Francesca Balossi Restelli and Lucia Mori
Sapienza University of Rome

Bread, baking moulds and related cooking techniques in the Ancient Near East

Abstract

The present paper deals with baking techniques and tools for the production of bread from Ancient Near Eastern archaeological contexts. The aim is to understand when grain doughs started to be cooked in the Near East, how they were produced and what they looked like. Ingredients, ancient utensils, and baking techniques are investigated as well as ethnographic analogies suggested. The analysis is further enriched by a comparison with techniques and tools attested in historical periods and in ancient texts, including baking moulds and recipes. This contributes to the identification and understanding of the technological differences between varying bread-baking installations existing in the Ancient Near East that often are not differentiated in the literature, for which we instead suggest distinct contexts of use.

Keywords
Bread baking,
Prehistory,
Near East,
Ancient culinary practices,
Baking moulds,
Ancient ovens,
Mesopotamia,
Cuneiform texts,
Ancient food recipes

Introduction

Bread is and was in the Near East the main staple food. Bread constitutes the major part of most people's diets reflected by the fact that in Near Eastern ancient and modern languages the term for "bread" is also used as a generic term for food.[1] Present-day villagers do not ask if guests want something to eat but if they want some bread. Since the Neolithic, more than 10,000 years ago, Mesopotamian and Near Eastern civilizations had a primarily farming economy, based mostly on cereal cultivation, with which bread is made. From the phases of urbanization (last centuries of the fourth millennium BCE),

[1] Carol DELANEY, *The Seed and the Soil: Gender and Cosmology in a Turkish Village Society* (Los Angeles, 1991).

when epigraphic sources are attested, these match up with the archaeological data, indicating that cereal production, consumption, and re-distribution was at the heart of the ancient Near Eastern economy, both in administrative ("public") and in domestic ("private") contexts.[2]

Bread, together with beer, was consumed by all members of society and, often in more elaborated recipes, was offered to the gods.[3] Already in the earliest writing, the Sumerian sign NÍG/GAR is used for NINDA (Sumerian), which will correspond to the later Akkadian term *aklu*, that means "bread" but is also a more general term for "food/nourishment". It is worth mentioning that the Akkadian *aklu* is related to the general concept of eating (the verb *akālum*), and the term *bēl akli* is used to indicate the "guest", to whom, as still practiced in modern times, bread is offered together with beer ("Give bread to eat, give beer to drink. Provide what is asked for, supply food and honour your guest!", *Counsels of Wisdom*, 61-64).[4]

Even the ration system typical of the Near Eastern "Great Organizations" economy was based on set allocations of cereals/bread, powdered beer, and sesame oil, suggesting that eating was intended essentially as eating bread.[5] Even though this is due to the agricultural landscapes that characterize the Near East, where cereals (barley mostly in the hotter southern regions and wheat mostly in the dry farming regions of Upper Mesopotamia and Anatolia) were grown, cultural habits certainly influenced food production and consumption. The symbolic value of bread is, in fact, extremely strong. It is mirrored both in literary, religious, and juridical texts all through Mesopotamian history as in the well known *Epic of Gilgamesh*, in which the character of the wild man, Enkidu is civilized through sex and through the introduction to proper eating and drinking which is the eating of bread and the drinking of beer.[6]

[2] Marcella FRANGIPANE, "Politics, Economy and Political Economy in Early centralised Societies. Theoretical debate and Achaeological Evidence", in Marcella FRANGIPANE (ed.), *Economic Centralisation in Formative States. The Archaeological Reconstruction of the Economic System in 4th Millennium Arslantepe* (Rome, 2010), pp. 11-22; Mario LIVERANI, *Uruk la prima città* (Bari, 1998), in particular pp. 47-51 "Il ciclo dell'orzo".

[3] Lucio MILANO, *Mangiare divinamente. Pratiche e simbologie alimentari nell'antico Oriente*, Eothen, vol. 20 (Florence, 2012)

[4] Jean BOTTÉRO, *La plus vieille cuisine du monde* (Paris, 2002); Frances REYNOLDS, "Food and Drink in Babylonia", in Gwendolyn LEICK (ed.), *The Babylonian World*, (New York–London, 2006), pp. 171-184.

[5] Lucio MILANO, "Food and Diet in Pre-Classical Syria", in Carlo ZACCAGNINI (ed.), *Production and Consumption in the Ancient Near East* (Budapest, 1989), pp. 201-271; Lucio MILANO, "Le razioni alimentari nel Vicino Oriente Antico: Per un'articolazione storica del sistema", in Rita DOLCE, Carlo ZACCAGNINI (eds), *Il pane del re. Accumulo e distribuzione dei cereali nell'Oriente Antico* (*Studi di Storia Antica* 13 – Bologna, 1989), pp. 65-100. As far as beer production in Ancient Mesopotamia is concerned see the experimental research by Martin ZARNKOW, Elmar SPIELEDER, Werner BACH, Bertram SACHER, Adelaide OTTO, Berthold EINWAG, "Kaltmaischverfahren – eine mögliche Technologie im Alten Orient", *Brauwelt*, 10 (2006), pp. 272-275.

[6] Jean BOTTÉRO, *La plus vieille cuisine...*, pp. 63-66.

