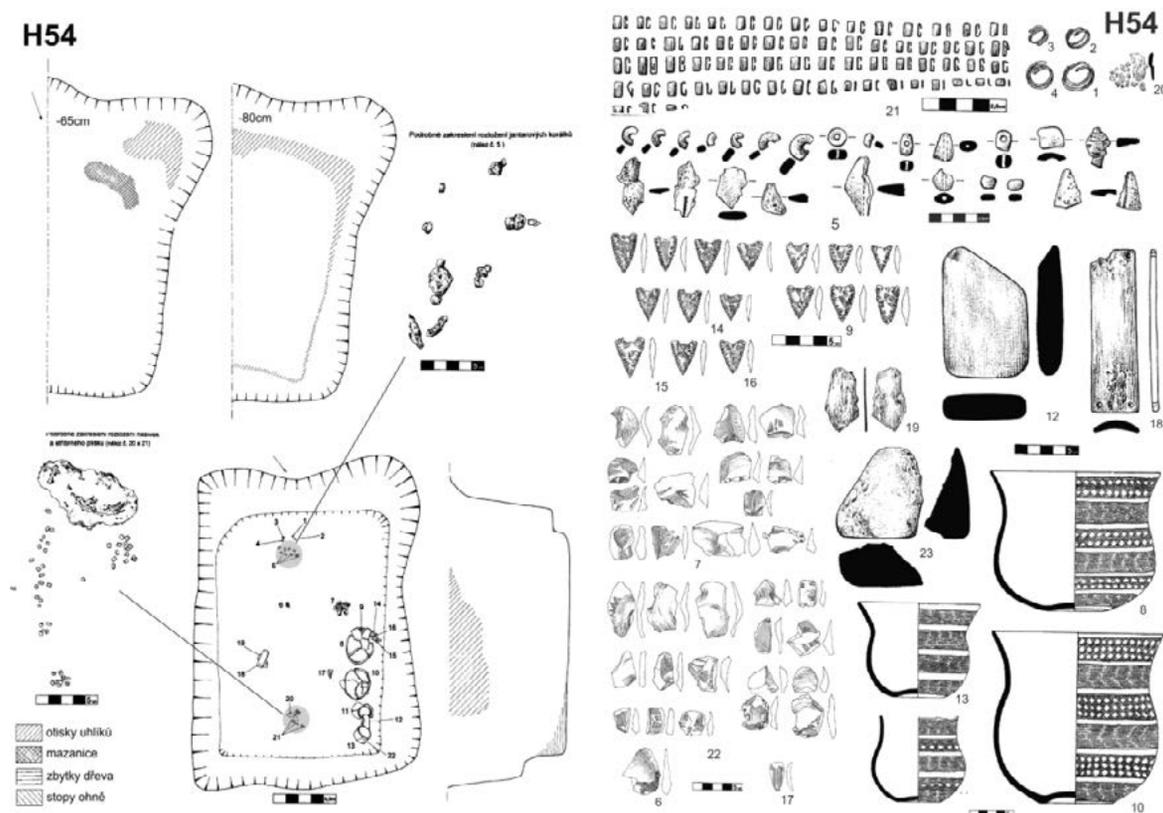


FIGURE 11. HULÍN-PRAVČICE 2, VIŠŇOVCE, DIST. KROMĚŘÍŽ. GRAVE 54. RICHEST GRAVE WITH WOODEN CHAMBER ON THE CEMETERY CONTAINED THE ACCUMULATION OF GOLD, SILVER, ELECTRON AND AMBER AND ALSO THE METALLURGICAL KITS (DRAWING BY A. PEŠKOVÁ).

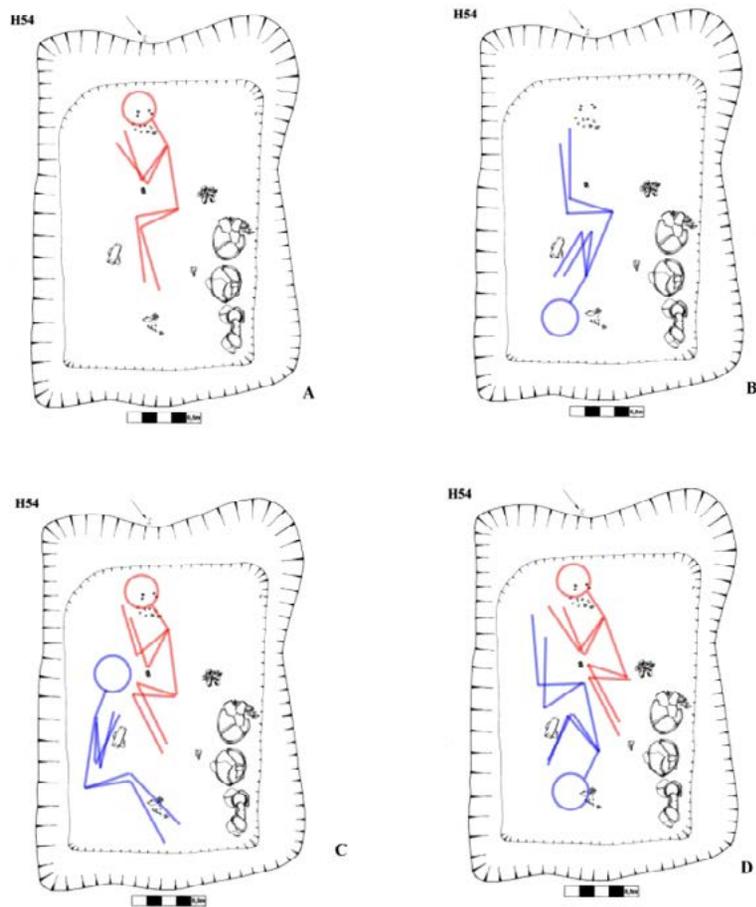
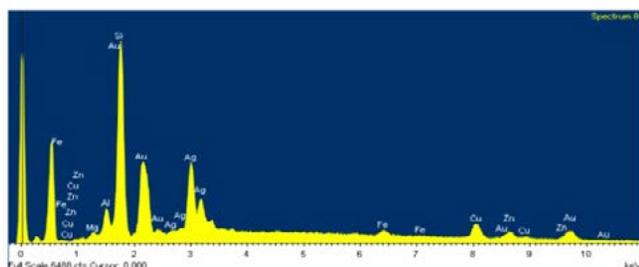
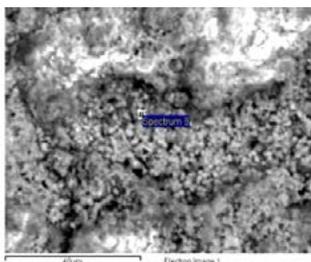


FIGURE 12 HULÍN-PRAVČICE 2, VIŠŇOVCE, DIST. KROMĚŘÍŽ. GRAVE 54. RECONSTRUCTION OF THE POSSIBLE POSITIONS BODY/BODIES OF THE DECEASED (PLAN BY L. ŠÍN).

graves. To a series of detected traces of metals (Cu, Ag, Au) and use-wear marks on the surface of tools we still must add a BBC cremation burial of a metallurgist from Zwenkau in Central Germany (Conrad, 2011), and traces of gold on a stone from a barrow in Upton Lowell, England. Copper and gold were identified on two anvils and a whetstone from a BBC pit in Hengelo-Elderinkweg (Drenth *et al.*, 2013). Negative results, on the other hand, yielded the analyses of finds from Amesbury-Archer, Lunteren and Soesterberg (Fitzpatrick, 2011: 116). Provided that we rule out an inappropriate analytic method (as happened to us), it might be an evidence of symbolically buried unused artefacts. The accompanying heavy minerals (barite, ilmenite, zircon) occur with Moravian analyses in a very small amount and are natural components of rocks, geologists say (cf. Bertemes, 2010: 145).

Positive detection of practical use of metalsmithing tools by microscopic analyses could give evidence of their actual or symbolic possession by a craftsman – metallurgist, or, with regard to social prestige, of a symbolically equipped person, who was not metallurgist (Leubingen), but attained this insignia post mortem, in accordance with his/her social status. In Moravia, for example, only a half of graves (12=54.5%) contained metals, but this is no conclusive evidence, either. Despite some scepticism with regard to previous attempts (Pike & Richards, 2002; Merkl 2013: 19) to identify the health impact of supposed long-time contact and working with metals in the buried craftsmen, new findings will possibly be brought by a qualitatively different multi-element chemical analysis of metal content in human bones (teeth). This discussion (Bertemes, 2010; Nessel, 2012; Merkl, 2013) thus cannot be closed.

In funerary equipment of the richest burials we can follow up joint occurrence of key social classes (combination between archer/hunter/warrior and metallurgist or some other craftsman), inclusive



Element	App	Intensity	Weight%	Weight%	Atomic%	Compd%	Formula	Number
	Conc.	Corrn.		Sigma				of ions
Mg K	0.16	0.6693	0.30	0.04	0.45	0.50	MgO	0.06
Al K	0.89	0.7925	1.45	0.05	1.99	2.75	Al2O3	0.28
Si K	8.32	0.9058	11.83	0.14	15.57	25.32	SiO2	2.16
Fe K	1.78	1.0729	2.14	0.19	1.42	2.76	FeO	0.20
Cu K	10.43	0.9382	14.32	0.41	8.33	17.93	CuO	1.16
Zn K	6.64	0.9414	9.09	0.49	5.14	11.31	ZnO	0.71
Ag L	10.67	0.7794	17.63	0.28	6.04	18.93	Ag2O	0.84
Au M	10.10	0.7115	18.28	0.29	3.43	20.51	Au2O3	0.48
O			24.95	0.37	57.63			8.00
Totals			100.00					
							Cation sum	5.88

FIGURE 13. HULÍN-PRAVČICE 2, VIŠŇOVCE, DIST. KROMĚŘÍŽ. GRAVE 54. SCANNING ELECTRON MICROSCOPE – ANVIL WITH TRACES OF COPPER (14,32%), GOLD (18,28%) AND SILVER (17,63%). MEASUREMENT BY J. ŠTELCL.

of gender-specific grave goods comprising prestigious items, for example those from precious metals (gold, silver, electrum) or metals at all (copper), signifying social rank, affiliation, power or prestige, which the buried person has had during his/her life. This all is sometimes accentuated by quantification of finds (so-called oversupply, Ger. *Überausstattung*). The variety of quantitative representation of metallurgical gear, beginning from a single piece (Amesbury-Archer) to as much as whole sets (Jezeřany-Maršovice, Hulín-Pravčice, Zwenkau), supports the idea of a symbolic *pars pro toto* representation (be it in used or unused condition) in a minor part of grave assemblages (typical of the Early Bronze Age). Anyway, metals and metallurgical tools can be attributed with special religious and social status emphasizing the significance of their owners.

In graves we always find only a part of the entire volume of metallurgical gear intended for casting (nozzle, casting mould) or metalsmithing (hammer, anvil, whetstones, polishers), but never a complete kit (inclusive of crucibles, raw material etc.). It means that these objects should not represent the

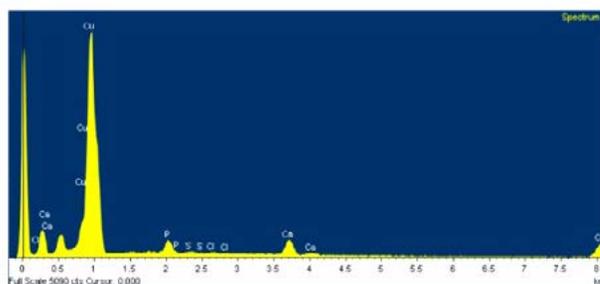


FIGURE 14. PŘEROV-
PŘEDMOSTÍ, DIST. PŘEROV.
GRAVE 1/57. COPPER TRACES
(57,68%) ON THE SURFACE OF
BOAR TUSK. MEASUREMENT
BY J. ŠTELCL.

Element	App	Intensity	Weight%	Weight%	Atomic%	Compd%	Formula	Number
	Conc.	Corrn.		Sigma				of ions
P K	1.74	0.8412	4.18	0.23	4.62	9.57	P2O5	0.65
S K	0.36	1.1265	0.64	0.14	0.68	1.59	SO3	0.10
Cl K	2.52	0.9980	5.09	1.15	4.91	0.00		0.69
Ca K	4.38	1.0697	8.26	0.31	7.05	11.55	CaO	1.00
Cu K	25.55	0.8930	57.68	1.09	31.06	72.20	CuO	4.39
O			24.17	0.80	51.68			7.31
Totals			100.00					
							Cation sum	6.14

production process itself, but rather its tangible result emphasizing the religious or social status of the buried person. Reverence thus does not go to prospectors or miners, but to metallurgists who were familiar with final technologies. However, we cannot be entirely sure whether this whole complicated process was perhaps not carried out by the same people.

The most graves of metallurgists in Moravia are dated to the early phase of BBC, which from a chronological point of view roughly corresponds to the local development of Moravian CWC. Graves of craftsmen also occur with later periods of BBC, but they are no longer so distinctive and richly equipped. Their number does not increase, but their monumentality and attributes of social prestige fade out, as if this symbol of social status and hierarchy became ‘popular’. To a considerable extent this also applies to Early Bronze Age graves of metallurgists, in which we can observe a clear (not immediate) continuity. This is also evident in many regions of Central Europe.

Unlike the end of Eneolithic, so far with separated insignia of metal founders and metalsmiths, in the Early Bronze Age graves we can identify joint occurrence of artefacts intended for both metalsmithing and metal casting (Gemeinlebarn-Maisgasse, Franzhausen II, Matúškovo, Nižná Myšľa). Each of the

above-mentioned periods maybe employed a different model of metallurgists. The wide, relatively complicated and demanding range of skills was mastered by only a narrow group of insiders, whose knowledge has been passed on from generation to generation within a narrow (family?) circle. These experts then carried out local production (in Moravian BBC it is evidenced by a casting mould from Luděřov or from the settlements of Brno-Obřany and Slavkov) within a community, or acted as wandering specialists performing contract work on a wide territory (Amesbury-Archer).

The complicated under- and aboveground construction of spacious tombs including circular palisade enclosures, as well as numerous grave goods in the form of weapons, archer's and craftsman's kits, multiple pieces of precious metal jewellery, amber ornaments etc. in the earliest/early BBC clearly indicate stratification of the community. It is a group of richly equipped burials with many common attributes representing the uppermost social class. They combine the social status of a prominent male (archer/hunter/warrior) with a skilled and wealthy craftsman (Amesbury, Künzing, Svobodné Dvory, Lunteren), who may also have had 'political' control over the production of metal artefacts. Along with specifically male prestigious objects in graves of wealthy females (few in number) they can be considered a formalised demonstration of a social elite, whose members tried to identify each other by the medium of funerary practices and distinguished themselves from the other social classes. This group of people manifest by virtually all available means their unprecedented social prestige, which is based, among other things, on mastering of the progressive and demanded technologies of metalworking. The considerably unified and similar character of graves of metallurgists on a vast territory enables to count this category among the social class of local elites. Significant is that the richest BBC graves always contain metallurgical gear and many other common elements, and we find them in all corners of Europe from England to as far as Moravia (Amesbury, Svobodné Dvory, Předmostí).

Graves of metallurgists, moreover, may reflect ritualised control over a socially and ideologically significant technology, which is associated with particular social status, or even prestige, based on exclusiveness of the production. And this to such an extent that it may have been an impulse to primary social differentiation in the form of burials of local male leaders, chieftains or 'elites' (with relevant group of females), who demonstrate their 'power' and social status, that is identity, post mortem by the medium of burial rites. It is surely no accident that both of the most prestigious components of inventory are contained in funerary equipment of these individuals.

References

- BÁTORA, J. 2002. Contribution to the Problem of 'Craftsmen' Graves at the End of Aeneolithic and in the Early Bronze Age in Central, Western and Eastern Europe. *Slovenská Archeológia* L: 179-228.
- BÁTORA, J. 2003. Kupferne Schaftlochäxte in Mittel- und Südosteuropa, (Zu Kulturkontakten und Datierung – Äneolithikum/Frühbronzezeit). *Slovenská Archeológia* LI: 1-38.
- BERTEMES, F. 2004. Frühe Metallurgen in der Spätkupfer- und Frühbronzezeit. In Meller, H.: *Der geschmiedete Himmel. Die weite Welt im Herzen Europas vor 3600 Jahren*. Halle/Saale: Theiss: 144-149.
- BERTEMES, F. 2010. Die Metallurgengräber der zweiten Hälfte des 3. und der ersten Hälfte des 2. Jt. v. Chr. im Kontext der spätkupferzeitlichen und frühbronzezeitlichen Zivilisationen Mitteleuropas. In Meller, H. & Bertemes, F (eds.): *Der Griff nach der Sternen. Wie Europas Eliten zu Macht und Reichtum kamen. Internationales Symposium in Halle (Saale) 16. – 21. Februar 2005*. Tagungen des Landesmuseums für Vorgeschichte 5, Halle: 131-161.
- BERTEMES, F.; SCHMOTZ, K. & THIELEE, W.-R. 2000. Das Metallurgengrab 9 des Gräberfeldes der Glockenbecherkultur von Künzing, Lkr. Deggendorf, *Archäol. Arbeitsgemeinschaft Ostbayern/West- u. Südböhmen 9. Treffen 23. bis 26. Juni 1999 in Neukirchen b. Hl. Blut*. Rahden/Westf: 53-60.
- BÖHM, J. 1929. Příspěvky k moravské prehistorii. *Časopis Vlasteneckého a Muzejního Spolku v Olomouci* XLI-XLII: 139-152.

- CONRAD, M. 2012. Glockenbecherzeitliche Gräber in Nordwestsachsen. *AFD* 51/52, 2009/2010: 39-130.
- DRENTH, E.; FREUDENBERG, M. & VAN OS, B. 2013. Prehistoric stone tools for metal-working from the Netherlands: an overview. In Bartelheim, M.; Peška, J. & Turek, J. (eds.): *From Copper to Bronze. Cultural and social Transformation at the Turn of the 3rd/2nd Millenia B.C. in Central Europe. Beiträge zur Ur- und Frühgeschichte Mitteleuropas 74*, Langenweissbach: 41-51.
- FITZPATRICK, A. P. 2011. *The Amesbury Archer and the Boscombe Bowmen. Bell Beaker Burials on Boscombe Down, Amesbury, Wiltshire*. Salisbury: Wessex Archaeology (Wessex Archaeology Report, 27).
- HARRISON, R. & HEYD, V. 2007. The Transformation of Europe in the Third Millennium BC: the example of 'Le Petit-Chasseur I + III' (Sion, Valais, Switzerland). *Prähistorische Zeitschrift* 82: 129-214.
- HÁJEK, L. 1966. Die älteste Phase der Glockenbecherkultur in Böhmen und Mähren. *Památky archeologické* LVII: 210-241.
- KAISER, E. 2003. Studien zur Katakombengrabkultur zwischen Dnepr und Prut. *Archäologie in Euroasien* 14. Mainz am Rhein.
- KAISER, E. 2005. Frühbronzezeitliche Gräber von Metallhandwerkern mit Gußformen für Schaftlochäxte im osteuropäischen Steppenraum. In Horejs, B.; Jung, R.; Kaiser, E. & Teržan, B. (eds.): *Interpretationsraum Bronzezeit* Bernard Hänsel von seinen Schülern gewidmet. *Universitätsforschungen zur Prähistorischen Archäologie* 121: 265-291.
- KUNA, M. & MATOUŠEK, V. 1978. Měděná industrie kultury zvoncovitých pohárů ve střední Evropě. *Praehistorica* VII: 65-89.
- MERKL, M. B. 2013. Blech und Becher: zur Rolle der Metallurgie in der Glockenbecher-Ostgruppe. *TÜWA Mittelungen* 14: 7-27.
- MOUCHA, V. 2003. Pokus o interpretaci nálezu z období kultury se zvoncovitými poháry ve Svobodných Dvorech (okr. Hradec Králové). *Archeologické rozhledy* LV: 772-783.
- NESSEL, B. 2012. Metallurgen im Grab – Überlegungen zur sozialen Einstufung handwerklicher Spezialisten. In Kienlin, T. L. & Zimmermann, T. (eds.): *Beyond Elites. Alternatives to Hierarchical Systems in Modelling Social Formations*. International Conference at the Ruhr-Universität Bochum, Germany, October 22-24, 2009. *Universitätsforschungen zur Prähistorischen Archäologie* Band 215: 423-432.
- PATAY, R. 2013. Bell Beaker Cemetery and Settlement at Szigetszentmiklós: First Results. In Heyd, V.; Kulcsár, G. & Szeerényi, V. (eds.): *Transitions to the Bronze Age. Interregional Interaction and Socio-Cultural Change in the Third Millennium BC Carpathian Basin and Neighbouring Regions*. *Archaeolingua* 30. Budapest: 287-317.
- PEŠKA, J. 2013. Two new burial sites of Bell Beaker Culture with exceptional finds from Eastern Moravia/Czech Republic. In Prieto Martínez, M. P. & Salanova, L. (eds.): *Current researches on Bell Beakers. Proceedings of the 15th International Bell Beaker Conference: From Atlantic to Ural. 5th-9th of May 2011. Poio (Pontevedra, Galicia, Spain)*, Santiago de Compostela: Galician Archeopots, 61-72.
- PEŠKA, J. (in print). Die soziale Stratifikation am Ende des Äneolithikums in Mähren, *Prähistorische Zeitschrift*, in print.
- PIKE, A. N. G. & RICHARDS, M. P. 2002. Diagenetic Arsenic Uptake in Archaeological Bone. Can we really identify Copper Smelters? *Journal of Archaeological Science* 29: 607-611.
- RŮŽICKOVÁ, P. 2008. Lukovité závěšky kultury zvoncovitých pohárů ve střední Evropě. Rukopis bakalářské diplomové práce. Brno. *pdf version*.
- ŠEBELA, L. 1999. The Corded Ware Culture in Moravia and the adjacent Part of Silesia (Catalogue). *Fontes Archaeologiae Moraviae* XXIII. Brno.
- ŠEBELA, L.; PŘICHYSTAL, A. & DVOŘÁK, P. (manuscript). Pohřebiště kultury zvoncovitých pohárů na Moravě III. Brno. Unpublished manuscript.
- TUREK, J. 2003. Řemeslná symbolika v pohřebním ritu období zvoncovitých pohárů. Suroviny, výroba a struktura společnosti v závěru eneolitu. In Šmejda, L.; Vařeka, P. (eds.): *Sedmdesát neustupných let*. Plzeň: 201-220.

- TUREK, J. 2006. Období zvoncovitých pohárů v Čechách. *Archeologie ve středních Čechách* 10: 275-368.
- ZIMMERMANN, T. 2007. *Die ältesten kupferzeitlichen Bestattungen mit Dolchbeigabe*. Monographien des Römisch-Germanischen Zentralmuseums Band 71. Mainz.

Bell Beaker funerary copper objects from the center of the Iberian Peninsula in the context of the Atlantic connections¹

Concepción BLASCO BOSQUED

Dpto. de Prehistoria y Arqueología Universidad Autónoma de Madrid,
c/ Tomás y Valiente, 1, 28049 Madrid, Spain
concepcion.blasco@uam.es

Ignacio MONTERO

CSIC. Centro de Ciencias Humanas y Sociales. Instituto de Historia,
c/ Albasanz, 26-28, 28037 Madrid, Spain
ignacio.montero@csic.es

Raúl FLORES FERNÁNDEZ

raulfloresfernandez@gmail.com

Abstract

This article studies the metallurgy of objects from funerary Bell Beaker contexts at recently excavated sites in the Madrid region. The unequal distribution of copper objects from the exhumed graves in different sites and tombs is striking. This suggests that the absence or presence of copper objects is not only noteworthy in terms of the richness of grave goods, but it also highlights other aspects of the burials: awls are used to denote females, whereas weapons are usually assigned to men, although they are also, in exceptional circumstances, found in female burials. Finally, we offer an analytical study of the different objects, with the presence of a halberd, part of the grave goods of one of the tombs, worthy of mention, the study of which highlights the importance of its chronology and contextualization within a Bell Beaker tomb.

Keywords: *Bell Beaker, Iberian Peninsula, Madrid, Metallurgy, Atlantic circle*

Résumé

L'article étudie la métallurgie dans contextes funéraires des sites campaniformes récemment fouillés dans la région de Madrid. Dans la compilation d'objets métalliques des tombes exhumées met en évidence leur répartition inégale dans les différents sites et tombes, notant que l'absence ou la présence non repose en termes de degré de richesse des plus ou moins grandeur des tombes. On souligne également son double sens: coups de poing comme indicateur de la femelle et armes assigné généralement les hommes et exceptionnellement aussi aux femmes. Enfin une étude analytique des différentes objets, avec une référence particulière à la hallebarde, qui fait partie de l'une des tenues mettant en valeur sa haute chronologie et leur contextualization dans une tombe campaniforme.

Mots-clés: *Campaniforme, Péninsule Ibérique, Madrid, Métallurgie, Atlantic cercle*

1. Copper objects in Madrid Bell Beaker funerary contexts

In the last decade, archaeometric studies have allowed us to make significant progress in understanding Bell Beaker groups at the regional level, serving as guidelines for future work. As usual, ceramic production and noting the presence of more traditional funerary objects has allowed us to differentiate Bell Beaker burials from the rest of the population (Clop, 2007; Ríos *et al.*, 2011). Clay analyses usually reveal local production in local workshops.

¹ Work funded by the project I+D+i HAR2011-28731: *Las sociedades calcolíticas y su marco temporal en la región de Madrid. Una revisión a la luz de nuevos datos.* Ministerio de Economía y Competitividad. Gobierno de España. Convenio con la Dirección General del Patrimonio de la Comunidad de Madrid.

Few individuals in this sector of the population have other elements besides ceramics as grave goods. These other elements, with the exception of copper awls, have not been located in domestic contexts, and their use in the most important burials could be indicating three different concepts:

1. Copper objects, especially weapons. Different copper-object combinations are noted ranging from single items to exceptional burials comprising genuine panoplies.
2. Elements of personal adornment made of expensive raw materials: gold and ivory.
3. Cinnabar dye for body decoration.

2. Burials with metal objects

Traditionally, Bell Beaker tombs have been identified by the presence of this phenomenon's distinctive pottery. However, recent excavations at the Camino de las Yeseras and Humanejos sites have revealed some graves lacking Bell Beaker pottery, but which can, in any case, be associated to the Beaker horizon due to the presence of a number of copper artefacts. Whereas cinnabar, ivory and gold ornaments are used exclusively in the production of grave goods of higher-ranked individuals, copper objects, and weapons in particular, could be associated with burials of a lesser status. Complete panoplies of copper weapons only appear in the richest graves.

We here present the preliminary results on the study of Bell Beaker metal grave goods found at three archaeological sites in the Madrid region (Fig. 1):

La Magdalena: Located in the municipality of Alcalá de Henares, near the river Henares. A total of 10 individuals were recovered from three Bell Beaker graves. Two of the burials only contained a single copper object each: an awl and a palmela point. The third grave was very disturbed and, although a possible metal ornament was found, it is not clear whether it belongs to the Bell Beaker period. Moreover, many of the Bell Beaker tombs were affected by the Roman necropolis present at the same site from the third to fifth centuries AD, from within which about 180 graves have been identified (Heras *et al.*, 2011, 2014).

Camino de las Yeseras: Located in the municipality of San Fernando de Henares. A total of eight graves containing Bell Beaker grave goods spread over three funerary areas and within a pit have been documented at this vast site. The minimum number of buried individuals, both in primary and secondary positions, is 18. Only two had copper objects amongst their grave goods, namely awls. Some details about the site and the burials have been published elsewhere (Blasco *et al.*, 2005, 2008, 2011; Liesau *et al.*, 2008, Vega *et al.*, 2010).

Humanejos: This extensive site, occupied over a long time period, is located in the Parla municipality. Seven Bell Beaker tombs have been studied to date, revealing a total of 17 inhumations. Two tombs have produced very rich burial assemblages and in all of the graves, but one, at least one copper object was found. Research on this site is in its early stages (Gómez *et al.*, 2011; Liesau & Blasco, 2011-2012).

The tombs at these three sites can be classified into four categories according to the number and type of metal objects deposited within them:

- A. Burials with one or two awls;
- B. Burials with one or two palmela points;
- C. Burials with one or two awls and one dagger; and
- D. Burials with two or more copper weapons and a wristguard.

2.1. Category A: Tombs containing one or two awls

A1. Individual burial in a pit (La Magdalena: UT 4463):

Female teen placed in a left lateral flexed position. Red ocher and cinnabar were sprinkled over the area between the neck and the pelvic region. The grave goods comprise a medium-sized pottery cup,

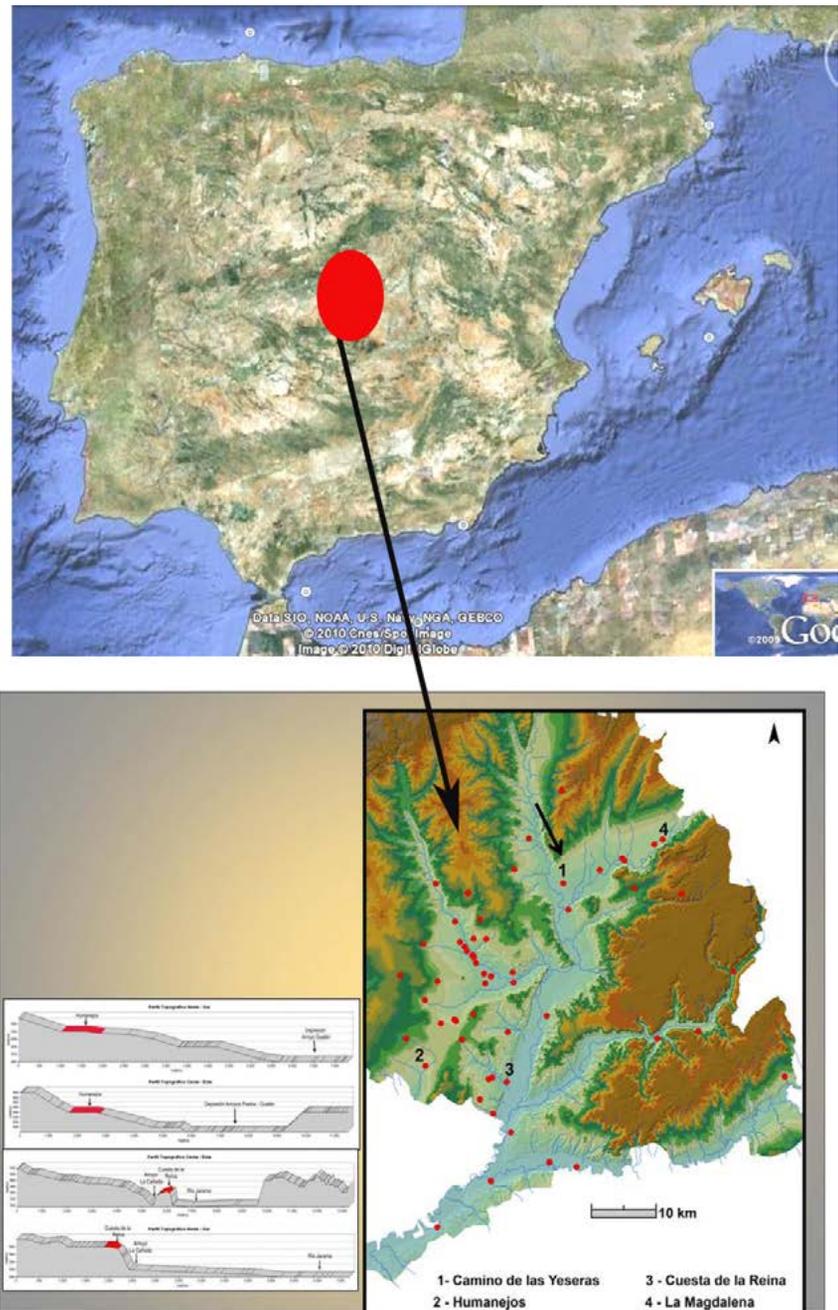


FIGURE 1. LOCATION MAP OF THE THREE SITES UNDER STUDY (AFTER RÍOS, 2011).

a well-preserved copper awl, a millstone fragment and a prismatic button with a V-shaped piercing made of African ivory (Heras *et al.*, 2014a: 196 Fig. 6, 2014b: 219) (Fig. 2A).

A2. Grave goods in a collective burial pit (Camino de las Yeseras: A. 21-E 06):

The tomb, which is completely disturbed, is found within a large pit, and was plundered in the third millennium BC. Its anthropological study has documented the presence of at least four individuals. Despite its looting, a copper awl (Fig. 2B), many Bell Beaker sherds, a double perforated button and a small gold rolled sheet have been recovered from within this burial pit. Two dates are available for this burial: 4004±30 BP/2580-2460 cal. BC, obtained from one of the skeletons (Ua-39310); and 3530±40 BP/1970-1740 cal. BC obtained from a dog skeleton that had been deposited as an offering and was used as to ‘seal off’ the burial (Ua-35019).

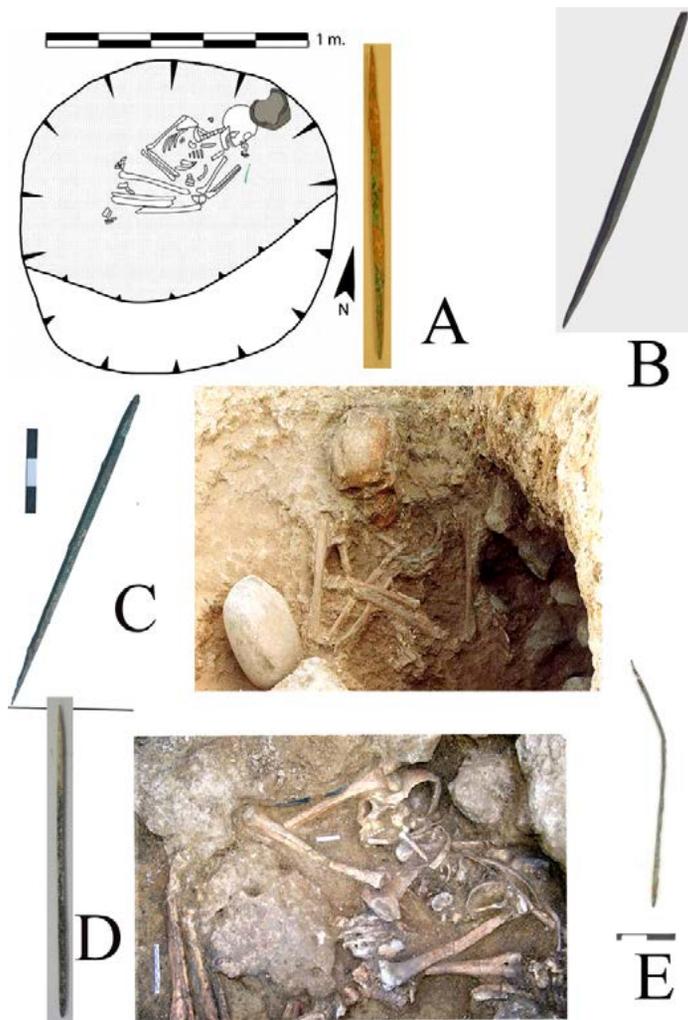


FIGURE 2: FEMALE BURIALS WITH COPPER AWLS AMONGST THEIR GRAVE GOODS. A: LA MAGDALENA (UT 4463) (AFTER HERAS *ET AL.*, 2014B). B: COPPER AWL FROM THE CAMINO DE LAS YESERAS' COLLECTIVE BURIAL (AREA 21). C: MULTIPLE BURIAL AT CAMINO DE LAS YESERAS (AREA 3) (PHOTOGRAPH BY MIGUEL RODRIGUEZ CIFUENTES) AND THE COPPER AWL. D: DOUBLE BURIAL AT HUMANEJOS (U.Ex 1853) AND A COPPER AWL HOLDED IN THE HANDS OF THE FEMALE (PHOTOGRAPH BY SARA GENICIO). E: COPPER AWL FROM A CHILD'S INHUMATION IN A MULTIPLE BURIAL AT HUMANEJOS (U.Ex 1166).

A3. Burial in an artificial cave in a funerary area (Camino de las Yeseras; funerary area 3).

The tomb contained the collective burial of six individuals. Four of the individuals were found in a secondary deposition at the bottom of the burial, and these had been covered by the skeletons of a 40-year-old female and a 30-40-year-old male. The latter's remains have provided a single date: 3650 ± 40 BP/2280-2030 cal. BC (BETA 184837). Bell Beaker pottery has been found associated with both these adults. The excavator (M. Rodriguez Cifuentes) assigned a Ciempozuelos cup with a small decoration, a plain pottery cup and a fragmented millstone grave goods to the female. A copper awl (Fig. 2B) was also recovered; this was initially thought to be a grave good from the male burial (Blasco *et al.*, 2005: 461-462), but we cannot rule out the possibility that it was linked to the female burial due to the partial overlap of the bodies as well as the lack of information on the exact location of the piece.

A4. Female grave goods in a double burial chamber (Humanejos: U.Ex 1853): The chamber, apparently initially dug to bury a male with a large quantity of grave goods, was used at a later date to bury a woman holding a copper awl in her hands (Fig. 2D). There was also a second grave good awl as part of the female burial, but the altering of the tomb due to the collapse of the tumulus displaced it from its original position. A successive inhumation process in this tomb is confirmed by AMS dating and taphonomic observations. The remains of the woman have provided a single date: (Ua-43525) 3797 ± 32 BP/2230-2130 cal. BC (see section D.2 for the radiocarbon date from the male individual).

A5. A child's grave goods in a multiple burial (Humanejos: U.Ex 1166):

Multiple burial with four individuals, one of whom was a four-year-old child wearing a green-stone necklace and holding a copper awl in his hand (Fig. 2E).

2.2. Category B: Tombs containing one or two palmela points

B1. Burial chamber under a tumulus (La Magdalena: UT 4307):

The tumulus had been greatly disturbed by a Roman tomb; a square burial chamber was discovered underneath it. The excavators have suggested the following sequence for this Chalcolithic burial: firstly, an adult was buried with one child and their grave goods included a palmela point (Fig. 3A), a flint knife, and Bell Beaker pottery. The second double burial, on the other hand, had no grave goods. (Heras *et al.*, 2014a: 195, Fig. 5, 2014b: 216).

B2. Upper level of a multiple pit burial (Humanejos: U.Ex 455):

Three individuals were buried in the base level. Two other altered adult male skeletons as well as a palmela point (Fig. 3B) were found covering these three individuals. The skeletal remains of one of the upper level individuals have provided the following date: (UA 40217) 3781±36 BP/2290-2140 cal. BC.

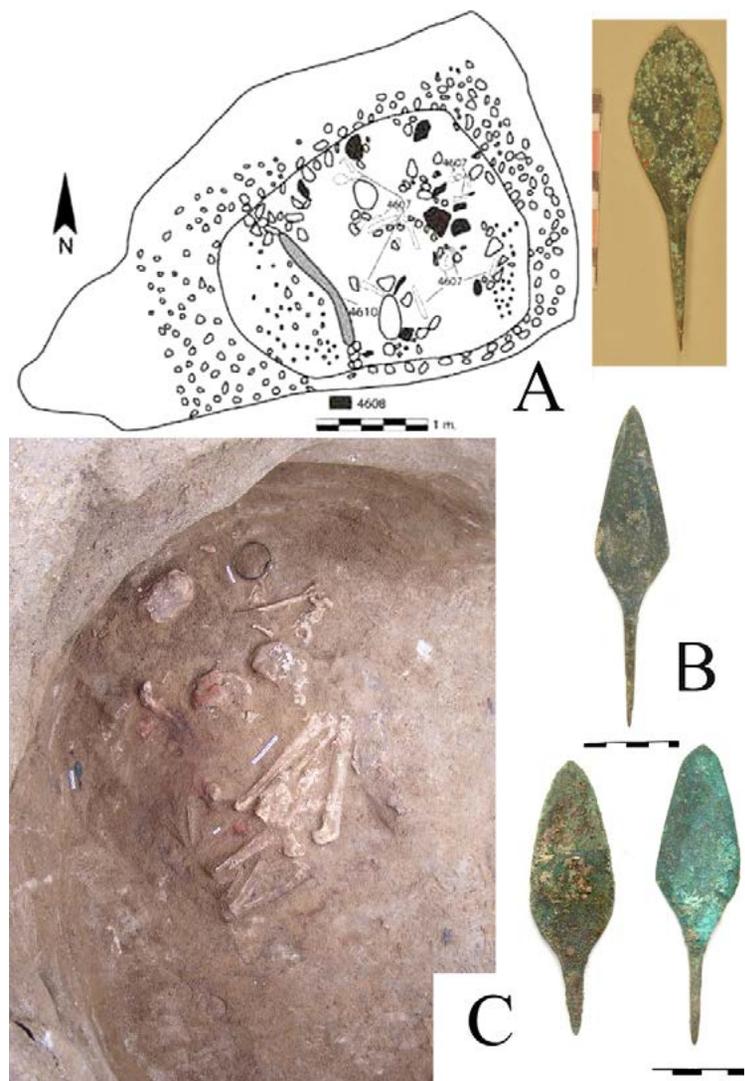


FIGURE 3: MALE BURIAL WITH A PALMELA POINT AS ONE OF HIS GRAVE GOODS. A: LA MAGDALENA (UT 4081) (AFTER HERAS *ET AL.*, 2014 B). B AND C. MULTIPLE BURIAL AT HUMANEJOS (U.Ex 455) (PHOTOGRAPH BY SARA GENICIO).

2.3. Category C: Tombs with (an) awl/s and a tanged dagger

C1. Pit burial (Humanejos: U.Ex 1166):

Round grave in a big, but shallow pit in which an 18-20-year-old woman was buried, accompanied by three children of different ages. The bodies were covered with cinnabar. The date obtained from the female remains is: (UA-40220) 3959±34 BP/2580-2340 cal. BC. The grave goods include several plain pottery containers placed at the head of each of the bodies. The adult woman also had an awl and a copper dagger clutched in her hands (Fig. 4A). A four-year-old child had a copper awl, which was described above in section A5.

C2. Burial in a shallow pit (Humanejos: U.Ex 1701)

Individual burial of a young woman, around 20 years old, in a large, shallow pit, placed in a left lateral decubitus position and legs contracted. The body was covered with cinnabar and adorned

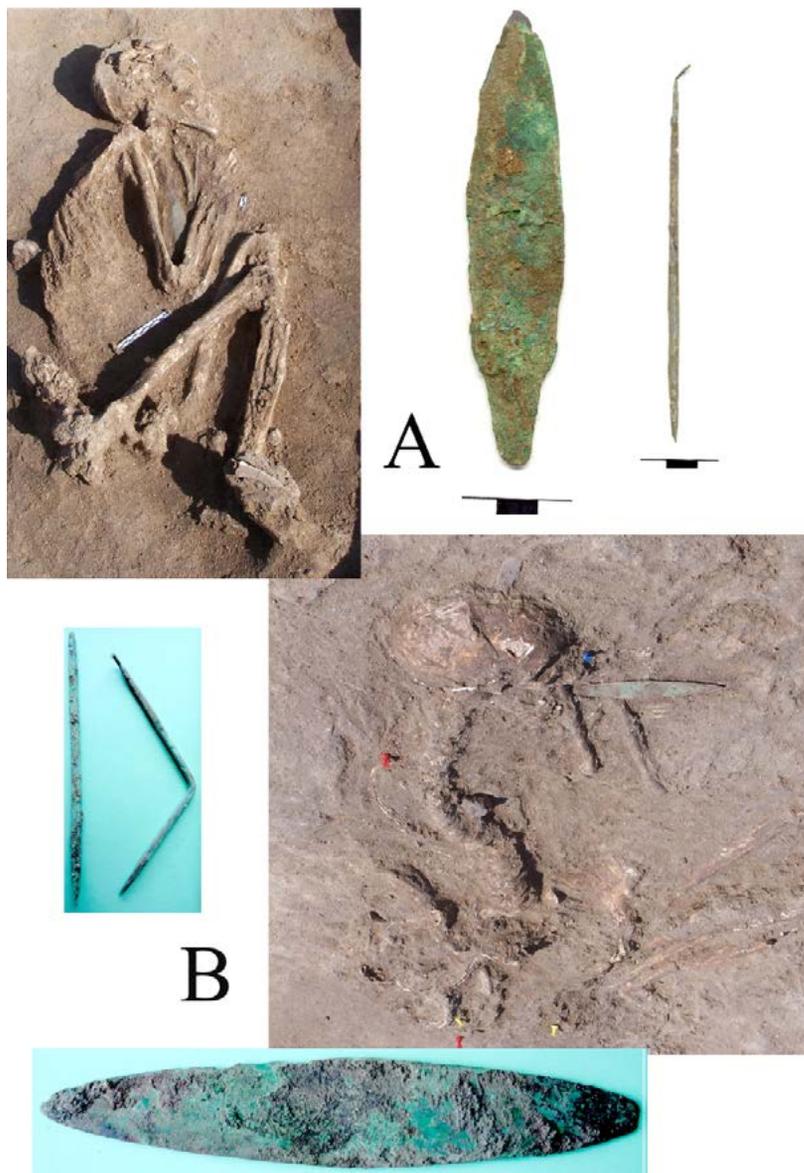


FIGURE 4. FEMALE BURIALS WHICH INCLUDED AN AWL AND A COPPER DAGGER AS THEIR GRAVE GOODS. A: DETAIL OF A FEMALE INHUMATION IN THE MULTIPLE BURIAL AT HUMANEJOS (U.Ex 1166) AND TWO METAL OBJECTS INCLUDED WITHIN AS GRAVE GOODS (PHOTO BY SARA GENICIO). B: DETAIL OF A WOMAN'S INDIVIDUAL BURIAL AT HUMANEJOS (U.Ex 1701) AND METAL-OBJECT GRAVE GOODS.

with a green-stone necklace. Her remains have provided the following date: (Ua-40222) 3800±34 BP/2250-2130 cal. BC. She was holding a copper dagger and copper awl in her hands and her other grave goods comprise a copper awl, (Fig. 4B), and two plain pieces of pottery, one of them a large pot or jar and a whetstone, all of them distributed near the feet.

2.4. Category D. Grave goods with two or more weapons and wristguard

D1. Pit burial (Humanejos: U.Ex 455):

Multiple burial in a deep pit. In the lower level, the bodies of three individuals in anatomical connection were placed in a left lateral decubitus position. Two other adult men had been buried above them (see section B2). One of these two latter individuals was profusely covered with cinnabar, especially around the thoracic region; red staining, however, was also found across the whole of the burial assemblage's substrate. The anthropological analysis indicates that the individuals buried in the lower level are:



FIGURE 5. DETAIL OF A MULTIPLE BURIAL AT HUMANEJOS (U 455 EX.) (PHOTOGRAPH BY SARA GENICIO) AND COMPONENTS OF THE PANOPLY OF SOME OF THE INDIVIDUALS.

- a 17-21-year-old male;
- a 10-12-year-old child with a wristguard on his forearm and a tanged dagger and palmela point in his hands (Fig. 5); and
- a 20-25-year-old male with a gold sheet attached to his skull. The excavators also assigned two palmela points to his grave goods. The body showed signs of having been near a source of heat and also had a large amount of cinnabar sprinkled over it, some of which also made its way onto the other two skeletons.

A fourth palmela point was also found, but it has not been specifically assigned to any of these three individuals. The remains of the older individual, also discussed in section B2, have produced a date: (Ua-40218) 3825±37 BP/2350-2200 cal. BC. In the sealing level, the remains of two other bodies with a palmela point were documented and noted earlier in section B2.

D2. Burial in a square chamber (Humanejos: U.Ex 1853)

This is an important square and deep chamber with a double burial (Gómez *et al.*, 2011: 117) in which an old-aged man has an outstanding assemblage of grave goods. It is worth highlighting the



FIGURE 6. DETAIL OF A DOUBLE BURIAL AT HUMANEJOS (U 1853 EX.) (PHOTOGRAPH BY SARA GENICIO) AND COMPONENTS OF THE PANOPLY, INCLUDING THE HALBERD FROM A MALE'S GRAVE.

presence of three copper weapons, a halberd, a dagger and a palmela point amongst his grave goods. Additionally, a schist wristguard and an ivory artefact, probably a handle for a palmela point, were also recovered from within this burial context (Fig. 6). A considerable amount of ornamentally-rich and varied Bell Beaker pottery was also found. The body of the male was daubed with cinnabar. A second palmela point was also found here, but its exact original location could not be determined so it could not be confidently assigned to either of the individuals. The woman had two awls, discussed earlier in section A4. The results from the AMS dating of the male place it at 3917±33 BP/2490-2290 cal BC (Ua-43524).

3. The distribution of metal objects in the funerary contexts under study

In Bell Beaker graves it seems that metal objects are unequally distributed. Considering the three sites with Bell beaker graves under study (La Magdalena, Camino de las Yeseras, and Humanejos), only 25% of the buried individuals received copper objects as grave goods. Weapons represent the predominant type of copper-artefact grave good (17%). The site of Humanejos is outstanding in this respect because not only does it have an important amount of copper objects, but it also possesses 85% of the total number of recorded weapons, as opposed to La Magdalena, which only has 15%.

The total percentage of weapons as Bell Beaker grave goods (25%) noted here indicates an underrepresentation when compared to the results published by O. Lemerrier for the Iberian record. He suggests that more than 50% of Iberian Bell Beaker burials contain at least one metal weapon (Lemerrier, 2011: 125). This statement, however, could be based on calculations carried out on selected samples, where, most likely, poorer burial records were not included in the publications.

A more detailed study of the data presented in this paper allows us to highlight the differences between the Camino de las Yeseras and Humanejos sites, both with a similar number of exhumed Bell Beaker individuals. They, however, reveal different distributions in terms of copper weapon and awl items: 44% of the graves at Humanejos contain these items, whereas only 11% do at Camino de las Yeseras. This comparison is even more striking if we consider the number of weapons: 12 at Humanejos and none at Camino de las Yeseras (Tab. 1).

The percentage of graves with weapons, however, hides another reality: most of them only contain single pieces. In contrast, 13 of the 18 metal objects documented at Humanejos were found concentrated in two of the graves (Tab. 1). According to Salanova, panoplies are rare occurrences across the whole of Western Europe, where they have only been identified in three individual graves (Salanova, 2005: 11). This catalogue has now extended with the new data from Humanejos. Although these are burials with more than one individual, the grave goods have been individually assigned to the male inhumations.

Sites	Burials with Bell Beaker graves	Individuals with Bell Beaker graves	Individuals with Bell Beaker metal objects	% of tombs with Bell Beaker graves	Individuals with weapons	% Graves with weapons	no. of weapons	no. of metal objects
La Magdalena	3	10	2	20%	1	10%	1	2
Camino de las Yeseras	8	18	2	11%	0	0	0	2
Humanejos	7	18	8	44%	6	33%	12	18

TABLE 1. COMPARISONS OF THE COPPER GRAVE GOODS FROM THE SITES UNDER STUDY.

Copper items, however, must not only be considered in terms of their number and typology, but also in terms of their weight. Weight is another important fact to consider when determining the social relevance of individuals: for example, the men buried in tomb U.Ex 1835 have a copper panoply more than 500 g in weight, whereas the weight of U.Ex. 455's panoply is no more than 50 g; both burials, however, contain the same number of items.

Other objects frequently found in graves are awls. However, their weight is not important as its range is only between 5 g and 10 g. They are especially linked to female graves, whilst weapons are linked to male graves. Females are normally buried with a single awl, although there are two exceptions to this trend: U. Ex 1701 and U. Ex 1166 at Humanejos contained two awls each, and in one of the tombs they were accompanied by a dagger.

4. The meaning of funerary metal objects

As we have already noted, although Bell Beaker copper objects have gender connotations, there are some exceptions to these in the case of female graves. Some objects imply other meanings or functionalities: awls have been associated with handicraft activities such as pottery ornamentation and the working of other organic materials such as wood, leather or textiles.

Some authors interpret many of these grave goods as artefacts used in life by the deceased (Clop, 2008: 136). However, not all of the awls recovered in these tombs seem to have been used for long periods of time; they therefore cannot be thought to represent objects used during the individuals' lifetimes. Use wear is generally absent in long and 'heavy' awls (about 12 cm long and around 10 g in weight). These sizes reveal artefacts that are bigger and heavier than the pieces known to come from domestic contexts. Another interesting feature that helps distinguish funerary awls from domestic ones, is the formers' morphology: a perfect square section with very sharp edges. Could they have had another meaning? Could they have been used as weapons? Or are they just identification symbols of female graves?

It has also been debated whether the weapons (dagger and palmela point) given to the deceased were used during life (Gutiérrez *et al.*, 2010: 414) or were specifically made to be used as grave goods. The two examples from Humanejos indicate that weapons were related to two males: one old-aged individual from grave 1853, and a 10-12-year-old boy (Tomb 455). This is an interesting case as it could be indicating that weapons could have been inherited or perhaps their presence was linked to the deceased's own merits (Heyd, 2007: 352–357).

5. Bell Beaker copper-item exchange networks

Awls and weapons in funerary contexts do not only represent different meanings in relation to social and gender roles, but also have different circulation dynamics. Whereas common small objects, such as awls, are more widespread in graves, weapons, on the other hand, were reserved for a small number of individuals within a community and their production must have therefore been more controlled.

On the other hand, the production process, using small amounts of metal and the maintenance of the awls, does not require the use of complex technologies. The presence of awls is not restricted to Bell Beaker domestic or funerary contexts, where they are gender-specific, as they have been recovered from other synchronous Chalcolithic sites and were used for a long time during the Bronze Age (Montón, 2010: 126). We do not rule out the idea that most of them are local productions.

Copper palmela points are only found in Iberian graves and, to a much lesser extent, occasionally in France. They mainly belong to western Bell-Beaker groups, and linked to copper objects could have been deemed relevant prestige objects in societies in which archers and hunting activities still played an essential role. In contrast to awls, palmela points do not seem to have been used before they were deposited in the tombs and do not appear in domestic contexts, whereas flint arrowheads are very

frequent, such as at Camino de las Yeseras. As the palmela points are very numerous in central Iberia (Hernando, 1992) we do not rule out the possibility of the presence of regional workshops and mid-distance exchange networks.

However, the presence of tanged daggers in European Bell-Beaker groups (Heyd, 2007: 346, Fig. 11) could reflect a different functional or social role of the Palmela points. Exchanges of knowledge, ideas or fashions as well as technology changes took place in Europe and this could explain the similarity between our familiarity with certain items from distant sites. A good example of this is how similar a small dagger from Ciempozuelos (Blasco & Ríos, 2010: 364, Fig. 7c) is to Hungarian Bell beaker daggers. These similar types, however, have not produced identical results when metallographically analysed, which has led to the conclusion that different manufacturing techniques were used to produce these daggers (Rovira *et al.*, 2011). However, we have no means of ascertaining whether the weapons that were also placed in tombs were included in this *modus operandi*, since we cannot rule out different production and distribution circuits. Reciprocal exchange amongst peers (the elites) places all elements produced at the same level if no differences or different technological knowledge are noted. As these could not be ruled out to be imitations based on their shape and size by, but no by direct exchange, as this case could demonstrate any technical interaction (Perlès, 2012).

Like the awls, copper daggers are an important and formally varied type of grave good in European Beaker burials (Heyd, 2007), and also in Bronze Age funerary contexts, such as the Iberian El Argar culture (Schubart, 2012:72). They even appear, exceptionally, in some female graves (Elbiali, 2011).

We can assert that there is sufficient evidence to suggest that weapons, as is the case with ceramics, may have been made using materials from nearby outcrops and that the technological principles of production and manufacturing of metal objects were shared and known by the artisans from each community. The fact that their production may have been restricted and that they may have been objects of symbolic and social value does not exclude the possibility that these may have also been used as gifts or for other transactions and therefore, in some cases, were of distant origin.

Finally, it is still difficult to explain the presence of a halberd within the Bell-Beaker panoply since the specimen from Humanejos' tomb U.Ex 1853 is the only known example to date to be found in this kind of context. It represents a unique find for this early chronology as it has traditionally been assigned to a Bronze Age type of weapons.

6. Funerary Bell-Beaker metallurgy: common objects and unique productions

One of the smelting vessels recovered from Camino de las Yeseras (Blasco & Rios 2010: 261-262) was studied using a scanning electron microscope (SEM), which has revealed the presence of the remains of unreduced copper ores: copper sulfide (chalcocite or covellite) and copper silicate (chrysocolla). Chrysocolla is documented in the copper mineralizations at Hoyo de Manzanares and Torrelodones, both in the Sierra de Madrid.

Some powder obtained from two other crucibles was also analyzed, and copper, arsenic and nickel were the main elements detected. The data indicate that in the site itself the full operational chain was at work, suggesting a good degree of self-sufficiency amongst these groups with regard to metal procurement, working and maintenance, at least in terms of simple metal objects like awls, and even for small weapons like palmela points and daggers.

The production of the most common weapons like daggers and palmela points does not pose any real technical difficulties, neither in terms of the types being produced nor in terms of their weight (around 20 g). However, we do not know why, in certain cases, metal is absent, such as at Camino de las Yeseras. No metal weapons have ever been found at this site's tombs, whereas the presence of gold, ivory and cinnabar (all exotic raw materials) objects has been noted. If the absence of metal

objects is not linked to difficulties in their production, even if not locally manufactured, we must look at the social meaning of these and other exotic raw materials.

Even in the cases where the graves at Humanejos containing significant numbers of weapons and whose composition, metrology and type-match to Bell Beaker standards, it is not possible to determine whether these grave goods are part of a batch obtained as a whole or from different acquisitions that were then lumped together. Elemental analysis reveals a different impurity pattern in metal composition even within objects from the same grave.

The halberd found in tomb U Ex 1853 at Humanejos dated to 3917±33 BP (Ua-43524)/2490-2290 cal BC is worth noting given its qualitative and quantitative differences. Typologically, it is an Atlantic subtype with a semicircular or trapezoidal tongue (Delibes *et al.*, 1999) of which different specimens are known, particularly from the middle basin of the Tagus, where Humanejos is located. However, all of the examples were unearthed by chance and are therefore decontextualized, although Siret did a freehand drawing ‘from memory’ of a find from El Castillejo (Toledo): a halberd next to Bell Beaker pottery, which remains unpublished.

The halberd differs substantially from the traditional components of the Bell-Beaker archer equipment known to date. From the point of view of its manufacture, we can say that it was cast in an asymmetric bivalve mould, judging by the differences in the section on both sides, with a greater emphasis on one of them, which appears to be a common feature in the rest of the known halberds. This is especially noticeable in the midrib. Once extracted from the mould, the piece was finished, as was custom at that time, by cold forging. Its composition is also that of an arsenical copper (2.05% As), similar to pieces from other parts of the same region and from the same period (Rovira & Gómez 2003).

The composition of the halberd presents no distinguishing features in relation to other metals found within the same grave. Both the palmela points and the dagger are copper pieces containing considerable amounts of arsenic, although the dagger contains the most overall (4% As).

Another aspect which should also be assessed is the volume of metal required to complete the casting. Atlantic halberds in general, like the one found at Humanejos, are always heavier than 250 g. The dagger from Villamiel is only 23.9 cm long and weighs 256 g, which places it in the lower end of the scale of those known to date, with the Bautas halberd weighing as much as 472 g, and the one from Humanejos weighing 442 g and measuring 27 cm.

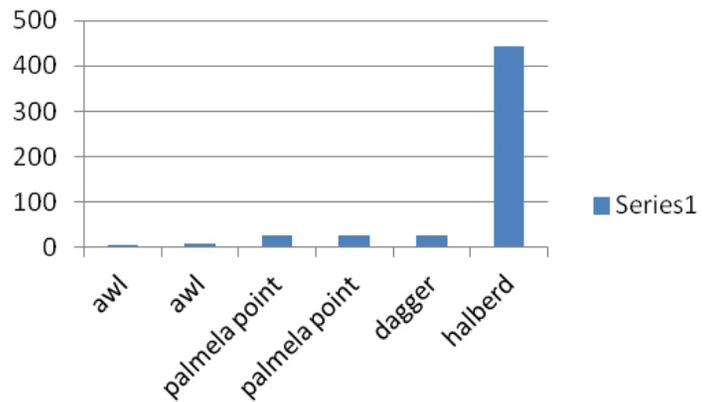
Considering the data provided by the experiments carried out using smelting vessels, the metal obtained by each reduction in an average vessel ranges between 100 g and 125 g. If we assess the losses that take place during the casting process, we can estimate that at least 3-4 smelting processes would be necessary in order to obtain the metal to cast a halberd like the one found at Humanejos.

The differences in volume and weight of the halberd compared to the rest of the metals found in the same tomb, which comprise the usual Bell Beaker panoply (as shown in Tab. 3), speak for themselves

Nº_Analysis	Type	Nº_INVENT	Fe	Ni	Cu	As	Sn	Pb
PA20290	Halberd (blade)	ue18532-1	nd	nd	97,9	2,05	nd	nd
PA20289	Halberd (rivet)	ue18532-1	nd	nd	97,9	2,09	nd	nd
PA20284	Palmela point	ue1853/7	nd	nd	97,4	2,64	nd	nd
PA20288	Palmela point	ue18532-2	0,04	nd	87,9	2,05	nd	0,03
PA20287	Dagger	ue18538-4	nd	nd	95,9	4,06	nd	nd

TABLE 2. XRF ANALYSIS OF THE METAL OBJECTS FROM THE PANOPLY FOUND IN TOMB UE1853 AT HUMANEJOS.

TABLE 3. WEIGHT IN GRAMS OF THE METAL OBJECTS PRESENT WITHIN THE GRAVE GOODS OF THE UEX1853 HUMANEJOS TOMB, WHERE THE VAST DIFFERENCE IN WEIGHT OF THE HALBERD IS NOTED WITH REGARD TO THE AWLS AND OTHER WEAPONS.



in terms of the challenge faced by the artisan when casting almost 20 times the weight of a palmela point or 10 times that of a dagger (Tab. 3).

The Humanejos halberd also poses other problems in terms of its technological innovation, whereby rivets are used as a way of fixing the blade to the haft. So far we have no clear evidence that during the Chalcolithic rivets were being used given that the system used for daggers was that of the developed tongue. These Atlantic halberds definitely represent a mixed system since they develop a wide and short tang (or ‘tongue’) where the rivets are found, differentiating them from the ‘Carrapatas’ type from the northwest of the Peninsula, where rivets are placed directly at the blade’s base. This system can be considered as indicative of a transition to daggers, swords or halberds with rivets characteristic of the Bronze Age. If the tongue is effective as an extension of the blade when hafting, the concept of a halberd in which the handle is perpendicular to the blade would require shorter tongues, but the force received when used would be greater therefore reinforcing rivets would be necessary.

Singular elements of this piece alongside the rest of the weapons from this and the rest of the Bell-Beaker deposits indicate that this is the work of a specialist employing new techniques identical to those in use during the second millennium BC. Given the absence of dates, we may assume that this piece could be synchronous to similar specimen finds from around the middle and lower Tagus basin (Barroso *et al.*, 2002-2003; Senna, 1994; 2007), all closely related to the British and Irish productions, but with its own identity judging by the length of the tongue.

7. Discussion

These Bell-Beaker findings from Madrid show that copper objects, like other grave goods and funeral rituals (Fig. 2E), follow a strict social code in place at the three sites under study. One piece of evidence for this funeral patterning is that the placing of awls in female inhumations. These are large pieces made, without doubt, with the sole purpose of being deposited in tombs, as they reveal no use wear. We do not rule out the possibility that these pieces could represent symbolically certain handicrafts. It is worth noting the presence of a young child buried holding a small awl in his or her hands. The heavy use traces noted on the piece’s tip and lateral surfaces, however, could be suggesting that the female child inherited her status.

Two exceptional sets of female grave goods, including a dagger alongside an awl (Fig. 4), were found at Humanejos. These grave goods could be a precedent of further costumes during the Bronze Age for female burials, particularly in the El Argar culture (Lull & Estévez, 1986), as well as in other European groups of the second millennium BC (Elbiali, 2011).

Weapons are found alongside the bodies of males in two different ways: one or two palmela points as the symbol of an archer, or as part of a complete panoply, including a tanged dagger and wristguard. In this case too it precedes the concept of Bronze Age warriors.

Grave goods containing an important set of weapons were documented in two of the graves:

The first grave, where the 10-12-year-old individual was buried, presents, despite his young age, an outstanding Bell Beaker panoply: two palmela points, a tanged dagger and a wristguard, confirming that these gifts were possibly due to the deceased's own merits, as young people gained full rights into society at an early age (Heyd, 2007: 352). To date we have insufficient data to fully understand the social status of infants and juveniles during this time, although it is most likely that the initial development of hereditary links amongst the elite classes took place then.

The second outstanding grave is that of an old-age male, which contained the classic panoply of weapons, but also a conical object made of ivory, which was possibly part of the shaft of one of the palmela points. An exceptional heavy and big halberd indicates that a remarkable amount of metal was spent to produce this piece carrying out a minimum of four smelting processes prior to the casting as we know from the techniques used.

In addition to the social role that funeral weapons play, we must consider the European spread of tanged daggers and wristguards throughout the Bell Beaker phenomenon. From the Atlantic to the Danube, and from the Iberian Peninsula to the British Isles, these objects reflect an extensive and dense network of material, ideological and technical exchange.

The palmela points, on the other hand, represent an exception since their main distribution is in the Iberian Peninsula. Other Bell-Beaker groups replace these items with elaborated flint arrowheads. These singular finds indicate a more stringent demand from the Iberian elites, despite the significant production of flint projectiles documented at many sites. It seems that Iberian leaders demanded more exclusive pieces, even if the raw materials were foreign in origin, and it is also possible that the workshops were non-local.

