

Natakamani and the bronze oil lamp. Some evidence of metallurgy from Jebel Barkal

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During the 2015 season, the Italian Archaeological Mission in Sudan working at Jebel Barkal brought to light an object that has no parallels on the site: a bronze oil lamp. This object was found in a context of heterogeneous materials, including pottery, stone fragments and a large number of beads, located in the south-western corner of the palace of King Natakamani, probably in a secondary deposition. The lamp is one of only three bronze objects found so far in Natakamani's palace and, from a technical standpoint, it represents a fine example of open core lost-wax technique. Unfortunately, the complex stratigraphy and the lack of comparisons within the site do not allow us to date the lamp with certainty, but possible stylistic parallels could be recognised with some bronze lamps coming from Meroitic tombs. By analysing the possible contacts between Meroe and the Hellenistic world we can speculate as to whether this object was imported, or rather, was a product of local craftspeople re-elaborating Graeco-Roman models.

Introduction: the context

The activity of the Italian Archaeological Mission in Sudan began in 1973 with Sergio Donadoni, Professor of Egyptology at 'La Sapienza' University in Rome. Donadoni arrived in Sudan after taking part in the UNESCO project for the salvage of Nubian antiquities threatened by the flooding of Lake Nasser. In 1978 the Italian team discovered a huge mudbrick structure at Jebel Barkal, and in 1984 a stela bearing the names of Amanitore and Arikankharor, relatives of the Meroitic King Natakamani, was found inside it. The edifice B1500 was then named the Royal Palace of Natakamani, and was destined to become pivotal in research activities for the following forty years (Roccati 2019, 25-32). For the last nine years, the Italian Mission, directed by Emanuele Ciampini, of Ca' Foscari University of Venice, has been working in a large area centred around Palace B1500, dotted with various buildings, differing in size and function