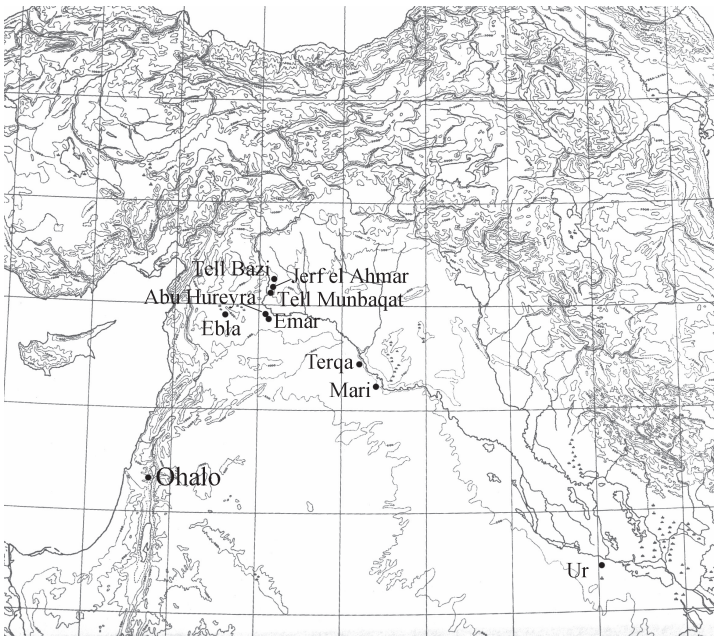

Fig. 1 : Map with sites mentioned in the text.

In juridical texts, already from the beginning of the third millennium BCE bread was present in legal transactions (ancient *kudurrus*), together with other kinds of food, as part of "compensation gifts", probably resulting in a banquet, the buyer of a piece of immovable property owed to the community.[7]

What was a proper banquet in Mesopotamian epigraphic documents of the third millenium BCE became a ritual act of "breaking the bread and anointing the table", which symbolically sealed estate transfers, in legal formulas dating to the second millennium BCE, found in the Syrian archives of Emar,[8] (Fig. 1) and present also, with some local variants, at Mari and Terqa.[9] From the same site, we get a vivid picture of important rituals involving the whole community, where food preparation, offering, and consumption played a key role in the main religious processions. Again different kinds of bread, probably produced by the entire population of the town especially for the

[7] Ignace GELB, Piotr STEINKELLER et al., *Earliest Land Tenure Systems in the Near East: Ancient Kudurrus*, OIP 104 (Chicago, 1991); Lucio MILANO, "Regime fondiario e compravendite immobiliari nella Mesopotamia del III millennio", in Mario LIVERANI and Clelia MORA (eds), *I diritti del mondo cuneiforme (Mesopotamia e regioni adiacenti, ca. 2500-500 a.C.)* (Pavia, 2008), pp. 91-120.

[8] Carlo ZACCAGNINI, "Ceremonial Transfer of Real Estate at Emar and Elsewhere", *Vicino Oriente*, 8/2 (1992), pp. 33-48.

[9] Francesco DI FILIPPO, "Gli atti di compravendita di Emar", in Mario LIVERANI and Clelia MORA (eds), *I diritti del mondo cuneiforme...*, pp. 419-456.

main religious festival, represented not only a way to relate to the city gods, but also a fundamental symbolic and concrete act to establish social relations inside the town, as underlined by W. Sallaberger.[10]

Bread preparation

In its simplest form, bread is made from a moist dough of flour and water. Flour production is known since the earliest phases of the Epipalaeolithic in the Levant, at sites such as Ohalo II, where the use of wild cereals is attested as early as 19000 BP and stone mortars appear around 15000 BP.[11] By the Natufian period (12000-10000 BCE in the Levant) mortars, querns, pestles, carbonized cereals, and legumes (rye, barley, *triticum*, lentils) become abundant.[12] Ground stone tools, mostly made of vesicular basalt, represent from now on the most recurrent and common artefacts in the archaeological record. In later historical phases, specialized areas for the production of flour with the use of rubber stones and saddle-shaped querns have been found both in public and domestic contexts.[13] We can thus hypothesize that bread was prepared in the Near East since the end of the Epipalaeolithic. Severe abrasion on the teeth of humans from the Neolithic site of Abu Hureyra suggests though that such bread must have been rather gritty.[14] Ingredients and flavours could vary: at

[10] Walther SALLABERGER, "Home-made Bread, Municipal Mutton, Royal Wine. Establishing Social Relations during the Preparation and Consumption of Food in Religious Festivals at Late Bronze Age Emar", in Susan POLLOCK (ed.), *Between Feasts and Daily Meals: Toward an Archaeology of Commensal Space, eTopoi* (2012), pp. 157-176; Adelheid OTTO, "Defining and Transgressing the Boundaries between Ritual Commensality and Daily Commensal Practices: the Case of Late Bronze Age Tall Bazi", in Susan POLLOCK (ed.), *Between Feasts and Daily Meals...*, pp. 179-195.

[11] Dani NADEL and Israel HERSKOVITZ, "New subsistence data and human remains from the earliest Levantine Epipaleolithic", *Current Anthropology*, no. 32 (1991), pp. 631-635.

[12] Ofer BAR-YOSEF, "The Natufian culture in the Levant, threshold to the origins of agriculture", *Evolutionary Anthropology*, vol. 6 (1998), pp. 159-177.

[13] Among the best preserved rooms with batteries of grinding stones in palatial contexts, we can mention a grinding room in Palace G at Ebla, dating to the 24th century BCE (Paolo MATTHIAE, *Ebla la città del trono* (Torino, 2010)). Much later Egyptian sources often testify dough preparation and bread baking, and will be cited throughout this article, but worth pointing out here is the finding of utensils and primary products used for bread preparation during the excavation of the Amarna workmen's village dated to 1360-1330 BCE. In the latter site mortars and querns were found that were used for pounding emmer wheat into flour (Delwyn SAMUEL, "Bread making and social interaction at the Amarna workmen's village, Egypt", *World Archaeology*, no. 31/1 (1999), pp. 121-144). The rotary quern is probably introduced in the Near East by the ninth century BCE; an updated general study on Near Eastern grinding stones and milling practices is provided by Luca BOMBARDIERI, *Pietre da macina, macine per mulini. Definizione e sviluppo delle tecniche per la macinazione nell'area del Vicino Oriente e del Mediterraneo orientale antico*, BAR International Series 2055 (Oxford, 2010).

