The research priorities for new archaeozoological and archaeobotanical investigations : Based on ?atalh?yuk in Turkey

The research priorities for new archaeozoological and archaeobotanical investigations: Based on Çatalhöyük in Turkey

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Introduction

When new archaeozoological and archaeobotanical investigations are conducted on a rural or urban settlement site, an approach to the long-term development of society on the site would be mainly illustrated. When did people begin to settle in the site? How had the society been organised and developed? What had the residents adopted as food resources? Various research questions are addressed in relating to this approach. "Understanding what people ate at various times in prehistory is fundamental for understanding how past populations survived and prospered - how healthy people were, the nature and stability of populations' adaptations to the environment, and whether agricultural surpluses were produced to support complex social and political organisations" (Pearsall, 2000, p.498). In other words, the approach to social significance of the site may be the research design for archaeological investigations.

The overall aim of this environmental report is to find out the research priorities for new archaeozoological and archaeobotanical investigations on a rural or urban settlement site. Archaeozoological assemblages may assume the interaction between humans and animals in relation to both exploitation strategies and social plus ritual aspects of human behaviour. Archaeobotanical assemblages can reflect plant food resources in conjunction with non-food uses of plants on the site. These remains may be evidence for the environment around the site.

The following would emerge as the main findings that an approach to the long-term development of society on a settlement site is resulted from sampling strategies, analysis of bioarchaeological remains, and interpreting results.

The base site chosen for discussion on the research priorities is the site of Çatalhöyük in central Turkey. Çatalhöyük is the Neolithic settlement site in Anatoria and an example of the important Anatolian contribution to the development of Mediterranean societies. The data used in this report is based around archaeozoological and archaeobotanical data from the excavations between 1993 and 2002.

The structure of this report is as follows. Firstly, the history of excavations at Çatalhöyük is described. Secondly, sampling strategies are described along with those used in the research of Çatalhöyük. The third section presents information realised from analysis of bioarchaeological data. In the fourth section, the interpretation of faunal and botanical remains at archaeological sites is stated. Finally, the results of this discussion are summarized and some conclusions are drawn.

1. The site of Çatalhöyük

1-1. Excavation in the early 1960s

The early Neolithic site in central Turkey, Çatalhöyük is one of the largest early settled village sites in the world. It consists of a pair of mounds in the Konya Plain with some of the earliest domestic wall paintings and sculptures, as well as the numerous archaeological remains of domesticated plants and animals.

The site of Çatalhöyük was first discovered in the late 1950s, and in the early 1960s, James Mellaart excavated it. Mellaart focused his excavation on the south western side of the east mound where he had first observed plastered walls eroding out of the surface of the mound during his survey (Matthews & Farid, 1996).

Mellaart's excavations showed that Çatalhöyük was the first urban centre in the world at 7000 BC and had the first wall paintings along with sculptures. The spectacular wall art provides a direct window into life 9000 years ago.

Consequently, Çatalhöyük would be an internationally important key for understanding the origins of agriculture and civilisation. Analysis of the structure realised from the site, of the spatial and temporal relationships between buildings, and between buildings and unroofed areas, seem to be fundamental to study the social, economic, ritual, and artistic relationships across the site, as well as to study any changes or developments through time (Matthews, 1994).

1-2. Excavations between 1993 and 2002

Since 1993, an international team of archaeologists led by Ian Hodder has been carrying out new research at Çatalhöyük. "The discovery of other earlier sites in the region, including an epi-Palaeolithic site, has indicated the possibility of understanding the long-term development of society and the adoption of agriculture" (Hodder, 1993). When the palaeoecological relations have been understood, the reasons for the prominent rise of Çatalhöyük can be explored (Hodder, 1993; 1996). In other words, this excavation project has been conducted in order to shed more light on the people that inhabited this site.

During the excavations, lots of objects realised from daily life and bioarchaeological remains were found. In particular, animal bone and plant assemblages were well preserved. They have been analysed in order to see the fruits of a more detailed and micro-scale approach. These rich preservation and behavioural information may provide the potential for in-depth understanding of the ways the buildings were used (Hodder, 1998).

Likewise, the survival architecture and artefacts with art and human burial make Çatalhöyük unique in its potential contribution to understand the development of complex societies (Hodder, 1993).

