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Colour in Iberian Iron Age architectural sculpture: the case of Cerro de la Merced

A cor na escultura arquitetónica da Idade do Ferro Ibérica: o caso do Cerro de la Merced

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Abstract

Recently, analytical research has confirmed the use of pigments in Iberian Iron Age freestanding sculpture. However, hard evidence of polychromy on the many preserved remains of architectural sculpture is still scarce. We focus on the case of a large block decorated with reliefs, probably dated to the end of the 5th or the beginning of the 4th century BCE, recently found at Cerro de la Merced (Cabra, Córdoba). Employing optical and electron microscopy analyses, FTIR spectroscopy, and GC-MS, it has been possible to confirm the existence of traces of red and white colour covering the entire surface, analyse the composition of the pigments employed, and to reconstruct the colour patterns of the different elements of the relief. Our aim is to deepen our understanding of the use of colour in Iberian architecture and to shed light on the colours employed, the techniques used to apply them and their arrangement patterns.

KEYWORDS
Iberian Iron Age
Monumental architecture
Iconography
Pigments
Reliefs

Resumo

Recentemente, investigações analíticas confirmaram a utilização de pigmentos na escultura autoportante da Idade do Ferro Ibérica. No entanto, as provas concretas de policromia nos muitos vestígios preservados de escultura arquitetónica, são ainda escassas. Centramo-nos no caso de um grande bloco decorado com relevos, provavelmente datado de finais do século V ou inícios do século IV AEC, recentemente encontrado no Cerro de la Merced (Cabra, Córdova). Através de análises de microscopia óptica e electrónica, espectroscopia FTIR e GC-MS, foi possível confirmar a existência de vestígios de cores vermelha e branca em toda a superfície, analisar a composição dos pigmentos utilizados e reconstruir os padrões de cor dos diferentes elementos do relevo. O nosso objetivo é aprofundar o conhecimento sobre a utilização da cor na arquitetura Ibérica e esclarecer as cores utilizadas, as técnicas de aplicação e a organização dos seus padrões.

PALAVRAS-CHAVE
Idade do Ferro Ibérica
Arquitetura monumental
Iconografia
Pigmentos
Relevos

Introduction

True colours

Although known or suspected for a long time (in Spain ever since early colourized pictures of the *Dama de Elche* were published very early in the twentieth century [1-2]), the systematic use of paint to highlight, emphasize or create details and volumes in ancient Mediterranean sculpture, be it stone or terracotta, Greek or Italic, has only recently been studied in detail [3-9]. The sculpture of the Iberian Iron Age Culture is not an exception to this rule, and recent research has shown its complexity, as in the case of *Dama de Baza* and many other examples dated between the early fifth and the first centuries BCE [10-17]. Red is the predominant colour, but true polychromy has also been documented, although in many cases only faint traces of pigment, almost invisible to the naked eye, have been discovered. Negative analysis results on other sculptures, discovered a century ago or more, and which suffered abusive cleaning, are not real proof of absence of painting in origin [17].

The act of painting a sculpture (or relief) was not merely for aesthetic effect, but rather a very important and necessary step for its completion. Sculpture lacking polychromy lacked "soul" and was incomplete; sculpted architectural elements were deprived of an emphasis on their syntax. Any sculpture to be exhibited in a public or private context had to be adequately painted, sometimes with a very high degree of complexity. As many recent works and exhibitions have proved beyond doubt, the ancient world was a world of colour and pigments.

Painting in Iberian sculpture could be quite plain, simply colouring ample surfaces in red, such as the caprine in the early *Porcuna* reliefs or the *Salobral Sphinx*. But it could also add relevant information such as the male lions' mane in a feline from Elche; or depicted textile detail (*Osuna*, *Dama of Baza* and *Baza Warrior*), sometimes emphasizing the guides provided by almost invisible incised lines, or subtle raised detail [15-17].

It is understandable that this branch of research has traditionally focused on zoomorphic and antropomorphic scultpture, rather than on more modest architectural elements carved with phytomorphic and/or geometric motifs in relief [18], and this is particularly evident in the Iberian Peninsula. However, our recent discovery of heavily decorated constructive blocks in archaeological context at Cerro de la Merced, combined with the recent studies on this type of reliefs [19] has given additional impulse to these studies, including their original colours.

