

ISLAMIC POTTERY PRODUCTION IN THE OUTSKIRTS OF LISBON

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RÉSUMÉ : *Un ensemble de fours de production céramique, datables entre le Xe et le XIIIe siècles, a été identifié dans une banlieue hors des murs de la Lisbonne islamique. Un des objectifs de ce travail sera la caractérisation typologique et technique de ces structures. On essaiera aussi de corréler leurs productions avec les contextes archéologiques islamiques de la ville. L'étude des matériaux céramiques sera réalisée en relation avec les vestiges structurels de la même chronologie dans l'objectif de les comprendre et les dater. La caractérisation des ensembles céramiques, surtout en ce qui concerne les pièces d'importation, contribuera à la détermination du rôle de la ville dans les circuits commerciaux de l'al-Andaluz.*

Context of pottery remains

Between 1991 and 1996 two archaeological sites were excavated in the low area of Lisbon, West of the Medieval city walls.

Rescue excavations revealed an intense and long occupation of the area, visible namely by the presence of pottery production structures dating to the Islamic period (four furnaces). These findings illustrate the city urban and economic flourishing between the 10th and the 13th centuries AD.

When one speaks of pottery production, its products (i.e., the pottery objects) immediately come to one's mind. Nonetheless, the stages of production must be seen as a whole – the selection of clay sources, its extraction, its composition and plastic preparation for the wheel, the drying, burning, and storage.

From the process of pottery production, the most resistant remains are the furnaces, due to their robust shape and the raw materials used for their construction. Undoubtedly, these are the more easily quantifiable remains. Likewise, in the present article, the furnace is the material evidence that allows us to speak more soundly of the presence of workshops in the centre of Lisbon.

The archaeological intervention in Mandarin Chinês revealed the presence of four furnaces. It is possible that the structures associated with the workshop extended towards the non excavated area, in which this set of furnaces would operate.

In the archaeological assemblage of Rua dos Correios the isolated furnace identified was part of a chain of production. The sector where the furnace was uncovered exhibits many intrusive elements and traces of destruction episodes, somewhat constant throughout all phases of occupation.

FURNACE 1. Built with adobe, it exhibits a circular shape, with a short access corridor, oriented East-West (162×160 cm) (Fig. 1). It is placed in the corner of one of two walls defining a chamber. This wall “served as a reinforcement to the structure of the furnace” (Gisbert Santonja 1990: 87) in the diverse operations of warming and cooling, stages that require the most solid structures.

Although only the combustion chamber is visible (100×115×40 cm), the furnace is typologically integrated in the double-chamber category (Gisbert Santonja 1990: 87-88) – combustion and burning, generally separated by a grid.

The layers recovered from the interior are clayish sandy, with abundant ashes and charcoal remains. Calcined and vitrified pottery fragments, displaying the shape of small flakes, are evidence of high temperatures (Fig. 2). On the other hand, fragments with defined shapes, such as pot and jug handles, rims and mugs, are also vitrified. These elements illustrate the furnace activity and the type of production developed at the time.

Inside the chamber there were also some raw clay fragments, possibly fallen down from the grid, and a set of five complete and finished objects – mugs, a fragment of a pot with handle, rim and belly. These are forms typical of the 12th century, traces of the most recent production in the present structure.

Some characteristics of the ceramic suggest that this structure provided a reduction environment, although the after burning was oxidizing – the colour is not very homogeneous and it exhibits light and dark spots of light tones, such as rose, brown and beige. The structure, however, could also have produced more oxidizing burning, depending on the oxygen levels during the manufacturing time. Some fragments show a double grey surface (e.g., the pot fragment exhibiting a completely reducing production)¹. These charac-

1. Bazzana (Bazzana 1979: 173-174) suggests a complete list for the different types of burning and their correlation with the after-burning.



Fig. 1. Mandarin Chinês. Furnace 1.



Fig. 2. Ceramic assemblage recovered from the interior of Furnace 1 combustion chamber.

teristics, however, do not exclude the production of more oxidizing features in this furnace during its utilization².

