The Archaeobotanical Archive report for the 1998 field season at Çatalhöyük: Christine Hastorf, University of California, Berkeley

UCB PEB Lab # 39

During the 1998 field season the archaeobotanical field team focused on four on-site research projects, with two additional collaborative laboratory projects that were ongoing simultaneously off site. The on-site projects are: 1) flotation recovery of botanical remains from every excavation context, overseeing the sorting of the heavy residue fractions of the floated matrix, and the on-site preliminary analysis of priority samples chosen from these units, 2) ethnobotanical and ethnoarchaeological research in regions surrounding Çatalhöyük, 3) micro-excavation and preliminary analysis of remains from specific contexts, 4) recovery and preliminary analysis of phytoliths from various on site contexts, 5) wood analysis by Eleni Asouti at the Institute of Archaeology, University College, London, and 6) molecular analysis of archaeological plant material both at the Middle Eastern Technical University in Ankara, and at the Research Laboratory for Archaeology, Oxford. The 1998 on-site team was Dr. Christine Hastorf, Julie Near, Meltem Agcabay, Steve Archer, Aylan Erkal, and Arlene MillerRosen. Visitors who consulted with the on-site team included Dr. Patty Jo Watson, Michelle Wollstonecroft, Hatice Bilgic, Dr. Michael Richards, Dr. Ay Melek Özer, and Dr. Mark Nesbitt..

Flotation and Analysis of Floated Botanical Remains

Julie Near
University of California

With the help of two flotation machines (the small machine was constructed in 1995 and the large machine was completed in 1996. Descriptions of these machines can be found in previous archive reports). In all, 1006 samples were processed during the 1998 field season. A target volume of 30 liters was desired for standard bulk and scatter samples taken from contexts across the site. Where this was not possible, as much soil was processed as was available. Volumes of the flotation samples were always recorded. In situations where less than one liter of matrix was collected for flotation, a manual system of residue retrieval was applied.

A manual bucket flotation system was created and this processed 116 small soil samples. This was done by a bucket having the chiffon mesh draped on top of and within water. The soil was then gently poured onto the chiffon cloth. This cloth retained both the heavy and the light residues after silts and other particles smaller than .34 mm were rinsed through with gentle water action.

Once the normal samples were processed and dry, the heavy residue was sorted by a team of eight workwomen, and the light fractions were gathered up by the archaeobotanical team. Most samples were prepared for transport and later analysis in the United States, England and Turkey. Some samples were selected as priority samples by excavators and specialists during the excavation season. These priorities were analyzed by a member of the team for reports that were given on subsequent priority tours. The procedure for this on-site field analysis (noted as field sorts) was an abridged procedure of our phase two lab sorting. The taxa level this phase records is at the plant type level; cereals, legumes (e.g. *Lens*), wild legumes, herbaceous material, parenchyma, oak seeds, nut husks, wood (*Prunus* spp), wild almonds (*Amygdalus* spp.), wild pistachios (*Pistacia* spp.) and hackberries (*Celtis* spp.), wild taxa seeds, wood, and endocarps. The 4mm and 2mm portions of the sample were sorted normally (materials pulled and weighed by categories such as cereals, pulses, wild seeds etc.) but the 1mm and .5mm portions were scanned only with no pulling. By shortening the sorting procedure (approximately 50% less time was required for sorting samples with these "field sort" procedures), 4 to 8 samples could be examined for each priority tour which happened two times a week. During this field season, 92 samples were examined in this manner. Among these samples the range of botanical density and content spanned the whole spectrum of possibility. A subsample of the botanical remains from this flotation sample population will form Julie Near's PhD dissertation.

Some possible patterns were noted during the field season. Remains of cereals, wild seeds, herbaceous material, parenchyma, nuts, and fruit are found throughout the site but the concentrations of these plant categories in particular areas indicates some cultural meaning behind their distribution. Parenchyma, the storage material that occurs in tubers and rhizomes that tend to grow in marshes is almost as ubiquitous at Çatalhöyük as cereals pointing to the overall significance of this plant type in the Neolithic. The fact that these plants have long been overlooked as an important aspect of the everyday subsistence of Neolithic inhabitants makes the continued abundant recovery of this material critical in our work at the site.