Finally, the presence of the halberd in one of the graves is an extraordinary find not only because of its early date in the second third of the third millennium BC, but also because it was found in a Bell Beaker grave and reveals typological similarities to several British specimens. It is by no means an exclusive item to explain several of the Iberian Bell-Beaker innovations noted so far, which include other such as ivory and cinnabar, the presence of which suggests a long-distance origin to the materials, ideas or knowledge.

The Humanejos halberd from the Madrid region, however, supports the notion that strong connections existed between the Iberian Beakers, based on their weapon typology, and the central groups and others from the Atlantic regions. This does not mean that this impressive weapon was cast in a British workshop since other similar examples from the Tagus Valley region have been known for quite some time. As they are not frequent, but, in any case, the findings are concentrated in this region, we do not rule out the idea of a possible regional workshop. This evidence confirms again connections with British metalworkers, which would have entailed the sharing of experiences and technological innovations within the Atlantic circle. This would have played a role in the formation and development of the Beaker phenomenon (Salanova, 2004), with the elites demanding similar types of sumptuous and symbolic, but also functional pieces for their packages.

The dispersion of copper Bell-Beaker metallurgy, and weapons in particular, is a clear example of the 'movement not only of materials and objects of various kinds, but also of an intangible element such as information; these circuits are the expression of contacts and relationships of various kinds, which affect both near and distant groups' (Bernabeu, 2012: 106).

Finally, we would like to highlight that the grave goods found at Humanejos, including the halberd, provide us with an answer to the question on why halberds were excluded from the grave-good packages of Atlantic chiefs; why did they chose not to include them in the tombs as new symbols of distinction when, comparatively speaking, rich grave goods demonstrated an obvious desire to express their outstanding lineage? (Delibes *et al.*, 1999: 42). Now we can confirm that not only did Atlantic aristocrats demand to have halberds included in their burials as sumptuous, distinctive symbols of their leadership, but that these types of symbolic grave goods preceded similar depositions found associated with later Bronze Age elites. As was the case with the earlier Bell-Beaker leaders, the introduction of halberds represents the main and most ostentatious sign of prestige.

References

- BARROSO, R.; BUENO, P. & BALBÍN, R. DE 2002-2003. Las primeras producciones metálicas en la cuenca interior del Tajo: Cáceres y Toledo. *Estudios pré-históricos* X-XI: 87-106.
- BERNABEU, J. 2012. Circulación, Intercambio, Interacción, Interdependencia de la cultura material a la red social. *Actes Xarxes al Neolític. Congrés Internacional*. Gavá Bellaterra 2-4/2/2011. *Rubricatum* 5. Barcelona: 103-110.
- BLASCO, C.; LIESAU, C.; DELIBES, G. BAQUEDANO, E. & RODRÍGUEZ, M. 2005. Enterramientos campaniformes en ambiente doméstico: el yacimiento de Camino de las Yeseras (San Fernando de Henares, Madrid). In Rojo, M.; Garrido, R. & García, I. (coords). *El Campaniforme en la península Ibérica y su contexto europeo*. Valladolid: Universidad de Valladolid (Serie Arte y Arqueología, 21): 457-479.
- BLASCO, C.; LIESAU, C.; RÍOS, P.; BLANCO, J. F.; ALIAGA, R.; MORENO, E. & DAZA, A. 2009. Kupferzeitliche Siedlungsbestattungen mit Glockenbecher- und Prestigebeigaben aus dem Grabenwerk von El Camino de las Yeseras (San Fernando de Henares, prov. Madrid). Untersuchungen zur Typologie des Grabritus und zu dessen sozialer Symbolik. *Madridier Mitteilungen* 50: 40-70.
- BLASCO, C.; LIESAU, C. & RÍOS, P. (eds.) 2011. *Yacimientos Calcolíticos con campaniforme de la Región de Madrid. Nuevos estudios*. Madrid: Universidad Autónoma de Madrid (Patrimonio Arqueológico de Madrid, 6).
- BLASCO, C. & RÍOS, P. 2010. La función del metal entre los grupos campaniformes: oro 'versus' cobre. El ejemplo de la región de Madrid. *Trabajos de Prehistoria* 67, 2: 359-372.
- CLOP, X. 2007. *Materia prima, cerámica y sociedad. La gestión de los recursos minerales para manufacturar cerámicas del 3100 al 1500 ANE en el Noreste de la Península Ibérica*. Oxford (*British Archaeological Reports, International Series*, 1600).
- DELIBES, G.; FERNÁNDEZ MANZANO, J.; FONTANEDA, E. & ROVIRA, S. 1999. *Metalurgia de la Edad del Bronce en el Piedemonte de la Cordillera cantábrica. La colección Fontaneda*. Valladolid: Junta de Castilla y León (Arqueología en Castilla y León, 3).
- ELBIALI, M. D. 2011. À la recherche du guerrier dans les sépultures du Bronze ancien et moyen (2200-1300 av. J.C.) en Europe centre-occidentale et Italie du Nord. In Baray, L.; Honegger, M. & Dias-Meirinho, M. H. (dirs): *L'armement et l'image du guerrier dans les sociétés anciennes*. Dijon: 189-224.
- FLORES, R. 2011. El yacimiento de Humanejos. In Blasco, C.; Liesau, C. & Ríos, P. (eds.): *Yacimientos Calcolíticos con campaniforme de la Región de Madrid. Nuevos estudios*. Madrid: Universidad Autónoma de Madrid (Patrimonio Arqueológico de Madrid, 6): 9-16.
- GARRIDO, R. 2000. *El Campaniforme en la meseta Central de la Península Ibérica (c. 2500-200 A.C.)*. Oxford (*British Archaeological Reports, International Series*, 892).
- GÓMEZ, J. L.; BLASCO, C.; TRANCHO, G.; RÍOS, P.; GRUESO, I. & MARTÍNEZ, M^a S. 2011. Los protagonistas. In Blasco, C.; Liesau, C. & Ríos, P. (eds.): *Yacimientos Calcolíticos con campaniforme de la Región de Madrid. Nuevos estudios*. Madrid: Universidad Autónoma de Madrid (Patrimonio Arqueológico de Madrid, 6): 101-132.
- GUTIÉRREZ, C.; LÓPEZ, A.; SIMÓN, A.; MUÑOZ, P.; BASHORE, CH.; MARTÍN, I.; CHAMÓN, J.; NARANJO, A. & MARÍN, J. A. 2010. Puntas palmela: procesos tecnológicos y experimentación. *Trabajos de Prehistoria* 67, 2: 405-418.

- HEYD, W. 2007. Families, Prestige Goods, Warriors & Complex Societies: Beakers Groups of the 3rd Millennium cal BC along the Upper & Middle Danube. *Proceedings of the Prehistoric Society*, 73: 327-379.
- HERAS, C.; GALERA, V. & BASTIDA, A. 2011. La fase campaniforme del yacimiento de La Magdalena. In Blasco, C.; Liesau, C. & Ríos, P. (eds.) (2011): *Yacimientos Calcolíticos con campaniforme de la Región de Madrid. Nuevos estudios*. Madrid: Universidad Autónoma de Madrid (Patrimonio Arqueológico de Madrid, 6): 17-22.
- HERAS, C.; GALERA, V. & BASTIDA, A. 2012. Campaniforme en el yacimiento de La Magdalena. Preactas de *Las 9 Jornadas de Patrimonio Arqueológico en la Comunidad de Madrid*. Alcalá de Henares; Museo Arqueológico Regional: 41-42.
- HERAS, C.; CUBAS, M. & BASTIDA, A. 2014a. Signos y símbolos en el registro funerario: Ajueres de la necrópolis calcolítica con campaniforme de 'La Magdalena I' (Alcalá de Henares, Madrid). *Actas de las novenas jornadas de Patrimonio Arqueológico en la Comunidad de Madrid (15 y 16 de noviembre de 2012)*. Madrid: 187-198.
- HERAS, C.; GALERA, V. & BASTIDA, A. 2014b. Enterramientos y ritual funerario en una necrópolis calcolítica con campaniforme en la submeseta sur: El Yacimiento de 'La Magdalena' I (Alcalá de Henares). *Actas de las novenas jornadas de Patrimonio Arqueológico en la Comunidad de Madrid (15 y 16 de noviembre de 2012)*. Madrid: 199-227.
- HERNANDO, A. 1992. *Materiales metálicos de la Edad del Bronce en la Meseta: Armas*. Madrid: UNED (Cuadernos de la UNED, 110).
- LEMERCIER, O. 2011. Le guerrier dans l'Europe du III^e millènaire avant notre ère. L'arc et le poignard dans les sépultures individuelles campaniformes. In Baray, L.; Honegger, M. & Dias-Meirinho, M. H. (dirs.): *L'armement et l'image du guerrier dans les sociétés anciennes*. Dijon: 121-165.
- LIESAU, C. & BLASCO, C. 2011-2012. Materias primas y objetos de prestigio en ajuares funerarios como testimonios de redes de intercambio en el Horizonte campaniforme. *Cuadernos de Prehistoria y Arqueología de la Universidad Autónoma de Madrid* 37-38, Vol. I: 209-222.
- LIESAU, C.; BLASCO, C.; RÍOS, P.; VEGA, J.; MENDUIÑA, R.; BLANCO, J. F.; BAENA, J.; HERRERA, T.; PETRI, A. & GÓMEZ, J. L. 2008. Un espacio compartido por vivos y muertos: El poblado calcolítico de fosos de Camino de las Yeseras (San Fernando de Henares, Madrid). *Complutum* 18, 1: 97-120.
- LULL, V. & ESTÉVEZ, J. 1986. Propuesta metodológica para el estudio de las necrópolis argáricas. *Homenaje a Luis Siret*. Consejería de Cultura de la Junta de Andalucía: 441-452.
- MONTÓN, S. 2010. Muerte e identidad femenina en el mundo argárico. *Trabajos de Prehistoria* 67, 1: 117-139.
- PERLÈS, C. 2012. Quand 'difusión' ne veut pas dire 'interacción'. *Actes Xarxes al Neolític. Congrès Internacional*. Gavá Bellaterra 2-4/2/2011. Rubricatum 5. Barcelona: 585-589.
- RÍOS, P. 2010. *Territorio y sociedad en la Región de Madrid durante el III milenio a.C.: El referente de Camino de las Yeseras*. Madrid: Universidad Autónoma.
- RÍOS, P.; GARCÍA, R.; ALIAGA, R. & BLANCO, J. F. 2011. Las cerámicas. Caracterización y contenido. In Blasco, C.; Liesau, C. & Ríos, P. (eds.): *Yacimientos Calcolíticos con campaniforme de la Región de Madrid. Nuevos estudios*. Madrid: Universidad Autónoma de Madrid (Patrimonio Arqueológico de Madrid, 6): 319-346.
- RÍOS, P. & LIESAU, C. 2011. Elementos de adorno simbólicos y colorantes en contextos funerarios singulares. In Blasco, C.; Liesau, C. & Ríos, P. (eds.): *Yacimientos Calcolíticos con campaniforme de la Región de Madrid. Nuevos estudios*. Madrid: Universidad Autónoma de Madrid (Patrimonio Arqueológico de Madrid, 6): 357-370.
- ROVIRA, S.; BLASCO, C.; RÍOS, P.; MONTERO, I. & CHAMÓN, J. 2011. La Arqueometalurgia. In Blasco, C.; Liesau, C. & Ríos, P. (eds.): *Yacimientos Calcolíticos con campaniforme de la Región de Madrid. Nuevos estudios*. Madrid: Universidad Autónoma de Madrid (Patrimonio Arqueológico de Madrid, 6): 291-310.
- ROVIRA, S. & GÓMEZ, P. 2003. *Las primeras etapas metalúrgicas en la Península Ibérica III. Estudios metalográficos*. Madrid: Instituto Universitario Ortega y Gasset. Ministerio de Cultura.
- SCHUBART, H. 2012. *Die Gräber von Fuente Álamo*, Madrider Beiträge, 32.

- SENNA-MARTINEZ, J. 1994. Subsídios para o estudo do bronze pleno na estremadura atlántica: a alabarda de tipo ‘atlántico’ do hábitat Das Baútas (Amadora). *Zephyrus* XLVI: 161-182.
- SENNA-MARTINEZ, J. 2007. Aspectos e problemas das orixens e desenvolvemento da metalurgia do bronze na fechada atlántica peninsular. *Estudos Arqueolóxicos de Oeiras*, 13: 119-134.
- VEGA, J.; BLASCO, C.; LIESAU, C.; RÍOS, P.; BLANCO, J. F.; MENDUIÑA, R.; ALIAGA, R.; MORENO, E.; HERRERA T.; PETRI, A. & GÓMEZ, J. L. 2010. La singular dualidad de enterramientos en el poblado de silos calcolítico de Camino de las Yeseras (San Fernando de Henares, Madrid). *Munibe Suplemento. Actas del Congreso Internacional sobre Megalitismo y otras manifestaciones funerarias contemporáneas en su contexto social, económico y cultural*, 11 al 15 de Junio de 2007. Beasain. Idiazabal (Guipúzcoa): 648-662.

Bell Beaker connections along the Atlantic façade: the gold ornaments from Tablada del Rudrón, Burgos, Spain

Andrew P. FITZPATRICK

School of Archaeology and Ancient History, University of Leicester,
University Road, Leicester, GB-LE1 7RH, United Kingdom
af215@le.ac.uk

Germán DELIBES DE CASTRO and Elisa GUERRA DOCE

Dpto. de Prehistoria, Arqueología, Antropología Social y CC.TT. Historiográficas,
Universidad de Valladolid, Plaza del Campus, s/n, 47011 Valladolid, Spain
delibes@fyl.uva.es; elisa.guerra@uva.es

Javier VELASCO VÁZQUEZ

Dpto. de Ciencias Históricas, Universidad de Las Palmas de Gran Canaria,
C/Pérez del Toro, 1, 35004 Las Palmas, Spain
jvelasco@dch.ulpgc.es

Abstract

The gold ornaments from a well-furnished burial in the Bell Beaker tumulus at Tablada del Rudrón, Burgos, in northern Spain are very similar to ornaments best known in Britain and Ireland. The insular ornaments, which were either earrings, tress rings or parts of headdresses, have been found in well-furnished graves of the 24-23rd century BC and were symbols of high status. Although the Tablada del Rudrón ornaments are similar to finds from England, they are not identical and their decoration is related to those on a different type of object found in Ireland. This fusion of 'similar but different' reflects the nature of the Bell networks along the Atlantic façade.

Keywords: *Bell Beaker; Gold; Atlantic; Burial*

Résumé

Les ornements en or d'un riche enterrement campaniforme situé dans le tumulus de Tablada de Rudrón, à Burgos, au nord de l'Espagne, sont très similaires à ceux bien connus des pièces trouvées en Grande Bretagne et en Irlande. Les bijoux insulaires, à valeur symbolique d'un statut social élevé, et dont on ne sait pas exactement s'il s'agit de boucles d'oreille, d'ornements pour les cheveux ou de compléments des vêtements pour la tête, ont été retrouvés dans des tombeaux contenant d'importantes offrandes du 24ème et 23ème siècles a. JC. Bien que les ornements de Tablada de Rudrón soient formellement très semblables à ceux d'Angleterre, leur décoration montre plutôt une étroite relation avec les divers bijoux retrouvés en Irlande. Cette condition de bijoux "similaires (quant à la forme) mais différents (par rapport à la décoration)" témoigne de la nature complexe des réseaux campaniformes tout le long de la Façade Atlantique.

Mot-clés: *Campaniforme, Or, Atlantique, Tombes*

1. Introduction

The highlands of the Lora region, in the northern part of the Burgos province (Spain) witnessed a brilliant megalithic past whose heyday concurred with the construction of massive passage graves, such as that of Las Arnillas, in Moradillo de Sedano during the second half of the fourth millennium cal BC (Delibes & Rojo, 2002). By 3300 cal BC all these monuments were no longer used as burial places and some of them were intentionally closed, such as the El Moreco tomb, in Huidobro, whose passage was deliberately blocked (Delibes & Rojo, 2002). For over a millennium there is no evidence

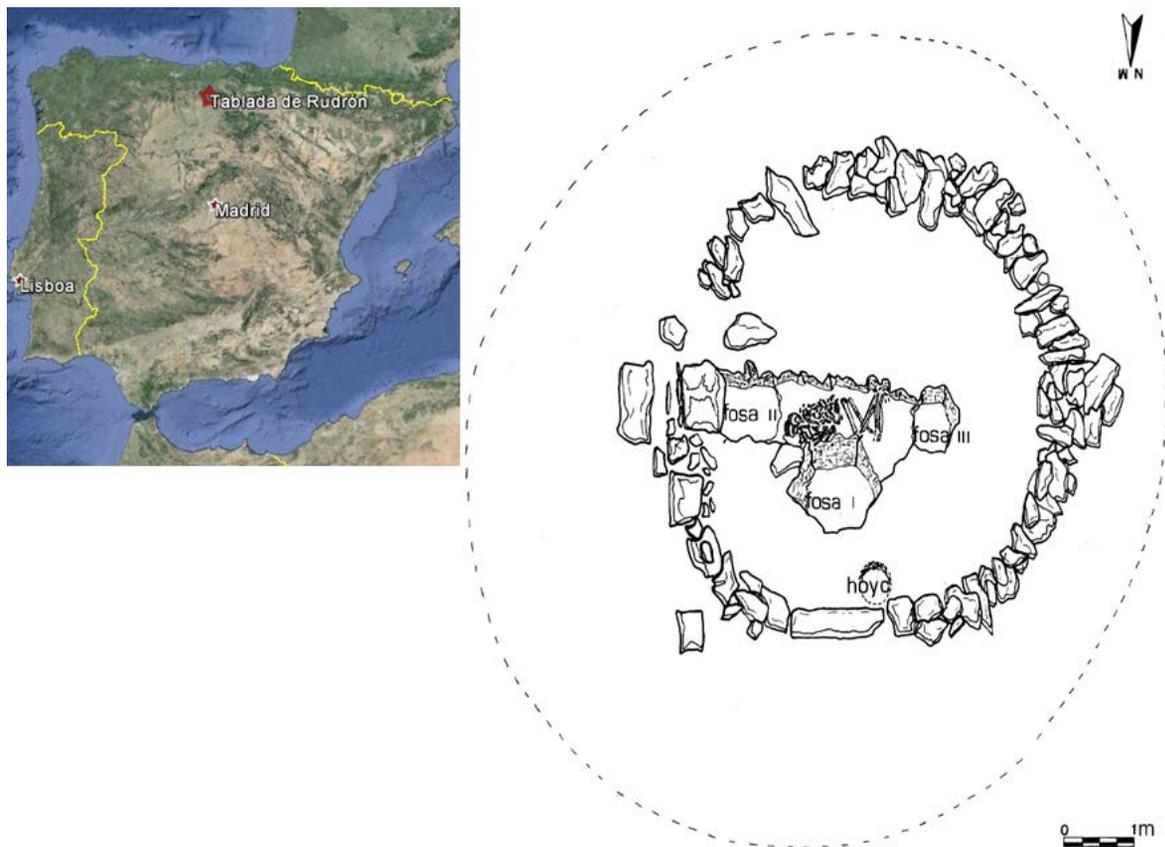


FIGURE 1. TABLADA DEL RUDRÓN: LOCATION AND SITE PLAN (AFTER CAMPILLO, 1984).

of activity at the megalithic tombs, but in the second half of the third millennium cal BC many of them, despite having been damaged during the passage of time, were re-used for Bell Beaker burials (Delibes & Santonja, 1987). This practice, which was quite frequent in the megalithic tombs of Iberia, has been interpreted as an attempt of the incipient Beaker elites to legitimate their position. In order to do so, they would have created a “fictitious genealogy” to link themselves to the sacred lineage of the ancestors (Álvarez Vidaurre, 2011; Delibes, 2004: 218-219). These Bell Beaker intrusions do not by any means imply a revitalization of the megalithic tombs as collective graves. On the contrary, Beaker inhumations were placed anywhere in the tomb – for example in pits in the burial mound or in gaps between the stones of the passage etc. – as can be seen in the megalithic tombs of the Tormes valley, in Salamanca (Benet *et al.*, 1997: 453-454), at La Sima mound, in Soria (Rojo *et al.*, 2005), or at some passage graves of La Rioja, with San Martín as one of the best examples (Barandiarán & Fernández Medrano, 1964; López Calle & Ilaraza, 1997).

Intrusive Bell Beaker burials are quite frequent in the megalithic tombs of the Lora region in Burgos. Items of the Beaker package such as sherds of Ciempozuelos pottery, copper Palmela points, V-perforated buttons and wristguards, have been recovered at Las Arnillas, Ciella, La Cotorrita and La Mina (Delibes *et al.*, 1993). However, in this paper we shall focus on a contemporary tomb that is slightly different: El Virgagal, at Tablada del Rudrón, which was built in the later third millennium BC. The excavations carried out by Jacinto Campillo between 1979 and 1983 revealed a non-megalithic burial mound that contained an abundant assemblage of beaker pottery (Campillo, 1985) (Fig. 1). In the years that followed the excavated remains of the cairn which were now exposed to the elements began to deteriorate. In the summer of 1997 the run off from heavy rain scoured through the monument revealing two gold ornaments that were found by Jacinto Campillo when he visited the site afterwards (Campillo, 2004) (Fig. 2).



FIGURE 2. TABLADA DEL RUDRÓN: GOLD ORNAMENTS (PHOTOGRAPH REPRODUCED BY COURTESY OF MUSEO DE BURGOS).

A new study of the monument by Germán Delibes and Elisa Guerra¹ which will use scientific methods not available to Jacinto Campillo such as stable isotope analyses and radiocarbon dating is currently in progress. Although the gold ornaments provide important evidence for Bell Beaker networks along the Atlantic façade they remain little known. Our purpose in this paper is to bring them to the attention of a wider audience.

2. The Bell Beaker monument at Tablada de Rudrón within the later prehistory of the Lora region in Burgos

In Burgos the term *loras* refers to vast highlands at 1000 m a.s.l. in which the river courses have incised deep valleys. The El Virgazal monument is located in the margin of one of them, at 300 m above the Rudrón river, one of the tributaries of the Ebro, offering an extensive view and a 360° panorama. The mound is circular; 12 m in diameter and 1 m high. A massive limestone block in the eastern area of the mound stands upright as a milestone or a stela.

The re-examination of the skeletal remains found during the excavations has identified at least seven individuals. It seems that the monument was originally built to cover the burial an adult male, aged 25-45 years, whose remains lay in the centre of the monument. He was buried on his right side in a flexed position, aligned west to east, with his head facing towards the north. Almost the entire skeleton was present and some bones were articulated. This suggests that it was the primary burial. The corpse is likely to have been deposited within a structure made of stone slabs and as a result the burial decomposed in an empty space. This would explain the movement of some bones within

¹ The research project “*Arqueometría campaniforme (2200-1800 A.C.): El túmulo prehistórico de Tablada de Rudrón*” (VA367A12-1) funded by the Consejería de Educación of the Junta de Castilla y León involves the work of the following researchers apart from the co-authors of this paper: Javier Basconillos, Jacinto Campillo, Miguel Moreno, Carlos Odriozola, Sara Palomo, Domingo Salazar, and Rodrigo Villalobos.

the grave as well as the rodent gnawing on the epiphyses of some long bones. This burial was radiocarbon dated to the late third millennium BC: 2290-1980 cal BC (Poz-49174: 3730±40 BP).²

The radiocarbon dates suggest that four other individuals were probably also Bell Beaker inhumations (Numbers 3, 5, 6 and 7). The two other individuals were dated to the Middle Bronze Age. As all the other remains were partial and disarticulated, their location peripheral and their fragmentation high, the hypothesis about Burial 1 being the primary one gains support. There are also some differences in the burial ritual. Burial number 3 is of a child aged 4-5 years, not all of whose remains were present. Some bones have canid gnawing suggesting that they were exposed before their burial at El Virgagal.

The interpretation of the grave goods is difficult. Apart from the gold ornaments, they consist of many sherds of beaker pottery, three stone wristguards, a V-perforated button possibly made of ivory, and a number of undiagnostic pottery sherds that might be from beaker or Middle Bronze Age vessels. The three characteristic types of pot found in Ciempozuelos Beaker tombs – Bell Beaker, carinated bowl and hemispherical bowl – (Delibes, 1977: 88-90) were all found at El Virgagal. The similarities in their fabrics and decoration patterns raise the possibility that they were part of a set, and they could have even have been produced specifically for the burial ceremony.

As most of these grave goods were found in the Sector I/north-eastern Area of the mound, close to Burial number 1, it can be inferred that they were originally associated with this burial. But the gold ornaments were found in a different location; next to each other in the south-eastern area of the mound (Campillo, 2004: 259), that is, some metres south of that burial. However, this was almost 15 years after the excavations were finished during which time the remains of the monument were exposed to the elements.

3. Basket-shaped gold ornaments

It seems certain that the ornaments, which are 74 mm long, were deposited as grave goods. Jacinto Campillo thought that they might have been placed on the fingers of the deceased but they are closely related to a class of ornaments that are usually interpreted as earrings. Most of these objects have been found in Britain and Ireland but there are also a small number of related examples from Iberia. The ornaments comprise a single plate of gold whose long sides were rolled up to create a basket or cigar-like shape. There is a simple tang on one side. As the function of the objects is still uncertain the neutral description of them as ‘basket-shaped ornaments’ is followed here. The rolled up plate is suggested to resemble a wicker basket and the tang the handle of the basket.

The great majority of basket-shaped ornaments are made of gold though a small number of later examples made of bronze have been found in England. The gold examples are part of a trans-European distribution of Bell Beaker precious metal ornaments that are usually interpreted as earrings or tress rings (hair ornaments) (Meller, 2014: 616-620). Some of the central European finds are made of electrum, a naturally occurring alloy of gold and silver (Hásek, 1989). Basket-shaped ornaments are often found in identical pairs and some 32 ornaments are known from 21 findspots. Most of the finds are from Britain and Ireland with only a few examples of related ornaments from France, Spain and Portugal (Fig. 3). The type has been reviewed recently by both Brendan O’Connor (2004) and Stuart Needham (2011).

These ornaments are one the best known types of early gold object in Britain and Ireland. Where they have been dated, the ornaments belong to the 24th and 23rd centuries BC and have Bell Beaker associations. The other well-known precious metal objects of this date are the so-called ‘sun-discs’

² Radiocarbon dates are cited at two-sigma and have been calibrated using OxCal v4.2 with the end points rounded outwards to 10 years if the error term is greater than or equal to 25 radiocarbon years.

which are found mainly in Ireland. Other types of precious metal object occur in much smaller numbers in the islands but they include one or two diadems, tubular, beads, and plaques. George Eogan has described these early finds as ‘Primary Bell Beaker Gold’ (1994). Gold lunulae are thought to be slightly later in date but to have appeared while sun-discs were still current, probably no later than the 22nd century BC.

Find contexts

The majority of basket-shaped ornaments – 22 – have been found in England and most of the findspots are in the Wessex region in central southern England. This represents a substantial increase on the three ornaments that Humphrey Case was able to list in the 1970s (Case, 1977: 26, tab. 3). Although many of the recent finds are single finds made by metal-detector users, as is now typically the case for Bronze Age gold objects in England (Murgia *et al.*, 2014), most of the ornaments across the length of England have been found in the archaeological excavation of graves. Seven pairs are known from certain or probable graves and the pair of ornaments from Gilmorton, which were found by a metal-detector user, also seem likely to be from a grave.

Just one find is known from Scotland, at Orbliston, Moray in the north-east of the country. Three ornaments are known in Ireland. There are no records about the context of the pair whose provenance is known only as ‘Ireland’. For many years a single ornament was attributed to ‘Dacommet’ or ‘Deehommed’ in County Down but documentary research has shown that it was found at ‘Benraw’ (Briggs, 2004).

A small number of related finds are known from continental Europe. A fragmentary example was found on the surface of a settlement at Colledic, Côtes d-Armor where beaker and Early Bronze Age pottery has also been found (Provost *et al.*, 1972; Briard, 1993: 184, fig. 18.1; Taylor, 1994: 46; O’Connor, 2004: 208). As it is incomplete it is not certain that it is a British type or a local product with a different shape. The gold ornaments recently found with a cremation burial at Eelde, Drenthe (Lanting, 2013: 74-77, fig. 15; Drenth, 2014: 314, fig. 8, b) also have some similarities with the insular finds. Although the object is an example of the helically coiled tress rings (*Lockenringe*) found in central and north-western Europe, the oval plate is comparable to those of some finds in England.

Two or three finds are known from south-west Portugal. A pair was found in the Gruta da Ermegeira collective tomb along with a range of other Bell Beaker objects, including pottery, stone tools, and tubular gold beads. As the tomb was plundered in the 1930s the associations of the ornaments are not known. The exact provenance of the ornament purchased as being from ‘Estremoz’, Évora, is also unknown but in view of the contexts of most finds of early gold from Iberia it probably came from a grave (Labaune, 2013). The possible basket-shaped ornament from Cova da Moura, Torres Vedras, may also have been associated with a burial. It was found in a cave that contained many burials and finds from the Neolithic and Bronze Age. Bell Beaker objects included pottery and a Palmela point.



FIGURE 3. EXAMPLE OF GOLD ORNAMENTS FROM ENGLAND: BARROW HILLS, RADLEY (PHOTOGRAPH REPRODUCED BY COURTESY OF THE ASHMOLEAN MUSEUM, OXFORD).

Groups

The different varieties of western European ornaments were first defined systematically by Stuart Needham (2011). Within what he called the ‘Atlantic series’ he distinguished four groups of ornaments on the basis of the ratio of their length and width (Fig. 4). The geographical distributions of three of these four groups are largely exclusive.

Group A has the most wide-ranging distribution. It comprises the Gruta da Ermegeira and ‘Estremoz’ finds, the ornament from Benraw (attributed previously to Deehommed), Ireland, and the pair

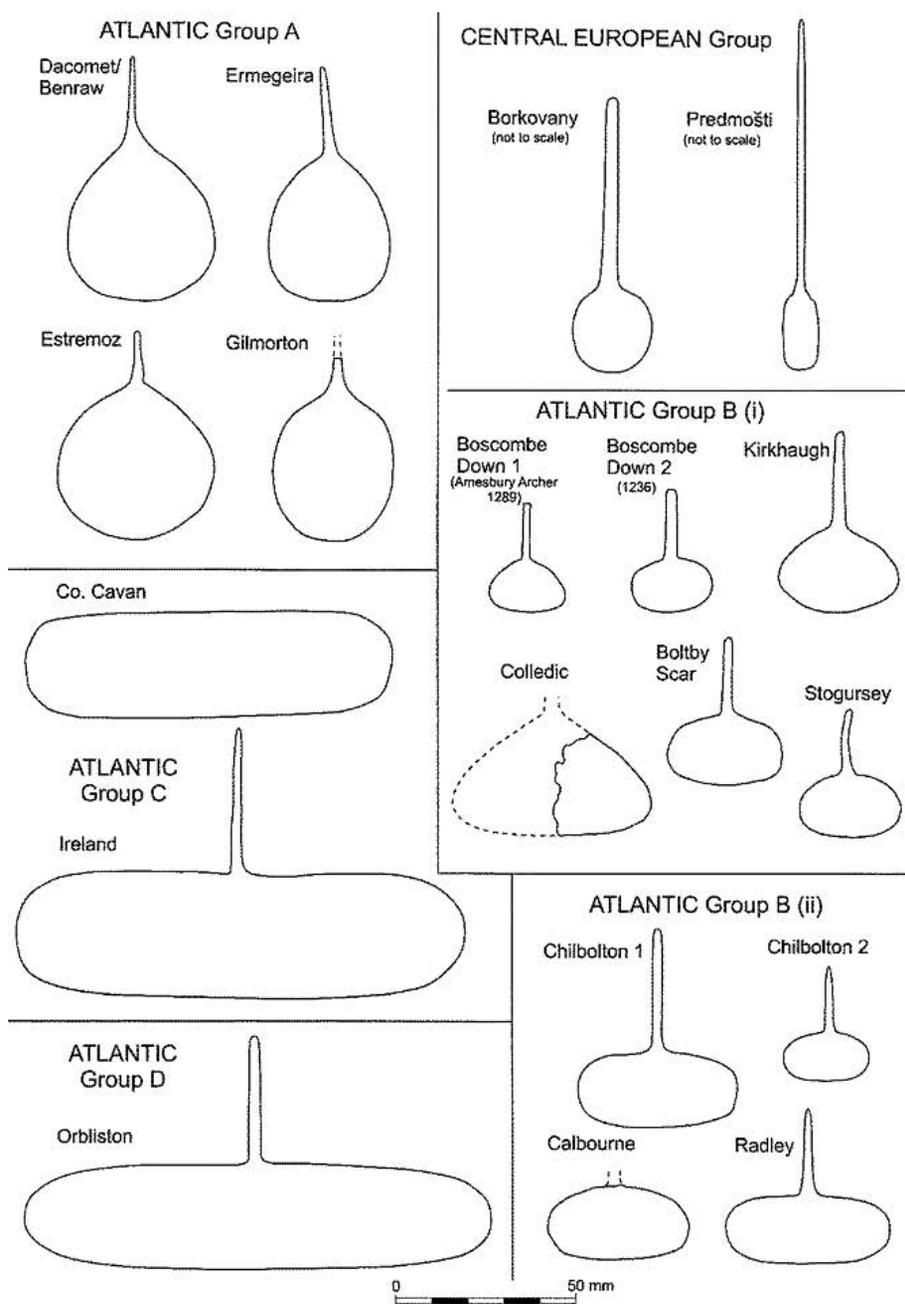


FIGURE 4. GROUPS WITHIN THE ATLANTIC SERIES OF BELL BEAKER GOLD ORNAMENTS. (SOURCE: NEEDHAM, 2011, REPRODUCED BY COURTESY OF WESSEX ARCHAEOLOGY).

attributed to Gilmorton, England. The plates of these ornaments are sub-circular or slightly ‘onion-shaped’. Although most of the finds are now flat, the Gilmorton examples are not. Their plates are curved and it would seem that they were not rolled up tightly to form a cylinder like the Group B ornaments. It seems possible that the Group A ornaments were suspended from their tangs. Decoration on the Group A ornaments is restricted to pointillé dots around the edge of the plate.

Group B ornaments are smaller and more oval-shaped than Group A and all the finds are from England. Needham sub-divided the Group into Group Bi and Bii on the basis of their decoration and the width of the plate. The decoration on the Bi variety comprises either pointillé dots or an impressed line around the edge of the plate and sometimes there are one or two impressed lines on the plate either side of the tang. Group Bii does not have pointillé decoration around the edge and the lines on the plate are more prominent. These are usually two groups of lines on either side of the tang. The number of lines in each group ranges from 3 to 7.

The Cholsey ornament is the only find from England that has four groups of lines, two groups either side of the tang. The Le Colledic find also has four groups of lines but, as noted above, it is not certain that it belongs to Group B.

As defined by Stuart Needham, Group C comprises the pair of basket shaped ornaments from ‘Ireland’ and four plaques from Bellville, Co. Cavan (Fig. 5-6). The undecorated basket-shaped ornaments from ‘Ireland’ are now flat but it is possible that they were originally curved. Though these ornaments and the Bellville plaques are similar in shape, the plaques do not have a tang and so are not basket-shaped ornaments. The plaques have two holes in the centre and this indicates that they were attached in a different way from the basket-shaped ornaments, probably using thread or a fine cord, and they could have had a different function. The sun discs, most of which have been found in Ireland, also have two holes which are almost always in the centre of the disc.



FIGURE 5. GOLD ORNAMENTS FROM ‘IRELAND’
(PHOTOGRAPH REPRODUCED BY COURTESY OF THE NATIONAL MUSEUM OF IRELAND).

The best parallels for the multiple groups of impressed lines on the *Tablada del Rudrón* ornaments are on the Bellville plaques. These are said to have been found in the bed of a modern stream along with a gold diadem.³

Group D basket-shape ornaments are known only from the pair from Orbliston in Scotland. They are similar in shape to Group C but are even longer.

³ It is possible that the fragmentary and undecorated sheet gold object(s) from Musherá, Co. Cork also represent four gold plaques (Cahill, 2006: 273, pl. xvii).



FIGURE 6. GOLD PLAQUES AND DIADEM FROM BELLVILLE
(PHOTOGRAPH REPRODUCED BY COURTESY OF THE NATIONAL MUSEUM OF IRELAND).

Dating

The best dating evidence for Group A finds is the beaker pottery from the Gruta da Ermegeira tomb and this would suggest a date around the 24th century BC. The best dated group is Group B as five burials have been radiocarbon dated, indicating that the ornaments were current in the 24-23rd centuries BC (Table 1). The grave goods from Kirkhaugh, where the burial did not survive, are consistent with this date. Although the Tablada del Rudrón examples appear to be slightly later than the finds in England, not enough finds have been dated to ascribe any significance to this.

Burial	Laboratory code	Sample	$\delta^{13}\text{C}$ (‰)	Radiocarbon age (BP)	Calibrated date % onfidence)	Posterior density estimate (95% probability)
Boscombe Down, Wiltshire: Amesbury Archer	OxA-13541	Human right femur	-20.6	3895±32	2470-2280 cal BC	2380-2290 cal BC
Boscombe Down, Wiltshire: Down/Companion	OxA-13562	Human right femur	-20.4	3829±38	2460-2140 cal BC	2350-2260 cal BC 59.7%
Barrow Hills, Radley, Oxfordshire, Barrow 4A	OxA-4356	Human bone	-21.4	3880±90	2580-2040 cal BC	-
Chilbolton, Hampshire, primary burial (16)*	OxA-V-2271-35	Human bone	-	3935±32	2570-2300 cal BC	-
Chilbolton, Hampshire, primary burial (16)	OxA-1072	Human bone	-	3740±80	2460-1920 cal BC	-
Chilbolton, Hampshire, secondary burial (15)	OxA-1073	Human bone	-	3780±80	2470-1970 cal BC	-
Tablada del Rudrón, Burgos	Poz-49174	Human bone	-17.5	3730±40	2290-1980 cal BC	-

* New date on the burial by the Beaker People Project (Needham, 2012: app. 1.1).

TABLE 1. RADIOCARBON DATES FOR GRAVES WITH GOLD BASKET ORNAMENTS IN ENGLAND AND SPAIN
(SOURCE: FITZPATRICK, 2011 AND THIS PAPER).

The Group C and D finds are not directly dated. The decoration on edge of the Orbliston basket-shaped ornament has some similarities with that on the edges of some of the larger Irish sun discs. Although it seems likely that these larger sun discs are later than the smaller ones (Case, 1977), there is no independent evidence for this suggestion. There is also no direct evidence for the view that the Group D Orbliston ornaments are late in date because they are large in size.

Function

It has usually been assumed that all the basket-shaped ornaments in Britain and Ireland had the same function; either earrings or tress rings, though Needham has suggested that they might be ornaments for headdresses (Needham, 2011: 137), while Campillo's suggestion that the Tablada del Rudrón examples might be finger rings is another possibility. The finds from Chilbolton and Radley were found by the head but it was not possible to say how they were worn while the pairs from the graves of the Amesbury Archer and The Companion were in positions that do not indicate how they were usually worn. The suggestion that the ornaments were earrings was proposed in the very first publication of the type, the large ornament from Orbliston (Paton, 1871) (Fig. 7). On the basis of the central European varieties Sherratt suggested that the insular ornaments were tress rings (e.g. Sherratt, 1986; 1987) but this interpretation has not been accepted universally (cf. Russel, 1990; O'Connor, 2004: 207).

It must be questioned, however, if the different groups had the same function. The Group A, C and D finds could all have been suspended from their tangs but it seems unlikely that Group B could have been. When found, all the Group B ornaments from excavations have been rolled up into a tubular or cylindrical shape with the tangs rolled around the outside. If this is how they were usually worn, they could not have been suspended from their tangs and this is compatible with Sherratt's interpretation of them as tress rings.

The Bellville plaques also had a different function. It is not known what they were attached to using the holes in the centre but this method of attachment would suggest that, like the sun discs, the surface was flat. Their ovoid shape recalls the pairs of rectangular gold plaques found in Bell Beaker graves in central Europe. The pair from grave 1/90 in the Tvořihřáz, Moravia, cemetery were found close to

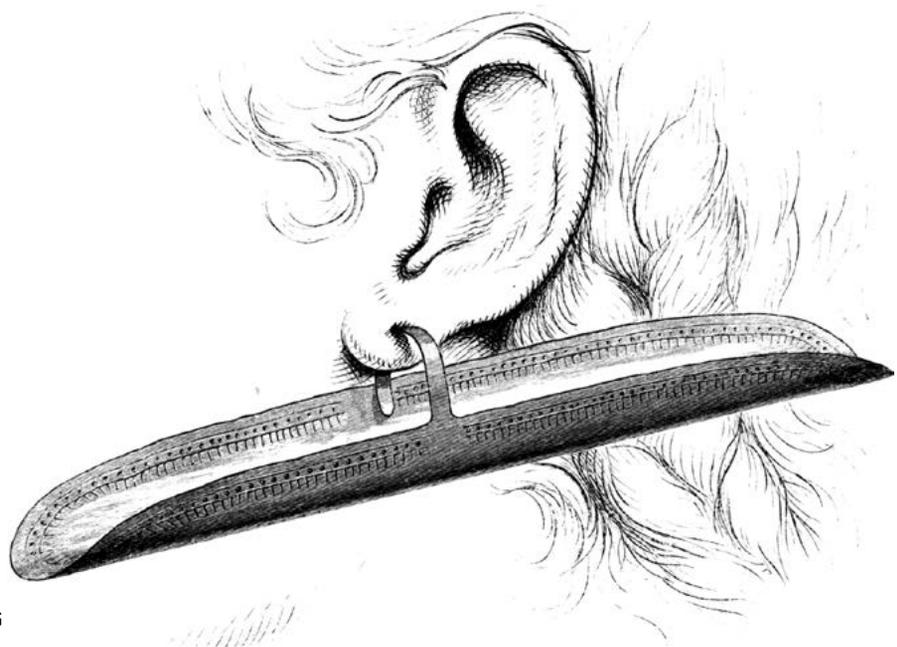


FIGURE 7. THE ORBLISTON ORNAMENT AS AN EARRING (SOURCE PATON, 1871).

the forehead of the deceased, indicating that the plaques ornamented either a headdress or a hairstyle (Bálek *et al.*, 1999: 35, Tab. 3; 19, 2. See also grave H63 in the Hulín-Pravčice 2, Višňovce 2008 cemetery where two tress rings were found close to two plaques, though the burial did not survive; Peška & Kalábek, 2009: 111, obr. 2; 5; Peška, 2013: fig. 11, 1-2; see also the chapter by Peška in this volume). The central European plaques were attached through holes in their short sides, often three at each end. Recently excavated examples are curved along their short axis, recalling the shape of basket-shaped ornaments and suggesting that they had a different function from the Bellville plaques.

Origins

The origin of the Group B ornaments is uncertain, partly because of the small number of related finds known beyond England and partly because the shape and function of early Bell Beaker gold ornaments seems to have differed between regions. It has been suggested that basket-shaped ornaments are a British innovation because of the number found there and their rarity elsewhere, with the Continental examples being later imitations (Needham, 2011: 133). However, as the ornaments were the earliest gold objects made in Britain it seems more likely that they copied a Continental prototype. As the most closely related Continental objects are the Group A ornaments from Iberia, which also has a relative abundance of Bell Beaker gold objects from an earlier date, this might seem to be the obvious source of inspiration. However, this suggestion has been doubted, partly because for many years Benraw was the only insular find of Group A (e.g. Taylor, 1979: 235; 1980: 22, 24), while Harrison turned the tables by suggesting that the Ermegeira earrings were intrusive to Iberia (1977: 42; see also Case, 1977: 27, tab. 5).

While the wider archaeological context would suggest that Group A was the inspiration for Group B (e.g. Fitzpatrick, 2013: 56-57), there are, as yet, too few finds to be sure. Gold analyses have not yet been helpful in determining the source of the gold (e.g. Pernicka, 2014). The Benraw ornament was first analysed as part of the Stuttgart project *Studien zu den Anfängen der Metallurgie*. The results were initially interpreted as indicating that the gold was Iberian but later other sources were considered (e.g. Hartmann, 1979). Subsequent studies also suggested that the composition of the gold is different from Iberian ones (e.g. Taylor, 1999: 113, fig. 12.3; 2001). What does appear to be clear, though, is that the gold is different from that used for the majority of gold objects from Bronze Age Ireland.

Even so, this need not indicate that the Benraw ornament was imported. While the use of native gold in Ireland has long seemed likely because of the large number of Bronze Age gold objects found in the island, the sources of the gold have always been a matter of debate (e.g. Hartmann, 1970; Briggs *et al.*, 1974; Eogan, 1984: 8-12; Warner, 2004; Warner *et al.*, 2009; 2010). It has been argued recently that the lead isotopes of the gold of the Irish objects are incompatible with those of any known native source of gold. It is suggested instead that the gold is more likely to have come from Cornwall in south-west England (Standish *et al.*, 2014; 2015).

At present the origin of the insular series of ornaments must remain an open question but if the Group A ornaments from Iberia were the prototypes for the insular series, this would suggest that Group B ornaments reflect a change in use, from earrings to tress rings. In any event, form need not correlate directly with function.

4. The Tablada del Rudrón ornaments

A similar fluidity of form and function is evident in the Tablada del Rudrón ornaments. Although the shape of the Tablada del Rudrón ornaments is comparable with Group B ornaments, they are much larger than any of the insular finds. A plot of the length and width of the complete 'Atlantic' basket-shaped ornaments and the plaques from Bellville shows that Groups A-D have mutually exclusive

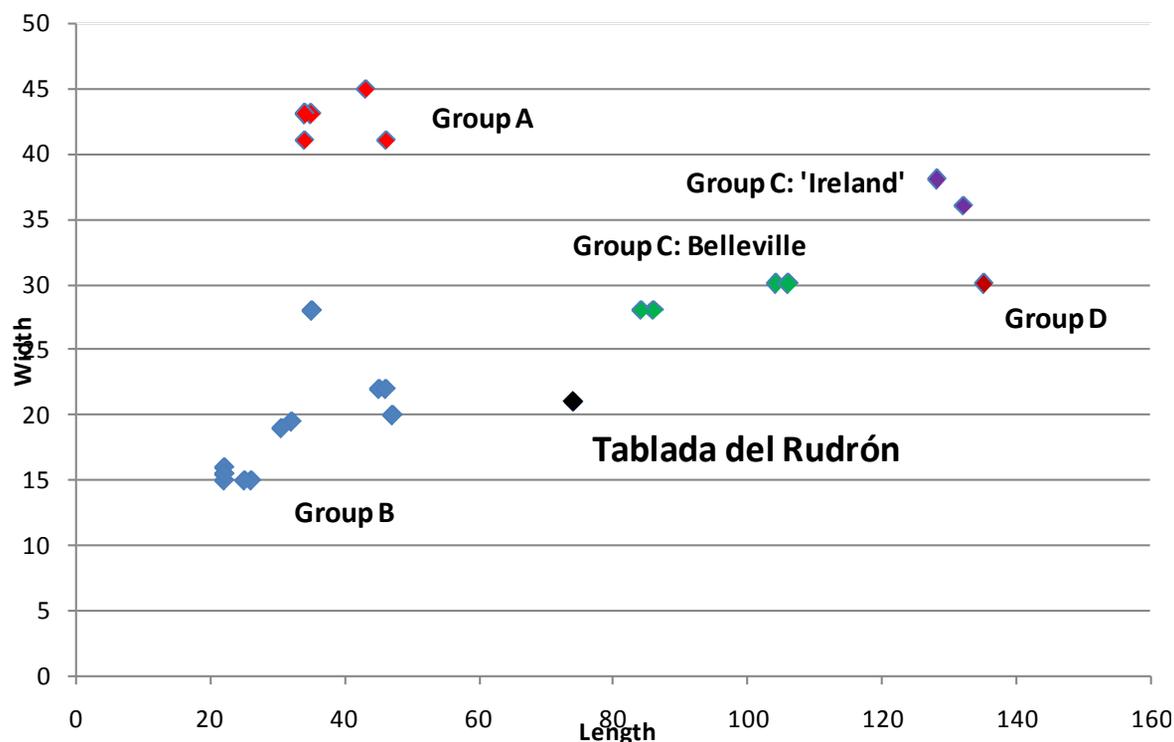


FIGURE 8. DIMENSIONS OF ATLANTIC SERIES GOLD ORNAMENTS
(SOURCE: ANDREW FITZPATRICK).

distributions (Fig. 8). In terms of their length the Tablada del Rudrón ornaments fall between Group B, from England, and the Group C pair from 'Ireland'.

The Tablada del Rudrón ornaments are closest in their size to the Bellville plaques and – though this is obviously related to their size – in having several groups of lines and also pointillé decorated edges. As noted above, most Group B ornaments only have two groups of lines, with only Chelsey and Le Colledic having four groups. The Bellville plaques have nine and ten groups of lines and the Tablada del Rudrón ornaments have eight.

The best parallels for the Tablada del Rudrón ornaments are, then, from different types of object. Their shape is similar to Atlantic Series Group B-D basket-shaped ornaments. The mixture of decorative techniques – pointillé dots around the edges and incised lines – is found on Group Bi ornaments which to date have only been found in England. The size of the Tablada del Rudrón ornaments is closer to the Bellville plaques from Ireland and the plaques provide the best parallel for the large number of groups of lines.

Where the Tablada del Rudrón ornaments were made is not known currently. It is hoped that the forthcoming metal analyses will clarify this, but they might not be decisive as has already been shown above by the example of the Benraw (Deehommed) ornament.

5. Bell Beaker connections along the Atlantic façade

Stepping back from this detail it is clear that individual aspects of the Tablada del Rudrón ornaments have their closest similarities with finds in Britain and Ireland but no exact parallels are currently known. In these regards the ornaments are typical of two of the defining characteristics of the Bell Beaker network.

The first is that at a broad level some social practices and types of material culture were similar, particularly in the way that material symbols of status were made from exotic materials such as gold, but in other, ways the detail of them was different at regional and local scales. As Czebresuk has put it, things were ‘similar but different’ (Czebresuk, 2004). At Tablada del Rudrón the gold ornaments were probably placed with the well-furnished burial of man whose grave was the primary one in the tumulus. Other grave goods are likely to have included a set of at least three Ciempozuelos type pots, one or more stone wristguards, and a V-perforated button possibly of ivory.

The second characteristic is the fluidity of form and function seen in the different types of insular gold ornament. This reflects the initial and rapid expansion of the network in northern and western Europe the 24th and 23rd centuries BC which was enabled by the journeys made by small groups (e.g. Fitzpatrick, 2011: 235-40; 2013). It seems likely that those at least some aspects of those networks will have continued into the following centuries. In this regard the gold objects from Tablada del Rudrón provide further evidence for one of the most important and well-known routes in the Bell Beaker network; the Atlantic façade (Salanova, 2004) (Fig. 9).

This is well evidenced by the distribution of some objects, for example copper axes and Palmela points (e.g. Briard & Roussot-Laroque 2002) and Maritime beakers. Some aspects of the ceramic evidence display precise distributions. They include the use of cockle shells to decorate Maritime beakers in widely separated regions of the Atlantic façade and into Scotland (Prieto & Salanova, 2009), and the occurrence of beakers in Brittany that might have been made in Portugal (Salanova, 2000; Cardoso *et al.*, 2005).

The similarities between gold objects on Iberia and Brittany are well-known (e.g. Eluère, 1977; Hartmann, 1979: 21-2) and have been reaffirmed strikingly by a new study of the Early Bronze Age gold and silver chains from the barrow at Lothéa, Quimperlé, Finistère (Nicolas *et al.*: 2013). In addition to the Group A basket-shaped ornaments, some of the best parallels for the other types of object that make up the group of Primary Bell Beaker gold in Britain and Ireland are also from the Atlantic facade. Some parallels are general because the objects themselves are so simple. Plain tubular gold beads like those found in the graves at Chilbolton, Hampshire, and Horton, Berkshire, in England are well known in Brittany (Eluère, 1982: 29, fig. 24) and in Bell Beaker associated contexts in Iberia (Leisner, 1965: 264-266; Pingel, 1992: 14, Abb. 3). The undated gold diadem said to be from near Winchester, Hampshire, and the plaque associated with the Bellville plaques can also be compared with finds from western France and Iberia (Needham, 2008a; Needham & Sheridan, 2014: 908-9, fig. 6; Eluère, 1977, 397, fig. 6, 10; 1982, 56-8. fig. 68, 70-1; Nicolas *et al.*, 2013: 217, fig. 20).

More precise connections are provided by the slightly later finds of pairs of gold ‘sun-discs’. The similarities between the small circular discs without central crosses found in Brittany and the larger, and probably later, pairs of Irish ‘sun-discs’ has been viewed cautiously (e.g. Eluère, 1982: 128) and the origins of the insular discs were sometimes sought in the ‘racquet-headed’ pins of central Europe (e.g. Clarke, 1970: 95; Case, 1977: 29; Taylor, 1980: 23). However, it is now clear that the ‘racquet-headed’ pins are later than the discs (e.g. O’Connor, 2004: 210) and, as argued above, rather than looking for close similarities between objects, the discs can also be seen as part of an Atlantic tradition of early gold working in which objects could be similar but different.

These similarities are clear in the pairs of gold discs from Cabeceiras de Basto, Braga, in north-west Portugal (Fig. 10) and Oviedo, Asturias, in northern Spain. The Cabeceiras de Basto discs were found with a lunula whose similarities to the Irish series were noted by Cardoso in the first publication of the find (Cardoso, 1930: 6-16, fig. 2). Even if the Cabeceiras de Basto lunula is ‘a very peripheral cousin of the British lunula’ (Taylor, 1980: 24, pl. 23, b), it is still related. The association of lunula and discs, both types of object that are well known in Ireland (Case, 1977; Cahill, 2015) is unlikely to be coincidental. It has been demonstrated recently in relation to the Coggalbeg, Co. Roscommon find that lunulae and sun discs were sometimes associated in Ireland (Kelly & Cahill, 2010). The pair

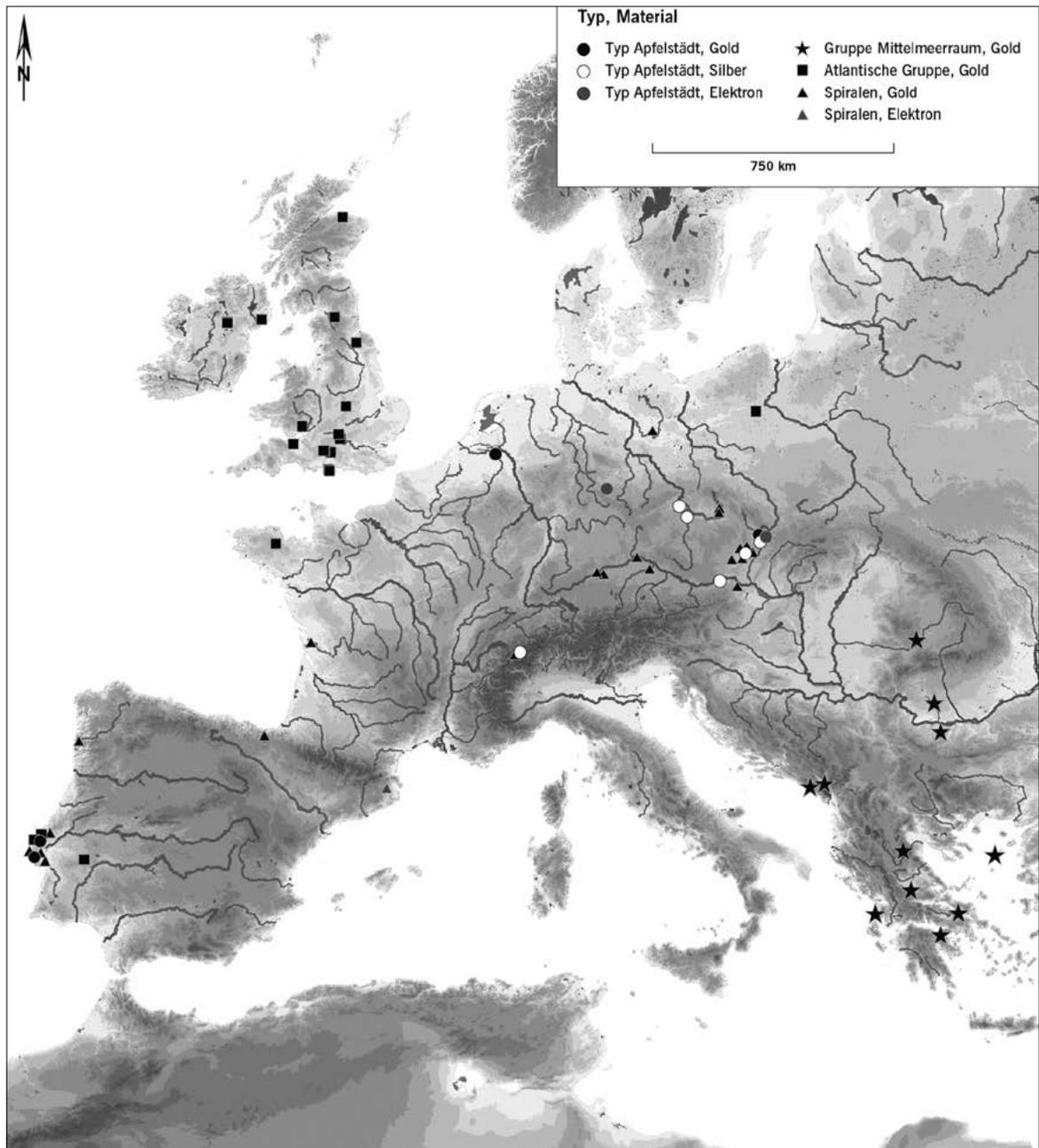


FIGURE 9. DISTRIBUTION OF LATER THIRD MILLENNIUM BC GOLD ORNAMENTS. (SOURCE: MELLER, 2014, REPRODUCED BY COURTESY OF THE LANDESMUSEUM FÜR VORGESCHICHTE, HALLE).

of gold discs from Oviedo is less well known than the Cabeceiras de Basto finds and although their decoration differs from the Irish discs in detail, they are similar in their shape and size, in having a central cross and central holes, and in having been made as a pair (Macwhite, 1951: 50, lám. viii). These finds seem likely to be broadly contemporary with the Tablada del Rudrón ornaments.

The similarities between the Tablada del Rudrón ornaments and those in Britain and Ireland emphasise these links. Where the Tablada ornaments were made is not yet known but they highlight the importance of journeys along the Atlantic façade and the role of objects made of exotic materials in constructing the social persona of the elites who helped construct the Bell Beaker Network.



FIGURE 10. CABECEIRAS DE BASTO LUNULA AND DISCS (PHOTOGRAPH REPRODUCED BY COURTESY OF MUSEU NACIONAL DE ARQUEOLOGIA, LISBON, PORTUGAL).

Acknowledgments

Mary Cahill, National Museum of Ireland, Dublin and Alison Sheridan, National Museums Scotland, Edinburgh, kindly commented on a draft of this paper.

References

- ÁLVAREZ VIDAURRE, E. 2011. *Historia de la percepción del megalitismo en Navarra y Guipúzcoa: aproximación a una biografía de sus monumentos*. Pamplona: Eunsa.
- BÁLEK, M.; DVOŘÁK, P.; KOVÁRNÍK, J. & MATĚJČKOVÁ, A. 1999. *Pohřebiště Kultury Zvoncovitých Pohárů v Tvořiházi (Okr. Znojmo)*. Brno: Ústav Archeologické Památkové Péče Brno. (Pravěk Supplementum, 4).
- BARANDIARÁN, J. M. & FERNÁNDEZ MEDRANO, D. 1964. Excavación del dolmen de San Martín (Laguardia). *Boletín de la Institución Sancho El Sabio* (Vitoria) 8 (1-2): 41-66.
- BENET, N.; PÉREZ, R. & SANTONJA, M. 1997. Evidencias campaniformes en el valle medio del Tormes. In de Balbín, R.; Bueno, P. (eds. lits.): *Actas del II Congreso de Arqueología Peninsular. II. Neolítico, Calcolítico y Bronce*. Zamora: Fundación Rei Alfonso Henriques: 449-470.
- BRIARD, J. 1993. Relations between Brittany and Great Britain during the Bronze Age. In Scarre, C. & Healy, F. (eds. lits.): *Trade and Exchange in Prehistoric Europe*, Oxford: Oxbow (Oxbow Monograph, 33): 183-190.
- BRIARD, J. & ROUSSOT-LAROQUE, J. 2002. Les débuts de la métallurgie dans la France atlantique. In Bartelheim, M.; Pernicka, E. & Krause, R. (eds. lits.): *Die Anfänge des Metallurgie in der alten Welt/ The Beginnings of Metallurgy in the Old World*, Rahden/Westfalen, Marie Leidorf (Forschungen zur Archäometrie und Altertumswissenschaft, 2): 135-160.
- BRIGGS, C. S. 2004. A note on the history of the gold ornament from 'Dehomet', 214-216. In O'Connor, B.: *The earliest Scottish metalwork since Coles*. In Shepherd, I. A. G. & Barclay, G. J. (eds. lits.): *Scotland in Ancient Europe: the Neolithic and Early Bronze Age of Scotland in their European context*. Edinburgh: Society of Antiquaries of Scotland: 205-216.

- BRIGGS, S.; BRENNAN, J. & FREEBORN, G. 1973. Irish prehistoric gold working: some geological and metallurgical considerations. *Bulletin of the Historical Metallurgy Group* 7, 2: 18-26.
- CAHILL, M. 2006. John Windele's golden legacy – prehistoric and later gold ornaments from Co. Cork and Co. Waterford. *Proceedings of the Royal Irish Academy* 106C: 219-337.
- CAHILL, M. 2015. 'Here comes the sun' ... Solar symbolism in Early Bronze Age Ireland. *Archaeology Ireland* 29, 1: 26-33.
- CAMPILLO, J. 1984. El túmulo campaniforme de Tablada del Rudrón (Burgos). "Memoria de las excavaciones realizadas en el túmulo de Tablada del Rudrón, (Burgos)". *Noticario Arqueológico Hispánico* (Madrid: Ministerio de Cultura) 26: 9-86.
- CAMPILLO, J. 2004. Dos sortijas cubrededos de oro halladas en el túmulo campaniforme de Tablada del Rudrón, Burgos. In *Homenaje al Prof. Dr Juan M.^a Apellániz. 30 años de arqueología (1972-2002)*, Bilbao, Kobie/Diputación Foral de Bizkaia (Kobie, Serie Anejos; 6, 1: 257-268.
- CARDOSA, M. 1930. *Jóias arcaicas encontrados em Portugal*. A Cruña: NOS (Revista Nós).
- CARDOSO, J. L.; QUERRÉ, G. & SALANOVA, L. 2005. Bell Beaker relationships along the Atlantic coast. In Prudêncio, M. I.; Dias, M. I. & Waerenborgh, J. C. (eds. lits.): *Understanding People through their Pottery. Proceedings of the 7th European meeting on Ancient Ceramics (EMAC '03)*, Lisbon: Instituto Português de Arqueologia (Trabalhos de Arqueologia, 42): 27-31.
- CASE, H. 1977. An early accession to the Ashmolean Museum. In Markotic, V. (ed. lit.): *Ancient Europe and the Mediterranean. Studies presented in Honour of Hugh Hencken*. Warminster: Aris and Phillips: 19-34.
- CHAPMAN, R.; LEAKE, R.; WARNER, R.; CAHILL, M.; MOLES, N.; SHELL, C. & TAYLOR, J. 2006. Microchemical characterisation of natural gold and artefact gold as a tool for provenancing prehistoric gold artefacts: a case study from Ireland. *Applied Geochemistry* 21: 904-918.
- CLARKE, D. L. 1970. *Beaker Pottery of Britain and Ireland*. Cambridge: Cambridge University Press.
- CZEBRESZUK, J. (ed. lit.), 2004. *Similar but Different. Bell Beakers in Europe*. Poznań: Adam Mickiewicz University.
- DELIBES, G. 2004. La impronta Cogotas I en los dólmenes del occidente de la cuenca del Duero o el mensaje megalíticos renovado. *Mainake* 26: 211-231.
- DELIBES, G. & ROJO, M. A. 2002. Reflexiones sobre el trasfondo cultural del polimorfismo megalítico en La Lora burgalesa. *Archivo Español de Arqueología* 75: 1-15.
- DELIBES, G.; ROJO, M. A. & REPRESA, I. 1993. *Dólmenes de La Lora, Burgos*. Colección Guías Arqueológicas. Salamanca: Junta de Castilla y León.
- DELIBES, G. & SANTONJA, M. 1987. Sobre la supuesta dualidad Megalitismo/Campaniforme en la Meseta Superior Española. In Waldren, W. H. & Kennard, R. C. (eds. lits.): *Bell Beakers of the Western Mediterranean. Definition, interpretation, theory and new site data. The Oxford International Conference (1986)*. Oxford: British Archaeological Reports (British Archaeological Reports, International Series 331): 173-206.
- DRENTH, E. 2014. Cremation graves of the Bell Beaker Culture from the Netherlands: social, spatial and temporal aspects. In Besse, M. (ed. lit.): *Around the Petit-Chasseur Site in Sion (Valais, Switzerland) and New Approaches to the Bell Beaker Culture Proceedings of the International Conference held at Sion (Switzerland) October 27th-30th, 2011*. Oxford: Archaeopress: 307-318.
- ELUÈRE, C. 1977. Les premiers Ors en France. *Bulletin de la Société Préhistorique Française* 74: 390-419.
- ELUÈRE, C. 1982. *Les Ors Préhistoriques*. Paris: Picard (L'Age du Bronze en France, 2).
- EOGAN, G. 1994. *The Accomplished Art. Gold and gold-working in Britain and Ireland during the Bronze Age (c. 2350-650 BC)*. Oxford: Oxbow (Oxbow Monograph, 42).
- FITZPATRICK, A. P. 2011. *The Amesbury Archer and the Boscombe Bowmen. Early Bell Beaker burials at Boscombe Down, Amesbury, Wiltshire*. Salisbury: Wessex Archaeology (Wessex Archaeology Report, 27).
- FITZPATRICK, A. P. 2013. The arrival of the Bell Beaker Set in Britain and Ireland. In Koch, J. T. & Cunliffe, B. (eds. lits.): *Celtic from the West 2. Rethinking the Bronze Age and the arrival of Indo-European in Atlantic Europe*. Aberystwyth and Oxford: Oxbow (Celtic Studies Publications, xvi): 41-70.

