NEW EXCAVATIONS AT A PTOLEMAIC-ROMAN FAIENCE FACTORY
AT MEMPHIS, EGYPT

P. T. NICHOLSON

In or about 1886, Sir Flinders Petrie, the first British Egyptologist to pay any real attention to early technology, walked over Kom Helul, a little-known area of Memphis. Here he noted the remains of what he considered to be a factory for the manufacture of faience, a glazed non-clay ceramic.

However, since he did not have permission to excavate, he seems simply to have recorded his observations, and he was not to return to the site for some 20 years. In the meantime, in 1891–1892, he had worked at Tell el-Amarna, where he had examined the remains of factories producing glass and faience and dating to the time of Pharaoh Akhenaten, about 1352–1336 BC. Certain features of the Amarna industry reminded him of the remains he had seen at Kom Helul, and this latter site became a priority for excavation when he finally received permission to work at Memphis in 1908.

Another reason for the high priority given to the site was that, following his mention of it to a friend, it had been looted by a third party who had simply collected specimens that — so far as I am aware — remain unpublished. Petrie cleared one kiln or furnace during this first season, but he did not make a plan or elevation of it, and he took only a single photograph of the structure, from the interior.

In 1910, Petrie returned for a second season of work at the site, and this time he focused on what he described as ‘the whole site of the kilns’, unearthing six or seven of them. Unfortunately, this time he took no photographs of the kilns. Moreover, he did not produce any plans or even show the general location on a map. He noted that, ‘as no roadways were found, it is hardly of use to give the plan here in addition to the dimensions’.

The Kom Helul site has subsequently become a type-site for the manufacture of Ptolemaic-Roman faience. As a result, we have a type-site that is located in only the most general terms, with no drawings of the structures found, and without any firm idea of whether it is Ptolemaic or Roman. There are also many questions concerning the technological processes that went on at Memphis.

In the hope of clarifying the situation, new excavations have recently started at Kom Helul on behalf of the Egypt Exploration Society.

THE NEW WORK

Locating Kom Helul was a relatively simple matter. Petrie marked the area, but not the position of the furnaces, on his map, and although the name is not well known locally, the site is preserved. The area of industrial activity is obvious; it is marked by large mounds of debris. However, it was not known if these mounds were ancient or the result of excavations by Petrie or others in the last century.

In September 2000, a preliminary season of excavation was undertaken, based on a rudimentary geophysical survey. The excavations yielded two areas of pottery dumping, one with a great deal of industrial material similar to that known from Petrie’s work.

The key finds among this pottery were the remains of saggers. These were heavily glazed on the inside with strongly coloured glazes in shades of blue and green. It was notable that the colour of the glaze on the underside of the base was often different from that of the glaze on the interior walls and base. This ruled out Petrie’s view that the glaze leaked through cracks in the saggars, thus glazing the underside. The glazing of faience at Kom Helul was by application, as Petrie thought. The glaze on the inside of the saggers is a result of volatilization during the firing.

It was also clear that there were various rim types among the saggers, and that a variety of strips of fired clay fitted some of these. These strips of clay are known as ‘sagger joiners.’ Not only do they preserve the rim shape, but they also leave a blank scar on the base of the vessel above them, clearly illustrating that the base of one vessel formed the lid of another, and so on, to make up a stack (Fig. 1).

The industrial ceramics from Kom Helul are extremely difficult to work on. Sagger joiners are often of the same clay as the vessels, and they become fused to them in such a way that it is often difficult to tell whether a piece is indeed a rim and sagger joiner, or whether a new type of rim is represented. On some occasions, it is even difficult to tell whether the fragment is from a rim or a base. Add to this the practice of lidding some saggers with bases made in the same clay and the problem is further compounded.

Saggers are not the only type of industrial ceramic, however. There are also three-pointed stands, which are known in a variety of sizes. Petrie discovered similar stands, although his had open bases. He believed that they stood inside the saggers and served to support the lowest part of the faience vessel, preventing it from breaking contact with the saggars. However, the examples now in the Petrie Museum, London, are too large to have fitted into the saggars Petrie collected — and, indeed, into many of those which he describes. In addition, they are not covered in glaze, as one might have expected if they had been inside a sagger.

Most of the examples found in 2000 show no signs of glaze, although the tips of their pointed ‘ears’ are almost always broken off. However, the processing of some of these 2000 finds during the 2001 season revealed, for the first
The outline of a furnace appeared only centimetres beneath the surface of the mound, and it was clear that it had not been excavated by Petrie. What this means is that his ‘whole site of the kilns’ is not the whole area. However, it does raise the question as to where his kilns are located. He states that ‘the kilns all lie square one with another, six of them within a space of 60 to 70 feet.’ The geophysical survey does not show an obvious area matching this description, but there is at least one area, north of our current trench, which may be the remains of Petrie’s work. Alternatively, the site of Petrie’s kilns may now lie beneath a village established about 30 years ago.

