The Transformation of Europe in the Third Millennium BC

Part I

Proceedings of the International Conference
Riva del Garda, Trento, Italy, 25–28 October 2023

Edited by
Franco Nicolis, Gabriella Kulcsár,
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The Yamnaya Impact on Prehistoric Europe

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ERZSÉBET JEREM and WOLFGANG MEID

Volume 48

THE YAMNAYA IMPACT ON PREHISTORIC EUROPE

Volume 7

Series editor
VOLKER HEYD

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BUDAPEST 2025

The publication of this volume was funded by the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation program, under grant agreement no. 788616 – The Yamnaya Impact on Prehistoric Europe (YMPACT).

Front Cover

The Maritime Bell Beaker from Ensisheim
(Reguisheimer Feld, obj. #8347, Haut-Rhin, France)
Photo by Isabelle Déchanez-Clerc, Sélestat
Permission: Archéologie Alsace
A special thanks to Loïc Jammet-Reynal, Lausanne, and Muriel Roth-Zehner, Sélestat

Back Cover

Detail of the decorated bottom of the Bell Beaker from Santa Cristina di Fiesse (Brescia, Italy)
Photo by Elena Munerati, Trento
Permission: Museo delle Civiltà (MUCIV), Rome
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ISBN 978-615-5766-84-8

HU-ISSN 1215-9239
HU-ISSN 2786-2968

2025

ARCHAEOLINGUA ALAPÍTVÁNY
H-1067 Budapest, Teréz krt. 13.

Cover design: Móni Kaszta
Copy editor: Maija Holappa
Desktop editing and layout by Rita Kovács

Printed by AduPrint Kft.

The necropolis of the Verdelha dos Ruivos Cave and the genesis of the Bell Beaker complex in Portuguese Estremadura

JOÃO LUÍS CARDOSO[1]

Abstract

The Verdelha dos Ruivos Cave, located some 20 km NNE of Lisbon, is the only necropolis of the Bell Beaker Complex identified so far in Portugal in which it was possible to isolate individual burials and reconstruct the original position of the corpses. The cave was discovered in 1973, during the inspection of a Cretaceous limestone quarry. The exploitation of the quarry face sectioned the cavity, leaving only its distal part. The archaeological excavation was carried out by a team from the former Geological Services of Portugal, led by O. da Veiga Ferreira. The team included a medical doctor, which constituted an obvious added value for characterising the composition of the population and defining inhumation practices. All that remained of the original natural cavity was a small crypt, whose brown infill contrasted with the colour of the limestone; this was a hardened carbonate breccia, with abundant limestone blocks and containing archaeological remains. The hardness of this consolidated infill made it difficult to carry out the excavation, which began in October 1973 and ended only in May 1974.

Four main levels were identified, consisting of successive individual tombs in lateral decubitus, on the left or right side, with the body coiled up in a foetal position. It was possible to identify the position of 11 graves, sometimes covered by small limestone slabs; the most fragile anatomical segments were missing. The archaeological remains included several artefacts, which were not very abundant, but showed a clear diversity, including all the objects deemed characteristic of the Bell Beaker Complex: sperm-whale tooth buttons, gold spirals, a Palmela point, idols and ceramics. All the decorated ceramics correspond to Beaker types, which leads to the conclusion that the funerary use of this cave should be exclusively attributed to a community belonging to the Bell Beaker Complex. Radiocarbon datings obtained support the beginning of this necropolis at ca. 2700 BC, extending into the second half of the 3rd millennium BC. These results are consistent with the remarkable antiquity of the emergence of the Bell Beaker Complex in the Tagus estuary region, as demonstrated by the results obtained at the prehistoric settlement of Leceia, located approximately 40 km to the SW, a fact that will also be enhanced and discussed in this paper.

Keywords: *Verdelha dos Ruivos Cave, Bell Beaker complex, Chalcolithic, Tagus estuary region, burial practice*

The Tagus estuary region, where the Verdelha dos Ruivos Cave is located, is one of the richest and most attractive areas for the study of the Beaker Complex in Europe. The archaeological interest in this cave resulted from the occasional recovery of the first human remains and ceramic fragments, shortly after a landslide on a middle Cretaceous (Cenomanian) limestone quarry face. These remains

[1] I would like to thank the invitation to be present again at Riva del Garda, 25 years after the first meeting on the 'Beaker Complex'. I owe Franco Nicolis, the 'father' of these meetings, the opportunity and the honour, once again, to be present in this magnificent place to present the first keynote paper of this meeting on the Beaker Complex and its chronology in the Tagus estuary region. For this reason, I want to thank you, Franco, in particular, as well as Volker Heyd, hoping that this meeting will be at least as fruitful as the previous one. Thank you very much!

