The manufacture and decoration of Parthian glazed ‘slipper coffins’ from Warka

ANDREW MIDDLETON, ST JOHN SIMPSON AND ANTONY P. SIMPSON

Summary The first examples of ‘slipper coffins’ were discovered by William Kennett Loftus (1820–1858) at the site of Warka in southern Iraq in 1850. They attracted much popular attention and are one of the hallmarks of Parthian funerary practice in Mesopotamia. Similar coffins have since been excavated at other sites in this region and are displayed in several major museums. There has been previous discussion of their date and/or contents but here the first detailed discussion of the processes of their manufacture is presented. The coffins were built from a series of slabs of chaff-tempered clay, using established ceramic-forming techniques, and glazed using alkaline glazes, long used in Mesopotamia. The observations provide an indication of the skills and confidence required to manufacture, decorate and fire these spectacularly large objects.

INTRODUCTION

One of the hallmarks of Parthian funerary practices in Mesopotamia was the manufacture of full-size glazed ‘slipper coffins’, so-called because of their resemblance to giant slippers. The first examples were discovered by William Kennett Loftus (1820–1858) at the site of Warka (Figure 1) in southern Iraq in 1850, and attracted much popular attention. Similar coffins have since been excavated at other sites in this region and are displayed in several major museums. However, this is the first detailed discussion of their processes of manufacture, as previous studies of these remarkable objects have tended to dwell exclusively on their date and/or contents.

THE CIRCUMSTANCES OF DISCOVERY

Loftus’ discoveries at Warka

Loftus first visited Warka at the beginning of January 1850, at which time he noted examples of ‘slipper coffins’. He returned to the site later that month, in the company of the artist Henry A. Churchill, and excavated there for a month. He later conducted a final season from January to April 1854, during which time he was accompanied by the artist William Boutcher. His principal discoveries have been summarized elsewhere [1, 2], but it is useful to recap on these before discussing the results of the new technological study of these coffins.

Loftus investigated most of the prominent mounds at Warka and found glazed slipper coffins in several areas of the site. Many appear to have simply been interred in the earth but others were placed inside brick vaults [3; p. 206]. In one case the glazed lid (1851,0101.5: ME 92008a) had been broken in antiquity and was covered with a second lid “puffed out in the centre and pierced by a small hole like the crust of a meat pie”. Most, if not all, of the coffins had been disturbed, probably owing to the later popular belief that they contained gold; this was a problem that Loftus encountered throughout his investigations. Moreover the skeletal remains “usually fell to powder on exposure to the air”, although in a number of cases the arms were observed “bent across the body” [3; p. 210]. Objects found within or next to the coffins included bronze bowls, pottery lamps, small glass bottles, stylized bone dolls, gold earrings and beads, gold and silver finger rings, silver and bronze armlets and toe rings, and the highly fragmentary remains of what were probably gold face-masks. Coins were found in the general excavation area, but these appear to have been surface finds or recovered from surrounding deposits rather than being part of the grave-goods.

Owing to the particular interest aroused by the discovery of glazed slipper coffins during his first visit, the purpose of Loftus’ excavation season in January to February 1850 was “to endeavour to obtain a specimen of these extraordinary coffins, in order that it might be forwarded to the British
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Museum” [3; p. 207]. Several trenches were excavated and “perhaps a hundred” coffins discovered, but each, to Loftus’ great irritation, “invariably fell to pieces in the attempt to stir them … [as] … those near the surface were considerably weathered, while those below were saturated with moisture, and frequently crushed by the superincumbent weight”.

Finally, three coffins were successfully lifted by applying layers of papier maché to the interior and exterior, Figures 2–4. These were lifted on tent-poles inserted beneath each, placing them on improvised litters made up of boards lashed onto handles formed of spades and spears, and carrying them on the shoulders of “a strong party of Arabs” for a distance of some nine miles to the Euphrates whence they were shipped back to England, Figure 5. A small number of fragments were also brought back, including a glazed lid, two other fragmentary decorated lids and a coffin fragment with different decoration.

Later excavations at Warka

Since Loftus’ pioneering investigations, excavations by the Deutsches-Orient Gesellschaft have added considerable information on the layout of the Parthian graves in one of the areas where Loftus had previously found these coffins. It now appears that many of the coffins were clustered below the floors within, or close to, small rectangular mudbrick structures [4; Plates 233–234]. In addition, four types of slipper coffin were distinguished, of which the most distinctive and numerous were decorated with repeated stamp impressions depicting a standing warrior and described in greater detail below.