The Iberian Iron Age complex at Cerro de la Merced (Córdoba)

Cerro de la Merced is an archaeological site located on a hilltop 4 km due east from modern Cabra (Córdoba). Cabra has been reliably identified as the ancient Iberian *oppidum* of *Licabrum* and later Roman *Municipium* of *Igabrum* [20]. The small, rounded conical hill lies squarely across the ancient and modern road linking the fertile *Campiña* plains to the east (Cabra, Lucena) and the hilly *Subbéticas* to the west, via the "El Mojón" pass. Although surrounded by higher mountains, particularly to the southeast, is isolated and clearly visible from the surrounding areas, its profile silhouetted against the sky. Any structure built in the hilltop was not meant to act as a watchtower, but on the contrary, it was designed to be seen from afar, as a territorial and symbolic marker [21] (Figure 1).

Site occupation dates back to the Neolithic period, but most preserved archaeological evidence corresponds to the Second Iron Age or "Iberian Culture". Excavations carried out since 2013 by our research group have proved that the remains do not correspond to a watchtower or Late Iberian small fortified enclosure as initial information and remains suggested [22], but rather to a monumental architectural complex with two main phases in the Second Iron Age, with further work currently in progress [23-26].

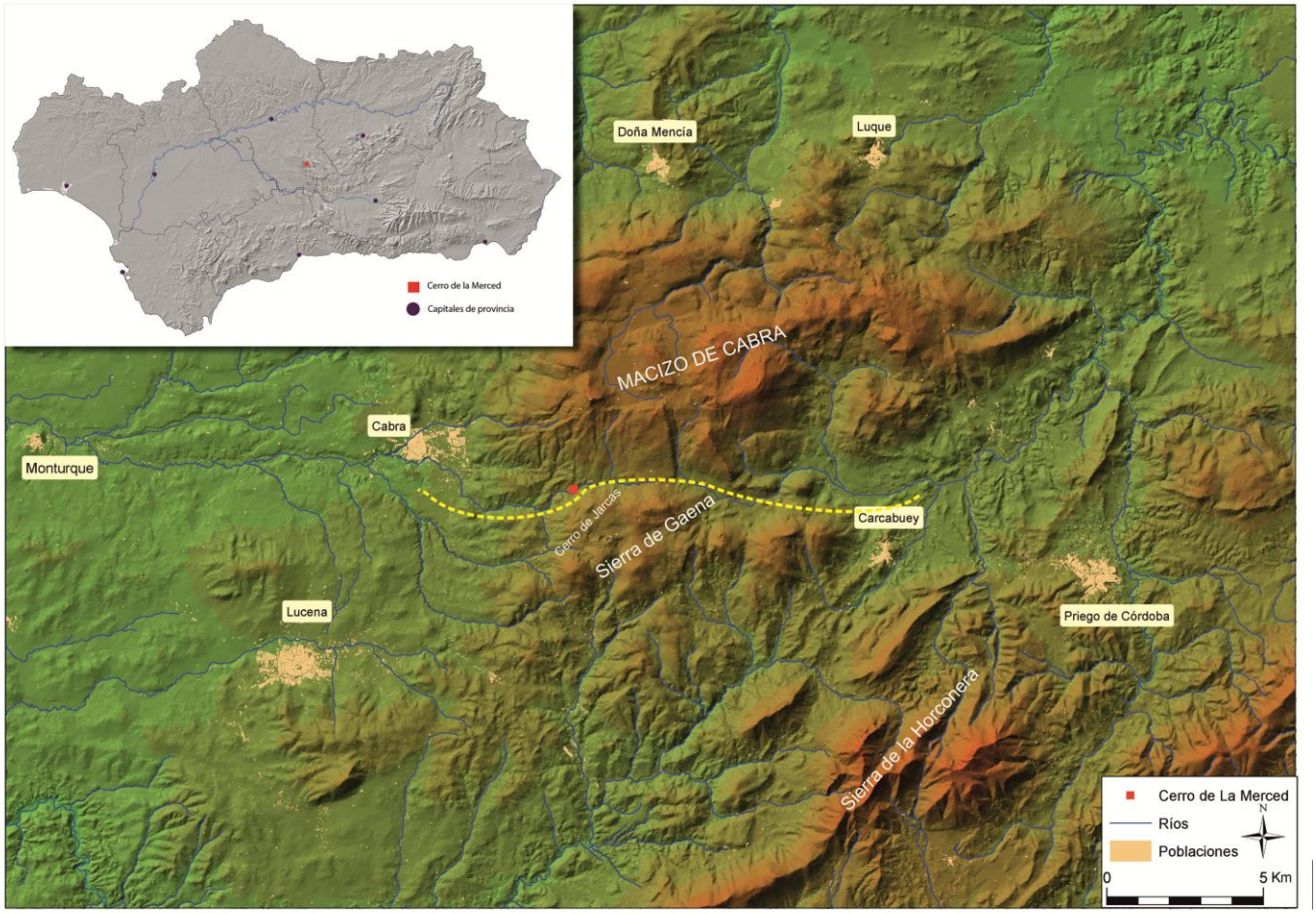

Figure 1. Location of Cerro de la Merced in Central Andalusia (Cabra, Province Córdoba). Cartography: F. Quesada and M. Camacho.

The first phase (provisionally "Building A") dates to the late fifth century BCE and the first half of the fourth century BCE, a dating supported both by the presence of Attic pottery imports and 14C dating. It is square, 14 metres on each side, one-storey building, well aligned with the cardinal points, its single