[14] Andrew M. T. MOORE, "The inception of potting in western Asia and its impact on economy", in William K. BARNETT and John W. HOOPES, *The Emergence of Pottery: Technology and Innovation in Ancient Societies* (Washington, 1995), pp. 39-53.

the Prepottery Neolithic site of Jerf el Ahmar, two charred "seed cakes" have been found, obtained by finely pounding some *Brassica* or *Sinapis* seeds.[15] We do not know the shape and dimensions of these most ancient foods, for which we thus use the generic term "bread-like" or pastry. Whilst Natufian breads (12000-10000 BCE) were most probably unleavened, as these required only that a thick mixture of pounded cereal and water be heated, we do not know whether the Neolithic ones were leavened or unleavened.[16]

Epigraphic sources mentioning flour, bread and pastry, although extremely abundant, especially in administrative texts related to food deliveries or to food for palatial consumption, often have intrinsic difficulties in translation. Many kinds of flour and types of bread are found, and bread types were often referred to with local names. Brunke's analyses of bread names attested in the UR III administrative documents underline how bread was described either by size or type or shape, but sometimes also with a combination of two or more attributes. Fats, fruits and nuts could be added to the dough, but generally speaking not salt.[17] This variety in preparation is accompanied by a variety in shapes as can be seen in the representations in the iconographic repertoire depicting bread making or bread offering on cylinder seals, stone vases, statues, and reliefs from the Early Dynastic period to the Assyrian era. In these sources appear different shapes such as rings, crescents, triangular flaps, and rectangular loaves, but also naturalistic shapes such as hands or ears are portrayed.[18]

Barley (*ûm*) and Emmer wheat (*kunāšum*), the main crops in the dry farming belt of Upper Mesopotamia, were certainly ground into flour with simple saddle-shaped grinding stones, as mirrored in the general Akkadian word for flour, *qēmum*, (Sumerian ZÌD) from *qemûm* = to grind. Different kinds of milling resulted in coarser (*tappinnum* – coarse-grained flour made of barley) or finer flours (*sasqûm* – fine grade flour mostly derived from emmer) and in the milling process parching could also be performed, as documented by the mention of a "roasted barley" and "toasted barley flour".[19] Bread was usually measured according to the quantity of cereal needed to make it and

[15] George WILLCOX, "Charred plant remains from a 10th millennium BP kitchen at Jerf el Ahmar", *Vegetation History and Archaeobotany*, no. 11 (2002), pp. 55-60.

[16] Solomon H. KATZ, Mary VOIGT, "Bread and Beer: The Early Use of Cereals in the Human Diet", *Expedition*, vol. 28/2 (1986), pp. 23-34.

[17] For a recent overall philological analysis of bread types attested in the Ur III archives see Hagan BRUNKE, *Essen in Sumer. Metrologie, Herstellung und Terminologie nach Zeugnis der Ur III-zeitlichen Wirtschaftsurkunden*, Geschichtswissenschaften 26 (München, 2011).

[18] For a list of bread representations see Elisabeth Rosemary ELLISON, *A Study of Diet in Mesopotamia (c. 3000 – 600 BC) and Associated Agricultural Techniques and Methods of Food Preparation*, Ph.D. Thesis, University College London (1978), pp. 123-124.

[19] Lucio MILANO, "Mehl", in David O. EDZARD (ed.), *Reallexikon der Assyriologie und vorderasiatische Archaeologie*, vol. 8 (1993), pp. 22-31.

it is not often possible to determine how many loaves could be baked out of a certain quantity of flour, but standard loaves weighing 600, 300, 200, 150, and 120 grams each have been reported for the pre-Sargonic Lagash.[20] Ur III administrative documents register loaves most recurrently made of one or half a litre of flour, whilst heavier loaves made of 2 litres of flour are attested from Mari.[21] Possibly such big loaves were of leavened bread as a two-litre flat bread would be too large to handle.

From the Mari palace archives dated to the nineteenth-eighteenth century BCE, a considerable number of administrative accounts of food deliveries literally for the "king's meal" (*naptan šarrim*) register huge quantities of cereals for a variety of breads produced by female specialists (*ēpītum*), some of which, in Jack Sasson's words, "bearing names which readily make sense etymologically, and so must be interpreted skeptically".[22] Among these are "sourdough bread" (*emṣum*),[23] "risen bread" (*kumuranātum*), "blistered bread" (*hibsum*), "round bread" (*kakkarum*), providing a variety of terms related to bread types which reflects the culinary sophistication of a high social status table like the royal one, but whose actual ingredients and shape often escape our real comprehension. Bread production in domestic contexts was much simpler.

Unleavened bread, as is still today in the Near East,[24] was probably already then the most common type of bread produced while leavened preparations were more elaborated and could be used in different kinds of recipes, as described in one of the complex food preparations of the "Babylonian cookbook" edited by Jean Bottéro. In the first recipe of Table B (YOS XI 26) small birds were placed in a case of dough and the meat was served both with unleavened and leavened bread: ll. 19-22: "Tu fais de cette pâte deux moitiés égales. Tu en laisse gonfler une, réservée dans une marmite; et tu cuis l'autre, au

[20] The weight of the standard loaves reported has been calculated from the attested measures of 1/10, 1/20, 1/30, 1/40 and 1/50 BÁN. 1 BÁN = 6 SÌLA in Pre-Sargonic Lagash (Lucio MILANO, "Mehl...", p. 29). The capacity unit SÌLA/*qû*(*m*), commonly used in Mesopotamia to measure grain, was roughly equivalent to 1 litre. For a general study on measures in ancient Near East see Marvin POWEL, "Masse and Gewichte", in David O. EDZARD (ed.), *Reallexikon der Assyriologie und vorderasiatische Archaeologie*, vol. 7 (1987-1990), pp. 457-517.

