New finds from an old treasure: the archaeometric study of new gold objects from the Phoenician sanctuary of El Carambolo (Camas, Seville, Spain)

Nouvelles trouvailles pour un ancien trésor : l'étude archéométrique de nouveaux objets en or du sanctuaire phénicien de El Carambolo (Camas, Séville, Espagne)

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Alicia Perea* and Mark A. Hunt-Ortiz**

Abstract: In this paper, we present the results of an archaeometric study by SEM-EDS, carried out on six gold objects originating from the historical site where, 50 years ago, an important gold treasure, belonging to the Orientalizing-Tartesian period, was found. The new finds came to light recently, during rescue excavations that unearthed a monumental complex described as a Phoenician sanctuary.

Résumé : Nous présentons les résultats d’une étude archéométrique par MEB-EDS effectuée pour six objets en or provenant du site historique où, 50 ans auparavant, un trésor important, appartenant à la période orientalisante-tartésique, a été trouvé. Les nouvelles découvertes ont été mises à jour récemment, pendant des fouilles de sauvetage qui ont exhumé un complexe monumental décrit comme un sanctuaire phénicien.

Keywords: Archaeometry, archaeometallurgy, goldwork, SEM-EDS, Orientalizing period, Southern Spain, Tartesian archaeology.

Mots-clés : Archéométrie, archéométallurgie, Travail de l’or, MEB-EDS, période orientalisante, Espagne méridionale, Tartessique, archéologie.

1. INTRODUCTION

On 30 September 1958, a treasure of gold objects was found by workmen refurbishing a public building at the top of a hill overlooking the fertile Guadalquivir river valley. The Carambolo gold hoard consists of two sets of objects, representing a total of 21 ornaments, including 16 rectangular plaques, two pendants, a pair of bracelets, and a pendant necklace. They have recently been dated to a period around the 8th century BC, except for the necklace, which is prob-

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ably Cypriot in origin and of a later date, around the 6th century BC, the period when the treasure was concealed. From a technological point of view, it has been interpreted as the joint production of two different workshops, one indigenous and the other of Mediterranean origin, suggesting a peaceful coexistence between local people and the Phoenicians, although no evidence for technological transmission has been detected (Perea and Armbruster, 1998). Rescue excavations at the time brought to light some structures that were interpreted as a ‘pit dwelling’. The pottery was said to be found in mixed archaeological levels containing both local and Phoenician types (Carriazo, 1973).

For many years, El Carambolo was the only site to produce a stratigraphy for the period when natives and Phoenician colonists first came into contact. Years later, a bronze statue of Astarte, the Phoenician goddess, was found nearby. This and other finds alerted archaeologists to the possibility that the site may have been more than a simple settlement, and that it might have had a religious function.

Rescue excavations carried out at this site from 2002 to 2004, due again to building works in the expanding city of Seville, unearthed a monumental sanctuary, dated to a period between the 8th and the 6th centuries BC. The complete stratigraphic sequence of the site extends from the final Bronze Age to the end of the Orientalizing period in the 6th century BC, when the site was abandoned (Fernández and Rodríguez 2005; 2007). The discovery of new gold objects during the most recent excavation has reopened the old debate on native versus Phoenician workshops.

2. THE NEW FINDS AND THE METHOD OF RESEARCH

The new find consists of six gold objects:
- a 42 cm long fragment of a double loop-in-loop chain. It displays the marks of an ancient repair and several broken links.
- a 1.3 cm long cylindrical bead or lining made from grooved sheet, misshapen and incomplete.
- four identical discoidal appliqués, 0.2 cm in diameter, each with a central hemispherical boss and a wire looped attachment on the back.

These objects were sent to the Laboratorio de Microscopia Eletrónica CENIM, CSIC, in Madrid, for topographic examination using a Scanning Electron Microscope (SEM), and were initially analysed by Energy Dispersive X-ray Spectroscopy (EDS) in order to determine the elemental composition of the alloys, and also the type of solder used, if any.