Warka in context: discoveries at other sites in Mesopotamia and Susiana

The largest number of Parthian slipper coffins has been excavated at Warka. Nevertheless, they have also been discovered at a number of other sites in central and southern Mesopotamia. These include Tell Amran and the Southern Palace area at Babylon [5, 6; p. 249 (vol. I); Plate 87d (vol. II), 7], Mashkan-shapir [8], Tell el-Meda’in [9; p. 32], the ‘Scribal Quarter’ and ‘Parthian cemetery’ in Sounding E at Nippur [10; pp. 214–216; pp. 226–230 and Plates opposite pp. 214 and 230, 11, 12], and Seleucia [13; p. 36, 14, 15; p. 246]. This distribution suggests that this type of coffin was most popular within urban centres, although survey reports from four rural sites suggest that they may also have been transported, presumably by canal, for use at smaller settlements in the vicinity of these towns [16].

Detailed discussion of these finds from sites other than Warka is beyond the scope of this contribution, but this brief review shows that although there is a gradually growing body of archaeological data on the location and organization of Parthian tombs and the range of associated grave-goods, there has been no scientific analysis of the remarkable coffins themselves.
TECHNICAL EXAMINATION OF THE WARKA COFFINS IN THE BRITISH MUSEUM

In 1997 three complete Parthian glazed slipper coffins from the collections of the British Museum – registration numbers 1851,0101.1 (ME 92006), 1851,0101.2 (ME 92005) and 1851,0101.3 (ME 92004) – were placed on temporary display in a special exhibition entitled Pottery in the Making. This provided the opportunity to undertake a technical study of these objects. Most of the observations reported here are based upon a close visual examination but, in addition, the opportunity was taken to remove a small fragment from ME 92006 for preparation as a thin section, allowing detailed examination of the clay fabric using a petrographic microscope. The thin section was also examined in a scanning electron microscope (SEM), permitting observation of the degree of vitrification of the fabric. An energy-dispersive X-ray (EDX) analyser attached to the SEM was used to determine the chemical composition of the clay body and also to analyse a small fragment of the glaze from ME 92006 that had been mounted in resin and prepared as a polished section.

The clay fabric

In his published excavation account Loftus commented that the coffins were made of “yellow clay, mixed with straw, and half-baked” [3; p. 205]. Examination of the coffins and of a small detached fragment from ME 92006 under a binocular microscope confirmed the pale yellow colour (Munsell 5Y 8/3), and the presence of a fair proportion of burnt-out organic temper, Figure 6. Examination of the thin section under the petrographic microscope revealed a relatively fine fabric, with an optically isotropic matrix containing
common, angular silt to fine sand-sized particles (mainly quartz, with some feldspar and, occasionally, another mineral that may be pyroxene). Dark red-brown, almost opaque grains are also common in the silt/fine sand fraction. Voids left after the burning out of the vegetal temper, noticed in the hand specimen, were again observed under the microscope and, in some cases, seen to contain phytoliths; the morphology of the phytoliths suggests that grass or cereal straw had been used as the organic temper [17].

The clay of the coffin is rather similar to that used for some sherds of Sasanian pottery found at Aksum which were examined in thin section by Freestone and Stapleton [18]. The composition of the clays (Table 1) is comparable to those published for ceramics produced from Mesopotamian alluvial clays – see, for example [19, 20]. Abundant chaff temper was added to the clay used for the coffins. This would have had the effect of opening the clay body of the coffin, leading to more even drying and firing, and would have reduced shrinkage as the clay dried; it would probably also have enhanced the wet strength of this exceptionally large object. The addition of chaff temper to alluvial clays from Mesopotamia has been reported elsewhere, for example by Matson in his discussion of the manufacture of glazed bricks at Babylon [19].