[21] Text ARM XXII 287, ll. 3-4 (Lucio MILANO, "Mehl...", p. 29); Hagan BRUNKE, *Essen in Sumer*..., p. 6.

[22] Jack SASSON, "The King's Table: Food and Fealty in Old Babylonian Mari", in Cristiano GROTTANELLI and Lucio MILANO, *Food and Identity in the Ancient World* (Padua, 2004), pp. 179-215.

[23] The "sourdough bread" has been often translated as "leavened bread", made of a sour or starter (see for example Jean BOTTÉRO, *La plus vieille cuisine*..., pp. 32-33).

[24] Samuel AVITSUR, "The Way to Bread: the Example of the Land of Israel", *Tools and Tillage*, vol. 2/4 (1977), pp. 228-241. Grith LERCHE, "Khubz Tannur: Freshly Consumed Flat Bread in the Near East", in Alexander FENTON and Trefor M. OWEN (eds), *Food in Perspective. Proceedings of the Third International conference on Ethnological Food research*, Cardiff, Wales, 1977 (Edinburgh, 1981), pp. 179-195.

four (tannur), en (petit)-pains sebetu de 2 (?) grammes chacun, que tu détache une fois cuits (de la paroi du fond)".[25]

Leavened breads are typically made from wheat, as wheat proteins are unique in their ability to form an elastic mass when mixed with water (gluten) that ferments producing carbon dioxide, a gas causing the dough's expansion. The cereal richest in glutenin is wheat (*Triticum spp.*), followed by rye (*secale cereale*), barley (*Ordeum vulgare L.*) and oat (*Avena sativa*). All these cereals were domesticated in the Near East by the middle of the Prepottery Neolithic (around 8000 BCE).

The production of carbon dioxide is started by the fermentation of the dough which can be due quite simply to the bacteria present in the flour, or else to the use of leavening agents. The latter have been discovered on ancient bread residues in Egypt dated to the New Kingdom, but it is very difficult to tell what kind of leavening agent was used.[26] Cereals rich in glutenin are commonly used to produce sourdough, a naturally leavened dough, thus without the use of yeast. If dough is left out in warm weather the fermentation process begins easily. Leavening agents, such as bacteria, added to the dough accelerate the fermentation process, but are not strictly necessary; yogurt is one of these. Most commonly in the past, it was probably small leftover pieces of dough that were added to the new mixture to start the fermentation process.

Debates on the beginning of the use of yeasts in the Near East are still ongoing; we know for sure that they were used in beer production at the beginning of the third millennium BCE.[27] It has furthermore been demonstrated that Mesopotamian bread was leavened by adding the flour of *Vicia ervilia* (bitter vetch) and *Cicer arientinum* (chick pea) to the bread flour, plants that had both been known and domesticated since the ninth millennium BCE.[28] We therefore can conclude that leavened breads could potentially have been produced at least since the Neolithic period.

The baking process

In bread preparation, the step following dough kneading is baking; the dough is cooked by dry heat without direct exposure to fire. Numerous types of cooking facilities used for baking bread have been reported from archaeological

[25] Jean BOTTÉRO, *La plus vieille cuisine...*, p. 52.

[26] Delwyn SAMUEL, "Brewing-Baking", in Paul T. NICHOLSON and Ian SHAW (eds), *Ancient Egyptian Materials and Technology* (Cambridge, 2000), pp. 537-576.

[27] Rudolph H. MICHEL, Patrick E. MCGOVERN et al., "Chemical Evidence for ancient beer", *Nature*, no. 360 (1992), p. 24.

[28] Marvin A. POWELL, "Salt, seed and yields in Sumerian agriculture. A critique of the theory of progressive salinization", *Zeitschrift für Assyriologie*, no. 75 (1985), pp. 7-38 (p. 18).

Fig. 2: Ethnographic example of a tannur in Eastern Anatolia (photo Balossi Restelli). Traces left by the round breads are visible on the inner surface.

sites and their differences may provide clues on the types of breads or bread-like foods that may have been baked.

The most recurrent and typical bread oven documented in ancient Akkadian texts is the *tinūrum*, equivalent of the modern tannur, today the most common bread oven in the Near East, an oven with a beehive-shaped hollow domed core (Fig. 2).[29] The core has a large opening at the top, through which bread (mostly round flat pancake-like) is inserted and stuck to the sides of the structure in order to be baked.[30] The fire is lit at the bottom of the tannur, where a small opening, 20-30 cm wide, is used to take advantage of the up-draft and for ash removal. In general, tannur cores have

[29] Peter A. MIGLUS, "Ofen", in David O. EDZARD (ed.), *Reallexikon der Assyriologie und vorderasiatische Archaeologie*, vol. 10 (2003-2005), pp. 39-42. For a recent analysis of tannurs in the archaeological evidence from the ancient Near East see Elena ROVA, "Tannurs, tannur concentrations and centralised bread production at Tell Beydar and elsewhere: an overview", in Lucio MILANO (ed.), *Paleonutrition and Food Practices in the Ancient Near East. Towards a Multidisciplinary Approach* (Padua, 2014), pp. 121-170. Bradley PARKER, "Bread ovens, social networks and gendered space: an ethnoarchaeological study of Tandır ovens in Southeastern Anatolia", *American Antiquity*, no. 76/4 (2011), pp. 603-627.