3. TOPOGRAPHIC STUDY

The cross-section of the wire employed for making the chain links is circular, with traces of a helicoidal line that has largely disappeared due to wear. These features indicate, firstly, a prolonged use, and also the fact that the wire was manufactured by twisting a thin strip of gold (also known as strip-twisting). It also shows the marks of an ancient repair. At the midpoint of the chain, an interconnected link appears which could represent the beginning of a second branch of the chain, or a link for suspending a pendant.
The cylindrical piece seems to be the lining of a cord or thick wire, rather than a separate bead. It is made from grooved foil rolled into a tube, which is considerably worn at the edges.

The four discoidal appliqués are real miniatures made by stamping small circular pieces of sheet, and had a wire loop soldered onto the back so that they could be sewn onto cloth. The wire loop was made by the same system of twisting as the one used for the chain. They are so small that the soldering process which had to avoid fusing the tiny objects was difficult. Traces of these problems can be seen in the dendritic structures throughout the surface.

4. Microanalytical study

Table 1 records the complete results of the analysed areas. The chain is made from an alloy of 12% silver and 1% copper. The cylindrical lining has a silver content of 16% and about 1% copper. We cannot provide an approximate composition for the four appliqués, because all the measurements are affected to a greater or lesser extent by the process of soldering the loop to the back. However, they seem to be of fairly pure gold, with a silver content that cannot have exceeded 8%. In the case of the solder, we think it was carried out using a ternary alloy as a soldering material, with a silver content of around 20-25% and about 2% copper. There is no indication that an autogenous welding method or a bonding using copper salts was used, since the curve of the silver and copper measurements increases notably at the interfaces.

5. The Iberian discoidal gold appliqués

The objects that provide most information for interpreting this find are the discoidal appliqués. We are aware of a small but significant number of these objects, which always appear in relatively numerous sets. All the finds are distributed in the southwest of the Iberian Peninsula, and their chronological contexts point to the final Bronze Age / Early Iron Age transition period, which encompasses the so-called Orientalizing period.

The hill fort (castro) of Ratinhos (Moura, Portugal) presents signs of continuous occupation from the Final Bronze Age to the 6th century BC (Silva and Berrocal-Rangel, 2005). In the higher part of the castro, a large building, described as a palace, was located, where a set of seven discoidal appliqués with a diameter of about 0.8 cm was found. The edges of the appliqués were decorated with a square cross-section twisted wire. EDXRF and PIXE analyses (Valerio et al., 2007) showed that the fabrication material was a gold alloy with 10% silver. The authors think that solid phase welding was used to attach the loop to the back by heating below the melting point without using a solder.

A second set of two appliqués, with a diameter of approximately 1.6 cm, is currently on display in the Lisbon Museum. It originates from Outeiro da Cabeça (Torres Vedras, Lisbon, Portugal) and was associated with earrings, beads and double spiral pendants, but it has no contextual data (Pingel, 1992: 295-296, nº 277).

A third set consists of 39 items from Fortios (Portalegre, Portugal), again lacking an archaeological context, and is also held in the Lisbon Museum (Pingel, 1992: 298,
The objects have a diameter of about 2 cm, wire loops on the back, and are decorated with concentric circles. This is the largest set of such artefacts, and it also contains the largest examples known to date.

Other comparable objects have been found, rather different morphologically from those under discussion here, but which could have been used in a similar manner to decorate garments, although they do not have the loop on the back, the defining feature of the sets described earlier. These are the appliqués from São Martinho (Alcácer do Sal, Setúbal, Portugal) and El Castañuelo (Huelva, Spain), which have holes on the outer edge, probably for sewing or fixing. The association of the find of São Martinho (Armbruster and Parreira, 1993: 188-191) with spirals, and the context of the items from El Castañuelo – a cist necropolis (Schubart, 1975: 95-96, lám. 54; Perea, 1991: 107) – seem to indicate an earlier date than that of the items with a loop on the back instead of holes (Perea, 2005). They could be dating to the Final Bronze Age of the southwest.