A series of survey results present that Çatalhöyük was occupied in the Neolithic and Chalcolithic. The lack of occupation in the Bronze Age and Iron Ages contrasts with the survey evidence from other sites in this region, and then, it can be assumed that the reasons for the abandonment had been very local. The site was reoccupied in Hellenistic, Roman, and Byzantine times, especially at the southern side of the larger eastern mound. This occupation consisted of large extraction and other pits, buildings, graves and midden material (Hodder, 1993). Such variation across space and time would thereby suggest the social development of Çatalhöyük.

2. The field procedure - sampling strategies

2-1. The role of sampling

As one of the field procedures during excavation, sampling is a portion of a site that may answer research questions. It can ensure the maximum information obtained from bioarchaeological assemblages on the site.

In addition, collecting samples is required for the recovery of botanical and faunal remains, like cereal grains, seeds, chaff, small animal, and fish bones and fish scales; therefore, sampling is needed to accommodate each category of material and means of preservation, primarily and systematically by flotation, and moreover, by collecting material in situ during excavation.

Sampling strategies are determined and conducted in terms of sampling size or units, universe, types, and subsampling. In other words, large enough reflection of environmental data from a site would lead to determine the nature of the site.

2-2. Sampling size/units

Sampling size or units must be large enough to reflect the distribution of species and their parts in the deposit from which the sample was taken (Reitz & Wing, 1999, p.113). How much should volume or weight of samples be collected from each section of a site? Although oversample as far as possible are important, too heavy residues may cause problems, for example, samples cannot reflect the quantitative data on the site. Therefore, amounts of sampling material must be decided before and during surveys.

At Çatalhöyük, the sampling aims to obtain and evaluate new data on Neolithic subsistence and sociocultural activities, as well as the natural and built environment. It may enable study of depositional components at a range of scales realised from analytical focus, and in different sample types and sizes (Matthews, 1997).

In the case of plant assemblages at Çatalhöyük, sampling for flotation of charred plant remains have continued. A flotation sample of approximately 30 litres and additional samples of 30 litres has been collected from each unit where possible (Asouti et al., 1999). In similar to collecting animal bone remains, the total flot weight of each relevant fraction and recording for all relevant flots are required to achieve

usefulness of botanical densities.

2-3. Sampling types, subsampling, field records

Sampling types and subsampling are sampling methods similar to sampling size. Sampling types include both organic material such as faunal and botanical samples and inorganic material such as soil. Subsampling aims to use block samples for micro-excavation and micromorphology. Moreover, field records as far as possible are required to analyse whole sampling data in much detail.

At Çatalhöyük, samples for organic and inorganic analyses along with archive were collected at 50 cm intervals from each unit of excavation. Especially, sampling and the detailed recordings of animal bone material are initiated. This aim is not only to identify each specimen of bone from the excavations to some level, but also to record all attributes realised from the material, like condition, surface markings and modifications, weathering, fragmentation and burning, which will aid the fuller contextual analysis of the deposits, as well as contribute to discuss animal acquisition and treatment at this site (Russell, Martin & Le Blanc, 1996).

Since 1997, animal bone assemblages have been recorded in full onto the specially designed Çatalhöyük Faunal Database (integrated with the rest of the site database), which attempts to document each fragment of bone/tooth to some level. The large quantity of faunal remains produced by the excavations, enhanced by excellent retrieval would require either a quicker method of recording or a form of sub-sampling (Martin & Russell, 1997).

2-4. Conclusion

Sampling strategies are one of the on-site methods during excavation. They may be due to obtain environmental information of a site. "Choices are continually being made regarding where to excavate, how to recover samples, and the degree of detail achieved during identification, analysis, and publication" (Reitz & Wing, 1999, p.113). As a result, it would be suggested that sampling strategies are suitable for an approach to find out the social significance of the site.

3. Analysis of bioarchaeological data

3-1. Representation of faunal and botanical remains

The data obtained from faunal and botanical remains can provide a variety of information on the site; especially such information may ensure an assemblage's history.