[30] Samuel AVITSUR, "The Way to Bread...."; Grith LERCHE, "Khubz Tannur...."; Bradley PARKER, "The Tradition of Tandır Cooking in Southeastern Anatolia: an Ethnoarchaeological Perspective", in Turan TAKAOĞLU (ed.) *Ethnoarchaeological Investigations in Rural Anatolia*, vol. 4 (Istanbul, 2007), pp. 7-43; Anna SMORGORZEWSKA, "Fire Installations in Household Activities. Archaeological study from tell Arbid (North East Syria)", *Paléorient*, no. 38 (2012), pp. 227-247.

a thin baked wall that can be fixed into a built-in "superstructure" most often made of mud or mud-brick and plastered in order to create a working surface.[31] According to epigraphic sources, tannurs could have been used, even though they were expressly built to bake bread on their sides, as hearths. This would have been possible by placing pots on top of the mouth, as is described in the same recipe of YOS XI 26, which mentions, after having baked the small unleavened breads in the typical way, the cooking of leavened breads forming the dough case stuffed with bird's meat, in two roasting trays on top of the tannur.[32]

Another kind of bread oven ethnographically attested in the Levant is the tabun. Its shape is like that of an igloo, with an opening on the top smaller than that of the tannur.[33] The tabun is often semi-buried so that the bread can be put on the internal walls or even on the floor of the tabun. At times a pot is also placed in such a way as to cook on the mouth opening. Ethnographic research also reports the use of tabuns for the purpose of cooking meat and stews.[34] In the literature the description of the use of tabuns is at times contradictory especially on the way fuelling took place, but it is attested that, fire can be lit both inside and outside, covering the oven, the opening of which is in this case closed with a lid.[35] However, as of now, there has been no clear identification of this kind of oven in archaeological contexts. It is not yet clear whether tannurs and tabuns were in the past simply typological regional differences between bread ovens, or whether they were functionally different.

A further kind of oven found in archaeological contexts and still used today is the domed oven. Its shape is generally like that of an igloo, circular at the base and with a domed cover (Fig. 3). It has a central opening at the base, from which both fuel and food can be introduced into the oven. This oven can be used to bake any kind of food and is not specifically designed for bread even though bread can of course be baked and is placed on the oven floor, after the fire has heated the chamber and both the charcoals and the ashes have been moved to the side. The oven has a baking chamber in which temperature is maintained constant. Bottéro assumes that the domed ovens

[31] Elena ROVA, "Tannurs, tannur concentrations...", p. 123.

[32] Jean BOTTÉRO, *La plus vieille cuisine...*, p. 53.

[33] Noor MULDER-HEYMANS, "Archaeology, experimental archaeology and ethnoarchaeology on bread ovens in Syria", in Marianne Mesnil and Kaï Fechner (eds), *Pain, fours et foyers des temps passés, Civilisation. Revue international d'anthropologie e des sciences humaines*, no. 49 (2002) pp. 197-221. But also see Lenka TZAKOVA, *Near-Eastern Tannurs Now & Then: A Close-Up View of Bread Ovens with Respect to the Archaeological Evidence and Selected Ethnographical Examples from Khabur Region*, Bachelor's Diploma Thesis, Masaryk university (2013), p. 5, for issues of nomenclature.

[34] Noor MULDER-HEYMANS, "Archaeology, experimental archaeology...", pp. 204-205..

[35] Lenka TZAKOVA, *Near-Eastern Tannurs Now & Then...*, pp. 31-35. http://palestine-family.net/index.php?nav=91-219&cid=530&did=3169&pageflip=3&hits=20; last accessed February 2015.

Fig. 3: Ethnographic example of a domed oven in Egypt (photo Mori). Moulds are inserted into the oven walls and baking trays piled up at the sides.

in ancient Mesopotamia were used to bake leavened bread (as opposed to the unleavened pancake type of bread of the tannurs).[36] Actually, in the domed oven, bread can be leavened or unleavened but the clues to this are not easy to find and, whilst the presence of a tannur does suggest the baking of unleavened bread, the opposite is not valid, thus domed ovens do not necessarily indicate the baking of leavened breads.

Bread ovens described as similar to the modern tannurs have been reported from Late Pottery Neolithic sites, but in our opinion the description does not seem to be straightforward enough to guarantee their clear recognition.[37] The preservation of tannurs in prehistoric archaeological sites generally only comprises the bottom part and the absence of the upper opening does not always make it easy to understand whether the finds are really tannurs or the previously mentioned more generic domed food ovens. A careful description of the floor surface, rarely offered in archaeological reports, might help to distinguish between these two ovens since the floor of the domed one, being a baking surface, is generally plastered, while a tannur does not need a special preparation of its floor.

[36] Jean BOTTÉRO, *La plus vieille cuisine...*, p. 82.
[37] Peter A. MIGLUS, "Ofer...".

Most of the ovens from Mesopotamian Neolithic sites that were once reported as tannurs are now, thanks to a more detailed analysis, no longer considered to be so.[38] In prehistoric periods the domed oven is the first closed baking structure identified. It is common in domestic dwellings of the ceramic Neolithic period (seventh millennium BCE) and in all pre- and protohistoric periods.[39]

Some excavation reports identify tannurs towards the end of the Late Chalcolithic, but even then, description does not seem to be straightforward enough to ensure their clear recognition as specialized bread ovens.[40]

Finally, tannurs are frequently reported in historical periods both in private and public contexts: small tannurs without a surrounding structure are found inside houses, while tannurs found outdoors generally do have the external mud or brick structure.[41] In the well preserved and well excavated houses of Tall Bazi, for example, bread ovens were present both in the main rooms of the private houses, but also, in several instances, outside the houses. A summer use has been hypothesized for the outdoor ovens, while tannurs placed inside the dwelling rooms could have been used in winter, with a supposed chimney to let out the heavy smoke produced by the bread baking – but also, maybe, for fish or meat roasting.[42]

In historical times domed ovens are also frequently attested, both in public buildings and in residential urban areas, adjacent to private houses. The kitchen area of the Mari palace hosted two domed ovens, an earlier smaller structure which was replaced by a larger circular oven located in Room 70.[43] The domed ovens in public buildings were often used together with sets of tannurs and thus they were probably used both for the more elaborate kinds of bread served at the "king's table" and for the production of larger quantities of baked products needed on particular ceremonial occasions.[44] Domed ovens were also excavated in private contexts (i.e. the house IB at "Baker's Square" reported by Woolley at Ur)[45] and for the middle Euphrates valley a communal use has been suggested for two large domed ovens excavated respectively at Tall Bazi and Tall Mumbaqat. Walter Sallaberger and Adelhaid Otto have hypothesized that, unlike the common tannurs present in all

[38] Lenka TZAKOVA, "*Near-Eastern Tannurs Now & Then...*".