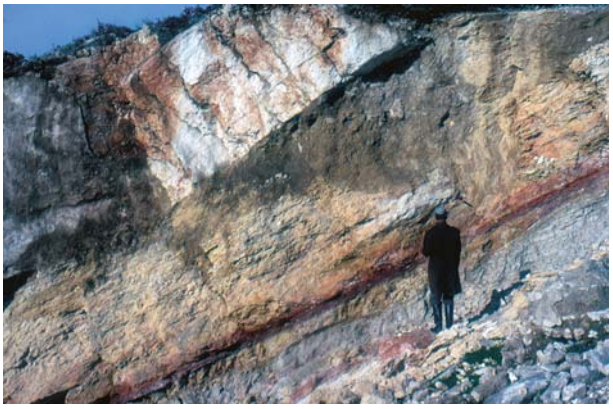


Fig. 1. A view of the abandoned Verdelha dos Ruivos quarry face, showing the karst gallery cut by the quarry (above), at the time still completely filled with archaeological deposits related to the Bell Beaker necropolis, prior to its excavation (photo from JLC/OVF archive)

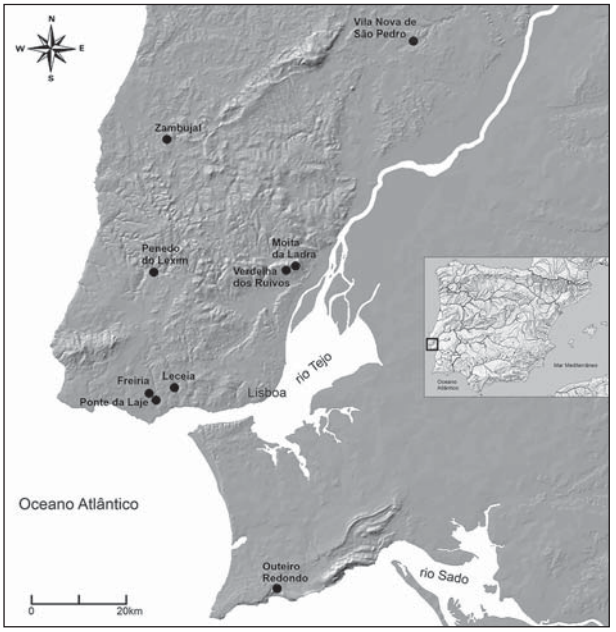


Fig. 2. Location of the Verdelha dos Ruivos Cave and the archaeological sites referred to in the text (image by J. L. Cardoso)

Fig. 3. Partial view of the Verdelha dos Ruivos quarry at the time when the cave (visible at the edge of the photo) was detected and subsequently explored. The vast River Tagus estuary can be seen in the background (photo from JLC/OVF archive)

were recovered by Octávio da Veiga Ferreira and Georges Zbyszewski, in the course of geological field works carried out by them in this region in 1973. In fact, the section of the archaeological infill still preserved inside the cave, caused by the aforementioned landslide, was evident to any experienced observer (*Fig. 1*).

The cave is located approximately 20 km NNE of Lisbon (*Fig. 2*) in a very rich archaeological region. The site, located at the top of a limestone slope, overlooks the vast Tagus estuary, which at the time would have been even wider (*Fig. 3*). The excavation was carried out on weekends, by a team including, in addition to Veiga Ferreira and Zbyszewski, Manuel Leitão, Christopher North and José Norton, between October 1973 and May 1974, for a total of 19 working days. Until now, only preliminary information and specific studies of some of the remains have been published (Zbyszewski *et al.* 1981; Leitão *et al.* 1984), meaning that a comprehensive study, accompanied by the conclusions provided by radiocarbon dating, was necessary. This paper is a synthesis of the said study, carried out by the author (Cardoso 2024).

The excavation was hindered by the position of the cave opening near the top of the quarry face (difficult to access), and its geometry and small dimensions, which only allowed the presence of a single person, while the cave sediments were sifted in the vicinity of the cliff, with the help of a third participant (*Fig. 4*). The difficulty of

Fig. 4. Verdelha dos Ruivos Cave. A view of the exploration works, showing three crew members at work, the first excavating the cave infill, the second, below, handling the dirt-filled buckets and the third, on the right, at the sieve (photo from JLC/OVF archive)

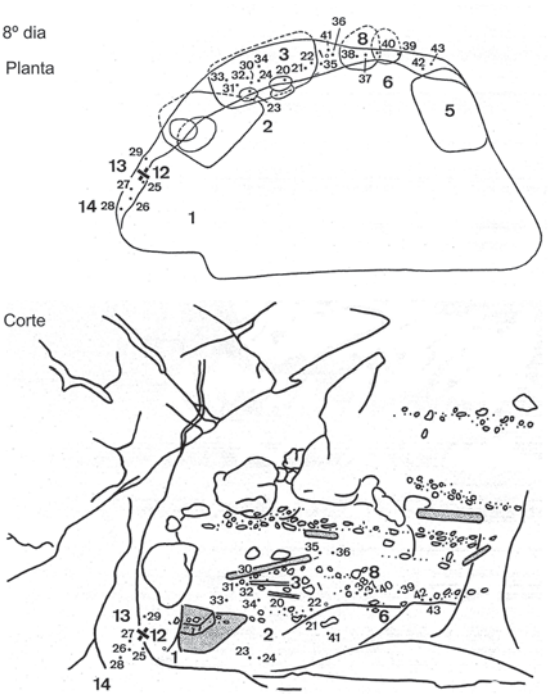


Fig. 5. Verdelha dos Ruivos Cave. Plan and section drawn on February 9th 1974 (plan from JLC/OVF archive)

carrying out the work was increased by the hardness of the deposit, due to the precipitation of calcium carbonate as a result of water circulation inside the cave. In view of these constraints, it was decided to carry out the excavation by progressive, vertical advances, from the outside to the inside, starting from the exposed front of the infill, recording both the vertical and horizontal position of each artefact, or human remains, on each working day, which constituted a good solution to the said difficulties. The stratigraphic succession of the vertical section was recorded daily; *Figure 5* shows, for example, the situation observed on February 9th 1974, on the eighth day of excavation, and the corresponding plan (*Fig. 5*).

