Bread making and social interactions at the Amarna Workmen’s village, Egypt

Delwen Samuel

Abstract

This paper explores the use of food as an indicator of ancient social relations amongst households, using bread preparation in ancient Egypt as a case study. Technological information on bread making gained through a multi-stranded archaeological approach is applied to an investigation of the Amarna Workmen’s village, a short-lived Pharaonic settlement dating to about 1350 BC. The analysis demonstrates that once supplied with raw ingredients the village households were largely self-sufficient, but that specific households co-operated in the production of bread. This case study is first set into context with a discussion of the issues and problems associated with the archaeology of food. A structure is suggested to help approach this complex subject.

Keywords

Baking; archaeology of food; Ancient Egypt; emmer wheat; household archaeology.

Food and culture

The study of food offers unique insights into human culture. Food is not only a fundamental human need but can be elaborated upon in almost infinite variety. Constrained by biological needs and limitations – and sometimes even these are transcended – the decisions about which foods are edible, the ways ingredients are prepared and the behaviours associated with food consumption are primarily dictated by culture. Food choices of all kinds help to define and cement the identity of social groups.

Food has been of interest to social anthropologists for many years (Douglas 1984: 7; Messer 1984). More recently, sociologists have begun to investigate food and its social significance (Mennell et al. 1992). Caplan (1994), Goody (1982), Messer (1984) and Murcott (1988) are amongst the authors who have provided useful overviews on diverse anthropological and sociological approaches to food.

The central role which food plays in all human societies means that food impinges on
many aspects of culture. Since archaeology is concerned with ancient culture, ancient food provision seems a natural area to explore. To date, most work has concentrated on raw resources and subsistence, but archaeologists have recently begun to explore food and its relation to culture much more widely (e.g. Gumerman 1997; Hamilakis in press).

**Food and archaeology**

The term ‘food’ can be very broadly defined. It can encompass raw resources or ingredients, intermediate stages of preparation, the final prepared product ready for consumption, the by-products and leftovers associated with assembling, preparing and consuming food, and discarded meal debris. A broad definition is important because single stages of food provision cannot adequately be examined in isolation (Sherratt 1991: 221).

**Challenges of food within the archaeological record**

Food in all its aspects presents a particular challenge to the archaeologist because it is highly complex. Food provision involves several stages (see Table 1), many of which involve profound alteration of raw materials and the generation of a series of by-products. Three main transformation processes can be pinpointed. Raw resources are modified into transitional ingredients to make them more easy to handle, to isolate what is considered edible, and to render indigestible materials palatable. The transitional ingredients are prepared into the final food product by a wide variety of treatments (e.g. Stahl 1989). Upon consumption, digestion alters fully prepared foodstuffs into absorbable components and excreted waste. At each of these transformation stages, the nature of the material often changes profoundly, becoming more difficult to recognize and less likely to survive in the archaeological record. Even if each phase is retrievable archaeologically, it may be difficult to link the products of each transformation.

In addition to the transformations which food undergoes, it is extremely perishable. Evidence of raw resources such as bones and charred plant remains can survive reasonably well, but prepared foods, made to be more digestible by humans, are much more susceptible to microbial attack and decay. This is also the case for gut contents, coprolites and cess. Such materials are unlikely to be preserved by charring. Furthermore, any prepared food not eaten by people is often scavenged by other organisms.

**Multiple lines of approach to the archaeology of food**

Given the problems involved in the study of ancient food, an approach which helps to structure relevant archaeological data, while taking into account the complexity of food, would be useful to target and to interpret surviving evidence. Goody’s (1982: 36–7) classic work provides clear descriptions of the stages of food provision. He relates his five phases of procurement, storage, preparation, consumption and disposal to the central human process of production. These phases, together with the processes involved and the locations where they take place, can be tabulated to show their links with the predominant cultural factors involved (Table 1). The divisions thus created are not rigid and
Table 1 The stages of food provision, indicating for each phase the process involved, the location where activities take place, and the key influencing cultural factors. Compiled and adapted with reference to Goody (1982: 37–8). The precise order of stages, particularly those between procurement and consumption, can vary. Also, the preparation stage may occur in more than one step; for example, raw resources may undergo preliminary modification prior to storage or distribution.

<table>
<thead>
<tr>
<th>Processes</th>
<th>Stages</th>
<th>Location</th>
<th>Dominant cultural factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collecting/</td>
<td>Procurement</td>
<td>Hunting/gathering/fishing area</td>
<td>Economics: primary production; work organization; technology of food production.</td>
</tr>
<tr>
<td>hunting/fishing</td>
<td></td>
<td>Farm/fishery/garden</td>
<td>Belief systems: what is/is not food.</td>
</tr>
<tr>
<td>Cultivating/growing/animal</td>
<td></td>
<td></td>
<td>Politics: rent/tribute/tax/potlatch; divisions in domestic unit; decisions on seed, sale, consumption; control of resources.</td>
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<tr>
<td>husbandry</td>
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<tr>
<td>Allocating/storing</td>
<td>Distribution</td>
<td>Granary/market</td>
<td>Social: division and stratification of labour.</td>
</tr>
<tr>
<td>Processing</td>
<td>Modification/Preparation</td>
<td>Inside/outside dwelling</td>
<td>Economics: technology of preparation.</td>
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<td></td>
<td></td>
<td>Kitchen/other areas</td>
<td></td>
</tr>
<tr>
<td>Eating</td>
<td>Consumption</td>
<td>Table/eating area</td>
<td>Social: how organized; who participates; what is served.</td>
</tr>
<tr>
<td>Clearing up</td>
<td>Disposal</td>
<td>Eating area/kitchen/rubbish area</td>
<td>Belief systems: allocation of particular foods; prohibitions.</td>
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<td></td>
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<td>Social: what is disposed of vs. consumed.</td>
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<td></td>
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<td>Belief systems</td>
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</table>

...elements of each grade into each other. Nevertheless, this structure helps to make explicit the diverse dimensions of food and to clarify the inter-relationships of all aspects of food provision.

