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# The lithic assemblage from Lapa da Galinha (Alcanena, Portuguese Estremadura) and the “Cave Megalithism” phenomenon in the 4<sup>th</sup> and 3<sup>rd</sup> millennium BCE

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## Abstract:

The present work proposes to present the analysis results of the flaked stone artefacts from Lapa da Galinha, a cave necropolis, located in the Estremadura Limestone Massif, that is a classic example of the funerary practices of the 4<sup>th</sup> and 3<sup>rd</sup> millennium BCE. The excavation dates back to 1908, and it was performed by members of the current National Museum of Archaeology, resulting in an extensive votive ensemble, associated with a minimum number of 70 burials. The evident collective nature of the burials, the votive ensemble and the rituals there identified emphasise its “Cave Megalithism” character, an expression that invokes only one of the many facets of the complex phenomenon that is Megalithism. Since the Megalithic funerary structures, such as natural caves, are utilized over a long period of time, it’s not easy- but not impossible- to reclaim in full, the events that took place. Focusing on the flaked stone artefacts, the main goal of this text is to contribute to the reconstruction of the belief system that characterizes the Neolithic and Chalcolithic communities from this region. Hence, the morpho-technological criteria, that followed previously established standards, and raw material analysis of the artefactual categories, even on a macroscopic level, were absolutely essential for us to suggest an extensive diachrony of the funerary use of the natural cave. With that in mind, we reflected on the importance of the transformations that occur within the material culture exposed throughout the text and their chronological meaning, but also on the true potential of this artefactual category as a tool to build a solid perspective regarding the symbolism inherent to these funeral practices.

**Keywords:** Megalithism; Neolithic and Chalcolithic; funerary practices; flint sourcing and consumption

## 1. Introduction

Excavated in 1908, this important funerary context, whose extensive votive ensemble reflects the diversity and the richness that portray the Megalithic phenomenon, had almost fallen into oblivion. The importance of reviewing the material culture and other data from old excavations is something that has profoundly marked the archaeological *fora* during the past decades. In fact, if it wasn’t for the recent work on the votive plaques (Gonçalves *et al.* 2014), this cave-necropolis would still be referenced based only on an inadequate note, presented in



the mid-20<sup>th</sup> century to the 1<sup>st</sup> National Congress of Archaeology, held in Lisbon (Sá 1959). For reasons that will be discussed throughout the text, the study of the knapped stone tools, the largest artefactual category that composes the votive ensemble, proved to be a key-element on the revitalization of the cave itself as a case study for the understanding of the funerary practices and the flaked stone industries of the Late Neolithic and Early Chalcolithic in the Estremadura Limestone Massif (from now on referred to as ELM). That being said, a question arises: Is it possible to differentiate the multiple episodes of occupation that characterize this funerary space, even if this lithic assemblage presents a high degree of variability and has no stratigraphic allocation? This is a question that doesn't have an easy answer, and it is an exercise that must be understood with the appropriate reservations.

This study, whose main objective is to understand the rituals practiced by the living in honor of the dead, reflects on one of the largest assemblages of knapped stone tools in the Estremadura funerary world, presenting an excellent state of preservation and relative chronological coherence. Connecting these artefacts with a particular flint source - the dominant raw material- revealed itself as a fundamental exercise because it allows us to have a better grasp of the mobility patterns and the interchange networks that characterize the Neolithic and Chalcolithic communities of the region. Therefore, we highlight the importance of this artefactual category, not only in terms of the technology employed in the manufacturing of this artefacts, but also in the process of understanding the ritual meaning that presides over these offerings. So it is not to be confused with other raw materials, the term flint is applied to a fine-grained material, from opaque to semi-translucid, with few voids or fractures and good knapping properties.

Within the Neolithic, the Iberian Peninsula attests a clear abundance of mortuary practices carried out inside karst cavities, occurring since mid-6<sup>th</sup> and, presumably throughout the 5<sup>th</sup> millennium BCE (Zilhão 1992). However, these are practices that do not fit into the Megalithic phenomenon (Boaventura 2009: 339), which is characterized by collective funerary practices that should not be confused with the concept of collective burials. Correlated with Megalithism, cave burial contexts in Iberia present a very complex scenario, namely in what concerns the formation processes and accumulation of bodies, that can be the result of an extended range of funerary rituals, but also due to the many radiocarbon dates that frequently transform our chronological frame and, consequently, our paradigms (Weiss-Krejci 2012).

Lapa da Galinha, as a funerary space that is fully integrated in a world of rituals and beliefs whose extent is still unknown to us, should be studied in a very singular context such as the ELM, where it is located (Figure 1). This geographic and geomorphologic unit, located in the upper area of the Portuguese Estremadura, must be understood as the most striking set of reliefs in the region. The Candeeiros mountain range (610 m), the Santo António high-plains (>350 m) and the Aire mountain range (677 m) are physically separated by the poljes of Mendiga (NNW-SSW) and Minde-Alvados (NW-SE), which confer a unique landscape to the Massif. This mountainous relief strongly contrasts with the typical alluvial plains of the Ribatejo region. Having said that, it should also be noted that one of the most characterizing features of the ELM is the high density of karst cavities, in which the Neolithic and Chalcolithic funerary rituals occur.

In the same geographic unit, in addition to Lapa da Galinha, there are about 25 karst cavities used by the communities of the end of the 4<sup>th</sup> and the beginning of the 3<sup>rd</sup> millennium BCE as a "container" for the dead (Mataloto *et al.* 2017; Sousa 2004). This high concentration of funerary caves gave basis to the "Cave Megalithism" concept, introduced by Gonçalves, to refer to the ritual depositions performed within these caves, all in all similar to the same practices that are identified in orthostatic monuments (Gonçalves 1978a; 1978b). This concept was later resumed by other authors such as Boaventura (2009) and Andrade *et*

*al.* (2010). For the ELM area, the remaining funeral architectures attributable to the Megalithic phenomenon consist only of four hypogea and two orthostatic monuments (Figure 2); there is no doubt that this territory is dominated by the presence of natural caves used as a funerary solution, presenting the oldest radiocarbon dates related with the Megalithic phenomenon (Boaventura 2011; Carvalho 2014). However, it should be noted that the diversity of the funeral architecture illustrates the multi-faceted reality that is the Megalithic phenomenon.



Figure 1. Location of the cave in the scope of the Iberian Peninsula.

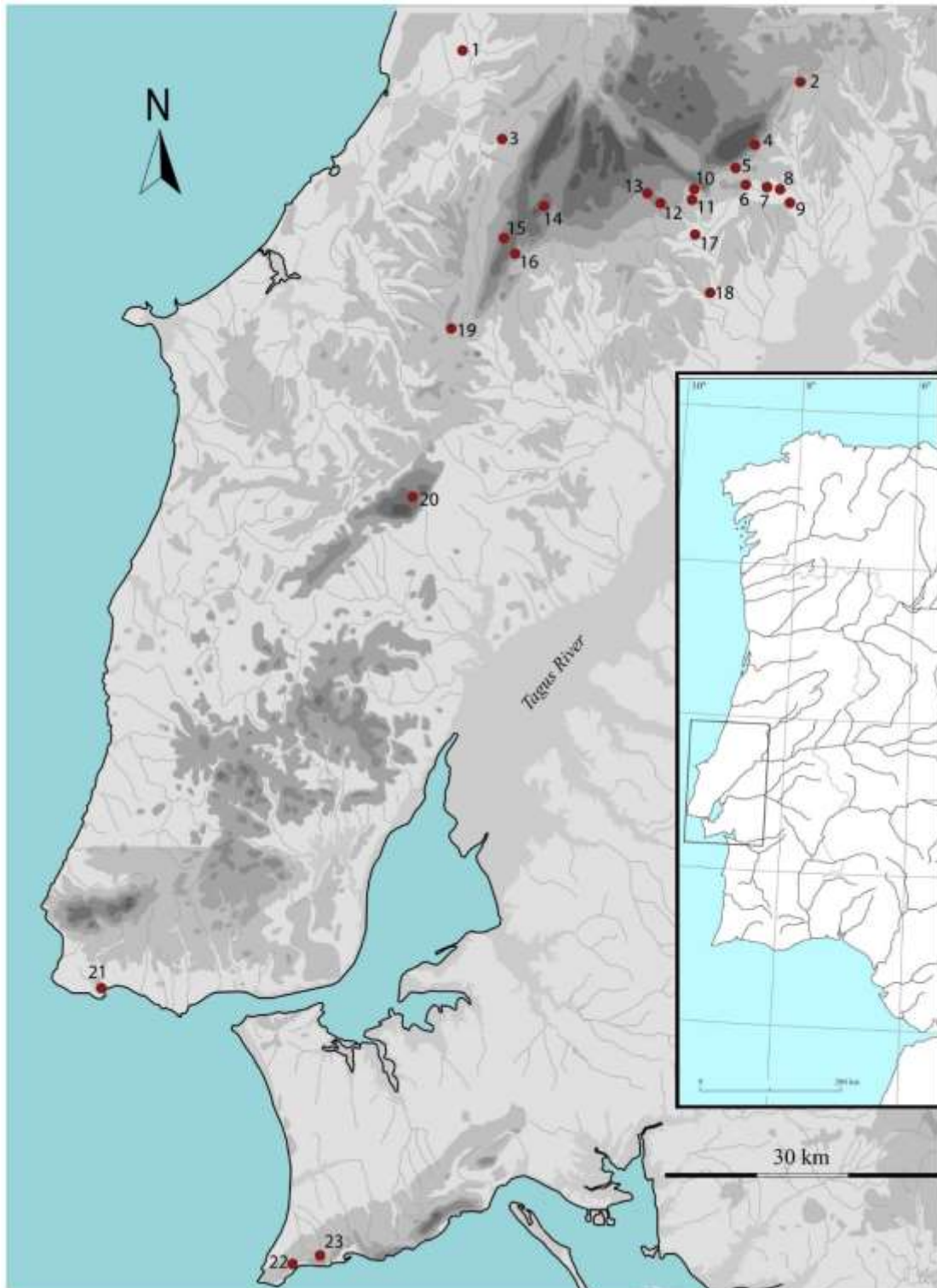


Figure 2. Lapa da Galinha (10) and the Neolithic-Chalcolithic funerary sites from the ELM and other caves mentioned in the text (cartographic base of Rui Boaventura). 1- Cova das Lapas (natural cave); 2- Buraca da Moura da Rexaldia (natural cave); 3- Grutas de Alcobça (natural caves); 4- Lapa dos Namorados (natural cave); 5- Lapa da Bugalheira (natural cave); 6- Entrada Superior 2 da Nascente do Almonda (natural cave); 7- Ribeira Branca 1 e 2 (hypogea); 8- Necrópole das Lapas (hypogeum); 9- Convento do Carmo (hypogeum); 10- Lapa da Galinha (natural cave); 11- Fonte Moreira (Dolmen); 12- Algar do Barrão (natural cave); 13- Gruta dos Carrascos (natural cave); 14- Lugar do Canto (natural cave); 15- Anta-capela das Alcobertas (Dolmen); 16- Gruta das Alcobertas (natural cave); 17- Gruta da Marmota (natural cave); 18- Lapa do Saldanha (natural cave); 19- Grutas da Senhora da Luz (natural caves); 20- Algar do Bom Santo (natural cave); 21- Poço Velho (natural cave); 22; Lapa do Bugio (natural cave); 23- Lapa do Fumo (natural cave).

## 2. Methods and materials

### 2.1. The cave and its votive ensemble

The collective character and importance of Lapa da Galinha as a funerary space is well established in the extensive votive ensemble that was recovered in the early days of Portuguese Archaeology- which, at times, can be an obstacle, especially due to the recording techniques employed. In fact, we were able to determine that there are more than 900 individual records of artefacts and objects from this necropolis, which needed to be studied with more detail. This set of offerings was associated with a minimum number of 70 burials, including a trephined skull. However, apart from this interesting skull and a mandible that remain in the National Museum of Archaeology (MNA), it was not possible to locate the abundant human remains that accompanied this votive ensemble. In addition to the flaked stone artefacts, which represent about 86% of the entire assemblage and constitute the main theme of this study, the other artefactual categories are also a clear testimony of the practices that characterize the “Cave Megalithism” phenomenon.