Petrie’s account of the kilns or furnaces gives their dimensions, all quoted in inches (Table 1). Because Petrie presented his data in inches, it seems likely that the scale of these structures has been overlooked. As can be seen from the conversion in Table 1, the preserved depth actually ranges from 1.52 to 4.75m. Most of the structures are preserved to a depth of more than 3m, and they are more than 1m square. Where it is preserved, what Petrie called the ‘draught hole’ is the stokehole, which was on the west or north side of the furnace.

Table 1 Petrie’s kiln dimensions in inches

<table>
<thead>
<tr>
<th>Kiln</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out N-S</td>
<td>145</td>
<td>(walls 18–21 inches)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Out E-W</td>
<td>155</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In N-S</td>
<td>83</td>
<td>50</td>
<td>42</td>
<td>-</td>
<td>57</td>
<td>46</td>
</tr>
<tr>
<td>In E-W</td>
<td>79</td>
<td>69</td>
<td>52</td>
<td>50</td>
<td>66</td>
<td>42</td>
</tr>
<tr>
<td>Depth now</td>
<td>121</td>
<td>133</td>
<td>133</td>
<td>146</td>
<td>187</td>
<td>60</td>
</tr>
<tr>
<td>Draught hole</td>
<td>W</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>W N</td>
<td></td>
</tr>
</tbody>
</table>

Converted into metres

<table>
<thead>
<tr>
<th>Kiln</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out N-S</td>
<td>3.70</td>
<td>(walls 0.46–0.54m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Out E-W</td>
<td>3.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In N-S</td>
<td>2.11</td>
<td>1.27</td>
<td>1.65</td>
<td>-</td>
<td>1.45</td>
<td>1.17</td>
</tr>
<tr>
<td>In E-W</td>
<td>2.00</td>
<td>1.75</td>
<td>1.32</td>
<td>1.27</td>
<td>1.68</td>
<td>1.07</td>
</tr>
<tr>
<td>Depth now</td>
<td>3.07</td>
<td>3.38</td>
<td>3.38</td>
<td>3.71</td>
<td>4.75</td>
<td>1.52</td>
</tr>
</tbody>
</table>

Petrie describes the walls as straight, and as being covered with slaggery material that preserves traces of the straw that he believed was used as fuel. He says that the slaggery is greatest above the level of the ‘draught hole.’ He also notes that there was no ‘trace of a perforated floor’ on which the saggars might have stood. Thanks to Petrie’s description, we have some idea of what was to be expected from our own work.

The structure unearthed in Trench HAC3 fits well with most aspects of Petrie’s description. It is roughly square, and it is heavily slaggery, particularly above the level of the stokehole. The slag often shows traces of some kind of plant material, but this is not thought to be straw. (If any of it is straw, it likely resulted from the vitrification of the bricks or plaster rather than from the use of straw as fuel.)

The stokehole is located on the east side. This does not necessarily contradict Petrie’s evidence, since he did not find the stokehole of three of the kilns he uncovered. The stokehole is arched, and it is approximately 0.35m high and
Fig. 2. Stove hole of furnace in HAC3, looking west. Sagger fragments are visible just in front of the opening. Scale bar = 0.5m; photo: P. T. Nicholson, courtesy of the Egypt Exploration Society.

0.25m wide (Fig. 2). The upper vent hole is almost opposite the stove hole, and the lower one is visible through it.

The HAC3 furnace differs in some details from those discovered by Petrie. First, the walls are tapered, becoming wider toward the bottom. It is possible that Petrie would have taken very little notice of such a phenomenon and simply recorded the walls as ‘straight.’ We also have at least two vents on the side of the furnace opposite the stove hole. These are smaller (H. c. 0.25-0.3m, W. c. 0.2m) than the stove hole, and they must have helped to draw the fire within the furnace. Petrie’s workmen could easily have missed such small vents. Indeed, they were not immediately obvious in our own excavation, which presumably progressed at a much slower pace than did Petrie’s. The exterior of the furnace on the west side, where the vents were found, has not yet been excavated. As a result, we cannot be sure how the vents were accessed, but we do know that the upper one was deliberately blocked up during the lifetime of the furnace, while the other one has a temporary blocking, such as might have been placed there at the end of a firing. The relative positions of the vents and the stove hole are shown in the schematic reconstruction of how the furnace might have operated (Fig. 3).

