The role of the husking tray in the late Neolithic communities of Northern Mesopotamia. A first experimental analysis

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ABSTRACT

The subject of this paper is the study of a pottery shape known as the “husking tray”, whose functional interpretation is the main topic of my doctoral research. The husking trays are usually very large trays, made of a coarsely straw-tempered clay, characterized by a very wide oval base and low sides; they were used by the communities living in Northern Mesopotamia during the seventh and the first half of the sixth millennium BC. The most interesting feature of this kind of vessel is the presence of incisions and impressions on their interior surface. Several scholars have suggested various hypotheses about how the husking trays could have been used and what specific function they could have had, but these suggestions have remained merely theories so far. In the paper it will show a first experimental analysis which has revealed that the husking trays could have been pans used to bake bread and the incisions/impressions on their inner surface could have been anti-adhesive arrangements.

KEYWORDS

Late Neolithic, Hassuna, Pottery, Experimental Archaeology, Cereals, Oven, Bread
1. Introduction

According to the archaeological literature, the term husking trays refers to trays, belonging to the Late Neolithic Period (ca 6 900-5 300 cal. BC), usually very large in size, which present an interior surface crossed by incisions/impressions (fig. 1).

Shards belonging to this pottery shape were found in the archaeological sites since the 1940s in Upper Mesopotamia and particularly in contexts related to the Hassuna pottery horizon. They were found here in so many amounts that the husking trays were for a long time considered as a fossil key of this Culture.¹

Then, with the spread of archaeological excavations, fragments of husking trays were found in all of the Near East and for periods before and later than which the Hassuna Culture had supposedly developed.²

Despite the wide area interested by their presence, the husking trays represent a homogeneous ceramic group for technological characteristics.³ Even though often in a fragmentary state, generally these are large oval trays that could reach up to 60 cm in length and 40 cm in width, on the contrary of the quite low sides (c. 10/15 cm). Both the base and the sides were almost always extremely thick and done in a rough way. The rim most of the times is very irregular so that the height is rather variable within each vascular shape.

The husking trays belong always to the most coarsely group of the ceramic assemblages in which they were found.⁴ The clay appears to be tempered with plant inclusions usually in large amount and of large size. The presence of this kind of temper, that disappear during firing, and made the pottery surface very porous.

In general, the surfaces of the husking trays are so poorly finished, that fingerprints left during the phase of shaping, are visible as well as the attachment of coils. In general, the surfaces are just roughly smoothed and less frequently scraped.

On the contrary to their outer surface, that usually did not show any kind of decoration or superficial treatment, the interior surfaces were crossed by incisions, impressions or grooves. These characterized the husking trays in a wide variety of patterns (parallel lines, criss-crossed lines, impressions, etc). These marks could be carried out with tools or with the finger and could also have a different depth in the same vessel.

These marks entirely covered the inner surface of the husking trays and have always caught the curiosity of scholars, who suggested throughout time, various hypotheses about their functionality and/or meaning.

¹ Cruells, Molist, Tunca 2004, p. 2.
In the present paper the hypotheses suggested until now about the possible function of the husking trays will be briefly summarized.

The two most commonly agreed of them will be critically assessed by a first experimental analysis. In the conclusion the results will be discussed.

2. Functional Hypotheses

Since the excavations of one of the first archaeological sites where fragments belonging to the husking tray group were found, archaeologists attempted to explain the peculiarity of this pottery shape by its presumed function.

The first attempt dates back to 1943-44 when Lloyd and Safar\(^5\) found fragments of husking trays at the site of Tell Hassuna. They, «for want of a better explanation of its purpose», supposed that these kind of trays were used for separating the grain from their husks. The idea was probably that the husking trays could have been used like large graters where spikes would have rubbed against them. For this reason, they referred to this peculiar kind of vessel as a husking tray which later became their definitive name.

In 1983 M. Voigt,\(^6\) who found husking tray shards at the archaeological site of Hajji Firuz Tepe in Iran, questioned the previous interpretation of Lloyd and Safar.

Voigt stated that it is unlikely that the trays were used for husking, given their size and weight, suggesting instead that they could have been portable ovens used to bake flat bread. This hypothesis was proposed on the basis of a comparison with a kind of oven used nowadays in Iran called sangak. The name of these ovens refers to the presence of a bed of pebbles at their base; when heated during baking they serve as a method to avoid the adherence of the bread to the base of the oven.

Thus, Voigt suggested that the husking trays, thanks to their textured, matte inner surface would have prevented a thin layer of dough from sticking during baking.

Moreover, Voigt noted that on the contrary to the husking tray shards, the domed ovens of Hajji Firuz Tepe do not belong to earliest levels. This fact would have provided support to the idea that the husking trays served as portable ovens before the appearance of the domed oven.

Since then, the majority of scholars have preferred Voigt’s explanation,\(^7\) tempting to support this idea with ethnographic comparisons\(^8\) of vessels used to bake bread but, it has always just remained a theory.

On the other hand, other hypotheses related to the proposal of Lloyd and Safar were proposed; the husking trays were used for similar activities but to manage softer foods\(^9\) or to produce wine.\(^10\)

Moreover, it was also proposed that the husking trays could have been used as “parching trays”\(^11\) to roast grains.