The range of archaeological data which directly or indirectly bears upon food provision can be related to Goody’s framework. For example, subsistence is most often formulated in terms of resources and their patterns of cultural use or change through time (Gumerman 1997: 105). In other words, subsistence as currently studied by archaeologists deals...
mainly with procurement with its primarily economic focus. However, much archaeological evidence derives from disposed material, with its implications for social and belief systems.

Much ancient activity was associated with food production and preparation because of their fundamental importance, not only for nutrition but as a key part of culture. Therefore, many of the artefacts found in the archaeological record are connected with food. Table 2 demonstrates that there is good archaeological potential to look at each stage of food provision. Several classes of ancillary evidence are available: carefully chosen ethnographic analogues, accurate experimental replication, and the biological constraints imposed both by human nutritional needs and the characteristics of exploited foodstuffs.

<table>
<thead>
<tr>
<th>Food provision stage</th>
<th>Types of material remains</th>
<th>Supporting data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procurement</td>
<td>- plant remains</td>
<td>- ethnography</td>
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<td></td>
<td>- animal remains</td>
<td>- experimental replication</td>
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<td></td>
<td>- resource procurement tools</td>
<td>- biology</td>
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<td></td>
<td>- human remains</td>
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<td>Storage</td>
<td>- silos</td>
<td>- ethnography</td>
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<td></td>
<td>- bins</td>
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<td></td>
<td>- storage vessels</td>
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<tr>
<td>Preparation</td>
<td>- hearths, ovens</td>
<td>- ethnography</td>
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<tr>
<td></td>
<td>- other preparation installations</td>
<td>- experimental replication</td>
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<tr>
<td></td>
<td>- tools e.g. mortars, querns, flint &amp; metal blades</td>
<td>- biology</td>
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<tr>
<td></td>
<td>- vessels: pottery, metal, basketry</td>
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<td></td>
<td>- house layouts</td>
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<td></td>
<td>- food residues and remains</td>
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<td></td>
<td>- butchery marks</td>
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<td>Consumption</td>
<td>- vessels</td>
<td>- ethnography</td>
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<tr>
<td></td>
<td>- house layouts</td>
<td>- experimental replication (for digestive processes)</td>
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<td></td>
<td>- gut contents: known individual, short time</td>
<td>- biology</td>
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<td></td>
<td>- coprolites: unknown individual(s), short time</td>
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<td></td>
<td>- cess: known/unknown individual/group, variable time span</td>
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<tr>
<td></td>
<td>- human remains: individuals, variable span</td>
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<tr>
<td>Disposal</td>
<td>Remains disposed of:</td>
<td>- ethnography</td>
</tr>
<tr>
<td></td>
<td>- vessels</td>
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<td></td>
<td>- preparation by-products</td>
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<td></td>
<td>- leftovers</td>
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<td></td>
<td>Condition of remains</td>
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<td></td>
<td>- e.g. whole vs. cracked bones</td>
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<td></td>
<td>Disposal patterns within/around settlement</td>
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The archaeology of food has moved in recent years beyond analysis of raw resources and the economics of procurement, as archaeologists explore ancient culture through evidence for food. Such investigations, though, require the application of a diverse range of data and careful integration (Hamilakis in press).

**The preparation stage and social relations**

Social interactions are bound up with most aspects of food (Fieldhouse 1995: 78), and thus might be investigated using any stage of food provision. The stages which are most likely to be visible in the archaeological record, however, are preparation and disposal.

The preparation stage is especially interesting for an investigation of social relations. Those who prepare food or control its preparation are often engaged in exchanges involving various commodities, including labour, raw ingredients, final prepared products and preparation resources such as utensils and equipment (e.g. Hendon 1996; McIntosh and Zey 1989). In addition, the preparation phase can be elucidated with a markedly diverse set of data (Table 2), much of which is likely to survive in the archaeological record. It is thus particularly likely to be a fruitful area of study.

This paper presents a case study of domestic bread preparation at an ancient Egyptian settlement, the Amarna Workmen’s village (Fig. 1). Since Egypt has a long history of archaeological investigation, has provided extensive documentary data and often yields organic remains in excellent desiccated condition, it is an ideal location for a multi-stranded approach to the archaeology of food and the preparation stage in particular. Bread is a key food to investigate, since it was a staple of diet and a foodstuff of particular significance to the ancient Egyptians, as described in the following section.

**Bread in ancient Egypt**

Written sources such as offering lists and administrative documents (e.g. Breasted 1907: 103; Drenkhahn 1975; Helck 1971) show there were two ancient Egyptian staple foods, beer and bread. These were consumed by all members of society and were frequent offerings to the gods. As an essential component of ritual offerings, bread was invested with significance as a symbol of life and the continuation of life. A food given such importance was likely to be closely bound up with social, economic and political relations. Moreover, the position of bread as a staple meant that its preparation was an important part of daily life for people in small households, on large estates and in temple bakeries.

