Who made bread, and how, at Amarna?

By Delwen Samuel

Bread was one of the pillars of ancient Egyptian diet throughout Pharaonic times. It sustained the populace but its role went far beyond nutrition. Because of its central role as a foodstuff, bread was a key commodity in the ancient economy, it played a role in social relations, it was a focus in religious and funerary rituals and specific forms were used in medicines. Bread and baking are therefore important topics of study for Egyptologists.

Tomb art traditionally has been the main source of information for flour production and bread baking. Baking scenes can be found dating to all periods until about the Twentieth Dynasty. Many authors have studied either specific scenes, or bakery art more widely, but the artistic evidence can only take us so far. It contains gaps and there are uncertainties of interpretation. It is restricted to illustration of baking for the elite and on its own does not go beyond description of many of the steps.

A number of ancient texts also deal with bread. Most baking texts are scribal problem texts which calculate, for example, how much grain is needed for certain numbers of loaves from temple bakeries, or which record bread rations assigned to different groups of people. The texts describe quantities but not methods and are not specific enough to be able to fully grasp the process.

Until recently, we knew little about bread and baking beyond the temple bakery and the estates of the elite. But what of the majority of the Egyptian population, the workers, artisans, farmers and others? Images and texts both tell us that bread was provided by the state as rations. Was this the only source of bread for most people? Or was baking undertaken on a small scale at a neighbourhood or household level, and if so, how did it compare? Given the central importance of bread to the ancient Egyptians, there must be abundant archaeological material to broaden our understanding, yet there have been few studies of the archaeology of Egyptian baking.

Amarna is an ideal site to explore the evidence that can help us to understand both how bread was made, and where it was produced. It is unique in ancient Egyptian archaeology for its large scale, the former presence of all levels of society together with state institutions, and the richness of the archaeological record which has been uncovered. This gives us a special opportunity to examine key activities of ancient Egyptian life.

Evidence for baking at Amarna

Perhaps the most obvious archaeological installation connected to baking is the bread oven. By New Kingdom times, the most common type was a thick-walled sloping cylindrical form. The size varied depending on where the oven was located. In the large magazines associated with the Great and Small Aten temples and the temple of Kom el-Nana, the ovens are substantial, with individually built ovens measuring about a meter in outer diameter.
Figure 2: A set of ovens in a bakery room at the temple of Kom el-Nana, Amarna. Photo: Barry Kemp.

Associated with the much smaller Main Chapel complex of the Workmen’s village, in contrast, an oven in an outer room measured about half a metre across its outer diameter. These ovens, with their thick walls, well-fired interior lining and often with accumulated ash and charcoal remains, should be easily detectable during excavation.

We have a good idea of how such ovens might have been heated and used, because they closely resemble traditional Near Eastern “tannour” ovens. These have been used for millennia for baking in Near Eastern countries, although they are not used in traditional contemporary Egyptian baking. The interior is heated to baking temperature by building and maintaining a fire inside. When a sufficient bed of embers has accumulated, the sides are washed down to remove soot, and the bread can be baked either directly on the interior surface or for smaller versions, on the hot embers.

Figure 3: An oven from the Workmen’s Village Main Chapel complex. Photo: Barry Kemp.
At Amarna, data from initial excavations indicated that there were few ovens in smaller domestic houses such as those at the Workmen’s village. Of the houses excavated by Peet and Woolley in the early 20th century, only about half contained ovens. When excavations at the Workmen’s village were resumed by Barry Kemp in the 1980s, new evidence emerged to suggest that more houses may have had ovens than at first seemed the case. By using careful excavation in layers and detailed recording, it was possible to see that fragments of oven were contained in the collapsed debris of one of the village houses, demonstrating that it was most likely originally situated on the roof. Ovens had most likely been built on the roofs of other, previously excavated houses, but any evidence to show this has been lost.

**Flour production**

Even in modern post-industrial Western society, where staple foods are easily and cheaply available, it is not uncommon for people to bake bread at home. They may bake in gas or electric ovens, in dedicated bread machines, and some fortunate people have purpose-built wood-burning bread ovens. The majority of Western home-bakers buy their flour rather than grind it themselves from raw grain. Flour production is an entirely separate stage to baking bread. Was this the case for the people of Amarna? Were state supplies in the form of flour rations as well as of bread?