The furnace has so far been excavated to a depth of approximately 2m without reaching the bottom, a task that we hope to accomplish in 2002. The question of the flooring of the structure must therefore remain open, and it will be interesting to see if the floor is made of brick or simply of compacted earth. Petrie fails to say what the bottoms of his kilns were like, which might suggest that he never actually reached it. A well levelled floor of some kind is likely if we are correct in assuming that all columns of saggars and three-pointed stands stood on it – which, in the absence of a perforated floor, seems likely (Fig. 3).

To date, the fill removed from the furnace has not accumulated gradually after the structure was abandoned. It appears to have been thrown into the furnace, probably to fill it in deliberately. Finds from the furnace consist mainly of pieces of saggar joiners and the remains of very large saggars, many of them greater than 400mm in diameter. These are rather different from most of those found in 2000, in that they are not heavily and colourfully glazed. Instead, where there is glaze, it is whitish or very pale blue, and the glaze is largely confined to the area near the rim. Lower down the profile, there is a thick white layer, which ends in up to 50mm of lime powder. Petrie mentions saggars 19 and 30 inches in diameter, but he does not make any distinction between their function and that of the smaller saggars. His text implies that they may have been covered in coloured glaze.

It is provisionally suggested that these large saggars formed the lowermost part of the stack, and that they contained lumps of limestone that were placed there to be calcined, probably to use in the glaze or body mixture of the faience. Further up the stack, there would have been smaller saggars containing actual faience vessels. The various levels of the stack may have been separated by three-pointed stands.

It is possible, of course, that our furnace was used only in the production of lime, which might ultimately have been used for the making of glaze. The answer to this question may emerge as we proceed down the profile and perhaps find some in situ material or drips of glaze on a brick floor.

Fig. 3 Schematic reconstruction of the furnace in HAC3 (not to scale); drawing: Joanne Hodges

Conclusions

There is not space here to discuss the Amarna evidence in detail. Although some of the cylindrical vessels found by Petrie at Amarna may have been used in the making of faience, others are likely to have been for glassmaking. It is also certain that when these vessels were stacked, they were arranged in a manner different from that observed at Kom Helul. Although the similarities between the materials at the two sites are striking, they are often superficial, and Petrie’s accounts must be used with caution.

Finally, there is the question of the date of the industry. Petrie thought it began in Ptolemaic times and continued into the early Roman period. Until we have a full report on our pottery and faience, we cannot be certain of this, but a provisional examination of the pottery from the furnace fill, undertaken by Janine Bourriau and Peter French, places the filling of the furnace in or later than the 2nd century.
AD. The fill contains substantial fragments of large saggars, one of which was also used to protect the lip of the stokehole. Other vessels were found nearby, and other fragments were used in the structure above the stokehole. This would certainly suggest that the saggars are contemporeaneous with the furnace, and that they were probably used with it (Fig. 2).

From other parts of the Kom Helul site, we have material from a range of dates. The 6th century BC and the Ptolemaic period are well represented. It may be that we are looking at a site where faience production continued for several generations.

What is clear from the new work is that Petrie’s account needs to be revised, and that the picture of faience production at Kom Helul is much more complicated than he thought. It is also clear that at least some of the similarities Petrie saw in material at Memphis and Amarna are superficial and based on a misunderstanding of the glazing technique used at Amarna. Funding recently obtained from the Leverhulme Trust will allow us to investigate Petrie’s work at Memphis and Amarna in more detail.25

ENDNOTES

3 Petrie [note 1], 34; idem, Memphis, 1, London: British School of Archaeology in Egypt and Quairitch, 1909, 14–15.
4 Petrie [note 1], 34.
5 Petrie, Memphis [note 3], pl. XLIX.
6 Petrie [note 1], 34.
7 Ibid.
8 P. T. Nicholson, ‘A New Furnace at Kom Helul, Memphis’, Egyptian Archaeology, 20, forthcoming (2002). The excavations have been funded by the British Academy (grants SG-30317 and SG-31928), Seven Pillars of Wisdom Trust, Thames Valley Ancient Egypt Society, and Cardiff University, to all of which I am grateful.
9 Petrie [note 1], pl. I.
10 Ibid., 35.
11 Ibid., pl. XIX.
12 Ibid., 34.
13 Ibid.
14 Ibid.
15 Ibid., 35.
16 Ibid.
17 Ibid.
18 Casts were taken of some of these impressions, but they have not yet been examined by an archeobotanist.
19 The blocking of vents and other openings at the end of a firing is a practice well attested among potters. It allows the kiln or furnace to cool more slowly.
20 Petrie [note 1], 35.
22 Petrie [note 1], 34.
23 Leverhulme Grant No. F/00407/M, ‘Reassessing Petrie: Ancient Egyptian Vitreous Materials’. I am indebted to the Leverhulme Trust for its generosity in funding this work.

PAUL T. NICHOLSON
Cardiff University, PO Box 909, Cardiff, UK
E-mail: nicholsonpt@cardiff.ac.uk