Animal bone remains may be the only hard evidence for those animals that were in the past (Reitz & Wing, 1999, p.141). However, "many of the analytical techniques are inadequate as a basis for the interpretive consideration of man's husbandry practices, the establishment of the structure of the death assemblage, and the behaviour which generated it and no doubt many of the other interpretive ends to

which faunal material is put" (Rackham, 1983, p.273). Then, knowing the types of losses and measuring the degree of disturbance would be important in analysing archaeological faunal assemblages and interpreting these finds (Reitz & Wing, 1999, p.115).

Faunal assemblages can represent mortality profile and bone modification. Mortality profile includes age at death, sex, and breed of animals through identifying their bones. Bone modification leads to analyse marks of animal bones revealed through pathology, butchery, burning and gnawing. These may attribute to distinguish the interaction between humans and animals. In other words, reconstruction of hominid subsistence patterns and palaeoecological conditions may be resulted from analysis of prehistoric faunal assemblages (Lyman, 1994, p.2).

To the contrary, archaeobotanical assemblages can be evidence for food plants on the site and early plant husbandry. Food plants include seeds, nuts, roots, and fruits; particularly, seeds such as cereals and weeds can show crop process through identification of the structure.

Plant remains would be preserved on archaeological sites by charring, by the exclusion of air through waterlogging and occasionally otherwise, and they usually represent a small fraction of the plant material that was originally present (Greig, 1983). Charred materials were resulted from heating in various stages of crop process or from incomplete burning of rubbish. Therefore, it may suggest human activities, in particular with the adoption of agriculture on the site.

In addition, identification of waterlogged plants and floral or non-floral parts can be due to the recovery of vegetation around the site; consequently, it would be an approach to the food resources of the inhabitants.

Both archaeozoological and archaeobotanical assemblages are reflected in human activities on a site. As a result, analysis of these data may lead to the recovery of human behaviour and economy on the site.

3-2. Analysis of faunal remains

At Çatalhöyük, animal bone material is extremely well preserved in the Neolithic deposits. This factor and the excellent retrieval practices whereby all deposits are sieved though a 4 mm mesh, result in large quantities of material being collected (Russell & Martin, 1998). These remains are analysed in much detail.

A broad range of animal taxa is appeared at Çatalhöyük: sheep, goat, cattle, equids, pig, deer, dog, wolf, fox, and small numbers of wild carnivores. Particularly, many remains of sheep and goat are found throughout the site. These remains may dominate in all areas, with more sheep than goat.

In the case of cattle, large carcass parts of cattle are found in middens or primary house fills (Martin, Russell & Frame, 2000). While the importance of horn cores and skull parts in structural installations is clear, a detailed contextual analysis is needed to assess whether cattle really become more common through time.

Non-mammalian taxa include bird, frog, tortoise, and fish. The analysis of these microfauna is recommenced since 1996 (Martin, Russell & Frame, 2000).

Although fish bones and scales are found in many contexts, fish and microfauna occur in small

quantities in virtually every context throughout the site. All of the fish bones seem to be from very small fish. Bird bone is rare, even allowing for its fragility, while birds may form part of the diet and part of the symbolic sphere. Furthermore, tortoise remains are limited to shell and carapace (Frame, Russell & Martin, 1999).

Bones revealed marks of burning, gnawing, weathering, digestion, fragmentation in conjunction with bone pathology. Numerous sheep/goat mandibles exhibited a condition whereby the roots of the developing permanent molars were growing downwards before the tooth had begun erupting into the jaw. This resulted in the roots puncturing the mandibular ramus and seemingly leading to infection/exostoses in many cases (Martin, Russell & Frame, 2000).

In short, the analysis of faunal remains would imply a wide range of animal taxa at Çatalhöyük. Towards this analysis, botanical analysis can help to determine a seasonal component to deposits, as well as relative and absolute dates would be critique.

3-3. Analysis of plant remains

The majority of the charred plant remains at Çatalhöyük have been recovered by wet-sieving and from the dry-sieving residues (Butler, 1995). This analysis can confirm that the different contexts in the site yield very different frequencies realised from plants. In other words, the entire major domesticates associated with the Neolithic in the region may be presented (Hastorf, 1996).

Field identification, on-site analysis can confirm that abundant and well preserved plant assemblages, including charred, mineralised, and silicified plant remains, were preserved throughout the buildings and from the earliest excavated phase of site formation. Although waterlogged plant remains were absent within the excavated deposits, rich assemblages of charred, mineralised, and silicified plant remains were present (Asouti et al., 1999).