**Table 1. Composition of the glaze and body from coffin ME 92006 and some comparative analyses**

<table>
<thead>
<tr>
<th>Oxide</th>
<th>Glaze analyses</th>
<th>Body analyses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>SiO₂</td>
<td>62.4</td>
<td>64.5</td>
</tr>
<tr>
<td>TiO₂</td>
<td>0.2</td>
<td>n.a.</td>
</tr>
<tr>
<td>Al₂O₃</td>
<td>2.8</td>
<td>2.6</td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>1.4</td>
<td>3.3</td>
</tr>
<tr>
<td>MnO</td>
<td>n.d.</td>
<td>n.a.</td>
</tr>
<tr>
<td>MgO</td>
<td>4.5</td>
<td>2.8</td>
</tr>
<tr>
<td>CaO</td>
<td>8.7</td>
<td>7.8</td>
</tr>
<tr>
<td>Na₂O</td>
<td>13.0</td>
<td>14.0</td>
</tr>
<tr>
<td>K₂O</td>
<td>4.1</td>
<td>5.1</td>
</tr>
<tr>
<td>CuO</td>
<td>1.9</td>
<td>n.a.</td>
</tr>
<tr>
<td>PbO</td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td>P₂O₅</td>
<td>0.3</td>
<td>n.a.</td>
</tr>
<tr>
<td>Cl</td>
<td>0.4</td>
<td>n.a.</td>
</tr>
<tr>
<td>SO₂</td>
<td>0.4</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

**Notes**
- All data are given in weight percent oxide, normalized to 100%.
- n.a. = not analysed; n.d. = not detected
- * = silica by difference

**Sources of data**
- A: Present study, mean of four analyses
- B: Mason and Tite [38], mean of three pre-Islamic glazes
- C: Stapleton and Freestone [18], mean of 15 unpublished analyses of Partho-Sasanian bodies from Aksum
- D: Bartel et al. [39], mean of Parthian glazes from Assur
- E: Present study, mean of two analyses
- F: Hedges and Moorey [28], representative Parthian glaze composition
- G: Freestone and Stapleton [18], mean of three unpublished analyses of Partho-Sasanian bodies from Aksum

**Techniques of construction**

Before proceeding to review the present observations, it is appropriate next to consider observations on constructional techniques made by Aviam and Stern, who examined a series of 250 Roman pottery coffins recovered from excavations of second to fourth century AD tombs in western Galilee [21]. They noted that these coffins had straight walls and flat bases, and were assembled from flat slabs of clay joined together when leather-hard. They also suggested that the clay slabs were made in rectangular moulds, and that assembly of the sarcophagi was facilitated by the use of some sort of coffin-shaped frame. While there are some superficial similarities between these Roman examples and the present group of coffins, it is immediately noticeable that the walls of the Parthian coffins are not straight and that these coffins have a generally less geometric and more rounded shape than the Roman examples. These general differences extend to other aspects of construction and decoration, and reflect fundamentally different workshop traditions in the construction of the two groups of coffins.

The observations recorded here are based upon detailed examination of coffin ME 92006, supported by comparative observations of the other specimens. Visual examination revealed evidence for numerous joins between the different clay elements from which it was constructed. In some instances the joins are clearly defined, but others are more obscure and in some cases the observations are complicated by earlier conservation work. However, a tentative reconstruction of the overall approach adopted in the construction of the coffin has been attempted, Figure 7.

The bases of the coffins are essentially flat and examination suggests that in each case, the base was formed by laying down a series of large slabs, joining them edge-to-edge by squeezing together the soft clay, a technique whose origin extends back to some of the earliest pottery from west Asia [22]. The interior surfaces of the bases are fairly undulating. Loftus observed the “impressions of the reed-matting upon which it rested during the process of manufacture” [3; p. 205], but these are no longer visible as, in order to give them greater strength, the coffins were mounted on slate supports after they entered the Museum in the mid-nineteenth century.
Observations suggest that the next stage in the construction process would have been to form the walls along both sides and at the curved head of the coffin. The flatter foot of the coffins may also have been closed at this stage, thus giving additional support to the sides. Like the bases, the sides appear to have been formed from a series of slabs of clay, although in this instance they were more regularly shaped, being roughly square, with an edge length of c.15 cm, Figure 7a. There is, however, no evidence to suggest that these slabs of clay were formed in moulds. The joins between the slabs were filled and strengthened using soft clay, and the seams between the bases and the sides were heavily reinforced by squeezing roughly sausage-shaped lumps of soft clay into the angle of the joins along the interior. Finger impressions in this luting clay imply that this was carefully pressed in along the length of the coffin, Figure 7b. It appears that the sides were raised to the level at which the walls were to curve over to form the top of the coffin, and a clear join-line can be seen running along the length of each of the coffins at this height. This perhaps indicates that the sides were left to dry partially and to acquire some rigidity before the next stage in construction, namely the closing of the ‘slipper’ along the top.