Bread, together with beer, was used as an economic yardstick in a moneyless economy. Although based on barter, the ancient Egyptian economy was sophisticated (Janssen 1975). Commodities were frequently valued in relation to measures of grain or loaves of bread. As part of this system, bread (along with beer) was provided as rations, and was an important part of the payment system by those who had access to people’s labour (Kemp 1989: 117ff).

Bread, and access to resources for its preparation, were not the determinants of social structure and organization, but expressions of them. For example, different groups in
Figure 1  Map of Egypt, showing the location of Amarna and Deir el-Medina. Stippled areas denote cultivated land.
society may have had differential access to baking and bread resources. Some people may have been provisioned entirely by rations whereas others may have produced their own loaves. In the case of the exceptionally well-documented village of Deir el-Medina (Fig. 1), we know that both routes of supply were available (Černý 1973). The ways that ingredients, tools or foods were shared or distributed may have related to the interactions of different members of ancient Egyptian society. Thus, although all Egyptians had access to and ate bread, there may have been particular types of bread, ingredients, or preparation facilities which were not available to or used by everyone.

The Amarna Workmen’s village as a case study

Archaeology of the Workmen’s village

The Amarna Workmen’s village consisted of a walled enclosure of about seventy rigidly uniform houses, surrounded by small chapels, animal pens, rubbish dumps and other installations. It lies just over a kilometre from the eastern edge of the main city of Amarna. The city was briefly the capital at a period when ancient Egypt was at the height of its imperial power. Founded by Pharaoh Akhenaten as the centre of his new religious vision about 1360 BC, and housing all levels of Egyptian urban society, Amarna lasted only 20–30 years before being almost completely abandoned (Shaw 1996). The very short lifespan of the site is remarkable and means that virtually all Pharaonic archaeological remains are contemporary (Kemp 1977: 124–5).

About half the Workmen’s village houses and some of the outlying buildings were excavated by the Egypt Exploration Society directors Eric Peet and Leonard Woolley in 1921 and 1922 (the main publication is Peet and Woolley 1923). This work provided a good idea of the general plan of the whole walled area (see Figure 3 and Peet and Woolley 1923: pl. XVI). As with all earlier campaigns at Amarna (Shaw in press), the 1920s excavations at the Workmen’s village were marked by extensive and rapid digging with large work forces and small supervisory teams. Small objects such as jewellery, ostraca and seals were frequently overlooked, so that valuable evidence for activities within the houses is under-represented (Shaw in press). The bias in recovered artefacts from these excavations can be redressed to some extent by the analysis of remains from spoil heaps (Shaw 1995: 227).

Archaeological work was resumed at the village in 1979 by the Egypt Exploration Society under the directorship of Barry Kemp, and continued for eight seasons (see Kemp 1987b: 21 for publications). Recent work has been characterized by fine-grained, small-scale excavation, which deliberately targets the minutiae of stratigraphy, the rubbish and organic remains, as well as complete artefacts, architectural features of buildings and the layout of space. The 1980s excavations examined four houses together with ground outside the enclosure wall. Illicit digging some time after the 1920s had disturbed much of the record. Enough detailed data were available, however, to obtain a substantially clearer view of the construction of the ancient village houses and their installations, as well as the activities which took place within them.

The older excavations at Amarna, although overlooking much material, have given far more horizontal exposure than is normally achieved by current archaeological techniques
(Kemp 1981: 97). Even though sketchily recorded, they have provided more information, both architectural and artefactual, than remote sensing methods are yet able to produce. Recent work is providing much more detailed records and contextual information, and is often able to generate data which allows older work to be reinterpreted with some confidence (Kemp 1987b: 24). The two sources of archaeological data, early and current, can thus be used in tandem to undertake analyses and make extrapolations across broad areas of the site, in a way which would not be possible with small-scale excavation alone.

The Amarna Workmen’s village cannot be considered a model for New Kingdom Egyptian villages in general. Most ancient Egyptian villagers must have been farmers, but the Amarna village inhabitants, living far from the Nile floodplain and separated from it by the city, could not have been primarily engaged with agriculture. Although the occupations of the inhabitants are somewhat uncertain (Kemp 1987b: 43ff.), it is clear that the village was founded by the royal administration for specific reasons – probably for tomb building and perhaps patrol duties – and that the villagers were supplied with many of their basic needs by the state. One archaeological indicator of this is a depot area situated about 50 metres south of the walled enclosure (Kemp 1984: 60ff.), where provisions were brought from the city and distributed to the villagers.

Whatever the nature of this settlement, the archaeological data from it is now almost unique in Egypt in its richness and extent (Kemp 1989: 255). As such, it provides an excellent baseline with which to explore food provision and its cultural implications. Shaw (1998) suggests that, although anomalous in structure and setting, activities at the Workmen’s village may be more comparable to those which took place in urban dwellings.

The nature of the Workmen’s village community

Where did the Amarna villagers live before they came to the settlement in the eastern desert? Were they disparate, perhaps local, families brought together by royal decree or recruitment, to form in effect an artificial community, or were they already a coherent group transplanted from an established neighbourhood elsewhere in Egypt? The answer to this question has an important bearing on the social relations which could be expected to ensue, but is elusive.