It was clear from floor samples taken in the BACH area that this building was left botanically less tidy than the other buildings that have been excavated thus far. Finds of all types within Building 3 show that the clean condition of Building 1's floor is different from this adjacent structure. Botanical elements from fruits and nuts were relatively higher in concentration in Building 3, as were other types of recovered plant material. One possible interpretation of these finds, particularly the fruits and nuts, is that they represent the material remains of special consumption events such as feasting. More work will be conducted to further examine the issue and signature of feasting at this Neolithic site.

While Building 5 (below Building 1) followed the general "clean" pattern of Building 1, the area outside of the walls of Building 1/Building 5 showed relatively high concentrations of botanical remains including fruits and nuts. Specifically, dense botanicals corresponded with samples that contained other interesting artifacts such as unfired clay objects and dense collections of microfauna. A very detailed spatial analysis of the Building 5 samples will be carried out to examine the possible organization of activities in attempts to compare this structure to the one above it. Special attention was placed on sampling the bin area in the SW corner of the building. The floor of this sector was completely floated in 50 by 50 cm layers. A series of these were also samples for chemical analysis and phytoliths in addition to the macroplant remains. It is hoped that this high resolution sampling will help to determine the uses and organic deposit history of this area as the excavation of the bins showed the bins to be completely cleaned or scoured of the material they would have stored.

In the Mellaart area the variety of spaces yielded an equally diverse botanical assemblage. Middens and fills were typically more dense, often as a result of high charcoal concentrations. Various episodes of dumping within midden contexts do appear to be represented by somewhat different botanical assemblages. Investigations into this variation will be conducted by Meltem Agcabay for her masters thesis using specific midden samples from Space 115. Most Mellaart floor samples were not examined in the field, but preliminary information indicates that these samples are also quite clean of botanical residues as in the north buildings. Further work will hopefully help to identify subtle variations across these spaces.

Ethnobotanical and Ethnoarchaeological Research

With the addition of Aylan Erkal to the archaeobotanical team, from the Middle Eastern Technical University, ethnobotanical research began in earnest on several types of plants which still grow in the areas surrounding Çatalhöyük. Specifically, Aylan focused her masters thesis study on the collection and recording of both environmental and cultural information of wild taxa including fruits, nuts, tubers, as well as other roots and rhizomes. Her work centred around villages in three main environmental zones that occur around the site: forest, steppe, and wetlands. Her plan of research is that the plants collected in these areas and the information supplied by villagers who were interviewed would add to the knowledge about use, distribution, and habitats of wild plants which have been found repeatedly at Çatalhöyük as well as some wild plants that are missing from the record but are important today. While the importance of gaining as much information about remains which are being recovered at the site is clear, also learning about missing taxa can give us as many things to think about as the former. Understanding why a plant is not present on a site may lead us to consider aspects of the environment, taphonomy, and cultural choice which would otherwise be overlooked. This research will form the basis of Aylan's masters thesis.

Some of the wild plants collected in the villages by Alyan Erkal will be identified with collaboration of Ankara University Science Faculty Botany Department. Further, nutritional tests will be undertaken on this wild taxa before and after processing and the comparison between the stages. She will do the nutritional tests collaborating with Middle East Technical University Food Engineering Department. These nutritional tests are important for the role of wild plant foods in nutrition in agricultural societies. Quantitative data will include a)energetics (caloric values) b) special nutritional properties (vitamins and mineral content) c)cultural role
Her research focuses will be on wild plant foods found at Neolithic sites in Central Anatolia, shewill also have the opportunity of the comparison of the wild nuts,fruits and tubers found on Catalhoyuk, Can Hasan I, Can Hasan III, and Pinarbasi sites.

Her collected wild taxa plant list is as follows:

Wild Nuts:
Fagaceae/Quercus spp.