The archaeological record can be used to answer this question. We can look for the remains of tools and installations connected with flour production and where they are found across the ancient city. But first we need to know what tools were used, and for that, we need to understand the nature of ancient Egyptian wheat, because its structure imposes technological challenges for flour making.

The ancient Egyptians grew two types of cereal crop: barley and emmer wheat. In earlier times, both may have been used for baking, but by the New Kingdom, emmer wheat seems to have been the grain of choice for bread. Emmer (or *Triticum dicoccum* to give it its scientific name), is little grown today but it has a very ancient history. It was one of the first plants to be domesticated approximately 10,000 years ago, and was once a staple crop of the western Old World. By the Late Bronze Age, modern types of so-called “free-threshing” wheat had eclipsed emmer in the Mediterranean, the Near East and Europe. This is likely due to the fact that emmer is harder to process than bread wheat and durum wheat (used mainly for pasta today). In Egypt, though, emmer remained the wheat of choice until the end of the Pharaonic period.

![Figure 4: A Syrian villager baking bread in a traditional tannour oven. Photo: Delwen Samuel.](image)

![Figure 5: Spikes of emmer wheat. Photo: Mark Nesbitt.](image)
The important processing difference between free-threshing wheats and wheat such as emmer is the way the chaff breaks up during threshing. Whole ears of wheat consist of a central structure to which are attached packages of chaff enclosing and protecting the grain. The threshing process involves beating the ears to break them up. When free-threshing wheats are threshed, the central structure of the ear stays intact, but all the chaff pieces fall away, releasing the grain inside. It is then a relatively easy process to sieve and winnow the inedible chaff from the desirable grain.

When emmer is threshed, the ear falls apart in a different fashion. The central structure falls apart into individual components called spikelets. Each is composed of a firmly intact envelope of chaff tightly enclosing the grain. An extra, labor-intensive step is needed to break up the tough chaff to release the grain.

The best way to understand how the ancient Egyptians achieved this is to look at how the work was traditionally undertaken in regions where emmer has until recently still been grown. The most common method was to pound the spikelets in large mortars made of wood or stone with wooden mortars or mallets. This could be done by a single person, or in pairs, or even groups if the mortar was large enough.

The bed of spikelets cushioned the blows so that the chaff was broken and shredded but the grain remained whole. Many ancient Egyptian artistic depictions show this stage, but because the structure of emmer ears has generally not been understood, is often wrongly described as coarsely cracking the grain or pounding it into flour.

At Amarna, the clearest evidence for emmer spikelet processing comes from the houses of the Workmen’s villages excavated in the 1980s. Here, some very well preserved limestone mortars were recovered. The best example comes from the house in the far south-west corner of the walled village, known as West St 2/3. Here, the mortar was placed in a corner and built up with a mud plaster rim to increase its height.

Its use for dehusking emmer is certain, because on the floor around it was a scattered deposit of broken emmer chaff with a few intact emmer spikelets. A review of finds from recent and previous excavations has shown that most houses of the village contained mortars.
It is harder to be sure about houses in the Main City, because excavation records are incomplete. Nevertheless, there is sufficient information to show that mortars were part of household equipment throughout the city.

Once the grain had been cleaned from the chaff, it could be ground into flour. This was done using flat stones of granite or quartzitic sandstone known as saddle querns. Such milling stones were used throughout the Old World in antiquity, and are still in use in some African regions today. Like pounding, this is also a labour-intensive and even more time-consuming task. Grinding on saddle querns can be done communally, but the size of grinding emplacements at the Workmen’s village indicates that in those houses, only one person at a time did the grinding. We can only speculate, but it seems possible that other members of the household carried out tasks nearby at the same time, such as sewing, weaving or other types of food preparation, so that grinding, although hard work, need not have been solitary.

Saddle querns are highly durable and have been found throughout the domestic quarters of Amarna. We can see from their distribution across the site that they had been used in many if not most of the households. There was also a large concentration of quern stones to the south of the Great Aten Temple, suggesting that this region was used to supply flour to the neighbouring bakeries, and perhaps to bakeries of the other city temples.