- HARRISON, R. J. 1977. *The Bell Beaker Cultures of Spain and Portugal*. Harvard, Harvard University (American School of Prehistoric Research Bulletin, 35).
- HARTMANN, A. 1970. *Prähistorische Goldfunde aus Europa*. Berlin: Mann (Studien zu den Anfängen der Metallurgie, 3).
- HARTMANN, A. 1979. Irish and British gold types and their west European counterparts. In Ryan, M. (ed. lit.): *The Origins of Metallurgy in Atlantic Europe*. Dublin: Stationary Office, 215-228.
- HÁSEK, I. 1989. Die ältesten Gold-und Silberfunde Mitteleuropas. In Buchvaldek, M. & Pleslová-Štiková, E. (eds. lits.): *Das Äneolithikum und die früheste Bronzezeit (C14 3000-2000 B.C.) in Mitteleuropa: kulturelle und chronologische Beziehungen. Actes des XIV Internationalen Symposiums Prag-Liblice 20.-24.10. 1986*. Prague: Karolinum (Præhistorica, 15): 49-54.
- KELLY, E. & CAHILL, M. 2010. Safe secrets I – an early Bronze Age detective story from County Roscommon. *Archaeology Ireland* 24, 2: 5-6.
- LABAUNE, M. 2013. Bell Beaker metal and metallurgy in western Europe. In Prieto Martínez, M. P. & Salanova, L. (eds. lits.): *Current Researches on Bell Beakers. Proceedings of the 15th International Bell Beaker Conference: From Atlantic to Ural. 5th-9th May 2011, Poio (Pontevedra, Galicia, Spain)*. Santiago de Compostela: Galician Archeopots, 177-188. https://www.academia.edu/5952632/Current_researches_on_Bell_Beakers
- LANTING, J. N. 2013. *Acht grafvondsten van de Veluwe klokbekergroep als uitgangspunt voor chronologische beschouwingen over de relaties saalisch-böhmische Schnurkeramik, Einzelgrafcultuur, Klokbeker-Oostgroep en Nederlands-Westduitse klokbekergroepen*. Eelde: Barkhuis.
- LEISNER, V. 1965. *Die Megalithgräber der Iberischen Halbinsel. Der Westen. Teil 1*. Berlin: De Gruyter (Madriider Forschungen 1, 3).
- LÓPEZ CALLE, C. & ILARRAZA, J. A. 1997. Condenaciones y remodelaciones. Una respuesta a la estratigrafía de los sepulcros megalíticos de Cameros. In de Balbín, R.; Bueno, P., (eds. lit.): *Actas del II Congreso de Arqueología Peninsular. II. Neolítico, Calcolítico y Bronce*. Zamora: Fundación Rei Alfonso Henriques: 309-321.
- MACWHITE, E. 1951. *Estudios sobre las relaciones atlánticas de la Península Hispánica en la Edad del Bronce*. Madrid: Seminario de historia primitiva del hombre (Dissertaciones Matritenses, 2).
- MELLER, H. 2014. Die neolithischen und bronzezeitlichen Goldfunde Mitteldeutschlands – Eine Übersicht. In Meller, H.; Risch, R. & Pernicka, E. (eds. lits.): *Metalle der Macht – Frühes Gold und Silber. Metals of Power – Early gold and silver. 6. Mitteldeutscher Archäologentag vom. 17. Bis 19. Oktober 2013 in Halle (Saale)*. Halle: Landesmuseum für Vorgeschichte Halle (Tagungen des Landesmuseum für Vorgeschichte Halle, 11): 611-716.
- MURGIA, A.; ROBERTS, B. W. & WISEMAN, R. 2014. What have metal detectorists done for us? A case study of Bronze Age gold in England and Wales. *Archäologisches Korrespondenzblatt* 44: 353-367.
- NEEDHAM, S. 2008. Gilmorton. Leicestershire: two Copper Age gold basket ornaments (2006 T154). In Barton, C. & Hitchcock, F. (eds. lits.): *Treasure Annual Report 2005/6*. London: Department of Culture Media and Sport: 17-18.
- NEEDHAM, S. 2011. Gold basket-shaped ornaments from graves 1291 (Amesbury Archer) and 1236. In Fitzpatrick, A. P.: *The Amesbury Archer and the Boscombe Bowmen. Early Bell Beaker burials at Boscombe Down, Amesbury, Wiltshire*. Salisbury: Wessex Archaeology (Wessex Archaeology Report, 27): 129-138.
- NEEDHAM, S. 2012. Case and place for the British Chalcolithic. In Allen, M. J.; Gardiner, J.; Sheridan, A., eds. lits. – *Is there a British Chalcolithic? People, place and polity in the late third millennium*. Oxford: Oxbow. p. 1-26 (Prehistoric Society Research Paper; 4).
- NEEDHAM, S. & SHERIDAN, A. 2014. Chalcolithic and Early Bronze Age goldwork from Britain: new finds and new perspectives. In Meller, H.; Risch, R. & Pernicka, E. (eds. lits.): *Metalle der Macht – Frühes Gold und Silber. Metals of Power – Early gold and silver. 6. Mitteldeutscher Archäologentag vom. 17. Bis 19. Oktober 2013 in Halle (Saale)*. Halle: Landesmuseum für Vorgeschichte Halle (Tagungen des Landesmuseum für Vorgeschichte Halle, 11): 903-941.

- NICOLAS, C.; PAILLER, Y.; STEPHAN, P. & GANDOIS, H. 2013. Les reliques de Lothéa (Quimperlé, Finistère): une tombe aux connexions atlantiques entre Campaniforme et Âge du Bronze ancien. *Gallia préhistoire* 55: 181-227.
- O'CONNOR, B. 2004. The earliest Scottish metalwork since Coles. In Shepherd, I. A. G.; Barclay, G. J. (eds. lits.): *Scotland in Ancient Europe: the Neolithic and Early Bronze Age of Scotland in their European context*. Edinburgh: Society of Antiquaries of Scotland, 205-216.
- PATON, N. 1871. Notice of two gold ornaments found at Orton on the Spey, while cutting for the railway from Elgin to Keith in 1863. *Proceedings of the Society of Antiquaries of Scotland* 8: 28-33.
- PERNICKA, E. 2014. Provenance determination of archaeological metal objects. In Roberts, B. W. & Thornton, C. P. (eds. lits.): *Archaeometallurgy in Global Perspective*. New York: Springer, 239-268.
- PEŠKA, J. & KALÁBEK, M. 2009. Pohřebiště kultury zvoncovitých pohárů z Hulína-Pravčic 2. *Archeologické Centrum Olomouc Příspěvková Organizace Ročenka 2008*: 108-124.
- PEŠKA, J. 2013. Two new burial sites of Bell Beaker Culture with an exceptional Find from Eastern Moravia/Czech Republic. In Prieto Martínez, M. P. & Salanova, L. (eds. lits.): *Current Researches on Bell Beakers. Proceedings of the 15th International Bell Beaker Conference: From Atlantic to Ural. 5th-9th May 2011, Poio, Pontevedra, Galicia, Spain*. Santiago de Compostela: Galician Archeopots, 61-72. https://www.academia.edu/5952632/Current_researches_on_Bell_Beakers
- PINGEL, V. 1992. *Die vorgeschichtlichen Goldfunde der Iberischen Halbinsel. Eine archäologische Untersuchung zur Auswertung der Spektralanalysen*. Berlin: De Gruyter (Madriider Forschungen, 17).
- PRIETO, M. P. & SALANOVA, L. 2009. Coquilles et campaniformes en Galice et en Bretagne: mécanismes de circulation et stratégies identitaires. *Bulletin de la Société Préhistorique Française* 106: 73-93.
- PROVOST, E., LE, GIOT, P.-R. & ONNE, Y. 1972. Prospections sur les collines de Saint-Nicolas-du-Pelem (Côtes-du-Nord), du chalcolithique à la protohistoire. *Annales de Bretagne* 79: 39-48.
- ROJO, M.; GARRIDO, R.; MORÁN, G.; GARCÍA, I. & KUNST, M. 2005. Del enterramiento colectivo a la tumba individual: el sepulcro monumental de La Sima en Miño de Medinaceli, Soria, España. *Boletín del Seminario de Estudios de Arte y Arqueología* 76: 11-42.
- RUSSEL, A. D. 1990. Two beaker burials from Chilbolton, Hampshire. *Proceedings of the Prehistoric Society* 56: 153-172.
- SALANOVA, L. 2000. *La question du Campaniforme en France et dans les Iles anglo-normandes: productions, chronologie et rôles d'un standard céramique*. Paris: Société préhistorique française et Comité des travaux historiques et scientifiques.
- SALANOVA, L. 2004. Le rôle de la façade atlantique dans la genèse du Campaniforme en Europe. *Bulletin de la Société Préhistorique Française* 101: 223-226.
- SHERRATT, A. 1986. The Radley 'earrings' revised. *Oxford Journal of Archaeology* 5: 61-66.
- SHERRATT, A. 1987. 'Earrings' again. *Oxford Journal of Archaeology* 6: 119.
- STANDISH, C. D.; DHUIME, B.; HAWKESWORTH, C. J. & PIKE, A. W. G. 2014. New insights into the source of Irish Chalcolithic and Early Bronze Age gold through lead isotope analysis. In Meller, H.; Risch, R. & Pernicka, E. (eds. lits.): *Metalle der Macht – Frühes Gold und Silber. Metals of Power – Early gold and silver. 6. Mitteldeutscher Archäologentag vom. 17. Bis 19. Oktober 2013 in Halle (Saale)*. Halle: Landesmuseum für Vorgeschichte Halle, 209-222.
- STANDISH, C. D.; DHUIME, B.; HAWKESWORTH, C. J. & PIKE, A. W. G. 2015. A Non-local Source of Irish Chalcolithic and Early Bronze Gold. *Proceedings of the Prehistoric Society* 81:, 149-77. DOI: <http://dx.doi.org/10.1017/ppr.2015.4>
- TAYLOR, J. J. 1979. The relationship of British Early Bronze Age goldwork to Atlantic Europe. In Ryan, M. (ed. lit.): *The Origins of Metallurgy in Atlantic Europe*. Dublin: Stationary Office, 229-250.
- TAYLOR, J. J. 1980. *Bronze Age Goldwork of the British Isles*. Cambridge: Cambridge University Press.
- TAYLOR, J. J. 1994. The first golden age of Europe was in Ireland and Britain (circa 2400-1400 B.C.). *Ulster Journal of Archaeology* 57: 37-60.

- TAYLOR, J. J. 1999. Gold reflections. In Harding, A. F. (ed. lit.): *Experiment and Design: archaeological studies in honour of John Coles*. Oxford: Oxbow, 108-115.
- TAYLOR, J. J. 2001. Bell Beaker goldwork: preliminary use of LA-ICP-analyses to elucidate cultural detail. In Nicolis, F. (ed. lit.): *Bell Beakers Today. Pottery, people, culture, symbols in prehistoric Europe, Proceedings of the International Colloquium Riva del Garda (Trento, Italy), May 1998*. Trento: Provincia Autonoma di Trento, Servizio Beni Culturali, Ufficio beni Archeologici, 727-728.
- WARNER, R. 2004. Irish gold artefacts: observations on Hartmann's analytical data. In Roche, H.; Grogan, E.; Bradley, J.; Coles, J.; Raftery, B. (eds. lits.): *From Megaliths to Metals: essays in honour of George Eogan*. Oxford: Oxbow, 72-82.
- WARNER, R.; CHAPMAN, R.; CAHILL, M. & MOLES N. 2009. The gold source found at last? *Archaeology Ireland* 23, 2: 22-25.
- WARNER, R.; MOLES, N.; CHAPMAN, R. & CAHILL, M. 2010. The Mournes: a source of early Bronze Age tin and gold. *Archaeology Ireland* 24, 4: 18-21.

Prestige indicators and Bell Beaker ware at Valencina de la Concepción (Sevilla, Spain)

Ana PAJUELO PANDO and Pedro M. LÓPEZ ALDANA
Departamento de Prehistoria y Arqueología, Universidad de Sevilla,
C/ Palma del Río, 24, 4º B, 41008 Sevilla, Spain
anapajuelo@gmail.com; aldanaostrogodo@gmail.com

Abstract

Valencina de la Concepción archaeological site, in the Spanish province of Sevilla, is generally acknowledged as the most important human settlement from the 3rd millennium BC in Iberia. Its occupation sequence starts with a poorly-represented Final Neolithic and reaches up to Bronze Age. The settlement reached its peak during the 1st half of the 3rd millennium; afterwards, a progressive decline would eventually lead to a rather modest Bronze Age occupation; Bell Beaker ceramics can be assigned to that transitional phase. On the other hand, there is a striking reduction of occupied spaces in the settlements, and Bell Beaker ware is found in association with prestige goods. These facts seem to indicate a moment of social and political crisis, with changes taking place in social structure and in the expressions of power.

Keywords: *Complex society, elite, prestige goods, Bell Beaker, Lower Guadalquivir River*

Résumé

Le site de Valencina de la Concepción située dans la province de Séville reconnu comme établissement humain du III millénaire avant notre ère le plus important, au moins, de la Péninsule Ibérique. La séquence occupationnel couvrant chronologiquement, de la fin du Néolithique, des preuves très faible jusqu'à l'âge de bronze, ayant son apogée au cours de la 1ère moitié du troisième millénaire avec un déclin progressif qui conduit à une occupation discrète Age Bronze. Les céramiques campaniformes entrent dans cette période de transition. D'autre part, nous assistons à une contraction frappante de l'espace occupé dans les colonies et les associations de ces types de céramique de matériaux qui, par leur nature, peuvent être crédités prestigieuse catégorie. Cela sert à indiquer une période de crise sociale et politique, avec changements dans la structure sociale et dans les expressions spécifiques de pouvoir.

Mots-clés: *Société complexe, élite, pièces de prestige, céramique campaniforme, Bajo Guadalquivir*

1. Introduction

Valencina de la Concepción is located on the right bank of the Guadalquivir River, a few kilometers from the city of Seville, on the north-eastern area of Aljarafe; its geology features mostly marine materials, like sands, silts and clays. The 3rd millennium BC site area belongs to two municipalities: Valencina de la Concepción, where the habitation and production areas and part of the necropolis are located, and Castilleja de Guzmán, which features the largest part of the necropolis. The site extends over an area of some 400 ha. Despite the fact that a significant part of that area belongs to Castilleja de Guzmán, we shall henceforth refer to the site as Valencina, as it is referred in most of the historiographic production pertaining to the site.

According to geoarchaeological studies (Arteaga & Roos, 1995), this human settlement was located close to an ancient cove, open to the sea but nevertheless a safe natural harbor. Other, less important 3rd millennium BC sites are known to exist in the surroundings of that cove, which was known as *Lacus Ligustinus* during the Roman period (Fig. 1).

This particular geographical location granted the settlement a situation of territorial advantage, as it occupies a point of contact between the highland areas of the Sierra Morena formation and the coastline. This must have been an important node on a major communication route that contributed



FIGURE 1. LOCATION
VALENCINA-CASTILLEJA.

to the long-distance circulation of products, as the site's archaeological record indicates. On the other hand, lands located close to the Guadalquivir River meadows feature a considerable potential for agriculture.

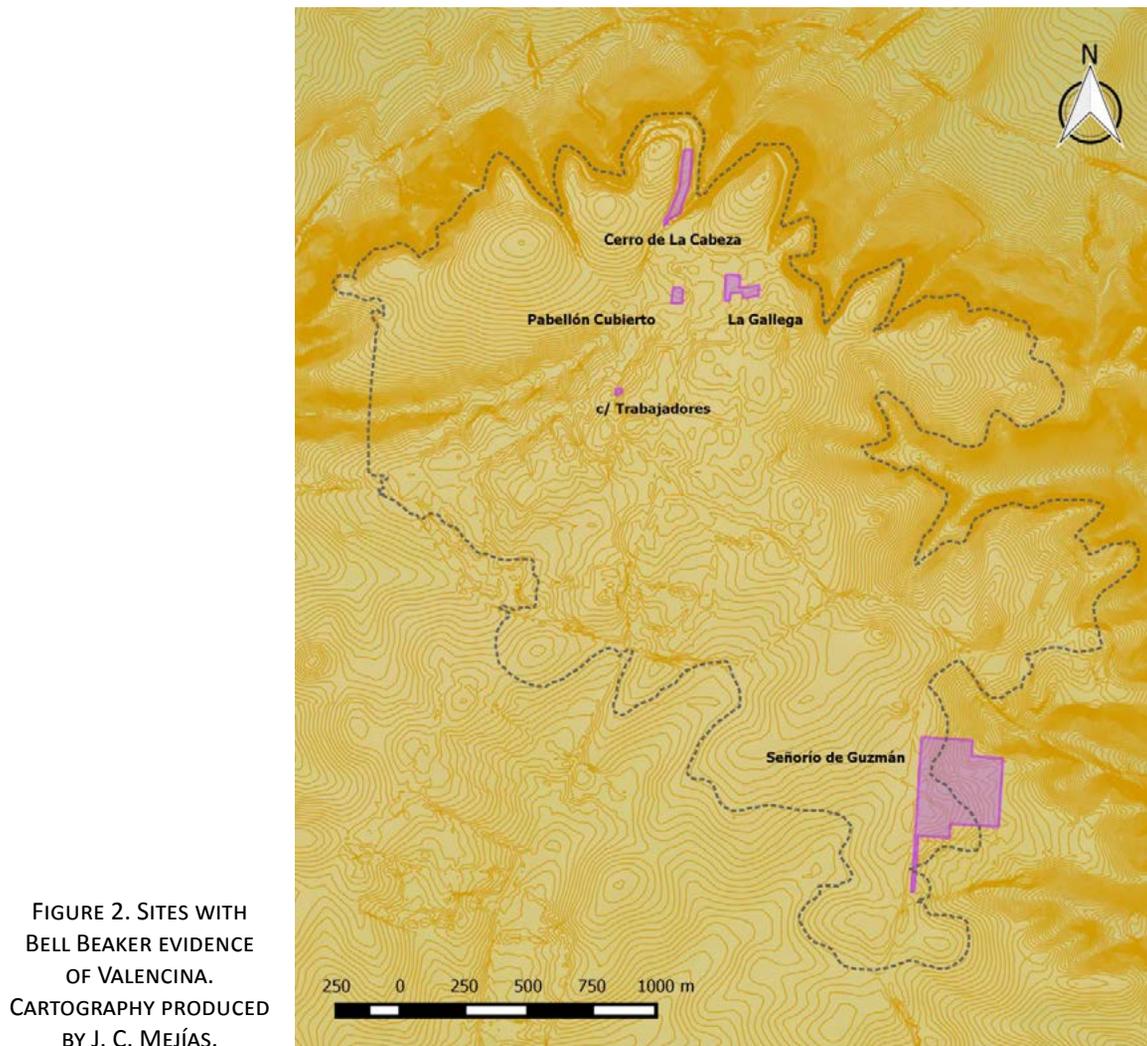
The first archaeological works carried out at the site date back from the nineteenth century and are related to the discovery of 'Cueva de la Pastora'. Since then, the history of local research had its ups and downs due to different reasons, of political, administrative or scientific nature. Furthermore, the fact that a large portion of the grounds where the site is located extends underneath the present-day town of Valencina raises a number of issues and inconveniences. Namely, the fact that only a number of fragmentary archaeological interventions were carried out, particularly from the eighties onwards. Despite their numbers, these works only uncovered a limited percent of the site's real extent.

2. Valencina's Bell Beaker archaeological record

A total of 117 archaeological interventions were carried out at Valencina between 1869 and 2011, but only 103 can be considered valuable contributions to the study of the site (Mejías, 2013). This means that in fact only 0,95% of the site has been excavated so far (Mejías *et al.*, in print). So, and despite those impressive numbers, the stratigraphy of the archaeological record pertaining to the Bell Beaker period was only identified in recent years. Bell Beaker occupation of the site was previously known from surface materials or materials without a precise or clear provenance, even if they were unearthed in the course of archaeological excavations (Fig. 2) shows the different locations featuring Bell Beaker evidence found during archaeological excavations:

1. Cerro de la Cabeza;
2. Pabellón Cubierto;
3. C/ Trabajadores;
4. Señorío de Guzmán (in the necropolis sector);
5. La Gallega.

Locations 2 and 3 account for the highest amounts and variability of finds, whereas only scarce information is available on locations 1 and 5.



At C/ Trabajadores, 336 Bell Beaker ceramic items were found in a structurally complex context, related to a period of intense occupation that encompasses most of the 3rd millennium BC. Nos. 14-18 C/ Trabajadores are located on a central *meseta* (plateau) to the northeast of the urban part of the town, sitting on Lower Pliocene formations of yellowish silty sands. The archaeological features are mostly circular (excepting a single ditch), negative structures of diverse dimensions. Their functions are hard to define, but they might correspond to hut circles and silos. Interestingly, some structures immediately preceding the Bell Beaker occupation were re-used for the deposition of human remains, particularly skulls, associated to other typical elements of Chalcolithic contexts, thus generating post-abandonment fills.

Bell Beaker types have been identified in several structures. Still, and in terms of the post-abandonment fills, most of the Beaker finds were found on top of structure 136. The relative chronology of this structure falls within Early Chalcolithic. It was almost completely silted-up by the time of the first Bell Beaker occupation; an undecorated cup was recovered from the upper silting deposits. Eventually, the structure was ritually sealed, which involved the deposition of a human skull. Immediately after, the presence of Bell Beaker ware is overwhelming (Pajuelo, 2009; López Aldana & Pajuelo, 2013).

The deposits we are referring to are excavation units (U.E.) [34], [37], [42], [44] and [51], mostly horizontal deposits, sometimes filling small hollows and slopes. There is a striking relative abundance



FIGURE 3. GOLD SHEET, DOLMEN MONTELIRIO, GOLD SHEET TOMB 1 SEÑORÍO DE GUZMÁN, GOLD SHEET C/ TRABAJADORES AND GOLD BEADS TOMB 5 'SEÑORÍO DE GUZMÁN'.

of ceramics featuring typical Bell Beaker decoration, besides other ceramic types that can be assigned to the 3rd millennium BC, as well as faunal remains. Paste analyses were carried out on Bell Beaker ware samples.

In broad terms, the unearthed materials match the Chalcolithic of SW Iberia, even if lithic products are scarce and conventional in this particular Valencina context, excepting an oolitic limestone halberd. Nevertheless, the proportion of the most abundant type of raw material could indicate a 'pre-industrial' production level, on a scale that would exceed a mere local production: large blocks of acid tuffite, possibly obtained from the nearby Sierra de Huelva, were used to produce large blades and flakes. This raw material is quite frequent in the Bell Beaker levels. Finally, it ought to be mentioned that some structures (lacking Bell Beaker elements) featured a certain amount of small rock crystal flakes.

Some metallic elements are extremely meaningful due to their association in the context of a 3 meter hut circle, along with fragmented ceramic products featuring a high percentage of refits and corresponding to mid- and large-sized containers and a few plates with thick rims.

This set of metallic elements includes three axes and a gold sheet purposefully twisted into a loop shape (Fig. 3). These items are not a typological novelty, but their association indicates hoarding,

either by an individual or a family. That intention can be inferred from the remains of vegetable fibers observed as imprints on the surface of the axes. Their exact nature remains unknown, as no analyses have been carried out so far.

Some objects belonging to the realm of material evidence of ideology ought to be highlighted as well, even though they cannot be directly related to the Bell Beaker occupations. These are idol-like representations akin to the Chalcolithic symbolic realm, including an earthenware figurine of a woman, a fragment of a large ‘Eye Idol’, broken right under the eyes and featuring the depiction of hair on the top, two fragments from different slate plaques, and a small earthenware zoomorphic figurine in the shape of a bovid.

Concerning ceramic products and in the absence of a detailed study, mid- and large-sized pots are predominant while plates with thickened or almond-shaped rims are scarce, the latter being more frequent. There is an outstanding and striking presence of Bell Beaker shapes (Fig. 4), including the traditional morphotypes with impressed decoration, sometimes filled with white paste. Besides undecorated Bell Beaker vessels, the following decorative styles have been identified as well: ‘Maritime’, dotted geometric and dotted geometric associated to small stamped motifs. Paste analyses were carried out on sample items.

The study of the decorative styles led to the conclusion that band decoration is the most frequent style, at a total of 113 sherds (bands filled with transverse lines are predominant – Traditional Maritime Style), followed by Triangle decoration at 82 sherds (mostly inverted triangles), Linear decoration at 17 sherds and Lozenge decoration at 9 sherds, while Incised and Undecorated counted 4 and 7 sherds respectively (Molina, 2014).

Bell Beaker occupation from *calle* Trabajadores is a very homogenous package, in terms of both its archaeological context and the decorative patterns, considering that the Maritime or International style and the Dotted Geometric style are predominant and correspond to an early Bell Beaker phase.

Archaeological materials were found in association with structures, mostly ditches featuring evidence of combustion, particularly in the southern sector, and sometimes faunal remains as well. These features might well correspond to combustion structures, possibly serving diverse functions, either ritual, cooking or heating (Rojo Guerra & Kunst, 2002).

On the other hand, the sherds unearthed during the excavation of the Pabellón Cubierto are highly eroded (Fig. 4). They were recovered from test pit 1, located in the central northern sector, within two oval-shaped structures, [115] and [116], which feature Chalcolithic ceramics, including some sherds of decorated Bell Beaker ware. The latter were found within these new depositional packages that extend beyond the limits of test pit 1, conforming a level that seals a structure excavated into the bedrock [133]. Materials associated to these units include decorated Bell Beaker sherds, along with ceramics of Chalcolithic chronology (platters with almond-shaped rims, carinated bowls, etc.) as well as lithic materials, adobe, fauna and malacofauna. Bell Beaker sherds are small-sized and rounded (Ortega & Román, 2010, Ortega, 2013).

Materials recovered from test pit 1 include 211 Bell Beaker decorated sherds of different sizes, featuring diverse decorative motifs and different degrees of preservation. Decorated Bell Beaker sherds were found within the general (Fig. 5), homogenous level that conforms the deposit which seals the structures dug into the bedrock; these materials might come from erosive, re-deposited levels (Ortega & Román, 2010).

Likewise, the stratigraphic sequence of test pit 3, located to the northwest of test pit 1, in the northern sector, also features a sealing deposit, which again contains decorated Bell Beaker ceramics – a total of 122 items were recovered here (Ortega & Román, 2010). Thus, 333 sherds were recovered between both test pits, which cover an area of some 17 m² (Ortega & Román, 2010).



FIGURE 4. BELL BEAKER FROM 'C/ TRABAJADORES'.



FIGURE 5. BELL BEAKER SHERDS FROM 'PABELLÓN CUBIERTO' (PHOTOGRAPHY BY ORTEGA & ROMÁN).

The materials unearthed in the level that seals structure [133] and in the silting deposits inside it reveal some very interesting evidence. On one hand, the silting deposits inside the structure contain Bell Beaker materials corresponding to Late Chalcolithic-Early Bronze Age and would thus date the abandonment of the structure to that period. But, on the other hand, the deposit sealing the structure also features Bell Beaker materials, in larger numbers. In functional terms, the structure seems to match the constructive typology related to habitation and/or productive processes (Ortega & Román, 2010).

Materials from C/ Trabajadores and from Pabellón Cubierto come from the settlement's habitation and production area. It ought to be stressed that the Bell Beaker elements were unearthed in the structures' re-use or sealing levels, which means that those structures were already abandoned or were deactivated by the time Bell Beaker groups arrived at the settlement.

A small number of Bell Beaker ceramics were also recovered during the excavation carried out at La Gallega, under a collapsed structure made from sun-dried clay balls, with vegetable imprints (Martín & Ruiz, 1992).

Excavations undertaken at Cerro de la Cabeza in 1975 also resulted in the recovery of some Bell Beaker materials and revealed the presence of enlarged hut foundations. The works carried out at the so-called *Corte A* (Profile A) further revealed a 7 meter deep, 4 meter wide, V-shaped ditch. The 'tumulus burial' of a single individual in flexed position and without any grave goods was found inside the ditch. Two other individuals seemed to have been thrown inside the ditch, without any ritual (Fernández & Oliva, 1986).

A dwelling feature with a flooring made of pebbles was built on top of the ditch, after its abandonment and silting up. Three small sized, eroded Bell Beaker sherds were found inside the dwelling (Fig. 6), along with some bronze items. The previously referred structures were already silted up when the dwelling was built and should therefore be assigned to a pre-Bell Beaker moment (Fernández & Ruiz, 1978; Fernández & Oliva, 1986).

Furthermore, a *tholos* was known to exist at Cerro de la Cabeza., i.e. a collective tomb featuring a circular chamber, quite probably covered by a false dome, built by placing each successive stonework layer out over the previous; schist slabs were used to build the chamber walls. It was impossible to determine whether or not the *tholos* had an entrance and a corridor, as that area had been heavily disturbed prior to the excavation works (Fernández & Ruiz, 1978).

There is some controversy concerning the definition of specific functional spaces within the site, particularly when it comes to the existence of a habitation and production area separated from a necropolis area. The authors subscribe the notion of a spatial and functional duality and would like to underline the fact that Bell Beaker ceramics were also recovered at the necropolis sector, namely in the area known as Señorío de Guzmán, in the municipality of Castilleja de Guzmán.



FIGURE 6. BELL BEAKER SHERDS FROM 'CERRO DE LA CABEZA' (PHOTOGRAPHY FERNÁNDEZ Y OLIVA).



FIGURE 7. BELL BEAKER FROM TOMB 1
'SEÑORÍO DE GUZMÁN'.



FIGURE 8. BELL BEAKER FROM TOMB 5
'SEÑORÍO DE GUZMÁN'.

Five funerary structures were excavated in 1996. Two of them (tombs 1 and 5) were stonework tholoi featuring some Bell Beaker ceramics (Arteaga & Cruz-Auñón, 1999b).

Tomb 1 is a structure composed of a 2 meter circular chamber and an almost destroyed corridor with a minimum length of 2 meters. Both are made of stonework, alternating sandstone blocks with schist slabs. A probable niche was identified in the northeast portion of the chamber but the high degree of destruction sheds some doubts about its true nature.

Two Bell Beaker fragments were found in this tomb, one belonging to a bell-shaped cup with an impressed decoration of parallel bands filled with crisscross lines on the lower part of the vessel (Fig. 7). The other fragment corresponds to the rim of a bowl, decorated with horizontal bands, one of which filled with crisscross lines while the other is broader and features short, angular lines intercalated with impressed lines. A piece of decorated sheet-gold of delicate manufacture was also recovered here. The embossed decoration conforms motifs akin to Bell Beaker style. It could also be the representation of an 'Eye Idol', similar to the one from Montelirio and the sheet-gold from the Matarrubilla dolmen (López Aldana *et al.* in print).

Tomb 5 is also made of stonework, alternating sandstone blocks with schist slabs. It features a 3 meter circular chamber with a schist slab flooring. A section of the corridor, northeast oriented and over 4 meters in length, has been preserved, including the schist slab flooring and two vertical schist slabs that mark the chamber entrance, much like doorjambs. Four Bell Beaker sherds were recovered from tomb 5: a fragment from a Maritime style bell-shaped cup decorated with impressed bands filled by zigzag lines (Fig. 8); and three other sherds that might belong to the same vessel

– a bowl of geometric style, alternating with impressed decoration probably made with bivalve shells from a still undetermined species.

Further finds from tomb 5 include a copper awl, copper slag, 3 gold tubular beads, over 600 limestone beads, 17 green stone beads, 1 *Dentallium sp.* and 3 *Cypraea sp.* It is not unlikely that all these elements were part of the same set, as its reconstruction indicates (Fig. 9). (only the gold items were not included) (López Aldana *et al.* in print).

Los Cabezuelos is a *tholos* tomb featuring a circular chamber with a false dome (a quarter of which was destroyed) and a rectangular corridor some 3,8 meters in length and southwest oriented. The small tumulus covering the tomb had been completely erased.

Three different use phases were identified, ranging from Full Chalcolithic to Early Bronze Age. The first phase corresponds to the collective burial of 12 individuals with scarce grave goods, dated from pre-Bell Beaker Chalcolithic. Next in the sequence comes the burial of a single



FIGURE 9. HYPOTHETICAL RECONSTRUCTION:
NECKLACE TOMB 5 'SEÑORÍO DE GUZMÁN'
(NOT INCLUDED 3 GOLD BEADS).

individual aged between 30 and 45 years, for which the burial chamber was re-used. This burial features rich grave goods, including a copper tongue dagger and five Palmela type points; it is assumed that this individual was a warrior, considering the panoply he was buried with. This burial can be assigned to the transitional horizon between Bell Beaker and Early Bronze Age. Finally, a female individual was buried on top of the 2nd burial, without any grave goods (Arteaga & Cruz-Auñón, 1999a).

No Bell Beaker ceramics were recovered from this tomb. Nevertheless, its grave goods include a set of characteristic elements that are usually associated to Bell Beaker ware, like the copper items (Palmela points and tongue dagger), ivory, gold, etc. (Arteaga & Cruz-Auñón, 1999a). It is not unlikely that such elements had already begun to replace Bell Beaker ceramics as prestige goods, until the latter were slowly but completely replaced by the former.

The Matarrubilla dolmen might well be a similar case. Its corridor featured two burials with grave goods that can be assigned to the Bell Beaker period, including ceramic cups and plates along with ivory, metal, gold, lithic and bone items (Obermaier, 1919).

Abundant fragments of undecorated sheet-gold were recovered from the corridor, as well as a decorated fragment featuring a punched geometric checkerboard decoration (Perea, García & Fernández, 2010).

3. Bell Beaker ceramics analyses

Finally, the authors wish to comment on the results of paste analyses performed on 23 ceramic samples from C/ Trabajadores, which include Bell Beaker and daily-use ware, to enable comparison.

Two undecorated and six decorated Bell Beaker sherds were analyzed. Among the latter, 3 bear geometric Bell Beaker decoration, 1 bears impressed decoration, 1 bears geometric and impressed Bell Beaker decoration and 1 bears Maritime style Bell Beaker decoration.

Concerning the daily-use ware, a total of 15 sherds were analyzed, corresponding to cups (2 sherds), platters (6 sherds), pots (3 sherds), one plate, one bowl, one closed morphotype and one carinated type.

The dendrogram (Fig. 10) shows the existence of 3 well differentiated groups, while 3 samples are possible outliers (Inácio *et al.*, 2012).

Group 1 includes 8 samples and features a very homogenous composition with quartz, plagioclases, alkaline feldspars and phyllosilicates as main mineral phases, observed in all samples, besides amphibolite and sometimes calcite.

Group 2 includes 8 samples and features a CaO content between 7,6% and 14,1%, which suggests the use of carbonated clays in a very homogenous composition.

Group 3 includes four samples; all vessels show a very homogenous composition. Evidence of alkaline feldspars and traces of pyroxenes were identified in some of the samples.

The comparative analysis of pastes and samples from the site's surroundings indicates that raw material procurement did not take place in the settlement but rather at locations where these clays can

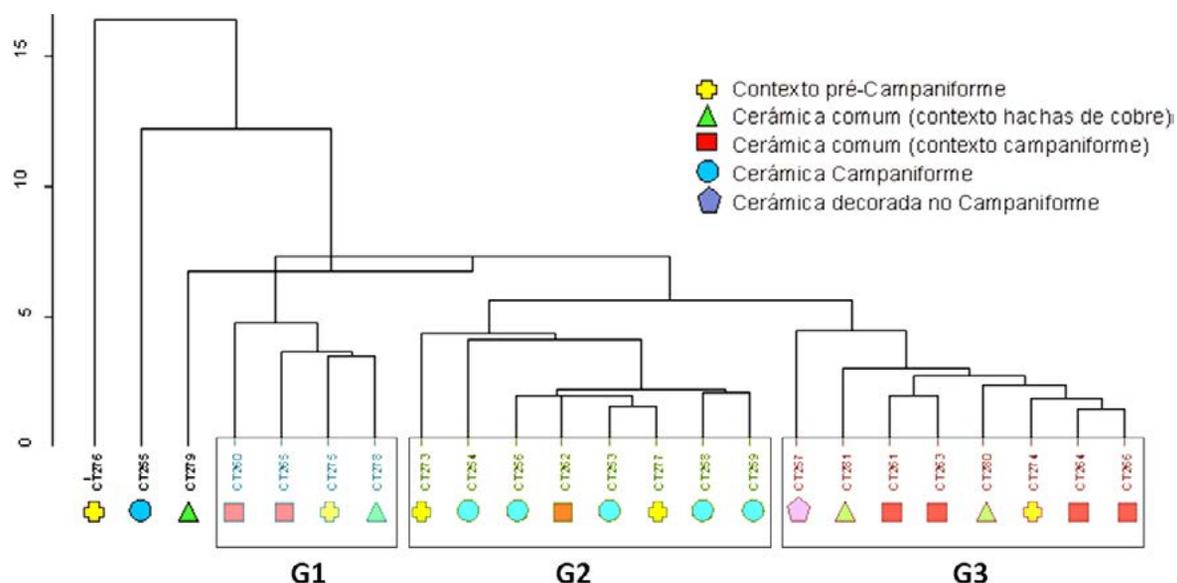


FIGURE 10. CHEMICAL ANALYSIS DENDROGRAM.

be found, a few kilometers away from the site. Nothing seems to suggest raw material interchange or long-distance trade.

In order to characterize the white paste filling observed in some Bell Beaker vessels, samples of that white powder were chemically analyzed using a scanning electron microscope, while X-ray diffraction (XRD) was used for the mineral analysis. The main filling is carbonated, as shown below; two samples feature a calcium and phosphorus composition possibly corresponding to a fluorapatite. Thus, preliminary data indicate the presence at Valencina de la Concepción of a white paste filling made of bone, similar to other cases from Iberian contexts but in smaller percentage.

Analyses of white paste fillings have been carried out at other Guadalquivir Valley sites, like Marinaleda and Acebuchal (Carmona), both in the province of Seville, showing that these white pastes are made of calcium carbonate (calcite) (Odriozola *et al.*, 2012).

This seems to be further confirmed by Lazarich's work in Western Andalucía. Thirty-eight Bell Beaker samples were analyzed using a scanning electron microscope to identify procurement areas and determine whether those productions were local or foreign. Results showed the former hypothesis to be true, in accordance with results from the analysis of ceramic samples from Monturque (Córdoba), which are local productions as well (Lazarich, 2005).

On the other hand, a comprehensive series of XRD analyses was carried out in order to characterize the material used in the filling of the so-called '*cerâmicas simbólicas*' ('symbolic pottery') recovered at Perdigões (Reguengos de Monsaraz, Portugal). Results proved that the white paste filling the decorations was made of burned bone (Odriozola, 2008). This has also been confirmed at Tierra de Barros (Badajoz) (Odriozola & Hurtado, 2007).

It is therefore possible to state, considering the above mentioned cases, that the use of bone to fill Bell Beaker decorations encompasses the Lower Guadalquivir, Middle Guadiana and Portuguese Alentejo regions.

Likewise, Bell Beaker ceramic paste composition analyses, using energy-dispersive-X-ray-fluorescence spectrometry (WD-XRF), were also performed on materials from the Guadiana Valley, namely from the sites of La Pijotilla, San Blas, Porto Torrão and Perdigões. These studies aimed at identifying the ceramic products' social networks of circulation (Odriozola *et al.*, 2008).

The presence of several composition groups at a single settlement, as at La Pijotilla and Porto Torrão, may be due to interchange or to different technological approaches, like the use or admixture of diverse clay sources. On the other hand, at San Blas and Perdigões a single raw material source seems to have been used, as far as ceramic production is concerned.

Further analyses were carried out at Porto das Carretas (Mourão, Évora), in the middle course of the Guadiana River. The site has two occupation phases; the second phase features Maritime or International Bell Beaker ceramics. Fourteen sherds were recovered here, mostly from a hut feature (M13), but also two from the tower and one from the metallurgical furnace (Soares & Tavares, 2010).

The ceramics were analyzed by means of DRX, FRX and MOLTP in order to characterize their mineral, chemical and texture profiles. Results indicate local productions using clays from the site's surroundings (Soares & Tavares, 2010).

The following C14 dates were obtained for the International group: 3920±40 BP, 3860±40 BP and 3840±60 BP (Soares & Tavares, 2010).

International Bell Beaker accounts for almost half of the circulating or interchanged ceramics. Circulation would have followed an East-West axis, using the Guadiana River as a facilitator of the interchange of these prestige ceramics (Odriozola *et al.*, 2008).

Ceramics analyses were also applied to materials from the Camino de las Yeseras (Madrid) site, using 4 techniques: petrographic microscope, X-ray diffraction, ICP/MS chemical analysis and scanning electron microscope (SEM). Furthermore, gas chromatography was used to analyze vessel contents, indicating some kind of oil (Ríos *et al.*, 2011). Traces of oils in ceramic vessels have been spotted at other prehistoric sites like Fuente Álamo, where vegetable oils were identified (Tresserras, 2004), or the Bell Beaker necropolis of Valle de las Higueras (Huecas), where results indicate animal fat (Bueno *et al.*, 2005: 75).

Results obtained for this site seem to prove that these are local productions, characterized by silicated pastes featuring coarse and semi-coarse organic and inorganic degreasers and low-temperature reduced firing. Most of the analyzed samples correspond to Bell Beaker ware (Ríos *et al.*, 2011).

4. Conclusions

To conclude, it ought to be stressed that the social formations from the last quarter of the 3rd millennium BC are obviously the heirs of the social organization from previous centuries, when the strong group and/or family stratification was being replaced by the progressive individuality of elite groups. Such groups evolve from differentiated, specialized craftspersons, who are the direct producers of subsistence goods (Pajuelo & López Aldana, 2001; López Aldana & Pajuelo, 2011), into socially outstanding Bronze Age warriors. This moment of crisis can actually be detected amongst the social groups by the end of the 3rd millennium BC. ‘A ghost goes across Europe’ (and North Africa): the Bell Beakers.

Regarding the Valencina chronologies for this Bell Beaker moment, only one date is available so far: 3380±150 BP but the exact provenance of the sample is not known. It was taken from a bone recovered at a depth of 2 meters, in a Bell Beaker level, according to F. Fernández (Lazarich, 2005).

In any case, the last Valencina datings on samples taken from several locations, amongst which C/ Trabajadores, range from 2485-2465 and from 2470-2435 cal BC 1σ (García Sanjuán *et al.*, in print).

As far as the raw materials for ceramic production are concerned, most cases indicate local clays from sources located close to the settlement. Still, the true circulation of these products can only be assessed by means of an analytical program with a broad territorial spectrum. What seems obvious is that it was viewed as a special type of ware, which identifies a group within the crisis-stricken social formations from late 3rd millennium BC.

The circulation of Bell Beaker ceramics quite probably required a distribution, trade or interchange system where social relations played a fundamental role. At the same time, one should consider their functions, without excluding the symbolic role they might have had, essentially related to the funerary realm. Bell Beaker ware also would have been an indicator of the social relevance and status of its bearers, with a broad visual spectrum. On a more domestic scale, they might have been used as special containers for selected products, which only reinforces their role as prestige indicators owned by privileged groups, as differential distribution within the groups and social asymmetries show, in this early classist society. Social differences would be clear, reflected by some individuals holding more power and privileges than the rest of the population (Pajuelo & López Aldana, 2001; López Aldana & Pajuelo, 2011). From this point of view, Bell Beaker ceramics would stand as a ‘brand’ and a symbol representing those elites.

Acknowledgments

We would like to thank Armando Lucena by the English translation.

References

- ARTEAGA MATUTE, O. & CRUZ-AUÑÓN BRIONES, M^a R. 1999a. El sector funerario de los Cabezuelos (Valencina de la Concepción, Sevilla). Resultados preliminares de una excavación de urgencia. *Anuario Arqueológico de Andalucía 1995. T III*: 589-599.
- ARTEAGA MATUTE, O. & CRUZ-AUÑÓN BRIONES, M^a R. 1999b. Las nuevas sepulturas (tholoi) y los enterramientos bajo túmulos (tartesios) de Castilleja de Guzmán (Sevilla). Excavación de urgencia de 1995. *Anuario Arqueológico de Andalucía 1995. T III*: 640-651.
- ARTEAGA MATUTE, O. & ROOS, A. M. 1995. El Proyecto Geoarqueológico de las Marismas del Guadalquivir. Perspectivas arqueológicas de la campaña de 1992. *Anuario Arqueológico de Andalucía 1992*: 329-339.
- FERNÁNDEZ GÓMEZ, F. & OLIVA ALONSO, D. 1986. Valencina de la Concepción (Sevilla). Excavaciones de urgencia. *Revista de Arqueología* 58: 19-33. Madrid.
- FERNÁNDEZ GÓMEZ, F. & RUIZ MATA, D. 1978. El 'Tholos' del Cerro de la Cabeza en Valencina de la Concepción (Sevilla). *Trabajos de Prehistoria* 35: 193-224.
- GARCÍA SANJUÁN, L.; BEAVAN, N.; DÍAZGUADARMINO-URIBA, M.; DÍAZ-ZORITA BONILLA, M.; FERNÁNDEZ FLORES, A.; HAMILTON, D.; LÓPEZ ALDANA, P. M.; MÉNDEZ IZQUIERDO, E.; PAJUELO PANDO, A.; VARGAS JIMÉNEZ, J. M.; WHEATLEY, D. & WHITTLE, A. (in print). Cronología radiocarbónica y modelado bayesiano del asentamiento de Valencina de la Concepción (Sevilla, España): hacia una cronología de alta resolución de la Edad del Cobre en el Sur de la Península Ibérica. *Congreso Internacional Nuevas Tecnologías Aplicadas a la Investigación Arqueológica, 'ARQUEOWORLD'*. Valencina de la Concepción (Sevilla). 6-8 Noviembre 2014.
- INÁCIO, N.; NOCETE CALVO, F.; NIETO LIÑÁN, J. M.; LÓPEZ ALDANA, P. M.; PAJUELO, A.; RODRÍGUEZBAYONA, M. & ABRIL, D. 2012. Cerámica común y campaniforme en Valencina de la Concepción (Sevilla): Indagando su precedencia través del análisis arqueométrico. *Estudos Arqueológicos de Oeiras, 19*. Actas del IX C.I.A. 2011. Lisboa: 95-104.
- LAZARICH GONZÁLEZ, M. 2005. El campaniforme en Andalucía. In Rojo Guerra, M.; Garrido Pena, R. & García Martínez de Lagrán, I. (coord.): *El campaniforme en la Península Ibérica y su contexto europeo*. Valladolid: Universidad de Valladolid (Serie Arte y Arqueología 21): 351-370.
- LÓPEZ ALDANA, P. M. & PAJUELO PANDO, A. 2011. Las primeras sociedades estatales del Bajo Guadalquivir. In Domínguez Pérez, J. C. (coord.): *Gadir y el Círculo del Estrecho Revisados. Propuestas de la Arqueología desde un Enfoque Social*. Cádiz: Universidad de Cádiz, 119-127.
- LÓPEZ ALDANA, P. & PAJUELO PANDO, A. 2013. La secuencia ocupacional durante el III milenio ANE en C/ Trabajadores 14-18 (Valencina de la Concepción, Sevilla). In García Sanjuán, L.; Vargas Jiménez, J. M.; Hurtado Pérez, V.; Ruiz Moreno, T. & Cruz-Auñón Briones, R. (eds.): *El Asentamiento Prehistórico de Valencina de la Concepción (Sevilla): Investigación y Tutela en el 150 aniversario de Descubrimiento de La Pastora*. Sevilla: Universidad de Sevilla: 157-169.
- LÓPEZ ALDANA, P. M.; PAJUELO PANDO, A.; MEJÍAS-GARCÍA, J. C. & CRUZ-AUÑÓN, M. R. (in print). Variabilidad Funeraria en las Sociedades del III Milenio en el Sector Señorío de Guzmán de Valencina-Castilleja (Sevilla). *Actas II International Congress of Transition Archaeology: Death Archaeology. 2013. Évora (Portugal)*.
- MARTÍN ESPINOSA, A. & RUIZ MORENO, M. T. 1992. Excavación calcolítica de urgencia en la finca 'La Gallega' 1^a fase. Valencina de la Concepción, Sevilla. *Anuario Arqueológico de Andalucía 1990. Volumen III*, Junta de Andalucía, Sevilla: 455-458.
- MEJÍAS-GARCÍA, J. C. 2013. Análisis espacial en el asentamiento y necrópolis de Valencina: patrones de distribución y sectorización. *VI Encuentro de Arqueología del Suroeste Peninsular*. Villafranca de los Barros: 463-500.
- MEJÍAS-GARCÍA, J. C.; CRUZ-AUÑÓN, M. R.; PAJUELO PANDO, A. & LÓPEZ ALDANA, P. M. (in print). Análisis del modelo de organización espacial de la necrópolis de Valencina. La complejidad social a debate. *Actas II International Congress of Transition Archaeology: Death Archaeology. 2013. Évora (Portugal)*.

- MOLINA, G. 2014. *La cerámica campaniforme de Calle Trabajadores 14-18: un acercamiento al campaniforme de Valencina de la Concepción (Sevilla)*. Trabajo de Fin de Grado. Universidad de Sevilla. Inédito.
- OBERMAIER, H. 1919. *El dolmen de Matarrubilla* (Comisión de Investigaciones Paleontológicas y Prehistóricas. Memoria, 26). Madrid: Museo Nacional de Ciencias Naturales.
- ODRIOZOLA, C. P. 2008. Scientific analysis of the White inlaid material of the symbolic pottery from povoado dos Perdigoes. *Apontamentos de Arqueologia e Património* 3: 41-44.
- ODRIOZOLA, C. P. & HURTADO, V. 2007. The manufacturing process of 3rd millennium BC bone based incrustrated pottery decoration from the middle Guadiana river basin (Badajoz, Spain). *Journal of Archaeological Science* 34: 1749-1803.
- ODRIOZOLA, C. P.; HURTADO, V.; DIAS, I. & VALERA, A. 2008. Produção e consumo de campaniforme no vale do Guadiana: uma perspectiva ibérica. *Apontamentos de Arqueologia e Património* 3: 45-52.
- ODRIOZOLA, C. P.; HURTADO, V.; GUERRA DOCE, E.; CRUZ-AUÑÓN, R. & DELIBES DE CASTRO, G. 2012. Los rellenos de pasta blanca en cerámicas campaniformes y su utilización en la definición de límites sociales. *Estudios Arqueológicos de Oeiras* 19. Actas del IX C.I.A. Lisboa, 2011: 143-154.
- ORTEGA GORDILLO, M. 2013. El registro estratigráfico en el Pabellón Cubierto de Valencina de la Concepción (Sevilla). In García Sanjuán, L.; Vargas Jiménez, J. M.; Hurtado Pérez, V.; Ruiz Moreno, T. & Cruz-Auñón Briones, R. (eds.): *El Asentamiento Prehistórico de Valencina de la Concepción (Sevilla): Investigación y Tutela en el 150 aniversario de Descubrimiento de La Pastora*. Sevilla: Universidad de Sevilla: 113-130.
- ORTEGA GORDILLO, M. & ROMÁN, L. 2010. *Memoria preliminar de la actuación arqueológica preventiva en el nuevo pabellón cubierto de Valencina de la Concepción (Sevilla)*. Memoria científica inédita. Sevilla.
- PAJUELO PANDO, A. 2008. *Memoria Preliminar Excavación Arqueológica Preventiva en C/ Trabajadores 14-18 (Valencina de la Concepción)*. Memoria científica inédita. Sevilla.
- PAJUELO PANDO, A. & LÓPEZ ALDANA, P. M. 2001. Ideología y control político durante el III milenio a.n.e. en el Bajo Guadalquivir. *Revista Atlántico Mediterránea de Prehistoria y Arqueología* 4: 229-255.
- PEREA, A.; GARCÍA, O. & FERNÁNDEZ, C. 2010. *El proyecto AU. Estudio arqueométrico de la producción de oro en la Península Ibérica*. Madrid: CSIC (Bibliotheca Praehistórica Hispania, XXVII).
- RÍOS, P.; GARCÍA, R.; ALIAGA, R. & BLANCO, J. F. 2011. 'La cerámica: caracterización y contenido'. In Blasco, C.; Liesau, C. & Ríos, P. (eds.): *Yacimientos calcolíticos con campaniforme de la región de Madrid: nuevos estudios*. Madrid: Universidad Autónoma de Madrid, 319-346.
- ROJO GUERRA, M. A. & KUNST, M. 2002. *Sobre el significado del fuego en los rituales funerarios del Neolítico*. Valladolid: Universidad de Valladolid (Studia Archaeologica).
- SOARES, J. & TAVARES, C. 2010. Campaniforme do Porto das Carretas (médio Guadiana). A procura de novos quadros de referência. In Gonçalves, V. & Sousa, A. C. (eds.): *Transformação e Mudança no Centro e Sul de Portugal: o 4º e o 3º milenios a.n.e.* Cascais: 225-261.
- VARGAS JIMÉNEZ, J. M. 2004. *Carta Arqueológica de Valencina de la Concepción (Sevilla)*. Sevilla: Consejería de Cultura de la Junta de Andalucía.

Some prestige goods as evidence of interregional interactions in the funerary practices of the Bell Beaker groups of Central Iberia

Corina LIESAU VON LETTOW-VORBECK

Dpto. de Prehistoria y Arqueología, Universidad Autónoma de Madrid,
C/ Tomás y Valiente, 1, 28049 Madrid, Spain
corina.liesau@uam.es

Abstract

Over the past several years, a number of Bell Beaker grave goods have been studied using new research approaches that have enabled us to gain a more in-depth knowledge of the raw materials they were made from. Recent findings and the use of new methods of study beyond the typological and stylistic ones employed for pottery, copper artefacts and ornaments, have made of archaeometric studies an indispensable tool to better understand Bell Beaker funerary practices in Central Iberia. The aim of this paper is to present and discuss several results in order to determine the raw materials used for the production of not just different types of 'bone' buttons, but also of other ornaments, highlighting their relevance in the Bell beaker package, as well as the choice of different materials used in funerary rituals, such as cinnabar.

Keywords: Bell Beaker, V-perforated buttons, Ivory, Sperm whale, Cinnabar, Iberian Peninsula

Résumé

Depuis une dizaine d'années, de nombreux ensembles funéraires campaniformes ont pu être étudiés à l'aide d'une série d'approches nouvelles permettant l'analyse exhaustive des matériaux utilisés pour les objets composant les dépôts funéraires. De la sorte, avec les approches classiques typologique et stylistique, l'archéométrie est devenue un outil indispensable pour mieux connaître les pratiques funéraires campaniformes du centre de la Péninsule Ibérique. Le but de ce travail est de présenter et de discuter une série de résultats obtenus à partir de différentes analyses pour identifier la matière première de plusieurs boutons et perles 'en os', tout en soulignant leur importance dans ce que l'on appelle le 'package campaniforme', et encore l'utilisation d'autres matériaux comme le cinabre dans les pratiques funéraires des tombes campaniformes socialement valorisées.

Mots-clés: Campaniforme, boutons perforés en v, ivoire, cachalot, cinabre, Péninsule Ibérique

1. Introduction

Over the past decade, thanks to rescue archaeology interventions, it has been possible to not only discover a significant number of new Chalcolithic sites in the Iberian Peninsula, but also to carry out open-field excavations that have provided new insights into pit settlements as well as to their relationship to ditched enclosures (Díaz del Río, 2003; Márquez & Jiménez, 2010; Blasco *et al.*, 2011; Ríos, 2011, García Sanjuán *et al.*, 2013a). Additionally, the number of funerary records has also increased considerably, not only those of the pre-Bell Beaker horizon, but also Bell Beaker and those contemporaneous with the Bell Beaker that do not possess the characteristic funeral rite 'package'.

Although a trend towards individualization of the burials is documented at the end of the third millennium BC with some tombs containing the Bell Beaker 'package' and others lacking it, it is only at a few settlements that the two different Chalcolithic funerary rituals have been systematically documented (Blasco *et al.*, 2005; 2011). At many other sites, the information obtained was insufficient either as a result of the short-term nature of the occupation, due to a lack of burials or because the areas excavated did not contain burials.

Nevertheless, the aforementioned limitations do not prevent us from highlighting a number of relevant typological features of the burials present during the Bell Beaker period: in pits; funerary areas with small artificial caves and hypogea; artificial caves enclosed by stone and mud walls, etc.; number of human beings buried; differentiated Bell Beaker packages and other associated grave goods from the most recent discoveries, as well as the review of ancient records (Blasco, 1994; Blasco *et al.*, 1998; Garrido, 2000; Rojo *et al.*, 2005a, 2005b; Bueno *et al.*, 2007-8; Blasco *et al.*, 2011; Ríos, 2011; Flores & Garrido, 2014). Recent discoveries provide a very different view to those published several decades ago by professors G. Delibes (1977) and R. Harrison (1977) or R. Garrido (2000), where the individuality of burials was emphasised, but now requires a reassessment given what we now know about the complex social structures of Bell Beaker burial practices in Central Iberia (Bueno *et al.*, 2000; 2005; Blasco *et al.*, 2005; Liesau *et al.*, 2008).

However, apart from the typical pottery package and different copper artefacts, important Bell Beaker graves contain other grave goods such as V-perforated buttons that are generally recorded as '*bone pieces*' and occasionally described as made out of ivory (Harrison, 1977; Harrison & Gilman, 1977; Espadas *et al.*, 1987; Uscatescu, 1992).

Occasionally, the use of red pigments is also mentioned, although up to now little attention has been paid to it and, in practice, almost no analysis of its chemical composition has been carried out.

The purpose of this study is to present some of the research carried out on a number of buttons from a series of sites in Madrid region, as well as on the red pigment's chemical components, and to discuss their social use implications.

2. Material and methods

Several so-called 'bone' ornaments and red pigments recovered from Bell Beaker graves from different sites in Madrid were studied to determine the origin and characteristics of the raw materials from which they were made (Fig. 1):

- 2.1 At La Magdalena (Alcalá de Henares) several Bell Beaker burials were recently excavated (Heras *et al.*, 2011; 2014a) (Fig. 1.1). A V-perforated prismatic ivory button associated to a female burial has been documented and studied by Heras *et al.* (2014b) (Fig. 5.13). No further analysis has been published on this piece, but it is nonetheless included in the present discussion.
- 2.2 A sample of four buttons and ca. 23 beads from the site of Camino de Las Yeseras (San Fernando de Henares) were found in two Bell Beaker burials (Liesau *et al.*, 2008; Blasco *et al.*, 2009) (Fig. 1.2). The first one represents a primary burial in a hypogeum of a 16-18-year old individual (Área funeraria 2; A-36, El 03-III). Other Grave goods were found in this burial as a Ciempozuelos carinated bowl with symbolic decorations representing deer with and without antlers, therefore stags (with or without antlers) or females (hinds). Around this individual's skull two perforated gold plates were found as well as 20 tubular gold beads that could have been part of a hair-band or headdress (Blasco *et al.*, 2009; Vega *et al.*, 2010; Blasco & Ríos, 2010). Other grave goods found include three hemispherical V-perforated buttons (Fig. 5: 2-4), one of them found at the height of the legs. At least 23 'bone' beads were recovered after floating and sorting the sediment as they were not detected during the excavation process (Liesau & Moreno, 2012). Two hemispherical V buttons and seven beads were analyzed using Fourier transform infrared spectroscopy (FTIR) (Fig. 2.1, 2). One bead was analyzed using X-ray microtomography (μ -CT) (Fig. 2.3) and another one using Laser-induced breakdown spectroscopy (LIBS) (Fig. 2.5) as the Schreger pattern could not be observed, which does not necessarily exclude the possibility of this piece being made from ivory (Krzyszowska, 1990). A collective burial within a pit with scarce human remains of four individuals was also found at the site. It revealed a complex sequence of deposits and re-openings in order to extract the human bones, a process during which a great part of the pottery was partially broken.

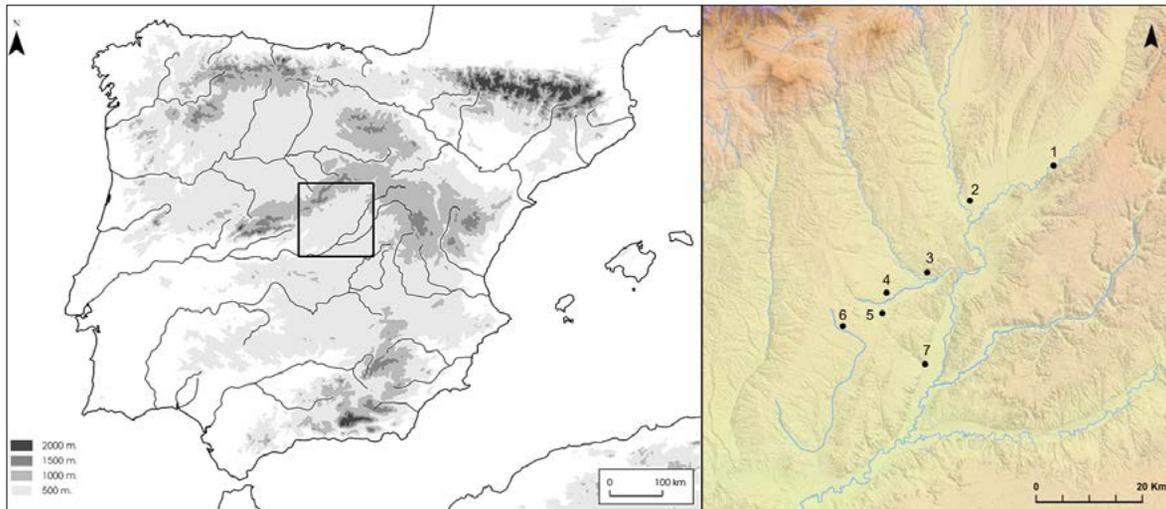


FIGURE 1. BELL BEAKER SITES IN CENTRAL IBERIA DISCUSSED IN THIS STUDY: 1. LA MAGDALENA (ALCALÁ DE HENARES) 2. CAMINO DE LAS YESERAS (SAN FERNANDO DE HENARES). 3. SALMEDINA (VILLA DE VALLECAS). 4. EL JUNCAL (GETAFE). 5. PEDAZO DEL MUERTO (PINTO). 6. HUMANEJOS (PARLA). 7. CUESTA DE LA REINA (CIEMPOZUELOS).

The structure was finally sealed with a dog sacrifice deposit in an interconnected pit. Both structures were filled with the same sediment and covered with a stone tumulus (Área 21, El 06) (Blasco *et al.*, 2009). A double perforated button was recovered from this pit's filling and it was analysed by several means, including FTIR and μ -CT (Liesau *et al.*, 2011) (Fig. 2.4), and the up-to-now unpublished results from the LIBS and PIGE analyses are presented in this study (Fig. 2.5, 6).

- 2.3 A reference to another site is being included, although no more detailed studies have been carried out on, but given its relevance due to its association with Bell Beaker inhumations, it will be also mentioned in the present discussion. The site is Salmedina (Villa de Vallecas) excavated by Berzosa & Flores (2005), in which another V perforated button was found in the site's pit 2, but was not analysed. (Fig. 1.3; Fig. 5.7).
- 2.4 A Chalcolithic ditched enclosure with Bell Beaker material in several pits was documented at the site of El Juncal (Getafe) (Fig. 1.4). One of these pits contained Bell Beaker material, but no human bones, as well as two V-perforated buttons with very small appendages (Fig. 6.7, 8). No analyses have yet been published (Martínez *et al.*, 2014: Fig. 4; 2015: Fig. 70).
- 2.5 Pedazo del Muerto (Pinto, Fig. 1.5) is another of the excavations in which an individual Bell Beaker burial with Ciempozuelos pottery and the presence of a perforated V button are noted (López Covacho *et al.*, 1996; Rodríguez Cifuentes, 2007: 55, Fig. 13). As no studies have been published on this subject matter, only a typological comment is included here.
- 2.6 Different pieces originating from various Bell Beaker funerary contexts within the Humanejos site (Parla) are being analyzed at present (Fig. 1.6) (Flores, 2011). Typologically-speaking they represent V-perforated tortuga buttons (Fig. 6.1, 2), biconical or olive necklace beads (Fig. 4.7-10), two hemispherical V buttons (Fig. 5.5, 6), one conical button with an upper flat surface (Fig. 5.10) recovered in a double inhumation with a rich Beaker package (Flores & Garrido, 2014 Fig. 3), and two toggles: a cylindrical pendant with an elevated perforation (Fig. 6.11), as well as another pendant with a central perforation (Fig. 6.14) (Liesau, 2012). A FTIR analysis was carried out on a conical piece located near a Palmela point (08/49/1/1853213) and on an olive-shaped bead (08/49/1/19383/7) (Fig. 4.7).
- 2.7 Three V-perforated buttons from an uncertain context, but linked to the famous Cuesta de la Reina of Ciempozuelos necropolis were found by R. Garrido at the Real Academia de la Historia (Garrido, 2000: Lámina 28: 4-6; Almagro *et al.*, 2004: 24) (Fig. 1.7). An examination of these pieces seems to confirm their importance, not just because they represent elements

appearing in these Bell Beaker burials, but also because of the FTIR results derived from the analysis of one of the pieces (no. 153) (Ríos & Liesau, 2011) (Fig. 5.1). The other ones are still under study (Fig. 5.9, 11).