Kemp (1987b: 43–6) considers the problem at some length. One possibility is that the Amarna villagers came from Deir el-Medina (Fig. 1), another Workmen’s village which was occupied from about 1500 BC to 1000 BC (Bierbrier 1982). This older village was founded and provisioned by royal decree (Valbelle 1985) to accommodate the labourers and artists who constructed the tombs in the Valley of the Kings and Valley of the Queens. Kemp (1987b: 44) casts doubt on this because of the very different use of the grounds around the walled houses, particularly the extensive pig-keeping operations discovered at the Amarna village (Kemp 1984: 40–59; 1986: 34–59; 1987a: 47–50, 62–4) and not found at Deir el-Medina. Also, the use of space within the Deir el-Medina houses, at least in their later phases, is completely different (Meskell 1998). It is known that other workmen’s communities existed elsewhere (Černý 1973: 62–5), so it is possible that the Amarna villagers came from some other long-lived locale (Kemp 1987b: 44–5).

If the village at Amarna was composed of families who had had no previous dealings with each other, social relations would have developed gradually and may never have become
particularly intimate over the course of only twenty years or so. This timespan is long
enough, however, that individual families may have intermarried or reached particular
exchange agreements. If the village represented a transplanted community, then it is most
likely that established social networks would have continued amidst new surroundings.
Kemp (1987a: 40ff.) has demonstrated that, although the houses of the Workmen’s village
were highly uniform, individuals made their own decisions and arrangements for living in
a way that suited them. This archaeological insight relates to a key point of Egyptological
debate (Shaw 1996: 99–100): were individuals and households largely dependent upon state
and temple redistribution networks for their supplies as Janssen (1975; 1983) proposes, or
were any elements of self-sufficiency involved as suggested by Kemp (1972, 1977, 1989) and
Smith (1972), and if so, to what degree? Furthermore, we know little of the extent to which
households of the same general social profile operated communally, whereby resources and
consumption of materials were shared, or individualistically, whereby decisions and actions
were taken independently of community ties (Counihan 1984).
Did the individuality visible in the Workmen’s village house architecture extend to the
production of a staple food? That is, were households independent producers of their own
bread supply, or did the villagers co-operate for access to essential resources for bread
production? Another possibility is that the villagers did not produce their own bread at
all, but were entirely dependent on the state. Archaeological evidence from the temples
of Amarna, part of the infrastructure of the state, shows that bread was produced on a
vast scale there (Kemp 1994: 147–50). The loaves must have been redistributed to at least
some sectors of the population. The Workmen’s villagers may have obtained part or all
of their bread from temple bakeries. By looking at the production of bread, I aim to
examine whether households undertook decisions and actions independently of com-

Sources of evidence for ancient Egyptian baking

At its simplest, bread is made from a moist dough (at minimum usually the flour of milled
grains mixed with water and possibly leavened), and baked (cooked by dry heat without
direct exposure to fire). There are many potential elaborations and the technology used
for making flour and baking can vary considerably. The accurate identification of each
step and the equipment used is critical if the activities and interactions of ancient bakers
are to be understood. Until recently, ancient Egyptian bread making had been deduced
through the artistic record, but there has been considerable confusion about the identity
of tools, their function, and the sequence of each step (Samuel 1993: 277).

This uncertainty is probably due to misunderstanding about the structure of the cereal
used for bread. The content of most ancient Egyptian desiccated loaves, at least for funer-
ary offerings, is emmer, a hulled wheat (Samuel 1996: 488). Emmer ears break apart into
individual packets called spikelets when threshed. Unlike free-threshing wheats, almost
universally used today, spikelets require vigorous processing after threshing because they
are composed of tough envelopes of chaff which encase the grain (Hillman 1984; Hillman
Figure 2 A basic scheme of the New Kingdom Egyptian bread making process from emmer spikelets to bread, showing the tools and installations used for each action in the sequence and the product of each stage.
A multi-stranded archaeological approach has recently provided much clearer information about New Kingdom bread making (Samuel 1994, in press). Figure 2 outlines the basic processing sequence which transformed emmer spikelets into finished bread, together with the accompanying tools and installations attested archaeologically, and the intermediate products produced at each step. Emmer spikelets were removed from storage, cleaned, and then dehusked with stone mortars and wooden pestles. The resulting shredded chaff was removed from the grain, which in turn was milled into flour with saddle querns. Finally, the flour was mixed into dough and baked. The three bread preparation installations which are most visible in the archaeological record are limestone mortars (together with their emplacements), quern emplacements and cylindrical ovens.

The function of ancient Egyptian mortars for dehusking emmer has rarely been recognized; they have usually been thought to be for crushing grain (Samuel 1993: 277). The traditional use of mortars and pestles in cereal processing is for stripping tough chaff and debranning grain (Harlan 1967: 199; Hillman 1984: 129–30). Experiments have shown that pounding breaks up emmer chaff and frees the grain very successfully (Meurers-Balke and Lüning 1992; Samuel 1993: 280). This is confirmed by archaeobotanical evidence from the Amarna Workmen’s village, where a substantial primary deposit of desiccated emmer chaff was retrieved around an emplaced limestone mortar (Plate 1) (Samuel 1989: 280–1). Together with the large quantities of emmer chaff in the village middens (Kemp 1983: 10, 12; Renfrew 1985), this clearly demonstrates that emmer was used for daily as well as for funerary bread.