As a hypothesis, we propose that these ornaments originated from garments belonging to the local elites of the Final Bronze Age. The subsequent adoption of the new Mediterranean technology brought by the Phoenician colonists included soldering. This enabled the wire loops to be attached to the back, so that they could be sewn onto cloth – something which had been previously accomplished by using holes. Soldering also enabled the appliqués to be adorned with twisted wires around the edges.

Table 1: Elemental spot composition (SEM-EDS, wt%).

<table>
<thead>
<tr>
<th>Item &amp; analysis Nº</th>
<th>Area</th>
<th>Au</th>
<th>Ag</th>
<th>Cu</th>
<th>Others</th>
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<tr>
<td>CRB01 201 Chain</td>
<td>Link</td>
<td>88.91</td>
<td>11.09</td>
<td>-</td>
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</tr>
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<td>CRB01202</td>
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<td>13.94</td>
<td>-</td>
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<td>12.56</td>
<td>-</td>
<td></td>
</tr>
<tr>
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<td>Fe, Ca</td>
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<td>19.09</td>
<td>0.70</td>
<td>Fe, Ca</td>
</tr>
<tr>
<td>CRB01206</td>
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<td>72.90</td>
<td>24.42</td>
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<tr>
<td>CRB02 201 Lining</td>
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<td>83.14</td>
<td>16.17</td>
<td>0.70</td>
<td></td>
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<tr>
<td>CRB02202</td>
<td>Sheet</td>
<td>82.45</td>
<td>16.70</td>
<td>0.85</td>
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</tr>
<tr>
<td>CRB02203</td>
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<td>17.09</td>
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<td>Si, Al, K</td>
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<td>7.25</td>
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<tr>
<td>CRB03 201 Discoid</td>
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<td>100</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>CRB03202</td>
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<td>8.81</td>
<td>0.85</td>
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<tr>
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<td>Sheet</td>
<td>99.19</td>
<td>-</td>
<td>0.81</td>
<td></td>
</tr>
<tr>
<td>CRB03204</td>
<td>Sheet back</td>
<td>90.88</td>
<td>9.12</td>
<td>-</td>
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<tr>
<td>CRB03205</td>
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<td>89.69</td>
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<td>0.55</td>
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<td>18.41</td>
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<td>22.63</td>
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<tr>
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<td>22.10</td>
<td>1.79</td>
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</tr>
<tr>
<td>CRB04 201 Discoid</td>
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<td>12.35</td>
<td>-</td>
<td>Fe</td>
</tr>
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<td>CRB04202</td>
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<td>26.99</td>
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<td>17.01</td>
<td>1.39</td>
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<td>Loop</td>
<td>90.38</td>
<td>9.62</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Tableau 1 : Composition élémentaire ponctuelle (MEB-EDS en %).
6. CONCLUSION

The great treasure of El Carambolo and this new find must be compared. The first one was hidden intentionally so that the jewels could be recovered. The objects were in a perfect state of preservation and showed few signs of wear. The new find, however, consists of fragmentary, incomplete objects that display traces of having been used for a long time, an aspect which seems to reflect an unintentional loss.

As we can observe from the finds of discoidal appliqués that appear from the Final Bronze Age onwards, the adornment of garments with gold must have been relatively common in the southwest of the Iberian Peninsula. This represents new evidence for the same process, i.e. the coexistence of native and Phoenician workshops, or the presence of goldsmiths with different technical knowledge. This is an interesting case of technological transmission: the Atlantic versus the Mediterranean.

Acknowledgements

We are very grateful to Álvaro Fernández Flores, director of the excavations at El Carambolo, for entrusting the study of the gold finds to us.

References


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