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Household Surfaces:
Botanical Remains from the House 3 Structure at Çatalhöyük, Turkey

Virginia Caswell Carpenter

submitted in completion of the Senior Honor Thesis

Department of Anthropology
University of California
Berkeley

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Copy for

Prof. Christine Hastorf

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Introduction

During the 1998 field season at Çatalhöyük, the BACH (Berkeley Archaeologists at Çatalhöyük) team focused part of their excavation on one particular space (space 86) in the north area of the East Mound (Stevanovic and Tringham 1998). During the excavations of space 86, which (along with space 158) has been designated an entire building and named Building 3 (see Map 1 in the appendix), two possible household surfaces were uncovered. This paper seeks to compare these two surfaces through an examination of the archaeobotanical samples that were taken throughout each context. More specifically, the cultural transformations of each surface will be examined in order to determine what, if any, was their role as a household surface.

The first surface is the appearance, in the northeast part of the space, of a "series of superimposed layers of plaster and building clay" (Stevanovic and Tringham 1998) which the BACH team has interpreted as a collapsed roof. The excavators have noted here the presence of "roof surfaces that are smudged and burned and discoloured (which) draw attention to the use of the roof possibly as the main arena of domestic activities," (*Ibid.*). Secondly, a group of plaster platforms located throughout the building were uncovered. It is possible that these platforms were used for a wide variety of functions, one of which being a household activity area, ("(they are) the prototypes of the Turkish sofa and served for sitting, working, and sleeping," - Mellaart 1967:60). Through examining the archaeobotanical samples from both the roof and the platforms (as well as samples taken from the fill above the platforms) it is unclear as to whether one can concretely define each context as a specific type of domestic activity area. However, it is clear that: 1) each of the contexts (or "interpretive categories") are different in composition, 2) deferential treatment of each context has possibly obscured the archaeobotanical record, and 3)

environment. Plant resources are universally exploited as food, fuel, clothing, and/or building material (just to name a few uses) by every human regardless of age, gender, and social status. Thus, differential exploitation of plant remains provide an opportunity to look into a wide range of human behavior from almost any angle. As Hansen (1991) so eloquently writes:

> The range of uses of plants and plant products... goes beyond basic subsistence to include medicinal, decorative and structural uses. Furthermore, plants may play an important role in the belief systems of primitive societies, or be involved in the rituals and folklore of a culture... (Through plant analysis, we can) go beyond subsistence to an identification of other types of behaviour such as interaction between groups, development of social stratification, or attitudes toward environment in terms of conservation of resources, (Hansen 1991:53).

Indeed, recent archaeobotanical studies *have* moved beyond descriptions of subsistence practices to being a primary avenue of research regarding, to name a few examples, the relationship between plant remains and levels of economic importance in the Near East (Dennell 1976), social stratification within a paleoindian village in British Columbia (Lepofsky *et al.* 1996), symbolism and the rise of the Incan state (Hastorf 1990) as well as the of rise social complexity in conjunction with resource intensification along the California coast (Basgall 1987). Archaeobotanical research at Çatalhöyük holds the same promise of being able to go beyond a supplementary description of diet and environmental conditions to being a primary source of information for understanding human behavior at the site.

Çatalhöyük

The archaeological site of Çatalhöyük is composed of two large mounds located in the southern Konya Plain of Turkey. The site was first opened in the early 1960's by James Mellaart (Melaart 1961, 1962, 1963, and 1966) and instantly gained attention as a result of its large size, its early date (from 8,000-7,000 BC), and its numerous examples of artwork (Todd 1976). No

> With the help of two flotation machines (descriptions of the machines can be found in the 1995-1997 Archive Reports from the Çatalhöyük web site - Wolle, 1999a)... A target volume of 30 litres 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... 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 for later analysis in the United States, England and Turkey, (Near 1998).

The flotation method was tested over the season by inserting 50 modern charred seeds into some of the archaeobotanical samples before being floated. I sorted one of those samples (flot # 1852); all 50 of the modern seeds were recovered, thus testifying to the method's accuracy. A more complete look at the archaeobotanical work done during the 1998 season can be found by looking in the *Çatalhöyük 1998 Archive Report* (Wolle, 1999b).