In general, isolated bones and cranial remains, in apparent disorder, were packed in a hard bone-breccia that made their extraction extremely difficult. Only two almost complete skulls were recovered, very fragmented and crushed (*Fig. 6*), in addition to other cranial fragments belonging to juveniles, which correspond to ca. 25% of individuals. Bones also showed a high degree of fragmentation, and many were missing, especially the smallest and most fragile ones. They were found associated with limestone slabs of small to medium dimensions, arranged horizontally, intended to be used either as a basement for the deposition of bodies or as a cover (*Fig. 7*). These slabs were associated with others, smaller in size, placed like a cleaver, with the aim of individualising them from each other.

Post-depositional disturbances were identified, both of anthropogenic and natural origin. The former corresponded to the accumulation of an ossuary, at the bottom of the cave, where the bones of some of the first tombs would have been pushed into, as recorded in the field notebook. The objective was to create space for new burials. Natural displacements resulted from the strong circulation of water inside the cavity, which contributed to the displacement of human remains and their degradation and fracture. Despite the strong changes observed in the position of the funerary deposits and respective offerings, the

Fig. 6. Verdelha dos Ruivos Cave. Two reconstructed skulls showing strong alterations resulting from compression (photo from JLC/OVF archive)

Fig. 7. Verdelha dos Ruivos Cave. View of the excavation works, showing a large slab covering one of the tombs (photo from JLC/OVF archive)

observation of successive sections and plans of the excavated area proved the existence of three main phases of primary depositions. These three main phases were separated by phases of abandonment of the cave, corresponding to archaeologically sterile deposits. Several bones were recorded still in anatomical connection in each of the three burial phases identified, providing evidence of primary depositions structured with limestone slabs, as mentioned above. Whenever it was possible to know the position of the bodies – for which the training in anatomy of one of the main participants in the excavation was determinant: Manuel Leitão, MD who was also in charge of the graphic recording of all plans and sections – it corresponded to lateral decubitus, indistinctly on the left or right side, with the limbs flexed, with no evident preferential orientation of the bodies or the skulls (*Fig. 8*). A total of 11 bodies were identified in these conditions, although always very incomplete, due to the post-depositional taphonomic alterations observed. The archaeological remains also show strong post-depositional disturbances, attested by some items that constitute true markers, such as a large decorated Palmela bowl whose fragments were dispersed over a wide area.

Almost all the elements of the so-called Bell Beaker 'package' are present along the entire stratigraphic sequence, indicating exclusive use of this funerary cave by people associated directly with the Beaker 'package'. The assemblage includes typical Bell Beaker elements such as an archer's wristguard and several 'turtle' type buttons with double V-shaped perforations on the ventral side, five of which were analysed and found to be made of sperm-whale ivory (Schuhmacher *et al.* 2013), with a parallel in the set of buttons from the Almonda Cave (Torres Novas) (Zilhão – Monge Soares – Gonçalves 2022). The

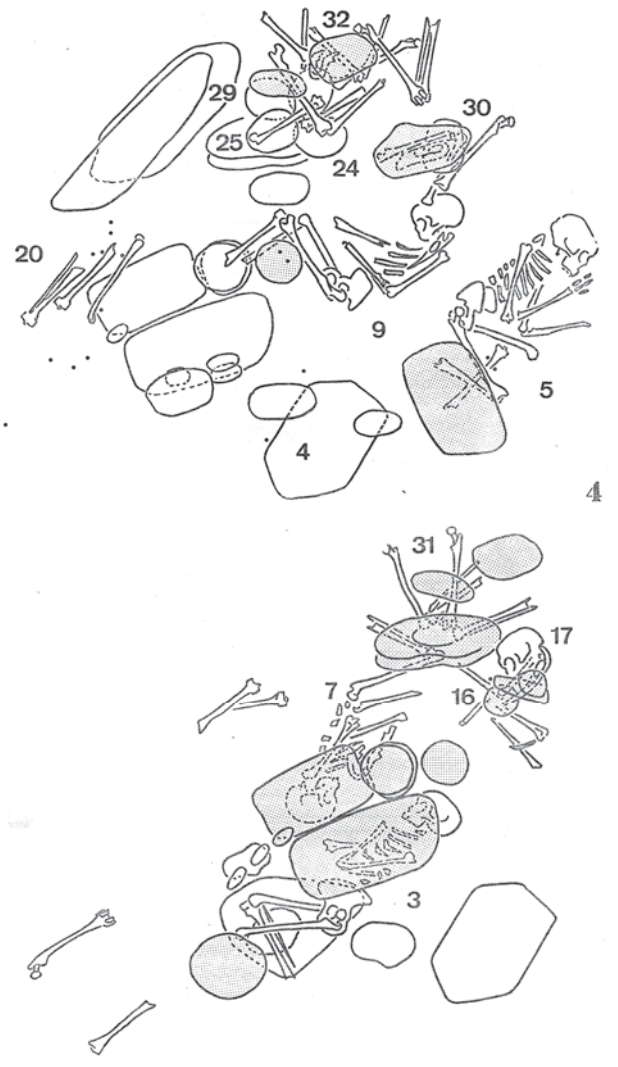


Fig. 8. Above: Verdelha dos Ruivos Cave. Partial plan of level II. Several burials can be observed, in lateral decubitus, with flexed arms and legs, partly covered by slabs and partly resting on them. Below: Verdelha dos Ruivos Cave. Partial plan of level III. Several burials can be observed, in lateral decubitus, with flexed arms and legs, partly covered by slabs and partly resting on them (plans from JLC/OVF archive)