FURNACE 2. Completely made of adobe, it preserves 100 cm of its walls. It has a circular form (diam. 147 cm) (Fig. 3) with a series of holes along its walls, placed horizontally at 10 cm from one another; their vertical distribution, however, is more variable, ranging from 15 to 20 cm. It must have been built as a bar furnace, evaluating from the regularity of the holes; the bars would rest on them and the ceramic objects were deposited on top. These bars replace the grid that generally separates the combustion area from the burning zone and over which the pottery ware is placed for burning.

In the interior of the chamber several clayish layers and construction pottery fragments were found. The materials that were exhumed in abundant quantities relate to pot-

tery production, also illustrated by the presence of numerous tripods of somewhat different dimensions and of rolls mostly with glaze remnants, generally honey-coloured, and sometimes green (Fig. 4). The rolls showed fingerprints and negatives of the bases of certain objects (for instance, mugs).

One of the functions of this furnace appears to be related to the glazing of objects, apart from their regular burning³. One glaze fragment found in the furnace area not only supports this hypothesis, but it also indicates the activity of another furnace in the area, specialized in the preparation and making of oxides⁴.

Many Islamic bar furnaces from the Mediterranean basin have been excavated and studied, like those from Cordoba, Valencia, Zaragoza and Marseille⁵. This fact allows us to establish possible technological parallels. Some of these furnaces do not exhibit the grid that separates the

2. It is controversial to suggest that furnace 1 only produces ceramic with reducing characteristics, given that the result would depend on the amount of oxygen that potter would allow into the chamber during the burning operation; it could also depend on the after-burning conditions. In the same batch, it is possible to have objects with different reduction characteristics; it could even depend on the positioning of the objects inside the furnace, varying with its distance from the fire. In Portugal, there is no experimental work that would replicate the furnaces and their operating conditions in order to establish parallels with known structures. According to João Labrinha (University of Aveiro, Department of Ceramics and Glass) an oxidizing burning occurs only when there is the same amount of oxygen as in the atmosphere, i.e., approximately 21%.

3. Not only these furnaces were used for burning and glazing, but there were also different types of pottery in the same batch (single burning, secondary burning – glazing, Biscuit), similarly to what happened in the 13th-century furnaces from Marseille (Marchesi *et al.* 1997: 175).

4. Together with the burning furnaces there were also some structures for producing a vitreous paste, i.e., for lead oxidizing. The furnaces from Mandarin Chinês that exhibit traces of other potter activities suggest the existence of a workshop where the complete sequence of production would take place. Hence, it is likely that a lead oxide furnace existed in this place. Its remains, however, were not identified. The set of furnaces suggests that they had local characteristics and accomplished a low level of production, when compared with known furnaces of the Mediterranean basin; consequently, the lead furnace could have been equally archaic, excavated in the soil, like it occurs presently in Africa (Marchesi *et al.* 1997: 153-164).

5. For the study of bar furnaces, cf. *Le vert et le brun* 1995; Marchesi *et al.* 1997.

combustion and the burning areas; instead, this function is fulfilled by the small holes on the walls where the bars are inserted. One of the characteristic features of this type of furnace is the existence of a lower area, generally excavated in the subsoil, with separate access and where the firewood is placed. The physical separation between the two areas – burning and combustion – is marked by a shelf, from which the wall pierced with holes develops. The draught system present in these structures is vertical, such as we see in the modern furnaces.

The furnaces described above appear to have one feature in common with 2, 3 and 4; i.e., the absence of the grid, the holes for holding the bars, and the vertical draught. The combustion area, however, is not so clearly defined in relation to the burning zone; this is demonstrative of the fact that, even though similar technical and functional principles are present, there is a local and regional character to this set of bar furnaces.