The samples chosen for this paper are based on the availability of the floated archaeobotanical samples. I sorted all four samples that were associated with platform surfaces; in addition, four samples from the fill above the platform were selected for comparison. The platforms within Building 3 are just beginning to be excavated and thus it is unclear, at this time, as to whether the samples designated as "from platform" really reflect the actual surface, or whether they are really indicative of the fill just above the platform. Comparing samples from both contexts is the best method of discovering what, if anything, differentiates the two contexts (Lennstrom and Hastorf 1995). Eight roof samples were selected from the units designated as "dirty roof" (unit 2238) and "clean roof" (units 2271 and 2273); four samples were selected from each. I chose the samples primarily based on their same relative depth. Thus, it was hoped that the roof samples would reflect what might have once been a single roof surface.

Each sample was then shifted and separated into categories based on the size of the remains (> 4mm, > 2mm, > 1mm, > 0.5 mm, < 0.5mm); see Table 1a for a description of what

inedible remains of plants such as wood, chaff, and nutshell as well as edible plant remains that are commonly charred by accident, such as cereal. Hard remains are more likely to be preserved as they are often used directly as fuel, or they involve fire in their processing (Miksicek 1987); soft remains, on the other hand, are often eaten "fresh... or boiled (and) are not very likely to be preserved by carbonization. If by chance they did get charred, the fragmentary remains... would be very fragile and difficult to identify," (*Ibid.*:220). Thus, soft remains are defined here as the non dense plant foods with high moisture contents that do not preserve well, such as parenchyma and herbaceous material, as well as plants that are not likely to be charred, intentionally or accidentally, such as rhizomes, nutmeat, and fruit. Seeds and pulses, by these definitions, belong primarily to the hard remains category as they are more durable than most of the soft remains and are more likely to have been somehow transformed by the use of fire, either in cooking or processing (Miksicek 1987). However, since neither material is found in great abundance nor do they weigh much, their presence is most apparent when grouped with the "soft" category. The individual remains were quantified by density; that is, the weight of the plant material per liter of soil floated. This is a basic method of quantification in archaeobotany (Miller 1988). Through an examination of hard versus soft remains, issues of preservation within each section will also be discussed.

Next, the botanical remains will be compared between each context in order to determine the validity of their interpretive category and to discuss the cultural transformations that may have affected each sample. Miksicek (1987) discusses several ways in which one might discern the cultural transformations of an archaeobotanical sample. While there are many different kinds of cultural transformations (such as site type and processing methods - Miksicek 1987:212); here,

harvested plants that remove them from the fields, prepare them for use, and store them, in addition to readying plant parts for their use as food, shelter, containers, tools, clothing, and so forth," (Hastorf 1988:125, 134). Each category is quantified by weight of remains per liter of soil floated. Next, the same two issues of consumption and processing, plus another category of fuel use, will be considered through direct comparisons between three indicator groups. Comparisons are ratios that "focus attention on two mutually exclusive variables. They can be used to assess the effects of different preservation contexts or to identify different use contexts," (Miller 1988:75). Indicator groups have been defined as "groups of organisms which are characteristic of particular events or conditions in the past... which can be rapidly recognized in archaeological assemblages... (and) which in some way carry special significance as evidence of conditions or human activities in the past," (Kenward and Hall 1997:663-664). Specific types of botanical remains are often used to directly indicate specific activities (for example, Lepospsky *et al.* 1996); here, cereal will be used to represent food consumption, chaff will represent food processing, and wood will represent food preparations (fuel use).