metal assemblage consists of two copper awls, very common in the regional Chalcolithic, and a Palmela point, along with four gold ornaments, which also occur in various Chalcolithic contexts of Estremadura (Cardoso – Bottaini 2024): a cut and folded leaf, possibly a ring, and the set of three gold spirals (*Fig. 9*), one from Level I and two from Level II, known from several Beaker contexts in Portugal, Spain and France, although they are rare productions. In Portugal, three spirals of varying lengths were also found in the monument of Bela Vista (Colares), whose most important occupation is characterised by a significant group of Bell Beaker ceramics (Melo *et al.* 1961, Est. 4, 7 and 8). The latter, just like the ones studied herein, should not be confused with the well-known spiral rings made of more robust strips of gold, resulting in pieces of larger diameters and shorter lengths. More recently, a spiral recovered from the Bell Beaker hypogeum of the Carmo Convent (Torres Novas) was identified (Valério *et al.* 2019) as well as another from the Bell Beaker burial of Pago de la Peña (Zamora, Spain) (Delibes de Castro 1977, 76). In France, spirals were found in two dolmen monuments: one item at La Pierre Levée in Vendée, and two items at Trizay in Charente-Maritime (Zbyszewski *et al.* 1981, 116–117), as noted by Chr. Eluère, who adds yet another monument from Morbihan, Kerouaren with one

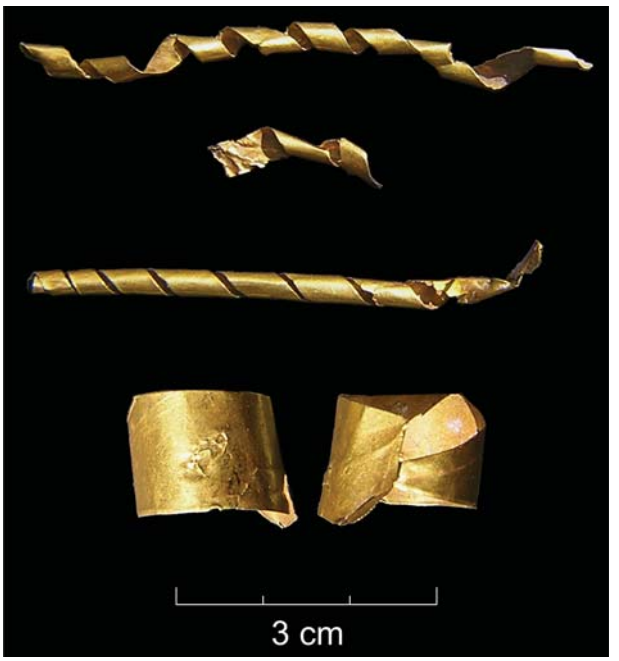


Fig. 9. Verdelha dos Ruivos Cave. Three gold spirals and a cut and folded gold leaf, possibly used as a ring (photo by J. L. Cardoso)

item (Eluère 1982, fig. 28). Among other alternatives, these can be attributed to hair adornments. It is also rare to find a rolled-up gold leaf, which could occasionally serve as a ring, whose cut marks show how it was obtained, this being an interesting indicator of how gold was worked during the Chalcolithic.

The composition of these gold pieces, like others from the same period and geographical area, is consistent with the exploitation of the auriferous Tagus River sands, celebrated by the Romans who exploited them intensively (Cardoso – Guerra – Fabião 2011). XRF analysis of the composition revealed the following results (Cardoso – Bottaini 2024): Silver (Ag) was found to vary between 7.65 and 13.9%, while copper (Cu) seems to be present as an impurity, at no more than 0.1%. The results obtained for these four artefacts are consistent with what is already known about Chalcolithic gold artefacts from the western Iberian Peninsula, which are generally made up of 5 to 15% Ag and Cu below 1% (Murillo-Barroso *et al.* 2015, 587). The golden artefacts from Portuguese Extremadura that have been analysed and published so far typically have an Ag content of over 6%, mostly between 8 and 16% (Valério *et al.* 2019, 146), revealing a compositional pattern similar to the items studied herein. The auriferous richness of the Tagus River, which has persisted to the present day and peaked during the Roman period (Cardoso – Guerra – Fabião 2011), was certainly the source of the raw material used in prehistoric times, which explains the remarkable concentration of objects from this period in the lower course of the river and its immediate surroundings.

One of the most important pieces of evidence of the exclusive frequentation of the cave by Beaker people is indicated by the decorated ceramics, strictly limited to Beaker vessels. These are distributed throughout the sequence, with no evident differentiation. Maritime Beaker is exceptional, represented by just a single vessel of the linear variant, recovered from the oldest Level I (*Fig. 10*). It can therefore be concluded that vessels of different shapes coexisted throughout the stratigraphic sequence, bearing different decorative techniques and patterns, from which the maritime Beakers are almost absent. Recording non-decorated vessels is also very important. This was the first time, on Portuguese territory, that their characteristics and stratigraphic distribution were recorded in a funerary context (*Fig. 11*). Apparently, the shapes of non-decorated and decorated vessels are correlated, particularly as far as the group of plain Beaker vessels is concerned; this suggests they would serve the same uses. In some cases, the symbolic component is especially evident, as documented by the tiny bowl from Level III, with few known parallels in Portugal.