Various functions have been ascribed to the box-like structures found both in Amarna village houses (Plate 2) and at Deir el-Medina (Bruyère 1939: 75–8; 1953: 96–101). Kemp (1986: 3) identified them as quern emplacements on the basis of artistic evidence and this function was confirmed experimentally (Nesbitt and Samuel 1996: 54; Samuel in press), with reference to ethnographic information (e.g. Schön and Holter 1990). There is only one candidate for bread baking found at New Kingdom sites: the cylindrical oven (Plate 3). Although open hearths are found in most central rooms of the Workmen’s village houses (e.g. Kemp 1986: 6), they are not suited to making anything other than simple ash-baked bread. Desiccated Egyptian loaves (e.g. Borchardt 1932; Sist 1987: 58) show little sign that they were made this way. Current-day traditional baking with the cylindrical Near Eastern tannour (Samuel 1989: 255; Währén 1961: 3) demonstrates that the cylindrical oven is for baking bread, and this has been confirmed by the recovery of starch granules from the interior lining of a Workmen’s village cylindrical oven (Samuel 1994: 299).

As well as these installations, equipment such as saddle querns and hand stones survives in the archaeological record. In exceptional conditions tools made from organic materials, such as wooden pestles and winnowing paddles, have been recovered. These smaller finds are often ignored or incompletely recorded, however, so a detailed analysis of baking facilities must rely primarily on the big, robust installations described above.

**Approaches to social interactions at Amarna**

Food is a developing area of archaeological research in Egypt, and New Kingdom social relationships have largely been investigated with other data. Amarna is one of the few
Plate 1 An emplaced limestone mortar in the north-west corner of the Front Room, West St. 2/3. The mortar is set into an emplacement of mud brick and mud plaster, and the rim built up with these materials. The black division on the scale bar is 25 cm. The interior diameter of the upper built-up rim is about 31 cm, total depth is about 39 cm. This is one type of mortar emplacement at the Amarna Workmen’s village; the other type was simply the limestone mortar let into the floor so that the rim was flush with the floor surface. The smaller dimensions of the mortar alone meant a smaller spikelet volume could be processed at a time compared with the rimmed type shown here. (Photo by Barry Kemp, courtesy of the Egypt Exploration Society)

Plate 2 The front rooms of Gate St. 8 looking east, with the remains of a quern emplacement to the lower right. The scale bar is 1 metre; each division is 25 cm. The emplacement is built against a structural wall which provides one side of a hollow box together with three low panels of mud brick. The right-hand panel was originally built up higher than that on the left, as can be seen from the marks on the mud plaster above it. Better preserved examples are filled with stones and mud brick, often topped by a layer of ash, and the sloping upper surfaces are covered in gypsum or mud plaster. The stone saddle quern was originally set into the sloping top, but no complete examples with the quern in place have yet been found. A separate shallow compartment, in which the miller would have crouched, is built between the main box and the corner of the room. This view shows how much space was taken up by quern emplacements in the little Workmen’s village houses. (Photo by Barry Kemp, courtesy of the Egypt Exploration Society)
extensive Egyptian settlement sites available for study, and several scholars have used it for socio-economic case studies. Given the constraints of inconsistent artefact recovery and recording, most attempts to analyse social relations at Amarna have used architectural remains, the only substantially published and reasonably reliable category of evidence available (Shaw 1992: 153). This has provided an impetus to formulate most questions about social life in terms of comparative rank and status, using house sizes, fittings, layout and surrounding space as indicators (Crocker 1985; Janssen 1983; Kemp 1977; Tietze 1985). Shaw (1992) applied further evidence in the form of artefact distributions and ethnoarchaeological analogy to examine how the urban house could be used to display wealth and high status.

The focus of this paper differs from such studies in the social questions addressed. Rank and status are not considered. Rather, I have sought to discover whether households of approximately the same social and economic status were interdependent on each other, using food preparation as a primary indicator. The Amarna Workmen’s village, anomalous though it may have been, was a relatively closed neighbourhood of people who, although apparently somewhat varied in rank and wealth (Kemp 1987a: 45; 1987b: 28, 48), were at more or less the same level in relation to the overall social organization of New Kingdom society. The distribution of bread preparation equipment is applied in the following section to explore social relationships amongst this particular ancient community.

Bread making and social relations at the Workmen’s village

Despite the lower standard of the pre-1979 Amarna excavations, the bulky food-related artefacts such as ovens and quern emplacements are more consistently recorded, even if misinterpreted, in the early Workmen’s village reports compared to other, smaller or more fragile installations and artefacts. In addition, if not removed by their owners, food preparation items have a reasonable chance of surviving in the archaeological record. Many
are robust, and are less vulnerable to the looting with which objects valued in ancient or modern times are threatened (Crocker 1985; Shaw in press). It has not always been possible to identify with complete confidence relevant food preparation articles from earlier excavations. In the discussion which follows, all probable or possible relevant installations are none the less taken as definite identifications and are included in the distribution study. In practice, there are few objects of uncertain type.

Janssen (1983: 281) has suggested that in the city of Amarna, small households were self-sufficient in bread production based on the frequency of ovens in small houses. How grain was obtained in the first place is not entirely clear from the archaeological record. Large houses at Amarna often, but not invariably, have extensive granary installations within their property boundaries, whereas small houses do not. Kemp (1972) proposes, and Janssen (1983: 281) agrees, that wealthy households were conduits of grain to the poorer members of the population, although the authors differ in their suggested mechanisms for this transfer.