For example, the pottery items, which are not that abundant, are perfectly aligned with the pattern that was recognised for other caves in the Portuguese Estremadura region (Cardoso & Carvalho 2008; Carreira & Cardoso 2002): a reduced formal repertoire, which derives mainly from the sphere, without any decoration. The presence of the red slip surface treatment is probable in some of the recipients, but that’s something that needs another degree of validation. The polished stone tools consist mostly on axes and adzes with a similar quantitative value. The collection is also made up by two chisels, one of which is very small, and one hammerstone, made in amphibolite, with substantial use marks on both operative ends. However, it was a special flat axe that caught our attention, not only due to the fact that it was made on some type of marble, very different from the other amphibolite axes, but also due to the traces of a perforation at its proximal end, a characteristic that reflects a concept that has its origins elsewhere, possibly in the Breton area (Andrade & van Calker, *in press*). The votive plaques and the peculiar “cross” - a schist engraved artefact that morphologically resembles an hafted axe- make up a very diversified set that once again confirms the cultural relationship between the Portuguese Estremadura and the North Alentejo, the region where the concept of these engravings and its raw materials source originated from (Gonçalves *et al.* 2014). The elements of personal adornment are mostly represented by the common schist and bone beads, as well as two triangular shaped pendants and at least one bone pin. There is mention to ivory and amber artefacts in this collection (Sá 1959: 127), but, at this point, we couldn’t confirm its presence. It is, therefore, a votive ensemble that reflects a very distinct belief system, which the Neolithic and Chalcolithic communities that utilized the Lapa da Galinha cave as a receptacle for the dead shared with other regions, namely the Southwestern Iberia (Gonçalves *et al.* 2014: 126).

Lapa da Galinha is located in the town of Vila Moreira, district of Santarém, just over 100 km NE from Lisbon. Situated at 132 m above the sea level, the cave opens to a landscape that looms over a plateau where the present town is implanted. The entrance to the cave is made by a “ramp”, excavated in the limestone, which gives access to a large room that spreads for more than 20 m in length, having a generic orientation of SW-NE (N36°E). In the center of this room one can find a thick column that virtually divides two concrete spatial realities- “Room 1” and “Room 2”. Nowadays, one can observe a daylight opening over “Room 1”, resultant from the abatement of the cave’s ceiling. With the information that is currently available, all the funerary depositions and offerings were carried out exclusively in these rooms. In the NE quadrant of “Room 2”, a small “diverticulum” gives access to a succession of small rooms and sinuous stroke galleries, which extend for about 50 m. In our visits to the cave we couldn’t identify any elements that would indicate the use of these areas

as funerary spaces, which does not mean that the 1908 workers did not do so. Therefore, one may say that Lapa da Galinha is a good example of the karstification processes of the region, giving origin to a complex karstic morphology (Figure 3).

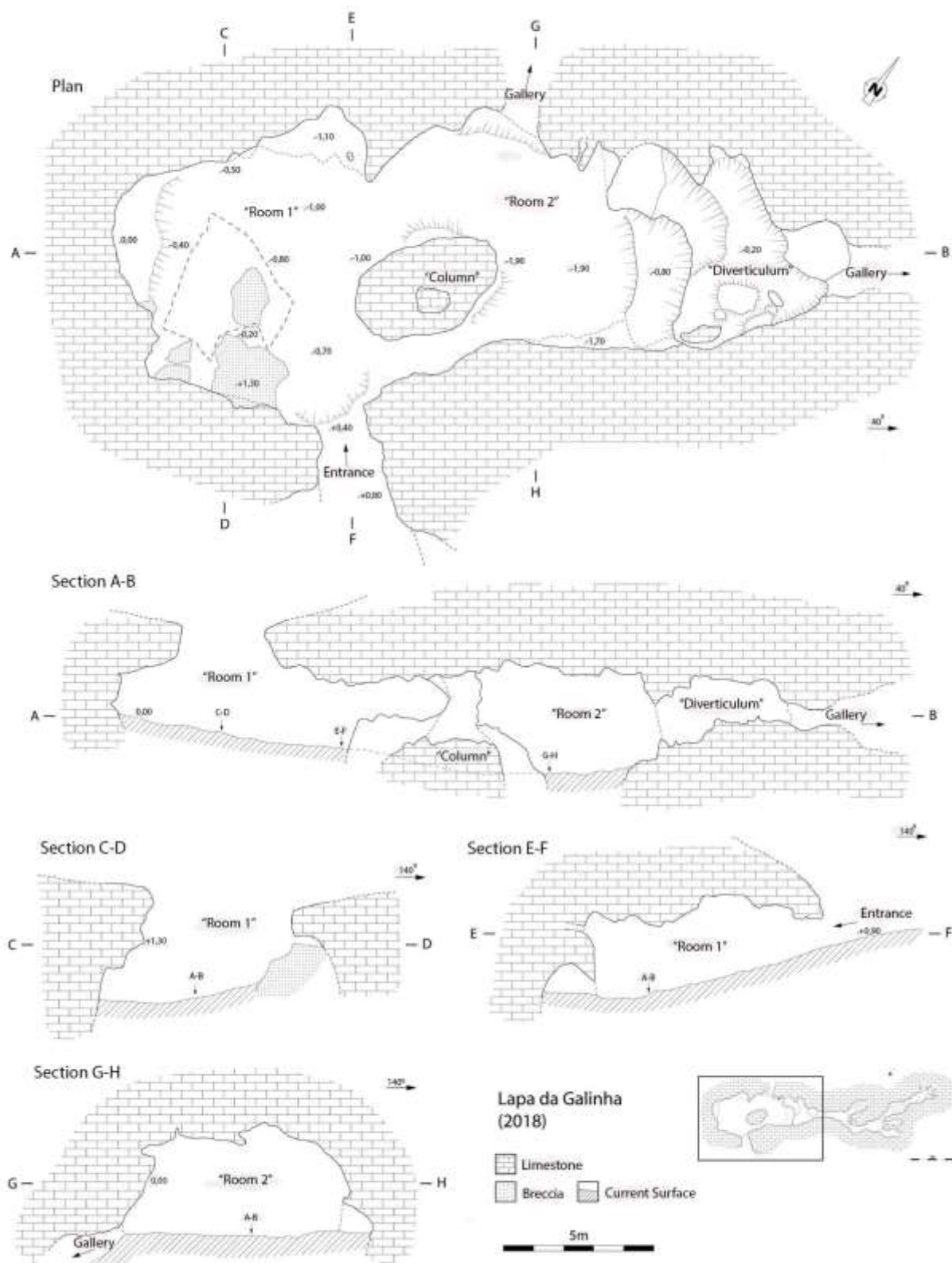


Figure 3. Graphic representation of the cave's morphology, drawn by the author with the collaboration of a various number of colleagues (January and April 2018). The scale bar segments are 5 m each (25 m long in total).

Considering the circumstances that led to the excavation of this cave and seeing that we couldn't find the original plans made in 1908, the majority of this assemblage doesn't have a known provenance context. For instance, only 25% of the blades and bladelets have their original context preserved, associated with particular burials. On the other hand, the very concept of "burial" must be read with caution, since, in our opinion, substantiated through the reading of the personal correspondence between the excavation supervisor (Félix Alves Pereira) and the former Director of MNA (Leite Vasconcelos), it was probably defined as a mere accumulation of skull and bones. As we well know, this concept doesn't have direct correlation with our understanding of what a burial really is. Recent excavations (Cardoso & Carvalho 2008; Carvalho 2014) in other caves that were used as a vessel for the dead during the Late Prehistory have shown that the funerary space is composed by a chaos of bone accumulations, where is not easy to individualize specific burials- except when we are able to recognize material elements that clearly divide a burial from another, as in the case of Lapa do Fumo and Lapa do Bugio (Cardoso 1992; Serrão & Marques 1971). To the best of our knowledge, there were no such evidences in Lapa da Galinha. Therefore, it doesn't make sense to separately treat the material set that preserves its provenance and the set that has no information regarding its context, separately. However, this is still an information to consider, especially when making other sort of material associations; for example, with some votive plaques, pottery, geometric armatures and arrowheads.

## 2.2. Techno-typological analysis

In order to ascertain the petrographic features of the multiple raw materials, we conducted a macroscopic analysis on the complete bladelets and blades using a Leica MZ6 binocular stereomicroscope (45x magnification). The analyzes sought to define potential sourcing areas based on the information available in the Portuguese Geological Chart- regarding the petrographic features of the flint sources available in the Estremadura region, see Matias (2012). Macrophotographs were obtained using a Veho VMS-001 USB microscope, with 50x magnification.

The assemblage was divided in four main morphological groups: blades and bladelets; geometric armatures; arrowheads; and large bifacial points. All available artefacts were individually described, assessing their specific morphological and techno-typological characteristics. The only core that was recovered, as well as the few little flakes that we identified in the collection will not be the studied in detail, since they are statistically inexpressive. In fact, their presence in a necropolis such as this may suggest another occupation episode of the cave, not necessarily of funerary nature.

Regarding the methodology used in the analysis of blades and bladelets we adapted the principles defined in Sousa (2010), that provided a reference frame for this particular artefactual group within the same time-space scope. The presence of heat-treatment was determined by macroscopic observation. For geometric armatures, we applied the typology developed in Mataloto *et al.* (2017), since the work focused on a significant assemblage - about 500 pieces from various Megalithic architectures- that standardized the terminology. The arrowheads and large bifacial points morphological groups were classified according to the criteria established by Forenbaher (1999), based on the morphology of the base and edges, which also included a weight index that we considered important to recognize the fundamental traits of the assemblages. The elongation and thickness indexes followed the proposition of Gonçalves (1989). Despite the inherent difficulty in identifying the support in which the arrowheads were made- due the full extension of the retouch- we tried to categorize it whenever possible. However, this exercise should not be taken as absolute so the analysis must be understood with caution.

### 3. Results

#### 3.1. Raw material:

The knapped stone assemblage (Table 1) from this cave is made up by 616 items, which, as said before, comprises one of the largest sets of this artefactual category ever recovered from funerary contexts in the South-Centre of Portugal. The macroscopic analysis of the assemblage showed the almost exclusivity of flint as the raw material: 611 out of 616 records. Despite the great chromatic variety of the flint and the different textures, the mesoscopic analysis (Figures 4 and 5) allowed to confirm our first macroscopic division:

Table 1. The flaked stone industry from Lapa da Galinha.

Knapped Stone Tools	Flint		Quartz		Hyaline-Quartz	
	N	%	N	%	N	%
Cores	1	1%	0	0%	0	0%
Debitage						
Crested; sub-crested blades	6	1%	0	0%	0	0%
Unretouched blades	125	20%	0	0%	0	0%
Unretouched bladelets	23	4%	0	0%	0	0%
Unretouched flakes	8	1%	0	0%	0	0%
Tools						
Geometric armatures	39	6%	0	0%	0	0%
Arrowheads	80	13%	4	100%	1	100%
Large bifacial points	23	4%	0	0%	0	0%
Retouched blades	278	45%	0	0%	0	0%
Retouched bladelets	6	1%	0	0%	0	0%
End-scrapers	22	4%	0	0%	0	0%
<b>Total</b>	<b>611</b>	<b>100%</b>	<b>4</b>	<b>100%</b>	<b>1</b>	<b>100%</b>

**Type 1:** Upper Cenomanian, Cretaceous, with similar characteristics to the Caxarias (Ourém) flint, located about 35 km from Lapa da Galinha. The presence of quartz macro grains and reddish iron oxides is regular, reaching in some cases, a diameter of 2 mm. In addition, the surface may contain poorly preserved bioclastic remains. The chromatic pallet ranges from greenish-grey, toasted yellow and brownish-white. Most of the blades and large bifacial points are made with this flint, but its presence is also significative within the geometric armatures and arrowheads.

**Type 2:** Upper Cenomanian, Cretaceous, with similar characteristics to the Arruda dos Pisões-Azinheira (Rio Maior) flint, located about 30 km from Lapa da Galinha. Although the formations of this region present the same iron oxides, these are smaller, less dense and bulky. The spectrum of colors is very heterogeneous, frequently in the same lithic artefact, ranging from tones of red to grey. This flint dominates the production of geometric armatures and arrowheads but is also used on blades and large bifacial points.