There is an important set of 'anthropomorphic' or 'turtle' Beaker buttons, dispersed across all three levels, reaching a maximum number of five in Level I. Their analyses revealed they were made from sperm-whale ivory (*Fig. 12*), with parallels in other Portuguese sites, such as the Almonda Cave (Zilhão – Monge Soares – Gonçalves 2022). A broad-bladed Palmela point from Level I, with an impact mark, and a wristguard fragment complete the traditional Beaker set, which is actually very scarce in this cave given the number of identified tombs. The evidence of impact on the Palmela point is quite interesting; the only comparable case was observed on a similar point from the fortified site of Moita da Ladra, in the vicinity of this cave, recovered from the external side of the wall, which suggests an obvious conflict situation (Cardoso 2014a, fig. 52: 5).

Some artefacts are common in regional Chalcolithic contexts, with or without Beaker items. This is the case of two copper borers or awls and two variscite beads – certainly sharing the same origins as the hundreds of others known in the region – one recovered in Level II and the other in Level III; their raw material possibly originated from the Palazuelo mines, in the Zamora region, some 600 km away (Odriozola *et al.* 2013; Domínguez-Bella *et al.* 2019). Several cylindrical idols made of limestone were recovered; these are also common in Chalcolithic contexts from Estremadura and the Southwest and Southeast of the Iberian Peninsula. One of these idols, from Level II, is actually made of ivory and can be included among the regional set of ivory productions, a raw material of North African

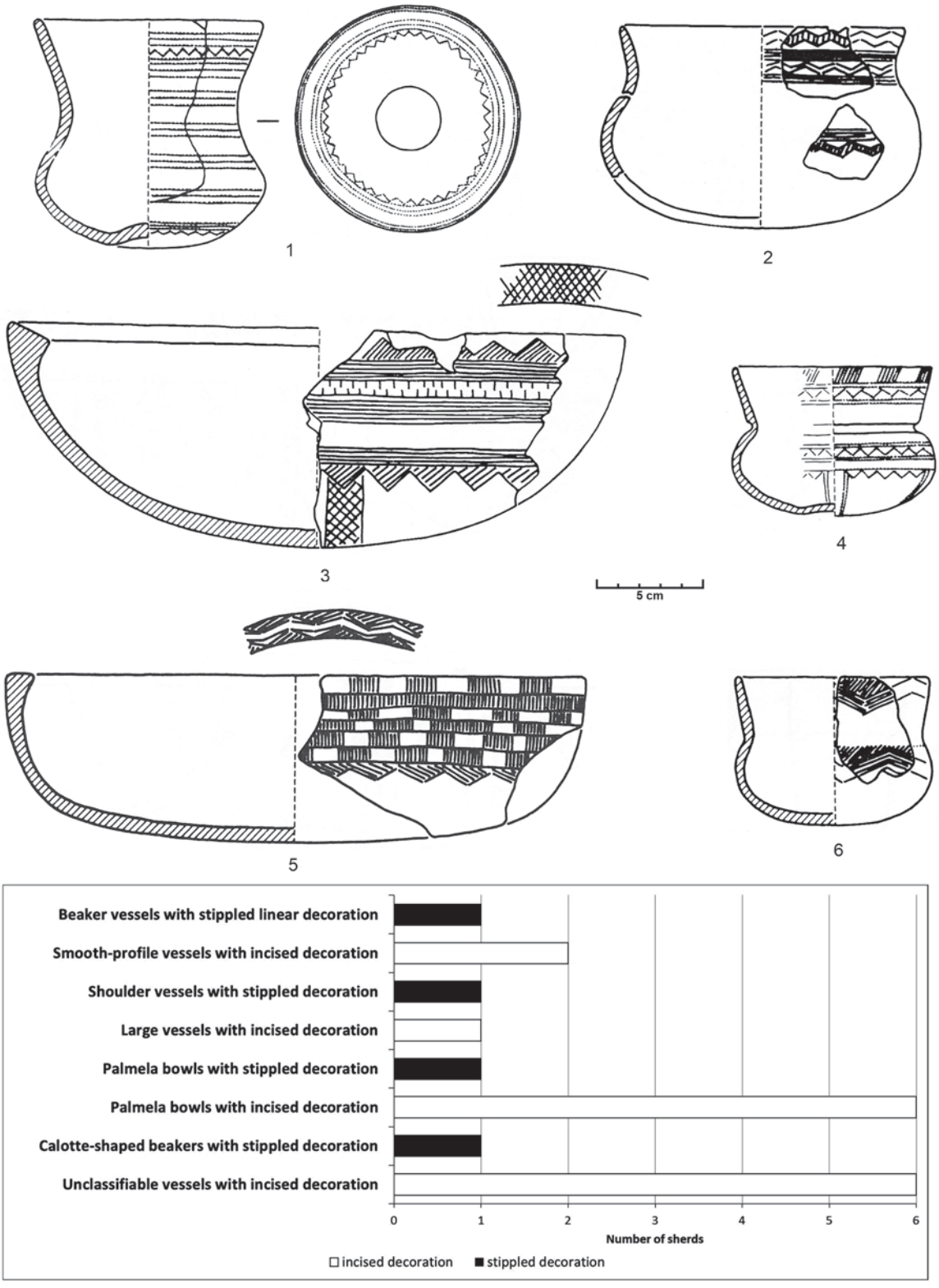
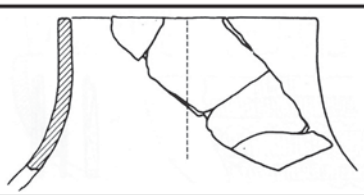
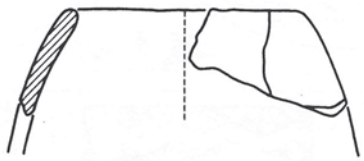
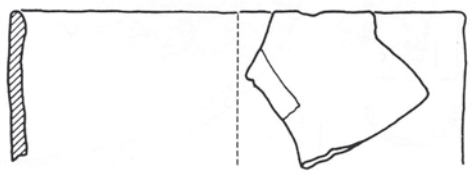
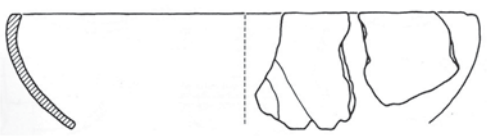
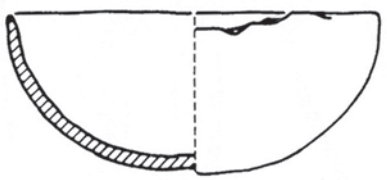
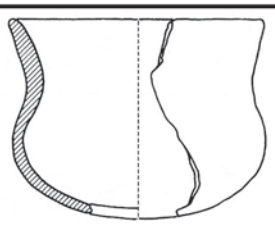