The terminology used to describe the V buttons follows the criteria and typology set out by Uscatescu (1992). For the beads, Rodanés' (1987) criteria were applied.

Several non-destructive spectroscopies were performed by Dr. Arun Banerjee, head of the Incentivs Center (*Institut für Geowissenschaften*, University of Mainz, Germany) combining different techniques: Fourier transform infrared spectroscopy (FTIR); Isotope-ratio mass spectrometry (IRMS); and High resolution Micro-computer-tomography (μ -CT) (Banerjee, 2002; 2004; 2012, Liesau *et al.*, 2011).

One double-perforated button and one bead (Fig. 6.5 and Fig. 4.7) underwent a Laser-induced breakdown spectroscopy (LIBS) study to characterize the raw materials. The analysis was carried out at the SECYR laboratory at the Autonomous University of Madrid. Given that other μ -CT techniques (High Resolution Micro-Computer- Tomography) showed that the aforementioned button was not made from a proboscidean tusk (Liesau *et al.*, 2011), it also underwent a fluorine and sodium determination by PIGE (Particle Induced Gamma-ray Emission) at the CNRS-CEMHTI in Orleans (France). The fluorine content can be used as a marker to distinguish ivories from land-dwelling mammals (mammoth and elephant) from water-dwelling animals (walrus, hippopotamus, narwhal and sperm whale) as has already been done for Palaeolithic bone, antler and ivory objects (Müller & Reiche, 2011). The PIGE analysis methodology is described in Sastri *et al.* (2013), where this button sample is coded as S13-A in Table 1 (Banerjee, pers. comm.). The specific gravity of bead number 2 was also determined and that of the aforementioned button by means of the hydrostatics scale method, which was carried out by Prof. Rosario García (Geology Department, Autonomous University of Madrid).

Other findings, such as red pigments recovered from several Bell Beaker tombs, have been analyzed using EDX (SIDI, Autonomous University of Madrid) in order to determine their chemical composition. The aim of this analysis was to identify if the red pigments are ochre pigments based mainly on iron oxides, a common natural resource, or if other non-common ones, such as cinnabar were also found in Bell Beaker inhumations.

3. Results

10 samples from two graves at Camino de las Yeseras, a V-perforated button from Ciempozuelos and two samples from Humanejos underwent FTIR analyses in order to determine their raw-material composition. The spectra of nine of the samples from Camino de las Yeseras and two samples from Humanejos revealed *Elephas (Paleoxodon) antiquus* characteristics, the forest elephant (Fig. 2.1), and only one small fragment of *Loxodonta africana*, ivory from the African elephant, coming from the individual grave of Camino de Las Yeseras (Fig. 2.2) (Liesau & Moreno, 2012). The African elephant raw material was also used to produce one of the ivory buttons from La Magdalena and Ciempozuelos.

On the other hand, the FTIR analysis of the button with small appendages from Camino de las Yeseras revealed it to be made from sperm whale (*Physeter macrocephalus*) ivory. Due to the fact that this was going to be the first evidence of a button made from sperm whale in the Iberian Peninsula inland, it was of uttermost importance to demonstrate the authenticity of this raw material within the Bell Beaker horizon. For this reason the piece underwent various μ -CT tests in order to compare the histological structure of the tissue with that of one bead made on forest elephant tusk (Fig. 2.3, 4). Fig. 2.3 shows the homogenous tissue of the bead without pores, but showing growing lines, typical of proboscidean ivory. Otherwise, the structure of the button in Fig. 2.4 does not reveal growing lines, but a dense tissue and some pores. Additionally, the LIBS spectrum reveals the differences

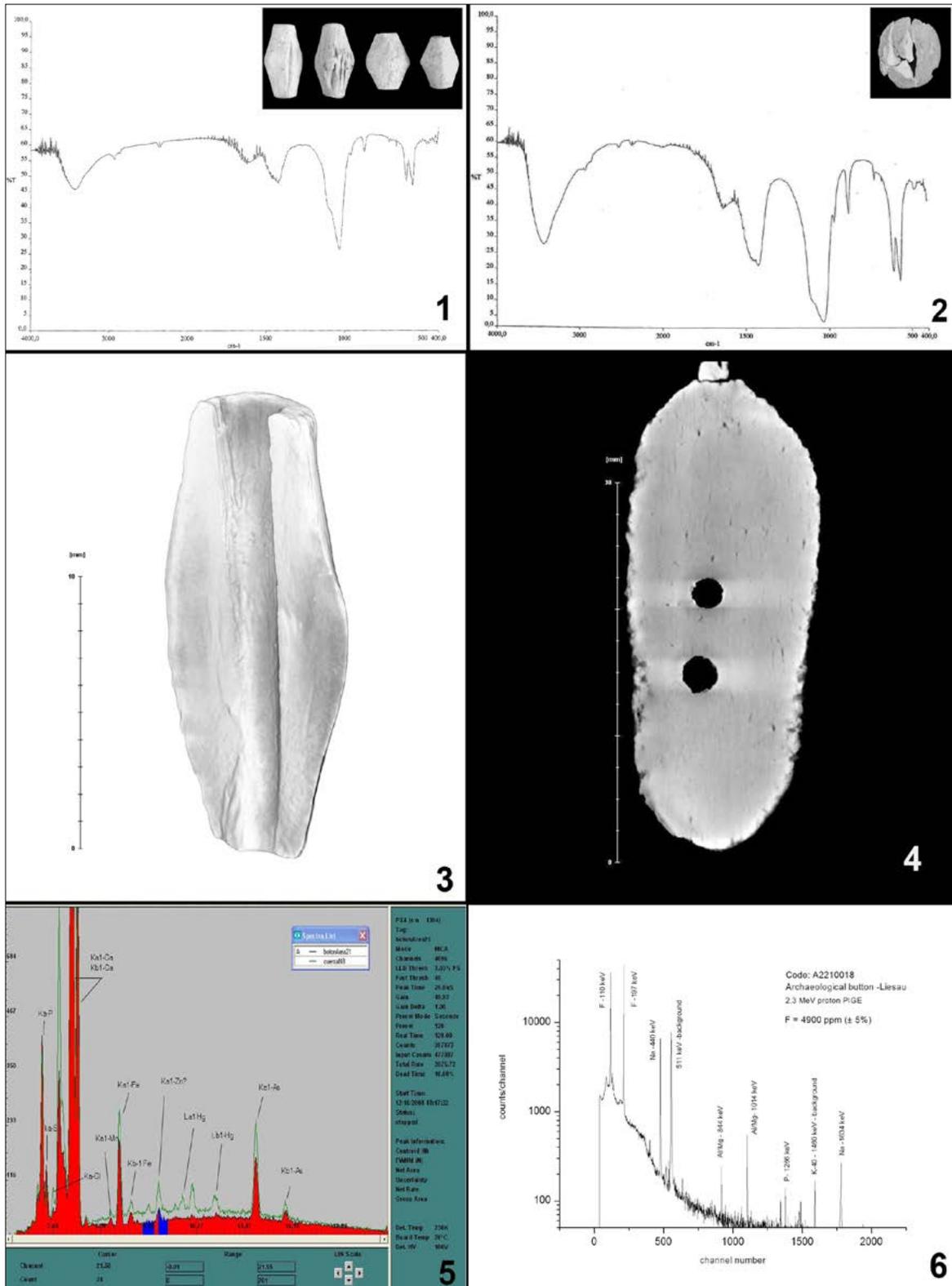


FIGURE 2. 1. FTIR SPECTRUM OBTAINED FROM BEADS MADE OF FOREST ELEPHANT IVORY. 2. FTIR SPECTRUM OBTAINED FROM BEADS MADE OF AFRICAN STEPPE ELEPHANT IVORY. 3. MICRO-CT SHOWING DENTINE GROWTH LINES AND CYLINDRICAL PERFORATION OF A BEAD MADE OF FOREST ELEPHANT. 4. μ -CT REVEALING NO GROWTH LINES, BUT ISOLATED PORES OF A DOUBLE PERFORATED BUTTON MADE OF SPERM WHALE. 5. LIBS SPECTRUM OF BEAD NO. 1 FROM FIG. 4 (GREEN) (FOREST ELEPHANT) AND THE DOUBLE PERFORATED BUTTON (RED). 6. PIGE SPECTRUM OF THE DOUBLE-PERFORATED BUTTON FROM FIG. 6.5. WITH A HIGH FLUORINE CONTENT, CHARACTERISTIC OF MARINE IVORY.

between the two raw materials, based on a bead made from forest elephant tusk and the sperm whale button (Fig. 2.5), where both are made of chlorapatite, but the button has a higher chloride value. Its specific gravity is also higher (2.09) than that of the forest elephant bead (2.01). Finally, the PIGE spectrum also detected a high fluorine content, characteristic of aquatic ivories such as that of the sperm whale (Fig. 2.6).

The chemical composition of the red pigments recovered from several Bell Beaker tombs, revealed traces of cinnabar on the flat surfaces of V-perforated buttons (Ciempozuelos, Camino de Las Yeseras), on pottery sherds (Camino de Las Yeseras) as well as from grave goods and from sediment in contact with the skeletons (Humanejos, La Magdalena).

4. Discussion

The possibility of being able to identify the raw material on which these pieces were made by means of archaeometric analyses has set forth a very promising new line of investigation and interpretation. This is important if we are to attain better knowledge on the western Bell Beaker phenomenon in the Iberian Peninsula, in which V buttons as grave goods are possibly as relevant there as the bow-shaped pendants are in Central Europe. Three highly interesting questions are relevant for this discussion:

- 4.1- The taxonomic origin of the raw materials.
- 4.2- The most feasible exchange routes of the raw materials or finished pieces.
- 4.3- The symbolic and social role that this type of pieces could have had as grave goods.

4.1- The taxonomic origin of the raw materials. Although the existence of pieces made out of ivory in the Iberian Peninsula has long been accepted (Siret & Siret, 1890; Castillo, 1928; Leisner & Leisner, 1943; 1956; Harrison & Gilman, 1977; Harrison, 1977; Pascual, 1995), as a result of the most recent studies a great variety of ivories have been identified, such as: forest elephant (*Elephas (Paleoloxodon) antiquus*), African elephant (*Loxodonta africana*) and Asian elephant (*Elephas maximus*) (Banerjee *et al.*, 2012; Schuhmacher, 2012).

For central Iberia, one of the most interesting results derived from our studies has been the identification of ancient elephant ivory found at two different sites (Camino de Las Yeseras and Humanejos). These finds reveal the use of fossil ivory given that this taxon disappeared from Europe during the late Pleistocene (c. 35/33,000 years ago) (Fig. 3.1). Due to the fragility of this fossil material, it was

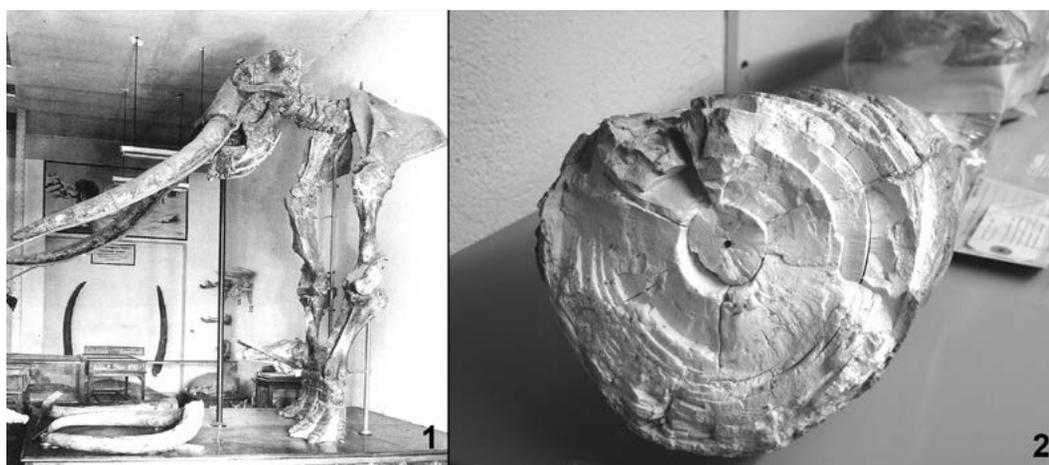


FIGURE 3. 1. PARTIAL RECONSTRUCTION OF THE SKELETON OF A FOREST ELEPHANT (*ÉLEPHAS (PALEOLOXODON) ANTIQUUS*) RECOVERED FROM THE SECOND TERRACE OF THE MANZANARES RIVER IN TRANSFESA (VILLAVERDE BAJO). *MUSEO NACIONAL DE CIENCIAS NATURALES*. PHOTOGRAPH TAKEN FROM AGUIRRE (1995. FIG. 17.21).
2. DETAIL OF A FOSSIL IVORY FROM A PROBOSCIDEAN TUSK FROM ARRIAGA, SALMEDINA 1 IN THE *MUSEO DE LOS ORÍGENES SAN ISIDRO*, MADRID.

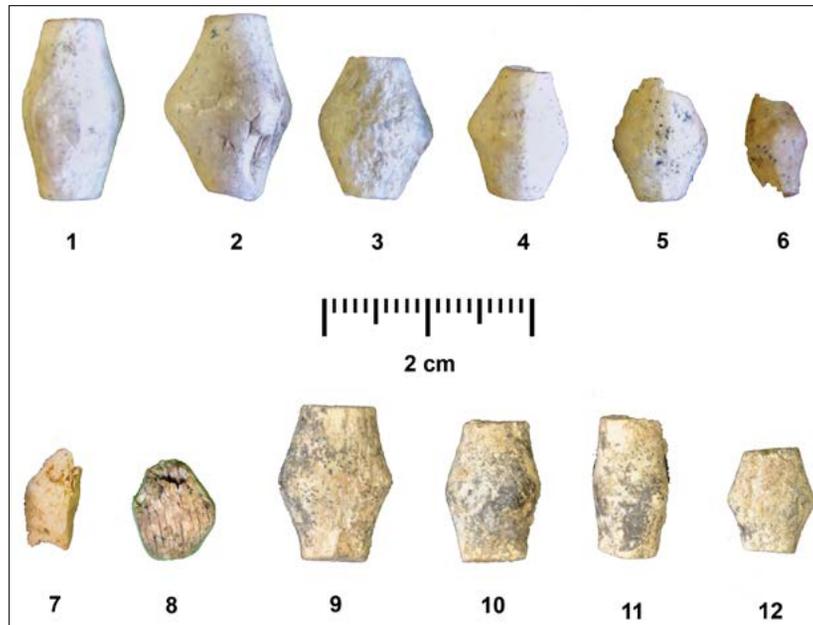


FIGURE 4. OLIVE-SHAPE AND BICONICAL BEADS MADE OF FOREST ELEPHANT IVORY (1-7). 1-6 SELECTION OF WELL-PRESERVED BEADS FROM ONE INDIVIDUAL BELL BEAKER GRAVE IN A HYPOGEUM AT CAMINO DE LAS YESERAS (A-36, III). 7-12 SELECTION OF SOME IVORY BEADS FOUND IN TWO BELL BEAKER TOMBS AT HUMANEJOS: 7-8 OLIVE-SHAPE BEADS USED AS A NECKLACE FOUND IN A SINGLE GRAVE (UE 19383); 9-12 BICONICAL BEADS FROM A DOUBLE GRAVE (UE1853) FOUND INSIDE A CARINATED BOWL.

argued that this type of ivory was not suitable for the manufacture of objects and was therefore ruled out by some authors (Goetze, 1925; 87; Penimann, 1952; Spindler, 1981: 99), even as recently as 2007 (Schuhmacher & Cardoso, 2007: 112). Nevertheless, archaeological evidence recovered from Bell Beaker tombs indicates that some well-preserved ivory tusks were used to manufacture many small ornaments such as beads or buttons (Ríos & Liesau, 2011; Liesau *et al.*, 2011; Liesau & Moreno, 2012) (Fig. 4). In the middle Tagus basin, and especially in the Madrid region, the wealth of palaeontological remains is very high; besides mastodon remains, elephants are also found very frequently in the Quaternary sediments of the Manzanares and Jarama rivers (Aguirre, 1995; Mazo, 2000; Sesé & Soto, 2002; Panera & Rubio, 2002). Although many other resources were exploited in our region during the Chalcolithic as flint, salt, granite, copper, forest elephant ivory was until jet ignored. But this type of ivory resource are actually frequent where Bell Beaker occupations and burials have been excavated such as at Ciempozuelos, San Isidro, Las Carolinas, El Ventorro, Camino de las Yeseras, Salmedina, etc. and could possibly have been accessible occasionally as a result of erosion phenomena in the lower terraces of the Tagus' tributaries (Fig. 3.2).

Another kind of proboscidean dentine identified amongst Bell Beaker grave goods is that of the African steppe elephant (Ciempozuelos and Camino de las Yeseras). A prismatic button found at a Bell Beaker burial in La Magdalena is the latest known find made on this kind of material (Heras *et al.*, 2014b). This raw material is, without a doubt, not indigenous in origin.

The Madrid region, in contrast to most part of the Iberian Peninsula, also has a large amount of other extinct taxa, such as the mammoth (Mazo, 2000; Liesau & Corona, 2002; Sesé & Soto, 2002; Álvarez-Lao & García, 2012), although the use of its tusks as raw material has not yet been confirmed.

Besides these proboscidean ivories, a button from the Camino de las Yeseras site is made out of a sperm whale tooth, which clearly reveals the use of a great variety of raw materials during the Bell

Beaker horizon; within the same site artefacts made from the mammal dentine corresponding to three specimens from three different origins has been noted. This fact leads us onto the second question for discussion on the origin of the raw material or pieces.

4.2- The most feasible exchange routes of the raw materials or finished pieces related to the arrival of African ivory to the Iberian Peninsula were postulated a long time ago. Alberto del Castillo put forward the idea that it was quite possible that the Guadalquivir inhabitants monopolized the exchange of copper as a high-value item directly with Africa, or that the ivory and other objects were coming from another exchange network from the Portuguese region: *'las gentes del Guadalquivir, que posiblemente monopolizaban el precioso metal, el cobre, ... intercambian directamente con África o les llegan los marfiles y otros objetos desde Portugal'* (Castillo, 1928: 47). Other researchers suggest that there was an increasing demand from Bell Beaker groups to obtain prestigious materials (Harrison & Gilman, 1977, 19, Harrison, 1977: 39-40, Poyato, 1989; Pascual, 1995). As the sites of the Madrid area are quite far away from the Mediterranean coast as well as from the Atlantic Ocean, -a minimum of 400-600 km-, the arrival of raw material or manufactured pieces from Africa or sperm whale teeth from coastal sites called for long distance exchange networks.

A sperm whale's life and food supply take place at sea in deep water, sometimes deeper than 1000 m. This means that their life normally takes place far away from the coast line for them to go up to breathe (Fernández-Casado, 2000). Their capture during prehistory, although highly doubted, does not mean that these big mammals were not well-known at the time; their noisy puffs as well as the hard blows from their tails and characteristic powerful water propulsion is thought by Cassen & Vaquero (2003) to be reflected in megalithic Atlantic engravings. Regardless of the debate on the depictions of cetaceans, there was a deliberate exploitation of beached whales. The archaeological register of coast sites near the Atlantic or the Mediterranean reveals that their teeth and other skeleton parts were used for several purposes, documented in Zambujal, Leceia, Fuente Álamo, Las Caldas, La Vital and Nerja cave. Some pieces present traces of butchering, other have been made into artefacts or barnacles were recorded in the archaeological register, so it is clear that the coastal communities profited from those beached whales (Driesch & Boessneck, 1976: 96; Cardoso, 1995; Manhart *et al.*, 2001: 349; Maicas, 2007:112; Corchón & Álvarez-Fernández, 2008; Iborra & López, 2011; Álvarez-Fernández *et al.*, 2013).

Due to the fact that their teeth are similar to those of proboscideans, their bright colour, hardness and density make them an attractive raw material for the manufacture of artefacts (Espinoza & Mann, 1993; Kokabi, 1997; Caubet & Gaborit-Chopin, 2004; Locke, 2008). At several Chalcolithic Portuguese sites the manufacture of V buttons made from whale teeth were confirmed in almost 17 pieces (Schuhmacher *et al.*, 2013). These results indicate that this material could have been a more frequently used raw material than was initially thought, and that the need to identify dentines is highly important in order to understand these high- or low-scale exchange networks.

Based on the aforementioned results on the Bell Beaker beads and buttons made of 'bone' material, these data provide a very wide and varied information on the taxonomy and resources affecting areas that are far away from the coast, as is the case of the Madrid region. Future isotopic studies of the material could confirm whether the forest elephant ivory has a local or a foreign origin. If it were to originate from local exploitations, this until-now unknown resource will add further value to some of the Bell Beaker occupations and their relevance in relationship to their exchange capacity. Besides, these items reveal an elitist characteristic of grave goods, as they are frequently associated to tombs that contain copper artefacts, gold pieces or cinnabar used in burial ceremonies.

Although the Peninsula workshops that can be clearly linked to a specialized production within the Bell Beaker horizon are still unknown, some Chalcolithic pre-Bell Beaker sites such as Valencina de la Concepción (Seville) have been documented (Nocete *et al.*, 2013; García Sanjuán *et al.*, 2013b). Others corresponding to the Bronze Age are also known such as El Quintanar and El Acequión

in Albacete, Mola d'Agres (Alicante), Illeta dels Banyets (Alicante) or Fuente Álamo (Almería) (Fernández Miranda *et al.*, 1994; Barciela, 2012; Pascual, 2012; López-Padilla, 2012; Liesau & Schuhmacher, 2012).

4.3- In terms of the symbolic and social role that these ivory pieces recovered in Bell Beaker tombs can reveal, it is worth reflecting on their typology and contexts in order to get to know their social or symbolic relevance.

4.3.1 What do the typologies recovered in the funerary record add to our understanding of them?

With the exception of a number of rhomboidal and other beads with central nodes, most of the pieces recovered at Camino de las Yeseras present a more conventional shape than those defined as *olive or biconical beads*, depending on the extent to which they present a more or less marked central rim. Their morphology varies according to their size and the kinds of raw materials they were made of, the extent to which they are eroded, as well as the drilling technique used. Whereas those pieces described as *olive-shaped beads* have a clear precedent in the Neolithic pieces manufactured on hard rocks, the biconical ones seem to be frequently assigned to the Chalcolithic and more specifically to the Bell Beaker horizon, although they are known to last until the Bronze Age (Pérez Arrondo & López de Calle, 1986: 131; Rodanés, 1987:142). Their presence in the Iberian Peninsula is hardly homogeneous, and as the aforementioned authors indicate, are rare in the Ebro basin and in the north (Guitart, 1986; Carmona, 2013) and better represented in east Iberia and in Lower Tagus records, where they were made of stone and other organic materials, although the ones made out of 'bone' do not appear very frequently (Pascual, 1998: 124; Leisner & Leisner, 1956: Taf. 15, 23, 39; Spindler, 1981: Taf. 29-30; Gonçalves, 2005:110).

The peculiarity of the biconical beads with nodes, which is a less common characteristic of Chalcolithic beads, points in the direction of the Madrid region as the origin of these samples; due to their raw material, typology and size we propose a local workshop or working area similar to the one at Camino de las Yeseras and Humanejos (Fig. 4). There is no doubt that this kind of larger scale production took place, as it is present in the bead collection in one tomb at Camino de las Yeseras and four tombs at Humanejos (Flores pers. comm.). The total number of pieces for the two sites exceeds 50, which fills up a relevant geographical blank in relationship to other Iberian ivory records.

A similar situation is noted with regard to the V-perforated buttons. In the past few years new finds have multiplied as well as their variants. **Hemispherical V buttons** were considered the oldest types and assigned to the eastern Pyrenees area (Arnal, 1954: 267; Guilaine, 1963: 824). Their distribution within the Peninsula is widespread although until quite recently they were better known in the peripheral areas of the Peninsula than in the interior (Fig. 5.8), although they are not always common (Barandiarán, 1978: 415; Pérez Arrondo & López de Calle, 1986: 168; Schüle, 1980: Taf. 1; Rodanés, 1987: 157; Uscatescu, 1992: 55-57; Pascual, 1995: 169; Maicas, 2007: 170; Espadas *et al.*, 1987; Garrido *et al.* 2005: 425).

However, during the most recent excavations, their scant appearance within the Madrid area seems to be more a reflection of a lack of research, and not a real absence of these kinds of pieces as the finds at Ciempozuelos (1), Camino de las Yeseras (3), Pedazo del Muerto (1), Humanejos (3) and Salmedina (1) have shown (Fig. 5.1-7).

Conic-type V buttons are predominant all across Europe, including the British Isles (Arnal, 1973; Lemerrier, 2004: 383; Salanova, 2005: 23; Kern, 2006; Shepherd, 2009). There are two pieces from Ciempozuelos, the second one defined as 'tronconical' (Garrido, 2000: 191). A recent review of this piece (no. 151), shows that the button presents a typical striated and rough surface that does not match the rest of the well-performed button surfaces (lower basal and apical zone). This could most likely reflect the most typical lamination or exfoliation pattern of the ivory growing bands due to the loss of collagen fibers that keep them joined. It is likely that this button was originally planned to be

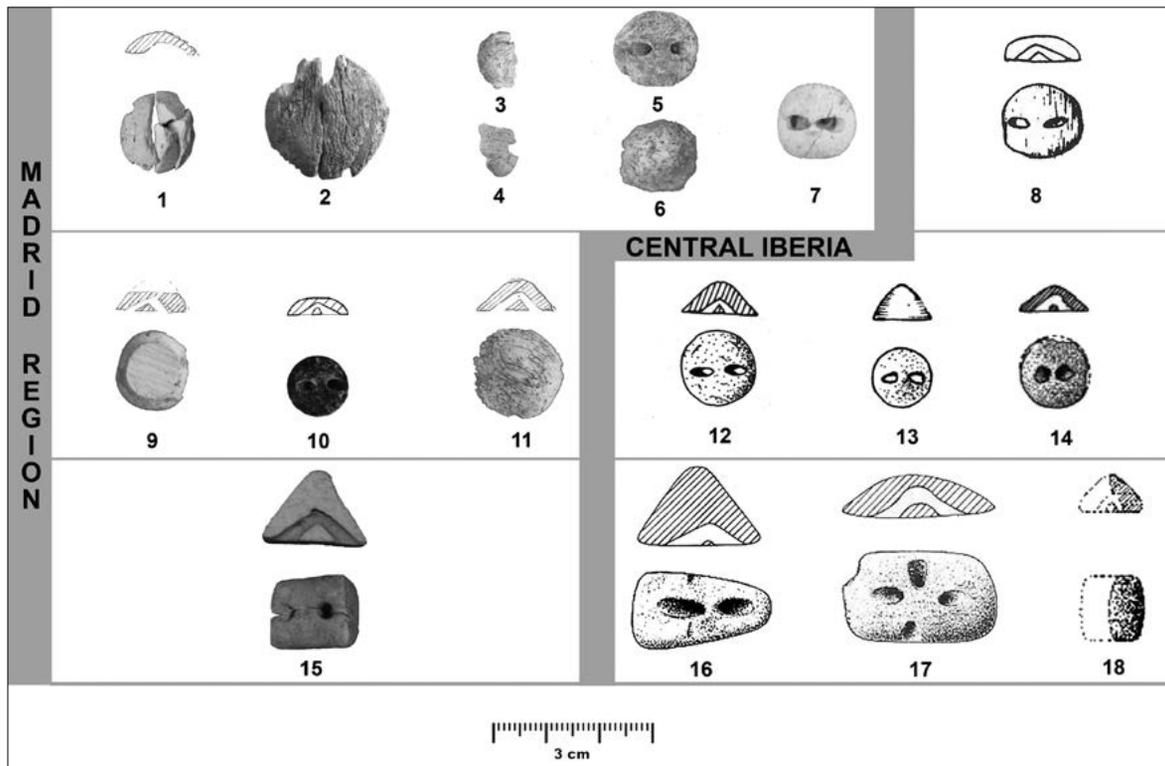


FIGURE 5. TYPES OF IVORY BUTTONS FROM CENTRAL IBERIA: 1-8. HEMISPHERICAL V-PERFORATED BUTTONS. 1. CIEMPOZUELOS. 2-4. CAMINO DE LAS YESERAS. 5-6. HUMANEJOS. 7. SALMEDINA. 8. EL CASTELLÓN (CIUDAD REAL). 9-10. CONICAL TYPES WITH A FLAT APICAL SURFACE: 9. CIEMPOZUELOS. 10. HUMANEJOS. 11-14. CONICAL V-PERFORATED BUTTONS: 11. CIEMPOZUELOS. 12. TABLADA DE RUDRÓN. 13. VILLABUENA DEL PUENTE. 14. EL HUNDIDO. 15-18. PRISMATIC V-PERFORATED BUTTONS. 15. LA MAGDALENA. 16-17. LAS ARNILLAS. 18. LA SIMA.

conical in shape, and was also used after fragmentation as the polished use wear upper zone shows (Fig. 5.9). Others, however, also reveal a flat surface on their apical zone, possibly due to the initial thin plate of the raw material, like the V button from Humanejos (Fig. 5.10).

The conical types appear more frequently in some areas of the Iberian Peninsula than others, such as within the Ebro basin and the Tagus estuary; they are, however, scarce in the Meseta, as the two examples from Burgos, Tablada de Rudrón (Fig. 5.12) and El Hundido (Fig. 5.14), as the one from Villabuena del Puente (Zamora) (Fig. 5.13) show (Campillo, 1985:65-66; Delibes, 1977: 76; Alonso, 2013: lámina 2.2). In the east and southeast of Iberia they appear occasionally within Bell Beaker contexts (Pascual, 1995; Maicas, 2007). It is, after all, not until the Middle Bronze Age when big and ostentatious pieces such as those recovered at El Acequión (Albacete) (Fernández Miranda *et al.*, 1994: 267) or Los Molinos de Papel (Murcia) (López-Padilla, 2011: 469) developed.

Another original type for the Madrid region is a **prismatic V button** recovered from La Magdalena (Heras *et al.*, 2014b) (Fig. 5.15). The fact that this piece is being associated to an individual female inhumation is very interesting, as for the first time there is evidence of this type of grave good being linked to a woman given that buttons in Iberia were normally associated with males (Camino de las Yeseras, Humanejos). Whereas they are scarce in the Meseta, they have been recovered from Neolithic sites such as Las Arnillas dolmen (Burgos) (Delibes *et al.*, 1986: 27) (Fig. 5.16), La Sima tumulus (Soria) (Garrido *et al.*, 2005:432) (Fig. 5.18) as well as from the Bronze Age settlement of El Castillo de Cardeñosa (Ávila) (Naranjo, 1984: Fig. 8.1). This type is quite widespread in the whole of

the Peninsula and presents a great development at the beginning of the Bronze Age in the Ebro valley and eastern Iberia (Rodanés, 1987: 159-161; Pascual, 1995; López-Padilla, 2011: 469).

One **tortuga button** found at Humanejos is, up to now, the only piece of this type found in the Madrid region presenting trapezoidal appendages, whereas the other piece cannot be well classified as its side was damaged during excavation (Fig. 6.1, 2). Both buttons are badly preserved and were found alongside an important set of beads and buttons roughly lined up inside a carinated bowl, some of them aligned, perhaps even fixed to an organic bracket or textile, whereas others were spread inside and one was placed under the bowl.

As has been noted by some authors, the *tortuga button* term has been much generalized to include all types of appendages, regardless of their size and shape, when larger ones, termed *ribbon type or papillon*, should be distinguished from those that present very small appendages (Types XIII, XIV with respect to XI and XII in Uscatescu 1992; Gonçalves, 2005:110; Pau, 2012: 71). In this case too, the samples from the peripheral areas of the Peninsula and especially the north- and south-eastern regions of France are better known (Arnal, 1954: Fig. 6; Guilaine, 1963: Fig. 1; 1967: 83; L'Helgouach, 1984: Fig. 6), although they also frequently appear in the Ebro valley (Vilaseca, 1952: Lámina II; Rodanés, 1987: 163), as well as in the southeast (Maicas, 2007: 170; Altamirano, 2014: Fig. 14: 4) (Fig. 6.4). However, when a large number and variety of them are found these are generally recovered from fortified settlements and cemeteries by the Tagus estuary (Paço, 1960; Leisner & Leisner, 1959; Gonçalves, 2005).

With regard to the buttons with small appendages, one of the pieces from Camino de Las Yeseras with a double perforation, perhaps resulting from the thinness of the piece (2,7 mm), fits well within this type given that its morphology is in accordance with the well-designed kind frequently documented within the Tagus estuary (Ríos & Liesau, 2011; Liesau & Moreno, 2012) (Fig. 6.3). One of the Vila Nova de S. Pedro buttons found is very similar to our sample (Fig. 6.6) (Paço 1960, Fig. 5, 2; Harrison 1977: 85; Varela 2005: 194), whereas other chalcolithic sites such as the Pedra de Ouro or Cabeço da Arruda II cemetery are also relevant thanks to the amount of similar types found (Leisner & Schubart, 1966; Fernandes & Barreto, 2005: 121). From another recently excavation in Madrid, El Juncal, two new finds with very small appendages like the Portuguese ones were found in a Bell Beaker pit (Fig. 6.7, 8), although a very similar piece made of ivory was also recovered from Vilanova de São Pedro (Fig. 6.9) or tomb number 3 of Los Millares (Fig. 6.10).

Meanwhile the typological affiliation with the Portuguese samples seems clear; the marine origin of the Camino de las Yeseras button suggests that this piece could have been manufactured in the Tagus estuary where the chronology is for sure among the most ancient for the western Bell Beakers, although it is clear that contacts with south and east Iberia during this horizon cannot be dismissed.

Another new type corresponding to the Madrid area is that of the **toggles**: a cylindrical pendant with an elevated perforation, extremely well-preserved, and a perforated piece made out of antler, both belonging to the Humanejos Bell Beaker male burials (UE 455, currently under study) (Fig. 6.11, 14). Both are exceptional types within the Peninsula. Of the first kind, there are only a few examples from Los Millares (Almería), La Encantada, Almizaraque (Almería) (Leisner & Leisner, 1943: Taf. 28, 22); one of them was in the process of being manufactured (Maicas, 2007:179). Another piece was recovered from an ancient excavation at Villa Filomena (Castellón) (Fig. 6.12) where it had already been linked to British Bell Beaker grave goods as well as to the Tagus estuary and its connection to the Atlantic (Pascual, 1998; Soler, 2013: 44-45); and similar types, such as the *arciform* pendants that are related to Bell Beaker contexts and interpreted as being pendants or buttons (Pascual, 2011a: 216). Finally, a piece made from deer antler with a central cylindrical perforation recovered from the aforementioned Bell Beaker grave is also a type very similar to a piece found at Vila Nova de São Pedro, although the raw material from which it was made is unknown to us (Paço, 1960, Varela, 2005) (Fig. 6.10).

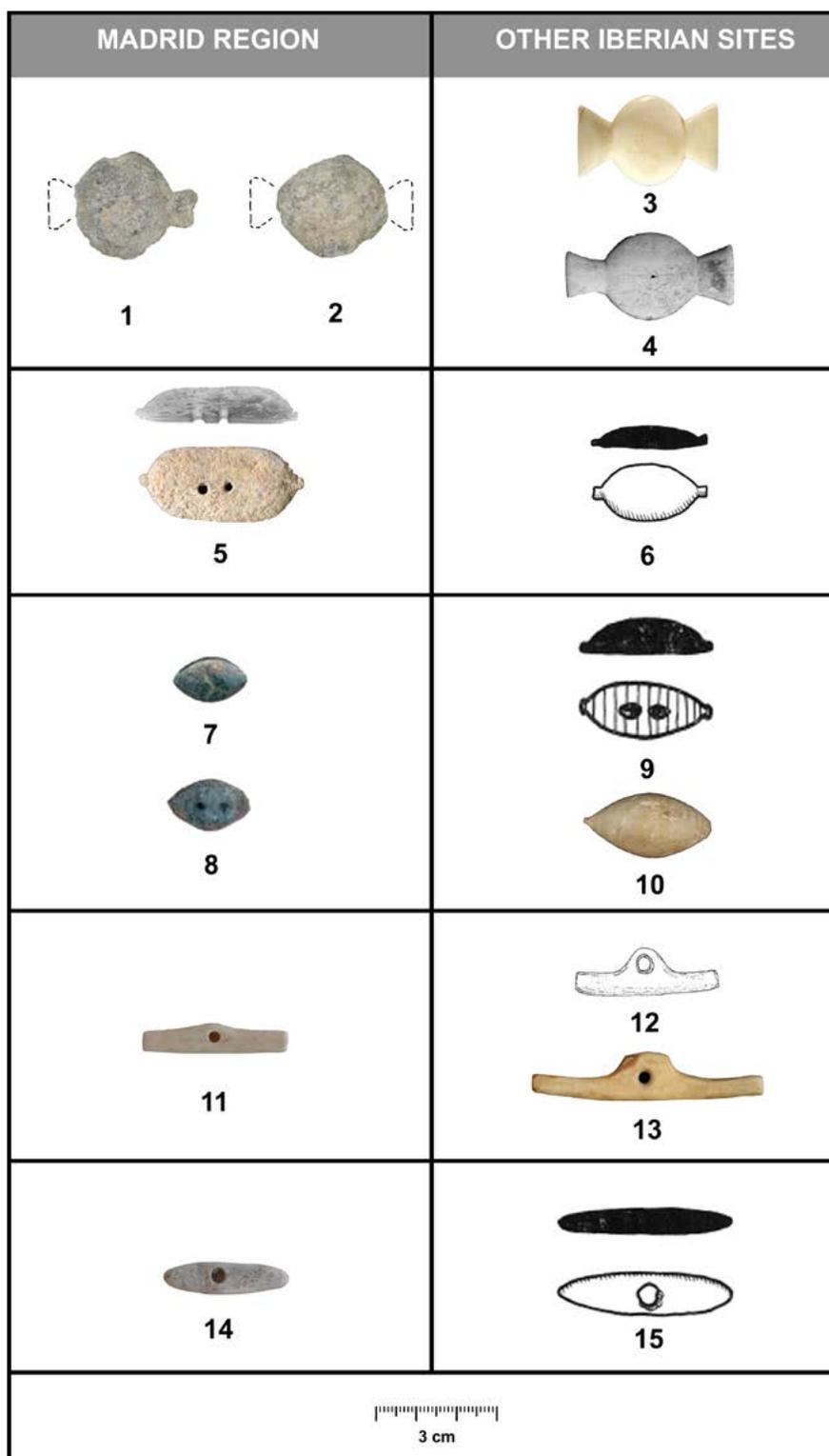


FIGURE 6. IVORY, ANTLER, SPERM WHALE, OR BONE BUTTONS/TOGGLES FROM BELL BEAKER CONTEXTS IN THE MADRID REGION AND OTHER IBERIAN SITES: 1-2. *TORTUGA* BUTTONS OR *PAPILLON* FROM HUMANEJOS (IVORY) COMPARED TO 3. FROM S. PEDRO DO ESTORIL (AFTER GONÇALVES, 2005, FIG. 7.26) AND 4. LOS CASTILLEJOS (AFTER ALTAMIRANO, 2014, FIG. 14.3). 5. *TORTUGA* BUTTON WITH SMALL APPENDAGES FROM CAMINO DE LAS YESERAS, SIMILAR IN DESIGN TO NO. 6 FROM VILANOVA DE S. PEDRO (PAÇO, 1960, FIG. 5, 6). 7-8. ELLIPTICAL OR SIMPLE *TORTUGA* BUTTONS FROM EL JUNCAL (MARTÍNEZ *ET AL.*, 2015: FIG. 70). 9. ELLIPTICAL BUTTON WITH SMALL APENDAGES FROM VILANOVA DE S. PEDRO (PAÇO, 1960, FIG. 5, 12). 10. ELLIPTICAL BUTTON WITH SMALL APPENDAGES FROM LOS MILLARES (MAN: 1976/1/MILL/3/8). TOGGLES: 11. HUMANEJOS. 12. LA FILOMENA (AFTER PASCUAL, 1998, FIG. 156). 13. ALMIZARAQUE (MAN: 1984/172/3). 14. HUMANEJOS. 15. VILANOVA DE S. PEDRO (PAÇO, 1960, FIG. 5.2).

Therefore, the Madrid area was also the recipient of different types of pieces and raw materials. Of all of the analyzed pieces, except the one made out of antler, none corresponds to a ‘mammal bone’, which is what was traditionally assumed.

4.3.2 What do raw materials and typologies add to social relevance in funerary contexts?

We are here dealing with raw materials carefully selected for their color, texture and shiny surfaces, and not just foreign materials, but also fossil ones. Although V perforations have Neolithic origins, it is from the Chalcolithic onwards that this complex V perforation became widespread (Arnal, 1973: 225) and was most definitely made by means of copper awls with a quadrangular section (Andrés, 1981: 162), even in very thin buttons. Taking into account the fragility of their bridge and the deliberate attempt at hiding the fixing modus of the piece, this allows us to emphasize two interesting features:

- The intentional way in which the raw material’s exoticism or nobility is exhibited.
- The representation of complex geometrical shapes that, apart from different tastes or fashions, could also be linked to social status, lineage, role within the community or gender. In general, V buttons in the Bell Beaker graves of the Madrid region continue to be scarce, and rescue excavations are not particularly good at recovering them, but when they do appear they are usually associated with wealthy grave goods, generally in male graves with a high number and a varied set of pottery, but also containing cinnabar and copper as gold pieces (Salmedina, Humanejos and Camino de las Yeseras). The inclusion of beads, some of them belonging to necklaces, are also noted and complete the ‘Bell Beaker package’ for relevant individuals.
- The word constraints for the present contribution prevent us from discussing the possible functionality of the buttons, their location; however, in these unaltered tombs require some discussion. Whereas the beads were placed around the person’s neck in some of the graves, others were combined with buttons, perhaps sewn onto a cloak that covered the pottery set or fixed to a belt made of a textile or leather piece (Humanejos). A button at La Magdalena was recovered close to the nose or mouth of a female, which was probably attached to a cloak, while at Camino de las Yeseras another button was placed between the male’s legs, which could suggest that it was part of the leggings or gaiters worn by the individual, as was suggested for some British burials (Shepherd, 2009: 346).

Unfortunately, the chronological ascription for the different types cannot be established for all of the sites. At Camino de las Yeseras the individual grave, not just the skeleton, but also the ivory beads and buttons lack the sufficient amount of collagen for them to be dated, while the button with small appendages does, which, as was previously noted, comes from a collective grave, and its dates range between 4004±30 BP, 2580-2460 cal BC (Ua-39310) and 3752±30, 2290-2110 cal BC (Ua-39309) (Liesau *et al.*, 2008; Ríos, 2011: 83). The Humanejos Bell Beaker graves are luckily better preserved, as well as being closed contexts in which a male in his 40s (UE 1853) was buried and was associated to rich Bell Beaker grave goods (halberd, Palmela point, hemispherical and Tortuga buttons as well as a large amount of biconical ivory beads). This individual has been dated to 3917±33 BP; 2470-2340 cal BC (Ua-43524). Another Humanejos inhumation (UE 1938) corresponds to an adult male between 25 and 35 years old; around his neck a series of spherical and olive beads, probably made of ivory, have been documented. This grave has provided a date of 3875±31 BP; 2470-2280 cal BC (Ua-423526). To conclude, the synchronic combination in Bell Beaker funerary records of hemispherical V buttons with biconical or olive beads (Camino de las Yeseras), as well as biconical beads, hemispherical and tortuga buttons (Humanejos), corresponding to quite an ancient Bell Beaker Ciempozuelos style can be confirmed based on the aforementioned data.

It must definitely be highlighted that all these items could be easily transported and exchanged. This fact has contributed, without a doubt, to their western European diffusion, continental and maritime. The tortuga and hemispherical V buttons, biconical beads and the toggles reflect interregional

interaction that is related to the Chalcolithic settlements by the Tagus estuary, where these kinds of pieces are highly abundant. In terms of the raw materials –sperm whale and African elephant ivory – the connection along the Tagus basin seems also to point to this exchange network, but the arrival of pieces from the interior from within the Los Millares circle, using natural paths connecting the north and south of the Iberian Peninsula, cannot be dismissed.

A good example of the circulation of ornaments and buttons is represented by the varied types recovered from Mediterranean Bell Beaker and Bronze Age graves, in which production centres could have been established, such as in the Balearic Islands or Sardinia (Uscatescu, 1992; Ugas, 1998; Pau, 2012; 2013). However, no analysis of their respective raw materials have been performed; the majority of them have been identified as vertebrates' bone and teeth, deer antler, shells, but also some of them as *ivory*. These raw materials should be analysed in detail as their interpretation is relevant to our understanding of the exchange networks. Additionally, it is very important to check whether sperm whale's teeth were used in Bell Beaker productions as a great interest in and increasing development of ornament manufacture using fossil materials have been documented for the Atlantic as well as for the Mediterranean Sea at this time (Leisner & Schubart, 1966; Pascual, 2011b) and during the Bronze Age (Liesau & Schuhmacher, 2012).

According to some authors' old statements, such as Arnal (1973: 225) is that it is since the Chalcolithic period that V-buttons in Central and Western Europe became widespread, especially during the Bell Beaker period, a time in *which ivory and Bell Beaker materials are connected* (Harrison, 1977: 39). Could some of the Mediterranean islands have access to a broader exploitation of several raw material resources that include sperm whale teeth and therefore developed a more specialized handicraft in relation to these items?

For the Mediterranean islands another interesting aspect that complicates our interpretations on the origin of the raw materials resources needs to be highlighted. On islands such as Sardinia, Sicily or Malta there are also other potential suppliers of dentins, such as the pygmy elephant and hippopotamus, as well as other fossils (Oakley, 1975; Davis, 1985; Pérez Ripoll, 2002). Although these animals were extinct, some well-preserved incisors or canines could have been used for the manufacture of ornaments, or brought to the Iberian Peninsula.

Given that it seems that V-shaped buttons and other ornaments like beads are also objects of high value in the Bell beaker package, it would be interesting to carry out similar studies on different collections in well-dated Bell Beaker tombs. It would also be interesting to review V-perforated bone-like buttons such as the bow-shaped pendants in Continental Europe in order to determine if the latter were all made of boar tusks, or if some of them were made of ivory, and in what kind of possible exchange routes they were involved in, as Mediterranean shells in the Bell Beaker east group graves are not uncommon (Heyd, 2007: 344).

Although because of this there are many pending aspects to be studied, it seems to be that those pieces are telling us something about the social status of the buried people, due to the selected and exotic raw materials used, in which the bone of consumed animals is the less frequently used raw material. The small presence of imitations made of mammal bones indicates its symbolic value or the high-level status available only to a minority. That very same happens with local or regional fossil ivory exploitations in Iberia, where, in any case, its appearance is also limited to those outstanding graves containing less-frequently encountered materials such as gold or cinnabar.

5. The use of cinnabar in Beaker tombs of the Madrid region

Cinnabar also represents an interesting prestige good that was circulated throughout the exchange networks since Neolithic times. It is especially well-documented in megalithic contexts, and it was not only applied to human remains, although it was also used to paint funerary chambers (Hunt & Hurtado, 2009; Hunt *et al.* 2011; Rogerio-Candeleda *et al.*, 2012; Bueno *et al.*, 2015). In the Iberian

plateau, several megalithic tombs and collective burials in pits reveal the use of cinnabar in their burials (Martín Gil *et al.*, 1994; Delibes, 1995; 2000).

The use of cinnabar or red pigments in the Madrid region before the Bell Beaker has been documented in the Neolithic flint mine of Casa Montero (Consuegra *et al.*, 2004; Hunt *et al.*, 2011) and in a collective Chalcolithic burial at the Juan Barbero cave (Tielmes), in which it was applied to the human bones (Rovira & Sanz, 1984: 101-102). We could also identify the use of cinnabar on a pottery sherd at Camino de las Yeseras with an impressed symbolic decoration, containing visible traces of cinnabar as well as a small conglomerate sample recovered from the central area of the ditched enclosure of the site (Ríos & Liesau, 2011: 361). An intentional accumulation of 'red ingots' was also noted, but no further information has been published on the nearby site of El Soto de Henares (Alcalá de Henares) (Galindo *et al.*, 2012).

The presence of red pigments in the Bell Beakers tombs of the Madrid region has been mentioned in many works, but it was not analysed until recently. In Camino de Las Yeseras we identified it in three of the most outstanding Bell Beaker tombs, although it was not observed in the contemporaneous collective Chalcolithic burials (Ríos & Liesau, 2011; Liesau & Blasco, 2012). The use of pigments made from ferric oxides for ritual purposes were also noted on a faunal deposit synchronous to the Bell Beaker horizon, which was covered with a possible aurochs skull and its horn cores were impregnated with red ochre (Liesau *et al.*, 2013). The cinnabar seems to be used in three possible ways:

- 5.1 The frequent impregnated basal zone of the V- or double-perforated buttons has been discussed several times (Siret & Siret; 1890; Delibes, 2000; López-Padilla, 2006; Ríos & Liesau, 2011; López-Padilla *et al.*, 2012) and it is thought that a cloak or shroud could have been impregnated or dyed with this mineral. This fact was observed in at least two graves at Camino de las Yeseras. Minute red pigment spots were noted on the basal surface of three buttons from Ciempozuelos. The EDX analysis revealed that all of them have traces of cinnabar. Although we do not know their exact context and whether they belong to just one or more graves, at least its identification confirms the use of this mineral within this famous cemetery (Fig. 7.1-2).
- 5.2 The use of cinnabar powder, sprinkled more profusely on certain parts of the body, such as the head, arms, knees and feet, as shown by the red spots on those areas for the individual grave of Camino de las Yeseras, in one inhumation at La Magdalena, as well as within five graves, with and without Bell Beaker pottery, at the Humanejos site, where the use of cinnabar is incorporated into the funerary practices of important tombs (Ríos & Liesau, 2011: 361-362). Similar characteristics are described for one of the Salmedina inhumations –although the analysis confirming the presence of cinnabar is still pending- (Berzosa & Flores, 2005: 559) (Fig. 7.2). Cinnabar also appears in the collective inhumations of the middle Tagus basin cemetery of Las Higueras (Bueno *et al.*, 2005). This mineral was not just restricted to rich male graves as it was also applied to several female bodies, some of which did not necessarily contain Bell Beaker pottery (Humanejos, UE 1166, UE 1701; and La Magdalena, UE4463).
- 5.3 Finally, the chance discovery of a double male Bell Beaker grave at Humanejos containing rich grave goods has allowed us to document, for one individual, a very well-known practice noted at El Argar in SE Iberia, observed by E. & L. Siret (1890: 195-202). It concerns a horizontal band that runs along the frontal and parietal portions of the skull as a result of an impregnated ribbon or garment being attached to the cranium. In this case, at least two parallel bands (vegetal fibers?) were observed, but had faded in the occipital zone. Although the defined traces could probably indicate the simple fact that the bare bones were previously smeared, it also suggests that the head was shaved before the funeral garment was placed or applied to it (Fig. 7.3). If we take into account that this type of actions appear on individuals that also bear ivory and gold, in most cases, the funerary layout must have been quite impressive, and was most probably accompanied by banquets attended by the community, as shown by the food and alcoholic-drink traces found on the grave pottery (Bueno *et al.*, 2005; Guerra, 2006; Rojo *et al.*, 2006). The use of cinnabar could have also been used to preserve the body until the

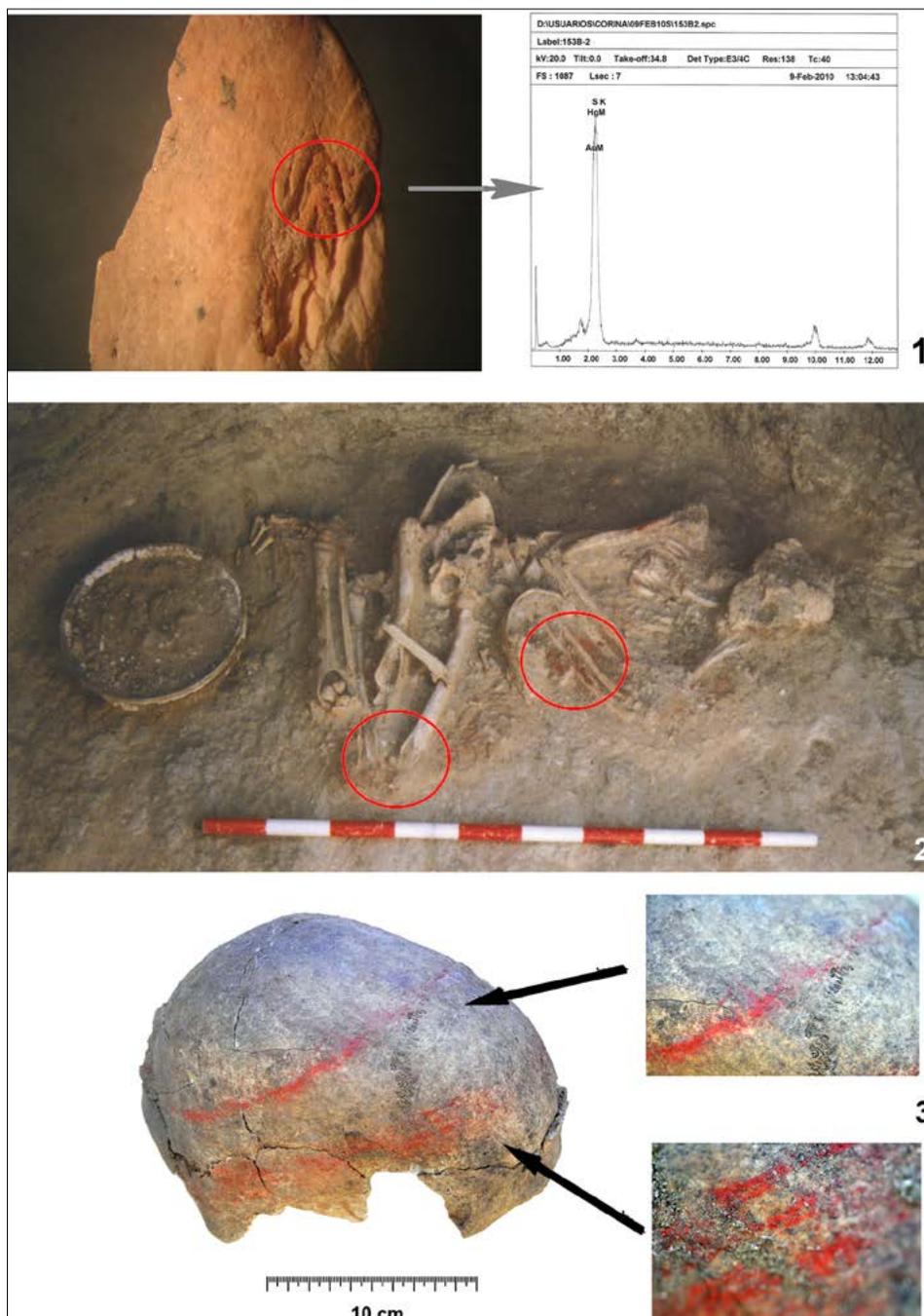


FIGURE 7. CINNABAR IN BELL BEAKER TOMBS: 1. LEFT: DETAIL OF THE BASAL ZONE OF A V-PERFORATED IVORY BUTTON FROM CIEMPOZUELOS (FIG. 5.1) WITH SEVERAL RED PIGMENT TRACES. RIGHT: EDX SPECTRUM OF THE RED PIGMENT TRACES FROM THE BUTTON THAT REVEAL MERCURY (HG) AND SULFUR (S) AS THE COMPONENTS OF CINNABAR. 2. BELL BEAKER GRAVE AT SALMEDINA WITH RED PIGMENT SPRINKLED ON DIFFERENT PARTS OF THE BODY SUCH AS THE FOREARMS, KNEES, FEET (AFTER BERZOSA & FLORES, 2005: FIG. 5). 3. TWO PARALLEL RED STRIPES CROSSING THE FRONTAL AND PARIETAL BONE OF A BELL BEAKER MALE FROM THE HUMANEJOS SITE REVEALING AN INTERESTING FUNERAL PRACTICE WELL-KNOWN IN THE EL ARGAR CULTURE. IT SEEMS THAT SOME ORGANIC PLANT MATERIAL WAS IMPREGNATED WITH CINNABAR AND AFTERWARDS TIED AROUND THE MAN'S (PREVIOUSLY SHAVED?) HEAD.

grave was finished or, perhaps, to be used when the bones of the ancestors were moved later on, as can be noted for Camino de las Yeseras (Liesau *et al.*, 2014).

Although cinnabar resources in Iberia are limited to a few geological contexts, the lead isotopes analysis carried out to date and locate potential catchment points are not conclusive as most of the analyses were carried out on a few traces left on the archaeological artefacts, and intact tombs are not common (Ríos & Liesau, 2011). However, the area of Almadén (Ciudad Real), the richest cinnabar mining area in the world, seems to be one of the most suitable candidates for its origin. Therefore, the existence of contacts on a regional scale will be a research line for future studies.

To conclude, the identification of the raw materials used to produce V- perforated buttons and other ornaments made of different types of dentins – Forest and African elephant tusks as well as sperm whale- in several Central Iberian sites with Bell Beaker tombs allows us to emphasize the exclusivity of these pieces, the presence of which reveals networks with long distance interactions, and they themselves must be recognized as important symbols related to the age, gender, other grave goods and funerary rites represented in these burials. Otherwise, if the origin of the fossil ivory is local, it could be another valuable item for the procurement and exchange of other materials or finished pieces. Additionally, the intentional selection of minerals such as cinnabar reveals the high symbolic value of funeral rites and reinforces the elitist character of significant Beaker tombs, but it also points out to the relatively standardized burial practices of our region that were in close contact to other Iberian societies and precede further Bronze Age traditions known from the El Argar Culture.

Acknowledgements

I would like to thank Prof. Martín Almagro Gorbea, Jorge Vega, Roberto Menduiña and Raúl Flores for providing me with the opportunity to analyze and study the ivory collections from the Ciempozuelos, Camino de las Yeseras and Humanejos sites.

This study has benefitted from three projects under my direction: *Economía y ritualidad en el tránsito del III al II milenio a.C. en la Comunidad de Madrid*. Financial support provided by: Comunidad de Madrid & UAM: CCG06-UAM/HUM-0469. *Materiales y recursos arqueobiológicos durante el Tercer Milenio a. C. en la Comunidad de Madrid*. Financial support provided by Comunidad de Madrid & UAM CCG08-UAM/HUM-4061. *Las sociedades calcolíticas y su marco temporal en la región de Madrid. Una revisión a la luz de nuevos datos*. Financial support provided by: HAR 2011-28731. Dirección General de Investigación y Gestión del Plan Nacional de I+D+i. Ministerio de Ciencia y Competitividad. Gobierno de España.

References

- AGUIRRE, 1995. Proboscídeos II. Los elefantes fósiles. In Meléndez, B. (ed.) *Paleontología*, 3 vol. 2. Madrid: Paraninfo, 311-353.
- ALMAGRO-GORBEA, M.; CASADO, D.; FONTES, F.; MEDEROS, A. & TORRES, M. 2004. *Prehistoria. Antigüedades Españolas I*. Real Academia de la Historia. Catálogo del Gabinete de Antigüedades. Madrid.
- ALONSO, C. 2013. Las tumbas campaniformes del monumento funerario ‘El Hundido’ (Monasterio de Rodilla, Burgos). *Munibe (Antropología-Arkeología)* 64: 1-15.
- ALTAMIRANO, M. 2014. Hueso, asta y marfil: manufactura de artefactos durante el III Milenio a.C. en el poblado de Los Castillejos (Montefrío, Granada). *Saguntum (P.L.A.V.)* 46: 21-40.
- ÁLVAREZ-FERNÁNDEZ, E.; CARRIOL, R.-P.; JORDÁ J. F.; AURA, J. E.; AVEZUELA, B.; BADAL, E.; CARRIÓN, Y.; GARCÍA-GUINEA, J.; MAESTRO, A.; MORALES, J. V.; PÉREZ, G.; PÉREZ-RIPOLL, M.; RODRIGO, M. J.; SCARFF, J. E.; VILLALBA, M. P.; WOOD, R. 2013. Occurrence of whale barnacles in Nerja Cave (Málaga, southern Spain): Indirect evidence of whale consumption by humans in the Upper Magdalenian. *Quaternary International* (2013). <http://dx.doi.org/10.1016/j.quaint.2013.01>.
- ÁLVAREZ-LAO, D. & GARCÍA, N. 2012. Comparative revisión of the Iberian woolly mammoth (*Mammuthus primigenius*) record into a European context. *Quaternary Science Review* 32: 64-74.

- ANDRÉS, T. 1981. El utillaje de hueso en los sepulcros de época dolménica del Ebro Medio. *Estudio de Arqueología Alavesa* 10: 145-176.
- ARNAL, J. 1954. Les boutons perforés. *Bulletin de la Société préhistorique de France* 51, 5-6: 255-268.
- ARNAL, J. 1973. Sur les dolmens et hypogées des Pays Latins: Les V-Boutons. In Daniel, G. & Kjærsum, P. (ed.): *Megalithic Graves and Ritual. Third Atlantic Colloquium Moesgård, 1969*. Copenhagen: 221-226.
- BANERJEE, A. 2002. Art-und Herkunftsbestimmung von Elfenbein mit Hilfe von zerstörungsfrei arbeitenden Methoden. *Mainzer naturwiss. Archiv* 40: 175-195.
- BANERJEE, A. 2004. Vergleichende Untersuchungen der ‚Schreger-Struktur‘ an Stosszähnen von Elefanten. *Mainzer Naturwiss. Archiv, Maniz* 42: 77-88.
- BANERJEE, A.; LÓPEZ PADILLA, J. A. & SCHUHMACHER, T. X. (eds.) 2012. *Marfil y Elefantes en la Península Ibérica y el Mediterráneo*, Internationale Tagung. Museo Arqueológico de Alicante, 26-27. Noviembre 2008, Iberia Archaeologica 16,1.
- BARANDIARAN, I. 1978. La Atalayuela: fosa de inhumación colectiva del Eneolítico en el Ebro Medio. *Príncipe de Viana* 152-153: 381-422.
- BARCIELA, V. 2012. tecnología del marfil en la Edad del Bronce de la Meseta Sur (España). In Banerjee, A.; López Padilla, J. A. & Schuhmacher, T. X. (eds.): *Elfenbeinstudien. Marfil y Elefantes en la Península Ibérica y el Mediterráneo occidental*. Coloquio Internacional. Museo Arqueológico de Alicante. Iberia Archaeologica, 16. Faszikel 1: 201-216.
- BERZOSA, R. & FLORES, M. 2005. ‘El conjunto funerario del vertedero de ‘La Salmedina’ (Distrito Villa de Vallecas, Madrid)’. In Rojo, M.; Garrido-Pena, R. & García, I. (eds.): *El campaniforme en la Península Ibérica y su contexto europeo*. Valladolid: Universidad de Valladolid (Serie Arte y Arqueología 21): 481-494.
- BLASCO, C. (ed.) 1994. *El Horizonte campaniforme de la Región de Madrid en el centenario de Ciempozuelos*. Madrid: Universidad Autónoma de Madrid (Patrimonio arqueológico del bajo Manzanares 2).
- BLASCO, C. & RÍOS, P. 2010. La función del metal entre los grupos campaniformes: oro ‘versus’ cobre. El ejemplo de la Región de Madrid. *Trabajos de Prehistoria* 67, 2: 359-372.
- BLASCO, C.; BAENA, J. & LIESAU, C. 1998. *La Prehistoria madrileña en el Gabinete de Antigüedades de la Real Academia de la Historia*. Madrid: Universidad Autónoma de Madrid (Patrimonio arqueológico del bajo Jarama, 3).
- BLASCO, C.; LIESAU, C. & RÍOS, P. (eds.) 2011. *Yacimientos Calcolíticos con campaniforme de la Región de Madrid. Nuevos estudios*. Madrid: Universidad Autónoma de Madrid (Patrimonio arqueológico de Madrid, 9).
- BLASCO, C.; LIESAU, C.; DELIBES; G. BAQUEDANO, E. & RODRÍGUEZ, M. 2005. Enterramientos campaniformes en ambiente doméstico: el yacimiento de Camino de las yeseras (San Fernando de Henares, Madrid). In Rojo, M.; Garrido-Pena, R. & García, I. (eds.): *El campaniforme en la Península Ibérica y su contexto europeo*. Valladolid: Universidad de Valladolid (Serie Arte y Arqueología 21): 457-479.
- BLASCO, C.; LIESAU, C.; RÍOS, P.; BLANCO, J. F.; ALIAGA, R.; MORENO, E. & DAZA, A. 2009. Kupferzeitliche Siedlungsbestattungen mit Glockenbecher- und Prestigebeigaben aus dem Grabenwerk von El Camino de las Yeseras (San Fernando de Henares, prov. Madrid). Untersuchungen zur Typologie des Grabritus und zu dessen sozialer Symbolik. *Madridier Mitteilungen* 50: 40-70.
- BUENO, P.; BALBÍN, R. DE & BARROSO, R. 2000. Valle de las Higueras (Huecas, Toledo. España). Una necrópolis Ciempozuelos con cuevas artificiales al interior de la Península. *Estudios Pré-Históricos* VIII: 49-80.
- BUENO, P.; BARROSO, R. & BALBÍN, R. DE 2005. Ritual campaniforme, ritual colectivo: La necrópolis de cuevas artificiales del Valle de las Higueras, Huecas, Toledo. *Trabajos de Prehistoria* 62, 2: 67-90.
- BUENO, P.; BARROSO, R. & BALBÍN, R. DE 2007-8. Campaniforme en las construcciones hipogeas del Megalitismo reciente al interior de la Península Ibérica. *Veleia* 24-25: 771-790.