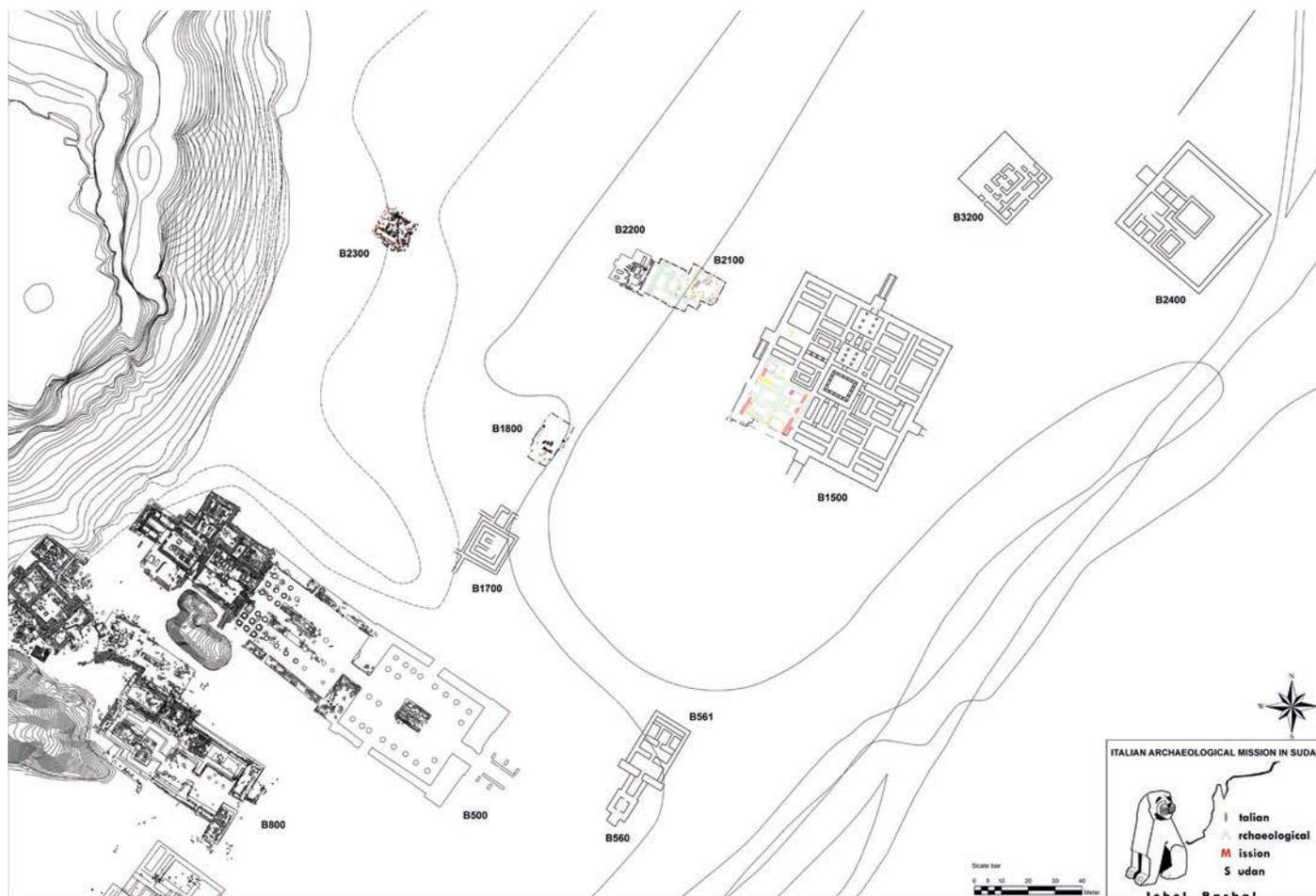


Figure 1. Area of Jebel Barkal (map Martino Gottardo).

(Figure 1); since 2014 it has been part of the Qatar-Sudan Archaeological Project, which has so far ensured the financing of the Mission together with the Ca' Foscari University's Support Fund to Research and Internationalisation Activities and the Italian Ministry of Foreign Affairs. Season 2015/16 and Season 2016/17 have been focused mainly on the southwest corner of the Royal Palace (B1500).

An interesting result of these campaigns was the discovery of a system of mudbrick walls lying beneath the foundations of the main structure dated to the 1st century AD. These walls attest to more than one occupational phase in the area chosen by Natakamani upon which to build his palace and all the edifices – kiosks and smaller buildings – connected with it (Gottardo 2019, 14-19). The structures unearthed in the south-west corner of B1500 also offer an important parallel to other older buildings (older than the time of Natakamani), especially: B2400, located in the north-eastern sector of the archaeological area and excavated by the Italian Mission in 2001 (Roccati 2008; Sist 2006); and B4000, the last investigated structure of the central sector (between B2100 and B2200, Figure 1), dated by radiocarbon analysis between 360 BC and 156 BC (Ciampini 2019, 4-5).

The 2015 campaign, in particular, allowed us to reach the deepest level of the building that was characterised by a red brick layer, a level to protect the base of the mudbrick walls from water, placed under the foundations of the perimeter wall of the palace (Ciampini 2015, 1-4). Three east-west casemates pertinent to the foundation structure (Callegher 2019, 20-23) of the palace were identified. They are characterised by mudbrick walls with a clear profile but also showing strong signs of spoliation, probably due to Post-Meroitic visitations of the area, and to *sebakhin* destructions (Figure 2). The wall delimiting the south-eastern side of Casemate 1 had been greatly damaged by several large spoliation pits; one, a rectangular ditch of about 0.70x1.50m, contained a deposit of heterogeneous materials including animal bones, ceramic bowls (both complete and fragmentary), a sandstone basin, grindstones, faience beads, and a lamp (Figure 3).

Materials and methods: restoration of the bronze lamp

The subject of this study is a bronze oil lamp (Iannarilli 2019, 93-94), closed-shape, characterised by an oval body in the middle of which is a hole for the introduction of oil. This hole is surrounded by a disc. It is not unusual, especially



Figure 2. Southwest corner of Palace B1500 (map Alice Salvador).