FURNACE 3⁶. It has a circular shape, and it is made of adobe. It appears to be the smallest furnace (diam. 47×80 cm) (Fig. 3). One of the most peculiar characteristics of this combustion structure is related to its position in the workshop. In fact, it develops in the interior of furnace 2 and, like the latter, it has no specific orientation and its access was not definable during excavation. In spite of the difficult interpretation for this structure we think it is another bar furnace, even though the lateral holes for the introduction of the bars were not identified; the draught is also vertical. The clayish layers that were found in its interior, contained numerous ceramic fragments of pottery production (Fig. 4); these findings support our interpretation.

FURNACE 4. Also made of adobe, it has a circular shape (diam. 90 cm, with walls 20-24 cm thick). It is important to emphasize that the northern wall of furnace 4 is also the southern wall of furnace 2. Hence, the whole foundation system of furnace 2 was also used for furnaces 3 and 4, as it can be seen in the profile. The access to this structure was not defined. It is also a bar furnace, because its internal wall (about 77 cm) had the same holes as the ones present in furnace 2. There is no grid present, nor a second chamber, not in this level nor at a lower one. From the contents of its interior, we should emphasize the presence of a significant number of rolls and some tripods (Fig. 4).



Fig. 3. Mandarin Chinês. Furnaces 2 and 3.



Fig. 4. Ceramic from pottery workshop: tripods and rolls, recovered from Mandarin Chinês, with furnaces 2, 3 and 4.

Mandarin Chinês pottery factory (or workshop)

The four furnaces described above are located within a space about 300 cm wide. Even though the access to furnaces 2, 3 and 4 was not defined during excavation, it seems logical that they followed the same orientation as the one from furnace 1, that is, facing East.

The first furnace analyzed is located at a higher level than the other three structures, intersecting the chamber

6. We thank Jacques Thiriot for his contribution in the identification of this furnace. According to his experience, it is common for furnaces to be deactivated and reconstructed, within short limits of same space. In fact, the same happened with more archaic furnaces. Often the construction of furnaces is made in the same areas repeatedly, creating constant superimpositions of these fragile structures.

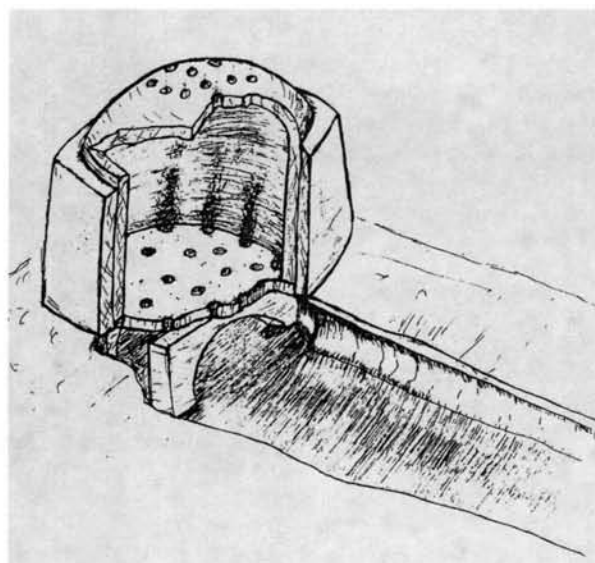


Fig. 5. Hypothetical reconstruction of furnace 5 (illustration by António José Cruz).

of furnace 4, from which 77 cm of the wall subsisted. The base of furnace 1 was partially built over the area of furnace 4, and overlaying an Islamic wall next to the southern wall of furnace 3 and apparently not disturbing structures 2 and 3.

It looks like furnaces 2 and 4 might have worked simultaneously. Furnace 3, however, must have been built after furnace 2 was deactivated⁷. Even though furnace 3 must have replaced furnace 2, the fact that the former was built inside the latter is puzzling. The technology used for building both furnaces was the same, suggesting that the type of production must have continued in furnace 3. The replacement of furnace 2 could have been due to structural problems of this bar furnace and its replacement could have been the most suitable solution. Furnace 3, however, was built partially on the existing structures of furnace 2.