Fig. 10. Verdelha dos Ruivos Cave. Typological distribution of decorated ceramics over the three identified archaeological levels (image from Cardoso *2014b)*

origin (Schumacher – Cardoso – Banerjee 2009), inventoried shortly after (Cardoso – Schumacher 2012). The assemblage also includes a bowl made on a diaphysis of a long bone, probably from a bovid, and another one, made of ivory; both are plain, but the ivory one features a much more careful finishing (*Fig. 13*). These artefacts also occur in Chalcolithic contexts of Estremadura, both residential,

FORMAS		Diâmetros	Nível I	Nível II	Nível III	Nº. Total de frag.
1		⦰ < 20 (2) ⦰ 20-40 (1)		3		3 (9,1%)
2		⦰ < 20 (5)		2	3	5 (15,2%)
3		⦰ 20-40 (2)		1	1	2 (6,1%)
4		⦰ < 20 (1) ⦰ 20-40 (2)		2	1	3 (9,1%)
5		⦰ < 20 (13) ⦰ 20-40 (5)	4	10	4	18 (54,5%)
6		⦰ < 20 (2)	1	1		2 (6,1%)
TOTAL		⦰ < 20 (23) ⦰ 20-40 (10)	5	19	9	33 (100%)

Legenda: ⦰ - diâmetro no bordo em cm ; (x) - quantidade de recipientes.

Fig. 11. Verdelha dos Ruivos Cave. Typology of plain ceramics (image from Cardoso 2024)

e.g. the settlement of Vila Nova de São Pedro (Azambuja) (Paço 1960/1961) and Leceia, in the latter case in Full/Final Chalcolithic contexts (Cardoso – Salvado 2001/2002, fig. 41: 5–7), and funerary, the latter naturally being much more abundant and, above all, better preserved, e.g. the remarkable assemblage from the Paimogo tholos (Lourinhã) (Gallay *et al.* 1973, fig. 69).

The undifferentiated presence of the same types of artefacts of a symbolic or ritual nature in Chalcolithic contexts with or without Bell Beaker elements underlines the absence of differences in the religious superstructure of both groups, even if they have actually embodied socially differentiated populations. The scarcity of funerary offerings in the still preserved part of the cave is even more evident when it comes to artefacts of a functional nature. There was a total absence of polished stone artefacts. Knapped stone artefacts, common in Chalcolithic funerary deposits, are exceptional as only six small flint blades were recovered, in Levels II and III. Likewise, only two copper awls were found, both in Level II, as previously mentioned.

The absolute chronology of the funerary deposit was obtained through five radiocarbon dates (GrN–10971-3 for burials #2–4; Wk–39949 for burial #5; Wk–40698 for burial #32) from the Groningen NL and the University of Waikato NZ AMS radiocarbon labs on human bones from three different burial levels. Together with a sixth date from the Instituto Tecnológico e Nuclear PT (ICEN–1242), however without stratigraphic context, results range widely at first glance, with GrN–10972 and Wk–39949 being clearly before GrN–10971 and 10873, while WK–40698 and ICEN–1242 are remarkedly younger. The beginning of the cave's funerary use (Level I), by some of the first Beaker communities in the region, now appears to date back to ca. 2700 cal BC, especially when having in consideration Wk–39949 (4090±23 BP) that confirms the previously obtained result of GrN–10972 (4100±60 BP). The intermediate burials from Level II were seemingly placed only