entrance facing East. It led to a big open-air courtyard paved with large stone slabs and, at the other end, three large rooms, the central one almost double the size of the lateral ones. The basic layout of this edifice has parallels in sanctuaries of the Late Orientalizing period in the south-western part of the Peninsula. To the south, close to the building, an ashlar stone monument was erected, decorated with reliefs and a plain cavetto cornice of Phoenician-Punic tradition and Egyptian origin as the so-called "Egyptian gorge moulding". It is probable that this monument had a commemorative purpose, and was connected to Building A.

In the mid-fourth century BCE, a major reform took place. A larger, more complex edifice was built ("Building B") using "A" as a base. The open courtyard was divided into four rooms (one of them a lightwell), the perimeter wall was massively reinforced with cyclopean-type masonry up to four metres wide, and a second floor was added. The result was a massive two-storey, 20 metres square edifice with still just one entrance to the east. Around this new building substantial retaining walls were built against the hillside (proven archaeologically at least to north and south), using the same cyclopean masonry; these terracing efforts created a wide platform around Building B where ancillary structures were erected. In the southern side, a staircase made of large stone slabs, overlooked by a "small porter's lodge" or "guardroom", linked the lower access with the main entrance of Building B (Figure 2). We interpret these series of terracing walls, smaller buildings, stone staircase and massive edifice as an Iberian aristocratic complex that functioned as such until the late third or early second century BCE, when it was sacked, demolished and ceased to function as a centre of local or regional power [25, 27].