Figure 3. Deposit where the lamp was found (photograph Francesca Iannarilli).

the broken handle; the whole surface, however, presented a patina due to oxidation – partially maintained – and signs of metal corrosion due to the deposition conditions (especially soil and Nile water, the flooding of which reached the archaeological area until recently. The last great flood occurred in 1988, devastating part of the city of Karima and the archaeological site of Jebel Barkal). The lamp was, therefore, subjected by the restorer Silvia Zauner-Mayerhofer to an extremely laborious mechanical cleaning procedure, which today allows for a better appreciation of the shape and details, while ensuring the preservation of the original surface (Figure 4).

After a careful first cleaning with a paintbrush and scalpel, particularly around the loose fitting parts, the lamp was examined in more detail. There were solid deposits encrusted everywhere, along with chloride efflorescence and stable cuprite blistering. The mechanical cleaning was then continued, making sure that the corroded surfaces were not altered in any way. This extremely cautious work was performed using a scalpel, needle files, small chisels, a variety of small rotating dental brushes, a milling cutter, and even a diamond cutter, in order to better appraise, but also to protect the original surface of the lamp, which is now clear and safe (Figures 5 and 6).

Technological study

The autoptic examination conducted on the object *in situ* and later, through the photographic documentation produced during the restoration activity, allowed us to confirm that it was made using the open core lost-wax technique. Most of the bronze objects found in Meroitic contexts – and Jebel Barkal is no exception – are produced through the lost-wax casting technique. The operating chain, based on archaeological experimental and archaeometric knowledge (Auenmüller *et al.* 2019, 146-156), involves at least five steps: a wax nucleus of the object to be made is modelled; the nucleus is covered with a rigid shell of perforated clay; the shell is fixed through the metal pins, useful to keep the core perfectly aligned during casting; by exposing the mould to the fire, the wax melts, passes through the holes leaving a negative space; metal is melted in a crucible, and then poured into the shell; once everything is cooled, the clay mould is broken, and the finished object is extracted; finally, the external surface is polished. The use of wax made it possible to model even small details and thus also create small and very refined objects. The reason for the choice of the lost wax technique is, in this case, due to the presence of a nucleus and the three-dimensional decoration of the ring. We can talk about an ‘open core’ because there are two openings in the lamp, related to the function of the artefact itself. Several cracks visible on the surface of the lamp could indicate that the metal walls were very fine (Verly *et al.* 2019, 88).

Discussion: metal artefacts between Meroe and Rome

Being that bronze is an alloy, through the addition of greater or lesser amounts of copper and tin it was possible to control its hardness and strength, allowing for easy processing, as compared to the utilisation of pure copper.

Curiosity about Kushite metallurgy has been recently revitalised by studies concerning the techniques and manufacture processes of metal objects in Meroitic contexts (Drici 2016; Humphris-Rehren 2014; Faroug Abdelrahman 2011) but the first interest in this subject was raised by the discoveries of the second half of the last century in Kerma (Bonnet 1986) and Meroe (Shinnie 1985).

in bronze lamps, for the small supply hole to be protected by a lid but unfortunately in this case it was lost. There is one round spout and a ring base. The handle is rather damaged, but from what remains we can deduce it was likewise a ring. On the basis of some comparisons characterised by leaves, palmettes, lunar crescents or even more complex motifs, it can be assumed that the handle of our lamp could also have been decorated.

The state of preservation of the object was rather good at its discovery, excluding



Figure 4. The lamp before and after restoration (photograph Silvia Zauner-Mayerhofer).

It has been suggested that copper was present in Nubia in the areas of Tombos and Kerma; in the latter, particularly, a bronze-maker's workshop dating from the Middle Kerma period was found, mainly used for the production of knives and daggers (Bonnet 1986, 19-21).

Most of the bronze objects found in Meroitic contexts are produced through the lost-wax casting technique. One precious example is the bronze statue of the so-called 'archer-king' found in Tabo, about 40km from Kerma (Maystre 1986), which has been recently subjected to a new technological study and X-ray examination (Timbart *et al.* 2015). Analysis has shown that the object was made of eight connected iron bars, a necessary reinforcement during the pouring of the bronze on the core in the direct lost-wax process (Mille-Borel 2007, 194-199, 268-269). This technological feature seems to be consistent with other bronze figurines from the Mediterranean area (Timbart *et al.* 2015, 201).