[39] Anna SMOGORZEWSKA, "Fire Installations in Household Activities. Archaeological study from tell Arbid (North East Syria)", *Paléorient*, no. 38 (2012), pp. 227-247.

[40] Bradley PARKER, "Bread ovens...", p. 615.

[41] Peter A. MIGLUS, "Ofer...".

[42] Adelheid OTTO, "Defining and Transgressing..." p. 181.

[43] Jean-Claude MARGUERON, *Mari: Métropole de l'Euphrate au IIIe et au début du IIe millénaire av. J.-C.*, (Paris 2004), p. 492.

[44] Adelheid OTTO, "Defining and Transgressing..." p. 186.

[45] Leonard WOOLLEY and Max MALLOWAN, *The Old Babylonian Period. Ur Excavation 7* (London, 1976), pp. 158-159.

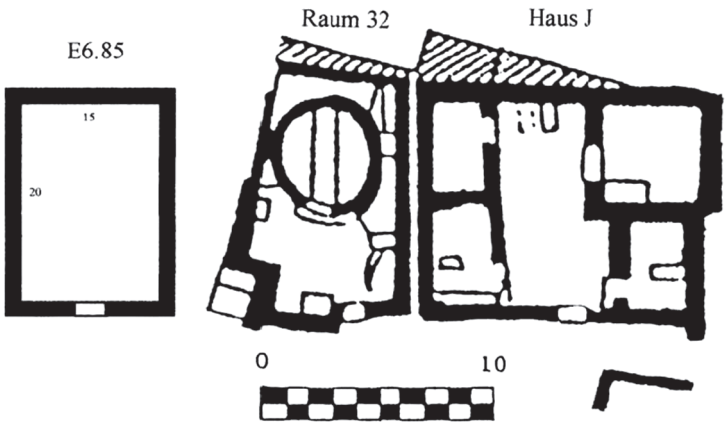

Fig. 4: Plan of a large domed oven excavated in Tell Munbaqa, ancient Ekalte, (Raum 32) beside a private house (Haus J), with a reconstruction of an "annex building for baking" attested in a real estate sale (HCCT-E.22), probably from the same site (Machule 1993, p. 90, Abb. 12 and Mori 2003, p. 72 Fig. 19).

houses, these large ovens served to prepare a special kind of bread on certain occasions, especially when an increased demand for bread was needed, as was the case during festivals (Fig. 4). This hypothesis is based on textual evidence from Emar in which outstanding rituals involving the whole community are attested with an imposing quantity of food – among which were bread-like products – that were produced, consumed, and offered to the city gods.

Next to these built ovens, the most common cooking facility ever is obviously the hearth (Fig. 5).[46] In order to cook bread or bread-like pancakes over the hearth, a griddle is used, today a metal convex plate, 30-50 cm in diameter (in Turkish called *saç*). Flat breads are placed on this plate to cook (Fig. 5).

Differences in the use of one baking structure or the other are not yet very clear to us. Initially there might be a chronological difference, with domed ovens used earlier than tannurs, but later differences are probably linked to the types of foods baked (ingredients and leavening) and/or to the required quantities. The co-presence in the same kitchens of a variety of baking systems would support this idea (i.e. Mari Middle Bronze Age palatial kitchens). Furthermore, while domed ovens may be generically used for different types of foods, tannurs do appear to be specialized for bread production.

[46] Randi HAALAND, "Porridge and Pot, Bread and Oven: Food ways and Symbolism in Africa and the Near East from the Neolithic to the Present", *Cambridge Archaeological Journal*, no. 17/2 (2007), pp. 167-183.

Fig. 5: Ethnographic examples of hearth and metal griddle in Eastern Anatolia (photo Balossi and Roberto Ceccacci).

Baking moulds and their use

Since no proper bread has been preserved for analysis from the ancient Near East and baking facilities do not give us any clue in this respect, the only certain indication we have to date for the presence of leavened bread is offered by the finding of moulds. Unleavened breads do not need moulds since the dough does not change shape once laid out, whilst leavened breads transform continuously, even during baking, and the use of moulds allows bread to be baked with specific shapes.

The most famous baking moulds collected from archaeological sites are from the palace of Zimri-Lim at Mari, where 49 ceramic artefacts related to baking have been found in Room 77, adjacent to Room 70 in which two domed ovens were built. Their shape and decoration is rich and variegated, with round and rectangular shapes, decorated both with geometric and figurative scenes depicting animals and anthropomorphic figures. Fewer examples have elongated shapes with animal forms (fish and lion).[47] The refinement of these moulds together with the variety of foodstuffs served at the king's table, listed in the epigraphic sources, show the degree of sophistication of the Mesopotamian cuisine.[48]

[47] Jean-Claude MARGUERON, *Mari: Métropole*..., pp. 515-516.
[48] Jack SASSON, "The King's Table...", pp. 182-197.