- BUENO, P.; BARROSO, R. & BALBÍN, R. DE 2012. *5.000 años atrás. Primeros agricultores y metalúrgicos del Valle de Huecas (Huecas, Toledo)*. Universidad de Alcalá de Henares.
- BUENO, P.; BALBÍN, R. DE & BARROSO, R. 2015. Graphic programmes as ideological construction of the megaliths: The south of the Iberian Peninsula as case study. In Rocha, L.; Bueno-Ramirez, P. & Branco, G. (eds.): *Death as Archaeology of Transition: Thoughts and Materials*. BAR, IS, 2708: 51-69.
- CAMPILLO, J. 1985. Memoria de las excavaciones realizadas en el término de Tablada de Rudrón (Burgos). El túmulo campaniforme de Tablada de Rudrón (Burgos). *Noticiario Arqueológico Hispánico* 26: 9-86.
- CARDOSO, J. 1995. Ossos de cetáceo utilizados no Calcolítico da Estremadura. *Estudos Arqueológicos de Oeiras* 5: 193-198.
- CARMONA, E. 2013. *Calcolítico en la Cuenca Media del Arlanzón (Burgos, España)*. Oxford: Archaeopress (British Archaeological Reports, International Series 2559).
- CASSEN, S. & VAQUERO, J. 2003. Cosas fabulosas. En: Muita gente, poucas antas? Orígens, espacios e contextos do Megalitismo. Actas do II Colóquio Internacional sobre Megalitismo. *Trabalhos de Arqueología* 25: 449-508.
- CASTILLO, A. DEL 1928. *La cultura del vaso campaniforme*. Barcelona.
- CAUBET, A. & GABORIT-CHOPIN, D. 2004. *Ivoires*. Paris: Musée du Louvre. Editions de la Réunion des musées nationaux.
- CONSUEGRA, S.; GALLEGO, M. & CASTAÑEDA N. 2004. Minería neolítica de sílex de Casa Montero (Vicálvaro, Madrid) *Trabajos de Prehistoria* 61, 2: 127-140.
- CORCHÓN, S. & ÁLVAREZ-FERNÁNDEZ, E. 2008. Nuevas evidencias de restos de mamíferos marinos en el Magdaleniense: Los datos de La Cueva de Las Caldas (Asturias, España). *Munibe*, 59:47-66.
- DAVIS, S. 1985. Tiny elephants and giant mice. *New Scientist*, 3 January: 25-27.
- DELIBES, G. 1977. *El vaso campaniforme en la meseta Norte española*. Valladolid: Universidad de Valladolid (Studia Archaeologica, 46).
- DELIBES, G. 1995. Ritos funerarios, demografía y estructura social entre las comunidades neolíticas de la submeseta Norte. In Fábregas Valcarce, R.; Pérez Losada, F. & Fernández Ibañez, C. (eds.) (1995): *Arqueología da Morte na Península Ibérica desde as Orixes ata o Medioevo*. Excmo. Concello Xinxo de Limia: 61-94.
- DELIBES, G. 2000. Cinabrio, huesos pintados en rojo y tumbas de ocre: ¿prácticas de embalsamamiento en la Prehistoria? In Olcina, & Soler, J. (coord.): *Scripta in Honorem Enrique A. Llobregat Conesa*. Alicante: 223-235.
- DELIBES, G.; ROJO, M. & SANZ, C. 1986. Dólmenes de Sedano II, El sepulcro de corredor de Las Arnillas (Moradillo de Sedano, Burgos). *Noticiario Arqueológico Hispánico*, 27: 9-39.
- DÍAZ DEL RÍO, P. 2003. Recintos de fosos del III milenio AC en la Meseta peninsular. *Trabajos de Prehistoria* 60, 2: 61-78.
- DRIESCH, VON DEN, A. & BOESSNECK, J. 1976. Die Fauna vom Castro Do Zambujal. *Studien über frühe Tierknochenfunde von der Iberischen Halbinsel* 5: 1-129.
- ESPADAS, J.; POYATO, C. & CABALLERO, A. 1987. Memoria preliminar de las excavaciones del yacimiento calcolítico de El Castellón, Villanueva de los Infantes, Museo, Servicio de Publicaciones e Intercambio Científico, Ciudad Real, *Oretum*, III: 39-78.
- ESPINOZA, E. & MANN, M. J. 1993. The history and significance of the pattern in proboscidean ivory characterization, *Journal of the American Institute for Conservation* 32, 3: 241-248.
- FERNÁNDEZ-CASADO, M. 2000. El Cachalote (*Physeter macrocephalus*) Galemys, 12 (2): 3-22.
- FERNANDES, J. J. & BARETO, J. B. 2005. Povoado fortificado da Pedra de Ouro. In Arnaud, J. M. & Varela Fernandes, C. (coord.): *Construindo a Mamória*. As Coleções do Museu Arqueológico do Carmo. Associação dos Arqueólogos Portugueses: 116-122.
- FERNANDEZ MIRANDA, M.; FERNANDEZ POSSE, M^a D., GILMAN, A. & MARTÍN, C. 1990. La Edad del Bronce en la Mancha Oriental. *Actas del Simposio; 1990 de La Edad del Bronce en Castilla-La Mancha*. Toledo: Diputación Provincial de Toledo: 243-287.

- FLORES, R. 2011. El yacimiento de Humanejos. In Blasco, C.; Liesau, C. & Ríos, P. (eds.): *Yacimientos Calcolíticos con campaniforme de la Región de Madrid. Nuevos estudios*. Madrid: Universidad Autónoma de Madrid (Patrimonio arqueológico de Madrid 9): 9-16.
- FLORES, R. & GARRIDO, R. 2014. Campaniforme y conflicto social: Evidencias del yacimiento de Humanejos (Parla, Madrid). *Actas de las Novenas Jornadas de Patrimonio de la Comunidad de Madrid*. Comunidad de Madrid: 159-167.
- GALINDO, L.; SÁNCHEZ S. V. M. & LORENTE, M. 2009. Soto de Henares: aproximación a un poblado de recintos. *Actas de las Cuarta Jornadas de Patrimonio Arqueológico de la Comunidad de Madrid*. Dirección General de Patrimonio Histórico y Museo Arqueológico Regional, Madrid: 263-271.
- GARCÍA SANJUÁN, L.; VARGAS JIMÉNEZ, J. M.; HURTADO PÉREZ, V.; RUIZ MORENO, T. & CRUZ-AUÑÓN BRIONES, R. (eds.) 2013a. *El Asentamiento Prehistórico de Valencina de la Concepción. Investigación y Tutela en el 150 Aniversario del Descubrimiento de La Pastora*. Sevilla: Universidad de Sevilla.
- GARCÍA SANJUÁN, L.; LUCIAÑEZ TRIVIÑO, M.; SCHUHMACHER, T.; WHEATLEY, D. W. & BANERJEE, A. 2013b. Ivory craftsmanship, trade and social significance in the southern Iberian Copper Age: the evidence from the PP4-Montelirio sector of Valencina de la Concepción (Seville, Spain). *European Journal of Archaeology* 16, 4: 610-635.
- GARRIDO, R. 2000. *El Campaniforme en la meseta Central de la Península Ibérica (c. 2500-200 A.C.)*. Oxford (British Archaeological Reports, International Series 892).
- GARRIDO, R.; ROJO, M. & GARCÍA-MARTÍNEZ, I. 2005. El Campaniforme en la Meseta central de la Península Ibérica. In Rojo, M.; Garrido-Pena, R. & García, I. (eds.): *El campaniforme en la Península Ibérica y su contexto europeo*. Valladolid: Universidad de Valladolid (Serie Arte y Arqueología 21): 411-435.
- GOETZE, A. 1925. Elfenbein, *Reallexikon der Vorgeschichte*. Berlin: Walter de Gruyter & Co.: 87.
- GONÇALVES, V. 2005. Cascais há 5000 anos. Tempos, Símbolos e Espaços da Morte das antigas Sociedades Camponesas. In GONÇALVES, V. (ed.): *Cascais há 5000 años*. Cascais: Câmara Municipal de Cascais: 63-195.
- GUERRA DOCE, E. 2006. Sobre la función y el significado de la cerámica campaniforme la luz de los análisis de contenidos. *Trabajos de Prehistoria* 63, 1: 69-84.
- GUILAINE, J. 1963. Boutons perforés en V du Chalcolithique pyrénéen. *Bulletin de la Société préhistorique de France* 60, 11-12: 818-827.
- GUILAINE, J. 1967. *La civilisation de Vase Campaniforme dans les Pyrénées Françaises*. Carcassonne.
- GUITART I PERARNAU, I. 1986. Objectes d'ornament personals prehistòrics del Moianés I D'Osona al Museu Episcopal de Vic. *Ausa* XII, 116: 1-19.
- HARRISON, R. J. 1977. *The Bell Beaker Cultures of Spain and Portugal*. American School of Prehistoric Research Bulletin, 35, Cambridge-Massachusetts.
- HARRISON, R. & GILMAN, A. 1977. Trade in the second and third Millennia B.C. between Magreb and Iberia. In: *Ancient Europe and the Mediterranean*. Studies in honour of Hugo Hencker, Warminster: 91-104.
- HERAS, C., CUBAS, M. & BASTIDA, A. 2014b. Signos y símbolos en el registro funerario: Ajuares de la necrópolis calcolítica con campaniforme de 'La Magdalena I' (Alcalá de Henares, Madrid). *Actas de las novenas jornadas de Patrimonio Arqueológico en la Comunidad de Madrid*. Madrid 187-198.
- HERAS, C.; GALERA, V. & BASTIDA, A. 2011. La fase campaniforme del yacimiento de La Magdalena'. In Blasco, C.; Liesau, C. & Ríos, P. (eds.): *Yacimientos Calcolíticos con campaniforme de la Región de Madrid. Nuevos estudios*. Madrid: Universidad Autónoma de Madrid (Patrimonio arqueológico de Madrid 9): 17-22.
- HERAS, C., GALERA, V. & BASTIDA, A. 2014a. Enterramientos y ritual funerario en una necrópolis calcolítica con campaniforme en la submeseta sur: El Yacimiento de 'La Magdalena' I (Alcalá de Henares). *Actas de las novenas jornadas de Patrimonio Arqueológico en la Comunidad de Madrid*. Madrid: 199-227.

- HEYD, V. 2007. Families, Prestige Goods, Warriors & Complex Societies: Beaker Groups of the 3rd Millennium cal BC along the Upper & Middle Danube. *Proceedings of the Prehistoric Society* 73: 327-379.
- HUNT, M. & HURTADO, V. 2009. Pigmentos de sulfuro de mercurio–cinabrio–en contextos funerarios de época calcolítica en el sur de la Península Ibérica: investigaciones sobre el uso, depósitos minerales explotados y redes de distribución a través de la caracterización composicional e isotópica. In Sainz Carrasco, M. E.; López Romero, R.; Cano Díaz, M. A. & Calvo García, J. J. (ed.): *VIII Congreso Ibérico de Arqueometría*: 123-132.
- HUNT, M.; CONSUEGRA, S.; DÍAZ DEL RÍO, P.; HURTADO, V. & MONTERO, I. 2011. Neolithic and Chalcolithic -VI to III millennia BC- use of cinnabar (HgS) in the Iberian Peninsula: analytical identification and lead isotope data for an early mineral exploitation of the Almadén (Ciudad Real, Spain) mining district. In: Ortiz, J. E.; Puche, O.; Rábano, I. & Mazadiego, L. F. (eds.): *History of Research in Mineral Resources*. Madrid: Instituto Geológico y Minero de España, Cuadernos del Museo Geominero, 13: 3-14.
- IBORRA, P. & LÓPEZ, M. D. 2011. La ganadería y la caza. In Pérez, G.; Bernabeu, J.; Carrión, Y.; García, O.; Molina, Ll. & Gómez, M. (eds.): *La Vital (Gandía, Valencia). Vida y muerte en la desembocadura del Serpis durante el III y el I milenio A.C.* Valencia: Diputación de Valencia (Serie de Trabajos Varios del SIP, 113): 105-120.
- KERN, D. 2006. An den Knöpfen abzählen- Endneolithische Altfunde aus Herrnbaumgarten, VB Mistelbach, Niederösterreich. *Archäologie Österreichs* 17/2: 164-176.
- KOKABI, M. 1997. Skelettreste als Rohmaterial- Material, Methode, Technik. In Kokabi, M.; Schlenker, B.; Wahl, J. & Wamser L. (eds.): *Schmuck und Gerät aus ‚Bein‘*. Prähistorische Staatsammlung München. Museum für Vor-und Frühgeschichte. München: 19-38.
- KRZYSZKOWSKA, O. 1990. *Ivory and related materials. An Illustrated Guide*. London: Institute of Classical Studies (Classical Handbook 3, Bulletin supplement 59).
- L'HELGOUACH, J. 1984. Le Groupe Campaniforme dans le Nord Le Centre et l' Ouest de la France. In Guilaine, J. (dir.): *L'Age du Cuivre Européen*. Paris: Centre National de la Recherche Scientifique: 59-80.
- LEISNER, G. & LEISNER, V. 1943. *Die Megalithgräber der Iberischen Halbinsel. Der Süden*. Römisch Germanische Forschungen, 17. Berlin.
- LEISNER, V. & SCHUBART, H. 1966. Die kupferzeitliche Befestigung von Pedra do Ouro (Portugal). *Madriider Mitteilungen* 7: 9-60.
- LEISNER, G. & LEISNER, V. 1959. *Die Megalithgräber der Iberischen Halbinsel. Der Westen*. Madriider Forschungen, 1. Berlin.
- LEMERCIER, O. 2004. *Les Campaniformes dans le sud-est de la France*. Publications de l'UMR 1540 du CNRS / ADAL. Monographies d'Archéologie Méditerranéenne, 18.
- LIESAU, C. 2012. *Estudio preliminar de los adornos de origen animal del yacimiento de Humanejos, Parla (Madrid)*. Informe Técnico LAZ 2012/6.
- LIESAU, C. & BLASCO, C. 2011-2012. Materias primas y objetos de prestigio en ajuares funerarios como testimonios de redes de intercambio en el Horizonte campaniforme. *Cuadernos de Prehistoria y Arqueología de la Universidad Autónoma de Madrid* 37-38 (Vol. I): 209-222.
- LIESAU, C. & CORONA, E. 2002. La fauna de la colección Bento: Una aproximación curatorial. In Blasco, C. (coord.) *La colección Bento del Museu d'Arqueologia de Catalunya, una nueva mirada a la prehistoria de Madrid*. Museu d'Arqueologia de Catalunya. Barcelona. Monografies, 3: 67-78.
- LIESAU, C. & MORENO, E. 2012. Marfiles campaniformes de El Camino de las Yeseras (San Fernando de Henares, Madrid). In Banerjee, A.; López Padilla, J. A. & Schuhmacher, T. X. (eds.): *Elfenbeinstudien. Marfil y Elefantes en la Península Ibérica y el Mediterráneo occidental*. Coloquio Internacional. Museo Arqueológico de Alicante, 26-27. Noviembre 2008. *Iberia Archaeologica* 16, Faszikel 1: 83-94.
- LIESAU, C. & SCHUHMACHER, T. X. 2012. Un taller de marfil en el yacimiento argárico de Fuente Álamo (Cuevas de Almanzora, Almería). In Banerjee, A.; López Padilla, J. A. & Schuhmacher, T. X. (eds.): *Elfenbeinstudien. Marfil y Elefantes en la Península Ibérica y el Mediterráneo*

- occidental*. Coloquio Internacional. Museo Arqueológico de Alicante. Iberia Archaeologica, 16. Faszikel 1: 121-138.
- LIESAU, C.; BLASCO, C.; RÍOS, P.; VEGA, J.; MENDUIÑA, R.; BLANCO, J. F.; BAENA, J.; HERRERA, T.; PETRI, A. & GÓMEZ, J. L. 2008. Un espacio compartido por vivos y muertos: El poblado calcolítico de fosos de Camino de las Yeseras (San Fernando de Henares, Madrid). *Complutum* 18, 1: 97-120.
- LIESAU, C.; BANERJEE, A. & SCHWARZ, J. O. 2011. Camino de las Yeseras' ivory collection: advances in analysis technology used in identifying raw material. In Blasco, C.; Liesau, C. & Ríos, P. (eds.): *Yacimientos Calcolíticos con campaniforme de la Región de Madrid. Nuevos estudios*. Madrid: Universidad Autónoma de Madrid (Patrimonio arqueológico de Madrid 9): 381-386.
- LIESAU, C.; DAZA, A.; LLORENTE, L. & MORALES, A. 2013. More questions than answers: The singular animal deposits from Camino de las Yeseras (Chalcolithic, Madrid, Spain). *Proceedings of the Animal and funerary context from ICAZ 2010, Anthropozoologica*, 42 (2): 5-14.
- LIESAU, C.; RÍOS, P.; VEGA, J.; MENDUIÑA, R. & BLASCO, C. 2014. Buscando los ancestros: la manipulación de los restos de las tumbas campaniformes en Camino de las Yeseras (San Fernando de Henares, Madrid). *Actas de las Novenas Jornadas de Patrimonio de la Comunidad de Madrid*, Comunidad de Madrid: 137-148.
- LOCKE, M. 2008. Structure of Ivory. *Journal of Morphology* 269: 423-450.
- LÓPEZ COVACHO, L.; ORTIZ DEL CUETO, J. R. & RODRIGUEZ CIFUENTES, M. 1996. El yacimiento prehistórico de Pedazo del Muerto (Pinto, Madrid). *Reunión de Arqueología madrileña. Madrid, Enero 1996*: 213-215.
- LÓPEZ PADILLA, J. A. 2006. Marfil, oro, botones y adornos en el área oriental del país de El Argar. *MARQ, Arqueología Museos* 1: 25-48.
- LÓPEZ PADILLA, J. A. 2011. *Asta, hueso y marfil. Artefactos de la Edad del Bronce en el Levante y Sureste de la Península Ibérica (ca. 2500-ca.1300 cal BC)*. Alicante: MARQ. Museo Arqueológico de Alicante (Serie Mayor, 9).
- LÓPEZ PADILLA, J. A. 2012. Dinámica de la producción y consumo de marfil en el Sudeste y Área centro-meridional del Levante Peninsular entre Ca. 2200 a.C. y ca. 1200 a.C. In Banerjee, A.; López Padilla, J. A. & Schuhmacher, T. X. (eds.): *Elfenbeinstudien. Marfil y Elefantes en la Península Ibérica y el Mediterráneo occidental*. Coloquio Internacional. Museo Arqueológico de Alicante. Iberia Archaeologica, 16. Faszikel 1: 139-155.
- LÓPEZ PADILLA, J. A.; DE MIGUEL IBÁÑEZ, M.^a P.; ARNAY DE LA ROSA, M.; GALINDO MARTÍN, L.; ROLDÁN GARCÍA, C. & MURCIA MASCARÓ, S. 2012. Ocre y cinabrio en el registro funerario de El Argar. *Trabajos de Prehistoria* 69, 2: 273-292.
- MAHNHART, H.; VON DEN DRIESCH, A. & LIESAU, C. 2001. Archäozoologische Untersuchungen in Fuente Álamo. In: H. Schubart – V. Pingel – O. Arteaga, Fuente Álamo. *Die Grabungen von 1977 bis 1991 in einer bronzezeitlichen Höhensiedlung Andalusiens*. Madrider Beiträge 25: 337-361.
- MAICAS, R. 2007. *Industria ósea y funcionalidad: Neolítico y Calcolítico en la Cuenca de Vera (Almería)*. Salamanca: CSIC (Biblioteca Praehistorica Hispana).
- MÁRQUEZ ROMERO, J. E. & JIMÉNEZ JÁIMEZ, V. 2010. *Recintos de Fosos. Genealogía y significado de una tradición en la Prehistoria del suroeste de la Península Ibérica (IV-III milenios AC)*. Universidad de Málaga. Málaga.
- MARTÍN-GIL, J.; MARTÍN-GIL, F. J.; DELIBES DE CASTRO, G.; ZAPATERO-MAGDALENO, P. & SARABIA-HERRERO, F. J. 1994a. Neolítico. Uso del Cinabrio. *Investigación y Ciencia* 219: 29-30.
- MARTÍNEZ, V.; MORENO, E.; GALLEGO, C. & LÓPEZ, O. 2015. El yacimiento inédito de El Juncal (Getafe). Primera aproximación. *La Arqueología en el trazado ferroviario del Sur de la Comunidad de Madrid*. ADIF AV, Mare Nostrum: 243-280.
- MARTÍNEZ, V.; MORENO, E. & LÓPEZ, O. 2014. El Juncal (Getafe, Madrid). Nuevo recinto de fosos en la Comunidad de Madrid. *Actas de las Octavas Jornadas de Patrimonio Arqueológico en la Comunidad de Madrid*. Madrid: Dirección General de Patrimonio Histórico: 509-513.
- MAN: MUSEO ARQUEOLÓGICO NACIONAL. Catálogo online. Fichas de los inventarios nº: 1976/1/MILL/3/8; 1984/172/3.
- MAZO, A. V. 2000. Proboscídeos de la Comunidad de Madrid. In Morales, J.; Nieto, M.; Amezua, L.; Fraile, S.; Gómez, E.; Herráez, E.; Peláez-Campomanes, P.; Salesa, M. J.; Sánchez, I. M. &

- Soria, D.: *Patrimonio Paleontológico de la Comunidad de Madrid*. Arqueología, Paleontología y Etnografía, 6: 263-269.
- MÜLLER, K. & REICHE, I. 2011. Differentiation of archaeological ivory and bone materials by micro-PIXE/PIGE with emphasis on two Upper Palaeolithic key sites: Abri Pataud and Isturitz, France. *Journal of Archaeological Science* 38: 3234-3243.
- NARANJO, C. 1984. El Castillo de Cardeñosa. Un yacimiento de los inicios de la Edad del Bronce en la Sierra de Ávila. *Noticiario Arqueológico Hispánico* 19: 36-84.
- NOCETE, F., VARGAS, J. M., SCHUHMACHER, T. X., BANERJEE, A. & DINDORF, W. 2013. The ivory workshop of Valencina de la Concepción (Seville, Spain) and the identification of ivory from Asian elephant on the Iberian Peninsula in the first half of the 3rd millennium BC. *Journal of Archaeological Science* 40: 1579-1592.
- OAKLEY, K. 1975. *Decorative and Symbolic Uses of Vertebrate Fossils*. Oxford: Pitt Rivers Museum. University of Oxford. Occasional Papers on Technology, 12.
- PAÇO, A. Do 1960. Castro de Vila Nova de S. Pedro. XII Alguns objectos de osso e marfim. *Zephyrus* XI: 105-117.
- PANERA, J. & RUBIO, S. (coord.) 2002. *Bifaces y elefantes. La investigación del Paleolítico Inferior en Madrid*. Zona Arqueológica, 1, Madrid: Museo Arqueológico Regional.
- PASCUAL, J. L. 1995. Origen y significado del marfil durante el Horizonte Campaniforme y los inicios de la Edad del Bronce en el País Valenciano. *Saguntum* 29: 19-31.
- PASCUAL, J. L. 1998. *Utillaje óseo, adornos e ídolos neolíticos valencianos*. Servicio de Investigación Prehistórica. Valencia: Diputación Provincial de Valencia (Serie de Trabajos Varios, 95).
- PASCUAL, J. L. 2011a. La industria ósea y los adornos. In Pérez, G.; Bernabeu, J.; Carrión, Y.; García, O.; Molina, Ll. & Gómez, M. (eds.): *La Vital (Gandía, Valencia). Vida y muerte en la desembocadura del Serpis durante el III y el I milenio A.C.* Valencia: Diputación de Valencia (Serie de Trabajos Varios del SIP, 113): 203-217.
- PASCUAL, J. L. 2011b. La malacofauna. In Pérez, G.; Bernabeu, J.; Carrión, Y.; García, O.; Molina, Ll. & Gómez, M. (eds.): *La Vital (Gandía, Valencia). Vida y muerte en la desembocadura del Serpis durante el III y el I milenio A.C.* Valencia: Diputación de Valencia (Serie de Trabajos Varios del SIP, 113): 121-138.
- PASCUAL, J. L. 2012. El Taller de marfil del Bronce Pleno de la Mola D'Agres (Alicante). In Banerjee, A., López Padilla, J. A. & Schuhmacher, T. X. (eds.): *Elfenbeinstudien. Marfil y Elefantes en la Península Ibérica y el Mediterráneo occidental*. Coloquio Internacional. Museo Arqueológico de Alicante, 26-27 Noviembre 2008. *Iberia Archaeologica* 16, Faszikel 1: 173-197.
- PAU, C. 2012. Los botones campaniformes sardos y sus analogías con la Península Ibérica y otras zonas del Mediterráneo. *Saguntum* (P.L.A.V.) 44: 67-76.
- PAU, C. 2013. Cuentas y colgantes campaniformes y epicampaniformes de Cerdeña. *Lucentum* XXXII: 9-30.
- PENIMANN, T. K. 1952. *Pictures of Ivory and other Animal Teeth, Bone and Antler*. Pitt Rivers Occasional Paper on Technology, 5, Oxford.
- PÉREZ ARRONDO, C. L. & LÓPEZ CALLE, C. 1986. *Aportaciones al estudio de las culturas eneolíticas en el valle del Ebro, I: elementos de adorno*. Logroño: Gobierno de la Rioja e Instituto de Estudios Riojanos (Historia 2).
- PÉREZ RIPOLL, M. 2002. Extinción de la fauna endémica y colonización humana de las grandes islas del Mediterráneo. *Saguntum*. P.L.A.V., 5 Extra: 147-163.
- POYATO, C. 1989. Relaciones entre la Península Ibérica y el Norte de África: marfil y Campaniforme. *Congreso Internacional El Estrecho de Gibraltar*, I. Ceuta 1987: 317-329.
- RÍOS, P. 2011. *Territorio y Sociedad en la Región de Madrid durante el III milenio a. C. El referente del yacimiento de Camino de las Yeseras*. Col. Patrimonio Arqueológico de Madrid, 7. Madrid: Dpto. Prehistoria y Arqueología – UAM (digital).
- RÍOS, P. & LIESAU, C. 2011. Elementos de adorno simbólicos y colorantes en contextos funerarios singulares. In Blasco, C.; Liesau, C. & Ríos, P. (eds.): *Yacimientos Calcolíticos con campaniforme de la Región de Madrid. Nuevos estudios*. Madrid: Universidad Autónoma de Madrid (Patrimonio arqueológico de Madrid 9): 357-370.

- RODANÉS, J. M. 1987. *La industria ósea prehistórica en el valle del Ebro, Neolítico-Edad del Bronce*. Zaragoza: Diputación General de Aragón (Arqueología y Paleontología, 4, Serie Arqueología Aragonesa).
- RODRIGUEZ CIFUENTES, M. 2007. El yacimiento de Pedazo del Muerto. *Yacimientos arqueológicos de Pinto. 15 años de intervenciones*. Ayto. de Pinto: 43-58.
- ROJERIO-CANDELERA, M. A.; HERRERA, L. K.; ZÉLIA MILLER, A.; GARCÍA SANJUAN, L.; MORA MOLINA, C.; WHEATLY, D. W.; JUSTO, A. & SAIZ-JIMENEZ, C. 2012. Allochthonous red pigments used in burial practices at the Copper Age site of Valencina de la Concepción (Sevilla, Spain): characterisation and social dimension. *Journal of Archaeological Science* 40, 1: 279-290.
- ROJO GUERRA, M.; GARRIDO PENA, R. & GARCÍA-MARTÍNEZ DE LAGRÁN, I. (coord.) 2005a. *El Campaniforme en la Península Ibérica y su contexto europeo*. Valladolid: Universidad de Valladolid (Serie Arte y Arqueología, 21).
- ROJO, M.; KUNST, M.; GARRIDO, R.; GARCÍA, I. & MORÁN, G. 2005b. *Un Desafío a la Eternidad. Tumbas Monumentales del Valle de Ambrona (Soria, España)*. Valladolid: Junta de Castilla y León (Memorias, Arqueología en Castilla y León, 14).
- ROJO GUERRA, M.; GARRIDO-PENA, R. & GARCÍA-MARTÍNEZ DE LAGRÁN, I. 2006. Beer and Bell Beakers: drinking rituals in Copper Age Inner Iberia. *Proceedings of the Prehistoric Society* 72: 243-265.
- ROVIRA, S. & SANZ, M. 1984. Análisis de Laboratorio de algunos materiales de la cueva de Juan Barbero. In Martínez Navarrete, M. I.: El comienzo de la metalurgia en la provincia de Madrid: La Cueva y cerro de Juan Barbero (Tielmes Madrid). *Trabajos de Prehistoria* 41: 17-128.
- SALANOVA, L. 2005. Los orígenes del campaniforme. Descomponer, analizar, cartografiar. In Rojo Guerra, M.; Garrido Pena, R. & García-Martínez de Lagrán, I. (coord.): *El Campaniforme en la Península Ibérica y su contexto europeo*. Valladolid: Universidad de Valladolid (Serie Arte y Arqueología, 21): 7-26.
- SASTRI, CH. S.; BANERJEE, A.; SAUVAGE, T.; COURTOIS, B. & SCHUHMACHER T. 2013. Fluorine determination in different types of ivory by PIGE technique, *Journal of Radioanalytical and Nuclear Chemistry* 295, 1. DOI 10.1007/s10967-012-2410-x.
- SCHUHMACHER, T. X. 2012. *Elfenbeinstudien. Chalkolitische und Frühbronzezeitliche Elfenbeinobjekte auf der Ibersichen Halbinsel. Studien zur Herkunft, Austausch, Verarbeitung und sozialer Bedeutung von Elfenbein*. Iberia Archaeologica, 16, 2.
- SCHUHMACHER, T. X. & CARDOSO, J. L. 2007. Ivory objects from the chalcolithic fortification of Leceia (Oeiras). *Estudos Arqueológicos de Oeiras* 15: 95-118.
- SCHUHMACHER, T. X.; BANERJEE, A.; DINNDORF, W.; SASTRI, C. & SAUVAGE, T. 2013. The use of sperm whale ivory in Chalcolithic Portugal. *Trabajos de Prehistoria* 70, 1: 185-203.
- SCHÜLE, W. 1980. *Orce und Galera*. Mainz am Rhein: Philipp von Zabern.
- SESÉ, C. & SOTO, E. 2000. Vertebrados del Pleistoceno de Madrid, In: *Patrimonio Paleontológico de la Comunidad de Madrid, Arqueología, Paleontología y Etnografía*, 6, Consejería de Cultura, Madrid: 216-243.
- SHEPHERD, I. A. G. 2009. The V-bored Buttons of Great Britain and Ireland. *Proceedings of the Prehistoric Society* 75: 335-369.
- SIRET, E. & SIRET, L. 1890. *La Edad de los Metales*, Barcelona.
- SOLER, J. A. 2013. Releyendo Villa Filomena. Notas sobre el proceso de investigación y acopio de materiales de un yacimiento imprescindible para el conocimiento del Campaniforme en la Península Ibérica. In Soler, J. A. (ed.): *Villa Filomena. Vila-Real (Castellón de la Plana) Memoria de una excavación nonagenaria*. Monografías de Prehistòria i Arqueologia Castellonenques, 9: 31-78.
- SPINDLER, K. 1981. *Cova da Moura*. Madrider Beiträge, 7. Philipp von Zabern.
- UGAS 1998. Facies campaniformi dell'ipogeo di Padru Jossu (Sanluri-Cagliari). In Nicolis, F. & Mottes, E. (ed.): *Simbolo ed enigma. Il bicchiere campaniforme e l'Italia nella preistoria europea del III milenio a.C.* Provincia Autónoma di Trento: 261-280.
- USCATESCU, A. 1992. *Los botones perforados en 'V' en la Península Ibérica y Baleares durante la Edad de los Metales*. Temas de Arqueología, 2, Foro Arqueología, Proyectos y Publicaciones, Madrid.

- VARELA GOMES, M. 2005. Artefactos de osso de Vila Nova de São Pedro. In Arnaud Morais, J. & Varela, C. (coord.): *Construindo a Memória. As Coleções Do Museu Arqueológico Do Carmo*. Associação dos Arqueólogos Portugueses. Lisboa: 194-196.
- VEGA, J.; BLASCO, C.; LIESAU, C.; RÍOS, P.; BLANCO, J. F.; MENDUIÑA, R.; ALIAGA, R.; MORENO, E.; HERRERA T.; PETRI, A. & GÓMEZ, J. L. 2010. La singular dualidad de enterramientos en el poblado de silos calcolítico de Camino de las Yeseras (San Fernando de Henares, Madrid), *Munibe Suplemento. Actas del Congreso Internacional sobre Megalitismo y otras manifestaciones funerarias contemporáneas en su contexto social, económico y cultural*, 11 al 15 de Junio de 2007. Beasain. Idiazabal (Guipúzcoa), XXXIV: 7-36.
- VILASECA, S. 1952. La Coveta de l'Heura, d'Ulldemolins (Provincia de Tarragona). *Ampurias*, XIV: 122-130.

Salt and Beakers in the third millennium BC

Elisa GUERRA DOCE

Dpto. de Prehistoria, Arqueología, Antropología Social y CC.TT. Historiográficas,
Universidad de Valladolid, Plaza del Campus, s/n, 47011 Valladolid, Spain
elisa.guerra@uva.es

Abstract

Salt was, and still is, a crucial element for the survival of agro-pastoral societies. Apart from its use as a condiment and as a dietary supplement for humans and livestock, it plays a very important role in the preservation of foodstuffs and in a range of industries (leather tanning, cloth dyeing, among others). An increasing number of sites confirm that salt was intensively exploited in prehistoric Europe from the Neolithic onwards, and it thus became an item of exchange in the trade networks. This paper focuses on the production of salt and its socio-economic implications during the third millennium BC. It is argued here that Beaker elites might have assumed control over its circulation in Western Europe. We also suggest some hypothesis about the relationship between trade routes and the distribution of the Beaker phenomenon in Europe.

Keywords: *Salt, Bell Beakers, Exchange, Trade routes, Skeuomorphs*

Résumé

Le sel a été et est toujours un élément principal pour la survie des sociétés agropastorales. À part de son usage comme assaisonnement et comme un supplément diététique pour les humains et le bétail, le sel joue un rôle très important dans la conservation d'aliments et dans un éventail d'industries (le tannage de cuir, teinture de tissus, parmi d'autres). Un grand nombre croissant de dépôts confirme que le sel a été bien exploité dans l'Europe préhistorique du Néolithique, et il est ainsi devenu un élément de l'échange dans les réseaux commerciaux. Ce document se concentre sur la production de sel et ses implications socio-économiques pendant le troisième Millénaire avant Jésus-Christ. On prétend ici que les élites campaniformes auraient pu prendre le contrôle de la diffusion du sel dans l'Europe Occidentale. Nous proposons également une hypothèse sur le rapport entre les routes du commerce et l'emplacement du phénomène campaniforme en Europe.

Mot-clés: *Sel, Campaniforme, Échange, Routes commerciales, Vannerie, Skeuomorphe*

1. Introduction

Salt was, and still is, a crucial element for the survival of agro-pastoral societies. Apart from its use as a condiment and as a dietary supplement for humans and livestock, it plays a very important role in the preservation of foodstuffs and in a range of industries (leather tanning, cloth dyeing, among others). Therefore, salt has been a concern for historians for many years (Mollat, 1968). In the 1960s it attracted the attention of archaeologists working on European Prehistory (Nenquin, 1961; Riehm, 1961), but it was not until recent times when the study of salt has emerged as a particular focus of interest (Saile, 2000; Weller, 2002a; Weller *et al.*, 2008; Abarquero *et al.*, 2012; Nikolov & Bacvarov 2012; Harding, 2013a; Brigand & Weller 2015).

Ethnographic studies, archaeological evidence and historical texts provide an overall picture of the production techniques that were developed for its procurement in the past. Different salt resources were exploited in Europe from the Neolithic onwards: sea water, salt springs, salty soil, and halite or rock salt (Weller, 2015). The most frequent exploitation procedures involved the evaporation of natural brines either by solar heating or by means of *briquetage* (massive deposits of roughly-made plain vessels and fired clay implements associated with boiling brine, which are broken and discarded on the site after use); filtering salty sand or mud; mining and quarrying halite or rock salt, and a recently documented technique involving wooden implements, wattle fences and troughs intended to permit the slow percolation of brine (Harding, 2013a).

This paper focuses on the evidence for the production of salt and its socio-economic implications during the third millennium BC. It is argued here that Beaker elites might have assumed control over its circulation in Western Europe. We also suggest some hypothesis about the relationship between trade routes and the distribution of the Beaker phenomenon in Europe.

2. The origins of the exploitation and circulation of salt in Europe

Evidence for the origins of salt exploitation in Europe is elusive. At the French Mesolithic site of Moriez, in Provence, a wooden structure, dated to around 5600 BC, and which was found around a salt spring, has been interpreted as a brine catchment system (Morin, 2002). However, the earliest confirmed data so far for salt production in Europe link this activity to farming societies (Fig. 1).

The Neolithic site of Poiana Slatinei, at Lunca, Romania, has provided the earliest evidence for salt production in the world (mid-sixth millennium BC), in the form of large amounts of combustion soils, ash and charcoal (Weller & Dumitroaia, 2005). From then on salt soon began to be produced in other sites in Eastern Europe. Circumstantial evidence comes from other Early Neolithic sites in Southeastern Europe, corresponding to the Starčevo-Körös-Criş culture (Harding, 2013a: 44-46), and it has even been suggested that there was a strong link between the Neolithization process and salt sources in the Balkan area (Tasić, 2000). Salt was intensively exploited during the Pre-Cucuteni and Cucuteni cultures in the eastern Carpathian region (Monah, 2002), and the Tripolye complex, which extended to the west, might have been supplied with salt from the Carpathians (Monah, 2012). In the Eastern Balkans, the salt production centre of Solnitsata, in Provadia, Bulgaria, started to operate in the Late Neolithic, by the late sixth millennium BC; but it was during the Chalcolithic, throughout the fifth millennium BC, when salt was produced on an industrial scale. This has been related to the

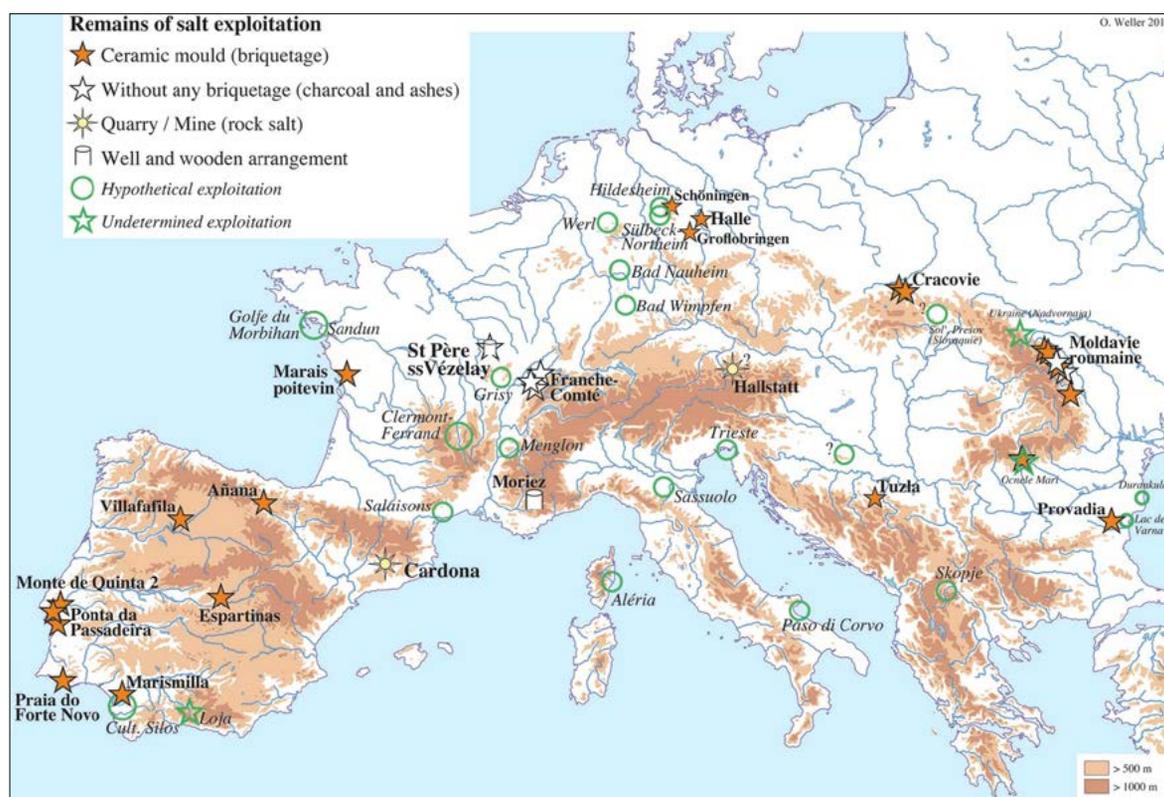


FIGURE 1. MAP OF EUROPE SHOWING THE LOCATION OF REMAINS OF SALT EXPLOITATION FOR THE NEOLITHIC AND CHALCOLITHIC PERIODS (COURTESY OF OLIVIER WELLER).

accumulation of wealth at the Varna cemetery, possibly resulting from the benefits of the trade in salt that could have been transported along the coast of the Black Sea and also to the mountain regions far to the east along the Lower Danube valley (Nikolov, 2010). Thus, the need for salt among those prehistoric groups inhabiting salt-poor areas in Eastern Europe and the Pontic-Caspian steppes may have facilitated the development of trade routes, intended not only for the circulation of salt but also for that of different raw materials and prestige items (Cavruc & Harding, 2012).

The best evidence for Neolithic salt production in Central Europe comes from several sites around Kraków in southern Poland, corresponding to the Middle Neolithic (Lengyel culture), by the mid-fifth millennium BC (Bukowski, 1985), while in Germany it was not until the later Neolithic (Bernburg culture) when salt was first produced in the Saale valley near Halle (Saile, 2012). However, on the basis of the tight spatial correlation observed in Germany between the salt springs and the distribution of greenstone long alpine axes, the exploitation and circulation of salt has been suggested, acting as an exchange item with the Neolithic societies of France by the fifth/fourth millennium BC (Weller, 2002b). Likewise, the occurrence of imported objects within salt-producing areas in Central Germany and Lesser Poland has also been considered evidence of salt trading along the Danube and eastwards into the Carpathian region (Saile, 2012). In Eastern France (Franche-Comté), salt was probably obtained by the fifth millennium BC, as is suggested by considerable accumulations of charcoal and ashes around salt springs (Pétrequin & Weller, 2008). In Centre-West France, along the Atlantic façade between the Marais poitevin and the Gironde estuary, a number of Final Neolithic ditched enclosures have provided a distinctive type of coarse ceramic vessels, dated to 3400-2900 cal BC, the use of which has been proven to be for boiling sea water (Ard & Weller, 2012).

Rock salt was extracted from the Muntanya de Sal outcrop, at Cardona (Barcelona, Spain), as early as the Middle Neolithic (4500-3500 cal BC) (Fíguls *et al.*, 2005), and salt may have been a major traded commodity that circulated through the existing exchange networks, along with the variscite from the close mines of Gavá, also in Barcelona (Weller *et al.*, 2007). Some indirect evidence suggests that the exploitation of the salt springs within the Salty Valley at Añana (Vitoria, Spain) by the use of *briquetage*, may have started by the Middle Neolithic, around the mid-fifth millennium cal BC (Martínez *et al.*, 2013). After a period of abandonment, salt springs at Añana were again exploited in the Chalcolithic throughout the third millennium cal BC (Plata & Martínez, 2014).

Other Neolithic sites on the Atlantic shores of south-west Iberia, spanning the late fourth and early third millennium cal BC, seem to be related to the production of salt, mainly due to the occurrence of large quantities of coarse ceramic vessels. From the mid-fourth millennium cal BC onwards there is circumstantial evidence for sea water processing at some Middle Neolithic sites around the Sado estuary, in Portugal, such as Barrosinha and Malhada Alta (Soares & Tavares, 2013: 160), and also at Praia do Forte Novo, in the Algarve region (Rocha, 2013). Despite the lack of charcoal, the boiling of sea water by *briquetage* has been suggested at the Final Neolithic site of La Marismilla (Puebla del Río, Sevilla, Spain), located on the former shoreline; this view is based on the occurrence of large quantities of pottery and certain structures that may have functioned as brine evaporation installations (Escacena *et al.*, 1996). Salt from La Marismilla might have been traded from the huge ditched enclosure at Valencina de la Concepción (Sevilla), less than 20 km away to the north (García Sanjuán, 2012: 50).

Circumstantial evidence for salt production comes from other Neolithic and Chalcolithic sites in Europe, but further research is still needed (Cassen & Weller, 2013; Harding, 2013a; Weller, 2015).

3. Archaeological evidence for salt production in the third millennium BC

During the transition from the fourth to the third millennium cal BC, evidence of salt processing in south-west Iberia becomes more abundant. At that time there was a sharp increase in the production of salt between the Sado and Tagus estuaries, as revealed by the massive accumulations of *briquetage*

at some Pre-Beaker Copper Age sites such as Monte da Quinta 2 (Valera *et al.*, 2006), Ponta da Passadeira (Soares, 2008; 2013), and Possanco (Soares & Tavares, 2013: 163). Considering that salt intended for exchange requires the production of considerable amounts that exceed the domestic needs of the producer (Cavruc & Harding, 2012: 181), these large accumulations of *briquetage* would suggest that the production of salt at those sites was not intended for the local market.

By the mid-third millennium BC, pottery interpreted as *briquetage* occurs in some Corded Ware sites from Central Europe, but evidence for salt production is not conclusive (Saile, 2012). This is in sharp contrast to the situation of the Bronze Age: many *briquetage* sites appeared in the Halle area of Germany, as well as in northern temperate Europe from Britain to Poland; solar evaporation of seawater took place along the Italian shores, and wooden installations spread over the Carpathian Basin. Thus, ‘*during the Bronze Age organised salt production becomes an everyday matter in many areas, and in some that production arguably reached industrial proportions*’ (Harding, 2013a: 88).

But returning to the evidence for the third millennium BC, when Beaker groups are considered, attention is to be focused on South-western Europe. At Saint-Pere-sous-Vézelay (Yonne, France) some wooden structures that might have functioned as brine collection wells, have been dated dendrochronologically to the 23rd century BC, that is to say, contemporary with the Bell Beaker culture (Bernard *et al.*, 2008), although no Beaker sherds have been recovered there.

The association of salt processing with Beaker groups is so far confined to Iberia. The spatial relationship has already been noted between Beaker sites (Ciempozuelos variant) and salt springs and lagoons in Central Spain (Delibes & del Val, 2007-8). In fact, Ciempozuelos Beaker sherds have been found in the surroundings of salt sources at El Perical and a few other locations within the Salado valley¹ (Sigüenza, Guadalajara) (Malpica *et al.*, 2011). At Fuente Camacho (Loja, Granada), near the Middle-Age saltworks, prehistoric pottery including a few Beaker sherds has been found in association with areas of burning and ashy layers (Terán & Morgado, 2011). A similar situation is observed at the Salt Valley of Salinas de Añana (Vitoria), where Ciempozuelos Beaker pottery has been found in spatial relation to brine-processing areas (Plata & Martínez, 2014). Excavations at Espartinas (Ciempozuelos, Madrid) have revealed an artificial mound formed by huge quantities of *briquetage*, areas of burning, interpreted as fires resulting from the process of boiling brine, along with Copper Age pottery and some Beaker sherds (Ayarzagüena & Carvajal, 2005; Valiente & Ramos, 2009). But more direct evidence comes from Molino Sanchón II, situated in the saline lagoons of Villafáfila (Zamora), where a number of brine processing areas consisting of wells, pits for filtering brine and heating places with clay pedestals, associated with large concentrations of ash and pottery, were dated to the second half of the third millennium cal BC (Abarquero *et al.*, 2012) (Fig. 2). A significant amount of Beaker pottery has been recovered in this salt processing factory for which political and symbolic interpretations have been proposed (Guerra *et al.*, 2011) (Fig. 3).

For the rest of Europe, there is remarkably scant knowledge of salt processing during the third millennium BC: no large accumulations of *briquetage*, nor any major sites beside salt sources are to be found. Professor Anthony Harding, one of the leading experts in salt production and circulation in Prehistoric Europe, has pointed out that ‘*taking the third millennium as a whole, one has to admit that there is little specific evidence anywhere, other than some isolated radiocarbon dates that suggest activity was proceeding (for instance at Băile Figa, Romania)*’² (Harding, 2013a: 88).

Therefore, according to our present knowledge of the Archaeology of Salt in prehistoric Europe, it seems that during the third millennium BC:

¹ It is interesting to note that Salado is the Spanish term for salty.

² At Băile Figa, a prehistoric salt production site in northern Romania, near Beclean, the earliest date (presumably the oldest object on the site so far) is from an elder branch from Trench III, dated 4381±28 BP, followed by a mallet from Trench I, dated 3837±35 BP. These appear to be isolated instances, as the other dates set the activity at this site during the Late Bronze Age and the Iron Age, although these two dates suggest there was earlier activity on the site (Harding & Kavruc, 2010).



FIGURE 2. BRINE BOILING AREA AT MOLINO SANCHÓN II (VILLAFÁFILA, ZAMORA, SPAIN) (PHOTO BY JAVIER ABARQUERO MORAS).

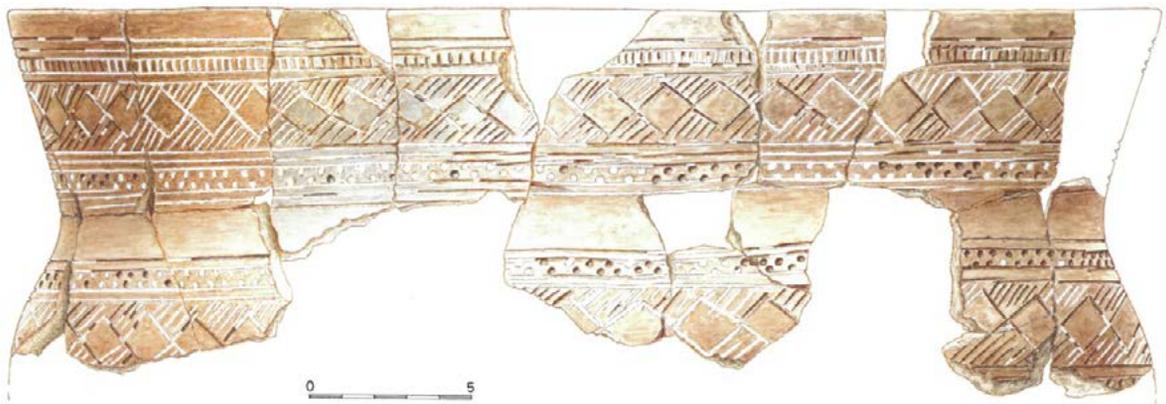


FIGURE 3. LARGE BELL BEAKER FOUND AT MOLINO SANCHÓN II (VILLAFÁFILA, ZAMORA, SPAIN) (DRAWING BY ÁNGEL RODRÍGUEZ GONZÁLEZ).

1. Evidence for salt production is practically confined to south-western Europe. However, despite the lack of direct evidence for salt processing in Eastern Europe, it seems unlikely that local communities were not aware of the salt sources that have been exploited over centuries, especially when evidence for the Neolithic and Chalcolithic suggests the circulation of salt through exchange networks. It cannot be overlooked that groups inhabiting salt-poor areas (such as Hungary or the Pontic-Caspian steppes) must continue to rely on the supply of salt from the production areas.
2. The significant accumulations of *briquetages* in a number of sites in Iberia suggest that salt was produced on a large scale. The amount of salt obtained would far exceed the needs of local groups; therefore, it would be intended for exchange.
3. Pre-Beaker Copper Age production sites are clustered in Portuguese Estremadura. Although we shall return to this issue later, it may be noted that it is in that very area where the Beaker phenomenon, or at least, its most distinctive item, the Maritime pot, might have originated.
4. By the late third millennium BC Ciempozuelos Beaker groups seem to have assumed control over the production of salt in Iberia.

4. Salt as an economic resource in the third millennium BC

Throughout the second half of the third millennium BC, a general dynamics of climate fluctuations has been documented in different parts of Europe, as a consequence of the effects of the 4,2 ka BP event, a short and abrupt climate change of extreme aridity (Wiener, 2014). This would have caused an intense drought, which has been seen as responsible for the collapse of many Old World civilisations and cultures (deMenocal, 2001; Wenxiang & Tungsheng, 2004).

It is precisely in times of subsistence shortfalls or other deleterious environmental conditions when social networks through which information and goods are transmitted are reinforced, as people turn to their neighbours for support and resources, such as food and information. Historically, this strategy seems to be a way of standing a better chance of dealing with an environmental crisis (Borck *et al.*, 2015).

Under such circumstances the importance of salt for prehistoric societies in Europe during the second half of the third millennium BC was twofold: on the one hand, it was an exchange commodity in its own right, but its use may have been more relevant as a food preservative, which has been a crucial element for the survival of ancient societies during long periods of winters and droughts. Crystallised salt or brine would have enabled the preservation of a wide range of foodstuffs, including meat, fish, vegetables and dairy products. Unlike hunter-gatherer societies, among which salt is not largely used for preserving food, traditionally farming societies, at least in Europe, use salt on a large scale in combination with other food preservation methods (such as smoking, or drying) (Monah, 2012: 139). Consequently, this would have greatly facilitated the movement of peoples, as the preservation of food is essential for long distance travel.

Therefore, one of the reasons behind the rapid spread of the Bell Beaker package throughout Western and Central Europe –something that took place during the second half of the third millennium BC– might have been the severe climatic conditions resulting from the aridification conditions that made prehistoric communities interact. The Beaker phenomenon itself is an excellent case of long-distance contacts within Europe, and one of the most illustrative examples of this dynamic corresponds to the Amesbury Archer's grave in southern Britain. Not only do many of the burial goods show connections with types either from Continental Europe or the Atlantic façade (the copper knives were actually made of ores from Spain and Western France), but the Archer himself lived in the Alps region when he was a child (Fitzpatrick, 2011).

5. A hypothesis concerning the production and circulation of salt within Beaker territories

Apart from the procedure adopted for the procurement of salt, organic containers (textiles, wooden implements, and basketry) have played an important role in traditional salt production processes all over the world (Fig. 4), even during the extraction of rock salt, evidence of which are the many Bronze Age and Iron Age work textiles found in the Hallstatt mines (Grömer *et al.*, 2013). The processing of salty earth also includes the basketwork filters in Nigeria, a technique which involves a combination of filtering and *briquetage* (Goutlequer, 1975). Baskets were, and still are, used in a number of activities: in Scotland, for instance, containers of seawater were heated and the water boiled away, leaving just a salt paste which was then put in baskets for further purification and so as to dry out completely, according to the research carried out in the framework of the project *Woven communities: Basketmaking Communities in Scotland*, funded by the Arts & Humanities Research Council, and developed by the University of Saint Andrews and the Scottish Basketmakers Circle (<http://wovencommunities.org>). Ethnographic examples of traditional salt production in south-east Asia and Africa have shown that basket containers are often used to sieve salt for impurities, to hold wet salt for drying, and in some areas to transport salt for trade (for references see Hathaway, 2013: 248). There is also ethnographic evidence from Mexico for the removal of moisture from salt by using textile sacks that are hung above evaporation hearths (Ceja, 2011).



FIGURE 4. SALT BOILING IN THE EARLY MODERN PERIOD (AFTER AGRICOLA, 1556).

In prehistoric Europe baskets and woven mats were also present at salt-production centres involved in boiling brine with the help of *briquetage*, as suggested by the occurrence of basket and mat impressions on many pottery vessels and clay implements (Valiente *et al.*, 2003; Weller, 2012: 74) (Fig. 5). In fact, among the general characteristics of the *briquetage* all over prehistoric Europe are the plant imprints and traces of wickerwork on the bottom that have been widely recognized on vessels serving both as moulds and crystallizers (Weller, 2015: 72). Additionally, on a Romano-British salt-production site there is direct evidence supporting the use of basketry in salt production, as indicated by a large fragment of basket recovered beneath a *briquetage* mound at site 166 (Huntspill, Somerset, Britain) (Grove & Brunning, 1998).

The means by which salt was transported in prehistoric Europe are not known, but it is unlikely that brine would have been involved in long distances exchanges or that crystallised salt was transported in durable containers. Ethnographic parallels show that traded salt is moved in cakes or sheets, in baskets or wrapped in textiles or vegetable material (Harding, 2013b: 377). Be that as it may, there is a clear homogeneity of the salt traded, as containers have a predetermined size, which helps to quantify the volume of salt. Besides, these salt containers become a social object, an identity marker of the producers, capable of enabling long-distance exchange networks (Weller, 2015: 72, 75).

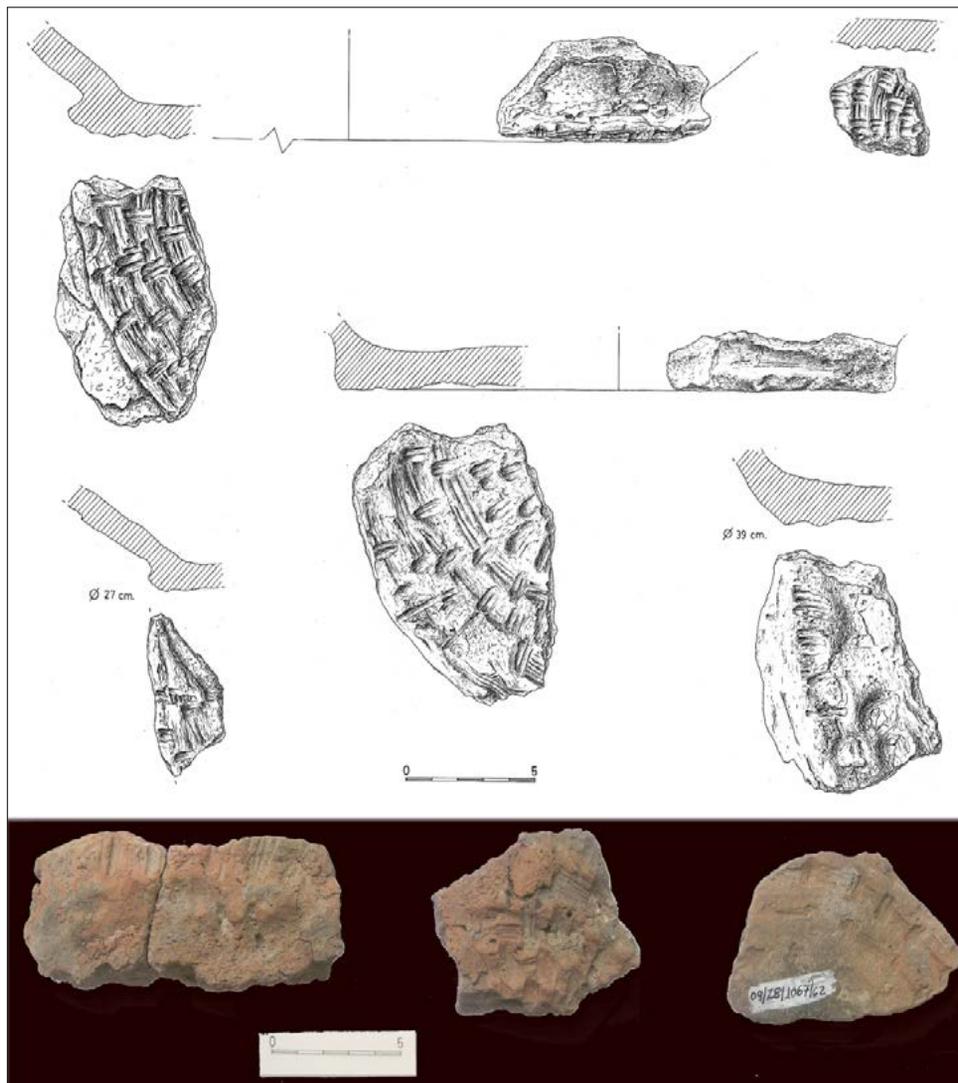


FIGURE 5. BASKETRY IMPRINTS ON SOME POTTERY SHERDS FOUND AT MOLINO SANCHÓN II (VILLAFÍLILA, ZAMORA, SPAIN) (DRAWING BY ÁNGEL RODRÍGUEZ GONZÁLEZ AND PHOTOS BY JAVIER ABARQUERO MORAS).

One of the ceramic styles in prehistoric Europe that best tallies with the concept of specialized production is Beaker pottery, and, more specifically, the Maritime variant. As a result, Laure Salanova (2000a) refers to this type as the standard. Not only are the distinctive shape, capacity, and decorative patterns of the Maritime Beakers similar all over Europe, but some technological aspects (such as the deliberate selection of iron-rich clays and the control over the firing conditions) also indicate that these vessels were intentionally fired to a practically consistent reddish-brown colour (Lantes-Suárez *et al.*, 2015). All these features lead us to believe that Maritime beakers may be imitating actual baskets or containers woven in vegetal fibers. The idea of Beaker pots as skeuomorphic copies or ceramic replicas of basket work is not new. It was Louis Siret, over a century ago, who noticed the similarity of certain Beaker vessels and some of the esparto grass containers found at the Neolithic site of Cueva de los Murciélagos, in south-east Spain (Siret, 1913: 205-207). It has even been suggested that some decorative patterns on Beaker pots can be attributed to wrappings of string or cloth, which provide a technological advantage by supporting wet and thin clay during the building-up of the vessel, especially if its shape is complex, as is the case (van der Leeuw, 1976). The presence of twisted cord impressions in the AOC and CZM variants strongly supports this

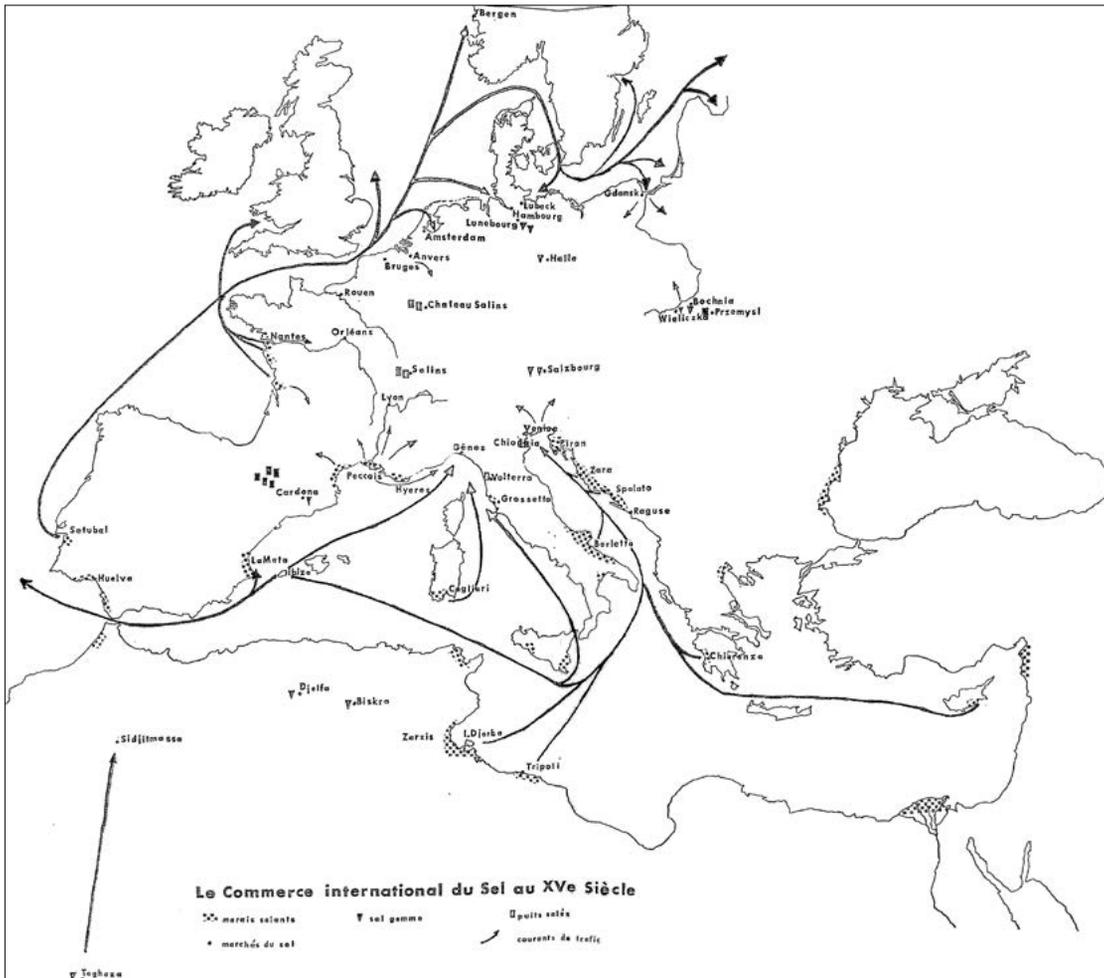


FIGURE 6. SALT TRADING ROUTES IN EUROPE IN MODERN TIMES (AFTER MOLLAT, 1968).

hypothesis.³ Indeed, basketry was fully developed in Iberia from the Early Neolithic onwards, as the esparto grass containers recovered at Cueva de los Murciélagos (Albuñol, Granada, Spain), dating back to the late sixth/early fifth millennium BC, clearly illustrate (Cacho *et al.*, 2006).