Plant remains found throughout Çatalhöyük are identified as cereals, wild seeds, herbaceous material, parenchyma, nuts, and fruits. However, the concentrations in particular areas may present some cultural meaning behind their distribution. Similarly, parenchyma, the storage material that occurs in tubers and rhizomes, is almost as ubiquitous at the site as cereals pointing to the overall significance obtained from this plant type in the Neolithic (Hastorf, 1998).

Some plant remains are identified as wood, cereals, chaff, wild seeds, nutshell, pulses, and tubers. In the past, wood was the dominant component of the samples. This combination of wood and some cereal along with chaff remains seems to be the general background level of plant remains for the area (Hastorf, Killackey & A?cabay, 2000).

In addition, wood charcoal is analysed in order to reconstruct ancient woodland vegetation in the Konya Basin and its surroundings during the Neolithic. This analysis can suggest that the highest taxonomic diversity has derived from samples belonging to the later phases of the settlement (Asouti & Hather, 2001).

3-4. Conclusion

Analysis of both faunal and botanical remains at a rural or urban settlement site can provide environmental information of the site. At Çatalhöyük, a wide range of both animal and plant taxa is appeared, and then, this analysis may help to interpret the economic and social development of this site.

4. Interpretation - social significance

4-1. Interpretation of bioarchaeological data

When samples of faunal and botanical assemblages are identified, the most challenging and interesting parts are presentation and interpretation of research results. If the maximum information is collected through analysing samples, it would help to determine the economic and social relations in the site. It would lead to approach to the long-term development of society on the site.

Animal bones can indicate mortality profile and bone modification; consequently, they may be approached to hunting economies or herding economies on the site, dietary preferences of the residents, and animal husbandry. "Animal remains can grant insights to the climatological floral environment to which a human group adapted" (Lyman, 1994, p.8). Specially, mortality data is an invaluable guide to the nature of hunting strategies, to the extent to which they were specialised or unspecialised. Accordingly, a faunal analysis can yield insights into the environment round a site and on how it was exploited by the inhabitants of the site for the food procurement (Barker).

On the other hand, plant remains seem to be evidence for food plants on the site and early plant husbandry; therefore, the analysis of the presence realised from particular plant taxa in a number of contexts may give an idea of their dominance over the site as a whole. Furthermore, the plant communities and crop plants represented signify diverse habitats that would not have existed at the find-site. Then, the interpretation of plant remains leads to the economy of the site, their use of cultivated land, grasslands, woodlands, scrub, and so forth (Greig, 1989, pp.74-78).

4-2. Interpretation of Çatalhöyük

4-2-1. Faunal remains at Çatalhöyük

At Çatalhöyük, animal bone remains are extremely well preserved in the Neolithic deposits. There is nothing suggestive of an early stage of butchery or processing. Most animal bones may have been discarded post-consumption, and a lack of weathered bone may suggest fairly rapid burial. Therefore, it would be assumed that material was dumped into the abandoned structure from surrounding buildings, and moreover, while there is some coherence between certain carcass parts, like articulated lower limbs and vertebrate, the assemblages generally can indicate mixed activities on the site (Martin & Russell, 1997).

While sheep and goat predominate in numbers, cattle and equids would have made a substantial contribution to the diet given their larger size. These animals would all have been present in the plain, whether as wild or domesticated animals.

The forest animals of deer, boar, and bear would be relatively rare. It would be assumed that with

only occasional exceptions, only certain body parts of these animals were collected and brought back or imported through exchange to Çatalhöyük from woodlands further a field.

Similarly, the rarity realised from bear bones at Çatalhöyük can suggest that the bears were not common in the Konya Plain. They would have inhabited mountain areas, and then, the paw or skin alone may have been brought to the site (Frame, Russell & Martin, 1999).

4-2-2. Botanical remains at Çatalhöyük

The on-site analysis at Çatalhöyük demonstrated that abundant, well preserved plant remain assemblages, including charred, mineralised and silicified plant remains, were preserved throughout the site (Asouti, 1999). Charring preserved the majority of plant remains recovered by flotation. Through field identification, it would be appeared that in the lower part of the mound, a rich variety of plants were exploited and enjoyed by the people of Çatalhöyük. These remains include both domestic and wild plants, concurring with work from earlier seasons at the site (Hastorf, 1996, 1998; Martin & Russell, 1997; Asouti, 1999).