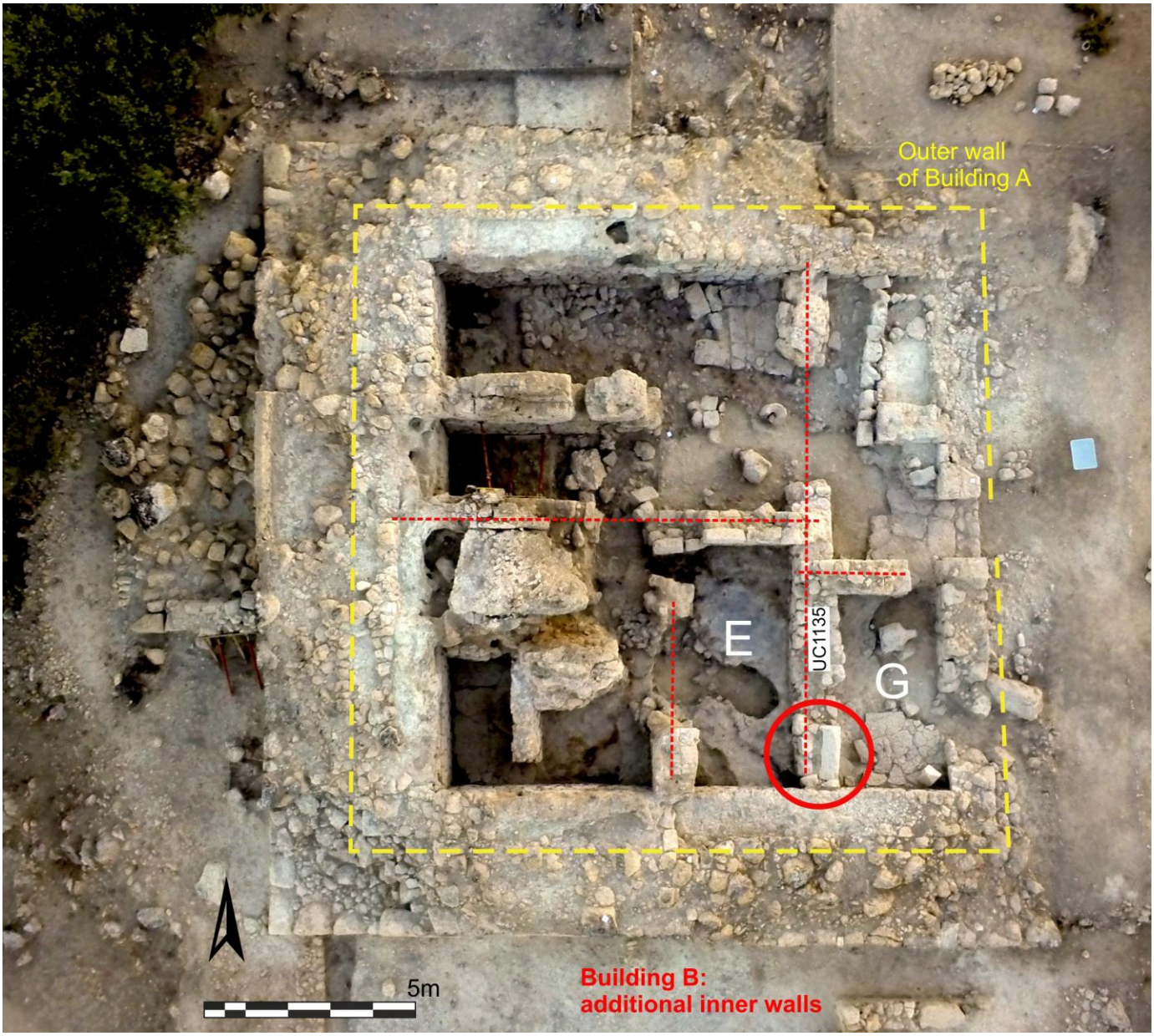

Figure 2. Cerro de la Merced, main building as of 2015. Location of reused relief block marked within red circle (photo: D. Gaspar and F. Quesada).

Reused ashlar blocks with relief decoration

During the construction of Building B a number of blocks from the earlier decorated monument were reused in the new walls. Some of them, such as the large blocks of the cavetto or "Egyptian" cornice were just fitted as they were into the masonry structures. In some other cases the ornaments from the relief frieze were chiselled away *in situ* to create smoother, flat surfaces to ensure a better fit in the new walls both mutilated blocks and stone relief chips from volutes and ionic eggs and darts have been excavated (Figure 3). These chips, originally abandoned among the construction debris and probably left on the surface of the ground for a long time show no traces of pigment.

Finally, at least one 163 × 45 cm, 480 kg calcarenite block, in which some chiselled elements and one end were missing from the original carved ashlar (inventory nr. 5219) was reused as part of wall (UC1135 – Unidad Constructiva 1135). On its main concave moulding, densely intertwined vegetal ribbons or taeniae are framed between prominent volutes in high relief that stand out and project outward; at the bottom we find a partly chiselled Ionic cyma with egg and dart motifs carved in an inverted position when compared to with canonical Greek art. This kind of interpretation of Classical motifs is typical of Iberian art.

Figure 3. Reused and chiselled blocks: *a)* room G looking S-SW, main calcarenite block inv. Nr. 5219 is marked with an arrow, still forming part of wall UC1135; *b)* from the same room, a block showing the chiselling marks; *c)* stone chip with traces of a band or taenia, probably part of the block to the left (photos: F. Quesada).

This piece is particularly relevant because it is one of the extremely rare examples of this kind of decoration found in a controlled archaeological excavation. As it was recycled in the above-mentioned wall, it has to be dated between c. 450 and 350 BCE, and not in the Late Iberian period as has been sometimes assumed for these motifs (Figure 4a). Based on typological and stylistic criteria, such as the presence of Ionic egg and dart motifs, it is possible to tentatively place it in the later part of fifth century BCE. We are not certain about the exact type of building to which it belonged, although given its dimensions and its probable relationship with the Egyptian gorge moulding blocks, it most probably belonged to the monument mentioned above, a tower-shaped with a square plan.

Figure 4. The block: *a) in situ* after removing the interior mud and gravel filling (photo: F. Quesada); *b)* location of pigment samples (photo: F. Quesada and A. Moreno).