Current knowledge seems to indicate that the origin of the Maritime Beakers may be established in Portuguese Estremadura (Cardoso, 2014; Carvalho-Amaro, 2013; Kunst, 2001; Salanova, 2000b, 2002). The Maritime variant seems to have spread from Portugal along the Atlantic coast, as far as northern Europe (Salanova, 2004). In this process sea routes played an important role, as shown by the similarity of Maritime Beakers presenting shell impressions, which tend to cluster in a number of coastal locations (Prieto & Salanova, 2009). Perhaps it is not merely a coincidence that this Atlantic route linking Portuguese Estremadura and the Lower Rhine area in prehistoric times, the same route proposed by Edward Sangmeister (1963) to explain the expansion of the Beaker package from the Tagus estuary to Central Europe, became an established salt trading route in Modern times connecting Setubal and Amsterdam (Antunes, 2008) (Fig. 6). All this leads us to suggest that Maritime Beakers

³ R. Harrison noted that 'since a basketry skeuomorph can occur wherever there are baskets and pots, it can clearly occur more than once' (Harrison, 1974: 100). Therefore AOC might have evolved from the Corded Ware, which actually included cord impressions possibly made of bast-fibre and grass material (Grömer & Kern, 2010), when coming into contact with Maritime Beakers, from which the AOC Beakers took the S-profile. On the other hand, CZM forms, which are quite exceptional in Iberia (Suárez, 2011), would be Maritime vessels adopting the cord decoration from Central Europe (Siret, 1913: 208): the reflux movement, according to Sangmeister (1963).

might be imitations of the actual baskets or sacks that were perhaps used to transport salt abroad from the production centres located on the Sado and Tagus estuaries. If we are right, and Beaker pots are in fact imitating salt containers in vegetal fibers, these vessels may, then, be the materialization of the trading routes connecting Western and Central Europe.

6. Discussion

The Beaker phenomenon spread rapidly over Europe in a West-East direction, but its advance was suddenly halted at a certain point (Heyd, 2007). While some isolated findings of the Beaker package have been recovered beyond the eastern border of this phenomenon, conventionally located at 20° eastern longitude (Demchenko, 2013), prehistoric Europe during the third millennium BC can be divided into two main areas: Beaker-adopting groups and Non-Beaker-adopting groups (Fig. 7).

Among the many reasons that may explain this situation, the role of salt in the existing trade routes is worth taking into consideration. In Eastern Europe salt was circulating over long distances from the Neolithic, *ca.* sixth millennium BC. However, evidence for salt production intended for exchange in Western Europe dates back to the late fourth/early third millennium BC. We suggest that exchange networks were reinforced throughout the third millennium BC as a result of the 4,2 ka BP event. In Western Europe salt then became an important commodity itself (possibly being transported in textile sacks or baskets?), not to mention the fact that it facilitated the preservation of food, which at the same time enabled long-distance journeys.

Considering that the Beaker phenomenon is concentrated in distinct regions that all have access to the sea or major rivers, Van de Noort (2012) argues that navigation, and especially seafaring, seems to be of key importance in the distribution of the Beaker package. Ethnographic accounts show that long-distance journeys are an important empowering activity, as they provide the traveler with exotic objects, apart from specialized knowledge (Helms, 1988). Therefore, those prehistoric individuals that possessed the capacity and the special knowledge to mount trading expeditions on the sea may have gained a dominant position among their peers (Ivanova, 2012: 360). In a similar way to that which Kristiansen (1984) has proposed for the Neolithic polished axes, the possession of Beaker items would require social groups to form alliances and relationships, involving the movement of people and exchange of goods and commodities. In this context, the use of Beaker pottery should be associated with rituals of hospitality, in which special foods and also alcohol were consumed (Sherratt, 1987), involving local communities and non-local navigators. Indeed residue analyses have found traces suggestive of beer, mead, and animal fats in some Beaker pots (Guerra, 2006; Guerra *et al.*, 2011-2012; Muckherjee *et al.*, 2011).

However, in Eastern Europe trading systems and cultural interactions were established with the Pontic steppes and the Aegean from the Neolithic. Among many other prestige items, salt was also circulating through those exchange networks. Therefore prehistoric societies from Eastern Europe, the Balkans and the Aegean felt no attraction for the Beaker package. On the other hand, Beaker groups may have controlled exchange networks in Western Europe, as well as certain technologies (copper metallurgy) and the production and circulation of prestige items, such as salt in Iberia, as the association of Ciempozuelos Beaker sites and salt production areas seems to suggest.

It must be admitted that this is a speculative paper and that some arguments still need to be tested. One of the weaknesses of our proposal is that there is no direct evidence as yet for salt production in Beaker sites in Portugal. However, it is also true that the need for salt would have been the same as in previous times, and it seems unlikely that the exploitation of salt that started at least in the Middle Neolithic would have suddenly stopped. In any case, we find it interesting as a line of research for further work to assess the agency of salt in not only the spread of the Beaker phenomenon, but also in its progressive disappearance, which is maybe related to the development of salt production all over Europe during the second millennium BC.

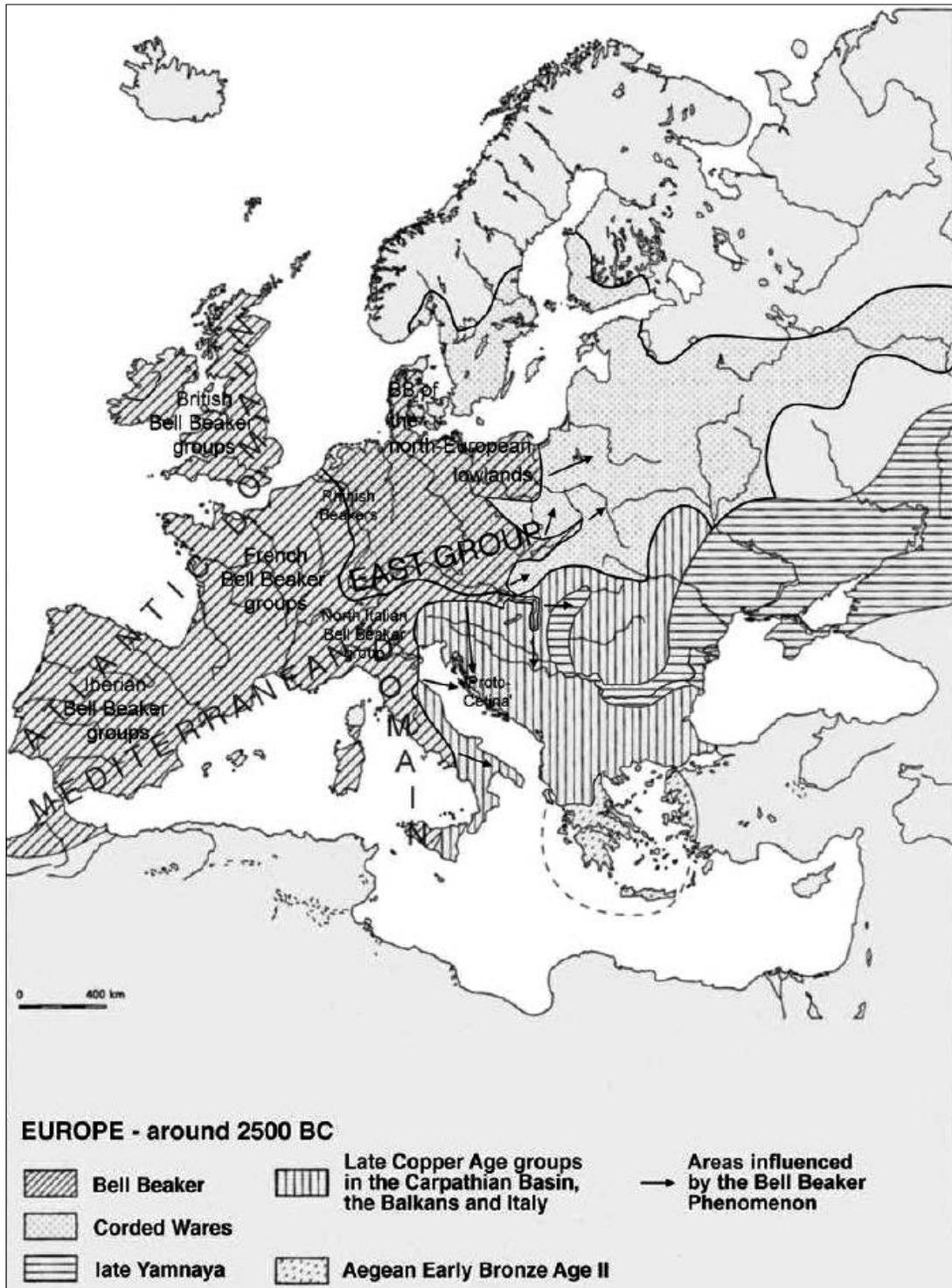


FIGURE 7. MAP OF EUROPE AROUND 2500 BC (AFTER HEYD, 2007).

References

- ABARQUERO MORAS, F. J.; GUERRA DOCE, E.; DELIBES DE CASTRO, G.; PALOMINO LÁZARO, A. L. & DEL VAL RECIO, J. 2012. *Arqueología de la Sal en las Lagunas de Villafáfila (Zamora): Investigaciones sobre los cocederos prehistóricos* (Arqueología en Castilla y León, 9). Valladolid: Junta de Castilla y León.

- AGRICOLA, G. 1556. *De Re Metallica* [Translated for the first Latin Edition by H. C. Hoover & L. H. Hoover (1950). New York: Dover Publications].
- ANTUNES, C. 2008. The commercial relationship between Amsterdam and the Portuguese salt-exporting ports: Aveiro and Setubal, 1580-1715. *Journal of Early Modern History* 12, 1: 25-53.
- ARD, V. & WELLER, O. 2012. Les vases de 'type Champ-Durand': témoins d'une exploitation du sel au Néolithique récent dans le Marais poitevin. In Joussaume, R. (ed.): *L'enceinte néolithique de Champ-Durand à Nieul-sur-l'Autise (Vendée)*. Chauvigny: Association des publications chauvinoises: 309-333.
- AYARZAGÜENA SANZ, M. & CARVAJAL GARCÍA, D. 2005. Sistemas de explotación de sal en las Salinas de Espartinas. In Puche, O. & Ayarzagüena, M. (eds.): *Minería y metalurgia históricas en el sudoeste europeo*. Madrid: SEHA: 71-78.
- BERNARD, V.; PÉTREQUIN, P. & WELLER, O. 2008. Captages en bois a la fin du Néolithique: les Fontaines Salées a Saint-Pere-sous-Vézelay. In Weller, O.; Dufraisse, A. & Petrequin, P. (eds.): *Sel, eau et forêt. D'hier à aujourd'hui. Actes du colloque international de la Saline Royale d'Arc-et-Senans, octobre 2006* (Cahiers de la MSHE Ledoux, 12. Série Homme et environnement, 1). Besançon: Presses Universitaires de Franche-Comté: 299-333.
- BORCK, L.; MILLS, B. J.; PEEPLES, M. A. & CLARK, J. J. 2015. Are Social Networks Survival Networks? An Example from the Late Pre-Hispanic US Southwest. *Journal of Archaeological Method and Theory* 22, 1: 33-57.
- BRIGAND, R. & WELLER, O. (eds.) 2015. *Archaeology of Salt: Approaching an invisible Past*. Leiden: Sidestone Press.
- BUKOWSKI, Z. 1985. Salt production in Poland in prehistoric times. *Archaeologia Polona* 24: 27-71.
- CACHO QUESADA, C.; PAPI RODES, C.; SÁNCHEZ-BARRIGA FERNÁNDEZ, A. & ALONSO MATHIAS, F. 2006. La cestería decorada de la Cueva de los Murciélagos (Albuñol, Granada). *Complutum Extra* 6(1): 105-122.
- CARDOSO, J. L. 2014. Absolute chronology of the Beaker phenomenon North of the Tagus estuary: demographic and social implications. *Trabajos de Prehistoria* 71, 1: 56-75.
- CARVALHO-AMARO, G. 2013. Pre-Bell Beaker ware from Estremadura, Portugal, and its likely influence on the appearance of Maritime Bell Beaker ware. In Prieto Martínez, P. & Salanova, L. (coords.): *Current researches on Bell Beakers. Proceedings of the 15th International Bell Beaker Conference: From Atlantic to Ural. 5th-9th May 2011. Poio (Pontevedra, Galicia, Spain)*. Santiago de Compostela: Galician ArchaeoPots: 197-208.
- CASSEN, S. & WELLER, O. 2013. Idées et faits relatifs à la production des sels marins et terrestres en Europe, du VIe au IIIe millénaire. In Soares, J. (ed.): *Pré-história das Zonas Húmidas: Paisagens de Sal* (Setúbal Arqueológica, 14). Setúbal: Museu de Arqueologia e Etnografia do Distrito de Setúbal: 255-304.
- CAVRUC, V. & HARDING, A. 2012. Prehistoric production and exchange of salt in the Carpathian-Danube region. In Nikolov, V. & Bacvarov, K. (eds.): *Salz und Gold: die Rolle des Salzes im prähistorischen Europe/Salt und Gold: The Role of Salt in Prehistoric Europe. Akten der internationaler Fachtagung (Humboldt-Kolleg) in Provadia, Bulgarien 30 September-4 October 2010*. Provadia: Faber: 173-200.
- CEJA ACOSTA, J. A. 2011. El Salado-Ixtahuehue and Benito Juárez-Soconusco: an Ethno-Archaeological Study of Salt Pre-industries of Southeast Veracruz, Mexico. In Weller, O. & Curcă, R. G. (eds.): *Archaeology and Anthropology of Salt: A Diachronic Approach. Proceedings of the International Colloquium, 1-5 October 2008, Al. I. Cuza University (Iași, Romania)* (BAR International Series, 2198). Oxford: Archaeopress: 37-48.
- DELIBES, G. & DEL VAL, J. 2007-8. La explotación de la sal al término de la Edad del Cobre en la Meseta Central Española: ¿Fuente de riqueza e instrumento de poder de los jefes Ciempozuelos? *Veleia* 24-25: 791-811.
- DEMCHENKO, T. 2013. Where does the East meet the West? A find of a wrist guard in the Republic of Moldova. In Prieto Martínez, P. & Salanova, L. (coords.): *Current researches on Bell Beakers. Proceedings of the 15th International Bell Beaker Conference: From Atlantic to Ural. 5th-9th*

- May 2011. Poio (Pontevedra, Galicia, Spain). Santiago de Compostela: Galician ArchaeoPots: 117-127.
- DEMENOCAL, P. B. 2001. Cultural Responses to Climatic Change during the Late Holocene. *Science* 292, 5517: 667-673.
- ESCACENA, J. L.; RODRÍGUEZ DE ZULOAGA, M. & LADRÓN DE GUEVARA, I. 1996. *Guadalquivir salobre. Elaboración prehistórica de sal marina en las antiguas bocas del río*. Sevilla: Confederación Hidrográfica del Guadalquivir.
- FIGULS, A.; BONACHE, J.; ARANDA, J.; SUÑÉ, J.; VENDRELL, M.; GONZÁLEZ, J.; MATA-PERELLÓ, J. M. & SANZ, J. 2005. Neolithic exploitation of halite at the Vall Salina of Cardona (Catalonia, Spain). In Figuls, A. & Weller, O. (eds.): *1ª Trobada internacional d'arqueologia envers l'explotació de la sal a la prehistòria i protohistòria. Cardona, 6-8 de desembre del 2003* (Arqueologia Cardonensis, I). Cardona: Institut de Recerques envers la Cultura: 199-218.
- FITZPATRICK, A. P. 2011. *The Amesbury Archer and the Boscombe Bowmen: Bell Beaker burials at Boscombe Down, Amesbury, Wiltshire* (Wessex Archaeology Report, 27). Wessex: Wessex Archaeology.
- GARCÍA SANJUÁN, L. 2012. El asentamiento de la Edad del Cobre de Valencina de la Concepción: Estado actual de la investigación, debates y perspectivas. In García Sanjuán, L.; Vargas Jiménez, J. M.; Hurtado Pérez, V.; Ruiz Moreno, T. & Cruz-Auñón Briones, R. (eds.): *El asentamiento prehistórico de Valencina de la Concepción (Sevilla): Investigación y tutela en el 150 Aniversario del descubrimiento de La Pastora*. Sevilla: Universidad de Sevilla: 21-59.
- GOULETQUER, P. L. 1975. Niger, Country of Salt. In de Brisay, K. W. & Evans, K. A. (eds.): *Salt, The Study of an Ancient Industry*. Colchester: Colchester Archaeological Group: 47-51.
- GRÖMER, K. & KERN, D. 2010. Technical data and experiments on Corded Ware. *Journal of Archaeological Science* 37, 12: 3136-3145.
- GRÖMER, K.; RÖSEL-MAUTENDORFER, H. & RESCHREITER, H. 2013. Funktion der Textilien aus dem Bergwerk/Function of textiles in the salt mines. In Grömer, K.; Kern, A.; Reschreiter, H. & Rösel-Mautendorfer, H. (eds.): *Textiles from Hallstatt: Weaving Culture in Bronze Age and Iron Age Salt Mines/Textilien aus Hallstatt: Gewebte Kultur aus dem bronze- und eisenzeitlichen Salzbergwerk*. Budapest: Archaeolingua: 119-134.
- GROVE, J. & BRUNNING, R. 1998. The Romano-British salt industry in Somerset. *Archaeology in the Severn Estuary 1998*. (Annual Report of the Severn Estuary Levels Research Committee, 9): 61-68.
- GUERRA DOCE, E. 2006. Exploring the significance of Beaker pottery through residue analyses. *Oxford Journal of Archaeology* 25, 3: 247-259.
- GUERRA DOCE, E.; DELIBES DE CASTRO, G.; ABARQUERO MORAS, F. J.; DEL VAL RECIO, J. M. & PALOMINO LÁZARO, Á. L. 2011. The Beaker salt production centre of Molino Sanchón II, Zamora, Spain. *Antiquity* 85, 329: 805-818.
- GUERRA DOCE, E.; DELIBES DE CASTRO, G.; RODRÍGUEZ MARCOS, J. A.; CRESPO DíEZ, M.; GÓMEZ PÉREZ, A.; HERRÁN MARTÍNEZ, J. I.; TRESSERRAS JUAN, J. & MATAMALA MELLÍN, J. C. 2011-2012. Residuos de productos lácteos y de grasa de carne en dos recipientes cerámicos de la Edad del Bronce del valle medio del Duero. *BSAA arqueología*, LXXVII-LXXVIII: 105-137.
- HARDING, A. 2013a. *Salt in Prehistoric Europe*. Leiden: Sidestone Press.
- HARDING, A. 2013b. Trade and Exchange. In Fokkens, H. & Harding, A. (eds.): *The Oxford Handbook of the European Bronze Age*. Oxford: Oxford University Press: 370-381.
- HARDING, A. & KAVRUK, V. 2010. A prehistoric salt production site at Băile Figa, Romania. *Eurasia Antiqua* 16: 131-167.
- HARRISON, R. J. 1974. Origins of the Bell Beaker Cultures. *Antiquity* 48, 190: 99-109.
- HATHAWAY, S. J. 2013. *Making the invisible, visible. Iron Age and Roman salt-production in Southern Britain*. PhD Thesis. Bournemouth: Bournemouth University.
- HELMS, M. W. 1988. *Ulysses' Sail. An Ethnographic Odyssey of Power, Knowledge, and Geographical Distance*. Princeton: Princeton University Press.
- HEYD, V. 2007. Families, Prestige Goods, Warriors & Complex Societies: Beaker Groups of the 3rd Millennium cal BC along the Upper & Middle Danube. *Proceedings of the Prehistoric Society* 73: 327-379.

- IVANOVA, M. 2012. Perilous Waters: Early Maritime Trade along the Western Coast of the Black Sea (Fifth Millennium BC). *Oxford Journal of Archaeology* 31, 4: 339-365.
- KRISTIANSEN, K. 1987. Ideology and Material Culture: an Archaeological Perspective. In Spriggs, M. (ed.): *Marxist Perspectives in Archaeology*. Cambridge: Cambridge University Press: 72-100.
- KUNST, M. 2001. *Invasion? Fashion? Social Rank? Considerations concerning the Bell Beaker phenomenon in Copper Age fortifications of the Iberian Peninsula*. In Nicolis, F. (ed.): *Bell Beakers today: Pottery, people, culture, symbols in prehistoric Europe. Proceedings of the International Colloquium Riva del Garda (Trento, Italy) 11-16 May 1998*. Trento: Provincia Autonoma di Trento: 81-90.
- LANTES-SUÁREZ, O.; PRIETO, B.; PRIETO-MARTÍNEZ, P.; FERRO-VÁZQUEZ, C. & MARTÍNEZ-CORTIZAS, A. 2015. The colour of ceramics from Bell Beaker contexts in NW Spain: relation to elemental composition and mineralogy. *Journal of Archaeological Science* 54: 99-109.
- MALPICA CUELLO, A.; MORÈRE MOLINERO, N.; FÁBREGAS GARCÍA, A. & JIMÉNEZ GUIJARRO, J. 2011. Land Organisation and Salt Production in Region of the Salado River (Sigüenza, Province of Guadalajara, Spain): Ancient and Medieval Times. Results of the First Campaign 2008. In Weller, O. & Curcă, R. G. (eds.): *Archaeology and Anthropology of Salt: A Diachronic Approach. Proceedings of the International Colloquium, 1-5 October 2008, Al. I. Cuza University (Iasi, Romania)* (BAR International Series, 2198). Oxford: Archaeopress: 179-185.
- MARTÍNEZ TORRECILLA, J. M.; PLATA MONTERO, A. & SÁNCHEZ ZUFIAURRE, L. 2013. Paisaje Cultural del Valle Salado de Añana. Intervención arqueológica en el extremo sur. *Arkeoikuska* 12: 48-53.
- MOLLAT, M. (dir.) 1968. *Le rôle du sel dans l'histoire* (Publications de la Faculté des Lettres et Sciences Humaines de Paris-Sorbonne. Série Recherches, 37). Paris: Presses Universitaires de France.
- MONAH, D. 2002. L'exploitation préhistorique du sel dans les Carpathes orientales. In Weller, O. (ed.): *Archéologie du Sel: Techniques et Sociétés dans la Pré- et Protohistoire européenne. Actes du Colloque 12.2 du XIVe Congrès UISPP, 4 septembre 2001, Liège et de la Table Ronde du Comité des Salines de France, 19 mai 1998, Paris* (ASTK, 3). Rahden: Marie Leidorf GmbH, Internationale Archäologie: 135-146.
- MONAH, D. 2012. L'approvisionnement en sel des tribus chalcolithiques sédentaires et des tribus des steppes du Nord de la Mer Noire. In Nikolov, V. & Bacvarov, K. (eds.): *Salz und Gold: die Rolle des Salzes im prähistorischen Europe/Salt und Gold: The Role of Salt in Prehistoric Europe. Akten der internationaler Fachtagung (Humboldt-Kolleg) in Provadia, Bulgarien 30 September-4 October 2010*. Provadia: Faber: 127-142.
- MORIN, D. 2002. L'extraction du sel dans les Alpes durant la Préhistoire. La source salée de Moriez, Alpes de Haute Provence (France) (cal. BC 5810-5526). In Weller, O. (ed.): *Archéologie du Sel: Techniques et Sociétés dans la Pré- et Protohistoire européenne. Actes du Colloque 12.2 du XIVe Congrès UISPP, 4 septembre 2001, Liège et de la Table Ronde du Comité des Salines de France, 19 mai 1998, Paris* (ASTK, 3). Rahden: Marie Leidorf GmbH, Internationale Archäologie: 153-162.
- MUCKHERJEE, A. J.; EVERSLED, R. P. & GIBSON, A. M. 2011. Organic residue analyses. In Fitzpatrick, A. P.: *The Amesbury Archer and the Boscombe Bowmen: Bell Beaker burials at Boscombe Down, Amesbury, Wiltshire* (Wessex Archaeology Report, 27). Wessex: Wessex Archaeology: 154-156.
- NENQUIN, J. 1961. *Salt, a study in economic prehistory* (Dissertationes Archaeologicae Gandenses, VI). Brugge: De Tempel.
- NIKOLOV, V. 2010. Salt and Gold: Provadia-Solnitsata and the Varna Chalcolithic cemetery. *Archäologisches Korrespondenzblatt* 40, 4: 487-501.
- NIKOLOV, V. & BACVAROV, K. (eds.) 2012. *Salt and gold: the role of salt in prehistoric Europe*. Provadia: Faber.
- PETREQUIN, P. & WELLER, O. 2008. L'exploitation préhistorique des sources salées dans le Jura français. Application et critiques d'un modèle prédictif. In Weller, O.; Dufraisse, A. & Pétrequin, P. (eds.): *Sel, eau et forêt. D'hier à aujourd'hui* (Cahiers de la MSH Ledoux, 12; coll. Homme et environnement, 1). Besançon: Presses Universitaires de Franche-Comté: 255-279.

- PLATA MONTERO, A. & MARTÍNEZ TORRECILLA, J. M. 2014. Explotación salinera. Excavación en el sector 25. *Arkeoikuska* 13: 55-63.
- PRIETO MARTÍNEZ, M. P. & SALANOVA, L. 2009. Coquilles et campaniforme en Galice et en Bretagne: mécanismes de circulation et stratégies identitaires. *Bulletin de la Société Préhistorique Française* 106, 1: 73-93.
- RIEHM, K. 1961. Prehistoric Salt-Boiling. *Antiquity* 35, 139: 181-191.
- ROCHA, L. 2013. A Praia do Forte Novo. Um sítio de produção de sal na costa algarvia? In Soares, J. (ed.): *Pré-história das Zonas Húmidas: Paisagens de Sal* (Setúbal Arqueológica, 14). Setúbal: Museu de Arqueologia e Etnografia do Distrito de Setúbal: 225-232.
- SAILE, T. 2000. Salz im ur- und frühgeschichtlichen Mitteleuropa. Eine Bestandsaufnahme. *Bericht der Römisch-Germanischen Kommission* 81: 130-234.
- SAILE, T. 2012. Salt in the Neolithic of Central Europe: Production and Distribution. In Nikolov, V. & Bacvarov, K. (eds.): *Salz und Gold: die Rolle des Salzes im prähistorischen Europe/Salt and Gold: The Role of Salt in Prehistoric Europe. Akten der internationaler Fachtagung (Humboldt-Kolleg) in Provadia, Bulgarien 30 September-4 October 2010*. Provadia: Faber: 225-238.
- SALANOVA, L. 2000a. *La question du Campaniforme en France et dans les Iles anglo-normandes: productions, chronologie et rôles d'un standard ceramique*. Paris: Société Préhistorique Française.
- SALANOVA, L. 2000b. Mécanismes de diffusion des vases campaniformes: les liens franco-portugais. In Jorge, V. O. (ed.): *3^e Congresso de Arqueologia Peninsular (Vila Real, Portugal, setembro de 1999), vol 4: Pré-história recente da Península ibérica*. Porto: ADECAP: 399-409.
- SALANOVA, L. 2002. Fabrication et circulation des céramiques campaniformes. In Guilaine, J. (dir.): *Matériaux, productions, circulations du Néolithique à l'Age du Bronze*. Paris: Errance: 151-166.
- SALANOVA, L. 2004. Le rôle de la façade atlantique dans la genèse du Campaniforme en Europe. *Bulletin de la Société Préhistorique Française* 101, 2: 223-226.
- SANGMEISTER, E. 1963. Exposé sur la civilisation du vase campaniforme. In *Les Civilisations Atlantiques du Néolithique à l'Age du Fer. Actes du Premier Colloque Atlantique. Brest 1961*. Rennes: Laboratoire d'Anthropologie Préhistorique: 25-56.
- SHERRATT, A. 1987. Cups that cheered: the introduction to alcohol to prehistoric Europe. In Waldren, W. & Kennard, R. (eds.): *Bell beakers of the western Mediterranean: the Oxford International Conference 1986* (BAR International Series, 331). Oxford: Archaeopress: 81-106. [Reprinted with additions as Chapter 15 in A. Sherratt (1997): *Economy and society in prehistoric Europe: changing perspectives*. Edinburgh: Edinburgh University Press].
- SIRET, L. 1913. *Questions de chronologie et d'ethnographie ibériques. Tome I: De la fin du Quaternaire à la fin du Bronze*. Paris: Paul Geuthner.
- SOARES, J. 2008. Economias anfíbias na costa sudoeste ibérica IV/III milénios BC: O caso da Ponta da Passadeira (Estuário do Tejo). In Hernández Pérez, M. S.; Soler Díaz, J. A. & López Padilla, J. A. (eds.): *Actas del IV Congreso de Neolítico Peninsular. Alicante 27-30 noviembre 2006. Tomo II*. Alicante: Museo Arqueológico de Alicante: 356-364.
- SOARES, J. 2013. Sal e conchas na Pré-História portuguesa. O povoado da Ponta da Passadeira (estuário do Tejo). In Soares, J. (ed.): *Pré-história das Zonas Húmidas: Paisagens de Sal* (Setúbal Arqueológica 14). Setúbal: Museu de Arqueologia e Etnografia do Distrito de Setúbal: 171-196.
- SOARES, J. & TAVARES DA SILVA, C. 2013. Economia agro-marítima na Pré-História do estuário do Sado. Novos dados sobre o Neolítico da Comporta. In Soares, J. (ed.): *Pré-história das Zonas Húmidas: Paisagens de Sal* (Setúbal Arqueológica, 14). Setúbal: Museu de Arqueologia e Etnografia do Distrito de Setúbal: 145-170.
- SUÁREZ OTERO, J. 2011. Del Campaniforme Cordado (AOC) en el Noroeste hispánico. Un extraño e inesperado invitado. In Prieto Martínez, M. P. & Salanova, L. (cords.): *Las comunidades campaniformes en Galicia: Cambios sociales en el III y II milenios BC en el NW de la Península Ibérica*. Pontevedra: Diputación de Pontevedra: 259-265.
- TASIĆ, N. N. 2000. Salt use in the Early and Middle Neolithic of the Balkan Peninsula. In Nikolova, L. (ed.): *Technology, Style and Society* (BAR International Series, 854). Oxford: Archaeopress: 35-41.

- TERÁN, J. & MORGADO, A. 2011. El aprovechamiento prehistórico de sal en la Alta Andalucía: El caso de Fuente Camacho (Loja, Granada). *Cuadernos de Prehistoria y Arqueología de la Universidad de Granada* 21: 221-249.
- VALERA, A.; TERESO, J. & REBUGE, J. 2005. *O Monte da Quinta 2* (Benavente) e a produção de sal no Neolítico final/Calcolítico do estuário do Tejo. In *Actas do 4º Congresso de Arqueologia Peninsular*. Faro: Universidade do Algarve: 291-305.
- VALIENTE CÁNOVAS, S.; GEA GARCÍA, A.; LÓPEZ CIDAD, J. F. & AYARZAGÜENA SANZ, M. 2003. Algunos datos sobre cestería y fibras vegetales aplicadas a vasijas en barro de la Edad del Bronce en las 'Salinas de Espartinas (Ciempozuelos, Madrid)'. *Pátina* 12: 101-108.
- VALIENTE, S. & RAMOS, P. 2009. Las salinas de Espartinas: un enclave prehistórico dedicado a la explotación de la sal. In SEHA (ed.): *La explotación histórica de la sal: investigación y puesta en valor. Actas del I Congreso Internacional Salinas de Espartinas, Ciempozuelos, Madrid, 2006*. Toledo: SEHA: 167-182
- VAN DE NOORT, R. 2012. Exploring Agency behind the Beaker Phenomenon: The Navigator's Tale. In Fokkens, H. & Nicolis, F. (eds.): *Background to Beakers: Inquiries into Regional Cultural Backgrounds of the Bell Beaker Complex*. Leiden: Sidestone Press: 61-79
- VAN DER LEEUW, S. E. 1976. Neolithic beakers from the Netherlands: the potter's point of view. In *Glockenbecher Symposium, Oberried 1974*. Bussum/Haarlem: Fibula-van Dishoeck: 81-140.
- WELLER, O. (ed.) 2002a. *Archéologie du Sel: Techniques et Sociétés dans la Pré- et Protohistoire européenne. Actes du Colloque 12.2 du XIVe Congrès UISPP, 4 septembre 2001, Liège et de la Table Ronde du Comité des Salines de France, 19 mai 1998, Paris* (ASTK, 3). Rahden: Marie Leidorf GmbH, Internationale Archäologie.
- WELLER, O. 2002b. Aux origines de l'exploitation du sel en Europe. Vestiges, fonctions et enjeux archéologiques. In Weller, O. (ed.): *Archéologie du Sel: Techniques et Sociétés dans la Pré- et Protohistoire européenne. Actes du Colloque 12.2 du XIVe Congrès UISPP, 4 septembre 2001, Liège et de la Table Ronde du Comité des Salines de France, 19 mai 1998, Paris* (ASTK, 3). Rahden: Marie Leidorf GmbH, Internationale Archäologie: 163-175.
- WELLER, O. 2012. La production chalcolithique du sel à Provadia-Solnitsata: de la technologie céramique aux implications socio-économiques. In Nikolov, V. & Bacvarov, K. (eds.): *Salz und Gold: die Rolle des Salzes im prähistorischen Europe/Salt und Gold: The Role of Salt in Prehistoric Europe. Akten der internationaler Fachtagung (Humboldt-Kolleg) in Provadia, Bulgarien 30 September-4 October 2010*. Provadia: Faber: 67-87.
- WELLER, O. 2015. First salt making in Europe: a global overview from Neolithic times. In Brigand, R. & Weller, O. (eds.): *Archaeology of Salt: Approaching an invisible Past*. Leiden: Sidestone Press: 67-82.
- WELLER, O. & DUMITROAIA, G. 2005. The earliest salt production in the world: an early Neolithic exploitation in *Poiana Slatinei-Lunca*, Romania. *Antiquity* 79, 306. Available at: <http://www.antiquity.ac.uk/ProjGall/weller/index.html>.
- WELLER, O.; DUFRAISSE, A. & PETREQUIN, P. (eds.) 2008. *Sel, eau et forêt. D'hier à aujourd'hui. Actes du colloque international de la Saline Royale d'Arc-et-Senans, octobre 2006* (Cahiers de la MSHE Ledoux, 12. Série Homme et environnement, 1). Besançon: Presses Universitaires de Franche-Comté.
- WELLER, O.; FÍGULS, A. & GRANDÍA, F. 2007. Place et role du sel minier de Cardona dans les échanges intercommunautaires du Néolithique moyen catalán. In Morère Molinero, N. (ed.): *Las salinas y la sal de interior en la Historia: Economía, Medio Ambiente y Sociedad. Actas del Congreso Internacional, 6-10 de septiembre de 2006, Sigüenza, Guadalajara*, vol. I. Madrid: Dykinson: 99-120.
- WENXIANG, W. & TUNGSHENG, L. 2004. Possible role of the 'Holocene Event 3' on the collapse of Neolithic Cultures around the Central Plain of China. *Quaternary International* 117, 1: 153-166.
- WIENER, M.H. 2014. The Interaction of Climate Change and Agency in the Collapse of Civilisations ca. 2300-2000 BC. *Radiocarbon* 56, 4: S1-S16.

The role of flint arrowheads in Bell Beaker groups of the Central Iberian Peninsula¹

Patricia RÍOS MENDOZA

Dpto. de Prehistoria y Arqueología, Universidad Autónoma de Madrid,
C/ Tomás y Valiente, 1, 28049 Madrid, Spain
patricia.rios@uam.es

Abstract

From the early years of this century, after the rise of processualists analysis and explanations, publications and conferences about Bell Beaker clearly perceived the abandonment of the idea of 'Bell Beaker culture' as a phenomenon. Scholars start speaking rather of Bell Beaker ideas with different backgrounds and cultural traditions. It is from then they begin to wonder about the reasons that lead each area to adopt certain elements of the Bell Beaker set and others not.

In this sense we believe that only in recent years the form of understand the archaeological Bell Beaker record is starting to change, giving rise to new interpretations that enrich research after years of analyzing contexts and materials conditioned or subject to exchange prestige objects ideas looking for an originating focus and a global European explanation.

In this article, we try to follow the lead of these new ways of analyzing, with a first approach to the role that flint arrowheads could play in Madrid region, taking into account not only its absence on the Bell Beaker set, but the technological lithic development of chalcolithic societies in this area, and the different household and funerary contexts they have been recovered. The goal is to propose possible answers to the question: why some things in the Bell Beaker set are adopted and others not? And a first step arises in the study area from the observation of the absence of flint arrowheads, however present in many other areas near and far. Why do not appear flint arrowheads in the Bell Beaker set of the region of Madrid?

The presence of flint arrowheads has not been much debated or for Bell Beaker researchers. The most important studies on the subject have been focused on the variability of these objects in relation to European Bell Beaker variants.

We aim to show the interpretative and analytical possibilities that can be derived by the flint arrowheads of Bell Beaker contexts in Madrid region, taking into account a wide range of new data that we know from the archaeological record for the regional Late Prehistory.

Keywords: Bell Beaker, flint arrowheads, craft specialization, exchange

Résumé

Dès les premières années de ce siècle, après la hausse de l'analyse et explications des processualistes, publications et conférences sur campaniforme perçus clairement l'abandon de l'idée de 'culture campaniforme' comme un phénomène. Savants commencent à parler plutôt des idées Campaniforme de différentes origines et traditions culturelles. Il est à partir de là, ils commencent à interroger sur les raisons qui conduisent chaque domaine à adopter certains éléments de l'ensemble campaniforme et d'autres pas.

Dans ce sens, nous croyons que seulement dans ces dernières années, la forme de comprendre le record campaniforme archéologique est en train de changer, donnant lieu à de nouvelles interprétations qui enrichissent la recherche après des années d'analyse des contextes et des matières conditionnées, ou soumis à l'échange et le prestige des objets à la recherche d'idées un foyer d'origine et une explication globale européenne.

Dans cet article, nous essayons de suivre l'exemple de ces nouvelles manières d'analyser, avec une première approche du rôle que silex flèche pourraient jouer dans la région de Madrid, en tenant compte non seulement de son absence sur l'ensemble campaniforme, mais le lithique technologique développement des sociétés chalcolithique dans ce domaine, et les différents contextes domestiques et funéraires qu'ils ont été

¹ Work funded by the Research Project I+D+i: HAR2011-28731: *The Chalcolithic societies and their time frame in the region of Madrid. A review in the light of new data.* Dir. Corina Liesau von Lettow-Vorbeck. Ministerio de Economía y Competitividad. Government of Spain.

récupérés. L'objectif est de proposer des réponses possibles à la question: pourquoi certaines choses dans le jeu campaniforme sont adoptées et d'autres pas? Et une première étape se pose dans la zone d'étude de l'observation de l'absence d'armatures de flèche en silex, mais présent dans de nombreux autres domaines proches et lointains. Pourquoi ne semblent pas armatures de flèche en silex dans l'ensemble campaniforme de la région de Madrid?

La présence de armatures de flèche en silex n'a pas été débattu ou d'intérêt pour les chercheurs Campaniforme de sorte qu'il n'a pas suscité un intérêt particulier. Les études les plus importantes sur le sujet ont été axées sur la variabilité de ces objets par rapport aux variantes européenne Campaniforme. Nous visons à montrer les possibilités interprétatives et analytiques qui peuvent être tirés par les armatures de flèche en silex de contextes Campaniforme dans la région de Madrid, en prenant en compte un large éventail de nouvelles données que nous connaissons de l'enregistrement archéologique pour la fin de la Préhistoire régionale.

Mot-clés: Campaniforme, armatures de flèche de silex, la spécialisation de l'artisanat, change

1. Introduction

After more than a century of interpretations, the so-called 'Bell Beaker phenomenon' still raises many questions, not only in the interpretive level but issues arising from the ontological level, in the sense of how the archaeological Bell Beaker record is valued by researchers. The value provided to the objects and to the properties of these sites of the III millennium BC in Europe is still conditioned by a traditional cultural-historical interpretation (sometimes reflected in several interpretative proposals), which belongs to the beginning of the studies on the subject around the first half of the twentieth century.

Thus, the 'progress' in the Bell Beaker investigation produced from mainly the 80s and 90s of the same century did nothing but add processualists analytical carried out by: studies of territory, catchment analysis, statistical studies, etc., in support to justify again a big European phenomenon now supported in key of exchange of exogenous raw materials or objects (objects studied from typological analogies or, at best, technological aspects).

Since then, interpretations valued the emergence of a social group, usually interpreted as a leadership that would sustain certain status by controlling the supposed exchange networks of prestige items, which at the same time explained the beaker objects distribution for the European continent. However, these new interpretations, faithful to the positivist prevailing paradigms of the New Archaeology, were not based in new theoretical models or in a change in the understanding of the archaeological Beaker record, which also then began to multiply.²

In the following years and since the beginning of the XXI century, works and congress begin to appear which highlights the need for a renewal of studies aimed at responding to the complexity of the Bell Beaker phenomenon and the regional or local differences, that every time were more known. Studies began to emphasize pre-Beaker societies in various European regions as a way to understand the emergence and spread of Bell Beaker within their own social or economic process that would lead to material influences and exchanges, far from migrations theories.

Thus in 2004 *Similar but different: Bell Beakers in Europe* was published (Cebreszuk, 2004). In this book, in honor of H. Case, different researchers show their interest in evaluate regional Bell Beaker contexts within Europe. Furthermore, in those years more studies begin to value the domestic/household contexts with the aim of recognizing the Bell Beaker evidences beyond funerary places where they predominate, as a line of research in which perceive the impact of the Bell Beaker in the different regional societies (*Bell Beaker in Every Day Life*, 10th International Meeting 2006) (Baioni *et al.*, 2008).

² As is known during these years the archaeological record increases considerably the number of known data and sites because, on the one hand, the activity of urban expansion and infrastructure in most of the European countries and, on the other, the application of methodological renewal that supposed the incorporation of the *New Archaeology*.

In these years, publications and conferences clearly perceived the abandonment of the idea of ‘Bell Beaker culture’ as a phenomenon, scholars speak rather of Bell Beaker ideas with different backgrounds and cultural traditions. It is from then they begin to wonder about the reasons that lead each area to adopt certain elements of the Bell Beaker set and others not. In this regard, remains in the interpretations the idea of a nuclear or original Bell Beaker area that the researchers analyzed in different European areas.

J. Turek thinks that the phenomenon consist not only of different elements of material culture but mainly of uniform system of burial rites, social organization and perhaps of shared ideology connected to Beakers as ritualized consumption of alcoholic (?) beverages (Turek, 2012b). And in this sense he understand that <<*Besides the main area of direct impact there are some periphery zone that adopted some elements of the Beaker Package, but usually without the ideological framework. The traditions differ from region to region, as in some regions the only some elements of material culture retained but the overall cultural expression continued in the pre-Beaker development and in some other regions beaker tradition and its decorative style remained for some time. Both, the echoes and traditions might have existed in some regions without the main Beaker ideological background*>> (Turek, 2014a:9).

N. Brodie talks about technological frontiers between communities possessing copper metallurgical know-how and west Europeans without the knowledge of copper production (Brodie, 1997: 307-311 *Chalcolithic frontier*).

L. Salanova also observed that the *foreign* (Bell Beaker) elements in France were never fully integrated in the local culture and that they were rather superimposed on it (Salanova, 2004).

Timid influence of post-processualism reaches Bell Beaker studies recently. Stand out Neustupný valuations which considers that the <<*BB phenomenon that in Central Europe can be categorized as a strict or fundamentalist culture*>> (Neustupný 2011: 177). I want to highlight the idea of the author in relation to the adoption of the elements of the Bell Beaker set, which is collected by J. Turek: *Even in the regions with strong local cultural tradition the ideological content of the Bell Beaker Phenomenon was apparently known in terms of the spatial concept of otherness (Spatial otherness, Neustupný 1998: 66–68). Negation of the Bell Beaker Phenomenon in some regions was therefore a conscious act of rejection of something familiar but alien. However, even in these regions some elements of the ‘Beaker Package’ might have been partially adopted. Deliberate negation may also be related to cultural and perhaps even cosmological orientation of communities in some regions* (Turek, 2013: 10).

In the last years, J. Turek after analyzing different interpretations and with great theoretical support in post-processualists proposals, as Neustupný ones, has reconsidered the true explanation for the rapid spread of Bell Beaker horizon. He understands that this expansion may have been ideologically and perhaps also cosmologically inspired. The same author emphasizes that <<*the Bell Beaker phenomenon is essentially synthetic, i.e. composed of multiple artefactual elements, culturally stylistic local traditions and a symbolic system, which originated in different places in Europe and quite probably also north-west Africa. The ideologically disseminated cultural uniformity was granted a wholly new level of quality by synthesizing all these elements, whether innovative or locally traditional*>> (Turek, 2015: 271).

In addition to pointing out a possible North African origin for the formation of Bell Beaker, a subject not discussed here now (Turek, 2012a), the author compares the emergence and spread of the Bell Beaker with the medieval Gothic style in Europe. He uses the spread of the Gothic art to demonstrate that the expansion of material culture does not necessarily require population shifts and that the contacts and political decisions of individuals were enough to adopt a new style (Turek, 2015: 274). Such cultural transfer can be represented for example by the Amesbury Archer, which we refer more times throughout the text (Fitzpatrick, 2011).

In this sense we believe that only in recent years the form of understand the archaeological Bell Beaker record is starting to change, giving rise to new interpretations that enrich research after years of analyzing contexts and materials conditioned or subject to exchange and prestige objects ideas looking for an originating focus and a global European explanation.

Authors like J. Turek M. or Bailly raise new or interesting ideas about the Bell Beaker phenomenon, representing a renewal in the investigation. And precisely this is the objective we propose in this paper, with a first approach to the role that flint arrowheads could play in Madrid region, taking into account not only its absence on the Bell Beaker set, but the technological lithic development of chalcolithic societies in this area, and the different household and funerary contexts they have been recovered. The goal is to propose possible answers to the question: why some things in the Bell Beaker set are adopted and others not? And a first step arises in the study area from the observation of the absence of flint arrowheads, however present in many other areas near and far. Why do not appear flint arrowheads in the Bell Beaker set of the region of Madrid?

If we understand that the motivation for the adoption of certain cultural elements could be associated to the prestige of 'exotica' rather than with the original symbolic meaning. What could represent flint arrowheads for chalcolithic societies of Madrid region which 'adopted' other Bell Beaker elements?

Few studies have addressed the role of the flint arrowheads in the chalcolithic or Bell Beaker society (Nicolas, 2011; Turek, 2011, Lemerrier, 2011; Bailly, 2014) beyond relate them automatically with the character of Beaker men as archers and warriors.

In other publications we have indicated the existence of a craft specialization in relation to the production of flint arrowheads in the study region, in particular from the finding of a specialized workshop in Camino de las Yeseras site (Rios, 2011; Liesau *et al.*, 2014). In our opinion, this craft specialization, could be attached to social rather than economic needs and it is just this idea that helps us starting to think about the role that these objects were not essential for the central Iberian Bell Beaker Package.

2. Flint arrowheads in Bell Beaker tombs. A craft specialization ascribed to social need: status or prestige items of archers

The presence of flint arrowheads has not been debated or interest for Bell Beaker researchers so it did not elicit a specific interest, with exceptions that we discuss below. This lack of studies has resulted in interpretive assumptions and typological remarks that have not addressed their role in the society, their character within the networks of exchange documented for other objects, raw materials or ideas. So the economic or social foundations that allowed the consideration of these objects as prestige items or not that provided Bell Beaker individuals to gain their social status, are unknown or imprecise in each region.

At this point, I'll make an overview of the different assessments that have been done regarding the presence of flint arrowheads on the Bell Beaker sets. First, we examine the wider interpretations that address the whole Bell Beaker set, in which arrowheads are include and which can derive the meaning ascribed to them, and then, we analyze the main ideas expressed about the flint arrowheads themselves.

Flint arrowheads are considered as one of the main elements of the Bell Beaker set. They have been traditionally interpreted as part of archer equipment together with wrist guards (Fig. 1).

The usual association of flint arrowheads and the metal weapons confirms the interpretation of the warrior character, especially in male tombs. Many interpretations focus on the idealized identity of warriors existing in society that cause the social rise of the holders of these objects (prestige item).

ELEMENTOS INTEGRANTES DEL CONJUNTO CAMPANIFORME

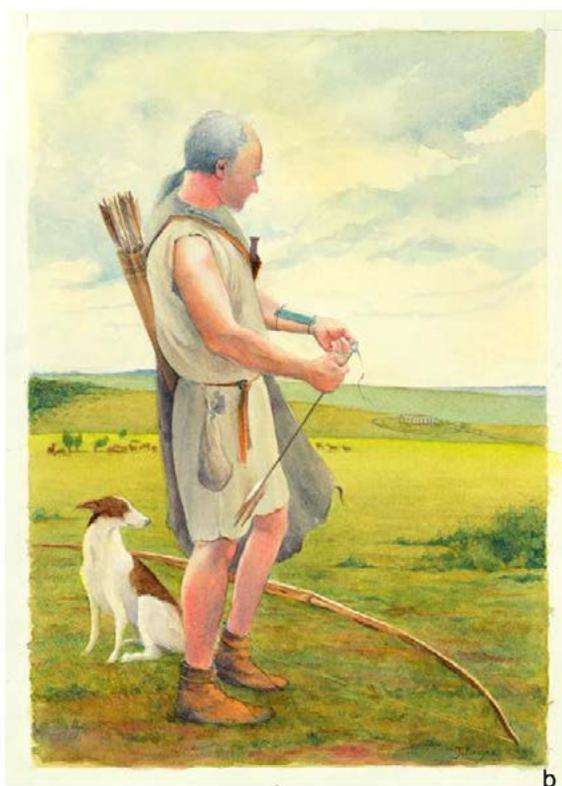


FIGURE 1. EXAMPLES OF THE WARRIOR AND ARCHER CHARACTER OF BELL BEAKER MEN. EVOCATION OF A BELL BEAKER MAN FROM AMBRONA VALLEY (A) (DESIGN L. PASCUAL IN GARRIDO, 2007) AND IDEAL RECONSTRUCTION OF THE AMESBURY ARCHER (B) (WESSEX ARCHAEOLOGY, 2004).

There are other interpretations that understand Bell Beakers objects as representing a cult package in which Bell Beakers symbolize male drinking rituals, participation in which was restricted to certain groups (Sherratt, 1987; Rojo-Guerra *et al.*, 2006). It has also been suggested that the package of bow and arrow, knife, and beaker, is a symbolic hunting set providing for the hunting of big game, its' ritual killing, and the ritual drinking of its blood. This hunting activity may have been undertaken in either the world of the living or the dead (Case 2004a; 2004b).

As mentioned above, in many cases the set has been interpreted as the remains of a new knowledge, an ideology or a reflection of a cosmology (Strahm, 2004: 122; Salanova, 2000: 15-17; Turek, 2014). In this way the flint arrowheads represent a symbol of the warrior and hunter character of Beakers that can be both a useful object as a tool for hunting and attack (and used as such before being deposited as grave good), as well as a useless object like a tool to show the characteristics of the owners personality and those who placed them in the grave.

One of the recent works of Nicolas & Gueret about Armorican flint arrowheads from Britain in the Early Bronze concludes in this regard. Armorican arrowheads, which show a craft specialization and a high degree of skill plus a special raw material, could have been made to be displayed as a clear object of prestige, a status symbol for whom owned them. This study and analysis, in addition to the features mentioned, shows that these pieces were not used as projectiles, but they have traces of use (glue, bright spots and blunts) without impact marks. Besides a very large number of Armorican arrowheads were loosely and poorly hafted. All These evidences are interpreted as an inoperative hafting mounted on shafts only made for the exhibition (Nicolas & Gueret, 2014).

With all the data together, they conclude that <<*The Armorican arrowheads, manufactured from exogenous flint by highly skilled knappers, certainly craftsmen, were apparently intended for display only. There is no doubt that these objects were reserved for the Early Bronze Age elite. These are in addition the most numerous and the most distinctive objects in the tombs of these chiefs. The Armorican arrowheads therefore can be considered as being insignia of power*>> (Nicolas & Gueret, 2014: 122).

Wristguards, in contrast of arrowheads, though traditionally seen as archer's equipment worn on the wrist to protect against the slap of a bowstring, both their function and their role within Beaker society and burials have become topics of discussion in recent years (Fokkens *et al.*, 2008; Woodward & Hunter, 2011).

In the same way, another interesting recent doctoral thesis about wristguards in Netherlands, has shown that, indeed were used in order to protect the arm of the archers (to adequately protect the forearm from the slap of the bowstring when an arrow is shot from a bow), but also the exhaustive study (use wear traces and experimental works) shows that many of those found in the archaeological record would not be functional and were interpreted as symbolic replicas (van der Wart, 2009).

This conclusion reached by the author after assessing the results of experiments by Smith and Whittaker, showing that the preference of the archer would be important. Each person would have <<*their own requirements and needs based on their personal shooting style. Some people attach more value to beauty and personal adornment than others, which could explain why some were prepared to invest more effort in making or acquiring a beautiful and elaborately made wrist-guard*>> (Idem: 45).

So this author understands that this kind of personal taste could explain the variety of shapes and sizes found in Bell Beakers wristguards.

If it happens like today, shape and size of the wrist-guard could have been determined by an archer's individual needs and taste, it would be very interesting for the performing conclusions on the role of these elements, as well as arrowheads or Beaker vessels, with regard to the types identified as regional marks based on tradition or the influence of a particular area.

I want to especially emphasize at this point, the importance of these findings to start thinking that an object can be both, functional and something more at the same time. As reflects van der Vaart, the Bell Beaker wrist-guards are likely an example of this: <<*I believe that they were functional archer's wrist-guards that had some kind of deeper meaning or symbolism for the people who used them. There is simply no practical reason why stone wristguards were the norm for 500 years. Something drove the makers to use stone as a raw material, but it is my opinion that at least some are first and foremost functional archers' wrist-guards. Some wrist-guards however do not appear to have been functional pieces of an archer's*>> (Idem: 45).

In some cases these initially functional wrist-guards evolved into objects whose deeper meaning was valued more than their original function. As Fokkens *et al.* (2008) show with their example of certain Native American wrist-guards, this is not an uncommon occurrence. This process however was not necessarily a linear one. The more functional examples could have been in use at the same time as the symbolic ones. References to gold wrist-guards seem to support the idea of some being non-functional objects.

Nicolas' and van der Vaart's works emphasized that the objects must be studied in a comprehensive manner. A type of specialized production, such as those that appear in the Bell Beaker set, which in turn has been deposited as grave goods, does not have to respond to a single function (economic, social, helpful, etc.), nor all items (broadly or discrete variability) have to respond to the same social, symbolic, and even techno-functional phenomenon, even in the same region or the same site. Only

by studying the ‘biography’ of the types of objects and analyzing the examples we can reach to understand some of the reasons for their presence in the Beaker grave goods.

Turning now to studies of Bell Beaker flint arrowheads, we must start with the Amesbury Archer, an outstanding example of the Bell Beaker record in this regard would be. This man would come as a traveler <<arrived into a foreign culture. He came with new and exotic goods – the Bell Beaker ‘Set’ with its accoutrements of warfare and hunting – and with access to, and some skill in, the secrets and magic of metal>> (Fitzpatrick, 2009: 184).

This important finding has confirmed some old assumptions, which put in relation the Bell Beaker with the expansion of copper metallurgy. Something that although we know that did not happen in many areas but it was able to happen in the British Isles (Fitzpatrick, 2009). So arrowheads continue being interpreted as a reflection of an activity of hunting or war, as in the case of the Amesbury Archer, were supplemented with: two stone wristguards, two gold basket-shaped ornaments, perhaps used as hair tress ornaments, three copper knives, five Bell Beakers, four boars’ tusks, many flint tools but also flint flakes or blanks for making new tools, and tools of stone and of antler, including an antler tool for pressure flaking flint. Besides the black stone, a so-called *cushion stone* has been interpreted as a metalworker’s tool.

Materials that carried the archer, coming from continental Europe, reflect the use of the flint arrowheads and also the tools and raw materials needed to make them, so the know-how about these objects. They were not only a symbol of hunting or war, but probably he used them on his journey³ and he procured to make new ones.

This example provides one of the issues we consider most important in the study of Bell Beaker objects and materials, specifically in the case at hand: the flint arrowheads, which is the craft specialization. It has been recognized in some works but rarely is valued to interpret the variability of the bell Beaker grave goods in the different sites and regions.

The most important studies on the subject have been focused on the variability of these objects in relation to European Bell Beaker variants. In this sense, the classic division distinguished the western variant (barbed and tangled arrowheads with squared stem) and an Eastern variant (triangular and hollow-based). Although some authors have already pointed out that there are no strict boundaries in the general distribution. For example Lemercier has stressed the presence of hollow-base points on the Iberian Peninsula, and that the presence of a large contact area between these two types is identifiable from Netherlands to Italy through Germany and Switzerland (Lemercier, 2011: 130).

More recently, Bailly, in an interesting specific work on the issue at hand, said that this division from the spatial distribution presented is full of contradictions and unresolved problems (Bailly, 2014). He proposes the hypothesis that this is not a strictly eastern *versus* western distribution, but Northwestern Europe *versus* Central Europe. In this sense, a distribution in which the middle course of the Danube, The Hansa, the Iberian and Italian Peninsulas and even Ireland are left as marginal areas (*Idem*: 363). He also emphasizes the scarcity of flint arrowheads in the Iberian Peninsula taking into account the importance of Bell Beakers in that region and the technological tradition of flint arrowheads production since Neolithic times (*Idem*: 364). Given the presence of other weapons, such as palmela points, Bailly proposes the hypothesis of that what might occur in these areas is that the flint arrowheads were replaced by copper palmela points in Beaker graves since the latter have quickly gained relevance and social prestige.

³ The importance to carry flint arrowheads in the movements across Europe during the third millennium BC has been confirmed by the chalcolithic ice mummy, Ötzi (Spindler, 1995).

Independently, the proliferation of these pieces reflects a technological know-how and a restricted typological diversity but is rarely valued the existence of specialists and appreciated productions.

In Bell Beaker time it has been also explained the increasing popularity of arrowheads, thanks to the control and redistribution of specialized production (Petrequin, 1990). However, very little has been linked to this possible specialized production due to a Bell Beaker demand, not as useful as symbolic: items represent a status that did not occur in all Bell Beaker regions. Furthermore if we exclude the works of Nicolas, it implies an assumed interpretation, but has been not always demonstrated by the archaeological record (2011, 2012; Nicolas & Guéret, 2014).

3. The case of Bell Beaker tombs in Central Iberia: a craft specialization ascribed to economic need or exchange. Functional items

In this section we want to show the interpretative and analytical possibilities that can be derived by the flint arrowheads of Bell Beaker contexts in Madrid region, taking into account a wide range of new data that we know from the archaeological record for the regional Late Prehistory.

Before showing the contexts analyzed in Madrid, we want to remember some data that we analyzed in a recent paper in which we evaluate de presence of arrowheads in relation to violence or defense contexts of some Iberian chalcolithic sites (Liesau *et al.*, 2014). It is interesting to note here the great variety of arrowheads types documented in different contexts revealing violence and/or defense acts (walls, pits, burials).

Without evaluating now the possible situation of insecurity and the need for defense at the moment, we have observed that most of the flint arrowheads represent very little refined technological implementation. Pieces with simple sketches of arrowheads and more or less pointed pieces without complex bifacial reduction are abundant. Pointed morphologies and cutting edges were frequently documented. Nor sizes, much less the types, are homogeneous or standardized, even in the items located in the same wall or in the same burial. Such variability is documented before and during the Bell Beaker time.

What does seem to change from Bell Beaker time during the mid-third millennium BC, is the presence of craft specialization areas (as workshops) in making arrowheads. Examples are known in: Cabezo Juré (Nocete *et al.*, 2004), Los Millares (Molina *et al.*, 1986; Molina & Cámara, 2005: 70-75 & 95; Ramos *et al.*, 1991) and Camino de las Yeseras (Ríos, 2011).

The apparently standardized production of these arrowheads does not seem to satisfy a demand for defense or hunting, but could be related to a demand of elites? Could this craft specialization correspond to the presence of arrowheads in Beaker graves?

We will try to articulate possible hypothesis to these questions for the Madrid region, from the known sites and specialized workshop found in Camino de las Yeseras.

But besides, it is interesting the situation of these production areas in the settlements, associated with walls, towers, forts or central spaces within ditched enclosures, certainly protected and controllable places for a part of the inhabitants.

It is also interesting to note the connection, for example at Cabezo Juré in this specialized area where gold pieces are documented and the site is interpreting as a metallurgical mining settlement. In this sense researchers argue that the residential unit that has been created around the arrowheads workshop area during the Bell Beaker phase shows the presence of a distinguished social group related to metal production, and linked to the arrowheads – that reserves or appropriates the use of the defenses (fortification) (Nocete *et al.*, 2004).

Site	Type and number of grave	BB SET							References
		BB pottery	copper weapons	flint arrow-heads	gold ornaments	bone/ivory industry	Wrist-guards	others	
<i>Arenero Arganda</i>	1?	x	x						Garrido, 2003
<i>Arenero Miguel Ruiz</i>	1 P	x	x						Blasco <i>et al.</i> 1994
<i>Camino de Las Yeseras</i>	5 AC 2 H 1 P	x			x	x		x	Blasco <i>et al.</i> 2009 Liesau <i>et al.</i> 2008
<i>Cuesta de La Reina</i>	7? NC	x	x				x		Riaño <i>et al.</i> 1984 Blasco <i>et al.</i> 1998
<i>Dolmen Entretérminos</i>	1 D	x	x		x				Losada, 1976
<i>Humanejos</i>	1P 1H	x	x		x	x	x		Gómez <i>et al.</i> 2011
<i>La Aldehuela</i>	1?	x					x	x	Garrido, 2003
<i>La Magdalena</i>	1 H 1 M 2 AC	x	x				x	x	Heras <i>et al.</i> 2014
<i>Mejorada del Campo</i>	1?	x	x				x		Blasco <i>et al.</i> 1994
<i>Salmedina</i>	2 H	x	x		x	x			Berzosa & Flores, 2005
<i>Villaviciosa de Odón</i>	1?	x	x					x	Blasco <i>et al.</i> 1994
Total: 11	Total: 29								

TABLE 1. SITES IN THE REGION OF MADRID WITH BEAKER GRAVE GOODS IN WHICH CERAMICS AND ALSO OTHER OBJECTS APPEAR BUT WITH TOTAL ABSENCE OF FLINT ARROWHEADS (P: PIT; H: HYPOGEUM; AC: SMALL ARTIFICIAL CAVE; NC: SMALL NATURAL CAVE; D: DOLMEN; M: MOUND; U: UNKNOWN).

If we analyze the Bell Beaker grave goods of Madrid we appreciate a complete absence of arrowheads on them, although other metal weapons and ornaments of gold and ivory are present (Tab. 1). In Camino de las Yeseras, eight Bell Beaker graves have been excavated, but it is noticeable the total absence of arrowheads in these graves.

In Tab. 1 the frequent association of Bell Beaker vessels to copper weapons, palmela points and daggers and a halberd in Humanejos can be seen. Also common are the bone or ivory ornaments and gold jewelry. For these two types of small objects, the lack of rigorous sieving and flotation of sediment in the excavations has not allowed their documentation *in situ* (Liesau & Moreno, 2011). Wristguards only have been documented in three cases, and were usually related to palmela points, understanding that these are projectile points, although this issue is not fully confirmed (Gutiérrez Sáez *et al.*, 2010).

Four of the eleven sites with Bell Beaker burials also present others items as grave goods:

In Camino de las Yeseras in three of the Bell Beaker tombs, appeared milling elements, mill stones in two cases and a mortar in another (Blasco *et al.*, 2005; Rios, 2011). In addition, we could consider within the category 'others' the two copper awls documented into two other tombs because they are not typologically weapons.

In the sites of Villaviciosa de Odón and La Aldehuela, the Bell Beaker set is completed with: a polished stone hammer that Harrison related to metal work (1977), and remains of casting metal, respectively (Garrido, 2000).

In the recently published site of La Magdalena, a copper awl and a copper strip have been documented in two graves in artificial caves (Heras *et al.*, 2014).

In all cases, except for the grinding elements from Camino de las Yeseras, these 'other' objects are related to metalworking or are copper tools, something that fits into the set of materials and the usual interpretation of the prestige value that could have at this moment to own the metal and, as in the case of the Amesbury Archer, possessing the knowledge to make it.

This interpretation is often based on the presence of metal objects in these graves, which are highly visible in the archaeological record, and reflects the importance traditionally ascribed to the ownership of metals as means of demonstrating and increasing social differentiation.

Grinding objects from Camino de las Yeseras site are a singularity to which the absence of weapons is added. Although it is not the subject at hand, it would be interesting to analyze, as we aim here with arrowheads, the role of these objects in the Bell Beaker tombs, considering that, on the one hand they are tools in the domestic sphere and, secondly, that their importance can be traced to a local tradition represented in earlier non Bell Beaker collective burials (Blasco & Ríos, 2014).

Tab. 1 shows in general terms that there is no clear pattern in the conformation of the Bell Beaker set, even in relation to ceramic vessels, whose variability could be more in relation to the type of grave and buried individuals. Regional Bell Beaker seems to be characterized by metal, well represented in the number of weapons, and also in the bone or ivory buttons and beads as gold ornaments.

Camino de las Yeseras, the site we know best thanks due many interdisciplinary studies, as also some other sites are confirming the presence of arrowheads is common in Bell Beaker domestic contexts. This circumstance, added to the presence of the specialized workshop leads us to ask: why the arrowheads in this area were not considered prestige items in Bell Beaker graves? Is it possible that such (how it is said) were the palmela points and other projectiles which became popular among peninsular Bell Beakers?

In other graves of the Northern Meseta like La Sima (Rojo *et al.*, 2005) or Fuente Olmedo (Martín Valls & Delibes, 1989), some flint arrowheads are also present together with other metallic weapon, which could speak in this regard.