**Type 3:** Upper Cenomanian, Cretaceous, of unknown flint source: distinguished from type 1 and 2 for being translucent. In fact, it could be easily mistaken for chalcedony. It was only used in two blades.

**Type 4:** Upper Cenomanian, Cretaceous, whose specific formation we couldn't determine because of its very weathered surfaces. This type was only identified in partly cortical blades.



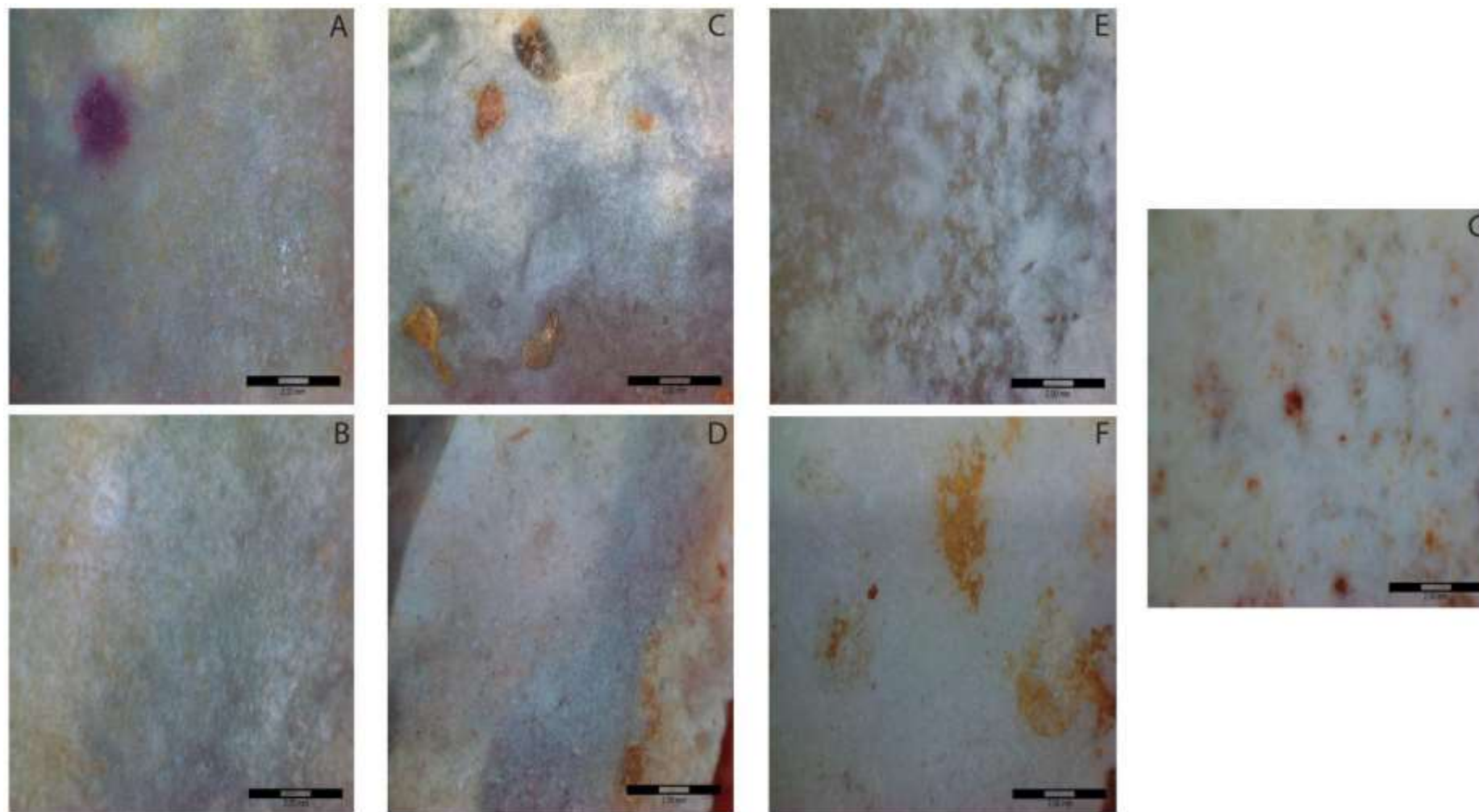


Figure 4. Mesoscopic aspects (x50) of the flint that characterizes the studied assemblage. Type 1: 4A and 4B; Type 2: 4C and 4D; Type 3: 4E and 4F; Type 4: 4G. The scale bars are 2 mm in total. Each segment is 0.67 mm.

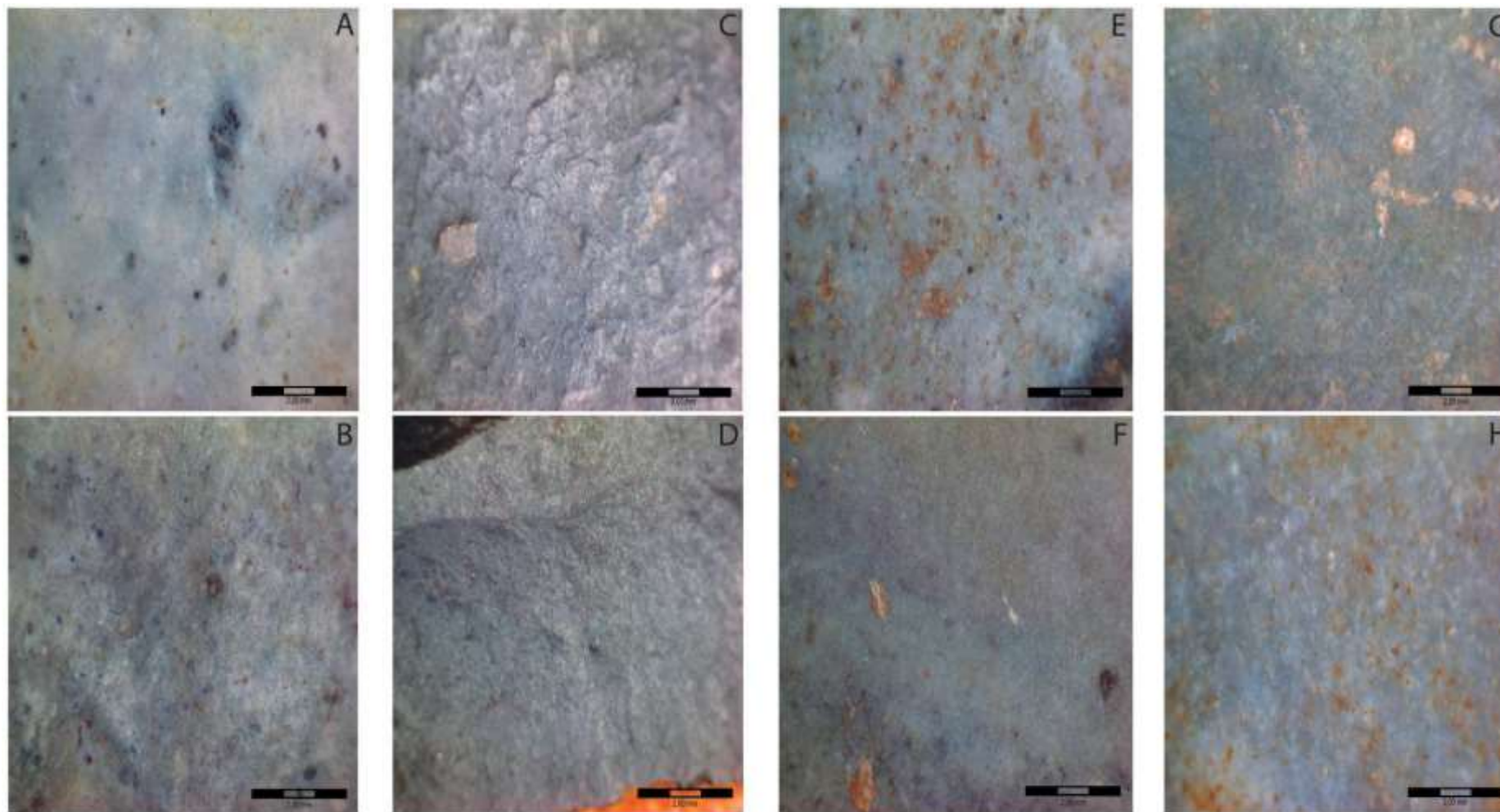


Figure 5. Mesoscopic aspects (x50) of the flint that characterizes the studied assemblage. Type 5: 5A and 5B; Type 6: 5C and 5D; Type 7: 5E and 5F; Type 8: 5G; Type 9: 5H. The scale bars are 2 mm in total. Each segment is 0.67 mm.

**Type 5:** Upper Oxfordian, Jurassic, with similar characteristics to the Agroal-Sabacheira flint, located about 40 km from Lapa da Galinha. The two formations, located in the Nabão Basin, about 10 km from Tomar, have very specific features that facilitate their identification: dark iron oxides and a set of little greyish-black inclusions that confer to the raw material a “dotted” facet. It may present some bioclastic remains, like foraminifera, but it isn’t possible to identify the species due to the altered surface of the artefacts.

**Type 6:** Jurassic, with similar characteristics to the Ribeira de Murta flint. Since the beginning of this work, the presence of a very dark flint, only present in one unretouched blade and a few geometric armatures, was something that clearly stood out. The features of this raw material led us to recognize the formation environment as the Ribeira de Murta flint source, where traces of flint exploitation during the Neolithic were identified (Aubry *et al.* 2009). The advanced state of surface deterioration doesn’t allow us to characterize its features, even though it could be possible to observe some of them, as the “*fissures cemented by microcrystalline quartz*” (Matias 2012: 73; Portuguese original).

**Type 7:** Undetermined Jurassic 1, which is composed by a small, but distinct, set of artefacts whose characteristics have already been recognized as being an “(…) *opaque flint, of grayish color, presenting Oxfordian features (Jurassic)*” (Mataloto *et al.* 2017: 112; Portuguese original). However, there is no direct correspondence with any formation with this geological age in the Western Iberia, so its origin remains unknown to this day. In addition to a few blades, this flint is used in the geometric armatures, but not in arrowheads or large bifacial points.

**Type 8:** Undetermined Jurassic 2, which derives from the previous type because of its darker color and texture. Its presence is very residual- only in one blade.

**Type 9:** Absolute Undetermined, where we couldn’t determine the geological age. Once again, the only blade that composes this group had serious surface weathering.

## 3.2. Artefacts

### 3.2.1. Blades and bladelets

The blades and bladelets categories are composed by 460 items, being the largest group in the studied assemblage. Using the artificial criteria of the 12 mm (Inizan *et al.* 1995) it was possible to distinguish bladelets (N=26) from blades (N=434), which present the fragmentation pattern exhibited in Table 2, which is not surprising, since the assemblage is from a funerary context.

Table 2. Fragmentation pattern of the bladelets and blades assemblage.

Fragmentation	Bladelets		Blades	
	N	%	N	%
Complete	3	0.65%	107	23.26%
Proximal end	6	1.30%	146	31.74%
Mesial end	6	1.30%	95	20.65%
Distal end	11	2.40%	86	18.70%
<b>Total</b>	<b>26</b>	<b>5.65%</b>	<b>434</b>	<b>94.35%</b>

Regarding the metric analysis, we were able to determine the following mean results: Bladelets- 1) Length:  $33.10 \pm 25.39$  mm (N=3); 2) Width:  $9.78 \pm 5.24$  mm (N=9), 3) Thickness:  $3.42 \pm 2.11$  mm (N=9) Blades- 1) Length:  $102.39 \pm 33.30$  mm (N=107); 2) Width:  $20.67 \pm 5.04$  mm (N=253); 3) Thickness:  $6.59 \pm 2.13$  mm (N=253). Based on these patterns, we could describe the set of bladelets as very similar- both in terms of metric variables and

technological features- and the blades as being expressively heterogeneous, where the variability is notorious. Within the blades assemblage, there are some differences: the minimum and maximum values of each metric variable are profoundly disparate: 1) for length, 10.48 mm and 174.12 mm, respectively; 2) width oscillates between 12.49 mm and 38.8 mm; 3) thickness presents a range of measurements that is comprised between 1.94 mm and 15.18 mm.