Furnace 4 represents another replacement situation – it replaced the deactivated furnace 1. In this case, however, a different technology was used for building the new structure, given that the preexisting bar furnace was replaced by a double chamber structure, suggesting a possible change in the type of production. It is possible that this change was due to market demands and that the an-

swer was to build a new furnace in the same space as furnace 1.

Apart from the superimposition of different furnace structures in such a narrow space, there were other indicators of the existence of pottery workshops in this area: objects used for the production of pottery (for the preparation of tints, or storage of the glaze oxides), containers with remnants of glazing and *santonica*, or traces of green clay in the interior of furnace 1 and a set of objects at the first stage of burning (biscuit), fragments of bowls (bases and rims), and a lamp spout.

FURNACE 5. Although it was badly destroyed, it presented an elongated form (300×156 cm), built with mud bricks. A circular form was identified, which must have corresponded to the area of the chambers (110×73 cm), adding to a corridor (90×45 cm). Its access and orientation are West-East, like furnace 1.

It is a furnace excavated directly in the clayish sandy soil. From its walls (approximately 40 cm thick), 64 cm are preserved, with two of the north pillars clearly visible (c. 20×20 cm), corresponding to the combustion area. Other smaller pillars are also visible. These were part of the access to the furnace, which would render possible the development of a dome as high as the combustion chamber. Some of the scaffolding holes from the internal grid were still in the interior of the combustion chamber.

In the interior of this structure, apart from layers exclusively made of ashes and charcoal, there were clayish levels, mixed with ashes. The objects found in the interior of the oven were a pot *in situ*, mug rims, pots, small jars, fragments of pitchers, basins and cups. They are ceramics mostly decorated with white pigment exhibiting brighter colours than those from the previous furnaces. It seems that the atmosphere in this particular case had an oxidizing tendency⁸, enhancing the iron components in the pastes.

From the analysis of the data above and by comparison with other furnaces we propose the following reconstruction hypothesis (Fig. 5):

- One area where the firewood for burning was placed – the interior camera, in which one could insert some ceramic objects not burned. If this operation was performed, then a separation between the objects and the fire had to be built.
- The area described must have been built below the soil

7. As archaeological research on pottery workshops of the Mediterranean basin has demonstrated (namely in Southern France), numerous furnaces are abandoned and, often part of their structures are reutilized. Part of the combustion areas are recycled into new constructions. A similar situation apparently occurred in furnaces 2 and 3 (Marchesi *et al.* 1997).

8. The remarks for the burning conditions presented for Mandarin Chinês equally apply, in this case.

and at its level⁹, the burning chamber would be built, at a positive level. This would have a specific entrance for placing the objects in its interior.

– The grid could have been built in adobe and hence, it would be more perishable.

– The burning chamber must have had a circular form but on its exterior there must have been a square “belt”, probably made of stone, which would follow almost the whole of the walls.

The dome of the burning chamber must have had several perforations to control the oxygen input and the smoke output.

– The smoke output would have been vertical.

Furnace 5, even though it was very destroyed, it exhibits more clearly the characteristics of known technological parallels; on the other hand, it maintains the more classical construction or technological trendmarks, taking advantage of the Roman models inherited by the Islamic tradition.

Area of Islamic tradition workshops?

The four furnaces from Mandarin Chinês integrate a pottery factory. In BCP, however, there is one isolated furnace, as part of a set of production structures; nonetheless, they are all integrated in the same geographical area of production.

They constitute a set of furnaces of reduced dimensions and with some peculiar technological characteristics that assign them a local character. Furnace 5 appears to be the most universal of all, not only in its dimensions (even though it is small) but also on the applied technology.

The production from these furnaces is mostly made of daily usage kitchen and table ware, as well as storage containers and lamps. The characteristics of the objects and the furnaces themselves suggest that the production must have been directed towards a regional or even local market, not spreading geographically much further.

The five furnaces, however, were working more or less simultaneously during the 11th to the 12th centuries, as the similarity of the produced ceramics suggests.

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9. It is not by chance that the majority of the archaeological traces of furnaces are the combustion chambers. It is their lower position in relation to the ground level that protects them from weathering.

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