Could flint arrowheads in the region of Madrid and other peninsular areas be replaced by other equipment in copper? Then would they have the same meaning? Or is it a choice within the region in which metal objects get a special character for inclusion in the grave goods and not the flint arrowheads?

In any case it is clear that the production of flint arrowheads don't decreased during Bell Beaker times, at least in the contexts that we analyzed.

Despite not having a numerical dating of the lithic workshop of Camino de las Yeseras, the stratigraphic relationship puts it in a synchronous moment of the most relevant Bell Beaker tombs at the site. The documented production is characterized by the accumulation of preforms of arrowheads together with two antler tools and the remains of the bifacial knapping to achieve them. There are not finished pieces nor the initial nodules, there is only an important stage of technological expertise to produce standardized supports (Ríos 2011).

Why standardized preforms were produced and accumulated? What was the purpose of this production that they have not been included in the Bell Beaker graves? What kind of specialization are reflecting

these areas of craft workshop? What do the flint arrowheads mean for the inhabitants and for big sites like Camino de las Yeseras?

4. Discussion

Although we are under study on the scope of the lithic workshop production (Ríos, in preparation), if we consider the theoretical model of craft specialization as a social phenomenon, the workshop of Camino de las Yeseras could be situated between categories 2 and 4 established by Stanley & Arnold (1986). That is between:

- Household industry: a production to supply goods to other households as well. Household industry is a part time secondary activity and can be present in egalitarian as well as in ranked societies (Idem: 2).
- Tethered specialization. A craftsman producing for elite consumption. Is that Brumfiel and Earle (1987) called *attached specialization*. Is associated to ranked societies where certain individuals seek to legitimate their status. The goal is thus social rather than economic. The specialist being supported by a patron, can afford to invest the time required to improve his or her skills and to make the product aesthetic, as rare, in fact, as useless as possible, because all these qualities confer status upon the patron. Mallinowsky called such good 'hypertrophic', a producing of objects which demand a high degree of manufacturing skill and a large investment in time and are made of raw materials to which there is limited access (Olausson, 1997: 269).
- Workshop industry: full time, primary means of producer income. Efficiency is important here. The goal is economic thus rather than social. Products would tend to be utilitarian items showing a high degree of standardization and not requiring long manufacturing times. Learning evidences.

Without going too much into the details of these theoretical models, it is interesting to note that the production of preforms in Camino de las Yeseras is showing an exclusive centralized area inside the settlement, and evidence of a skilled craftsman learner. The aim of this production is not well known, so we cannot appreciate the volume that could represent this specialized production to assess the possibility that was aimed to exchange in the economic sense. However, it is interesting to note the raw material on which the preforms were made of is good quality opal flint.

Given the abundance of flint in the region compared to other areas, we might think that production is related to the abundance of raw material. The specific type of flint is located in an immediate area to Camino de las Yeseras near the Neolithic mines of Casa Montero. Thus, the preforms may represent not only a specialized support for the production of arrowheads, but a standardized support to exchange raw material.

It is however a hypothesis that we are far from being able to confirm because, as occurs with the production documented in the Neolithic mines of Casa Montero, we should carry out the recognition of this products at other archaeological sites, which would allow us to trace their distribution, determine how far they travelled, and estimate their economic importance and social cost (Bustillo *et al.*, 2009).

In short, although we cannot assure that it were a specialization activity aimed at the demand of an elite, it seems that it did not play an important role for the Bell Beaker set as a symbol of status and prestige, perhaps because they were the producers of those arrowheads. For locals, the flint had not an exceptional value, was plentiful and the knapping technology was known and technological development had already made the leap to the specialized and standardized production. Following this argumentation, the presence of metal objects, especially weapons in Bell Beaker graves could be explained considering that they are an evidence of production or other craft specialization which indicate a kind of 'tethered specialization'. Metal objects probably came to the analyzed sites of Madrid region through the exchange aims to satisfy the desire of elite that distinguish by themselves with these status symbols in their funeral rituals. The value of prestige may be the copper accumulated

in manufacturing these objects, which could add taste or fashion by weapons within an idealized idea of warrior character.

Therefore metallurgical technology would not be unknown until now, but what could happen from now would be the arrival of these large metal objects showing no an initial and domestic production -as was known in this region,⁴ but a specialized production, as other craft specialization, initially intended to satisfy a social need (Olausson, 1997: 269). Because of this, many of these objects do not 'need' functional efficiency, as it could be derived from other items deposited as grave goods. The value was given by the people who ported according to their symbolic, social and economic criteria, although as we will never know, we think that might be in relation to: the technology, in the sense of innovation; as the raw material, in the sense of an limited or inaccessible resource; or the image represented in the sense of a particular way of understanding the world (cosmology).

For the people of these settlements, the possession of these copper weapons would be valuable because they probably do not produce them, so they were exotic objects, accessible only through exchange. There is also the question if the arrowheads could become part of the game of exchange to facilitate access to these and other objects.

The question of the role of the Bell Beaker metallurgy has recently been discussed by several authors in this sense of craft specialization reaching such ideas and the discovery of the Amesbury Archer interpreted as a metalworker has renewed the question. Fitzpatrick (2009: 182) argues that <<*Instead they symbolised the control of the new technology and the dead men are seen as having had a privileged access to what is regarded as an esoteric knowledge or exclusive technology, one which is widely regarded as having strong ritual and magical associations (eg Cowie 1988; Budd and Taylor 1995; Kristiansen and Larsson 2005, 53-57)*>>.

Also Turek suggests that this metallurgic technology comes from a particular social category and personal status which, allowed the control of what is called 'strategic technologies and raw materials' (Turek, 2004: 151). A related point is made by Kristiansen and Larsson (2005, 57-58) who suggest that later in the Bronze Age special tools were added to other grave goods of the elite. Defining identities in mortuary rituals is complex but it is perhaps unnecessary to doubt that the men with whom the metalworker's tools were buried could use them; Turek accepts the presence of tools used to produce arrowheads and other pieces of archery equipment as unproblematic.

In this regard, it seems that neither for Turek the flint arrowheads are prestige objects but a symbol of an activity performed by the deceased. Perhaps some objects deposited in tombs did have related to the occupation of the person buried. In relation to the personal ornaments, made of gold and bone or ivory, these authors do not doubt their role and their presence on the Bell Beaker set as they represent almost invariably small items of jewelry and weaponry employed as status symbols (Turek, 2004; Bartelheim, 2007). Fitzpatrick (2009: 183) explains that the amount of gold required was small and the skills may have been modest, but the knowledge of metalworking, the access to the metal and control of the distribution of the finished objects within the *chaîne opératoire*, was new, and perhaps priceless.

5. Preliminary conclusions

Reflection of this article only confirms something that has already been said in recent years: Bell Beaker is a phenomenon much less monolithic than assumed. Arrowheads or copper weapons would not have the same value in one part of Europe to the other, even in the same region; therefore, global explanations are not valid for it. To know the economic foundations, it is necessary to study the social contexts of domestic and productive activities in each region.

⁴ Evidence of metallurgical production for Bell Beaker and pre Bell Beaker time denote a domestic scale developed in ceramic recipients and small crucibles wherein would be achieved small copper objects (Blasco & Ríos, 2010; Rovira & Montero, 2013).

Assess for certain materials in Bell Beaker funerary contexts has not served until today to explain why gain prestige value, such as flint arrowheads, nor to explain why they appear in some areas and not in others. Therefore, the traditional contextual analysis is obsolete.

Social and economic differences in Recent Prehistory could occur between settlements, even in a wider scope. The singularity of the Bell Beaker set from Camino de las Yeseras, where there is no kind of weapon but other objects such as grinding stones, might point in this direction.

In order to know the role of flint arrowheads in Bell Beaker set, a detailed study of this archaeological record from each site and the region is necessary. The explanation of their value in Beakers societies as grave goods, can only be better understood with an exhaustive technological, functional, experimental study by a review not only of the items associated to the Bell Beaker set, but by analyzing production throughout the time in a way of ‘biographies arrowhead’ (Nicolas & Gueret, 2014).

It is possible that in areas where arrowheads and flint for manufacturing are abundant, such as Madrid, they do not become a valuable or prestige object for Bell Beaker? Or maybe they do but become prestige items through a control over its production and redistribution to other groups?

At the moment we cannot answer these questions but probably Bell Beakers of Madrid region prefer to control the specialized arrowheads flint production and make them available to the Bell Beaker networks exchanging them for items of distant origin or technology like copper weapons, cinnabar, African ivory or gold.

References

- BAILLY, M. 2014. Discordance des temps, concordance des espaces? Remarques sur les armatures de flèches en contexte Campaniforme. De l’arc Jurassien à l’isthme Européen. In Arbogast R. M. & Greffier-Richard, A. (dir.): *Entre archéologie et écologie, une Préhistoire de tous les milieux. Mélanges offerts à Pierre Pétrequin*. Besançon: Presses universitaires de Franche-Comté (Annales Littéraires de l’Université de Franche-Comté, 928; série Environnement, sociétés et archéologie, 18): 355-385.
- BAIONI, M.; LEONINI, V.; LO VETRO, D.; MARTINI, F.; POGGIANI, R. & SARTI, L. 2008. *Bell Beaker in Every Day Life*. Proceedings of the 10th Meeting ‘Archéologie et Gobelets’ (Florence – Siena – Villanuova sul Clisi, May 12-15, 2006), *Millenni, Studi di Archeologia Preistorica* 6. Museo e Istituto Fiorentino di Preistoria ‘Paolo Graziosi’, Florencia.
- BERZOSA DEL CAMPO, R. & FLORES, M. 2005. El conjunto funerario campaniforme del Vertedero de ‘La Salmedina’ (Distrito Villa De Vallecas, Madrid). In Rojo, M.; Garrido-Pena, R. & García, I. (eds.): *El campaniforme en la Península Ibérica y su contexto europeo/Bell Beakers in the Iberian Peninsula and their European context*. Valladolid: Universidad de Valladolid (Serie Arte y Arqueología 21): 481-490.
- BLASCO BOSQUED, C. (ed. & coord.) 1994. *El Horizonte Campaniforme de la Región de Madrid en el centenario de Ciempozuelos*. Madrid: Comunidad de Madrid (Patrimonio Arqueológico del bajo Manzanares, 2).
- BLASCO, C.; BAENA, J. & LIESAU, C. 1998. *La Prehistoria Reciente madrileña en el Gabinete de Antigüedades de la Real Academia de la Historia. Los yacimientos Cuesta de la Reina (Ciempozuelos) y Valdocarros (Arganda del Rey)*. Madrid: Universidad Autónoma de Madrid.
- BLASCO, C.; LIESAU, C.; DELIBES, G.; BAQUEDANO, E. & RODRIGUEZ CIFUENTES, M. 2005. Enterramientos campaniformes en ambiente doméstico: el yacimiento de Camino de las Yeseras (San Fernando de Henares, Madrid). In Rojo, M.; Garrido-Pena, R. & García, I. (eds.): *El campaniforme en la Península Ibérica y su contexto europeo/Bell Beakers in the Iberian Peninsula and their European context*. Valladolid: Universidad de Valladolid (Serie Arte y Arqueología 21): 457-479.
- BLASCO, C.; LIESAU, C.; RÍOS, P.; BLANCO, J. F.; ALIAGA, R.; MORENO, E. & DAZA, A. 2009. Kupferzeitliche Siedlungsbestattungen mit Glockenbecher- und Prestigebeigaben aus dem Grabenwerk von El

- Camino de Las Yeseras (San Fernando de Henares, prov. Madrid). Untersuchungen zur Typologie des Grabritus und zu dessen sozialer Symbolik. *Madrider Mitteilungen* 52: 40-70.
- BLASCO, C. & RÍOS, P. 2010. La función del metal entre los grupos campaniformes. Oro versus cobre. El ejemplo de la Región de Madrid. *Trabajos de Prehistoria* 67, 2: 359-372.
- BLASCO, C. & RÍOS, P. 2014. De tumbas colectivas a tumbas individuales en yacimientos de ‘campos de silos’ con recintos de fosos del III milenio A.C. In Guerra Doce, E. & Fernández Manzano, J. (coord.): *La muerte en la Prehistoria ibérica: casos de estudio*. Valladolid: Universidad de Valladolid (Studia Archaeologica, 99): 105-124.
- BRODIE, N. 1997. New perspectives on the Bell-Beaker culture. *Oxford Journal of Archaeology* 16, 3: 297-314.
- BRODIE, N. 1998. British Bell Beakers; twenty five years of theory and practice. In Benz, M. & van Willigen, S. (eds.): *Some New Approaches to the Bell Beaker ‘Phenomenon.’ ‘Lost Paradise...? Proceedings of the 2nd Meeting of the ‘Association Archéologie et Gobelets, Feldberg (Germany), 18th–20th April 1997*, Oxford: Archaeopress (British Archaeological Reports International Series, 690): 43-56.
- BRODIE, N. 2001. Technological frontiers and the emergence of the Beaker culture. In Nicolis, F. (ed.), *Bell Beakers Today. Pottery, people, culture, symbols in prehistoric Europe*, Proceedings of the International Colloquium Riva del Garda (Trento, Italy, May 1998), Trento, Servizio Beni Culturali, Uffì cio beni Archeologici: 487-496.
- BRUMFIEL, E. & EARLE, T. 1987. Specialization, Exchange and complex societies: an introduction. In Brumfiel, E. & Earle, T (eds.): *Specialization, Exchange and Complex Societies*. Cambridge: Cambridge University Press: 1-9.
- BUSTILLO, M. A.; CASTAÑEDA, N.; CAPOTE, M.; CONSUEGRA, S.; CRIADO, C.; DÍAZ-DEL-RÍO, P.; OROZCO, T.; PÉREZ-JIMÉNEZ, J. L. & TERRADAS, X. 2009. Is the macroscopic classification of Flint useful? A petroarchaeological analysis and characterization of flint raw materials from the Iberian Neolithic mine of Casa Montero. *Archaeometry* 51, 2: 175-196.
- CASE, H. 2004a. Beaker burial in Britain and Ireland: A role for the dead. In Besse, M. & Desideri, J. (eds.): *Graves and Funerary Rituals during the Late Neolithic and the Early Bronze Age in Europe (2700-2000 BC). Proceedings of the International Conference held at the Cantonal Archaeological Museum, Sion (Switzerland), October 4th-7th 2001*. Oxford: Archeopress (British Archaeological Reports International Series, 1284): 195-201.
- CASE, H. 2004b. Beakers and the Beaker Culture. In Czebreszuk, J. (ed.): *Similar but Different. Bell Beakers in Europe*. Poznan: Adam Mickiewicz University: 11-34.
- CZEBRESZUK, J. (ed.) 2004. *Similar but Different. Bell Beakers in Europe*. Poznan: Adam Mickiewicz University.
- FOKKENS, H., ACHTERKAMP, Y. & KUIJPERS, M. 2008. Bracers or Bracelets? About the Functionality and Meaning of Bell Beaker Wrist-guards. *Proceedings of the Prehistoric Society* 74: 109-140.
- GARRIDO PENA, R. 2000. *El Campaniforme en la Meseta Central de la Península Ibérica (c. 2500-2000 AC)*. Oxford (British Archaeological Reports, International Series, 892).
- GARRIDO PENA, R. 2003. *El campaniforme en la Meseta: análisis de su contexto social, económico y ritual*. Tesis Doctoral (Tesis de la Universidad Complutense de Madrid, Facultad de Geografía e Historia, Departamento de Prehistoria, defense 29-06-1999).
- GARRIDO PENA, R. 2006. Transegalitarian societies: an ethnoarchaeological model for the analysis of Copper Age Bell Beakers using groups in Central Iberia. In Díaz del Río, P. & García Sanjuán, L. (eds.): *Social Inequality in Iberian Late Prehistory*. Oxford: Archaeopress, British Archaeological Reports, International Series S1525): 81-96.
- GARRIDO PENA, R. 2007. El Fenómeno campaniforme: un siglo de debates sobre un enigma sin resolver. In Cacho, C.; Maicas, R.; Martínez, M. I. & Martos, J. A. (dir.): *Acercándonos al pasado: Prehistoria en 4 actos*. Madrid: Museo Arqueológico Nacional, Ministerio de Cultura, [on line] (http://man.mcu.es/museo/JornadasSeminarios/acercandonos_al_pasado/archivos_pdf/garrido.pdf).
- GÓMEZ, J. L.; BLASCO, C.; TRANCHO, G.; RÍOS, P.; GRUESO, I. & MARTÍNEZ, M^a S. 2011. Los protagonistas. In Blasco, C.; Liesau, C. & Ríos, P. (eds.), *Yacimientos calcolíticos con campaniforme de la*

- Región de Madrid. Nuevos estudios.* Madrid: Universidad Autónoma de Madrid (Patrimonio Arqueológico de Madrid, 6): 100-132.
- HERAS MARTÍNEZ, C.; CUBAS, M. & BASTIDA RAMÍREZ, A. B. 2014. Signos y símbolos en el registro funerario: Ajueres de la necrópolis calcolítica con campaniforme de 'La Magdalena I' (Alcalá de Henares, Madrid), *Actas de las IX Jornadas de Patrimonio Arqueológico de la Comunidad de Madrid.* Organizadas por la Dirección General de Patrimonio Histórico en el Museo Arqueológico Regional de la Comunidad de Madrid durante los días 15 y 16 de noviembre de 2012: 187-190.
- KRISTIANSEN, K. & LARSSON, T. 2005. *The Rise of Bronze Age Society. Travels, transmissions and transformations.* Cambridge: Cambridge University Press
- LEMERCIER, O. 2011. Le guerrier dans l'Europe du IIIe millénaire avant notre ère. L'arc et le poignard dans les sépultures individuelles campaniformes. In Baray, L.; Honegger, M. & Dias-Meirinho, M. H. (dirs.): *L'armement et l'image du guerrier dans les sociétés anciennes.* Dijon: 121-165.
- LIESAU, C.; BLASCO, C.; RÍOS, P.; VEGA, J.; MENDUÑA, R.; BLANCO, J. F.; BAENA, J.; HERRERA, T.; PETRI, A. & GÓMEZ, J. L. 2008. Un espacio compartido por vivos y muertos: El poblado calcolítico de fosos de Camino de las Yeseras (San Fernando de Henares, Madrid). *Complutum* 18, 1: 97-120.
- LIESAU, C. & MORENO, E. 2011. Marfiles campaniformes de El Camino de las Yeseras (San Fernando de Henares, Madrid), In Banerjee, A.; López Padilla, J. A. & Schuhmacher, T. X. (eds.): *Marfil y Elefantes en la Península Ibérica y el Mediterráneo.* Coloquio Internacional. Museo Arqueológico de Alicante, 26-27 Noviembre 2008, *Iberia Archaeologica*, 16,1: 87-97.
- LIESAU, C.; RÍOS, P.; BLASCO, C. & GÓMEZ, J. L. 2014. Indicios de violencia en yacimientos de la región de Madrid en el marco del Calcolítico peninsular. *Gladius, Estudios sobre armas, arte militar y vida cultural en oriente y occidente XXXIV*: 7-36.
- LOSADA, H. 1976. El Dolmen de Entretérminos. *Trabajos de Prehistoria* 33: 209-221.
- MARQUES DE LORIANA 1942. Nuevos hallazgos del vaso campaniforme en la provincia de Madrid, *Archivo Español de Arqueología XV*: 161-167.
- MARTIN VALLS, R. & DELIBES DE CASTRO, G. 1989. *La Cultura del Vaso Campaniforme en las campiñas meridionales del Duero. El enterramiento de Fuente-Olmedo (Valladolid).* Valladolid: Museo Arqueológico de Valladolid (Monografías del Museo Arqueológico de Valladolid, 1).
- MOLINA, F. & CÁMARA, J. 2005. *Los Millares. Guía del yacimiento arqueológico.* Sevilla: Junta de Andalucía, Consejería de Cultura.
- MOLINA GONZÁLEZ, F.; CONTRERAS CORTÉS, F.; RAMOS MILLÁN, A.; MÉRIDA GONZÁLEZ, V.; ORTIZ RISCO, F. & RUIZ SÁNCHEZ, V. 1986. Programa de recuperación del registro arqueológico del Fortín 1 de Los Millares. Análisis preliminar de la organización del espacio. *Arqueología Espacial* 8: 175-201.
- NEUSTUPNÝ, E. 1998. Otherness in Prehistoric Times, *KVHAA Konferenser 40* (Stockholm 1998): 65-71.
- NEUSTUPNÝ, E. 2011. Pulzování archeologických kultur. In Bárta, M. & Kovář, M. (a kol.): *Kolaps a regenerace: cesty civilizací a kultur: minulost, současnost a budoucnost komplexních společností* (Praha 2011) 173-183.
- NICOLAS, C. 2011. Artisanats spécialisés et inégalités sociales à l'aube de la métallurgie: les pointes de flèches de type armoricain dans le nord du Finistère. *Bulletin de la Société Préhistorique Française* 108, 1: 1-33.
- NICOLAS, C. 2012. Des pierres précieuses? Les pointes de flèches du Campaniforme et de l'âge du Bronze ancien en Bretagne (2500-1700 avant notre ère). In Marchand, G. & Querré, G. (dir.): *Roches et sociétés de la Préhistoire entre Massifs cristallins et Bassins sédimentaire.* Rennes: Presses universitaires de Rennes (Collection Archéologie & Culture): 205-219.
- NICOLAS, C. & GUÉRET, C. 2014. Armorican Arrowheads Biographies: Production and Function of an Early Bronze Age prestige good from Brittany (France). *Journal of lithics Studies* 1, 2: 101-128.
- NOCETE, F. (coord.) 2004. *ODIEL, Proyecto de la investigación arqueológica para el análisis del origen de la desigualdad social en el suroeste de la Península Ibérica.* Sevilla: Junta de Andalucía (Monografías arqueológicas, 19).
- OLAUSSON, D. 1997. Craft Specialization as an Agent of Social Power in the South Scandinavian Neolithic. In Schild, R. & Sulgostowska, Z. (ed.): *Man and Flint. Proceedings of the VIIth*

- International Flint Symposium Warszawa – Ostrowiec, September 1995*. Warsaw: Publication of the Institute of Archaeology and Ethnology, Polish Academy of Sciences: 269-277.
- PETREQUIN, P. 1990. Le lac de Chalain (Jura) et la structuration d'un terroir du Néolithique à l'âge du Fer. In: Mordant, C. & Richard, A. (ed.): *L'habitat et l'occupation du sol à l'âge du Bronze en Europe. Actes du colloque international de Lons-le-Saunier, mai 1990*. Paris: CTHS: 227-257.
- RAMOS MILLÁN, A.; MARTÍNEZ FERNÁNDEZ, G.; RÍOS JIMÉNEZ, G. & ALFONSO MARRERO, J. A. 1991. *Flint Production and Exchange in the Iberian Southeast, III millennium B.C. Excursion Guidebook*. Granada: Universidad de Granada e ITGME.
- RIAÑO, J. F.; RADA Y DELGADO, J. & CATALINA GARCÍA, J. 1894. Hallazgo prehistórico en Ciempozuelos. *Boletín de la Real Academia de la Historia* XXV, VI: 436-450.
- RÍOS, P. 2011. *Territorio y Sociedad en la Región de Madrid durante el III milenio a. C. El referente del yacimiento de Camino de las Yeseras*. Col. Patrimonio Arqueológico de Madrid, 7. Madrid: Ed. Dpto. Prehistoria y Arqueología – UAM (digital).
- ROJO-GUERRA, M.; KUNST, M.; GARRIDO-PENA, R.; GARCÍA-MARTÍNEZ DE LAGRÁN, I. & MORÁN DAUCHEZ, G. 2005. *Un desafío a la eternidad. Tumbas monumentales del Valle de Ambrona*. Valladolid, Junta de Castilla y León (Arqueología en Castilla y León, 14).
- ROJO GUERRA, M.; GARRIDO-PENA, R.; GARCÍA-MARTÍNEZ-DE-LAGRÁN, I.; JUAN-TRESSERAS, J. & MATAMALA, J. 2006. Beer and Bell Beakers: drinking rituals in Copper Age inner Iberia, *Proceedings of the Prehistoric Society* 72: 243-265.
- ROVIRA, S. & MONTERO, I. 2013. Iberia: Technological Development of Prehistoric Metallurgy. In Burmeister, S.; Hansen, S.; Kunst, M.; Müller-Scheessel, N. (eds.): *Metal Matters; Innovative Technologies and Social Change in Prehistory and Antiquity, FORSCHUNGSCLUSTER 2 Innovationen: technisch, sozial*. Bibliografische Information der Deutschen Nationalbibliothek: 231-239.
- SALANOVA, L. 2000. *La question du Campaniforme en France et dans les îles anglonormandes. Productions, chronologie et rôles d'un standard céramique*. Paris: Comité des Travaux Historiques et Scientifiques-Société Préhistorique Française, 2000, 392 p. (Documents Préhistoriques, 13).
- SALANOVA, L. 2004. Frontiers inside the western Bell Beaker block. In: Czebreszuk, J. (ed.): *Similar but Different. Bell Beakers in Europe*. Poznań: Adam Mickiewicz University: 63-75.
- SHERRATT, A. 1987. Cups that cheered. In Waldren, W. & Kennard, R. (eds.): *Bell Beakers of the Western Mediterranean*, Oxford: British Archaeological Reports (International Series, 331): 81-114.
- SPINDLER, K. 1995. *El hombre de los hielos*. Barcelona: Galaxia Gutenberg.
- STRAHM, C. 2004. Das Glochenbecher-Phänomen aus der Sicht der Komplementär-Keramik. In Czebreszuk, J. (ed.): *Similar but Different. Bell Beakers in Europe*, Poznań: Adam Mickiewicz University: 101-126.
- TUREK, J. 2012a. Origin of the Bell Beaker Phenomenon – the Moroccan connection. In: Fokkens, H. & Nicolis, F. (eds.): *Background to Bell Beaker. Inquires in regional cultural backgrounds of the Bell Beaker Complex*. Leiden: Sidestone Press: 155-167.
- TUREK, J. 2012b. J. Turek, Periferie fenoménu zvoncovitých pohárů, Periphery of the Bell Beaker Phenomenon. *Archeologie ve středních Čechách* 16: 183-193.
- TUREK, J. 2014a. Echoes and Traditions of the Bell Beaker Phenomenon. In Bartelheim, M., Peška, J. & Turek, J. (ed.) (2013): *From Copper to Bronze. Cultural and Social Transformations at the Turn of the 3rd/2nd Millennia B.C. in Central Europe. Sonderdruck aus: Beiträge zur Ur- und Frühgeschichte Mitteleuropas* 74. Gewidmet Ph. Dr. Václav Moucha, CSc. anlässlich seines 80. Geburtstages. Beier & Beran. Archäologische Fachliteratur Langenweissbach: 9-23.
- TUREK, J. 2014b. Social and symbolic foundations of the Beaker Phenomenon. In Besse M. (ed.): *Around the Petit-Chasseur Site in Sion (Valais, Switzerland) and New Approaches to the Bell Beaker Culture*, Proceedings of the International Conference (Sion, Switzerland – October 27th-30th 2011): 285-293.
- TUREK, J. 2015. Lost and found paradigm. Creating a Beaker world. In Kristiansen, K.; Smejda, L. & Turek, J.: *An Offprint from Paradigm Found. Archaeological Theory. Past, Present and Future. Essays in Honour of Evzen Neustupný*: 263-277.

- VAN DER LINDEN, M. 2004b. Polythetic networks, coherent people: a new historical hypothesis for the Bell Beaker phenomenon. In: Czebreszuk, J. (ed.): *Similar but different. Bell Beakers in Europe*: 35-62.
- VAN DER VAART, S. 2009. *Bell Beaker Wrist-guards Reconsidered. A research into their functionality and possible uses*. Unpublished Bachelor Thesis, Faculty of Archaeology, Leiden University.
- WESSEX ARCHAEOLOGY 2004. *Images from the Amesbury Archer*; <http://www.wessexarch.co.uk/projects/amesbury/archer.html>
- WOODWARD, A. & HUNTER, J. (ed.) 2011. *Examination of Prehistoric Stone Bracers from Britain*. Oxford: Oxbow Books.

El Peñón de la Zorra (Villena, Alicante, Spain): change and continuity in settlement pattern during Bell Beaker¹

Gabriel GARCÍA ATIÉNZAR

Universidad de Alicante, Ctra San Vicente del Raspeig, s/n,
03690 San Vicente del Raspeig, Alicante, Spain
g.garcia@ua.es

Abstract

In this paper we analyze some archaeological indicators that can be related to the emergence of Bell Beaker elites. We focus on the study of occupation patterns in the Upper Vinalopó valley (Alicante, Spain) where the appearance of the Beaker package precedes a series of changes in the location of settlements and in the habitat structures that can be related to a reorganization of production and the emergence of social elites.

Keywords: *Bell Beaker, Settlement pattern, Social elites, Interchange nets*

Résumé

Dans cet article, nous analysons certains indicateurs archéologiques qui peuvent être liés à l'émergence d'élites sociales lors le Campaniforme. Nous allons concentrer sur l'analyse des modèles d'occupation de la vallée de l'Alto Vinalopó (Alicante, Espagne), où l'émergence de le paquet campaniforme précède ou est associé à un certain nombre de changements dans l'emplacement des établissements et les structures habitat qui peut être liée à une réorganisation de la production et l'émergence de leaders sociaux.

Mot-clés: *Campaniforme, modèle d'établissement, élites sociales, réseaux d'échange*

1. Introduction

The Beaker 'package' –copper weapons, ivory adornments, Bell-Beaker pottery, etc.– implies the combination of various prestige goods shared by certain individuals and assumed as such by the community as a whole (Sherratt, 1987; Garrido, 1999, 2006). Traditionally the emergence of these social elites has been related with the monopoly of the production of certain products and the control of exchange routes (Kunst, 1998; Delibes & del Val, 2007-2008).

One of the main archaeological contexts associated with this new social development was the first individual inhumations, although some important individuals may have received special treatment in collective graves in natural or artificial caves and in megaliths (Rojo *et al.*, 2005; Bueno *et al.*, 2007-2008). The use of certain prestige goods made from exotic materials (gold, ivory, etc.) or new technologies (copper metallurgy, precious metal work, etc.) would reflect processes of incipient social inequalities in certain societies in the middle centuries of the third millennium cal BC. This picture can be seen in several of the Peninsula's inland sites such as Camino de las Yeseras, Humanejos and La Magdalena (Blasco & Ríos, 2010; Liesau & Blasco, 2011-2012), and in parts of Portugal (Kunst, 1998). However, in the peninsular Levant it is more difficult to reach the same conclusion for a variety of reasons, not least because the multiple inhumation in caves characteristic of the late Neolithic/Chalcolithic continued to be practised (Soler, 2002). However, several individual burials have been found in settlement areas associated with Beaker grave goods (La Vital, Vila Filomena, Lloma de l'Atarcó, Arenal de la Costa) and even a little earlier (Tossal de les Basses, La Vital, Costamar, Camí de Missena) (Bernabeu, 2010; García Puchol *et al.*, 2013).

¹ This work was supported by the research project of government of Spain HAR2012-37710: '*III-II milenio cal BC: poblamiento, ritualidad y cambio social entre las cuencas de los ríos Júcar y Segura*' and by the research project of the government of Valencian Region GV/2013/002 '*Espacio y tiempo: el horizonte campaniforme en las comarcas meridionales valencianas (ca.2600-2200 cal BC)*'.

On the other hand, some of the assumptions that we have previously suggested were the bases that sustained the Beaker elites are not observed in the archaeological record of this region, since it lacks both seams of copper and other mineral resources, e.g. salt or cinnabar. However, in certain contexts –settlement and funerary– the so-called Beaker ‘package’ has in fact been found, and has traditionally been equated with the existence of these emerging elites. So it is worth asking ourselves, what were the bases that this emerging social class used to support its position in an area lacking certain raw materials? There are some indicators that it was the process of productive intensification, mainly in farming and husbandry, that would lead to the increasing complexity of late Neolithic/Chalcolithic communities (*ca.* 3500-2500 cal BC).

In this paper we aim to examine in depth the characterisation of these emerging elites by analysing a number of archaeological indicators, especially settlement patterns in a specific area –the Upper Vinalopó, Alicante, Spain– because we believe that the transformations observed in this area over the course of the second half of the third millennium cal BC could be associated with new forms of social organisation that resulted in inequality.

2. Intensification of production and the pattern of settlement

In the Levant of the Iberian Peninsula a pattern of settlement can be defined from the fourth to the early centuries of the third millennium that is characterised by intense occupation of valley bottoms and beside rivers and water courses. In most cases, excavation has revealed concentrations of negative structures –silos– used for storing or preserving food. These have been associated with the intensification of production (López Padilla, 2006; Jover *et al.*, 2012) and even with the development of incipient local hierarchies (Bernabeu *et al.*, 2006; Pérez Jordà *et al.*, 2011). In addition, buildings for domestic use have also been detected, some of them that were in use for an extraordinary length of time, with which various types of activity have been linked. These settlements –villages– are always sited in the centre of endorheic areas or valley bottoms, close to better quality agricultural land and near lakes or watercourses where there would have been abundant natural resources (García Atiénzar, 2009). These factors, together with the fact that some of these sites were enclosed by ditches, are evidence that Neolithic communities were becoming established in a particular territory.

The development of this settlement pattern can be explained in terms of the progressive increase in population of Neolithic societies. But it can also be analysed in terms of the relations that they established with communities in the peninsular Southeast, in particular those to the south of the Segura river basin. In this territory, once the Neolithic communities had stabilised in demographic and territorial terms, production started to intensify in the first half of the fourth millennium cal BC thanks to the greater variety of lithological resources, the diversity in productive capacity of the soils and exclusive access to outcrops of metal-bearing ores. From then on, the emerging ruling groups intensified their acquisition, production and exchange of raw materials and products with neighbouring territories, and complementary activities and social dependency began to develop amongst groups.

Thus a political structure was constructed in the Southeast which in anthropological terms can be equated with tribal hierarchies (Sarmiento, 1992), recognised in the archaeological group of Los Millares. The expansion of this group would be based on the unequal distribution of technical knowledge and exploitation of resources, particularly metallurgical resources. In this social network, the redistribution of goods and control of the workforce would become evident in the creation of large villages such as Los Millares (Molina & Cámara, 2005) or that which lies beneath the town of Lorca (López Padilla, 2006).

On the other hand, the territories situated between the Segura and Júcar river basins are not areas with notable resources; instead the lithology is similar throughout the area and metal-bearing deposits are entirely absent. In these territories there might be considerable demographic growth when two

important conditions were present: large areas of good land that allowed sufficient food to be produced and key points along routes communicating basins or territories where raw materials and products from different sources could be controlled and redistributed (Jover *et al.*, 2012). All the evidence seems to suggest that mechanisms of social control were not developed either between the different areas nor within each group, since the resources necessary for the reproduction and maintenance of each productive unit could easily be obtained in each basin independently.

However, as certain products –copper, ivory, particular siliceous and metamorphic rocks– became a more important part of social interaction and links with the territories further south were consolidated, the control mechanisms for distributing them became more clearly defined. In this way the association of certain territories with the communities that inhabited them emerged –reflected in collective funerary rituals– and the principles of reciprocity that had previously dominated Neolithic communities began to change towards a system of asymmetric redistribution in which the work of some lineages was appropriated by others. In this way, and although the resources that existed in each territory continued to be communal property, the resulting products no longer were, and control of the workforce became a key element in the development of inequality between lineages, since certain productive processes and the capacity for political decision-making remained in the hands of the kinship groups that controlled the largest workforce.

This increasing social complexity developed through the middle centuries of the third millennium cal BC. The extension and consolidation of these social networks would lead to the appearance of changes in social dynamics that can be inferred from the following indicators:

- Increased territorial control of places of transfer and exchange, the occupation of hilltop sites being a good indicator.
- The greater presence of metal objects, mainly used as grave goods.
- The presence of funerary remains associated with settlement areas, both in open-air settlements and in caves associated with the first hilltop settlements.

A detailed analysis of this phenomenon allows us to see that this process presents a marked chronological gradient (López Padilla, 2006; Jover *et al.*, 2012; García Atiénzar *et al.*, i.p.). Thus in the case of the lands close to the Segura and Mundo river basins this evidence appears in the course of the first half of the third millennium cal BC, while the lands associated with the basins of the Vinalopó, Serpis and Albaida become more clearly defined in the second half, often coinciding with the appearance of Beaker pottery (López Padilla, 2006). This gradient allows us to defend the thesis that this transformation expanded from south to north, although we should not forget that the process of expansion also took place in other directions, if the early appearance of some of these features at the mouth of the river Serpis is taken into consideration (Bernabeu & Molina, 2011: 277) (Fig. 1).

3. The Villena basin: the Beaker phenomenon

The human occupation of the Villena basin goes back to the Middle Palaeolithic. From the beginning of the Holocene, a defining feature of this territory is the existence of large, brackish lagoons that became an ecological reserve which attracted human populations. In fact, the area around the Villena Lagoon was occupied almost without interruption from the Epipalaeolithic onwards (Soler García, 1976). Several sites have been documented towards the end of the Neolithic that, although they have not been extensively excavated and the number of finds are limited, could be interpreted as settlements of the village type.

Several sites can be recognised in the Villena basin that reveal the process of economic intensification (Casa de Lara, La Macolla, etc.) and changes in the pattern of settlement that allow us to infer that social asymmetries were developing or, at the very least, the forms of social organisation were changing.

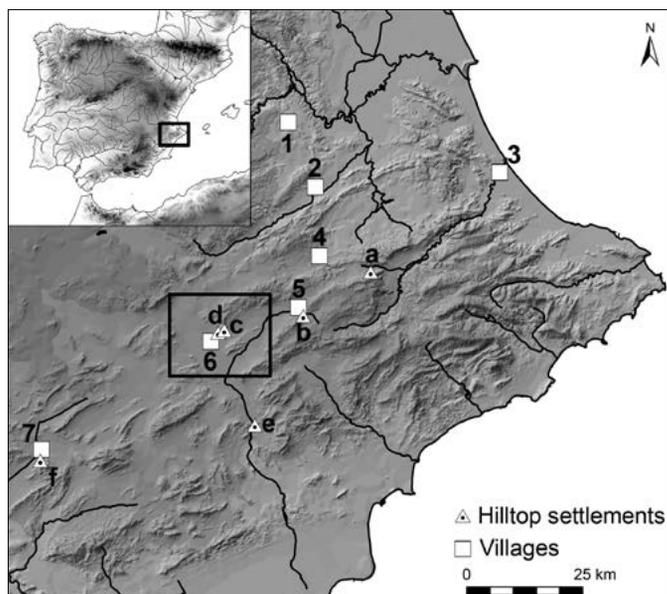


FIGURE 1. LOCATION OF STUDIO AREA AND THE MAIN SITES CITED IN THE TEXT (*VILLAGES*: 1. ERETA DEL PEDREGAL; 2. QUINTARET; 3. LA VITAL; 4. ARENAL DE LA COSTA; 5. MOLÍ ROIG; 6. CASA DE LARA; 7. EL PRADO. *HILLTOP SETTLEMENTS*: A. MOLA D'AGRES; B. LA SERRELLA, C. PEÑÓN DE LA ZORRA; D. PUNTAL DE LOS CARNICEROS; E. EL MONASTIL; F. HERRADA DEL TOLLO).

Prominent amongst the sites that were occupied before the Beaker culture appeared is **Casa de Lara**. It is a large settlement situated on the perimeter of an ancient brackish lagoon which was first occupied in the Epipalaeolithic (Fernández, 1999). When we look at its occupation by the Beaker culture, we find a tanged dagger with rhomboid blade as well as other metal objects and several fragments of pottery with incised Beaker decoration. However, the absence of a stratigraphic context means we are unable to evaluate these finds correctly, and cannot rule out the possibility that some of the metal items may predate the Beaker settlement. This settlement was inhabited continuously from the late Neolithic to the Beaker period, a characteristic that is also observed in other sites in neighbouring basins: El Prado de Jumilla (Jover *et al.*, 2012), Quintaret in Montesa (García Puchol *et al.*, 2014), Molí Roig in Banyeres (Pascual & Ribera, 2004), Ereta del Pedregal in Navarrés (Juan-Cabanilles, 1994) and La Vital in Gandía (Pérez *et al.*, 2011).

The appearance of the first hilltop settlements is also associated with Beaker materials. **Puntal de los Carniceros** (Soler García, 1981; Jover & de Miguel, 2002) is situated on a plateau some 60 m above the surrounding plain. This site affords excellent visual control of the Almansa corridor, a valley that connects the Mediterranean coast with the Meseta through the Vinalopó Valley, and the Beneixama Valley, a corridor that gives Villena access to the coast through the Serpis valley. The site is characterised by the masonry walls that mark its limits on three sides –North, East and South– and a steep escarpment on the West, defining a rectangular enclosure of some 3,500 m². The notable investment of time and effort in building it is particularly evident in the north wall, which is more than 3 m thick in some places, has five courses of medium-sized stone blocks arranged in parallel and extends for more than 90 metres. The stratigraphic information is limited to a sondage carried out in the 1960s in which no structures were documented, although various fragments of incised Beaker pottery were recorded (Fig. 2).

The site which offers most information is that of **Peñón de la Zorra** (Soler García, 1981; Jover & de Miguel, 2002; García Atiénzar, 2014). It is a settlement located on a rocky, triangular-shaped spur, the Beaker remains being concentrated at the highest point, situated 100 m above the valley floor. Four lines of walls of between 1 and 1.5 m wide parallel to the contour lines, defining an area of some 5,500 m², can be observed on the surface. They are separated from each other by a distance of between 50 m for the first two lines and 20 m for the two higher ones. These walls extend in parallel with the

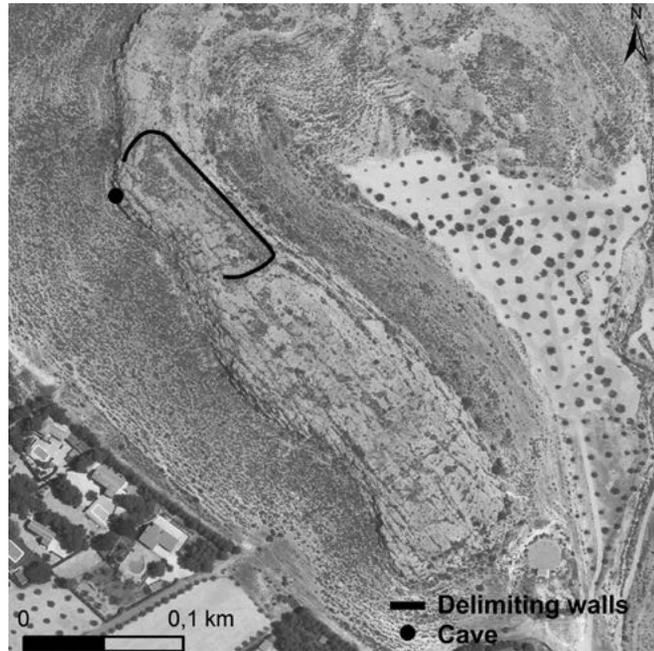


FIGURE 2. PUNTA DE LOS CARNICEROS. LOCATION OF THE SETTLEMENT AND PLANIMETRY OF THE MASONRY WALLS.



FIGURE 3. PEÑÓN DE LA ZORRA. LOCATION OF THE SETTLEMENT, PLANIMETRY OF THE MASONRY WALLS AND LOCATION OF THE BURIAL CAVES.

escarpments, and they could be interpreted as a system of circulation along a passage between the constructed spaces and the escarpments (Fig. 3). As in the case of Puntal de los Carniceros, the effort expended in the construction of these enclosures was considerable.

Recent excavations (García Atiénzar, 2014) have allowed several masonry constructions to be identified that can be defined as units of habitation, and also a solid structure of large blocks of stone built on a triple platform constructed using the same technique. Its morphology, its position as an axis that articulates the other buildings, the amount of rubble documented around it and its elevated



FIGURE 4. PEÑÓN DE LA ZORRA. PLANIMETRY OF BUILDINGS ASSOCIATED WITH THE BELL BEAKER PHASE.

position suggest that it was a lookout tower from which the occupants could keep watch over the surrounding area, principally the Beneixama valley, the main natural corridor connecting this region and the Meseta with the coast along the Serpis valley (Fig. 4).

To date, five units of habitation have been documented, although with stratigraphic relationships that suggest that they represent different phases of occupation. The first is defined by a space (House 5) with a trapezoidal plan and an area of approximately 25 m² and is built against the elevated structure, which would date both buildings to the earliest period of the settlement. Under the rubble from the walls of this unit a single level of abandonment is documented; this contained an assemblage of archaeological materials including 12 pottery vessels with Beaker decoration, mainly of the incised style, sometime combined with the impression of points or pseudo-excised (Fig. 5). The vessels included the three typical forms of Beaker pottery: the bell-beaker, the pot and the bowl. Together with them other small and medium vessels without decoration were recovered. The rest of the material assemblage consisted of a bone spatula, a perforated *Cerastoderma* shell, some flakes of flint and several hammer stones and grindstones. This phase was dated from a grain of wheat to c. 2480-2280 cal BC (Beta-332584: 3900±40 BP).

In addition to this building, others have been defined that, because of the different stratigraphic relationships observed and the dates obtained, are later chronologically and date to the Early Bronze Age.

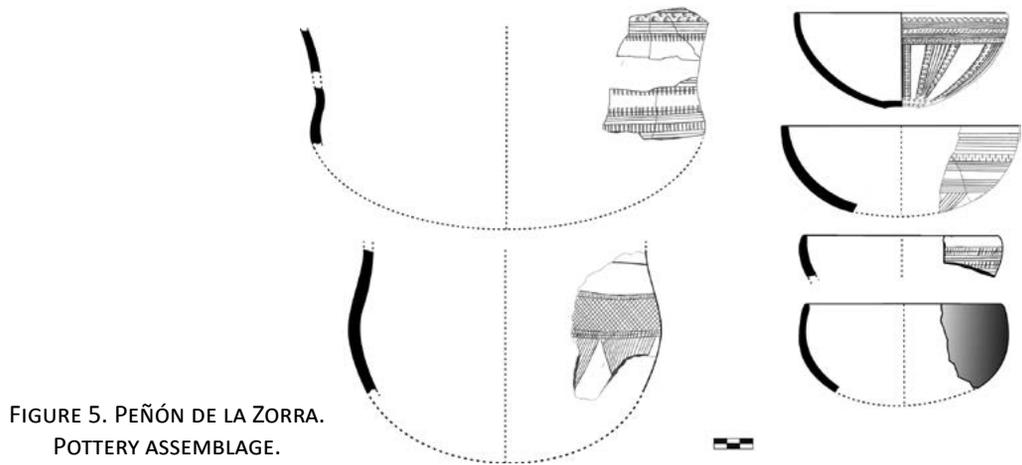


FIGURE 5. PEÑÓN DE LA ZORRA. POTTERY ASSEMBLAGE.

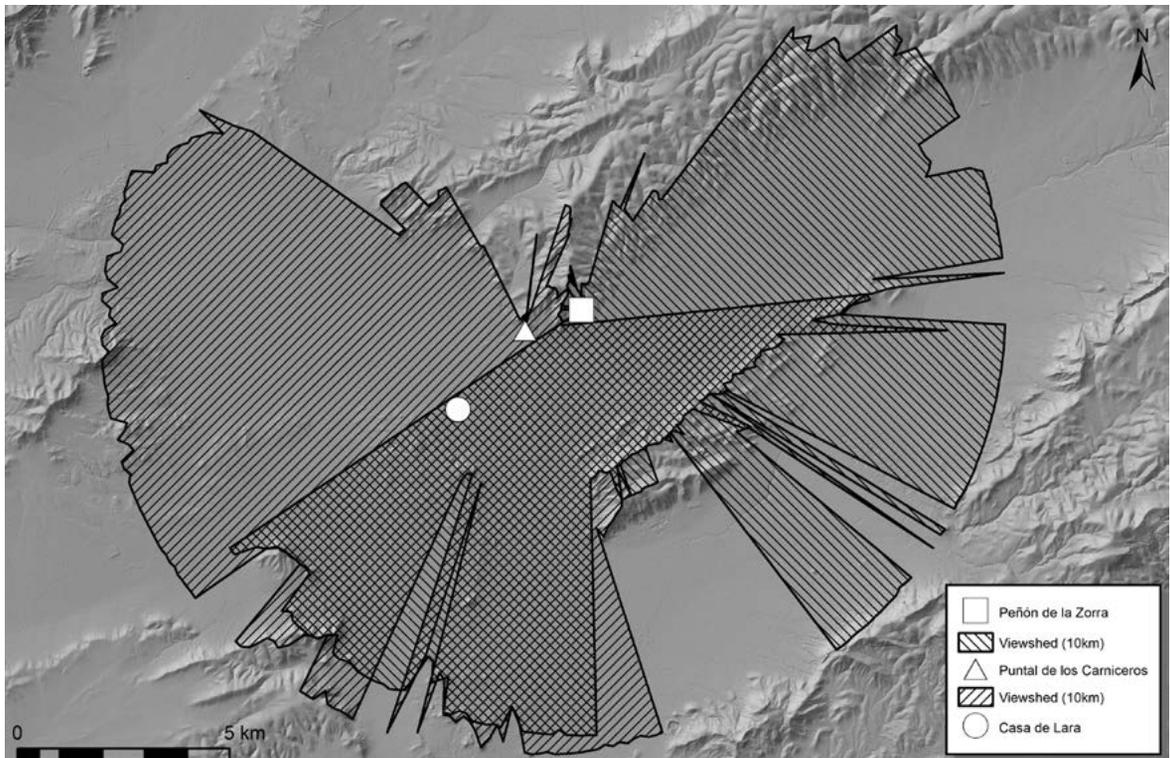


FIGURE 6. ACCUMULATED VIEWSHED FROM THE PUNTAL DE LOS CARNICEROS AND PEÑÓN DE LA ZORRA.

4. The emergence of Beaker social elites in the Alto Vinalopó

Traditionally, the Beaker finds in Villena were interpreted as the paradigm for the emergence of social elites (Soler García, 1981; Bernabeu, 1984). This inference was made fundamentally on the basis of the funerary evidence from the Peñón de la Zorra, particularly the Eastern and Western Cave. These two caves, excavated by J. M^a Soler in 1964, were published as evidence of individual burials associated with Beaker culture metal grave goods: the tanged dagger and two Palmela spearheads discovered in the Eastern Cave (Soler García, 1981). The subsequent review of the anthropological remains (Jover & de Miguel, 2002) allowed it to be determined that a greater number of dead were buried there: six in the Eastern Cave and two in the Western Cave.

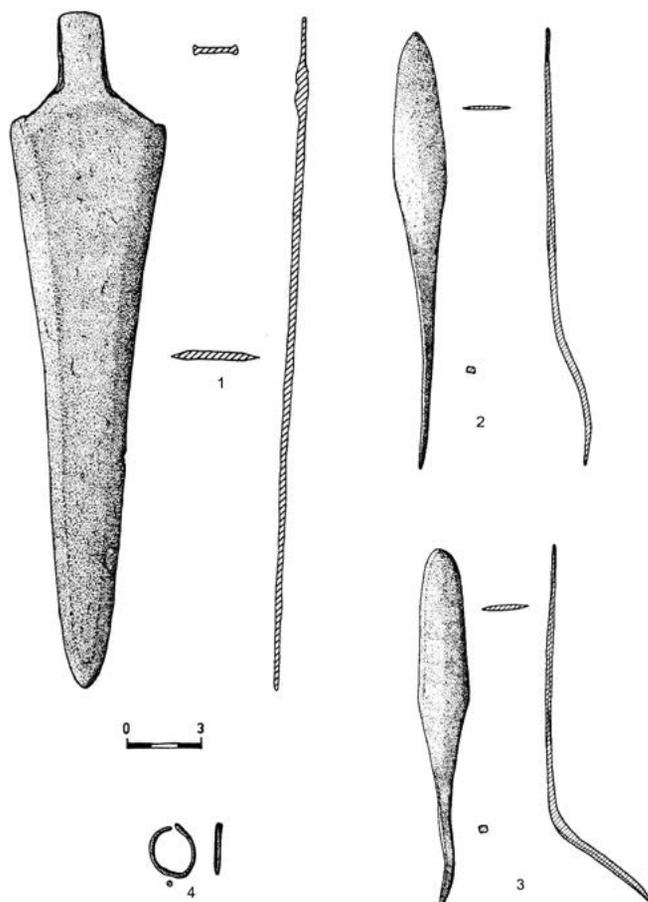


FIGURE 7. METALLIC GRAVE GOODS FROM THE WESTERN CAVE OF THE PEÑÓN DE LA ZORRA (SIMÓN, 1998).

Thus what had initially been interpreted as an example of individual Beaker burials became collective burials that, to some extent, maintained the funerary traditions typical of the late Neolithic. However, certain characteristics suggest a departure from previous funeral practices because burials linked with settlements on hilltop sites are documented for the first time, and this association has also been established for Beaker settlements on the plain (Pérez Jordà *et al.*, 2011; Soler Díaz, 2013). Moreover, the number of those buried is quite low when compared with multiple burials in the caves. Finally, metal weapons were included in the grave goods, although there is also some evidence of metal grave goods in the immediately preceding period (Pérez Jordà *et al.*, 2011). In this respect, mention should also be made of the find of silver rings, an element that had been interpreted by some authors as a sign of modernity (Bernabeu, 1984; Simón, 1998) (Fig. 7). The new radiocarbon evidence demonstrates that at least one of the individuals must have been buried in the Eastern Cave at the same time as the final occupation of the settlement during the Bronze Age (MAMS-19108 3357±22 BP: 1736-1611 cal BC 2σ). Therefore, and given the long period of time during which these caves were used for funerary purposes, we think that this evidence is not the best suited for trying to explain the process by which social elites emerged.

We think that the patterns of settlement and some of the architectonic features described above are better indicators for analysing this process. However, any analysis of the territory's pattern of settlement should start from two fundamental questions: Are the settlements with Beaker pottery –on the plain and hilltop settlements– contemporaneous? Or, on the other hand, did the abandonment of the first imply the founding of those sited on hilltops? There are various regions around Villena where sites on the plain associated with Beaker materials ceased to be occupied when others appeared on hilltops, some of which would survive into the second millennium cal BC. We can highlight the cases

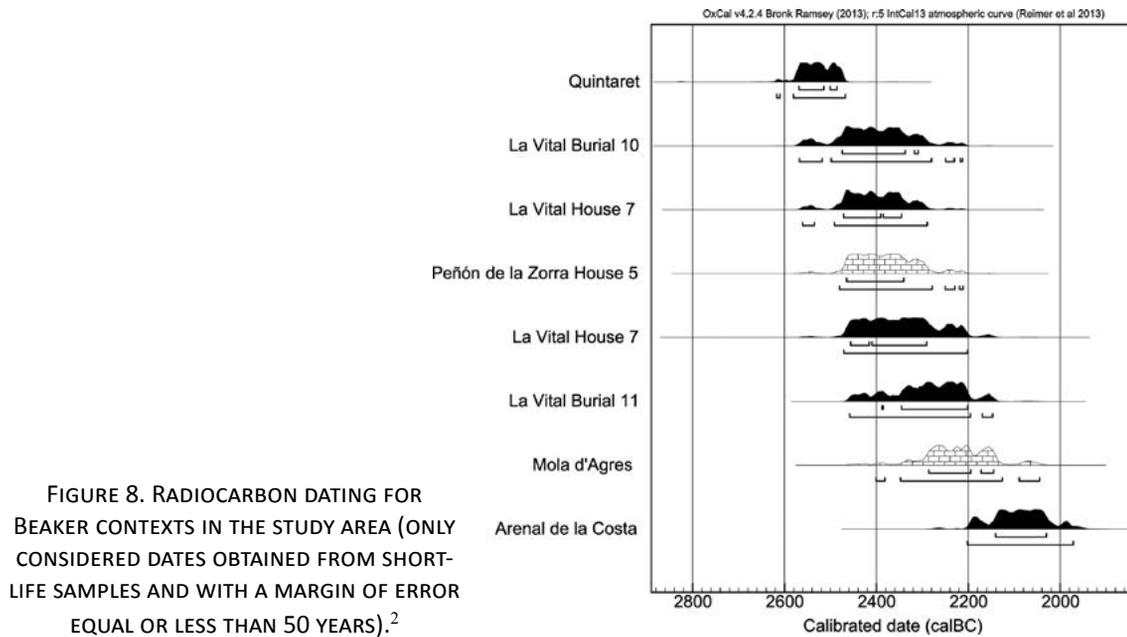


FIGURE 8. RADIOCARBON DATING FOR BEAKER CONTEXTS IN THE STUDY AREA (ONLY CONSIDERED DATES OBTAINED FROM SHORT-LIFE SAMPLES AND WITH A MARGIN OF ERROR EQUAL OR LESS THAN 50 YEARS).²

of the Jumilla basin, where Beaker materials (pottery and metal) have been observed in the settlement on the plain of El Prado (Jover *et al.*, 2012), and metal objects of Beaker typology in Herrada del Tollo (Simón *et al.*, 1999), in the Middle Vinalopó, where Beaker pottery was documented in the settlements on the plain at Terrazas del Pantano and also in the hilltop site of El Monastil (Segura & Jover, 1997), or that of Banyeres de Mariola, where Beaker pottery has been documented both in the settlement on the plain of Molí Roig and in the hilltop site of La Serrella (Pascual & Ribera, 2004; Pascual, 2007).

Unfortunately, few sites have been excavated to date, although the datings available point to the presence of Beaker materials in sites on valley floors from 2500 cal BC onwards. This evidence is always associated with sites that had been occupied from the first half of the third millennium cal BC onwards. The first hilltop sites occupied (Peñón de la Zorra and Mola d'Agres) are later, dating to around *c.* 2400-2300 cal BC. Although the chronological evidence is still limited (see Fig. 8), it can be proposed that the sites on the plain were progressively abandoned –although some, such as Arenal de la Costa, may have survived until the final centuries of the third millennium cal BC– and the population became progressively concentrated in settlements sited at a higher altitude. Thus for some centuries a model of complementary settlement can be documented, with villages on the plain devoted to farming and husbandry and walled hilltop settlements that offered excellent visual control over the lands worked and communication routes. The date that probably marked the end of this dichotomy in the pattern of settlement would be around 2200 cal BC, a period that saw major changes in the settlement pattern in the Upper Vinalopó –and also in neighbouring basins– that implied a new internal structure of the settlements, giving rise to what we know as the Bronze Age (Jover *et al.*, 2014: 61).

If this progressive transition can be shown to have occurred, it not only provides evidence of a new form of settlement but of a radically different model of the way societies were organised. In these hilltop settlements the population was concentrated into a much small space in units of habitation with a rectangular plan. This model is very different from that observed in the late Neolithic –even in the early phases of the Beaker culture– when we see hamlets consisting of a few dwellings scattered over the best agricultural land or near areas with water.

² For more details, check Pérez Jordà *et al.*, 2011 and Jover Maestre *et al.*, 2014.

The concentration of the population in one place would have culminated in an increase in productive capacity. At this time no improvements are observed either in the means of production –with the exception of the appearance of denticulated sickle blades– or agricultural techniques, so the only way to increase the productive capacity necessary for obtaining certain products with a high social value would be to reorganise production. This greater level of social integration is also seen in communal work unrelated with the subsistence economy, such as the defensive walls of the hilltop settlements or the elevated structure on the Peñón de la Zorra. Furthermore, the documentation of an extensive of Beakers in the same place (House 5 of the Peñón de la Zorra) is evidence of the concentration of symbols of power in one place and in the hands of a small sector of the population. In any case, what these indicators show is the success of the tribal domestic unit as the basic form of social organisation, characterised by reciprocal solidarity amongst its members, and the appearance of broader and more complex organisational units that could be defined as hierarchized tribal societies in which a series of ruling elites appropriated part of the production in exchange for undertaking the group's 'intellectual' or 'maintenance' work (Bate, 1998). These elites, whose principal role would be the management of agricultural production and the organisation of other, non-productive, tasks would be distinguished by the ostentation and use of metal products, especially in the form of weapons, and Beaker pottery. In addition, they would emphasise their pre-eminence over the rest of the community by associating their graves with domestic spaces, either in former silos or in small fissures in the hills on which the settlements were sited, establishing a funerary tradition that would expand considerably in the course of the Bronze Age, both in the Southeast and in the peninsular Levant.

References

- BATE, L.-F. 1998. *El proceso de investigación en arqueología*. Barcelona: Crítica.
- BERNABEU, J. 1984. *El vaso campaniforme en el País Valenciano*. Valencia: Diputación Provincial de Valencia (Trabajos Varios del SIP, 80).
- BERNABEU, J. 2010. El mundo funerario entre el VI y el II milenio AC. In Pérez, A. & Soler, B. (eds.): *Restos de vida, restos de muerte*. Valencia: Museu de Prehistòria de València, Diputación de Valencia: 45-54.
- BERNABEU, J.; MOLINA, L.; OROZCO, T. & DIEZ, A. 2006. Three millennia of Prehistory in Mediterranean Spain (5600-2000 cal BC). In Díaz del Río, P. & García, L. (eds.): *Social inequality in Iberian Late Prehistory*. Oxford: Archaeopress (British Archaeological Reports, International Series 1525): 97-116.
- BERNABEU, J. & MOLINA, LL. 2011. El horizonte campaniforme 30 años después. In Pérez Jordá, G.; Bernabeu, J.; Carrión, Y.; García, O.; Molina, Ll. & Gómez, M. (eds.): *La Vital (Gandía, Valencia). Vida y muerte en la desembocadura del Serpis durante el III y el I milenio AC*. Valencia: Diputación de Valencia (Serie de Trabajos Varios del SIP, 113): 275-280.
- BLASCO, M.-C. & RÍOS, P. 2010. La función del metal entre los grupos campaniformes. Oro *Versus* cobre. El ejemplo de la Región de Madrid. *Trabajos de Prehistoria* 67, 2: 359-372.
- BUENO, P.; BARROSO, R. & BALBÍN, R. 2007-2008. Campaniforme en las construcciones hipogeas del megalitismo reciente al interior de la Península Ibérica. *Veleia* 24-25: 771-790.
- DELIBES, G. & DEL VAL, J. 2007-2008. La explotación de la sal al término de la Edad del Cobre en la Meseta central española ¿fuente de riqueza e instrumento de poder de los Jefes Ciempozuelos? *Veleia* 24-25: 791-812.
- FERNÁNDEZ LÓPEZ DE PABLO, J. 1999. *El yacimiento prehistórico de Casa de Lara, Villena (Alicante): Cultura material y producción lítica*. Villena: Fundación Municipal José María Soler.
- GARCÍA ATIÉNZAR, G. 2009. *Territorio Neolítico. Las primeras comunidades campesinas en la fachada oriental de la península Ibérica (ca. 5600-2800 cal BC)*. Oxford: Archaeopress (British Archaeological Reports, International Series 2021).
- GARCÍA ATIÉNZAR, G. 2014. Primeras aportaciones del proyecto de excavaciones arqueológicas en el poblado campaniforme del Peñón de la Zorra (Villena, Alicante). *MARQ. Arqueología y Museos, Extra 01*: 196-201.