Fig. 6: Ethnographic example of bread tray pre-heated in fire before the dough is put on top of it to bake (http://www.narodnimuzej.rs).

Archaeologically speaking, the identification of bread moulds and the way bread was baked in them is based on a comparison with Egyptian bread production, well illustrated in wall paintings from funerary contexts, by wooden models and in ancient texts.[49] In the scenes depicted in the Tomb of Ty, dated to the Old Kingdom, bowls used as moulds (called *Bedja*) are stacked one above the other over the fire, with their mouths pointing towards the heat. They are then removed from the fire and dough is placed into the heated vessels in order to bake. The thick walls of the vessels served to retain heat. Interesting is the fact that the dough appears to have been poured into the pots thus the term used in the hieroglyphs next to the image reads as "pouring the dough" (*wdh šdt*). The dough appears to have been liquid, or semi-liquid. The scene shows that the flat-bottomed *Bedja* bowls were used as the bottom mould, while conical vessels were used as lids. After baking, the loaves had to be extracted from the moulds. In the upper part of register 2 men turn the *Bedja* bowls over, probably to remove the baked loaves, and the text says they are "opening the *Bedja* (*bd_3*)".

In Mesopotamia a similar interpretation was proposed for the bevelled rim bowls from the Uruk period and was strongly debated in the past but discussion on this is now at a standstill because of the absence of new data concerning these containers.[50] In a much earlier and very different context,

[49] Alan R. MILLARD, "The Bevel Rim Bowls Their purpose and significance", *Iraq*, no. 50 (1988), pp. 49-57; Hilary WILSON, "Pot-baked bread in ancient Egypt", in *Varia Aegyptica*, vol. 4 (1988), pp. 87-97; Francesco TIRADRITTI, "Il pane nell'Egitto Antico", in Massimiliano MARAZZI (ed.), *Centro Mediterraneo Preclassico, studi e ricerche*, vol. 2, *I Cereali nell'Antico Mediterraneo Preclassico* (Naples, 2006), pp. 49-65.

[50] Michael CHAZAN, Mark LEHNER, "An Ancient Analogy: Pot Baked Bread in Ancient Egypt and Mesopotamia", in *Paléorient*, vol. 16, no. 2 (1990), pp. 21-35.

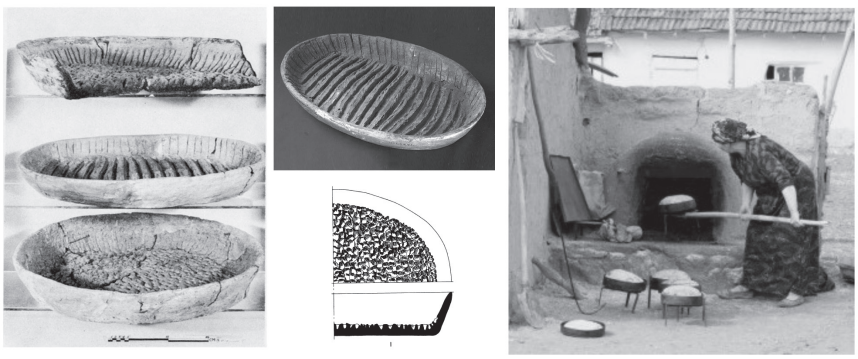

Fig. 7: Moulds: Husking trays from Hassuna and Matarrah (Lloyd et al. 1945 plate XVIII; Braidwood et al. 1952, fig. 16) and woman baking leavened bread with moulds in Western Anatolia (http://www.fotokritik.com/1076690/koy-ekmegi).

in Late Neolithic Hassuna period, husking trays may be interpreted as bread moulds (Fig. 7). Husking trays are found throughout a vast area of the Near East, in levels dated to the second half of the seventh millennium BCE. These were first given their name by Robert Braidwood in the 1940s, when he suggested they might have been used to separate cereal grain from their husk, even though he himself said that such an interpretation was "highly tentative".[51] Various scholars have noted that they might have been linked to bread production but only Mary Voigt has actually discussed their use, arguing that husking trays were portable ovens for the baking of flat breads.[52]

On the basis of the above observations regarding leavened and unleavened bread we concur on the use of husking trays as bread moulds and further argue that it was leavened bread that they were used for. Husking trays are never well fired and have dimensions similar to those indicated for modern *Crepulja*. The latter are bread moulds in use in the Balkans and south-eastern Europe. They are shallow clay containers, at times with a little hole in the middle, used to bake bread on open hearths. The shape is that of a flat tray with variable dimensions: a diameter from 25 to 60 cm, a thickness of 3-5 cm and a height of 7-13 cm.[53] The *Crepulja* are made of unfired clay and sit in the fire until

[51] Seton LLOYD, Fuad SAFAR et al., "Tell Hassuna Excavations by the Iraq Government Directorate General of Antiquities in 1943 and 1944", *Journal of Near Eastern Studies*, vol. 4, no. 4 (1945), pp. 255-289; Robert J. BRAIDWOOD, Linda BRAIDWOOD et al. "Matarrah: A Southern Variant of the Hassunan Assemblage, Excavated in 1948", *Journal of Near Eastern Studies*, vol. 11, no. 1 (1952), pp. 1-75.

[52] Halil TEKIN personal communication; Olivier NIEUWNEHUYSE, Walter CRUELLS, "The Proto-Halaf period in Syria. New sites, new data", in *Paléorient*, vol. 30, no. 1 (2004), pp. 47-68; Mary VOIGT, Hajji FIRUZ TEPE, *Iran: the Neolithic Settlement* (Philadelphia, 1983), p. 159.