In the case of the Workmen’s village, the depot area in front of the walled village indicates a centralized supply centre for the villagers, provisioned by an outside source. If the analogy to Deir el-Medina is applicable to the Amarna village, documentation provides confirmation of state supply (Černý 1973; Valbelle 1985). There is evidence, though, that some Deir el-Medina inhabitants owned farmland and had access to their own agricultural resources (McDowell 1992). Whether this was so for the Amarna villagers is unknown. As the community was much less wealthy than the later Deir el-Medina village and was blocked from easy access to agricultural land, the inhabitants were unlikely to have had their own farms, although there are clear traces of pig husbandry as well as small garden plots (e.g. Kemp 1987a: 50–2), within the Workmen’s village itself.

**Distribution of flour preparation facilities**

Figure 3 is a plan of the walled sector of the Workmen’s village, incorporating both the 1920s work and the later 1979–86 excavations. Plotted onto it is the distribution of tools and installations connected with cereal processing. These are mortars for dehusking, pestles (when records are given), quern emplacements where milling took place, loose quern stones (as recorded), and cylindrical oven installations. Possible mortars and quern emplacements, together with probable ovens, are also indicated. Out of forty-two houses fully or partially excavated, thirty-seven were sufficiently recorded to assess the distribution of bread preparation installations. Installation data are tabulated in Tables 3a and b. The anomalous houses discussed by Kemp (1987a: 40ff; 1987b: 27, 29) are included in this tally, on the basis that they may have been used by specific people or households for regular domestic activities, even if they were not normal dwellings.

Of the thirty-seven houses for which data can be reasonably reliably obtained, twenty-four houses (65 per cent), are equipped with both mortars and quern emplacements, usually found in the same room, often a front room (and see Kemp 1987a: 41). Almost all houses, that is thirty-three (89 per cent), have quern emplacements. Ten houses have no mortar (see Table 3b) but many of these had access to a mortar emplaced nearby in the street. In the case of the West Street houses, there is a mortar in front of house 15 and the Main Street houses had easy access to a mortar in front of house 4. Thus, a number of
households which lacked their own mortar seem to have shared a communal facility for the initial dehusking stage, but had their own emplacements for producing flour. Clearly, the majority of village houses had their own means of transforming emmer spikelets into clean flour.

**Decision making and house pairing**

Decisions about siting the quern and mortar, and use of communal facilities, may have been due to individual household preferences about the use of space within the architecturally similar houses. In the case of houses using communal facilities, it is possible that the presumed inconvenience of carrying the required materials to the street mortar and scheduling its use was balanced against the advantage conferred by freeing up room within the cramped confines of the personal household space. Some reasons for wanting or requiring more space in the house can be seen in the archaeological record. In some houses space-consuming activities were carried out, such as weaving (Peet and Woolley 1923: 60–1) and keeping animals (Kemp 1987a: 43, 44). It is not obvious, however, what activities may have been facilitated by the lack of mortars amongst those houses which seem to have used communal street facilities.

For the West Street houses without mortars, another possible reason for the lack of this essential domestic item is that the occupants could not afford them. The proportion of West Street houses without mortars is 30 per cent, twice that of the eastern sector, where 16 per cent of houses have no mortar. The figure for West Street is somewhat reduced if one assumes that the people living in house 26 made use of house 23 (Kemp 1987a: 42), but this is balanced by the lack of any baking installations in Main St. 3 (see Fig. 3).

The layout of the walled enclosure did not originally include the double row of West Street houses (Kemp 1987a: 3–4, 45; Peet and Woolley 1923: 67). West Street appears to have been occupied at the end of the use of the Workmen’s village. Kemp (1987a: 12–13; 1987b: 48) has suggested that the western sector may have been occupied by people with separate duties, perhaps a military or police unit. Peet, Woolley and Kemp all agree that West Street was a poorer sector of the village, on the basis of fewer artefacts and house fittings.

Shaw (1995: 230–2) has re-examined the evidence from both sets of excavations. He concludes that the range of activities taking place in West Street was comparable to those in the eastern village sector, and that lower diversity and numbers of artefacts in West Street could be explained by the shorter occupation time. Although Shaw (1995: 232) posits several possible explanations for fewer artefacts in West Street, the distribution of bread preparation facilities suggests that essential equipment was not available to many West Street householders and sharing of resources had to suffice.

The choice or necessity for some households to use communal pounding facilities but for virtually every household to have its own milling instalation may have been due to time considerations. According to experimental data (Samuel 1994: table 5.3), the pounding step is relatively quick, and in the hands of experienced operators was likely a rapid process. The milling stage, however, is much slower. Furthermore, people may have pounded emmer spikelets ahead of time and cleaned the grain of chaff, then stored it briefly before grain was needed for food preparation. Once flour was produced, it was
Table 3a  Record of presence of mortars, quern emplacements and ovens in the Amarna Workmen’s village houses, by number and percentage of houses. (See Figure 3 for plan of village and distribution of bread preparation equipment.) This table includes only those houses for which reasonably reliable data can be obtained, discounting the five excavated houses which were not completely excavated or for which published records are missing (see Table 3b).