Among the most complex decorative motifs of bronze objects known from Meroitic contexts, there are the famous centaur and horse adorning the handles of the lamps of Queen Amanikhatashan. These two bronze lamps, found in the Northern Cemetery of Meroe and ascribed to Amanikhatashan (Welsby 1996, 174-175), Queen of Kush, could be items of comparison for us. In common with the Jebel Barkal lamp, both Meroe lamps are characterised by a flat top surface and one round spout. The one decorated with a centaur, today displayed in the Sudan National Museum, also has a ring base and both have been found in a context dated to the 1st century AD. The handles of the two lamps from Meroe, unlike the lamp from the Palace of Natakamani, are fully preserved and end with elaborate decorations. The handle of our lamp, even if broken, appears to have been likewise ring-shaped.



Figure 5. 3D model of the lamp after restoration (illustration Silvia Callegher).



Figure 6. Scale photo of the lamp (photograph Silvia Callegher).

A similar bronze lamp with a ring handle is preserved at the Museum of Fine Arts, Boston (inv. 2017.552). This object is very damaged, severely corroded and with the lid fused to its top, but its dimensions (width x length: 62x110mm) seem to correspond to those of our lamp (width x length: 50x127mm), and the same applies to its oblong shape and its ring handle. Unfortunately, we have no further information, because the MFA catalogue sheet states that the lamp was found in storage without information; and anyway, it is classified as 'Egyptian'.¹

On the basis of their stylistic features, Shinnie supposed that the two lamps of Amanikhatashan were imports from the Mediterranean world and they were the work of a Greek craftsman (Shinnie 1967, 127-128). Various Hellenising objects and stylistic elements can be found in Meroitic sites, but it is not easy to determine if they were introduced into Sudan as gifts or commercial goods (Sakoutis 2009, 66-70). One possibility is that these kinds of oil lamps were imported. The relationships between Meroe and Rome were not always peaceful, but certainly Kush represented an important commercial interlocutor with the Roman Empire (for ivory, precious materials and animal skins). According to Manzo (2006, 89), the objects of Hellenistic-Roman typology found, especially in the necropolis of Meroe, would have been manufactured for the imperial court and sent as gifts to their rulers, an exchange closely connected to diplomatic activities controlled by the court. For example, the tomb of Queen Amanishakheto contained more than fifty metal signet rings – mostly gold – of a very common typology found in the Graeco-Roman world, especially from the 1st century AD, although it cannot be excluded that the goldsmiths were actually of foreign origin based in Meroe (Welsby 1996, 186).

On the other hand, we also have to consider that the Meroitic artisans could have acquired specialised knowledge of metal technology and were able to copy a model coming from abroad. The high technical level of Meroe's lamps, as well as that – albeit less conserved – of Jebel Barkal, recall some examples of Graeco-Roman manufacture suggesting, if not a direct importation, certainly a notable tendency to emulate and re-work Hellenistic models found in many aspects of Meroitic material culture.

Conclusions

The analysis of commercial and diplomatic relations between the Meroitic capitals and the Mediterranean world allows us to hypothesise three different possible origins for these lamps. They can be considered: a) imported goods; b) the product of foreign workers residing in the Meroitic area; or c) made by local workers who, thanks to the frequent contacts with the Hellenistic world, were able to reproduce and re-elaborate Graeco-Roman models and styles.

We cannot exclude that in the 1st century AD, local technical skills had reached the level required for the production of objects such as the 'lamp of Natakamani' and the recent discovery at Jebel Barkal from Buildings B2100 and B2200, currently under excavation (Ciampini 2019), of some fragmentary crucibles with melted bronze inside could attest to a local metallurgical production, but this very recent evidence deserves further in-depth archaeological analysis in order to be better interpreted and confirmed.

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