- GARCÍA ATIÉNZAR, G.; BUSQUIER, J. D.; MATÁIX, J. J.; CAÑIZARE, F.; DOMENE, P.; CARRIÓN, Y.; TORMO, C.; PÉREZ, G.; JOVER, F. J.; LÓPEZ, J. A., BARCIELA, V.; MONTERO, I. & SORIANO, I. (in press). El poblado de Vilches IV. Un asentamiento calcolítico en altura en el Campo de Hellín. *I Reunión Científica de Arqueología de Albacete*. Albacete: Instituto de Estudios Albacetenses.
- GARCÍA PUCHOL, O.; BERNABEU, J.; CARRIÓ, Y.; MOLINA LL.; PÉREZ, G. & GÓMEZ, M. 2013. Una perspectiva funeraria sobre el periodo campaniforme en el Mediterráneo occidental. Leyendo el contexto social de los enterramientos individuales de La Vital (Gandía, Valencia). *Trabajos de Prehistoria* 70, 2: 264-277.
- GARCÍA PUCHOL, O.; MOLINA, LL.; COTINO, F.; PASCUAL, J. LL.; OROZCO, T.; PARDO, S.; CARRIÓN, Y.; PÉREZ, G.; CLAUSÍ, M. & GIMENO, L. 2014. Hábitat, marco radiométrico y producción artesanal durante el Final del Neolítico y el Horizonte Campaniforme en el corredor de Montesa (Valencia). Los yacimientos de Quintaret y Corcot. *Archivo de Prehistoria Levantina* XXX: 159-211.
- GARRIDO-PENA, R. 2000. *El campaniforme en la meseta Central de la península Ibérica. (c. 2500-2000 A.C.)*. Oxford: Archaeopress (British Archaeological Reports, International Series 892).
- GARRIDO-PENA, R. 2006. Transegalitarian societies: an ethnoarchaeological model for the analysis of Copper Age Bell Beaker using groups in Central Iberia. In Díaz del Río P. & García L. (eds.): *Social Inequality in Iberian Late Prehistory*. Oxford: Archaeopress (British Archaeological Reports, International Series 1525): 81-96.
- JOVER, F. J. & DE MIGUEL, M^a. P. 2002. Peñón de la Zorra y Puntal de los Carniceros (Villena, Alicante): revisión de dos conjuntos de yacimientos campaniformes en el corredor del Vinalopó. *Saguntum* 34: 59-74.
- JOVER, F. J.; GARCÍA, G.; MORATALLA, J.; SEGURA, G.; BIETE, C.; TORMO, C. & MARTÍNEZ, S. 2012. Continuidad residencial e intensificación productiva durante la primera mitad del III milenio cal BC en el Levante de la península Ibérica: las aportaciones del asentamiento de El Prado (Jumilla, Murcia). *Revista Atlántica-Mediterránea de Prehistoria y Arqueología Social* 14: 15-54.
- JOVER, F. J.; LÓPEZ, J. A. & GARCÍA-DONATO, G. 2014. Radiocarbono y estadística bayesiana: aportaciones a la cronología de la edad del bronce en el extremo oriental del sudeste de la península ibérica. *Saguntum* 46: 41-69.
- JUAN-CABANILLES, J. 1994. Estructuras de habitación en la Ereta del Pedregal (Navarrés, Valencia). Resultados de las campañas de 1980-1982 y 1990. *Saguntum* 29: 67-97.
- JUAN-CABANILLES, J. 2005. Las manifestaciones del Campaniforme en el País Valenciano. Una visión sintética. In Rojo, M.; Garrido-Pena, R. & García, I. (eds.): *El campaniforme en la Península Ibérica y su contexto europeo/Bell Beakers in the Iberian Peninsula and their European context*. Valladolid: Universidad de Valladolid (Serie Arte y Arqueología 21): 389-399.
- KUNST, M. 1998. Waren die ‘Schmiede’ in der portugiesischen Kupferzeit gleichzeitig auch die Elite?. In Fritsch, B.; Maute, M.; Matuschik, I.; Müller, J. & Wolf, C. (eds.): *Tradition und innovation. Festschrift Christian Strahm*. Rahden: Westf (Prähistorische Archäologie Wissenschaft. Studia Honoraria, Band 3): 541-551.
- LIESAU, C. & BLASCO, M. C. 2011-2012. Materias primas y objetos de prestigio en ajuares funerarios como testimonios de redes de intercambio en el Horizonte campaniforme. *Cuadernos de Prehistoria y Arqueología de la UAM* 37-38: 209-222
- LÓPEZ PADILLA, J. A. 2006. Consideraciones en torno al ‘Horizonte Campaniforme de Transición’. *Archivo de Prehistoria Levantina* XXVI: 193-243.
- MOLINA, F. & CÁMARA, J. A. 2005. *Guía del yacimiento arqueológico Los Millares*. Sevilla: Empresa Pública de Gestión de Programas Culturales, Consejería de Cultura, Junta de Andalucía.
- PASCUAL, J. 2007. Serrella durant la Prehistòria. *Serrella: els nostres orígens*. Museu de la Font Bona: Ajuntament de Banyeres de Mariola: 33-36.
- PASCUAL, J. & RIBERA, A. 2004. El Molí Roig. Un jaciment del III mil.lenni a Banyeres de Mario-la (l’Alcoià). *Recerques del Museu d’Alcoi* 13: 129-148
- PÉREZ, G.; BERNABEU, J.; CARRIÓN, Y.; GARCÍA, O.; MOLINA, LL. & GÓMEZ, M. (eds.) 2011. *La Vital (Gandía, Valencia). Vida y muerte en la desembocadura del Serpis durante el III y el I milenio A.C.* Valencia: Diputación de Valencia (Serie de Trabajos Varios del SIP, 113).

- ROJO, M. A.; KUNST, M.; GARRIDO-PENA, R.; GARCÍA, I. & MORÁN, G. 2005. *Un desafío a la eternidad: tumbas monumentales del Valle de Ambrona*. Soria: Junta de Castilla y León. Consejería de Cultura y Turismo (Memorias, Arqueología en Castilla y León, 14).
- SARMIENTO, G. 1992. *Las primeras sociedades jerárquicas*. México: INAM. (Colección Científica, 246).
- SEGURA, G. & JOVER, F. J. 1997. *El poblamiento prehistórico en el Valle de Elda (Alicante)*. Petrer: Editorial Club Universitario (Colecció l'Algoleja, 1).
- SHERRATT, A. G. 1987. Cups that Cheered. In Waldren W. H. & Kennard R. C. (comps.): *Bell Beakers of the Western Mediterranean. Definition, interpretation, theory and new site data. The Oxford International Conference 1986*. Oxford: Archaeopress (British Archaeological Reports, International Series 331): 81-114.
- SIMÓN GARCIA, J.-L. 1998. *La metalurgia prehistórica valenciana*. Valencia: Diputación Provincial de Valencia (Serie de Trabajos Varios del SIP, 93).
- SOLER DÍAZ, J. A. 2002. *Cuevas de inhumación múltiple en la Comunidad Valenciana*. Madrid-Alicante: Real Academia de la Historia, Museo Arqueológico Provincial de Alicante.
- SOLER DÍAZ, J. A. (eds.) 2013. *Villa Filomena (Vila-real, Castellón de la Plana). Memoria de una excavación nonagenaria. Un poblado de joyos con campaniforme*. Castellón: Diputación de Castellón (Monografies de Prehistoria i Arqueologia Castellonneques, 9).
- SOLER GARCÍA, J. M^a. 1976. *Villena. Prehistoria-Historia-Monumentos*. Alicante: Diputación Provincial de Alicante.
- SOLER GARCÍA, J. M^a. 1981. *El Eneolítico en Villena (Alicante)*. Valencia: Real Acadèmia de Cultura Valenciana (Serie Arqueològica, 7).

Elements for the definition of the Bell Beaker horizon in the lower Ebro Valley: preliminary approaches

Anna GÓMEZ

Dpto. de Prehistoria, Universitat Autònoma de Barcelona, Edifici Mòdul de Recerca A,
08193 Bellaterra, Barcelona, Spain
anna.gomez@uab.cat

Patricia RÍOS MENDOZA

Dpto. de Prehistoria y Arqueología, Universidad Autónoma de Madrid, C/ Tomás y
Valiente, 1, 28049 Madrid, Spain
patricia.rios@uam.es

Marc PIERA and Miquel MOLIST

Dpto. de Prehistoria, Universitat Autònoma de Barcelona, Edifici Mòdul de Recerca A,
08193 Bellaterra, Barcelona, Spain
pieratex@hotmail.com; miquel.molist@uab.cat

Abstract

The significance of the lower valley of the Ebro during Late Prehistory was undoubtedly due to its richness in resources for the first agricultural societies and for being an important way of communication between the Mediterranean coast, northeast, and the interior of the Iberian Peninsula. This importance is evident in large sites located for years, but today they are still under study with the aim to understand different economic and territorial dynamics that occurred in the III and II millennia cal BC. Problems inherent to the archaeological record, and circumstances of research, place us today in an initial knowledge, especially with regard to Bell Beaker, whose evidence and interpretations have changed little in the last twenty years in that region.

It is still lacking material and chronological characterization of Bell beaker domestic occupations and their relationship with funerary areas. In this sense, we think the key may be in sites findings from recent years that are examples of extensive occupations in valleys along the III millennium BC, present throughout the region in high farming capacity areas. One of these sites, El Molló, located on an immediate terrace Ebro River is the subject of study by our Research Group.

The aim of this paper is to provide a critical review to the bell beaker horizon in the lower Ebro Valley from the updated documentation and the review of the known records, particularly the register associated to the 'Bell Beaker set' as a first step to the understanding of the possible economic and social basis that sustained the appearance of bell beakers in the region.

The results of our approach does not yet allow us make definitive conclusions. For the moment the state of art on Bell Beaker in the area (and on the third millennium BC in general) is far from being able to provide an answer to differentiate: exchange elements, elements of local origin and production, and local elements such as emulations result of contact or the arrival of ideas.

Keywords: *Bell Beaker, lower Ebro valley, new sites, exchange objects*

Résumé

L'importance de la basse vallée de l'Ebre au long de la Préhistoire Récente était sans doute en relation à sa richesse en ressources pour les premières sociétés agricoles et au même temps pour être une importante voie de communication entre la côte méditerranéenne et le nord-est et l'intérieur de la Péninsule Ibérique. Cette importance est évidente dans les grands gisements situés depuis longue date, mais actuellement, nous sommes encore dans le processus d'étude et de la compréhension des différentes dynamiques économiques et territoriales qui se sont produites dans le III et II millénaires cal BC. Les problèmes liés au registre et à la nature de la propre recherche, placent les connaissances actuelles dans une position faible, notamment en matière de Campaniforme, dont le témoignage et les interprétations ont peu changé au cours des vingt dernières années.

Il y a un déficit des bonnes caractérisations matérielles et chronologiques des occupations domestiques et leur relation avec les zones funéraires. En ce sens, nous pensons que la clé peut être dans l'étude des gisements découverts ces dernières années, et qui illustrent de nombreuses occupations en plein air le long de la III millénaire avant JC. Ils sont présents dans toute la région et ils montrent une grande capacité agricole et d'élevage. Un de ces sites, El Mollo, située sur une terrasse près de l'Èbre, constituée l'objectif d'une étude par notre équipe de recherche.

Pour l'instant, l'état de la recherche du phénomène Campaniforme -et du IIIème millénaire AC en général-, elle n'est pas en mesure de fournir une réponse à différencier les éléments arrivées à partir des éléments des réseaux d'échange, des éléments de souche local et éléments locaux qui peuvent répondre à des émulations suite d'un contact ou l'arrivée d'idées.

Mot-clés: *Campaniforme, Vallée de l'Ebro, Nouveaux établissements, objets d'échange*

1. Introduction

The Ebro Valley is an important space for developing the first agricultural and farming settlements through Recent Prehistory. It is doubtless that the main axis is the river itself, which acts as communication tool and a way of circulating goods, ideas and people that unite such a wide and complex territory.

Different human populations choose the lower valley, between III and II millennium BC, with different economic and territorial strategies. The result is a complex settlement pattern which today is still under study and comprehension process (Fig. 1). Regarding the so-called Bell Beaker horizon, it is traditionally considered that in this area, after the archaic phase represented by the International and/or corded Bell Beaker, it appears a more recent phase represented by the development of the Salomó style, with strictly regional characteristics.

European Research on Bell Beaker, interpreted from traditional theoretical basis and also extended to the Iberian Peninsula research, has pushed into the background certain regions and contexts in which the phenomenon is not so visible considering its material definition on the basis of the presence of the objects. This way, 'non-beaker' contexts have remained underestimated for the interpretation of the period and the phenomenon itself. The Lower Ebro Valley is not an exception on this sense, so historical and archeological interpretation of III millennium BC has been built from the presence of sepulcher caves with Bell Beaker good-graves that defined a cultural area within the European phenomenon, with little room for discussing or thinking about the emergence of the assumed Bell Beaker elites or the material evidence within the chalcolithic societies of the area.

Regarding the topic of this volume, the apparition in the region of certain materials as testimony of the existence of exchange networks that could have been controlled by Bell Beaker personalities and sustained by the demand of an elite, has not been valued either from interpretations less stuck to the historical-cultural paradigm or to the purely processual approach associated to prestigious objects. There is a lack of visions that consider all the material evidences – Bell Beaker and non-Bell Beaker – and the new archeological findings in the main valleys.

With this article we intend to provide a critical review to the Bell Beaker horizon in the low Ebro Valley area from the updated documentation and the review of the known records, particularly the register associated to the 'Bell Beaker set' as a first step to the understanding of the possible economic and social basis that sustained the appearance of Bell Beaker personalities in the region. Besides this objective, on the other hand, there is the intention to enhance the open site in El Molló, recently studied by an interdisciplinary team between the *Autónoma University of Barcelona* (UAB) and the *Terres de l'Ebre Museum* under Dr. Miquel Molist direction. This settlement reveals the difficulty of interpreting and understanding the large sites with wide chronology, proven by the existence of domestic¹ archeological sites contemporary to the Bell Beaker

¹ We refer to the term 'domestic' to differentiate this type of settlement from the common funerary caves and shelters.

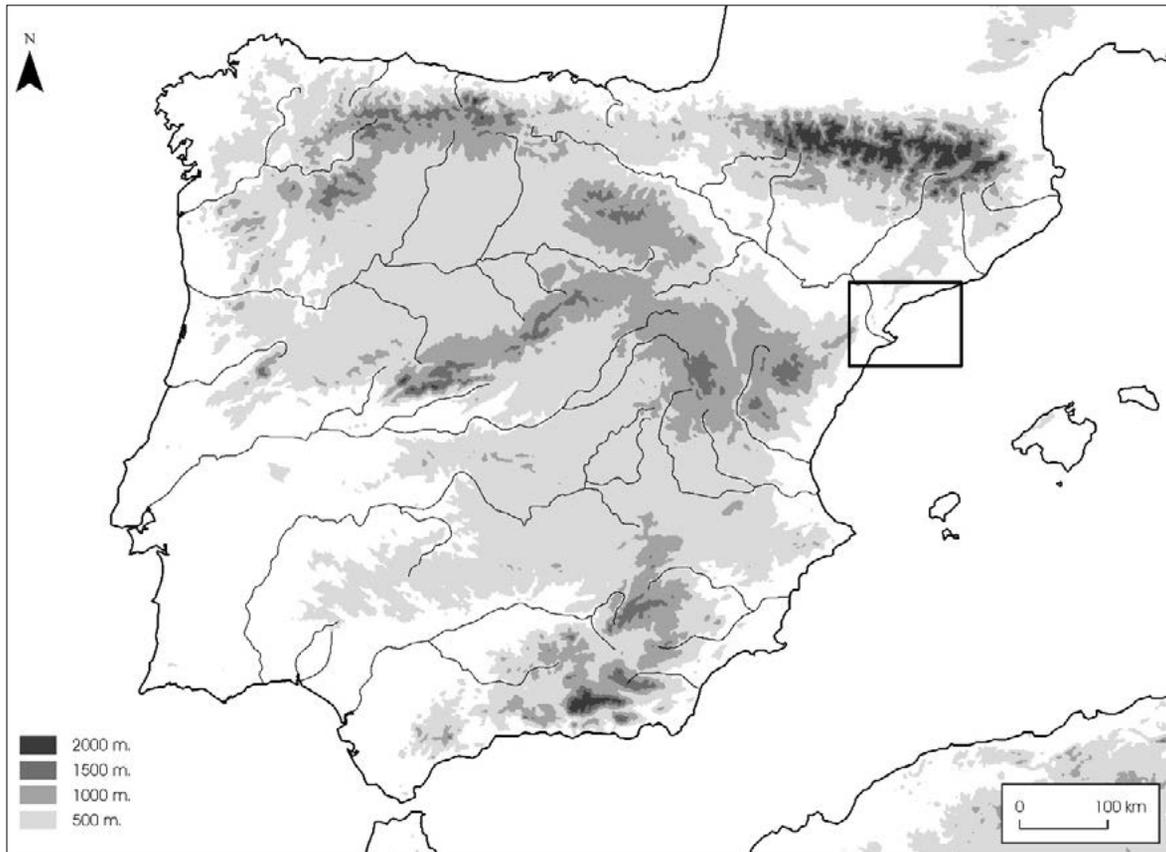


FIGURE 1. SITUATION OF THE LOWER EBRO VALLEY IN THE IBERIAN PENINSULA.

phenomenon,² generally chronologically and culturally assigned to a Late Neolithic or an Early Bronze Age in Catalonia, and whose exchanging role within the exchange Bell Beaker networks is still unknown.

This first approach is part of the development of an Investigation Project³ that will update the state of the art on the topic from the new field findings, and will allow us to insist on the characterization of the archeological record and to have a wider and more actualized vision of the Recent Prehistory sequencing in the area.

2. State of the art. The Bell Beaker in the low Ebro Valley region in the context of the Northeast Peninsula

Despite the progress of the knowledge about the Bell Beaker horizon in the Northeastern Peninsula, and in general about the III millennium BC thanks to the better contextualized new findings and also to new but very scarce datings⁴ (Balaguer *et al.*, 2013; Blasco *et al.*, 2011; Carlús & Castro, 2011;

² In the absence of the datings results from this site, the studied materials so far show the characteristics of the sites defined within the Catalan Early Bronze associated to dates from end of III millennium and beginning of II millennium BC, same chronologic interval assigned to the plain development of the bell beaker phenomenon in the Iberian Peninsula.

³ Project 'Interacció entre els ambients fluvials i les primeres societats agrícoles. Contribució al seu coneixement a partir de l'anàlisi arqueològic de la Vall de l'Ebre (sector Ribera d'Ebre) i la Noguera Pallaresa (sector Gerri de la Sal)'. IP: Miquel Molist, Universidad Autónoma de Barcelona. 2014/100633 PLA DE RECERCA D'ARQUEOLOGIA I PALEONTOLOGIA DE CATALUNYA 2014-2017.

⁴ We refer to open settlements as Vapor Gorina, Ca l'Estrada or Bosc del Quer, in cave or shelter as Colomera Cave, and funerary sites as Sagrera hypogeum or Carrer Paris hypogeum.

Roig *et al.*, 2008), the case of the lower Ebro Valley is still mainly anchored to old excavations data and the scarce although important news have not been assessed as a whole, in spite of being one of the most important valleys and communication way in the Iberian Peninsula.

Previous publications on the Bell Beaker topic in the Northeastern Peninsula (Clop, 2005; Martín, 2003; Martín *et al.*, 2003) consider the Ebro region from the classic site Calvari Cave, which illustrated the presence of Bell Beakers of international styles in the southern area of the territory, and also through the apparently subsequent development of one of the so-called regional styles, the Salomó, established from the basis of the findings in Fonda de Salomó Cave, in the surroundings of the area of study (Harrison, 1977). However, most part of the Bell Beaker findings appeared in the northern regions, in which also the acknowledgement of non-Bell Beaker manifestations from III millennium BC began to start with new findings and Bell Beaker sites better contextualized, besides providing new datings (Alcalde *et al.*, 1997; Clop & Faura, 2002; Francès *et al.*, 2004, 2007; Mercadal, 2003). This way, the region of study (the lower Ebro Valley) was considered marginal in the study of the III millennium BC (Final Neolithic – Chalcolithic); its acknowledgement has only partially been improved by the important studies on prehistoric metallurgy developed since the 90's (Rovira *et al.*, 1997; Martín *et al.*, 1999; Rodríguez de la Esperanza, 2005), and by the definition or better acknowledgement of first manifestations of the Bronze Age associated to a epi Bell Beaker moment at the beginning of the II millennium BC (Forcadell & Villalbí, 1999; Martín, 2003; Martín & Mestres, 2003; Maya, 1997, 2002; Maya & Petit, 1986; Rovira, 1978, 2006; Tarrús, 1985).

The investigation projects about the prehistoric metallurgy in the Iberian Peninsula, that included the analysis of the objects and remainders of metallurgical activity found in the northeastern Peninsula, allowed to know and to characterize the metallurgy of the Bell Beaker contexts documented so far, and to disassociate its apparition to the abovementioned horizon.⁵ Besides, the study and analysis of important surfacing metallic minerals zones, allowed to locate an important area in the South, in the Priorat region, that could be related with the metallic findings and evidences of Bell Beaker and non-Bell Beaker mining industry of the region and the immediate zone in the Ebro Valley (Martín *et al.*, 1999; Rovira *et al.*, 1997).

On the other hand, the study of the first manifestations of the Bronze Age seemed to be better characterized thanks to the definition of the 'northeastern group' and to the findings of the Arbolí Cave (Maya, 1997, 2002; Maya & Petit, 1986; Vilaseca, 1934, 1941) and the subsequent sites that were joining this phase thanks to the appearance of the same type of pottery decoration, considered as epi Bell Beakers.

Regarding the temporary sequence and despite the scarce Bell Beaker contexts datings, important efforts were made to analyze and locate the phenomenon within the sequence of the Recent Prehistory in the Northeast with the aim to help the definition of the different cultural moments that, as the Bell Beaker, have been characterized from certain concrete pottery types. More exhaustive works in this regards pointed a few years ago the temporary coincidence of the intervals defined for the ceramic of the III millennium BC; Veraza, Bell Beaker, epi Bell Beaker and Early Bronze Age, from the existing data (Martín & Mestres, 2003; Barceló, 2008). For the Bell Beaker contexts, according to the analysis done by Barceló (2008), the central trend of the assessed intervals, the more that confirming contemporariness indicated that it was not possible to statistically asseverate that the Veraza style is previous to the Beaker one.

Within all the chronological development it was possible to concrete a major chronological superposition between Veraza, Bell Beaker and epi Bell Beaker contexts around 2200-2100 BC, something that had already been approached by Martín & Mestres (2003). It is important to remark that within the dates, none belonged to the area of study in the Ebro Valley.

⁵ Autoctonomous pre bell beaker metallurgy.

We actually know, in the second decade of the XXI century, that the Bell Beaker in the northeastern Peninsula mainly appears as **funerary grave goods**, which remain as regular tomb in each area since Final Neolithic. Bell Beaker appears in hypogea, pits, caves, shelters and megalithic structures, both in individual and collective burials. The problem is still to locate the Bell Beaker within wide and complex burial and/or settlement sequences, and to obtain valid chronologies of well contextualized levels as well. Only in the last years the outlook has been improved by the excavation of several collective hypogea although they were out of the area of study, as the Carrer Paris hypogea (Francés *et al.*, 2007) or the Can Martorell one Mercadal, 2003 whose datings provide better dates for the Bell Beaker horizon (Fig. 2). The former has allowed to define two burial moments, one in the first half of III millennium BC and the latter, linked to Pyrenean region style Bell Beaker materials in the second half of the III millennium BC, although there are undated intermediate levels of international style and with impressed geometric that could correspond to an intermediate chronology between the abovementioned dates (Francés *et al.*, 2007: 25).

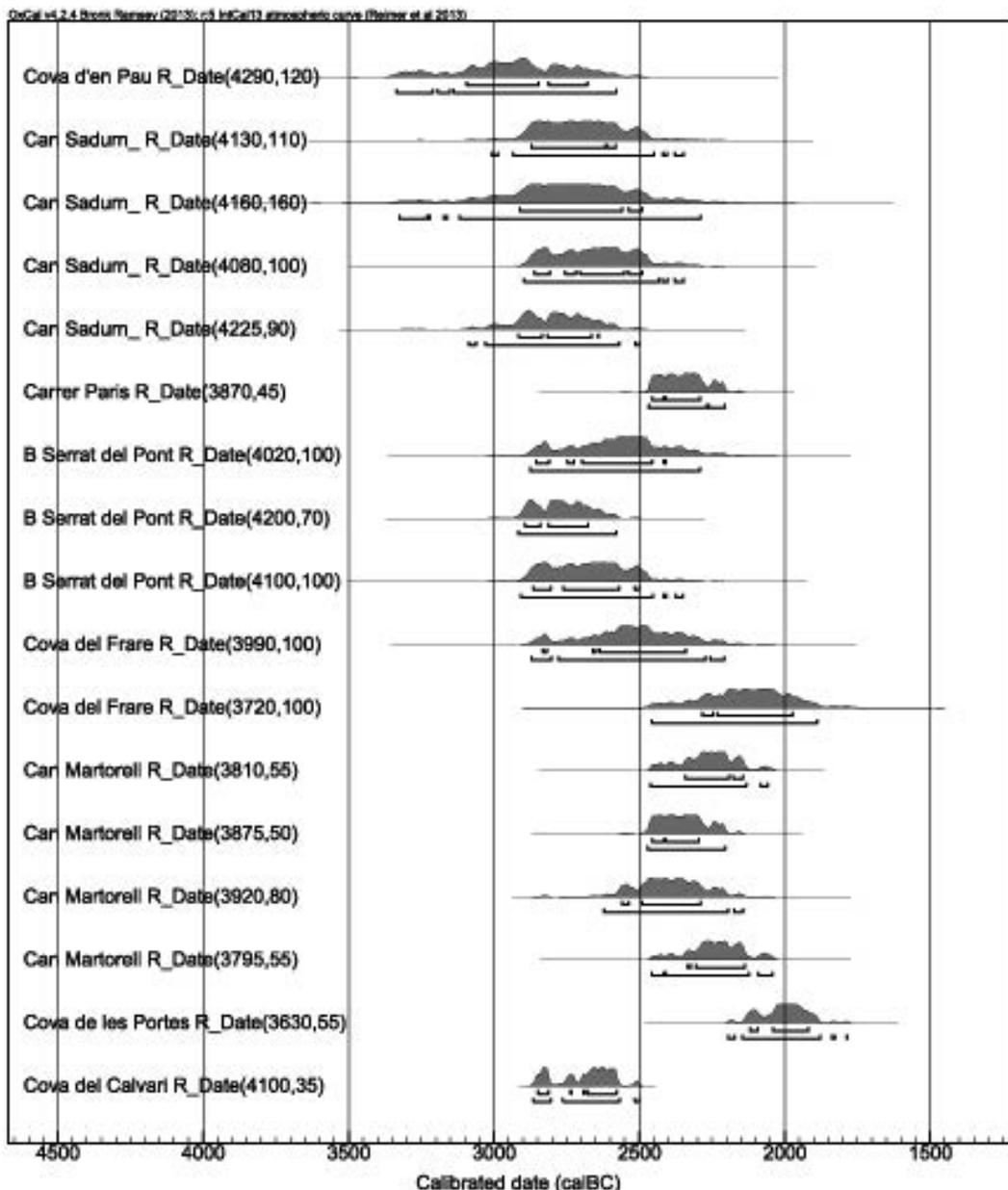


FIGURE 2. DATINGS FROM NORTHEASTERN PENINSULA BELL BEAKER CONTEXTS ELABORATED BY P. RÍOS.

The Can Martorell hypogeum, with a simpler stratigraphy, is located also in the second half of III millennium by several datings, to which the Bell Beaker is associated and interpreted as Pyrenean region style (Marcadal, 2003).

The recently known date for the classic funerary Calvari Cave provides the only reference for the Bell Beaker in the area of study: 4100 ± 35 BP (Soriano, 2013: Anexo 1. Dataciones radiocarbónicas), which in calibrated dates is located in an interval between 2849-2579 cal BC at 1σ or 2866-2500 cal BC at 2σ (*Oxcal 4.2, IntCal 13 atmospheric curve*) (Fig. 2), what supposes the confirmation of the Bell Beaker presence in the region in ancient dates, in an interval similar to the eldest documented in other areas of the Peninsula (Ríos, 2013).

In the case of the **domestic contexts**, since a few years ago the Bell Beaker presence was symbolic and very residual, and it was often presented in contexts in which its presence was hard to assess, being part of fillings of a pit or silo, a type of structures and, generally in the Catalan case, associated to other pottery groups as Veraza or belonging to the Early Bronze Age, which is a common circumstance for this type of contexts in the whole Europe (Baioni *et al.*, 2008). In the scarce sites in which this type of occupation was verified, as in Frare Cave, this was placed in a level following to the Late Neolithic with Veraza type pottery (Martín *et al.*, 1985); however, these datings show an error margin too high to make chronological precisions because they cover most part the III millennium BC (Fig. 2). The same happens with the Bauma Serrat del Pont in which it is documented an important sequence of occupation along the III and II millennia BC, in which the Bell Beaker occupation is presented focusing in the first half of III millennium BC, at lower levels to the moment identified as Early Bronze Age (level II.3), although again the obtained datings show a wide error margin (Fig. 2) (Alcalde *et al.*, 1998). It is about the site in which the Bell Beaker occupation in the northeastern Peninsula has been better characterized so far, prompting the association of the Bell Beaker potteries with the metallurgical production, to pottery types identified within the previous Veraza tradition, and to incised decorations sometimes were combined with plastic decorations of ribbing that we could consider the proper decorations to the moment but to the ‘extra Bell Beaker’ production.

In spite of these progresses, the impact of the Bell Beaker in the chalcolithic societies of III millennium BC in the Northeast is far from being assessed, the material and chronological characterization of the domestic occupations and its relation with the burial environments is still missing. In this sense, we think the key could be in sites found in the latest years,⁶ which are an example of wide outdoor occupations along the III millennium BC, that developed in environments of high agricultural and livestock capacity of the region, as evidenced by the Bosc del Quer sites, nearby the Vic flatland and the Ter valley (Carlús & de Castro, 2011; de Castro, 2012), the Vapor Gorina settlement in the Western Vallés over a Ripoll river terracing (Roig *et al.* 2008), or El Molló settlement, in an immediate terrace to the Ebro river subject of our research.

For the concrete characterization of the Bell Beaker occupation in the southern part of the Northeast, seventeen sites with Bell Beaker are known in a wide area that corresponds with the current province of Tarragona (Gusi & Luján, 2012), although just two of them are circumscribed to the area of study nearby the Ebro river: the abovementioned Calvari Cave (Cura, 1987) and the l’Aumediella Cave, interpreted as an habitat with a Bell Beaker vase of Salomó style although it is an isolated finding from a bad defined context (Harrison, 1977) (Fig. 3).

The Calvari Cave provides more data regarding the associated materials, with international type examples, two copper daggers, several V-perforated pyramidal buttons and some other plain-hemispheric pottery vessels and others with straight walls, sometimes with small plastic applications aligned aside the border. Besides, the abovementioned date from the first half of III millennium BC for these Bell Beaker burials (grave 1), means to be an important finding in order to place the appearance of the first metallic pieces and the buttons as well in such an early moment of III millennium BC.

⁶ Excavation large areas management.

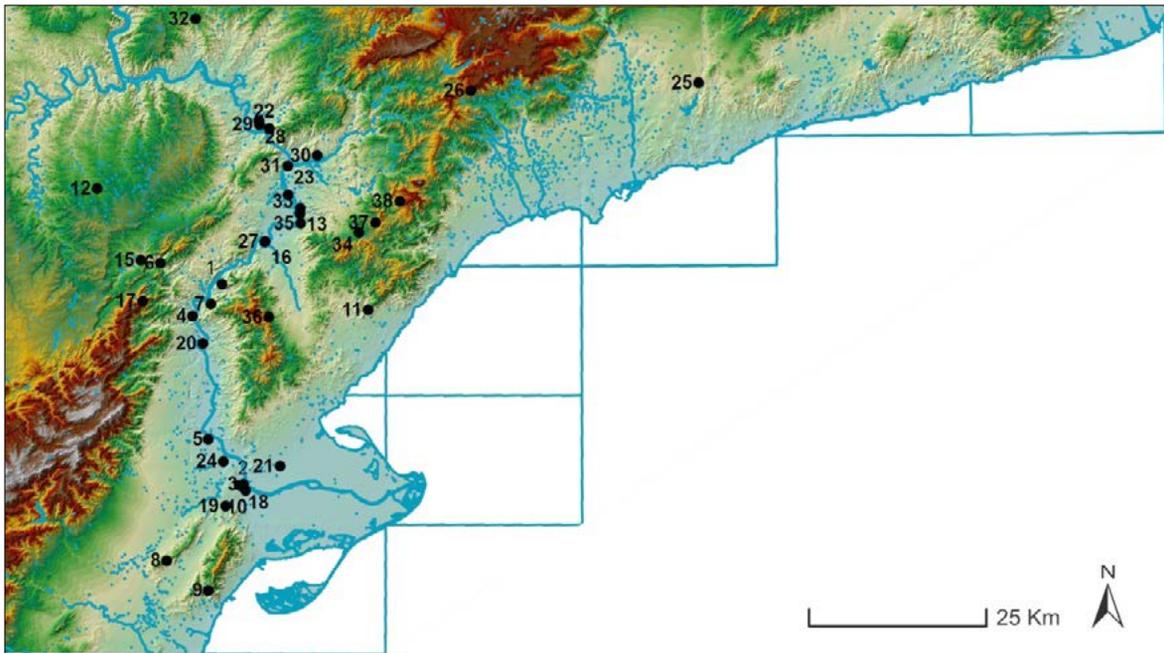


FIGURE 3. MAP WITH MAIN LATE NEOLITHIC, CHALCOLITHIC AND BRONZE AGE ARCHAEOLOGICAL SITES IN THE LOWER EBRO VALLEY AND SURROUNDINGS: ARRAMBLADOR DEL BARRANC DEL RACÓ (1), BARRANC DE LA MINA (2), BARRANC DEL CEGUET (3), CAMÍ DE COLL ROIG (4), CERVERETA CAVE (5), FONTCALDA'S CAVE (6), AUMEDIELLA'S CAVE (7), BRUIXES' CAVE (8), BARRANC DE LA ROCA ROJA CAVE (9), CALVARI'S CAVE (10), TALLER'S CAVE (11), LES COVES (12), EL MOLLÓ (13), ELS MALLOLS (14), ERMITA DE SANT JOSEP (15), LES GAVARRERES (16), LES MASETS (17), LA MORA (18), PARTIDA D'ÀMETLLERS (19), LES PLANES (20), PUNTA DE L'ABAT (21), ROCA DEL SOL I (22), MORA'S GRAVE (23), MIANES' GRAVE (24), FONDA DE SALOMÓ CAVE (25), ARBOLÍ CAVES (26), LES SORTS-LES PEDRES (27), PARTIDA DE FONTJOANA (29), BARRANC DE BOICS II (30), DEPOSIT D'AIGÜES DE RENFE (31), LA PUNTA (32), MAS DE MALL (33), MAS D'EN PELES (34), MAS D'DALT (35), AVENC DE LA GUINEU (36), MARCÓ'S CAVE (37), JANET'S CAVE (38) (INTRODUCE HERE: MAP GENERATED WITH ARCGIS 10, DATA OBTAINED FROM AN INTEGRATED MANAGEMENT TOOL OF CULTURAL HERITAGE: EGIPCI: GESTIÓ INTEGRAL DEL PATRIMONI CULTURAL IMMOBLE) ELABORATED BY P. RÍOS.

In addition to the Bell Beaker sites in the map from Fig. 3 we have placed the rest of the known sites assigned to III millennium BC and the beginning of the II millennium BC nearby the basin of the river. It is about 39 places characterized from superficial collections of materials, or punctual excavations of any structure, but about whom we do not know correctly nor the occupation type, nor the sequence, and either associated datings. More or less precise chronological designations within a wide horizon from the Late Neolithic to the Early Bronze have been done from the characteristics of some materials, especially the lithic ones (Durán & Noguera, 2006; Esteve Gálvez, 2000; Genera, 1982) (Fig. 3). The only exception is the Cervereta Cave site, about which we know a wide study and a dating with a wide error margin, what situates it already in II millennium BC (Forcadell & Villalbí, 1999).

Known data for Early Neolithic are qualitatively better and they have allowed defining habitat places, burials and necropoles zones for the first farmers from the lower valley (Bosch, 1993, 2001; Bosch *et al.*, 1996, 2004; Durán & Noguera, 2006).

The best documented Neolithic evidences correspond to Barranc de'n Fabra, an open settlement located in the last stretch of the river, and formed by a group of circular cabins made with various building material where a stone plinth stands out and walls are made of clay and vegetable remainders, with combustion structures, some of them used as homes (Bosch *et al.*, 1996). This place is complemented by other known sites in the area such as Masdenvergenc (Montsià), Molinàs, Las

Masets en Pauils, Turó d'en Serra (Tivenys), among many others. Evidences in caves as Vidre Cave (Roquetes) or Xafarroques Cave (Benifallet) are also known.

It is about societies with different funerary practicing where we document from individual inhumations in a grave or hypogeum, as Mora Tomb, aside small artificial caves to burial chambers with tumulus, which in some cases appear concentrated like a cemetery as in the abovementioned site Barranc de'n Farra. The materials that take part of these grave goods have provided plenty of pottery vases, tools made from knapped stone industry, and an important combination of personal ornamentation elements in the shape of necklaces. It is estimated that some of these places could have endured in the Late Neolithic, as sites as the Carretera de Mora a García and the Mora's Grave, although the sequence is not clear.

The complex and wide phase that goes from the Late Neolithic to the Early Bronze Age has been defined in the region by a significant increase of settlements evidences (Fig. 3). It is remarkable, in the Ginestar zone, the finding of a negative structure as kind of grave in Sors-les Pedres (Ginestar-Rasquera), which was excavated in 1998 allowing to recover a group of pottery and lithic assemblage assigned to an indeterminate moment between the Late Neolithic and the Early Bronze Age (Noguera 1998).

Nearby El Molló group, a project subject of study of this team, are included the sites Els Mallols or Partida de la Fontjoana (Vinebre), Barranc dels Boics II, Depòsit d'Aigües de la Renfe and Roca del Sol (Garcia). Waters beneath the El Molló area show the settlements of the Ginestar area such as Las Gabarreres, La Punta o El Cingle de la Boquera en Ribarroja. The chronologies related to these sites provide a sequence that begins with elements as arrowheads assigned to the Chalcolithic in Mas del Mall, in Roca del Sol or in Mas d'en Peles, and with evidences of epi Bell Beaker in Mas de Dalt (Tivissa), together with sequences more or less wide from the Early Bronze Age.

Such as it is evidenced by the abovementioned Bell Beaker sites, in this moment the presence of graves are also evident as it is the case of L'Avenc de la Guineu (Rasquera), Marcó Cave, Janet Cave in Tivissa, most of them with a sepulchral function but whose occupation cannot be specified. Occupations reflected in the Calvari Cave assigned as by the mentioned date to the first half of III millennium BC, and the one in Cervereta Cave, from the beginning of II millennium BC,⁷ could be showing the limits of the Chalcolithic in the region in a wide period in which the settlement pattern does not seem to change and in which in a certain moment of the first half of the III millennium Bell Beaker elements will be introduced. The concrete changes in the environmental use belonging to the habitats or to the burials, still needs to increase exhaustive studies and to characterize the domestic assemblages.

In the Cervereta Cave, small decorated pieces are kept and could be assigned to epi Bell Beaker decorations; also pieces with basket impressions in their base are typical from the Early Bronze Age (Rovira, 2006). Among the rest of pottery types the post common belong to simple shapes derived from the sphere, with fairly noticeable carinations and some soft s-profiles, that situates the site closer to the III millennium BC (Forcadell & Villalbí, 1999).

This site's characteristics and datings coincide to the point that the traditions from the Chalcolithic are not lost at the end of the III millennium BC -neither the materials- and only with the II millennium in progress real changes are observed both in the settlement places and in the materials as well. This circumstance has been detected in other peninsular regions and in the Northeast it has been pointed out both in the chronological studies and in the materials characterized by the styles 'deriving' from the Bell Beaker. This way, Barceló highlighted how the chronological continuity of the epi Bell Beaker style to decorate pottery vessels would show the absence of a relevant historic change. And it would not be but until 1750 cal BC when it could be possible to assign a date to the emergence of

⁷ 3540±130 BP (UBAR 503): 2111-1692 cal AC 2σ and 2276-1532 cal AC 1 σ (*Oxcal 4.2, IntCal 13 atmospheric curve*).

stylistic models inspired in the Bell Beaker one, that would have been valid for almost 1,300 years (Barceló, 2008). To an identical conclusion has arrived J. Gascó for the South of France (Gascó, 2001).

3. A novelty in the regional register: El Molló site (Mora la Nova, Tarragona)

El Molló site (Mora la Nova) is located in the Ebro river terraces, currently 500 away from its riverbed and in a lightly higher position but on a flatland slightly stepped and adjacent to the river. With an extension of about 200,000 square meters, the site is limited by small elevations to the Northeast and by side cliffs that go down to the river. It is about, therefore, a fertile area, of a great farming potential and immediate to such an important communication way which is the river.

Thanks to the knowledge of archeological precedents in El Molló area and in the frame of the building works in an industrial area, several preventive archeological interventions were made, surveys and drillings that ended with two archeological excavations in extension (Fig. 4). Despite not knowing the exact limits of the different occupations detected, among the seventy excavated structures we can distinguish at least two groupings, and in the absence of completing the materials study, three chronological phases: one grouping corresponding to the postcardial Neolithic together with another with materials more typical of the Late Neolithic, and a second grouping of the Early Bronze (Fig. 5).

The latter occupation –the one interesting for the topic under study– is characterized by different morphology the pits. Ten of them have been identified as silos, characterized by having circular



FIGURE 4. GENERAL VIEW FROM *EL MOLLÓ* DURING THE ARCHAEOLOGICAL WORKS
(*CODEX, ARQUEOLOGIA Y PATRIMONI*).

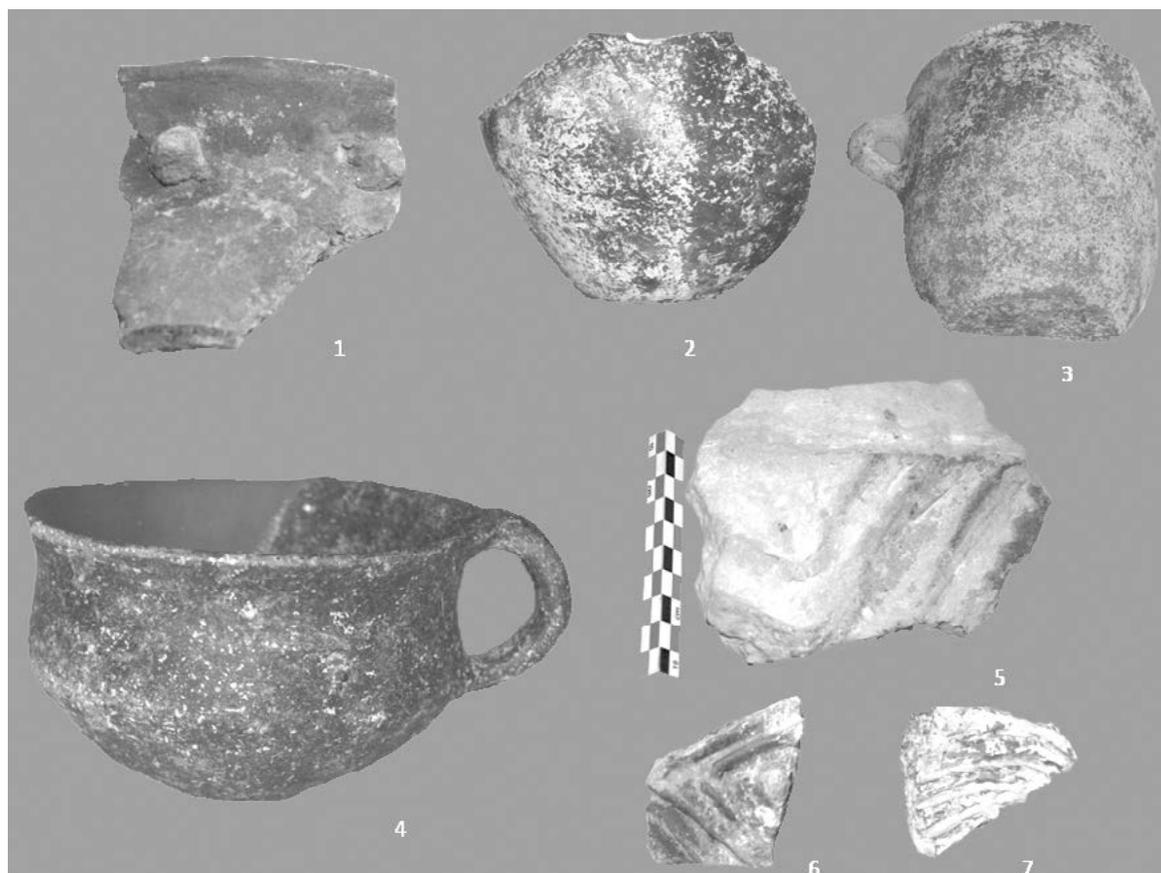


FIGURE 5. POTTERY SHERDS FROM *EL MOLLÓ* (ELABORATED BY M. PIERA, A. GÓMEZ).

features with a diameter of 0.8 meters and 1 meter of depth and cylindrical or globular profiles. Other seven similar pits, have been differentiated by being very moderately in depth and have been linked to structures of varied functionality. Finally, five big pits were excavated presenting an irregular oval plan and of a depth not exceeding half a meter and that could be identified as hut type structures. From those, there are three of about 3 meters long and 2.5-3 meters width, another one slightly larger, of 4.8 by 4 meters, and a smaller one, of 2.5 by 2 meters. In the largest one, a hearth was detected, compounded by burnt clay floor of rectangular shape of 0.6 by 0.4 meters, that could suggest the presence of habitat space or where some productive activity could be developed. In this sense, we highlight that almost half of the pottery fragments corresponding to this phase appeared in the filling of this big structure.

It is interesting to mention the characteristics of the domestic pottery group represented by this occupation, in which 3,007 pottery fragments have been accounted, representing 87% of the total pottery recovered in the site. Pottery shapes are represented by small and medium carinated bowls, hemispherical bowls, open vessels with rectilinear profiles, globular containers with borders curved to the exterior conferring it a s-profile, large clay large pots with thick cordoned rims and other small and round applications. It is observed a prevalence of flat bases and, handgrips elements, their handles are well represented, both in vertical as in horizontal disposition, although different plastic applications are found too (Fig. 5).

In some of the medium and large containers it has been detected the presence of extra clay, which confers the piece a wrinkled finished, called 'engrutat'. In others, it is appreciated a great variety of plain parallel cordons tracing triangular motifs leaving in the surface of the vessel free spaces where

a button is applied. Regarding the decoration, apart from the plastic motifs like cordons and buttons, it is also possible to find small impressed oval motifs over the cords or in the wall itself, profusely occupying the entire container's surface.

In some of the large containers basket impressions are observed, a distinctive feature probably to lift the vessels, which is frequent in other Early Bronze sites, as in the abovementioned Cervereta Cave (Rovira, 2006).

In general, all these formal and decorative elements are typical from an Early Bronze in the region, a post-Arbolí moment.

The occupation assigned to the Late Neolithic is by the moment scarcely spatially characterized, and it has been defined in certain pits by the presence of simple shape containers, globular-shaped and single carinations, and absence of decorations.

In the rest of the recovered material equipment, still under study, a small indeterminate copper fragment stands out (in analysis process), which supposes a great novelty in the area, possibly indicating the existence of domestic character metallurgy in the settlement and the presence of metallic tools out of the funerary Bell Beaker contexts typical in the zone.

4. First hypothesis about exchanges and influences during the Bell Beaker in the low Ebro Valley

The region under study, the low Ebro Valley in Catalonia, is presented as region intermediate between several of the established focal areas from the peninsular and European Bell Beaker (Harrison, 1977). This circumstance seems to determinate the Bell Beaker character of the region, whose contexts appear to be influenced by both the northern focuses from the North of Catalonia and the South of France, something that used to happen since Late Neolithic (Veraza), as by the southern ones – Mediterranean Bell Beaker – and from the peninsular inland. This way, we find synthesis works about the Bell Beaker in the different surrounding regions that include the area of study as southern, northern or western margin (Gusi & Luján, 2012; Clop 2005; Martín *et al.*, 2002; Rodríguez de la Esperanza, 2005).

Nevertheless, the state of the investigation of III millennium BC in the zone is far from being able to provide an answer to the necessity of differentiate elements that came from exchange, elements with local roots and local elements that could respond to emulations products of the contact or the ideas arrival. A situation already pointed out by A. Martín and others in 2002, moment in which although the works had exceeded the traditional approaches by analyzing the raw materials, they were not sufficient to overtake the lacks or the socio-economic interpretation problems (Martín *et al.* 2002).

Considering the knowledge about the Bell Beaker in other peninsular regions, and although we are in an initial phase of study, from a first analysis of evidences we can point out at least three aspects in which it is visible the inclusion within the exchange networks established since halfway through III millennium BC by the European Bell Beaker groups:

4.1 International and corded pottery styles

The presence of Bell Beaker vessels of international or corded style, that traditionally could be related with the eldest Bell Beaker, and, because its scarcity, susceptible to arrive to the region through exchanging, has been almost discarded after the catchment analysis of pottery raw materials done for years in this and other regions (Clop, 2005; Ríos, 2011). In this sense, the presence of this vessels in the Calvari Cave, false gallery from Mas Pla (Querol) or Turó de les Fosses (Celma) within the region under study, with standardized decorations (ZM, CZM), whose chronological adscription in

Catalonia has always been done through the parallels with other regions, would be explained by the arrival of ideas about these decorations or isolated fragments that are emulated by the local societies. The distribution of these styles out of the area under study in the surrounding regions show a higher density of examples in the North, in regions from Lleida and Girona in direct contact with the South of France, which in respect to the South, where the examples from Vila Filomena site constitute the only referent, for the East, with examples quite much far in the Ebro medium basin. However, the date provided by the Calvari cave nearby the Ebro mouth could reopen the interpretation of the arrival of these influences by maritime via, something that is being discussed for certain zones of the peninsular inside (Alday, 2001).

But by the moment, the few associated dates and mainly the scarce Bell Beaker well-defined stratigraphic contexts, impede us to make better precisions beyond the confirmation that through this latter known date the Bell Beaker in Catalonia appears in the same moments as in the rest of the Peninsula, around the middle of III millennium BC, and that the way of entry of 'the Bell Beaker' could have been the South of France, according to the data we know so far. We do not discard, however, the way of the Ebro Valley as communication axis through which Beakers could arrive from the inside, although we do not have enough evidences.

Beyond the pottery that defines it, the exchange of ideas through the Bell Beaker elites is observed mainly from the presence of other objects, minorities in the register, arrived through knowledge, objects or raw materials exchange and/or, as in the case of pottery, from the type emulation.

4.2 Copper objects: weapons

As it has already been mentioned, the study of prehistoric metallurgy in the region and in all the Northeast is the more advanced and known aspect of the research thanks to several projects and works done since the 90's (Martín *et al.*, 1999; Montero *et al.*, 2012; Rovira *et al.*, 1997; Soriano, 2013). These studies have confirmed the presence of pre Bell Beaker metallurgy in the region (Vilaseca phases I and II) that could be associated to the close ores in El Priorat. Bell Beaker metallurgy, present through important trousseau objects and some oven vessel fragment, has not allowed however better chronological precisions because most of them are not well contextualized. This has avoid knowing the changes in the process or the technological evolution although, with the exception of the examples from Balma de Serrat el Pont, the metallurgy associated to the Bell Beaker seem to be made of copper and easy to produce in a simple process, as it happens in other peninsular regions. The increase of copper objects associated to the Bell Beaker horizon could be related in this sense with any type of exchange, although as we say, composition and isotope analysis made on the known outcrops in the Northeast show a more than possible coincidence. In such a way that the presence of weapons in the Bell Beaker horizon (palmela points, daggers) perhaps once again is more due to a fashion question than to an effective exchange of objects. The Bell Beaker elites could control the small metallurgical productions to possess these distinguish objects. The scarcity of metallurgy not linked to the Bell Beaker trousseaus, characterized by the presence of small pins or fragments of sticks and some small axe, do not allow either to suppose the existence of a double production: both domestic objects and weapons for trousseaus and/or Bell Beaker elites.

Some authors have related the scarce copper objects from Catalonia previous to this date with workshops from the South of France (Soriano, 2013), relating with the Bell Beaker the production and diversification of objects: daggers, palmela points, awls and axes.

Nevertheless, in the South zone –the zone subject of study, we could consider a metallurgy arrived through the Ebro valley from the inside, where it is also possible to find mines and mining deposits. In this sense, the spread of objects known today could follow significant patterns throughout the valley (Rodríguez de la Esperanza, 2005), being for example an entry via for Atlantic types in daggers and palmela points. Other objects, as awls, could respond to local domestic productions.

4.3 Gold ornaments and V-perforated buttons

In spite of the currently known register in the area of study does not warn about the presence of **gold ornaments** in the Bell Beaker contexts, surrounding areas both from Catalonia and the Ebro Valley or the East, in the Bell Beaker contexts show small gold pieces of simple technology, similar to the documented ones in the whole Bell Beaker Europe.

The study of goldsmithing in the peninsular Northeast documents the eldest objects since 3000 BC characterized by a high level of knowledge and technical ability, surely arrived concurrently to the first copper objects -2800 cal BC-, from French or Central European workshops (Soriano & Chamón, 2012). With the Bell Beaker findings multiply, but the type of objects (gold rolled up beads) and mainly the technology employed is much more simple (hammered in cold), as it happens in the rest of the Peninsula. Known analyses over these types of ornaments establish an alluvial origin of the gold. Despite the existing difficulty in the establishment of the catchment sources for this alluvial gold, it should be recall the wealth of gold-bearing placers in the zone under study.

The gold in Bell Beaker time starts to play another role, as in the case of copper weapons, surely signing a social primacy among the Bell Beaker elites: it only appears in tombs, only in the individual ones, or as individualized trousseaus. It is a change observed in other areas as well.

Among the enormous variety of materials and ornament objects documented in the Northeastern peninsular along the III millennium BC (Martín, 2001; Martín *et al.*, 2002), **V-perforated buttons** have been traditionally put in relation with exchanges during the Bell Beaker horizon. Today we know that it is about objects that endure in the regional register with a big development of the prismatic types in the Early Bronze as it happens in the Southeast and in the Balears. The data we currently know do not allow us to suppose the presence of these buttons from the exchange with other areas nor with their production.

5. Preliminary conclusions

The Lower of the Ebro valley shows an important variety that allows inferring some initial data in different aspects of the social dynamics chosen by the Chalcolithic and the Early Bronze communities that frequented and occupied this territory.

Settlement pattern kept the caves and mountainous shelters connected to flat open space occupations nearby large river courses. Data known in the last years show that along the III millennium BC, locations in valleys develop conforming wide steady settlements, still not much characterized in Catalonia, but that should have taken the same dynamic such as in the rest of the Peninsula and in France.

Bell Beaker presence in the first half of the III millennium BC in the region is evidenced in sepulchral and habitat caves, but to know its incidence in the flatland settlements is still missing, as it is happening in other Southern areas with examples with burials in hypogea and other structures part of the domestic areas.

The possibilities for communicating and exchanging objects by sea and land through the Ebro valley are difficult to be assessed by the moment, although the Bell Beaker personalities got the panoply and the ornamental objects. The entry in the Bell Beaker exchange circuits could suppose, as it was traditionally interpreted, a drive for the development of metallurgy.

References

- ALCALDE, G.; MOLIST, M.; SAÑA, M. & TOLEDO, A. 1997. *Procés d'ocupació de la Bauma del Serrat del Pont (La Garrotxa), entre el 2900 i el 1450 cal AC*. Publicacions Eventuals d'Arqueologia de la Garrotxa (Olot), 2. Museu Comarcal de la Garrotxa.

- ALCALDE, G.; MOLIST, M.; MONTERO, I.; PLANAGUMA, LI.; SAÑA, M. & TOLEDO, A. 1998. Producciones metalúrgicas en el nordeste de la Península Ibérica durante el III milenio CAL AC: El taller de la Bauma del Serrat del Pont (Tortellà, Girona). *Trabajos de Prehistoria* 55, 1: 81-100.
- ALDAY RUIZ, A. 2001. Vías de intercambio y promoción del campaniforme marítimo y mixto sobre el interior peninsular. *Cuadernos de Arqueología Universidad de Navarra* 9: 111-174.
- BALAGUER, P.; GARCÍA, P.; TENZA, A. & ANTEQUERA, F. 2013. *L'hipogeu funerari de la Sagrera (Barcelona). Resultats preliminars. Revista d'Arqueologia de Ponent* 23: 77-88.
- BARCELÓ, J.A. 2008. La sequència cronocultural de la prehistòria catalana. Anàlisi estadística de les datacions radiomètriques de l'inici de l'holocè a l'edat del ferro *Cypsela* 17: 65-88.
- BAIONI, M.; LEONINI, V.; LO VETRO, D.; MARTINI, F.; POGGIANI KELLER, R.; SARTI, L. (ed.) 2008. Bell Beaker in everyday life. Meeting of the Association Archéologie et Gobelets. Firenze, Siena, Villanuova sul Clisi. Museo fiorentino di preistoria 'Paolo Graziosi' Firenze: 9-16.
- BLASCO, A.; EDO, M. & VILLALBA, M. J. (eds.) 2011. *La Cova de Can Sadurni i la Prehistoria de Garraf. Recull de 30 anys d'investigacio*. Milano: Hugony editore: 359-365.
- BOSCH ARGILAGÓS, J. 1993. Cronologia prehistòrica al curs inferior de l'Ebre: primeres datacions absolutes. *Pyrenae* 24: 53-56.
- BOSCH ARGILAGÓS, J. 2001. Les ocupacions prehistòriques de caçadors-recol·lectors a la Cova del Vidre (Roquetes): Assentament i clima. *Recerca* 5: 9-20.
- BOSCH ARGILAGÓS, J.; FORCADELL, T. & VILLABÍ, M^a M. 1996. El 'Barranc de Fabra': asentamiento de inicios del IV milenio a.C. en el curso inferior del Ebro. *Rubricatum* 1, 1: 391-396.
- BOSCH ARGILAGÓS, J.; FAURA, J. M. & VILLABÍ, M^a M. 2004. Intervenció arqueològica a l'àrea del Molinàs (Amposta, Montsià): aproximació a les pràctiques funeràries i al poblament des del neolític fins a l'època andalusina a les terrasses de la zona de la desembocadura de l'Ebre. *Tribuna d'Arqueologia* 2000-2001: 7-32.
- CARLÚS, X. & DE CASTRO, O. 2011. Resultats de la intervenció arqueològica al jaciment del Bosc del Quer (Sant Julià de Vilatorrada, Osona), *Tribuna d'Arqueologia*, 2011-2012. Conferència: Palau Marc (Rambla Santa Mònica, 8, Barcelona), 23 de novembre de 2011.
- CASTRO DE, O. 2012. El bosc del Quer, un jaciment arqueològic a cavall entre la plana de vic i el Montseny. *Monografies del Montseny* 27: 47-59.
- CLOP, X. 2005. La 'Cuestion Campaniforme' en el Noroeste de la Península Ibérica. In Rojo Guerra, M. A., Garrido-Pena, R. & Garcia-Martinez, I. (coords.): *El campaniforme en la Península Iberica y su contexto europeo*. Valladolid: Universidad de Valladolid (serie Arte y Arqueología, 21): 297-310.
- CLOP, X. & FAURA, J. M. 2002. *El sepulcre megalític de les Maioles (Rubió, Anoia). Pràctiques funeràries i societat a l'altiplà de Calaf (2000-1600 cal ANE). Estrat* 7.
- CURA, M. 1987. L'horitzó campaniforme antic als Països Catalans. *Fonaments* 6: 97-128.
- DURÁN, J. J. & NOGUERA, J. 2006. El Neolític a la Ribera d'Ebre. *Miscel·lània del CERE*, 17: 143-163.
- ESTEVE GÁLVEZ, F. 2000. *Recerques arqueològiques a la Ribera Baixa de l'Ebre. I. Prehistòria del Museu del Montsià*. Ajuntament d'Amposta.
- FORCADELL, T. & VILLALBÍ, M^a M. 1999. Cova Cervereta: una nova cavitat sepulcral de finals del neolític al curs inferior de l'Ebre. *Quaderns de Prehistòria Arqueologia de Castelló* 20: 37-54.
- FRANCÈS, J.; GUÀRDIA, M.; MAJÓ, T. & SALA, O. 2007. L'hipogeu calcolític del carrer Paris de Cerdanyola del Valles. *Tribuna d'Arqueologia* 2006: 315-333.
- FRANCÈS, J.; MAJÓ, T.; SALA, O.; GUÀRDIA, M. & HERNÁNDEZ, J. 2004. Hipogeu calcolític del carrer Paris (Cerdanyola del Valles). *Cota Zero* 19: 7-9.
- GASCÓ, J. 2001. La datation absolue de la Protohistoire du XXIIe au VIIIe siècle avant notre ère dans le sud de la France. *Documents d'Archéologie Méridionale* 24: 221-229.
- GENERA, M. 1982. Inventari arqueològic de la Ribera d'Ebre. *Fonaments* 3: 47-134.
- GUSI, F. & LUJÁN, J. 2012. El vaso campaniforme en la provincia de Castellón y territorios limítrofes, *Quaderns de Prehistòria i Arqueologia de Castelló* 30: 33-52.
- HARRISON, R. J. 1977. *The Bell Beaker cultures of Spain and Portugal*. American School of Prehistoric Research, 35. Cambridge.

- MARTÍN, A. 2001. État de la question du campaniforme dans le contexte culturel chalcolithique du Nord-Est de la Péninsule Iberique. In Nicolis, F. (ed.): *Bell Beakers today: Pottery, People, Culture, symbols in Prehistoric Europe*. Col·loqui de Riva del Garda 11-16 de maig 1998. Trento: 155-171.
- MARTÍN, A. 2003. Els grups del neolític final, calcolític i bronze antic. Els inicis de la metal·lúrgia. *Cota Zero* 18: 76-105.
- MARTIN COLLIGA, A. & MESTRES, J. S. 2003. Periodizació desde la fi del neolític fins a l'edat del bronze a la Catalunya sudpirinenca. Cronologia relativa i absoluta. *XII Col·loqui Internacional d'Arqueologia de Puigcerda*. Puigcerda, 2000.
- MARTÍN, A.; BIOSCA, A. & ALBAREDA, J. M. 1985. Excavacions a la Cova del Frare (Matadepera, Valles Occidental). Dinamica ecológica, sequencia cultural i cronología absoluta. *Tribuna d'Arqueologia* 1983-1984: 97.
- MARTÍN, A.; GALLART, J.; ROVIRA, C. & MATA-PERELLÓ, J. M. 1999. El Nordeste de la Península Ibérica. In Delibes, G. & Montero, I. (coord.): *Las primeras etapas metalúrgicas de la Península Ibérica*. II Estudios Regionales. Instituto Universitario Ortega y Gasset. Ministerio de Educación y Cultura: 115-117.
- MARTÍN, A.; PETIT, M. A. & MAYA, J. L. 2002. Cultura material, economia i intercanvis durant el III mil·lenni a Catalunya. *XII Col·loqui Internacional d'Arqueologia de Puigcerdà*. Institut d'Estudis Ceretans. Puigcerda: 295-321.
- MERCADAL, O. (coord.) 2003. La costa de Can Martorell (Dorsius, El Maresme). Mort i violència en una comunitat del litoral català durant el tercer mil·lenni a.C. *Laietania* 14: 256.
- MONTERO-RUIZ, I.; RAFEL, N.; HUNT, M.; MATAPERELLÓ, J.; ODRIÓZOLA, C.; SORIANO, I. & MURILLO-BARROSO, M. 2012. Minería prehistórica en el priorato: caracterización arqueométrica de minas de Cornudella y Ulldemolins, VII Congreso Internacional sobre minería y metalurgia históricas en el sudoeste europeo, Utrillas (Teruel, Aragón, España): 131-140.
- MAYA, J. L. 1997. Reflexiones sobre el Bronce Inicial en Cataluña. *Saguntum* 30: 11-27.
- MAYA, J. L. 2002. Relacions i contactes durant el Calcolític i l'Edat del Bronze a la Catalunya Meridional. *Citerior* 3: 17-46.
- MAYA, J. L. & PETIT, M. À. 1986. El grupo del nordeste. Un nuevo conjunto de cerámicas con boquique en la Península Ibérica. *Anales de Prehistoria y Arqueología* 2: 49-71.
- NOGUERA, J. 1998. Evolució del poblament de la foia de Móra (Ribera d'Ebre, Tarragona) des del bronze final a l'iberic ple: anàlisi i evolució del territori. *Revista d'Arqueologia de Ponent* 8: 19-38.
- RÍOS, P. 2011. La cronología: nuevas fechas para el calcolítico de la región de Madrid. Aproximación crono-cultural a los primeros poblados estables. En Blasco, C.; Liesau, C. & Ríos, P. (eds.): *Yacimientos calcolíticos con campaniforme de la Región de Madrid: Nuevos estudios*. Madrid: Universidad Autónoma de Madrid (Patrimonio Arqueológico de Madrid, 6): 71-86.
- RÍOS, P. 2013. New dating of the Bell Beaker Horizon in the region of Madrid. In Prieto, P. & Salanova, L. (coords.): *Current researches on Bell Beakers. Proceedings of the 15th International Bell Beaker Conference: From Atlantic to Ural*. 5th-9th May 2011, Poio (Pontevedra, Galicia) Spain. Santiago de Compostela: Archaeopots: 97-110.
- RODRÍGUEZ DE LA ESPERANZA, M.^a J. 2005. *Metalurgia y metalúrgicos en el Valle del Ebro (c. 2900-1500 cal. A.C.)*. Madrid: Real Academia de la Historia. Institución 'Fernando el Católico' (Biblioteca Archaeologica Hispana, 24).
- ROIG, J.; MOLINA, D.; COLL, J. M. & MOLINA, J. A. 2008. El jaciment calcolític del Vapor Gorina (Sabadell, Vallès Occidental). *Tribuna d'Arqueologia* 2007: 93-122.
- ROVIRA PORT, J. 1978. Un vaso polípodo de la Cova Fonda de Salomó (Tarragonès, Tarragona) y los vasos polípodos de la Edad del Bronce en Catalunya. *Informació Arqueològica* 26: 11-14.
- ROVIRA PORT, J. 2006. Las producciones cerámicas con impronta basal de estera vegetal del Calcolítico final-bronze antiguo/medio de la Península Ibérica: acerca de la alternancia de influjos y el origen del protourbanismo en la depresión central catalana como modelo de territorio basculante. *Quaderns de Prehistòria i d'Arqueologia de Castelló* 25: 109-137.
- ROVIRA, S.; MONTERO, I. & CONSUEGRA, S. 1997. *Las primeras etapas metalúrgicas de la Península Ibérica, I. Análisis de materiales*. Madrid: Instituto Universitario Ortega y Gasset.

- SORIANO, I. 2013. *Metalurgia y Sociedad en el Nordeste de la Península Ibérica (finales del IV – II milenio cal ANE)*. Oxford: Archaeopress (British Archaeological Reports. International Series, 2502).
- SORIANO, I.; CHAMÓN, J. 2012. Estudio arqueometalúrgico del punzón de Cova de la Pesseta (Torrelles de Foix, Barcelona). Datos composicionales, metalográficos, isotrópicos y funcionales, *Marq, Arqueología y Museos*, núm. 5, Alicante: 73-89.
- TARRÚS, J. 1985. Consideracions sobre el Neolític final-calcolític a Catalunya (2500-1800 a.C.), *Cypsela* 5: 47-58.
- VILASECA S. 1934. Un enterrament prehistoric a Riudecols (*Camp de Tarragona*). *Bulleti del Centre Excursionista de Catalunya XLIV -447*: 415-421.
- VILASECA, S. 1941. Más hallazgos prehistóricos en Arbolí (provincia de Tarragona). *Ampurias* 3: 45-62.