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Number of houses</th>
<th>% of houses</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Total houses with reliable data)</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Both mortars and quern emplacements</td>
<td>24</td>
<td>65</td>
</tr>
<tr>
<td>Quern emplacement only</td>
<td>9</td>
<td>24</td>
</tr>
<tr>
<td>Mortar only</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Neither quern emplacement nor mortar</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Oven</td>
<td>18</td>
<td>49</td>
</tr>
</tbody>
</table>

Table 3b  List of specific excavated houses of the Amarna Workmen’s village missing mortars or quern emplacements, anomalous houses included in the distribution analysis, and houses for which insufficient data is available for tabulation.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Houses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quern emplacement only</td>
<td>West St. 13, 19, 21, 26; Long Wall St. 12; Main St. 4, 5; Gate St. 8, 11</td>
</tr>
<tr>
<td>Mortar only</td>
<td>West St. 24; Main St. 8; Gate St. 9</td>
</tr>
<tr>
<td>Neither mortar nor quern emplacement</td>
<td>Main St. 3</td>
</tr>
<tr>
<td>Anomalous houses (see Kemp 1987a: 40ff; 1987b: 27, 29)</td>
<td>West St. 23; Long Wall St. 8; Main St. 3</td>
</tr>
<tr>
<td>Not counted due to insufficient data</td>
<td>West St. 15; Long Wall St. 1, 2; Main St. 2; Gate St. 12</td>
</tr>
</tbody>
</table>

likely to become rancid quickly, to be much more vulnerable to insect infestation, and was perhaps difficult to store conveniently. Flour was probably produced at the time it was needed, and therefore demand for milling facilities would have been much less flexible than access to pounding equipment.

Another factor which may have influenced the choice between communal facilities and personal household mortars, as well as siting, may have been the number of people engaged in processing cereals. If several people in one house – such as older daughters or younger children – carried out some of the preparation tasks, it may simply have been

Figure 3 (opposite)  Plan of the Amarna Workmen’s village walled enclosure, with locations indicated of mortars, pestles, querns, quern emplacements and ovens. Dotted wall lines indicate the probable location of rooms in unexcavated houses, based on the plans of excavated houses. Note how the section originally drawn by F. G. Newton (Peet and Woolley 1923: plate XVI) shows several quern emplacements with their typical sloping profiles, thus aiding identification of these installations in the Peet and Woolley archaeological reports. This figure is based on an original plan drawn by F. G. Newton in 1922 (Peet and Woolley 1923: plate XVI) and incorporates recent archaeological work carried out in the 1980s.
Plate 4 View of West St. 2/3 looking west. The scale bar is one metre; each division is 25cm. West Street 2/3 is bigger than most houses in the Amarna Workmen’s village, and all the major bread preparation facilities are located in different parts of the house (see also Figure 3). The emplaced mortar in the far back right of the front room is that shown in Plate 1. The surviving base of a quern emplacement is visible in the annexe on the left, at the far (western) end. A second limestone mortar was found nearby. Traces of a cylindrical oven were found on the opposite side of the annexe/house wall (in shadow in this view), in the far left corner of the house proper, but the installation itself, like all the fittings in the two rear rooms and middle room of the house, was thoroughly destroyed by modern robbery. (Photo by Barry Kemp, courtesy of the Egypt Exploration Society)

physically less cramped to have the different stages carried out in different parts of the house (Plate 4). It is difficult, though, to think of a way to test this notion.

One of the few houses without a quern emplacement stands out because of its unusual architecture. West Street 24 has been substantially altered so that, alone of all the dwellings on the east side of the street, the front door opens onto Long Wall Street (Peet and Woolley 1923: 90). This house contains a mortar, while the house nearly opposite, Long Wall Street 12, has no mortar but probably has a quern emplacement. No mortar was uncovered in the Long Wall street. These striking features lead to the suggestion that these two houses were sharing basic household resources for bread production.

Similar pairing can be argued for the other two houses, otherwise of normal layout (thus discounting Main Street 3), which do not have quern emplacements: Main Street 8 and Gate Street 9. As Gate Street 8 and 9 were excavated as an isolated pair (Kemp 1986: 1ff.; 1987a: 30ff.), while the street itself was not fully excavated, it is not possible to be absolutely sure about the way that cereal processing tools were distributed and used there. It is intriguing, however, that while Gate Street 9 lacks a quern emplacement, no mortar or sign of a mortar emplacement was recovered from neighbouring Gate Street 8. In addition, Gate Street 9 contained a loose quern, suggesting that it did own the implement if not the emplacement for milling. These houses were excavated in the 1980s with detailed recovery and recording techniques. Balanced against this is the fact that both houses were disturbed by illicit digging prior to excavation. The Gate Street 9 quern, for
example, was found high in the fill (Barry Kemp, pers. comm.) so its original provenance
may have been Gate St. 8 and in any case cannot be certain. Nevertheless, traces of
substantial items such as a quern installation and a stone mortar or its site of emplace-
ment might be expected to survive.

The Main Street 8 household may have shared a quern emplacement with either of its
neighbours. There is nothing definitive about the cereal preparation equipment to indi-
cate what arrangements the inhabitants of number 8 made for milling grain, although
the double oven in number 9 (Peet and Woolley 1923: 80), the only one of this type in
the village, is perhaps suggestive of use more extensive than normal. An examination
of other artefact classes may have had potential to detect links with other households.
Since artefact recovery and recording for these houses were cursory, however, any
such evidence which may originally have been present has probably unfortunately been
lost.