Wild Fruits:
Anacardiaceae/ Pistacia spp. ; Rhus spp.
Ulmaceae/Celtis spp.
Rosaceae/Prunus spp. ; Amygdalus spp. ; Rosa spp. ; Pyrus spp.
Crataegus spp.
Elaeagnasceae/Elaeagnus spp.
Rhamnaceae/ Rhamnus spp.
Vitaceae/Vitis spp.
Berberidaceae/Berberis spp.
Liliaceae/Asphodeline spp.

Tubers:
Cyperaceae/Scirpus maritimus
Cyperaceae/Cyperus rotundus
Poaceae/Hordeum bulbosum

Ethnoarchaeological research was also conducted during the 1998 season in an initial attempt to develop a wider base for the interpretation of the spatial distribution of botanical remains and their contexts and modes of deposition. We took trips to villages in the nearby area so we could observe the utilization of flat roofs as well as the use and consequent distribution of a wide range of plants. Discussions with other members of the Çatalhöyük team on the subject of ethnoarchaeology provided a forum in which to engage one another not only on the observations we made while on our trips, but also the implications of such research on our archaeological interpretations. A chapter is being written for the next volume of the project that includes everyone involved in ethnoarchaeological inquiry.

Micro-excavation of Specific Contexts

For the first time this year, we are joining the micromorphology (Wendy Matthews) and chemical analysis (Bill Middleton) teams to complete a much more detailed excavation of selected portions of the site. This initial year we chose to begin our micro-excavation on a 30 by 40 by 20 cm chunk of the in tact roof collapse from Building 3. The idea of this project is to allow for even more detailed excavation, separation and recording than is currently completed during the field season's excavations. For special locations like this roof or certain floors, we hope to periodically coordinate such an excavation with the ongoing micromorphological work. While three large chunks of the roof was collected this field season, one has gone to be on display at the visitors center on site. The largest is being held for detailed excavation in the 1999 field season, and the smallest was excavated in 1998. This micro-excavation was aided by Wendy Matthews. Each of the 26 levels in this smaller block had small soil samples collected for phytoliths, and chemical analysis, while the remaining excavated soil was measured for volume, sieved, and sorted for all artefacts 100% down through the 5 mm mesh size. We began with a series of documenting photographs, and then excavated every visible soil difference separately. The layers were irregular in thickness as well as in color and texture. Such analysis will continue in the next field season.

1998 Archive Report on Phytolith Studies at Çatalhöyük

Arlene Miller Rosen
Ben Gurion University, Israel

In the 1998 field season Dr. Miller Rosen initiated phytolith studies in the field at Çatalhöyük. Traditionally phytolith analyses are carried out in laboratories long after the excavation season has ended. Analyzing phytoliths on-site allowed interchange of information with the excavation crew and other specialists at the site, sampling of fragile silica plant impressions which are easily destroyed in transport, and the adjustment of sampling strategies to the needs of the ongoing excavation. In order to complete phytolith processing in the field we assembled a temporary field laboratory. The technique used for phytolith extraction from archaeological sediments was as follows.

About 4 gm of sediment, taken from individual excavation units, was sieved through a 0.5 mm sieve. Approximately 2 gm of the less than 0.5 mm fraction was placed in a 50 ml test tube and HCl was added to remove pedogenic carbonates. The samples were washed and then 20 ml of a Calgon solution was added to disperse clays. The clays were removed by settling silt and fine sand particles in a column of water and then pouring off the clays in suspension. Samples with a large quantity of organic matter were treated for a short time in a mild solution of household bleach. The remaining sediment was then washed, dried, and a portion of each sample was mounted in Entellan for a quick scan of phytoliths and other minerals. If the concentration of phytoliths was low, the remaining sediment was placed in a 15 ml test tube and a heavy density liquid (Sodium polytungstate), adjusted to a specific gravity of 2.3, was added. The phytoliths in the sediment were then concentrated in the suspension which was poured into clean test tubes and washed with distilled water. The concentrated phytoliths were dried and mounted on microscope slides for identification and counting.