In terms of general morphology, we decided to cluster both bladelets and blades seeing that their general features corresponded. So, the assemblage is characterized by trapezoidal cross-sections (69%), with regularly parallel edges (66%) and arris (77%). The longitudinal profiles are mainly straight with a slight concavity (75%), not as pronounced as the plunged profiles (21%). The faceted butts are predominant (47%), mainly with distinct bulbs (63%). The heat treatment, identified with a reasonable degree of reliability in about 10% of the blade assemblage, does not seem to be a distinctive characteristic of this knapping technique. About 67% of the blades are retouched, unifacially, extending on both edges. Within this universe we were able to recognize the typical form of the flint perforators (N=7) and flint end-scrapers (N=22), which transformed their distal end, and therefore, their total length. Even though it lacks a microscopic confirmation, use-wear traces seem to be present in about 10% of the morphological group.

### 3.2.2. Geometric armatures

There are 39 geometric armatures. Only one was fragmentated, but it was still possible to classify it as a large symmetric trapezoid. In fact, the predominant typology is trapezoid (N=32; 84%), followed by segments (N=4; 11%) and triangles (N=2; 5%). Regarding their subtypes and classification, we obtained the data presented in Table 3.

Table 3. Geometric armatures subtypes from Lapa da Galinha.

Subtypes	N	%
Elongated asymmetric segment	2	5.26%
Elongated symmetric segment	1	2.63%
Simple segment	2	5.26%
Asymmetric trapezoid with straight or slightly concave truncations	12	31.59%
Rectangle trapezoid with accentuated concave base	9	23.68%
Rectangle trapezoid with straight or slightly concave truncations	4	10.53%
Symmetric trapezoid with straight or slightly concave truncations	6	15.79%
Scalene triangle	1	2.63%
Isosceles triangle	1	2.63%
<b>Total</b>	<b>38</b>	<b>100.00%</b>

The trapezoids present abrupt-direct retouch and straight truncations. Evidently, the trapezoids that have a concavity base (N=9) are not included in this group. Cross-sections are mainly trapezoidal (N=20; 52%), but the triangular are also significant (N=12; 32%). The heat treatment has been recognized in less than 20%, just like we had established for the blades. The geometric assemblage provided the following mean measurements: 1) Length:  $25.37 \pm 4.36$  mm; 2) Width:  $12.48 \pm 1.86$  mm; 3) Thickness:  $3.01 \pm 0.52$  mm. Considering their maximum and minimum sizes, all geometric armatures could be obtained by the segmentation and use of small blades.

### 3.2.3. Arrowheads

The 85 arrowheads from Lapa da Galinha present a high state of preservation, since we recorded that 68 points (80%) conserved all their measurements and other seven points (8%) were only slightly fragmented, which did not prevent their classification. Flint is dominant (94%) but quartz (5%) and hyaline-quartz (1%) are also represented, as showed in Table 1. There are 74 pieces (87%) with convex or triangular shaped bases and only five pieces (6%) maintained their concave base. We also identified two foliate pieces (2%) and another four (5%), whose morphology was impossible to determine. We were able to observe that the arrowheads from Lapa da Galinha are mainly elongated and thin- we couldn't recognize any short or thick piece (Figure 6). The arrowheads that preserved their longitudinal profiles revealed a predominance for the plano-convex pieces (70%), with a significant number of symmetric profiles (22%). The cross-sections are mainly trapezoidal and biconvex (72%).

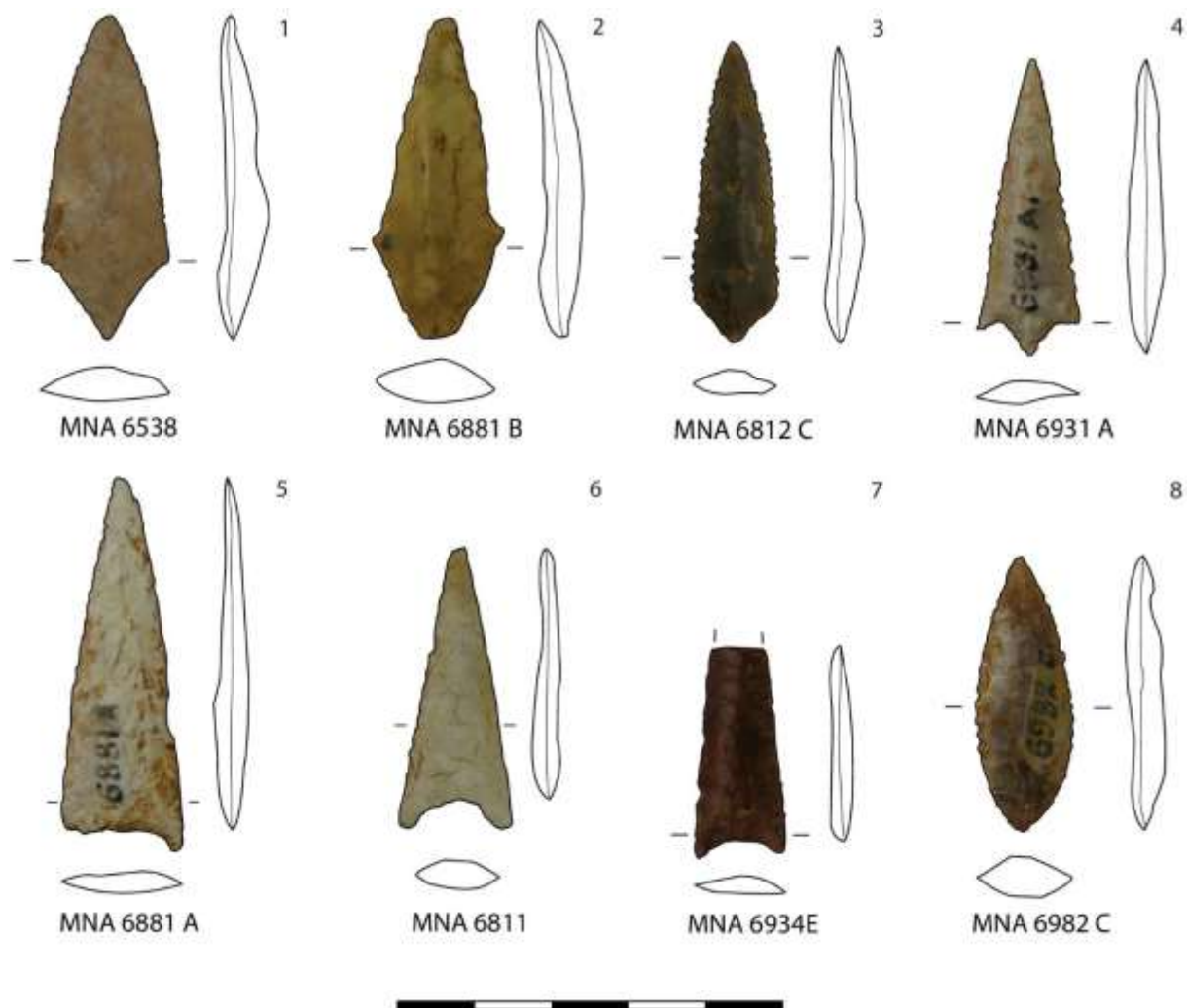


Figure 6. Different morphologies of arrowheads. 1-4: convex or triangular base; 5-7: concave base; 8: foliate. The scale bar is 5 cm long (in 1 cm segments).

They all exhibit bifacial retouch, evidencing some differences regarding its location, extension and angle of retouch. It is generally applied to the full extension of the bifacial artefact, or at least in more than 75% of its surface. Still, it was noted a strong presence of the retouch covering the edges and base in the posterior face of the arrowheads. Heat treatment was applied in 39% of the set, and it produced arrow points with very similar features, like the invasive retouch, which covers most of the artefacts surface. We were able to distinguish

those arrow points that were produced on blades (24%) from those that derived from flakes (4%)- these lower percentages are the consequence of the previous mentioned difficulty.

### 3.2.4. Large bifacial points

The expressive assemblage from Lapa da Galinha is made up by 23 items: there are 14 that are fully preserved (61%) and the rest are fragmented in proximal and distal ends. According to the generical classification, we were only able to categorize four of the large bifacial points: one “halberd”, two “daggers” and one “spearhead”. The discussion concerning the artefacts that don’t fit in the traditional typologies is in the next section. Regarding the “daggers” (MNA 6674 and 6659) are in fact, those items that present the longer length - 158.95 mm and 169.39 mm respectively- and the smaller width, around the 30 mm mark. In fact, these two elongated “daggers” are most likely splendid examples of the “pointed blades” (Gonçalves 2003: 267), which are very similar to the typical large bifacial points, but instead they present a slight curvature on their longitudinal profile, a feature that derives from the blade production sequence (Figure 7). Their unifacial retouch is not fully covering, but is invasive and is present on both lateral edges, not affecting the central areas (Boaventura 2009: 242).



Figure 7- Two “pointed blades”: the similarity between these two items must be highlighted. The scale bar is 5 cm long (in 1 cm segments).

Regarding the surface polishing, it is also clearly inconstant: it is present in nine (39%) of the artefacts and the fraction of polished surface is very irregular. Two distal ends showed a very intensive polished surface, but because of their fragmented state we couldn't establish its extension.

#### 4. Discussion

We suggest that most of the flint used in the production of the studied assemblage has its provenance in regional Cenomanian contexts- the presence of Jurassic flint from the Tomar region, although important, is merely residual. However, the discussion that we present here must be understood as a basis to work on, and not as consummated data, especially because this is an approach based on the procurement sites that are already identified and studied, but mostly due to the scale of the analysis, that requires microscopic confirmation.

According to the data previously presented, we cannot say without doubt, that the blade and bladelet assemblage from Lapa da Galinha is more or less robust, since we have noted an alternation between a set of modest dimensions, that present obvious ripples in the interior faces, probably obtained by indirect percussion (Carvalho & Gibaja 2014: 177), and another set which presents larger measurements that could not be the result of this technique, but instead the product of pressure (Figure 8). However, there are some blades in which is very difficult to assess the technique used to extract the final product, since they present morphological features and metric values that can be the result of both techniques (Carvalho & Gibaja 2005: 376). The fact that we have no access to the cores from which the blades and bladelets were extracted does not allow to develop other kind of considerations. Considering the low percentage of use-wear that was identified, we consider the possibility that most of the blades were not the tools used in the day-to-day life by these communities, but in fact they were artefacts whose production was specially intended for a votive purpose.

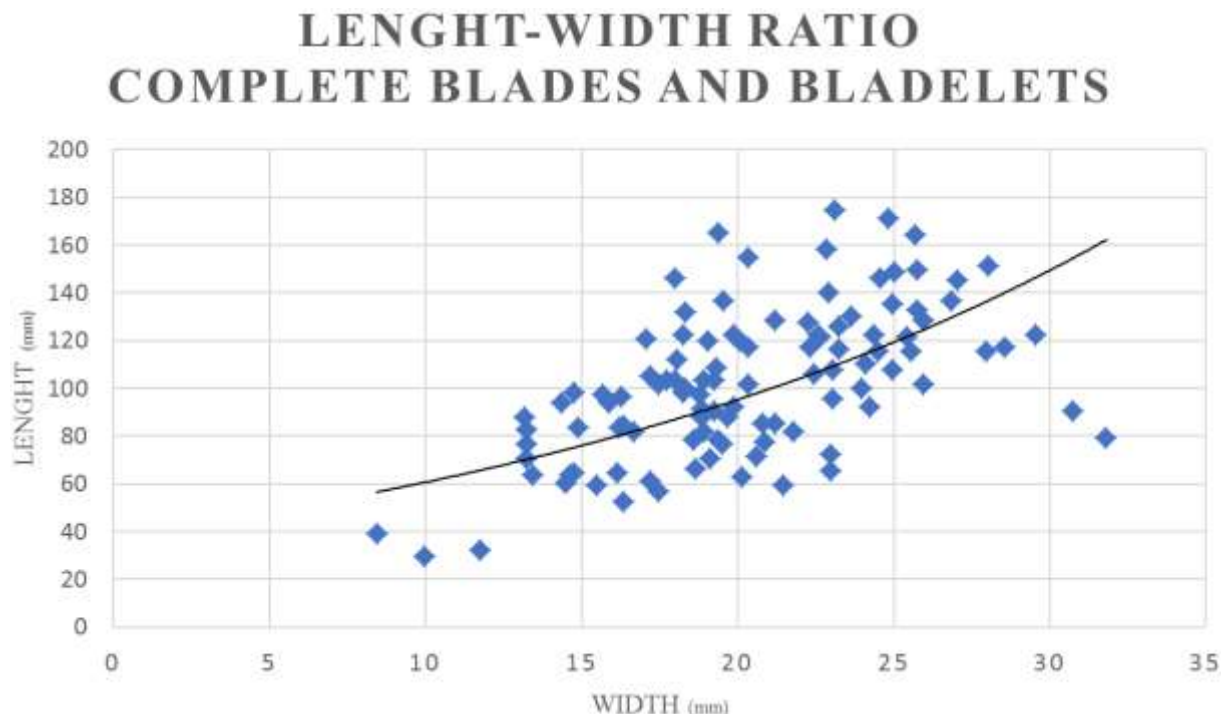


Figure 8. Length to width ratio of the complete blades and bladelets that maintain all their original measurements.