There is one more example of shared resources amongst households apparent in the
Workmen’s village. Kemp (1987a: 44) points out that Main Street 10 and 11, which both
had a full complement of cereal preparation installations, shared a staircase and may both
have been occupied by two families sharing their dwellings. The ground floor rooms in
number 11 apparently sheltered animals, suggesting that this area was not used for the
full range of human activity which occurred in other houses.

Distribution of baking facilities

The extent to which baking facilities were standard household equipment or shared
installations is more difficult to assess. Figure 3 shows that there are many fewer ovens
than mortars or quern emplacements; about half the houses lack evidence for ovens
(Table 3a). Most ovens are at the back of the houses. It would appear at first sight that
many households were not able to bake their own bread, for a large installation like an
oven should be obvious during excavation. However, a clue from recent excavations
indicates that the actual situation was more complex. Fragments of cylindrical oven
together with ashy deposits were found high in an area of undisturbed fill of Gate
Street 8, leading to the suggestion that the oven was on the roof or upper storey of
the house (Kemp 1986: 20–1). There is no reason to imagine such a circumstance was
unique.

To obtain evidence of this type requires both careful stratigraphic control and recog-
nition of broken cylindrical oven fragments. Since these were lacking in earlier excava-
tions there will always be a limit to the evidence about precise oven distribution (Kemp
1986: 21). Given the many houses with both mortars and quern emplacements and
thus the means of producing flour, it seems reasonable to suppose that most of these
houses also had ovens originally. Most but not all the houses with no ovens on the ground
floor have staircases giving access to the roof or upper storey. Some specific houses
self-sufficient in flour production may have shared baking facilities, but I suggest that
most were able to bake their own bread as well. The fact that Gate Street 8 probably
had an oven on the upper storey, while no trace of oven remains were found in number
9, reinforces the suggestion that these two houses were sharing cereal preparation
resources.
Social networks in the Workmen’s village

Most village families prepared their own bread, suggesting that self-sufficiency in bread production was valued. Perhaps the centrality of bread in ancient Egyptian life made it socially and symbolically important to produce independently if possible. Bread may have played a role in exchanges between people in the village – we do not know – but in order to participate in such interactions householders would have had to produce their own loaves.

Where there is evidence of collaboration between a pair of households, did the people with the mortar in their house dehusk spikelets for two family units while the co-operating household milled all the grain? It is uncertain whether labour as well as equipment was shared for bread preparation, but experimental evidence for the substantially different times these steps require suggests that such a strict division was unlikely. It seems more probable that people from both paired households carried out all tasks, but perhaps processing sufficient cereal for two families at the same time in a co-operative and social fashion.

Apart from the specific household pairs which prepared bread together, there is archaeological evidence to suggest that other undertakings at the village were carried out by specific small groups. The layout and numbers of chapels and animal pens, as well as sites in the depot area, indicate that village networks were set up on the initiative of the occupants themselves (Kemp 1987b: 30).

The community origins of the village can now be better evaluated. If disparate households had developed inter-relationships over about 20 years only, we would expect to see a random, organic pattern of pairing, not side-by-side co-operation. Overall, the networks visible in the archaeological record favour the idea that the Amarna village inhabitants came from an already-established community. This is an encouraging conclusion for the validity of social and economic comparisons between the Amarna Workmen’s village and more long-lasting settlements elsewhere.

Dependence, self-sufficiency and social relations

The Amarna Workmen’s village was clearly a community created by the state and dependent upon it for its basic supplies. Within this framework, there is now plenty of evidence to show that the villagers operated independently of one another in their daily activities. This analysis of food provision has demonstrated that, once provided with the raw materials, individual village families or household pairs were largely self-sufficient in bread production.

The archaeological evidence shows limited and specific exchanges of preparation equipment and only little use of communal installations. The dependency on outside supplies coupled with individualistic household activity which is apparent at the Amarna Workmen’s village seems to fit a wider pattern of human behaviour. Two examples, one ancient and one modern, are briefly reviewed here.

In his study of Neolithic to early Bronze Age transitions in the Aegean, Halstead (1995) traced community development from communal cooking facilities to sequestration of installations within compounds and then into houses. At the same time, there is evidence
for increasingly unequal economic and social status within ancient settlements. Halstead (1995: 19) concludes that concentration of supplies and their distribution into the hands of an elite was accompanied by a decline in reciprocity amongst socio-economically dependent groups.

Precisely the same process is charted by Counihan (1984) in her study of social and economic changes in modern Sardinia. Traditional small-town baking there was characterized by strong reciprocation amongst the women; each woman relied upon a wide social network to help produce her household supply of bread, and she in turn assisted others. The grain supply for each household was produced by the men. After the Second World War, people became economically dependent on the government through salaries, subsidies and pensions. Concurrently, men ceased grain production while women no longer baked together but purchased their own household bread. Economic dependence upon the state led to a transformation from communal to individualistic social relations.

By the time of the New Kingdom in Egypt, a highly sophisticated economy had been developed, in which the state played a major role in supply and redistribution of resources. Much of the population received rations from the state and were therefore dependent upon it to some degree. The evidence of bread preparation at the Workmen’s village indicates that, under these economic conditions, there was little inter-household co-operation in domestic production activities but rather individual organization of resources. The Workmen’s village fits a wider pattern whereby centralized or state provision leads to independence amongst households of similar socio-economic status, not communal interactions.

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Bread making and social interactions at the Amarna Workmen’s village, Egypt