Excavators at Çatalhöyük encountered many occurrences of white silica impressions (silica skeletons) from the remains of baskets, mats and reed construction material. Once identified as important to investigate, a small amount of this white material was added to 15 ml test tubes, treated with HCl to remove carbonates, washed and mounted on microscope slides for identification. These samples were especially valuable because they were in situ evidence for the use of a single plant type. With these samples we were able to identify several genera of reed plants from different microenvironments which were used for baskets, mats and the lining of a storage bin.

During two weeks at Çatalhöyük, 47 phytolith samples were collected and processed from hearths, middens, living floors and other contexts. These were processed in the field for preliminary study. Initial results show there were abundant remains of phytoliths from the husks of wheat and barley. Many of these were large multi-cell forms which suggest that cereals were cultivated in the wet marsh lands or alluvium around the site rather than in better-drained upland fields (Rosen and Weiner 1994). Large reed grasses such as the common reed (*Phragmites* sp.) were used as construction material. Both of the silica basketry impressions analyzed came from the Panicoid grass sub-family. These are for the most part C4 grasses which grow in dry-land microenvironments. This contrasts with the silica skeletons from the matting which were derived from wet-land sedges (Cyperaceae). Phytoliths from thin sections (supplied by Wendy Matthews) and sediment samples believed to contain animal dung, included large proportions of phytoliths from wild woody herbaceous plants(dicotyledons). This presence suggests that the animals were taken to graze off-site rather than foddered with straw or allowed to graze in harvested fields of cereals.

Rosen A.M., and Weiner S. (1994). Identifying ancient irrigation: A new method using opaline phytoliths from emmer wheat. *Journal of Archaeological Science* 21: 132-135.

Charcoal Analysis Report 1998 (Preliminary results from Çatalhöyük and Pinarbasi)

Eleni Asouti and Jon Hather
Institute of Archaeology, University College London

Objectives

Two major objectives were set at the outset of this research project that began in 1998:

- To provide a major source of data that may contribute toward reconstructing the woody vegetation in the Konya basin for the period under consideration (ca. 10,000-8,000 b.p.).

- To investigate the use of woodland resources by prehistoric communities for the same period. Namely:

  i. How did the inhabitants of the area meet their needs in firewood for various purposes, such as heating and cooking (i.e., firewood collection)?

  ii. Which factors affected their wood choices as these appear in the archaeological record? The answer to this involves addressing a series of interrelated issues:

(a) Is there any evidence for the integration of firewood procurement to other aspects of the settlements' day-to-day routines (e.g., subsistence related foraging and cultivation)?
(b) Can we conclude that there were any specific reasons for choosing or avoiding particular taxa? Of paramount importance here is to investigate whether fuel selection was somehow controlled by a desire to regulate access to and use of woodland resources reserved for purposes other than firewood procurement.

i. Is it feasible to address issues relating to routine practices (e.g., daily tasks and ceremonial events) and the possible role of firewood collection within them?

ii.

iii. Finally, can we detect any spatial and/or temporal changes in firewood use and, if so, offer plausible explanations for them?

Rationale behind these objectives

A main concern of the traditional approach to charcoal analysis is the reconstruction of the woody vegetation around the archaeological site(s). In practice, what this actually requires from the analyst is to assess woodland composition in the past, by isolating the contribution of the different factors affecting the formation of a charcoal assemblage. Thus the so-called "cultural filters" (e.g., preferences for particular taxa), the taphonomic processes (including depositional and post-depositional environments) and the recovery and laboratory biases are viewed as potential impediments to palaeoenvironmental analysis (Smart & Hoffman 1988).

Far from questioning the significance of properly identifying the factors that shape a charcoal assemblage, as indeed any archaeobotanical assemblage would, the approach adopted in this case study attempts a shift away from the well-established practice of deploying charcoal analysis solely as another technique for palaeoenvironmental reconstruction. Such a stance derives primarily, although by no means exclusively, from the realisation of the difficulties inherent in any attempt to quantify wood charcoals in terms of taxonomic frequencies (for a review see Smart & Hoffman 1988). More important in this respect, is their recognition that it is the product of human action in the first place. As such, the wood may serve as the starting point for addressing questions of woodland utilisation by Neolithic communities in Anatolia.