It is interesting to note that the set of bladelets and smaller blades is essentially produced with the flint identified as Type 2, which may suggest a constriction of the raw material. That is to say that, even though the flint nodules of Rio Maior were capable of producing larger blades, these would be more suitable to obtain the smaller blades and bladelets. However, this does not imply that the flint from Caxarias couldn't produce this type of product, because that's not the case- its presence is purely residual. The knapping quality in both areas is widely documented (Forenbaer 1999).

The contrasting features should be related to the fact that, during the Middle and Late Neolithic, these two techniques coexist: in fact, as it had already been noticed: "(...) According to several authors, the morphological features of the products obtained by indirect percussion technique and by pressure technique, tend to overlap." (Carvalho & Gibaja 2005: 376; Portuguese original). However, it should be noted that none of the blades that kept their full length exceeds 17.5 cm, which is an interesting fact, as it clearly demonstrates that none of the analyzed blades was obtained by the lever pressure technique using copper points. This blade extraction technique, in addition to be a good indicator of the Chalcolithic flaked stone industries, produces unique features, such as a standardized blade butt with a sharp dihedron, lengths that surpass 20 cm and widths between 2.2-2.3 cm. (Carvalho & Gibaja 2014: 176; Pellegrin & Machado 2007: 174).

In fact, our observations regarding this assemblage have a chronological meaning that should be highlighted. As Carvalho already noted, on numerous occasions (Carvalho 1996; 2014), the production of larger blades is something that does not emerge abruptly in the archaeological record of the 4<sup>th</sup> and 3<sup>rd</sup> millennium BCE. Morgado and Pelegrin (2012: 224-225) also recognized this enlargement process in the stratigraphic sequence of Andalusia: "*The increasing size of blades becomes obvious in the stratigraphic sequence of the region, as shown in natural caves occupied since the Early Neolithic (...) The increasing size results from the increasing strength applied to the lithics*". This is a process that started from the moment that these elements began to be systematically produced, in the Early Neolithic, as it's the case in some Southern Spanish caves, such as El Toro or Cendres (García Puchol 2009; Rodríguez Rodríguez 2004). The graph that we present, along with the exponential growth line, is very illustrative of this gradual evolution (Figure 8). For this reason, funerary use of Lapa da Galinha must have known a wide diachrony, witnessing the change in the knapping techniques and explaining the reason why geometric armatures, arrowheads and votive plaques all coexist. To advocate for a hiatus in the funerary dynamics is something that could only be confirmed by absolute dating, regarding that it would be an effort that would present serious problems, since the original context has not been preserved.

The presence of crested and sub-crested blades (second generation crested blades) in this funerary assemblage, although not significant (N=6), deserves a special comment. These distinctive blades, associated with the core preparation phase, are also present in other Neolithic and Chalcolithic funerary sites of the Portuguese Estremadura and have been interpreted as an offering to an individual that during his lifetime had practiced the work of a knapper, in what would be an incipient dynamic *specialization of the craft* (Carvalho & Gibaja 2014: 178; Inizan 2002). The six pieces identified are very heterogeneous, both in terms of raw material and their dimensions, so it's not possible to attempt any refitting. Besides presenting a length larger than 10 cm and an irregular cross-section there is little more to be said about these fascinating votive offerings (Figure 9, n°4).



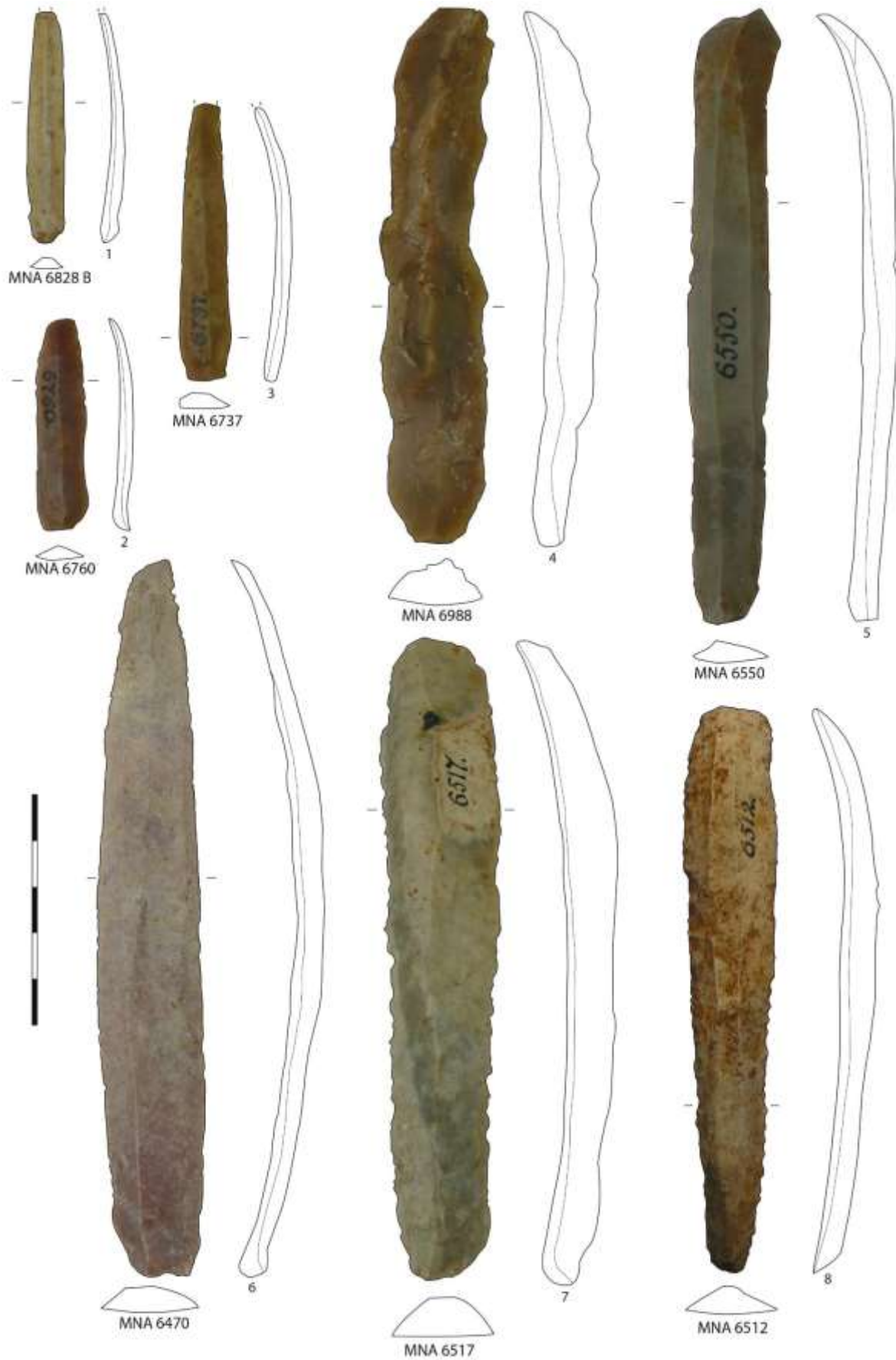


Figure 9. Blades and Bladelets: 1,3,5,6: unretouched; 2,7,8: marginal retouch; 4: crested. The scale bar is 5 cm long (in 1 cm segments).

The morpho-typological features of geometric armatures are absolutely in line with the data that was developed for burial caves (Figure 10): a predominance of trapezoids, more precisely of asymmetric trapezoids with straight or slightly concave truncations; a less important role for segments and even more residual for triangles (Mataloto *et al.* 2017: 114-117). The cave of Poço Velho, Cascais (Gonçalves 2009: 183) has provided really interesting results in this matter: even if it is located outside of the geographical scope of this study, the ELM, the statistical presented by the geometric armatures has direct match with the information presented by Lapa da Galinha- dominance of the asymmetric trapezoids, a notable expression of trapezoids with a round concavity base and an unimpressive number for segments and triangles. It is very interesting to note that the same pattern was documented for the first megalithic tombs in Alentejo (Carvalho 2013: 75). These monuments, with simple architectural structures and an elementary set of votive offerings, are conventionally associated with a first phase of the megalithic phenomenon in the Southwestern Iberia (Rocha 2005), although some authors propose a later chronology for the small orthostatic monuments in the Spanish Extremadura, challenging the traditional linear model (Bueno-Ramírez *et al.* 2004). If one decides to understand these monuments as representatives of an earlier phase, it would be possible to suggest that this funerary practice from Alentejo would have its mirror in the “Cave Megalithism” from Estremadura.

As said before, the presence of geometric armatures with accentuated concave bases is to be noted, since this particular typology has been interpreted as a later component compared to the geometric armatures with straight truncations (Figure 11). That was the case with the geometric armatures from the dolmen of Nossa Senhora da Conceição dos Olivais (Estremoz), where the authors noted that the concave base geometric armatures could be an “*element of transition between the typical geometric armatures and the concave base arrow points*” (Boaventura *et al.* 2014: 218; Portuguese original). In short, the geometric microliths are viewed as the antecessors of the classic arrowheads that characterize the Late Neolithic and most of the Chalcolithic, which eventually will replace the first ones. The type of flint identified with the number 7, is represented only by the traditionally “*older*” elements, such as this, so its plausible to believe that, in fact, the use of this raw material is characteristic of the 4<sup>th</sup> millennium BCE. Based on this postulate we suggest that in the time in which this natural cave was used for funerary purposes, there is a change in the typological concept of this morphological group. This does not necessarily mean a hiatus, instead, it means that the time of occupation of the cave was sufficiently long to record this transformation.

The Bom Santo and Lugar do Canto caves, whose radiocarbon dates point to the Middle Neolithic (Carvalho & Cardoso 2015; Carvalho & Gibaja 2014), present a number of geometric armatures that is similar to the one of Lapa da Galinha - 34 and 35, respectively. Even the morphological aspects, when compared, are very similar: for example, the exception to the rule is the inverse retouch, always residual (Cardoso & Carvalho 2008). In fact, when the metric values of the three funerary sites are compared, we note that the results are statistically identical, so it's plausible to suggest their chronological association.