Going further back in the supply chain, there is little evidence to indicate how grain was distributed throughout the city. It is reasonable to surmise, for example, that the large complexes of the elite were supplied by their farms in the countryside, either across the Nile from the Amarna plain, or elsewhere in Egypt. We do have some archaeological evidence for the Amarna Workmen’s Village. Excavations by Barry Kemp and his team in the 1980s uncovered a depot about 50 metres to the south of the walled area of the Workmen’s Village, designated the zir area. The layout together with numerous traces of large storage or “zir” jars led Kemp to conclude this was a supply depot for the village, and that the Amarna Workmen’s Village was supplied with goods by the state. The written sources from Deir el-Medina provide a good analogy. Grain together with other food items must have been brought here. It was most likely transported in sacks, as artistic depictions indicate.

One feature at the zir area which puzzled the excavators was an ashy deposit in the north-east corner, full of charcoal, chaff and other organic material. One explanation for this might be that an area where grain and other foodstuffs were brought, stored however briefly and no doubt spilled on occasion, would be prone to insect and rodent infestation. Robert Miller suggested that ashy deposits on village quern emplacements were derived from fires which cleared grain fragments and eliminated pests. Perhaps the zir area needed similar cleansing and the ashy deposit was where the remains of contained fires were dumped.
Nature of bread

Unfortunately, no surviving bread loaves have been recovered from Amarna. There are, however, hundreds of loaves now distributed throughout the world in Egyptological museum collections. These were almost all recovered from tombs and so are unlikely to be fully representative of the daily fare. They are very diverse in size and shape, and are often elaborately decorated.

Daily bread was surely not so fancy, but tomb loaves show that Egyptian bread could be a decorative art form when required, just as today many loaves for special occasions are attractively formed. Surviving loaves were sometimes made from reasonably finely ground flour. More often, the bread is full of roughly cracked grain fragments. This coarse texture has led some scholars to suggest that ancient Egyptian milling technology was crude and incapable of producing fine flour. The fine texture of some loaves belies this. The presence of coarsely broken grain means that this texture must have been appreciated, much like the chewy texture of a multi-grain or British “granary” loaf with whole or cracked cereal is enjoyed today.

Microscopic studies carried out on some tomb bread samples have established that Egyptian bread was leavened with yeast, but that the crumb structure is relatively dense. Emmer wheat can be made into risen loaves similar to wholemeal bread, but this is not the structure seen in the surviving ancient loaves. There are still questions to be answered about ancient Egyptian bread making techniques and how it may have tasted.

The archaeological record at Amarna has given us a much better understanding of bread production. We now have more detailed insights on how both households and state institutions produced bread and the complexities involved with the bread supply. The technology depicted in the artistic record can be better understood and the gaps filled in. In keeping with our knowledge derived from texts of bread rations distributed by the state, at Amarna the enormous numbers of temple magazines filled with ovens shows a tremendous output of bread loaves through the apparatus of state temples. The bulky oven installations in houses of the Workmen’s village, as well as those from elsewhere in the city, show that households of all social classes must have baked on regular basis, made from producing their own flour. Bread was the foundation of meals for every level of society and was both state-supplied and self-generated for all households.
The President’s Papyrus

Greetings fellow Amarnaphiles,

I want to wish everyone a most happy and prosperous New Year. It would appear that 2014 will be a good year for the American economy, if one can judge by the performance of the stock market. Hopefully we will all have even more to celebrate at this time next year.

Unfortunately, the future of Egypt is even more uncertain as I write. If the future is in doubt, so too, is the preservation of its past.

When it comes to antiquities, Egypt is one of the richest in the world. With the instability of the political situation, looting has become endemic. Although regrettable, it is understandable, since 40% of the economy is dependent upon the tourist dollar. Because of the current situation, tourism is at an all time low and people are trying to make up their loss of income any way possible.

The situation at Amarna, however, appears to be stable with no threats to the site itself. Here is hoping that 2014 will prove not to realize our worst concerns for Egypt as a whole.

Wishing you all the best,

Floyd Chapman