[53] Biljana DJORDJEVIĆ, Gordan NIKOLOV, "Bread-baking Pan (Crepulja/crepna) from Neolithic to Present in South-East Europe. The Beginning of Ethnoarchaeological Cooperation in the Region", in Francesca LUGLI, Assunta Alessandra STOPPIELLO et al., *Ethnoarchaeology: Current Research and Field Methods*, BAR 2472 (Oxford, 2013), pp. 53-57.

well heated, before being lifted out with a hook. The dough is put into the hot *Crepulja* and covered with a lid (*sač*); it is the heat of the mould that bakes the bread. The pot can also be covered with ashes and live coals that increase the heat and help bake the bread.[54] When the lid is not used, the bread needs to be turned over during baking. Sometimes this special dish has an uneven relief on the interior base that according to Balfet isolates the dough from the hot surface and enables it to rise without burning.[55]

The Hassuna husking trays are recognized by the deep impressions on the interior base and often on the sides too. As in the case of today's *Crepulja* and in the ancient Egyptian *Bedja*, these trays could have been used for baking bread or bread-like food (pastries). Impressions could have served, as Balfet states in the north African case, to avoid the burning of the dough, but they might also have something to do with its proper rising.[56] Air would in fact remain trapped within these impressions once the tray was filled with dough. The hot air would tend to rise with increasing temperatures, pushing the bread in its growth. The style of the impressions in Hassuna husking trays is highly variable and would have probably determined different decorations on the bread crust. On the basis of this interpretation we suggest that these different decorations on the bread might underline social or kin differentiation of bakers and/or consumers.

Unfortunately, publications rarely give photographs or information concerning traces of fire on husking trays and it is thus, for the time being, impossible to say whether they were used in an open fire, as the *Crepulja*, or inside an oven, as we hypothesize was the case for the Zimri-Lin moulds. In the Hassuna period, domed ovens and hearths are both present. Thus, possibly, husking trays could have been used in both ways.

As stated above, the use of moulds for unleavened breads is rare, if not absent; a single tray-like dish is known from Tunisia, that, pre-heated over an open hearth, is used to bake a kind of thin phyllo dough.[57] This is not exactly a mould though, as the bread does not modify its shape to fit that of the tray. Similarly, ancient texts and archaeological findings suggest that "trays" or supports were used in the past too in connection with hearths. Figure 6 shows an ethnographic parallel of this. An invocation text (CT 39, pl. 24, 30; CAD L, p. 178a) says that "a young man will grind 1 litre (SÌLA) of barley and will throw the bread on a brick, in a fire lit with thorny branches"; this has been

[54] Biljana DJORDJEVIĆ, Gordan NIKOLOV, "Bread-baking Pan...", p. 54.

[55] Hélène BALFET, "Bread in some regions of the Mediterranean area. A contribution to the study of eating habits", in Margaret L. ARNOTT (ed.), *Gastronomy: The Anthropology of Food Habits* (The Hague, 1975), p. 309.

[56] Hélène BALFET, "Bread in some regions...".

[57] Francesco DI GENNARO, Anna DEPALMAS, "Forni, teglie e piastre fittili per la cottura: aspetti formali e funzionali in contesti archeologici ed etnografici", in Francesca LUGLI, Assunta Alessandra STOPPIELLO et al. (eds), *4. Convegno nazionale di Etnoarcheologia: atti*, 17-19 Maggio 2006, Roma, Italy, BAR International series, 2235 (Oxford, 2011), pp. 59-60.

taken to indicate that the bread was baked on a brick that had previously been heated inside the fire.

The latter baking system is certainly the most ancient attested for cooking food in the Near East. During the Natufian and Prepottery Neolithic periods, food was cooked by sitting it on stones previously heated in pit-hearths.[58] Ethnographically, pottery *saç* are known, as is the case of the *zantu*, in the Levant, a ceramic round mushroom-shaped disk, 35-50 cm large and 7-8 cm high.[59] This object is heated in the fire and then food is placed on it to bake. Similar were probably other utensils observed by different scholars in the Levant and defined as ceramic baking trays.[60] Modern metal *saç* have more recently eliminated the need for many of these.

Concluding remarks

We can attribute the origin of bread and pastry products to the Natufian period or even before, since we have clear evidence of intensified consumption of cereals and their manipulation for the production of flour. Ingredients of these pastries are variable both in terms of flour and flavourings. Most probably this early bread is unleavened, as suggested by the absence of ovens and/or moulds and baked on heated stones. Leavened breads are potentially produced in the Late Neolithic Hassuna period, when moulds (the so-called husking trays) are first found. The apparent absence of clear fire marks on these moulds might suggest their use in the domed ovens typical of this period, but more specifically oriented research is needed to test this hypothesis. The shapes of these moulds are more or less oval but deeply impressed and incised decorations suggest that the end shape of the bread could vary according to the style of such decoration.

The introduction of tannurs indicates a specialization in bread production, which develops its own specific techniques as well as tools. In later historical periods bread production would reach a high level of complexity, mostly in "public contexts", with the presence of specialized bakers. Dating the phases of such an introduction is a central but, in our opinion, still debatable question because of the little attention given in the past by prehistoric archaeology to the distinction between generic ovens and tannurs. While their presence appears to be certain by the Early Dynastic period in Mesopotamia, earlier evidence is less clear and should be more precisely defined.

[58] Yutaka MIYAKE, "Salat Camii Yanı: A Pottery Neolithic Site in the Tigris Valley", in Mehmet Özdoğan, Nezih Başgelen et al. (eds), *The Neolithic in Turkey. New Excavations & New Research* (İstanbul, 2011), pp. 129-149.

[59] Robert Jacobus FORBES, *Studies in Ancient Technology. Vol. 6, Heat and Heating: Refrigeration, the Art of Cooling and Producing Cold* (Leiden, 1966), p. 63.

[60] Namely the *ra'afim* and the *mahvat/mahreshet*: Samuel AVITSUR, "The Way to Bread...", p. 235.