The block had been inserted as part of wall UC1135, its plain back facing outside and thus its reliefs facing inside and protected with a mud fill. This is probably the reason why the decorated side showed on discovery very faint traces of colour, that we have analysed in meticulous detail.

Sampling and techniques

Our research group sought the collaboration of ARTYCO, a specialized Heritage Research & Conservation company that has also conducted this kind of studies for the MAN (Spanish National Archaeological Museum in Madrid) among other Institutions. Following a careful visual examination, three different paint samples were taken: two of them (YAM-1 and YAM-2), which appeared to be red in colour, were taken from the interior of the volutes, where the polychromy was best preserved. A third sample (YAM-3) that appeared to be whitish, was taken from the bottom part of the decorated surface (Figure 4b).

Four complementary analytical techniques have been employed in the study of polychromy: optical microscopy (OM); Fourier transform infrared spectroscopy (FTIR); scanning electron microscopy /energy dispersive X-ray analysis (SEM-EDS); and gas-phase chromatography coupled to mass spectrometry (GC-MS) [28-29]. All help to determine the existence or absence of polychromy, to identify the inorganic and organic materials components of the paint, and the application method. This study is, to date, the most detailed study conducted on the polychromy of an element of Iberian Iron Age architecture. In this paper we are presenting a brief synthesis of the main data obtained and interpretative results [28].

Results and discussion

The first relevant observed result is that the three samples show what can be interpreted as a preparatory layer preceding the application of paint. The composition of the layers in the three samples is summarized in Table 1. In all three samples, a thick preparatory coat (Layer 1) is visible (Figure 5, Table 1). It is composed of a heterogeneous white-brownish lime mortar, with abundant calcite and smaller amounts of quartz and silicate minerals, the remaining elements being saline impurities, probably due to the nature of the surrounding soil in which the block was buried. The use of preparation layers has been also documented elsewhere, for example the sphinx from El Salobral (Albacete) [30].

The second layer corresponds to the paint layers, which show two different compositions and colours. YAM-1 and YAM-2 show red paint, applied as a very thin coat of a mixture of red ochre and some calcite. This is similar to other documented Iberian Culture polychrome examples, such as the *Dama de Elche*, where these ochers are mixed with gypsum and intensified with vermilion to enhance the mouth of the figure [1]. However, with attention to our case study, we should remind that gypsum is different from calcite and, despite the significant amount of calcite found here, a reflection of the use of calcite is needed. Calcite could have been used as the binder (*vide supra*), as a filler or, as we suggested before, as a pigment in order to lighten the red. Cinnabar, also used for red in Iberian sculpture [1-2], is absent in our block.

In contrast, YAM-3 has a very thin and irregular brownish layer over a much thicker white layer, calcite-rich with traces of gypsum, probably part of a white paint layer.

Table 1. Composition of samples.

Sample	Layer	Colour	Thickness (μ)	Minerals (bold - main components; light - traces)	Organic substances
YAM-1	1	White-brownish	1500	**calcite**, **quartz**, **clays**, **micas**, iron oxides, dolomite, gypsum, chlorides, calcium phosphate, borates, oxalates	Acid metabolites Fatty acids
	2	Red (Paint)	0-40	**iron oxides** (red ochre), **calcite**, dolomite, gypsum, calcium phosphate, borates, oxalates	
YAM-2	1	White-brownish	2000	**calcite**, **quartz**, **clays**, **micas**, iron oxides, dolomite, gypsum, chlorides, calcium phosphate, borates, oxalates	Acid metabolites Fatty acids
	2	Red	0-40	**iron oxides** (red ochre), **calcite**, dolomite, gypsum, calcium phosphate, borates, oxalates	
YAM-3	1	White-brownish	200	**calcite**, **quartz**, **clays**, **micas**, iron oxides, dolomite, gypsum, chlorides, calcium phosphate, borates, oxalates	Acid metabolites Fatty acids
	2	White	60	**calcite**, **quartz**, **clays**, **micas**, dolomite, gypsum, chlorides, calcium phosphate, borates, oxalates	
	3	Brown	0-20	**iron oxides** (red ochre), **calcite**, dolomite, gypsum, calcium phosphate, borates, oxalates	

The binders used in this case could be either the lime (or limewash) mixed with the pigment (as suggested by the presence of calcite on the paint layer) [28-29] or even organic binders. The latter is suggested by the presence of fatty acids and metabolites that appear in all samples. However, further investigation is required regarding these results, as these fatty acids could be also a result of a latter addition.