Finally, a similarity in shape has been noted between the husking trays and the vessels currently used in Anatolia to elaborate dairy goods.\(^12\)

3. Experimental Analysis\(^13\)

To verify if the suggested hypotheses about the function of the husking trays were actually feasible, a first set of experimental tests were carried out.\(^14\)

In particular, these experiments focused on verifying the hypothesis that the husking trays were used to separate the cereal grains from their husk (Lloyd and Safar’s hypothesis) and the idea that they were used in bread baking (Voigt’s hypothesis).

\(^5\) Lloyd, Safar 1945, p. 278.
\(^6\) Voigt 1983, p. 159.

\(^7\) Balossi, Mori 2014, p. 53.
\(^8\) Tekin 2015, p. 25.
\(^10\) Hypothesis suggested by Bahman Kargar quoted in Ajorloo 2013, p. 39.
\(^12\) Cf. Güner 1988; Köşay 1957.
\(^13\) For a brief summary of the experimental analysis see also Taranto 2018.
\(^14\) The data presented here are the results of the master thesis from the author of this paper.
The first step was to reproduce functional replicas of husking trays15 (fig. 2). This work was based on the drawings and the data of the husking tray fragments found at Tell Sabi Abyad in Syria.16 During the shaping phase, a coarse, refractory clay was tempered with a large amount of straw fragments. Both the pinching and the coiling techniques were used to shape the trays.

According to the data of the husking trays of Tell Sabi Abyad, the surface of the vessels were simply, roughly smoothed17 and their inner surface was scored in different patterns both with the fingers and with tools.

After more than a month of drying some of the experimental replicas were fired in an earth-oven and others in a modern kiln.

3.1 Husking Test

The hypothesis that the husking trays were used as large graters for husking the spikes was at first submitted to experimental analysis18 (fig. 3).

The experiment has revealed that the husking trays could have hardly been used for that work. In fact, the incisions and impressions were an obstacle to that kind of activity because of their size and depth: often whole fragments of spikes filled them without breaking. Moreover, the ceramic surface (characterized by high porosity) is unsuitable to endure the mechanical stress caused by the rubbing of hard grains.

Finally, the other characteristic of this pottery shape like the remarks relative to the size and the weight suggested by M. Voigt would remain unexplained.

15 Cf. Mathieu (ed.) 2002. The major part of the husking tray replicas was carried out during the course of experimental archaeology maintained by professor C. Lemorini in the 2015/16 at the Sapienza University of Rome.

16 Nieuwenhuyse 2008; Akkermans et Al. 2014; Le Mièrè, Nieuwenhuyse 1996.


18 In the experiment hulled barley spikes were used.
3.2 Baking Tests

To be able to perform the experiments related to the hypothesis that the husking trays were used for bread baking, it was necessary to build the three kinds of fire installations that were supposedly present in the Late Neolithic contexts.

A domed oven, a tannur-like oven and a fire-place were replicated on the basis of archaeological remains of fire installations (fig. 4).

They were shaped by superimposing strata of rough clay mixed with a fair amount of large straw fragments. The dough consisted of stone-grounded flour, roughly sieved, of two kinds of cereals: the wheat and the barley. Wood-coals were used as fuel.

Fourteen tests were executed for this first set of experimental analysis. For every one of them, variables such as the kind of fire installation, cooking

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20 The presence of this kind of oven during this period is doubtful. In fact the upper part of the oven in the archaeological examples was not found leaving its missing part uncertain. Balossi, Mort 2014, pp. 48-49.
21 The replicas were based on examples from Yarim Tepe: Merpert, Munachaev 1993, p. 77; p. 84; Mulder-Heymans 2002.
22 Wheat and barley generally are the most common crops resulting from the paleobotanical analysis in the Near Eastern, Late Neolithic sites such as at Tell Sabi Abyad (Akkermans et al. 2014, p.239).
Figure 5
Baking experimental test with tannur-like oven

Figure 6
Baking experimental test with the fireplace
time, baking temperature, presence/absence of sour-dough, consistency of the dough (liquid, semi-liquid or solid) were changed.

3.2.1 Experiment with the tannur-like oven

The baking tests performed with the tannur-like oven have revealed that this kind of fire installation is unsuitable for baking bread with the husking trays (fig. 5).

In fact, an attempt was made to put the vessel filled with the dough at the top of the upper opening of the tannur-like oven but:

- if the fire inside the oven was lit, its flames produced burn traces on the external surface of the tray that are not present on the archaeological shards of husking trays. Moreover, the resulting bread was burnt at the bottom and completely undercooked at the top.
- if the fire inside the oven was extinguished, baking was impossible because the remaining heat from the preheating stage of the oven, was not high enough to allow the bread to bake.

3.2.2 Experiment with the fireplace

Also, the attempts to bake bread with such a large pottery shape in a simple fireplace did not work (fig. 6). In this case the large size of the husking trays prevented the oxygen from feeding the burning coals under it which resulted in extinguishing them. Thus, the heat did not arrive from the top because the baking was in the open air, neither from the bottom because once the husking trays were put in, the coals became extinguished in a short time. As result, the bread remained totally raw.