The theoretical impetus for this approach has stemmed from a detailed study of the literature dealing with woodland management and the ways in which traditional rural communities relate to wooded environments in arid regions. Today, researchers have become increasingly aware of the fact that people's attitudes towards forests and woodlands are not mediated by the need of simply extracting fuel, timber and food, thus leading to progressive environmental degradation and depletion of resources. On the contrary, it has been realised that traditional societies tend to devise local strategies for the integration of woodlands in their day-to-day activities and routines, thus ensuring the continuity of resources critical for the community's existence and reproduction. The means employed to this end involve the establishment of various mechanisms for restricting access to wooded areas, usually manifested through the exertion of authoritative, religious or hereditary rights (Dei 1992; Peluso 1996). Moreover, firewood collection rarely takes place in isolation from other tasks, usually performed on a seasonal basis, such as land clearance, cultivation, plant gathering and fodder provisioning (Ben Salem & van Nao 1981). On top of all these, local traditions offer examples where particular taxa attain a distinct status due to specific attributes they possess (e.g., form and shape of individual plants, flowering habits, longevity, burning properties, etc.). In other instances, fuel gathering may be ritualised in the context of fire ceremonies, initiation rites, burial customs and other similar events (Heizer 1963, 191-192).

Methodological considerations

With this theoretical framework in mind, there emerged two important methodological requirements:

- To decide on a subsampling strategy that would allow adequate taxa recovery plus the examination of as many samples as possible within the available time. Moreover, it was necessary to create a recording system that would enable tracing patterns otherwise undetectable (i.e., through the sole use of taxa lists).

- To take full advantage of the contextual information available from the site and its surroundings, by integrating the observed patterns with evidence provided by palaeoecology, archaeology, archaeobotany and zooarchaeology. This would facilitate both environmental reconstruction and the archaeological interpretation.

For charcoal analysis, choosing a suitable subsampling strategy actually means reaching a decision on the number and size range of fragments to be examined. In principle, a number of 100 fragments are considered as the minimum requirement for obtaining a satisfactory assessment of the sample composition (Keepax 1988, 44). This limit was followed for the 4mm fraction of each sample. Additionally, a number of 50-100 fragments from the 2mm fraction per sample were examined, in order to trace smaller elements, such as shrubs and twiggy material. While examining the 4mm fraction, care was taken to include all fragment sizes by dividing subsamples into different size portions. Overall, this procedure verified the original prediction that only the commonest taxa for each sample will appear within the biggest fragments, with the number of taxa recovered rising progressively as smaller fragment sizes were examined.

By recording fragment attributes such as taxon, form (i.e., stem, twig, round wood), number of rings present in each fragment and signs of fungal decay (i.e., dead wood), it was hoped that certain patterns would begin to emerge. The latter would form the basis for investigating:

(a) Attitudes and routines concerning gathering the wood of particular taxa or groups of taxa. These may appear in the archaeological record in various ways (e.g., through the occurrence of branches and dead wood from trees that were valued for other purposes, in contrast to timber producers that would turn up mainly as stem wood).
(b) The intensity of woodland utilisation by the different groups residing in this area. The absence or presence of particular taxa may help addressing questions of accessibility.

Preliminary results

There follows an account of the main groups of taxa that have been recovered so far. Others and certain individual genera had to be omitted from this list, since their secure identification is the subject of ongoing investigations.

- *Hygrophilous trees and shrubs*

These include mostly willows and poplars (Salicaceae) followed by elm (*Ulmus* sp./spp.), alder (*Alnus* sp./spp.), chaste tree (*Vitex* cf. *agnus-castus*), tamarisk (*Tamarix* sp./spp.) and ash (*Fraxinus* sp./spp.). These are present exclusively in the Çatalhöyük samples.

- *Fruit trees and shrubs*

This group comprises several members of the Rosaceae family, such as cherries, pears and hawthorns (*Prunus* spp., Maloideae) and almonds (*Amygdalus* sp./spp.), along with wild pistachios (*Pistacia* spp.) and hackberries (*Celtis* sp./spp.). Of these, *Amygdalus* appears to be ubiquitous in Pinarbasi (Site A and B), whereas *Pistacia*, Maloideae, *Prunus* cf. *cerasus* spp. and *Celtis* are less abundant. In Çatalhöyük almonds are rare, but the rest appear more or less regularly in the charcoal assemblages.