Figure 5. Microphotographs (300×) of the layers analysed in each samples: *a)* YAM-1; *b)* YAM-2; *c)* YAM-3 (photos: E. Parra Crego).

Apart from the brownish layer document in YAM-3 sample that needs to be further addressed to determine whether it is a layer of contamination or original pigment, these data indicate the existence of two different coloured paints on the piece: red and white. This is consistent with the location of the samples YAM-1 and YAM-2 (red) (Figure 5a-b) were taken from the main frieze, in the interstices between the ribbons and the volutes, while YAM-3 (white) (Figure 5c) belongs to the lower part, close to the ovolo moulding with eggs and darts in the shape of an inverted Ionic cyma. The identical lower preparation layer in the three samples is also consistent. This suggests a pattern for a tentative bichrome polychromy: the relief-carved elements (bands/ribbons and volutes) were originally painted red, while the background on which these motifs appear would be white. This probably also applies to the Ionic egg and dart motifs in the lower part, where no samples were taken, but where traces of red pigment can still be observed with the naked eye.

This red/white bichrome pattern is a simple but quite effective colour combination, that helps to enhance the carved parts of the piece, its syntax. We must also consider that this is only one block of a larger building where, perhaps, other colours were applied, resulting in compositions with a richer polychromy.

Red, in fact, seems the predominant colour in Iberian sculpture [1-2,10-14] sometimes covering entire surfaces and in certain cases red paint on volutes has been observed in architectural reliefs, such as in a capital from Cástulo [31]. This was probably not just an aesthetic decision, and long-ago researchers such as R. Ramos [32] or J. Blánquez [33] drew attention to this choice and sought a symbolic explanation for the predominance of this colour (Figure 6). Considering that many of the architectural pieces close to the one discussed here were part of funerary or commemorative monuments, it would not be surprising that red held a special symbolism related to ritual or sacred contexts, to the world of deities and/or the afterlife. Only further research and analysis will allow for a more in-depth examination and explanation. Other recent works, however, while accepting the symbolic nature of colour, do not place particular emphasis on red, other than it is usually the most stable and best-preserved pigment [30].