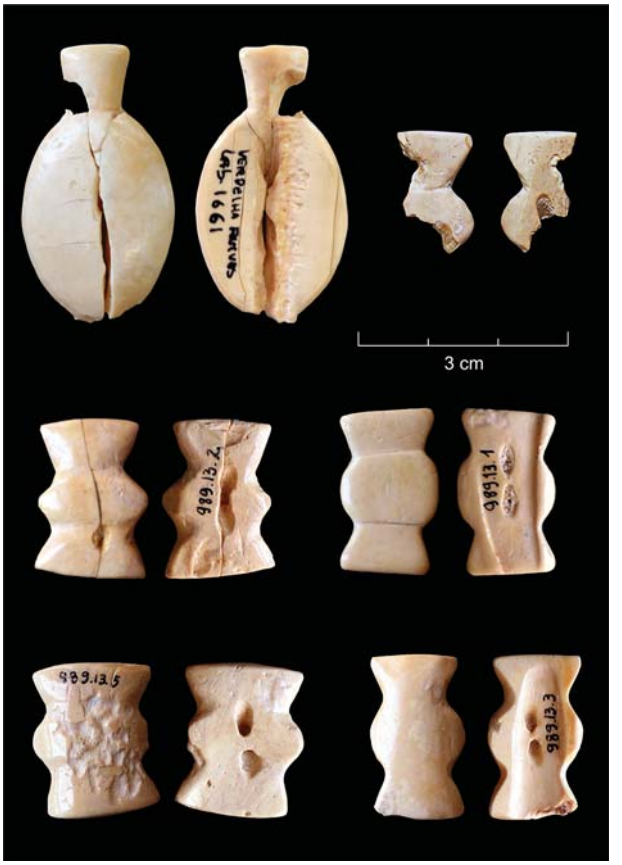


Fig. 12. Verdelha dos Ruivos Cave. Assemblage of sperm-whale ivory Bell Beaker buttons. (photos by T. X. Schuhmacher and J. L. Cardoso [1st row, item to the right])

Fig. 13. Verdelha dos Ruivos Cave. Right: vessel made of long bone diaphysis (photo by J. L. Cardoso). Left: vessel made of ivory (photo by T. X. Schuhmacher)

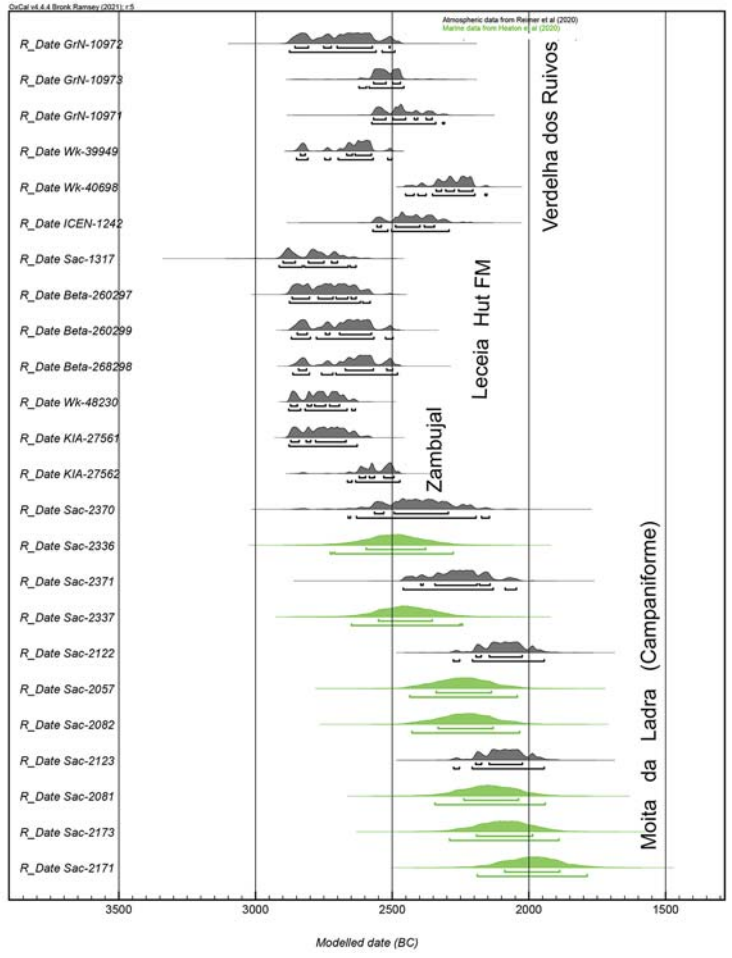


Fig. 14. AMS radiocarbon dates on bone remains from the Verdelha dos Ruivos Cave and other archaeological sites of comparable chronology (courtesy of Dr. A. M. Monge Soares)

shortly after, still between 2600 cal BC and 2500 cal BC, including perhaps also the very beginning of the second half of the 3rd millennium BC (GrN–10972, burial #3; GrN–10973, burial #4). It is only with the most recent human depositions (Level III) that a significant time gap becomes visible, certainly due to now reaching another plateau in the calibration curve of the 3rd millennium BC. These burials likely took place around 2400–2300 cal BC, thus configuring a recurrent use of the cave for more than three hundred years.