- *Conifers*

Here junipers (*Juniperus* sp./spp.) predominate, with sporadic finds of fir (*Abies* sp.) and a single fragment of pine (*Pinus* sp.). Again these appear only in samples derived from Çatalhöyük.

- *Oak trees*

Two distinct types of oak stem wood have been recovered, one with very narrow annual rings and another with broad ones. It is currently impossible to differentiate between species, but both are deciduous. No oak fragments have been found so far amongst Pinarbasi wood charcoals.

- *Leguminous shrubs*

The presence of members of the Papilionoideae sub-family of the legume family has been ascertained. Identifying these to the genus level proved to be a tricky task, due to the extreme anatomic variability encountered even amongst individuals of the same species. Comparisons with anatomical descriptions (Fahn *et al.* 1986; Schweingruber 1990) and reference slides from the C. A. Western wood reference collection held at the Institute of Archaeology, confirmed the presence of *Genista* spp. Further identifications are at the stage of verification. They appear as minor components in both sites.

- *Steppe shrubs*

Several fragments belonging to the families of Chenopodiaceae and Asteraceae (Compositae) have been recovered, almost exclusively from the 2mm fraction. The anatomical structure of several chenopod charcoals from Çatalhöyük resembles that of *Noaea mucronata*. Chenopods are occasionally present in Pinarbasi as well.

Preliminary discussion of the wood results

Geoarchaeological investigations have established the location of Çatalhöyük East on an alluvial floodplain (Roberts *et al.* 1996), thus offering additional support for the existence of a gallery forest, comprising hygrophilous taxa, in the immediate vicinity of the site. The data available so far, indicate a dense vegetation cover. Most of the Salicaceae fragments bear signs of fungal decay thus signifying their collection as dead wood. In many instances, we have observed a high abundance of gummy deposits in their vessel elements, a phenomenon attributed, amongst other reasons, to the sealing of abscission marks on trunks caused by the shedding of branches. The factors held responsible for the natural pruning of these taxa include the inability of light to penetrate the tree canopy and seasonal deficiencies in ground moisture (Millington & Chaney 1973).

Besides that, the evidence suggests two further vegetation entities: (a) a zone of xeric woodland-steppe, characterised by almond trees and shrubs, along with wild pistachios and woody chenopods, and (b) a zone of oak park-woodland, with dryland oaks in association with rosaceous trees, pistacios, junipers, hackberries and light-demanding plants (leguminous shrubs and cherries) flourishing in natural openings and cleared spaces. In moister areas on upland slopes, denser oak-forest could grow, giving way to coniferous montane forest at higher altitudes.

It must be stressed here that the above suggestions are provisional only, in that they are based on a limited amount of palaeoecological investigations and neoecological research (Zohary 1973; Bottema & Woldring 1984; Hillman in press; Neil Roberts written communication) and are devoid of any temporal dimension. A more detailed account of the palaeoenvironmental data and their implications for human settlement in the Konya basin will be presented after more study.

Apart from this, the archaeological wood information obtained so far seems very promising. As a general remark, we can say that until now the highest taxonomic variability has derived from the Çatalhöyük assemblages, whereas Pinarbasi stands at the opposite end of the spectrum. This in all probability represents the outcome of the different range of activities performed at each site.