The top of the coffin was again built up from slabs of clay, but these slabs were much smaller than those used for the base and sides. The interior surface of the top of the coffin is rather irregular and undulating and was probably free-formed, rather than being shaped and supported by some sort of rigid former. Soft clay was again used to strengthen the joins between the slabs and the potter’s fingerprints can again sometimes be seen preserved in the soft luting clay. As construction of the top proceeded, access to the interior would have become progressively more difficult. It is presumed that the D-shaped hole in the foot of the coffin – measuring 7.5 × 12 cm – was cut at this stage, permitting access to the interior, for instance to reinforce the join between the foot and the top of the coffin, Figure 7c. It is noticeable that the roughly horizontal join between the
sides and the top of the coffin was not heavily reinforced on the interior, probably because of the difficulty of access.

The principal decoration was confined to the upper surface and was impressed into a layer of soft clay, up to 1 cm thick, which was applied along the top of the coffin, Figure 7d. The main body of decoration was formed by the repeated application of a single rectangular die, measuring c.7.5 cm across and c.14.5 cm in length, to the panel of soft clay to form a repeating pattern, three across and five deep. The face of this die was carved with a cut design which, when impressed into the wet clay of the coffin, created a low-relief decoration showing a standing male figure wearing a short tunic and baggy trousers with a sword slung at his left side, his hands on his hips and his hair bunched at the sides and back, Figure 8. The same die appears to have been used on the lid and a second coffin in the British Museum; a die of this type was recovered from the German excavations in this area of the site, although the details vary [23; Plate 42d]. This was the most common design on coffins from Warka (compare, for example, with [9; p. 32 and Plate 22, 24–26, 27; p. 195]), although Peters described finding two examples “ornamented in arabesques ... instead of human figures” [10; pp. 304–305]. The figural iconography on these stamps falls within the known repertoire of Parthian art, both monumental and miniature.

Secondary bands of clay were applied along the two long edges of the decorated panel and around the opening at the head of the coffin, presumably with the ancillary purpose of reinforcing these areas. These bands were decorated with crescent stamps and oblique impressions (each c.2.3 cm long) around the rim, Figure 7e. A low raised panel immediately below the open end of the coffin was decorated with a lightly incised repeating feather or branch pattern. Details differ on a second large coffin (ME 92005): for instance, this has criss-cross incised lines around the edge of the opening, the head is decorated with small circular impressions c.0.5 cm across and has a low raised and pinched band running along the lower walls immediately below the impressed panels.

Once these decorative elements had been completed, the coffin was presumably left to dry to the leather-hard stage before the application of glaze and its transfer to the kiln for firing. Even after the coffin had dried to the leather-hard stage and acquired some strength, this must have been a difficult and potentially hazardous operation.

**Glazing the coffin**

Loftus commented on the fact that the “whole visible surface of the coffin is covered with a thick glazing of rich green enamel on the exterior, and of blue within the aperture, the former colour probably arising from chemical decomposition and long exposure” [3; p. 203]. Glaze was applied to the upper surfaces, presumably as a liquid slurry rather than as a dry powder; there is also some glaze on the exterior of the side walls but this is incomplete. Glaze was applied to the interior, but only in the area immediately visible through the opening via which the body would have been introduced into the coffin. Observation of this area is particularly informative as numerous runs of glaze can be seen extending towards the foot of the coffin (Figure 7f); this feature recurs on the other coffins examined and carries significant implications for the firing of the coffins.

The effects of weathering on the glaze were observed in the polished thin section of glaze examined in the SEM, but sufficient well-preserved glaze remained in the sample to permit a quantitative estimate of its composition to be made.
using EDX analysis in the SEM (Table 1 column A). These analyses showed that the glaze on coffin ME 92006 is of a soda-lime-silica composition, with copper as the colorant. There are relatively few published analyses of Parthian glaze materials, but the glaze from this coffin falls clearly within the Partho-Sasanian tradition of unleaded alkaline glazes [28, 29]; see also Table 1, columns B to D, in which some published and unpublished comparative analyses are listed. The relatively high levels of potash and magnesia in these glazes suggest that plant ash was used as the flux.

**Firing the coffin**

The type of kiln used in the production of these glazed coffins remains uncertain. The slipper-coffin shape of an eroded kiln found at Mashkan-shapir was interpreted as evidence that coffins of this type at this site were fired horizontally and presumably one at a time [8; p. 65 and Figure 32]. Certainly, simple updraught kilns are thought to have been used to fire plain and glazed ceramic vessels during this period and it is likely that a similar type of kiln was employed in the manufacture of these coffins. However, close examination of the glazed areas on the coffins under discussion shows pooling of the glaze on the upper interior beneath the overhanging rim and runs of glaze down the interior, Figure 7f. Similar traces can be seen on illustrations of coffins in other collections [27; p. 195]. This evidence clearly indicates that at least some of these coffins were fired in a vertical position.