The early, ca. 2700 cal BC chronology of the Beaker presence at the Verdelha dos Ruivos Cave has a direct parallel in the fortified Chalcolithic settlement of Leceia, 40 km SW, outside of which a Beaker hut was consistently dated to between 2800 and 2600 cal BC (*Fig. 14*). Moreover, in the fortified Chalcolithic settlement of Zambujal (Torres Vedras) the oldest levels with the presence of maritime Beakers (Phase 2a) date back to at least 2600 cal BC, as stated by the last excavator of the site, M. Kunst (2017).

Where did the community that buried their dead in this cave live? It would certainly not be the same one that occupied the Chalcolithic walled enclosure of Moita da Ladra, located approximately 2 km to the east, where maritime Beakers and other vessels with geometric dotted decoration are exclusive (*Fig. 15*), as usual in fortified sites of the region like Vila Nova de São Pedro, Zambujal and Leceia, to name but the three most important ones (see *Fig. 2*). Conversely, the coarser productions are predominant at the smaller sites scattered across the adjacent gentle slopes, represented by larger bowls with incised

decorations, related to the storage of products, despite the fact that both the fortified sites and the open settlements coexisted throughout the second half of the 3rd millennium BC, according to the obtained dates (Cardoso 2014b).

The differences observed in the Beaker productions from the two types of sites in the Tagus estuary region led the author, more than 10 years ago, to admit the existence of a segmentary society, in which the dominant group would occupy the high and defended places, using quality tableware in daily life, dominated by maritime Beakers and associated forms. Therefore, one should consider that the use of this cave corresponds to a population coming from the surrounding region, exploring the fertile adjacent fields, and not to the people that occupied the top of the Moita da Ladra volcanic chimney, whose primary function was to control the products coming from the other side of the Tagus estuary. This is equivalent to the situation observed in this same region, around 40 km to the west. In fact, the population that inhabited the small and open settlement of Freiria, during the third quarter of the 3rd millennium BC, would have used the Ponte da Laje Cave, located approximately 2 km to the southeast, as a burial place, given the similarity of the Beaker ceramics found at both sites and their contemporaneity (Cardoso 2014b; 2017). Thus, the existence of different Beaker groups in the Tagus estuary region may be due not to different chronologies, as the dates obtained prove, but to the status of their users, according to their positions in the structure of the society established in the region since ca. 2700 cal BC. This situation, however, is consistent with the presence of objects of supra-regional circulation, such as V-perforated buttons, Palmela points and archers' wristguards and, in addition and exceptionally, gold ornaments (e.g., the items found at the Verdelha dos Ruivos Cave), used by both social groups.

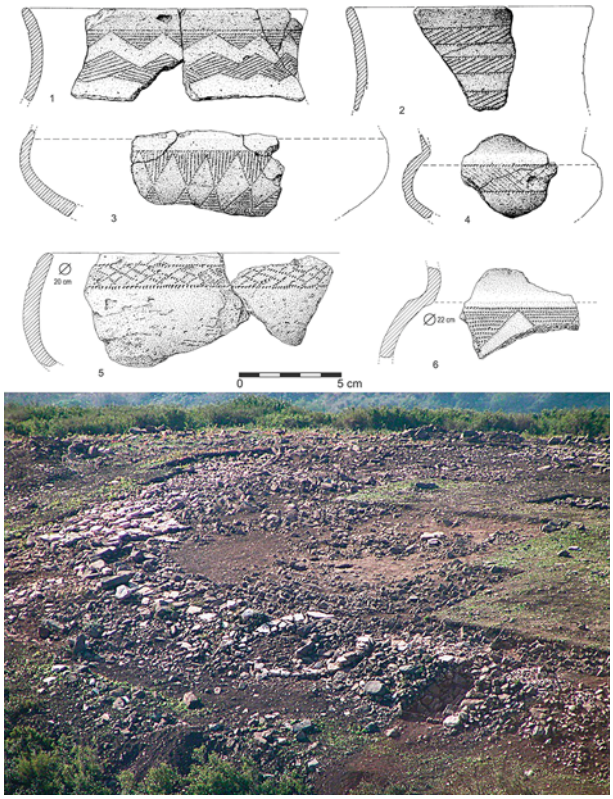


Fig. 15. Aerial view of the fortified Chalcolithic settlement of Moita da Ladra, located near the Verdelha dos Ruivos Cave (photo by J. L. Cardoso), and the Bell Beaker ceramic materials recovered from the site (drawings by B. L. Ferreira)

It is important to emphasise that the situation described above appears to be much richer and more complex than what was possible to describe in this paper. In fact, it is important to bear in mind that, from the middle of the 3rd millennium BC onwards, it is in the region of the Tagus estuary that the greatest concentration of maritime vessels on a European scale was found. However, some sites of primary importance that were flourishing during this period feature a total or almost total absence of Beaker vessels. And at other sites, the presence of Beakers is limited to segregated sectors. This is the case with the fortified Chalcolithic settlements of Outeiro Redondo (Sesimbra), and Penedo do Lexim (Mafra) (see *Fig. 2*), where the populations did not incorporate Beaker production into their daily lives. This fact refers to another dimension of the discussion on the Beaker phenomenon, which is the existence of socially differentiated populations in the Tagus estuary, from 2700 cal BC onwards. But this

is an issue that needs to be addressed and discussed on a broader scale, on the basis of increasingly solid material evidence, over the next twenty-five years.

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ISBN 978-615-5766-84-8

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