At Çatalhöyük, Salicaceae are ubiquitous and appear to have been one of the major firewood sources. Although willows and poplars are not prized for their heating value, they constituted a readily available source of firewood. Further, they burn slowly, giving rise to a gentle low flame without sparking, qualities that render them less dangerous for consumption within domestic space. Elms also burn slowly and regenerate relatively fast. Fruit trees appear primarily as round wood and only occasionally in a decayed state, a situation probably signifying their collection as part of foraging trips to the surrounding woodlands. One might as well discern here a desire to preserve a highly esteemed source of wild foodstuffs. Conifers are known to have been used for various purposes (junipers as timber alongside oak, and firs for domestic utensils; Mellaart 1967, 215) and this was confirmed by our analysis. There have been recovered numerous fragments of juniper stem wood and few of fir. The latter bear artificial shapes and derive from hearth contexts, thus probably representing the result of cooking accidents. Juniper is resistant to decay and releases a distinctly aromatic scent. This is also true when it is thrown into fire, a quality it shares with ash. Leguminous shrubs and woody chenopods are being collected to this day by people in Central Anatolia, mainly as kindling (Ertug-Yaras 1997, 183-184). Finally, there appears to be a strong correlation between the occurrence of broad-ringed oak stem wood and the presence of signs of fungal decay. If this proves true, especially for the Mellaart area where there is no evidence as yet for the controlled burning of houses, then we are faced with the possibility of old structural timber being re-used as firewood, on the event of house levelling and rebuilding.

A preliminary comparison of Çatalhöyük findings with those from Pinarbasi indicates the complete absence so far from the latter of park-woodland taxa, especially oak. The sole exception to this is the sporadic occurrence of various Maloideae, which however are common in both zones. On the contrary, predominant are the almonds, with minor contributions from pistachios, reeds and several shrubs characteristic of the woodland-steppe. This is puzzling given the site's close proximity to the Karadag massif and therefore to oak woodland, even more so if the rarity of almond charcoals in Çatalhöyük itself is considered. It is likely that Çatal inhabitants exerted some sort of control over access to oak woodlands. More evidence for the nature of occupation in Pinarbasi (seasonal/permanent) and the relation of the latter to Çatalhöyük is needed before reaching any definite conclusions.

A current research priority is the analysis of the spatial and temporal patterning observed for Çatalhöyük charcoal assemblages. There are some indications of decreasing taxonomic variability towards the later levels, but that might actually reflect differential preservation conditions, as well as context-related variation. If however this represents a real trend, it could, under certain circumstances, portray a pattern of reduced mobility over time for the inhabitants of Çatalhöyük. This and the potential ritual significance of specific deposits will be the subject of further investigations.

Note

This work is part of a Ph.D. research project undertaken by Eleni Asouti at the Institute of Archaeology of University College London, under the supervision of Dr. Jon Hather and Dr. Louise Martin. For further information, e-mail: e.asouti@ucl.ac.uk

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Laboratory Research on Molecular Plant Studies

A genetics laboratory has approached the project to complete analysis on Neolithic plants. The team sent a visitor to the site during the 1998 field season to initiate this research and make plans for their analysis. Their initial step in the research is to g ain material in order to learn how much, if any, of the genetic material has preserved. Our collaborator was Hatice Bilgic from the Chemistry Department, Middle East Technical University in Ankara. The major interest of the research group of the Biochemistry Laboratory at Middle East Technical University is research on the genetic relationship and the characterization of the modern Turkish wheat cultivars and some wild types by using microsatellite markers and AFLP markers. What they are specifically intending to carry out currently is to isolate, amplify, and sequence a specific region of ancient wheat genome (Glu-B1 locus), and then to be able to compare the results from the ancient wheat to the modern ones together with Dr. Terry Brown at UMIST, Biomolecular Sciences, UK. They expect that the results of this work will help to understand the time and mechanism of the domestication of wheat and will be part of Ms. Bilgic's thesis. The ancient wheat samples from Catalhoyuk Neolithic will be the oldest of their research and are expected to be closely related to the first cultivated cereals.

The second project is in association with the Oxford Research Laboratory for Archaeology, with Michael Richards. This project is interested in studying the stable isotopes of a range of important taxa in the Neolithic. Our project will provide specimens of ten taxa of economic interest to the laboratory in hopes that they can identiy major aspects of the Neolithic diet including at Catalhoyuk. The taxa to be studied will include wheat, barley, *Scirpus (*Cyperaceae), *Lens*, *Quercus*, *Prunus* spp., almond (*Amygdalus*), wild pistachio (*Pistacia*), and hackberry (*Celtis*).