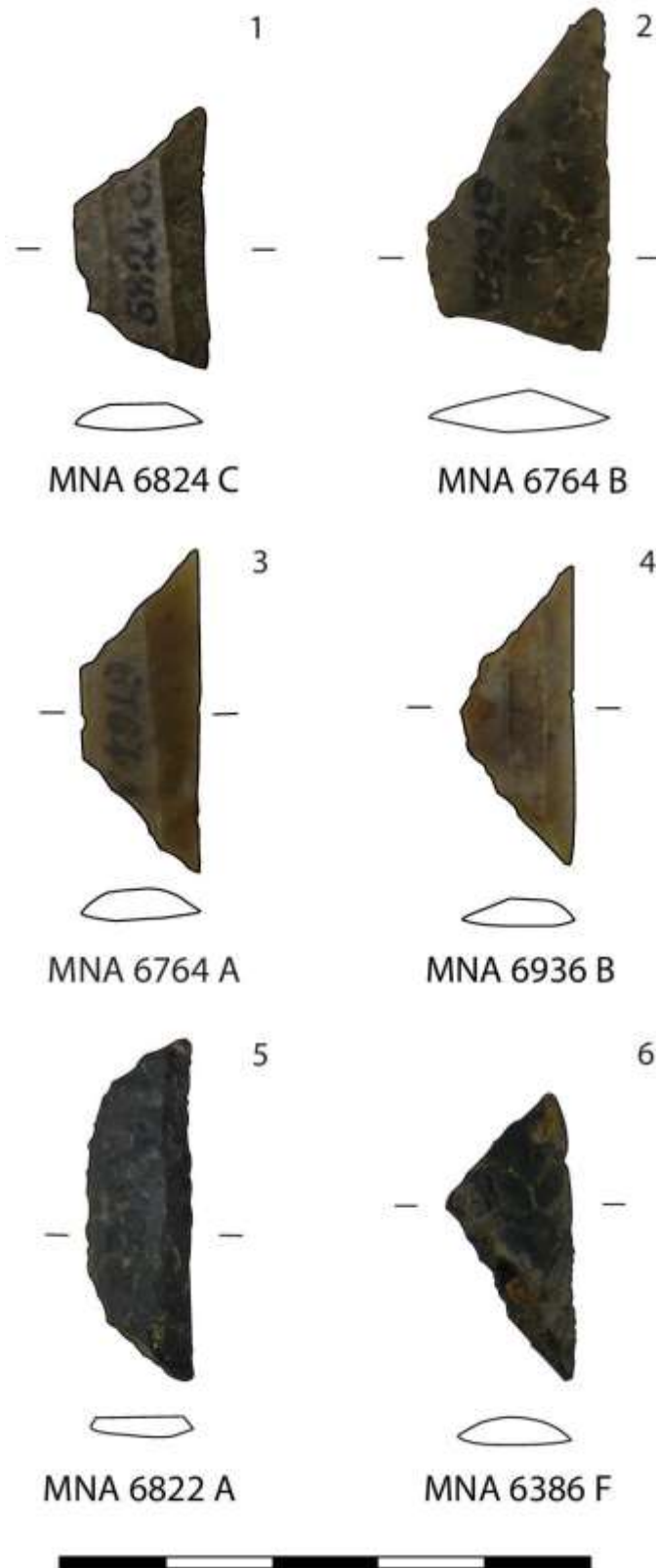


Figure 10. Geometric armatures subtypes. 1-2: Asymmetric trapezoid with straight or slightly concave truncations; 3-4: Symmetric trapezoid with straight or slightly concave truncations; 5: Elongated symmetric segment; 6: Scalene triangle. The scale bar is 5 cm long (in 1 cm segments).

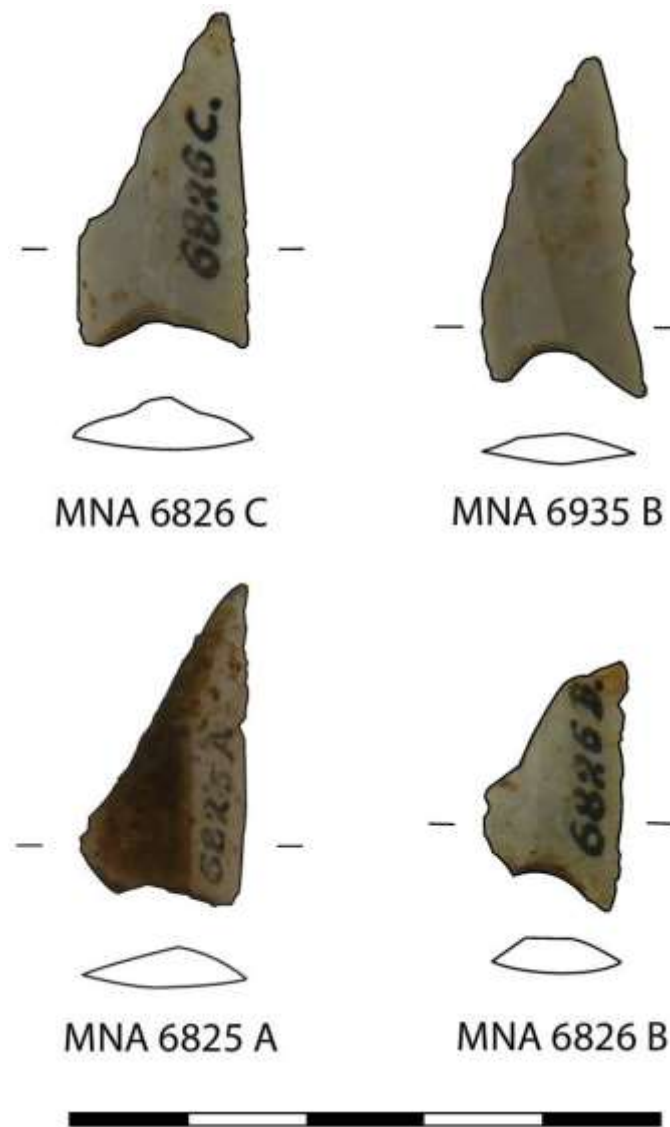


Figure 11. Geometric armatures with accentuated concave base. The scale bar is 5 cm long (in 1 cm segments).

The presence of geometric armatures in funerary contexts dated to the Late Neolithic and Early Chalcolithic, even though they are a minority in relation to older contexts, must not be dismissed and interpreted as a simple remanence of a funerary tradition that ends with the production and circulation of bifacial products, like arrowheads and large bifacial points. As Gonçalves noted, referring to this presence in the archaeological record: “(...) *for the second half of the 4<sup>th</sup> millennium (...) the large geometrics made from blades (and not bladelets) are purely symbolic, one per burial (...)*” (Gonçalves 2009: 495). Just like all the transitioning periods, the disappearing of the geometric microliths and the emergence of arrowheads is involved in a certain discussion, whose meaning is not yet clear. However, we are certain that this was a process which was not abrupt or linear in the region: in fact, geometric armatures are extremely residual, but are present, in settlement areas of the 3<sup>rd</sup> millennium, like in the fortified settlements of Lexim or Zambujal (Sousa 2010: 172). Also, in a recent study that focused on the knapped stone tools from the *tholoi* of South Alentejo (Russo & Sousa 2017), geometric armatures are only present in two monuments (Malha Ferro e Barranco da Nora Velha), and when they are present, their quantitative is always low. The further analysis of this pertinent issue would be a solid base to work on but that is not the goal of this paper.

The arrowheads assemblage clearly shows that the workers who exploited the cave in 1908 weren't selective with the archaeological finds, since we have recorded a very small set of pieces, corresponding to base and mesial fragments. The same could be said about bladelets and blades.

Of the five arrowheads made from quartz and hyaline-quartz, we could only classify the base morphology in three of them- all convex or triangular shaped. However, we were able to note that all the pieces present short bifacial retouch, along the edges and base. Only one case of serrated edges was observed (6906 BIS). Therefore, we couldn't find any morpho-typological differences between the raw materials of arrowheads, as is the case, for example, with the Lapas necropolis (Vagueiro 2016: 45), an artificial cave in Torres Novas, in which all the arrowheads that weren't made with flint, but bone instead, showed a concave base, unlike the general characteristics of the whole set- the convex or triangular shaped arrowheads are clearly dominant. Regarding the concave base arrowheads from Lapa da Galinha, it should be noted that these share the same typological characteristics: symmetric profile, absence of serrated edges and bifacial retouch, which covers the whole anterior surface of the arrow. Although it is possible to advance different raw material sources for this particular set, we have observed that the production process of these concave base points is very homogenous, at least at this stage within the operational sequence.

We reached the conclusion that the degree of bifacial thinning of this artefactual group is very high. The serrated edges, interpreted by Forenbaer (1999: 25) as an attribute intended to maximize the effect of a pierced arrow, are only present in 26% of this assemblage (N=23). The high degree of preservation and the relation between dimensions and weight of some of these artefacts - that would impair their primary function - led us to believe that the production of this assemblage, for the most part, was intended to compose the votive ensemble for the dead, like we had established for the blades and bladelets.

The large bifacial points morphological group, to this day, still requires further analysis in order to establish clear criteria for all researchers. The work of Forenbaer (1999), which intended to suppress the chaos surrounding this morphological group, sought to cover the largest number of artefacts that were available at the time of his study (N=205). Unfortunately, it wasn't possible to produce a typological classification like the case of arrowheads, mostly due to the formal variability that was recognized (Forenbaer 1999). In fact, the current scenario for the large bifacial points is far from desirable, as their treatment consists only in the mere description of technological features, physical dimensions and general morphology: there is no universal consensus between the Portuguese researchers on what a "halberd", a "dagger" or a "spearhead" (Cardoso *et al.* 1996; Sousa 2004). If there are no universal criteria defining the nomenclature and organizing the available information, it is not surprising to observe the multiplicity of designations, which ultimately, disturbs the course of the research. Traditionally, artefacts presenting a wider base are considered "halberds" (Figure 12: 1), while artefacts with a narrow base and a longer body are called "daggers". Artefacts presenting a rounded base and an appreciable length are named "spearheads". The subjectivity and limitation of these concepts are not sufficient to unravel a complex universe that is full of "exceptions".

There are ten large bifacial points whose classification is unclear according to the already mentioned terminology. This means that the Lapa da Galinha assemblage, being the largest set present in funerary contexts of the ELM, would ignore a valuable contribute to the ongoing discussion relative to this unique artefact. The contrast is even greater if we account for the fragments whose base morphology is still possible to determine. Forenbaer's typological table (1999: 91) allows us to consider the morphology of the base and edges, but there is still a considerable number of artefacts that fall into the "intermediate" category, however unclear it may seem. Although we are able to categorize three items (13%) as being

generally rounded, the rest of the set's morphology is highly variable, especially if we consider the morphology of the base, which could be straight, convex, convex rounded and sub-rectangular tongue. There are also two (9%) large bifacial points that can't be assimilated into any group defined by Forenbaer, since they present a morphology that is typical of the arrowheads, with a tangged base. This two (MNA 6511 and 6809) are easily distinguished from arrowheads because of their much larger dimensions (Figure 12: 2 and 4). These features, combined with the shape of the edges, do not allow to integrate in any of the defined typologies, proving once more the urgent necessity to reach a compromise on this artefactual category.

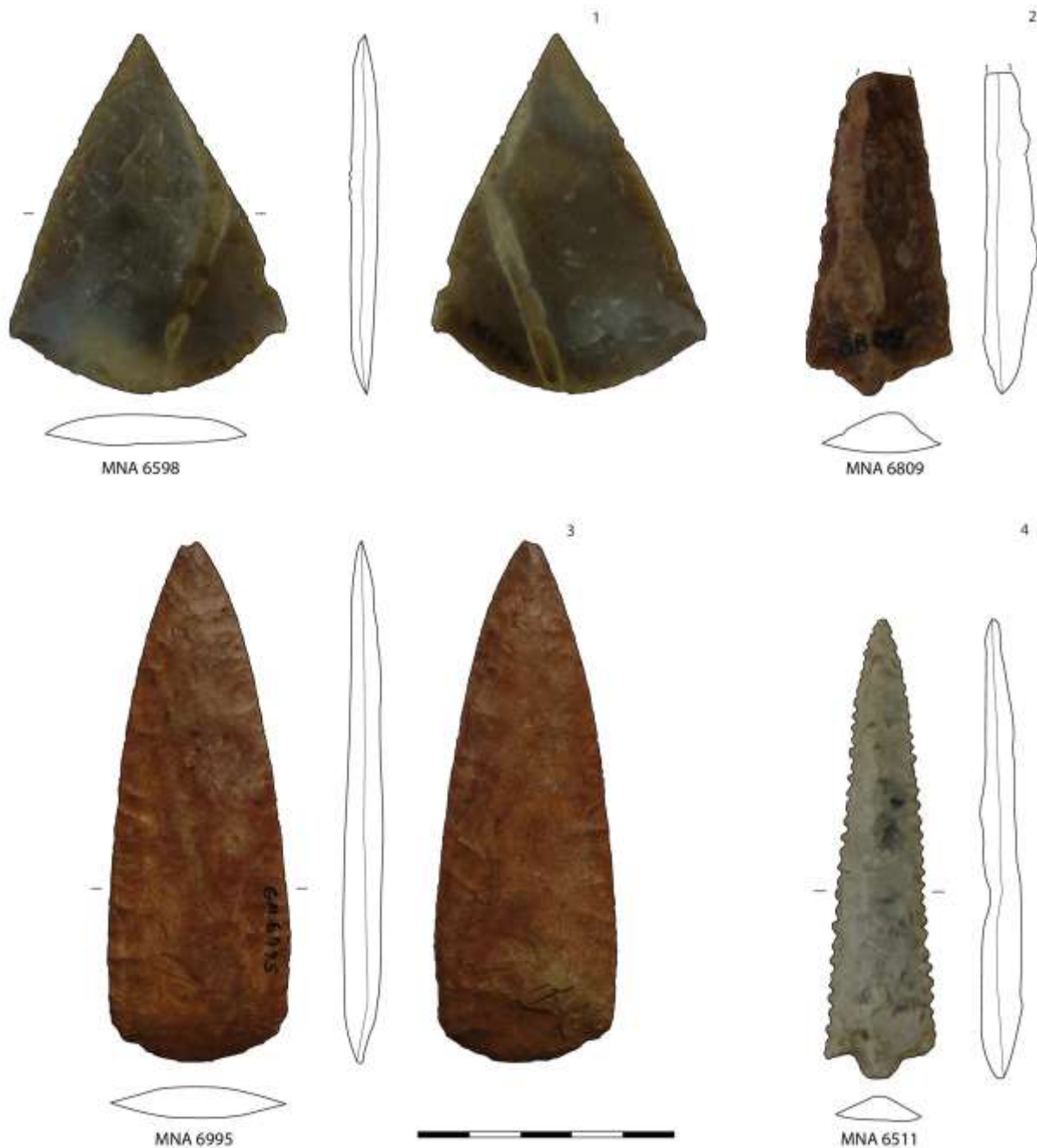


Figure 12. The variability of large bifacial points is evident. 1: “halberd”; 2 and 4: bifacial points that resemble the shape of arrowheads; 3: bifacial point with “rounded” base. The scale bar is 5 cm long (in 1 cm segments).