Botanical remains include plant food resources, like cereals, wild seeds, herbaceous material, parenchyma, nuts, and fruits, as well as non-food plants such as wood, chaff, wild seeds, nutshell, pulses, and tubers. Although recovered in small quantities and as yet unidentified to species, the tubers and rhizomes would have played an important role as a carbohydrate staple in ancient diet (Butler, 1995).

The fruits and nuts can represent the material remains of special consumption events, for example, feasting (Hastorf, 1998). More works will be conducted to further examine the issue and signature of feasting at this Neolithic site.

Furthermore, the data that cereals increase in usage through time may show a shift from the earlier mix of wild nuts, fruit, and seeds along with the domestic grains and pulses in the overall annual diet (Agcabay, et al., 2001).

4-2-3. Social significance of Çatalhöyük

The rich preservation of faunal and botanical remains can provide information on the society of Çatalhöyük.

The presence obtained from significant amounts of both wild and domesticated plant remains at Çatalhöyük can imply that the economic and social practices were multifarious in character. The diversity of resources used by this Neolithic community can give rise to questions about the division of labour, task group composition, task group activities and habitual movements over the landscape, specialised activities, agricultural practises and the possible management of wild resources, as well as these elements of daily life and annual cycles within the economic, symbolic and cultural meanings, and values of the society (Wollstonecroft & Erkal, 1999).

Amounts of sheep bone remains would be the evidence that sheep were the most common animal at Çatalhöyük and they were intensively managed if not fully domesticated. The choice of animal used in domestic contexts would be due to a seasonal component, when sheep were not appropriate. Likewise, the

rarer carnivores such as foxes, wild cat, and bear would have been hunted at particular times, rather than scattered throughout the sequence (Frame, Russell & Martin, 1999).

Furthermore, the survival of architecture and artefacts, coupled with the evidence of art and human burial, can make Çatalhöyük unique in its potential contribution to understand the development of complex societies (Hodder, 1993).

4-3. Conclusion

Archaeozoological and archaeobotanical data from a site can provide various information of the site. In particular, analysis of both plant and animal bone assemblages at the site may imply not only food preferences and behaviour of the occupants, but also the economic and social development of the site. In other words, the interpretation realised from these bioarchaeological data would contribute to approach to social significance of the site.

Summary and conclusions

It is the aim of this report to outline the research design for new archaeozoological and archaeobotanical investigations on an urban or rural settlement site. The data used in the report are realised from faunal and botanical evidence at Çatalhöyük in central Turkey chosen for this discussion.

Çatalhöyük is one of the largest early settlement sites around the world. The site consists of a pair of mounds in the Konya Plain with the earliest domestic wall paintings and sculptures, as well as the domesticated plant remains and animal bone remains. These archaeological assemblages can provide the bulk of the evidence for subsistence at Neolithic Çatalhöyük, and then, this information can be supplemented with the direct evidence of human diets provided through stable isotope analysis of human and faunal bone (Richards, 2003).

The result of the discussion on sampling strategies suggests that sampling may be needed to accommodate each category of material along with means of preservation, primarily plus systematically by flotation and collecting material in situ during excavation. At Çatalhöyük, sampling aims to evaluate new data on Neolithic subsistence, sociocultural activities and the natural and built environment; consequently, samples of both organic and inorganic material were collected from each unit of excavation.

Analysis of bioarchaeological data may lead to the recovery of human behaviour and economy on the site. These data can provide environmental information of the site. In the case of Çatalhöyük, a broad range of animal and plant taxa is appeared, and the characteristics of the site are thereby due to the analyses.

The discussion on interpretation of both faunal and botanical remains presents that it would help to determine the economic and social development. The rich preservation realised from faunal and plant remains at Çatalhöyük can provide information on the society, and then, this interpretation would assume that complex societies were developed in this Neolithic site.

To conclude, it would be appeared that sampling strategies, analysis of faunal and botanical remains

at a site, and the interpretation to assess social significance of the site are required in order to assess the long-term development of society on the site. Therefore, these are the research priorities for new archaeological investigations.

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