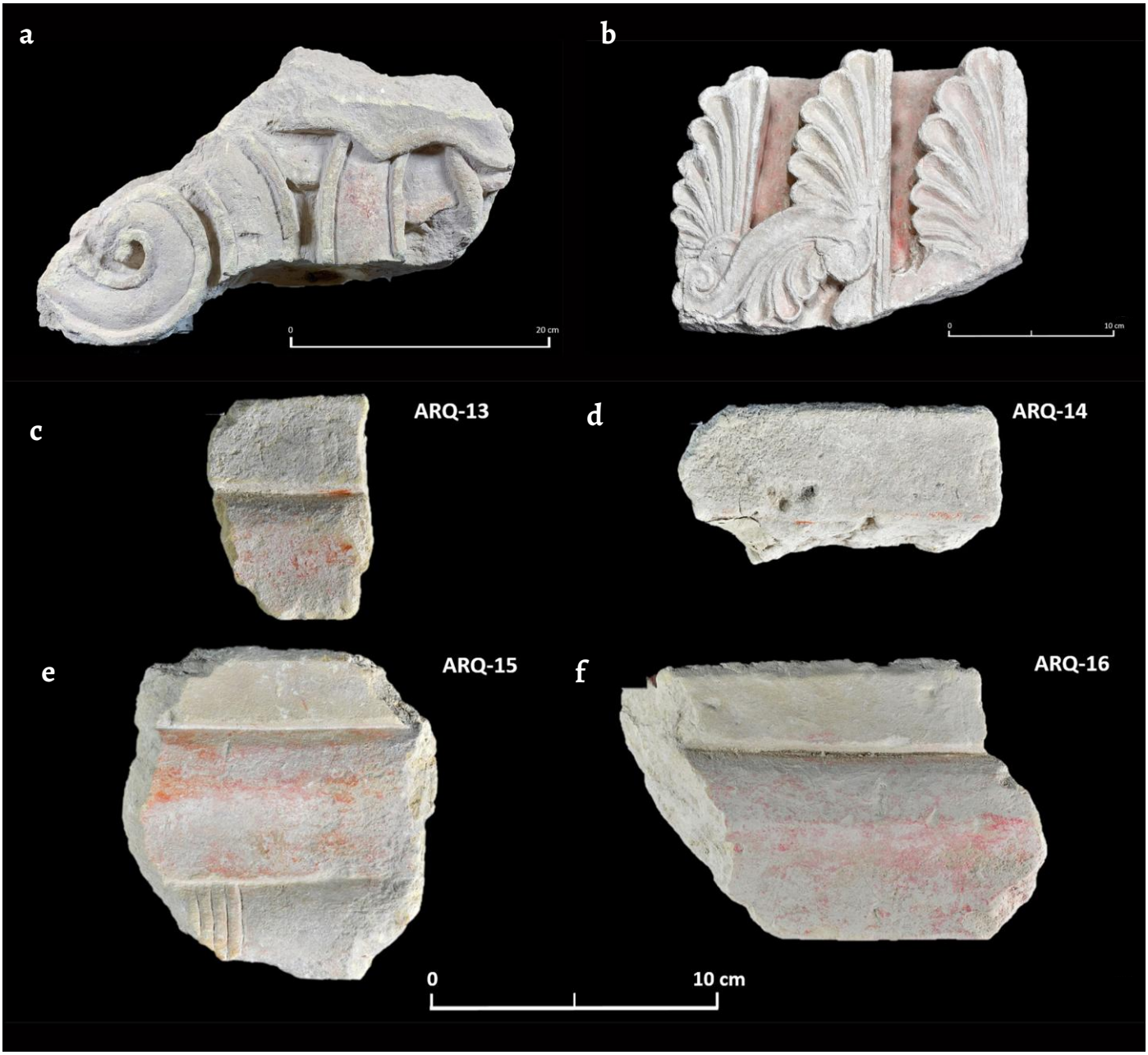

Figure 6. Selection of architectural elements with painted, mainly red, decoration from different sites: *a)* from La Alcudia (Prov. Alicante); *b)* Camino del Río (Monforte, Prov. Alicante); *c-f)* Cigarralejo (Mula, Prov. Murcia) (photos: J. Robles).

While the original block has been transferred to the Cabra Archaeological Museum, a full-scale replica has been cast in resin from a silicone elastomer S-421 mould. It has been partially painted using the colours suggested by the analysis, and then placed on site for the benefit of visitors after it was presented in a Temporary Exhibition (2022) in the Iberian Culture Museum (Jaén) when it was displayed close to the original (Figure 7). Although we do not know the exact hue of these colours, especially the red pigment, and we do not know if other colours could have been applied to certain details, we believe that this image of the block is powerful and closer to what it may have looked like in the Iberian period.

Figure 7. Carved block and partially painted replica in Iberian Culture Museum in Jaén (Exhibition 2019-2020) (photo: F. Quesada).

Concluding remarks

The case of the early, Phase A monument at Cerro de la Merced and its reuse as building material is relevant because it has provided us with the opportunity to put forward a good chronological frame for relatively frequent type of architectural relief decoration found both in Andalusia and the southeastern part of the Peninsula but often lacking proper archaeological context. It has also been possible to analyse traces of pigment and put forward a decorative bichrome pattern (at least) that is consistent with other examples. All this fits into a wider line of research that includes:

1. Documentation of painted patterns on Iberian stone architecture, not just on zoomorphic or anthropomorphic sculpture. There are many pieces where traces of colour can be observed, but thanks to the new technologies, we can begin to see the "invisible" and to document pigments where traces are no longer visible to the human eye.
2. Reconstruction of the original appearance of the monuments. Using procedures such as those employed here, we get closer to the original image these buildings and monuments displayed in their prime. When we have more sources, a sculpture in the ancient world - or architectural monument - was not conceived as "finished" unless it was painted. Therefore, it is necessary to consider preparing and polychroming as a very important phase of the production process.

Furthermore, it is necessary to delve systematically into the analysis of pigments and binders to understand how they were made and how they were applied. In this case, in addition to the paint layers, we have been able to document a preparatory layer. The binder used here could be lime mixed with the pigment, as suggested by the amount of calcite found on the paint layer, or, perhaps, an organic binder, as suggested by the presence of fatty acids.

And finally, the question of meaning. Even if conceived to enhance the elements of a relief, its syntax, some colours -particularly red- seem to have had in Iberia a particular symbolism that is difficult to grasp today.

These are, ultimately, pending tasks that need to be further explored. It is an area barely explored in the Iberian world, but one that offers interesting and new perspectives of study as some quite recent studies are revealing.

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