The fact that the polishing of large bifacial points is inconsistent is very interesting, seeing that this difference may be associated with the kind of final product. That is to say that the wider points, as the “halberds”, tend to be polished to the lateral edges, so the quantity of polishing surpasses the 75% mark. The other items that showed signs of polishing are mainly elongated artefacts and exhibited a less polished surface, in the order of 25-75%. Also, the number of large bifacial points without signs of polishing is very significant: we don't believe that they were artefacts still in production, to be carried out in the settlement area; they are all finished objects that, for some reason, share a funerary space with analogue artefacts, but without a polished surface.

The fact that the “spearhead”, the two “daggers” and the largest specimens within this category are made from the flint of the Caxarias (Ourém) region seems highly suggestive, to the extent that allows us to think about the possibility that this specific geologic environment is capable of providing large chunks of raw material to obtain final products with these large dimensions. In fact, the large bifacial points from Pragais e Buraca da Moura da Rexaldia are also made with this flint (Andrade *et al.* 2010; Sousa 2004).

The large bifacial points assemblage from Lapa da Galinha is a perfect example of the diversity and variability of this truly votive artefact (Figure 12), which, despite being systematically present in other chrono-culturally coeval necropolises, has not received special consideration. The visible votive character of these artefacts, which transmits immediately the idea of investment in its manufacture, allied with the absence of stratigraphic allocation for most of the points, has provoked a certain disorder between those that study this question, in particular as regards the ongoing discussion on the influence and power networks that characterize the Neolithic and Chalcolithic communities, and consequently, on the incipient social distinction that is emphasized during the 3<sup>rd</sup> millennium BCE.

Considering the variability of the funerary practices, visible on both the knapped stone assemblage and the other artefactual categories, we believe that our proposition for the wide diachrony of the funerary use of Lapa da Galinha was fully justified. Even though access to the original context of the excavation wasn't possible, the knapped stone assemblage proved to be fundamental for its chrono-cultural characterization. For instance, the geometric armatures are not so few that they could be considered a mere “survival”, so we should see them as the morphological group which belongs to an older phase of the funerary use of the cave, possibly corresponding to the Middle Neolithic (particularly, mid-4<sup>th</sup> millennium BCE), even though the *glycymeris* bracelets are absent (Zilhão & Carvalho 1996). Certainly, they would be accompanied by an undetermined number of blades and bladelets, although it is difficult to recognize these specific cases. Pointing out those blades and bladelets that present the smallest dimensions and have no traces of retouch as being the oldest ones in the assemblage should not be considered as a valid argument, at least on its own.

About the later phase of the cave's utilization, which we comprise between the last quarter of the 4<sup>th</sup> millennium and the first quarter of the 3<sup>rd</sup> millennium, we can say that the utilization dynamics was much stronger, that the funerary presence of these communities was much more visible in the archaeological record. There are in fact, a number of elements that, when combined, form a well-defined set that is consensually dated to the chronological interval that we are treating here. Evidently, the arrowheads, which will gradually replace the geometrics, and the large bifacial points, that may be the reflection of the increasing social complexity which is accentuated thereafter, are part of this well-defined set. Regardless of the difficulties in assigning a chronology to the assemblage of blades and bladelets, it will be relatively peaceful to integrate the larger flint blades obtained using pressure debitage in the later phase. This set of blades will precede the production of greater blades, highly standardized, typical of the Chalcolithic period (Carvalho 2009).

## 5. Conclusion

We have tried to introduce our perspective on the rituals that took place inside Lapa da Galinha: rituals that suffer transformations and that receive the contribution of new concepts which mutate the reality that is studied by us. This cave-necropolis is perfectly illustrative of the changes that characterize the Megalithic phenomenon, and that was one of the primary goals of this paper- to accentuate and to recall the vitality of the “Cave Megalithism” concept, in which this cave is fully integrated. The abundant assemblage of knapped stone tools, now duly considered, allows us to dwell in the potentiality of this artefactual category to understand the everyday life during the Late Prehistory in this specific region.

The Neolithic and Chalcolithic of the Portuguese Estremadura region, whose research history dates from the 19<sup>th</sup> century, is a world that, in a slow but continuous way, has been characterized in its many strands. Still we know that the sphere of contact between the world of the living and the world of the dead is something that remains hidden to the Portuguese researchers. The dynamics inherent to the research should fill in a lot of the blank spaces regarding the relation between settlement areas and necropolis, flint procurement sites, resource exploitation and the exchange of ideas that portray the complex social and cultural system in which the prehistoric communities are involved. The reevaluation of the votive ensembles excavated in a time where there was no stratigraphic control would greatly benefit from updated and transdisciplinary projects.

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## References

- Andrade, M.A., Maurício, J. & Souto, P. 2010, Contributo para a definição das práticas funerárias neolíticas e calcólicas no Maciço Calcário Estremenho. 1. Estudo morfo-tipológico de duas placas de xisto gravadas provenientes da gruta da Buraca da Moura, da Rexaldia (Chancelaria, Torres Novas). *Nova Augusta*, 22: 241-261. (in Portuguese) (“Contributions to the definition of the Neolithic and Chalcolithic funerary practices in the Estremadura Limestone Massif: Morpho-typological study of two votive plaques from Buraca da Moura, da Rexaldia cave”) URL: <http://hdl.handle.net/10451/31782>
- Andrade, M.A. & van Calker, D. 2019, Contributo para a definição das práticas funerárias neolíticas e calcólicas no Maciço Calcário Estremenho. 3: Um machado votivo de talão perfurado proveniente da gruta da Lapa da Galinha (Vila Moreira, Alcanena, Portugal). *Revista Portuguesa de Arqueologia*, 22: 5-30. (in Portuguese) (“Contributions to the definition of the Neolithic and Chalcolithic funerary practices in the Estremadura Limestone Massif. 3: A votive axe with a perforation from Lapa da Galinha (Vila Moreira, Alcanena, Portugal)”) URL: <https://www.academia.edu/41337951/>



- Aubry, T., Mangado Llach, X., Sampaio, D., Calvo Trias, D., Igreja, M.A., Klaric, L. & Gameiro, C. 2009, Os artefactos: Reconstituição da funcionalidade e da dinâmica de formação dos sítios. Chapter 5. In: *200 séculos da história do Vale do Côa: Incurções na vida quotidiana dos caçadores-recolectores do Paleolítico* (Aubry, T., Ed.), Trabalhos de Arqueologia Vol. 52, Instituto de Gestão do Património Arquitectónico e Arqueológico (IGESPAR), Lisbon: p. 131-339. (in Portuguese) (“The artefacts: Reconstitution of sites’ functionality and formation dynamics”)
- Boaventura, R. 2009, *As antas e o Megalitismo da região de Lisboa*. Ph.D. thesis, Pré-História (Faculdade de Letras), Universidade de Lisboa, Lisbon, 415 p. (in Portuguese) (“Orthostatic monuments and Megalithism in the Lisbon area”)  
URL: <http://hdl.handle.net/10451/587>
- Boaventura, R. 2011, Chronology of Megalithism in south-central Portugal. *Menga. Revista de Prehistoria de Andalucía*, 2(1): 159-190. URL: <http://hdl.handle.net/10451/9718>
- Boaventura, R., Mataloto, R., Andrade, M.A. & Nukushina, D. 2014, Estremoz 7 ou a anta de Nossa Senhora da Conceição dos Olivais (Estremoz, Évora). *O Arqueólogo Português*, 4-5(5th Series): 171-231. (in Portuguese) (“Estremoz 7 or the dolmen of Nossa Senhora da Conceição dos Olivais (Estremoz, Évora)”) URL: <http://hdl.handle.net/10451/31781>
- Bueno-Ramírez, P., Barroso Bermejo, R. & de Balbín Behrmann, R. 2004, Construcciones Megalíticas avanzadas de la cuenca interior del tajo: El núcleo cacereño. *SPAL*, 13: 83-112. (in Spanish) (“Advanced Megalithic constructions of the inner Tagus Basin: The Cáceres group”) doi:10.12795/spal.2004.i13.03
- Cardoso, J.L. 1992, A Lapa do Bugio. *Setúbal Arqueológica*, 9-10: 89-225. (in Portuguese) (“Bugio Cave”)  
URL: [http://maeds.amrs.pt/informacao/setubalarqueologica/setubalarqueologica910/5\\_CARDOSO.pdf](http://maeds.amrs.pt/informacao/setubalarqueologica/setubalarqueologica910/5_CARDOSO.pdf); <http://hdl.handle.net/10400.2/3862>
- Cardoso, J.L. & Carvalho, A.F. 2008, A Gruta do Lugar do Canto (Alcanede) e a sua importância no faseamento do Neolítico no território português. *Estudos Arqueológicos de Oeiras*, 16: 269-300. (in Portuguese) (“The Lugar do Canto Cave (Alcanede) and its importance on phasing the Portuguese Neolithic”)  
URL: <http://hdl.handle.net/10400.2/6045>
- Cardoso, J.L., Ferreira, O.V. & Carreira, J.R. 1996, O espólio arqueológico das grutas naturais da Senhora da Luz (Rio Maior). *Estudos Arqueológicos de Oeiras*, 6: 195-256. (in Portuguese) (“The votive ensemble exhumed in the natural caves of Senhora da Luz (Rio Maior)”) URL: <http://hdl.handle.net/10400.2/4558>
- Carreira, J.R. & Cardoso, J.L. 2001, A gruta da Casa da Moura (Cesareda, Óbidos) e a sua ocupação pós-paleolítica. *Estudos Arqueológicos de Oeiras*, 10(2001-2002): 249-361. (in Portuguese) (“The natural cave of Casa da Moura (Cesareda, Óbidos) and its post-Paleolithic occupation”) URL: <http://hdl.handle.net/10400.2/6050>
- Carvalho, A.F. 1996, O talhe de pedra e a transição Neolítico-Calcolítico e sul de Portugal: Tecnologia e aspetos de organização de produção. *Trabalhos de Arqueologia da EAM*, 3-4(1995-1996): 41-60. (in Portuguese) (“Knapping and the Neolithic-Chalcolithic transition in the South of Portugal: Technology and organizational aspects of production”) URL: <https://www.academia.edu/2085836/>