The isotropic nature of the fine matrix, observed under the petrographic microscope, suggests that the firing temperature was sufficiently high to vitrify the fabric. This inference was confirmed by SEM examination, which showed that the matrix is very fragmented, but contains regions of glassy, bloated material, Figure 9. EDX analysis showed that the clay fabric is calcium-rich (Table 1, column E), and typical of other Partho-Sasanian glazed ceramics (Table 1, columns F and G). These textural observations, coupled with the compositional information, suggest that the coffin was fired at a temperature in the range 850 to 1050°C [30]; in addition, Matson recorded that rather similar calcareous clays from the banks of the Euphrates fired to a yellow body colour at temperatures in excess of 900°C [31]. The rather fragmented texture seen in the SEM, and the friable nature of the fabric are probably attributable to the effects of weathering during burial.

Despite the large size of the coffins, the firing appears to have been fairly even and the fabric is fully oxidized, with the abundant chaff temper being totally burned out. It is possible that this was due, at least in part, to the placement of the coffins in a vertical position. In this orientation the hollow coffin, with an orifice at each end, may have acted rather like a chimney, channelling some of the heated air through the interior, leading to a more thorough and even firing. It seems likely that coffins would have been fired in batches in order to minimize the use of fuel.

**Usage of the coffins**

The coffins were now finished and ready for use but, because of their overall size and shape, they would still have been difficult to handle and easily broken. This perhaps suggests that these Parthian coffins were made locally to where they were to be used. In contrast, petrographic analyses of some Roman coffins found in Galilee that were reported as having ‘strongly vitrified’ bodies suggest that these coffins were sufficiently robust to have been shipped to this region from Cyprus or Turkey [32].

**CONCLUSIONS**

This examination of several glazed ‘slipper coffins’ from Warka has revealed some of the techniques used by the Parthian ceramic coffin-makers. The particular skills (and confidence) required to manufacture, decorate and fire
these spectacularly large objects appear to have been developed by potters who were familiar with the use of chaff-tempered clays and the production of slab-built vessels. They were also aware of the use of alkaline glazes, long used in Mesopotamia. Equipped with these technical skills they were able to form, glaze and fire the coffins. The weight of these particular coffins is not known but it is instructive to note that Roman clay coffins found in northern Israel were reported to weigh on average 100 kg [21]. Handling such objects, particularly in the unfired state, must have required considerable care.

These are not, however, the earliest pottery coffins. Other versions were manufactured in Mesopotamia, Syria-Palestine and southern Anatolia at various periods from the second half of the second millennium BC to the third century AD. The form and decoration of these included 'Egyptianized' anthropoid sarcophagi that were favoured in southern Palestine during the Late Bronze Age and recurrent in southern Mesopotamia and south west Iran during the Achaemenid or Seleucid period [6; pp. 251–252 (vol. I); Plate 87c (vol. II)]. Deep 'bath-tub' coffins, often decorated with simple rope cordons around the exterior and fitted with handles at either end, were popular in Mesopotamia from the Late Assyrian to the Achaemenid periods, and are found also in Palestine, Jordan and the Persian Gulf. These coffins were originally fitted with wooden lids, but sheet-metal versions are also known [33]. During the Neo-Babylonian and Achaemenid periods, shallower 'trough' coffins were also manufactured [34]; this type continued as late as the early Sasanian period judging by single examples excavated at Tell Nebi Ismail and Nuzi [35; p. 177, 36; Figure 33, 39 and 299].

The innovation of the Parthian potters of lower Mesopotamia was to modify the shape of these coffins in order to make the distinctive 'slipper' form. Despite the absence of relevant written sources or direct workshop evidence, it is likely that specialized potters were responsible at different periods for the manufacture of fired clay coffins. Familiarity with the properties and strength of clay, and the necessary methods of building, handling and firing gained through experience of building large storage jars, probably contributed towards the successful production and long-term conservatism of making clay coffins. As such, these remarkable objects are a testimony to the skill of these potters.

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13. Yevin, S., 'The tombs found at Seleucia (Seasons 1929–30 and 1931–32); In Second preliminary report upon the excavations at Tel Umar, Iraq, ed. L. Waterman, University of Michigan Press, Ann Arbor (1933) 33–64, Plates XIV–XXIII.

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NOTE
1. The four pages in reference 16 correspond to Nippur Survey sites 667, 1115, 1306 and 1628 respectively.