To facilitate the baking of the dough the idea of using lids was taken into account, however, this idea was discarded because they are not present in the archaeological record.

On the basis of ethnographical examples putting hot coals also at the top of the husking tray was tested, however, this attempt did not work either. The upper part of the dough turned into a hard crust that stuck to the sides and instead the bottom part remained totally undercooked.

3.2.3 Experiment with the domed oven

In the first experiments conducted by baking bread with the husking trays in the domed oven positive results were not obtained.

Initially many experiments failed due to the use of semisolid dough. Once again the upper surface of the dough in contact with the high temperature of the oven, turns into a very hard crust while the lower part of the dough, when in contact with the ceramic surface, remains quite raw and wet (fig. 7).

Subsequent work made it clear that the consistency of the dough was a critical variable, and this crucial insight ultimately led to positive results.

Finally, since this variable of the dough was changed in which more solid forms were used, the experiments began to work, and baking bread became possible (fig. 8). In fact, using a very solid dough, prevented the incisions/impressions on the surface of the vessel from being filled. With this method the scoring on the pottery’s surface had a function: it created a bumpy surface that prevented the dough from adhering well to the vessel therefore facilitating the extraction of the bread after baking.

In conclusion the experiment worked:

- by simply putting the husking tray filled with a very solid dough in the preheated domed oven directly on the burning coals;
- with the preheating technique of the tray.

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23 The cooking temperatures were recorded with a pyrometer TE/XF0600F3E, AM&C.
24 Today the tannur ovens are used to bake bread by putting the dough discs against the heated inner walls. In the experimental analysis an attempt was made to bake by placing the tray over the upper porthole since it is the only possible way to bake with a husking tray in this kind of oven. However, nowadays in the Near East sometimes pots are also put at the top of the tannur to cook.
25 There are many ethnographic examples of pots used for baking by burying them (usually covered with a lid) in hot coals. Cf. for instance Djordjevic, Nioloov 2013, p. 54.
**Figure 7**
Baking experimental test with domed oven

**Figure 8**
Baking experimental test in the domed oven and preheating of the tray
The role of the husking tray in the late Neolithic communities of Northern Mesopotamia

4. Concluding Remarks

In conclusion this first set of experimental tests allow us to consider that Voigt’s hypothesis is actually feasible with some adjustments:

- the husking tray would not be portable ovens, but pans used with a domed oven;
- the bread would not be so thin because the presence of incisions on the inner surface of the husking trays would indicate the height of the hypothesized bread (ca 4-5 cm).

Furthermore, if the husking trays were used in this way many of their characteristics would have had an explanation.

The general shape of the husking trays with a wide base and low sides qualify them as the perfect pan to cook in a domed oven: their shape in fact allows a large quantity of food to homogenously distribute so that it could arrive to a similar temperature at the same time (taking modern pans into account).

The ceramic composition of the husking trays (coarse, plant-tempered clay) is suitable for cooking in an oven because it minimizes the thermal stress.29

Finally, the incisions/impressions present on the inner surface would be explained: they would be anti-adhesive arrangements.

This should explain why the incisions/impressions often looks to be done in a careless way, the reason they have different depths throughout the same vessel and why they were distributed regularly and repeatedly on the surface of the trays. In regards to the interpretation of the pottery shape, this work suggests that the “husking tray concept” could shift towards a more functional sense related to an adaptation of the pans for bread baking. However, the fact that the incision/impressions could have a functional purpose, it does not exclude that the different "decorations" could have also had a meaning.

Moreover, the cereal is a very good candidate as a main ingredient to be cooked with in the husking trays; in fact, it was one of the staple foods of these kinds of communities.

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26 Balossi, Mori 2014, p. 53; see also Djordjevic, Nilolov 2013.
28 This temperature was recorded with a non-contact infrared thermometer PCE-889B.
Finally, it should be remembered that for later periods of the Near Eastern history there are parallels for baking bread in pots; the scenes depicted in the Old Kingdom Tomb of Ty\textsuperscript{30} and by the so-called “bread moulds” of the Zimri Lim palace in Mari\textsuperscript{31} are evidence of this.

In conclusion, this research gives insight to the functional interpretation of the husking trays and broaden the horizons about the understanding of the Late Neolithic communities in the Near East. Nevertheless, the experimental analysis indicate a possible direction, but should be considered a first step. Only future experimental analysis in conjunction with the archaeological data could provide more precise and solid suggestions of the role played by this pottery shape.

Acknowledgment

I would like to thank Professor Cristina Lemorini and Professor Francesca Restelli Balossi without whose aid and support of the research could not have begun. In addition, thank you to the welcoming and trustworthy Professors, Miguel Molist Montaña and Anna Gómez Bach, without whose support for this research could not continue. Finally, thank you for the considerate suggestions provided by the reviewers.

\textsuperscript{30} Chazan, Lehner 1990.
\textsuperscript{31} Margueron 2004, p. 492.
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