- Carvalho, A.F. 2009, O final do Neolítico e as origens da produção laminar calcolítica na Estremadura Portuguesa: Os dados da gruta-necrópole do Algar do Bom Santo (Alenquer, Lisboa). In: *Les grans fulles de sílex. Europa al final de la Prehistòria* (Gibaja, J.F., Terradas, X., Palomo, A. & Clop, X., Eds.), Monografies Vol. 13, Museu d'Arqueologia de Catalunya, Barcelona: p. 75-82. (in Portuguese) (“The Late Neolithic and the origins of Chalcolithic blade production in the Portuguese Estremadura: The data from Algar do Bom Santo cave (Alenquer, Lisbon)”)
- Carvalho, A.F. 2013, Estudo do espólio funerário em pedra lascada da necrópole de hipogeus neolíticos de Sobreira de Cima (Vidigueira, Beja). Chapter 5. In: *Sobreira de Cima. Necrópole de hipogeus do Neolítico (Vidigueira, Beja)* (Valera, A.C., Ed.), ERA MONOGRAFICA Vol. 1, Núcleo de Investigação Arqueológica (NIA), Lisbon: p. 71-85. (in Portuguese) (“Study on the flaked stone artefacts from Sobreira de Cima Neolithic hypogea (Vidigueira, Beja)”)
- Carvalho, A.F. 2014, *Bom Santo Cave (Lisbon) and the Middle Neolithic societies of southern Portugal*. Promontoria Monográfica Vol. 17. Faculdade de Ciências Sociais e Humanas da Universidade do Algarve, Faro, 256 p.
- Carvalho, A.F. & Cardoso, J.L. 2015, Insights on the changing dynamics of cemetery use in the neolithic and chalcolithic of southern Portugal: Radiocarbon dating of Lugar do Canto Cave (Santarém). *SPAL*, 24: 35-54. (in English) (“Ideas sobre transformaciones en las dinámicas de utilización de cementerios neolíticos y calcolíticos del sur de Portugal: Las dataciones radiocarbónicas de la cueva de Lugar do Canto (Santarém)”) doi:10.12795/spal.2015i24.02
- Carvalho, A.F. & Gibaja, J.F. 2005, Talhe da pedra no Neolítico Antigo do Maciço Calcáreo Estremenho (Portugal): Matérias-primas, tecnologia e análise funcional. In: *III Congreso del Neolítico en la Península Ibérica* (Arias Cabal, P., Ontañón Peredo, R. & García-Moncó Piñeiro, C., Eds.), Universidad de Cantábria, Santander: p. 373-381. (in Portuguese) (“Early Neolithic knapping in the Estremadura Limestone Massif (Portugal): Raw material, technology and functional analysis”)
- Carvalho, A.F. & Gibaja, J.F. 2014, Knapped stone tools. Chapter 5.2. In: *Bom Santo Cave (Lisbon) and the Middle Neolithic Societies of Southern Portugal* (Carvalho, A.F. & Bicho, N.F., Eds.), Promontoria Monográfica Vol. 17, Faculdade de Ciências Sociais e Humanas da Universidade do Algarve, Faro: p. 173-184.
- Forenbaher, S. 1999, *Production and exchange of bifacial stone artifacts during the Portuguese Chalcolithic*. BAR International Series Vol. 756. British Archaeological Reports, Oxford, 173 p.
- García Puchol, O. 2009, La piedra tallada del neolítico en Cendres (Alicante). In: *La Cova de les Cendres* (Bernabeu Aubán, J. & Molina Balaguer, L., Eds.), Series Mayor Vol. 6, Museo Arqueologico de Alicante (MARQ), Alicante: p. 85-104. (in Spanish) (“The Neolithic flaked stone assemblage in Cendres cave (Alicante)”)
- Gonçalves, V.S. 1978, *A neolitização e o Megalitismo da região de Alcobça*. Secretaria de Estado da Cultura, Lisbon, 80 p. (in Portuguese) (“The Neolithic process and Megalithism in the region of Alcobça”)
- Gonçalves, V.S. 1978, Para um programa de estudo do Neolítico em Portugal. *Zephyrus*, 28-29: 147-162. (in Portuguese) (“For a Neolithic study program in Portugal”) URL: <http://revistas.usal.es/index.php/0514-7336/article/view/616>

- Gonçalves, V.S. 1989, *Megalitismo e metalurgia no Alto Algarve oriental. Vol. 1*. Unidade de Arqueologia do Centro de História da Universidade de Lisboa (UNIARCH), Lisbon, 566 p. (in Portuguese) (“Megalithism and metallurgy in the northeastern region of Algarve”)
- Gonçalves, V.S. 2003, *Sítios, “horizontes” e artefactos: Leituras críticas de realidades perdidas. Estudos sobre o 3º milénio no centro e sul de Portugal* (2 ed.). Câmara Municipal, Cascais, 380 p. (in Portuguese) (“Sites, horizons and artefacts: Critical readings of lost realities. The third millenium in center and south Portugal”)
- Gonçalves, V.S. 2009, *As ocupações pré-históricas das Furnas do Poço Velho (Cascais)*. Cascais, tempos antigos Vol. 3. Câmara Municipal, Cascais, 590 p. (in Portuguese) (“The prehistoric occupation in Poço Velho cave”)
- Gonçalves, V.S., Andrade, M.A. & Pereira, A. 2014, As placas votivas (e o báculo) da lapa da Galinha, na primeira metade do 3.º milénio a.n.e. *Estudos Arqueológicos de Oeiras*, 21: 109-158. (in Portuguese) (“The votive plaques (and the cross) from Lapa da Galinha, in the first half of the third millennium BCE”) URL: <http://hdl.handle.net/10451/31455>
- Inizan, M.L. 2002, Tailler des roches par pression: Émergence d'une technique, étapes de sa diffusion dans le monde. In: *Matériaux, productions, circulations du Néolithique à L'Âge du Bronze* (Guilaine, J., Ed.), Errance, Paris: p. 33-46. (in French) (“Pressure knapping: Emergence of a technique, stages of its diffusion around the world”)
- Inizan, M.L., Reduron, M., Roche, H. & Tixier, J. 1995, *Technologie de la pierre taillée*. Préhistoire de la Pierre Taillée Vol. 4. Cercle de Recherches et d'Études Préhistoriques, Meudon, 189 p. (in French) (“Flaked stone technology”)
- Mataloto, R., Andrade, M.A. & Pereira, A. 2017, O Megalitismo das pequenas antas: Novos dados para um velho problema. *Estudos Arqueológicos de Oeiras*, 23(2016-1017): 33-156. (in Portuguese) (“The Megalithism of small dolmens: New data to an old problem”) URL: <http://hdl.handle.net/10451/27902>
- Matias, H. 2012, *O aprovisionamento de matérias-primas líticas na Gruta da Oliveira (Torres Novas)*. (Geoarqueologia) Master's thesis, Departamento de Geologia, Faculdade de Ciências, Universidade de Lisboa, Lisbon, 133 p. (in Portuguese) (“Lithic raw material sourcing from Gruta da Oliveira (Torres Novas)”) URL: <http://hdl.handle.net/10451/8207>
- Morgado, A. & Pelegrin, J. 2012, Origin and development of pressure blade production in the southern Iberian Peninsula (6th–3rd millennia B.C.). Chapter 8. In: *The emergence of pressure blade making: From origin to modern experimentation* (Desrosiers, P.M., Ed.), Springer, London: p. 219-235. doi:10.1007/978-1-4614-2003-3-8
- Pelegrin, J. & Morgado, A. 2007, Primeras experimentaciones sobre la producción laminar del Neolítico reciente - Edad del Cobre del sur de la Península Ibérica. In: *Arqueología experimental en la Península Ibérica. Investigación, didáctica y patrimonio*. (Ramos Sáinz, M.L., Gonzalez Urquijo, J.E. & Baena Preysler, J., Eds.), Asociación Española de Arqueología Experimental, Santander: p. 131-139. (in Spanish) (“First experiences on the blade production of the Late Neolithic-Chalcolithic in the Iberian Peninsula”)
- Rocha, L. 2005, *Estudo do Megalitismo funerário no Alentejo central: A contribuição de Manuel Heleno*. Ph.D. thesis, Arqueologia, Faculdade de Letras da Universidade de Lisboa, Lisbon, 307 p. (in Portuguese) (“Funerary Megalithism in central Alentejo: The contribution of Manuel Heleno”) URL: <http://hdl.handle.net/10174/2237>

- Rodríguez Rodríguez, A.C. 2004, Análisis funcional de los instrumentos líticos tallados. Chapter 7. In: *La Cueva de El Toro (Sierra de El Torcal-Antequera-Málaga). Un modelo de Ocupación Ganadera en el Territorio Andaluz entre el VI y II Milenios A.N.E* (Martín-Socas, D., Camalich-Massieu, M.D. & González Quintero, P., Eds.), Monografías: Arqueología Vol. 21, Junta de Andalucía; Consejería de Cultura, Seville: p. 135-160. (in Spanish) (“Functional analysis of knapped stone tools”)
- Russo, R. & Sousa, A.C. 2017, A pedra lascada nos tholoi do Baixo Alentejo interior: Notas preliminares de casos de estudo. In: *Arqueologia em Portugal: 2017 - Estado da Questão* (Arnaud, J.M. & Martins, A., Eds.), Associação dos Arqueólogos Portugueses, Lisbon: p. 705-722. (in Portuguese) (“Knapped stone tools in the tholoi of the South Alentejo: Preliminary notes on case studies”)
- Sá, M.C. 1959, A Lapa da Galinha. In: *Atas e Memórias do 1º Congresso Nacional de Arqueologia* Vol. 1, Instituto da Alta Cultura, Lisboa: p. 117-128. (in Portuguese) (“The Galinha cave”)
- Serrão, E.C. & Marques, G. 1971, Estrato pré-campaniforme da Lapa do Fumo (Sesimbra). In: *Actas e Memórias do II Congresso Nacional de Arqueologia* Vol. 1, Ministério da Educação Nacional, Coimbra: p. 121-142. (in Portuguese) (“Pre-Beaker occupation in Lapa do Fumo (Sesimbra)”)
- Sousa, A.C. 2004, A necrópole do Neolítico final de Pragais: Velhos dados, novas leituras. In: *Arqueologia: Coleções de Francisco Tavares Proença Júnior* (Ferreira, A.M., Ed.), Instituto Português de Museus, Castelo Branco: p. 90-111. (in Portuguese) (“The Late Neolithic necropolis of Pragais: Old data, new readings”) doi:10.13140/2.1.1153.6966
- Sousa, A.C. 2010, *O Penedo do Lexim e a sequência do Neolítico Final e Calcolítico da península de Lisboa*. Ph.D. thesis, História, Faculdade de Letras, Universidade de Lisboa, Lisbon, 353 p. (in Portuguese) (“Penedo do Lexim and the Late Neolithic and Chalcolithic sequence of the Lisbon Peninsula”) URL: <http://hdl.handle.net/10451/3480>
- Vagueiro, C. 2016, *A gruta artificial das Lapas (Torres Novas): Contributo para o conhecimento das práticas funerárias dos 4º e 3º milénios a.n.e. na Estremadura Portuguesa*. Master's thesis, Arqueologia, Faculdade de Letras da Universidade de Lisboa, Lisbon, 137 p. (in Portuguese) (“Lapas artificial cave (Torres Novas): Contribution to the knowledge of the funerary practices during the 4th and 3rd millenniums BCE in the Portuguese Estremadura”) URL: <http://hdl.handle.net/10451/26013>
- Weiss-Krejci, E. 2012, Shedding light on dark places: Deposition of the dead in caves and cave-like features in Neolithic and Copper Age Iberia. Chapter 9. In: *Caves in context: The cultural significance of caves and rockshelters in Europe* (Bergsvik, K.A. & Skeates, R., Eds.), Oxbow Books, Oxford: p. 118-137. doi:10.2307/j.ctvh1djk4.13
- Zilhão, J. 1992, *Gruta do Caldeirão: O Neolítico Antigo*. Trabalhos de Arqueologia Vol. 6. Instituto Português do Património Arquitectónico e Arqueológico (IPPAR), Lisboa, 326 p. (in Portuguese) (“Caldeirão Cave: The Early Neolithic”)
- Zilhão, J. & Carvalho, A.F. 1996, O Neolítico do Maciço Calcário Estremenho: Crono-estratigrafia e povoamento. In: *Congrès del Neolític a la Península Ibèrica* Vol. 2 (Gavà, M.d., Ed.) Vol. 1, Rubricatum, Gavà: p. 659-671. (in Portuguese) (“Neolithic in the Estremadura Limestone Massif: Chrono-stratigraphy and settlement”)