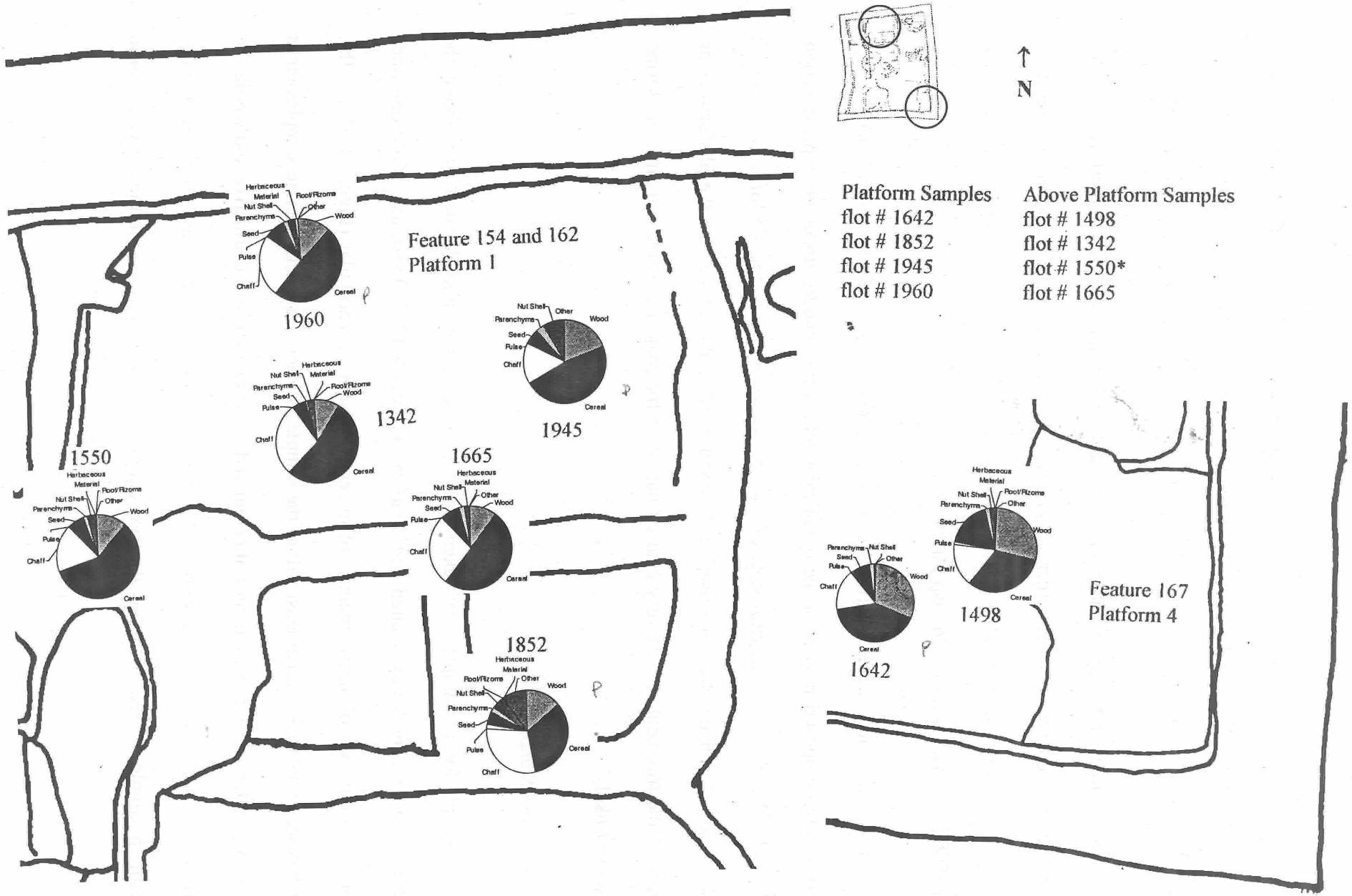
Findings within Context

Platform Samples

The platform samples were taken from Feature 154/162, also called Platform 1, and Feature 167, also called Platform 4. Platform 1 is described as follows:

> (F. 154) is large and squarish in shape with rounded corners. Its edge (F. 162) was built up as a 10-15 cm wide, shallow wall around the platform. This platform in linked to the east side of the short interior wall (F. 160) and went through the same phases of uses and replastering as the interior wall itself. At this point it can be said that, in the beginning, the interior wall and the platform surface were finished in white plaster. Later on they were painted in red colour, and even later they were again finished in white plaster, (Stevanivic and Tringham 1998).

Figure 1. Location and Density of Remains (by count) for Platform and Above Platform Samples.



Platform Samples	Above Platform Samples
flot # 1642	flot # 1498
flot # 1852	flot # 1342
flot # 1945	flot # 1550*
flot # 1960	flot # 1665

*coordinates for flot # 1550 were not taken, but the Unit 2269 is designated as "above Platform 1).

samples is also some evidence of distortion (as defined by Hubbard and al Azm 1990); many of the remains are badly charred and in one case, organic remains have actually fused onto a seed (flot # 1342). Finally, there is not a clear dominance of seed type across these samples. Besides *Scirpus* and *Chenopodium* type, grass and wild legume seeds were found along with *Thymus* and *Labelia* type; there were also many seeds types that were unidentifiable.

Flot # 1498 was distinctive from the other above platform samples in that it was composed of a greater concentration of wood than the other samples as well as having a higher number of seeds in relation to the overall remains found (Figure 1, Table 4b). Flot # 1498 was designated as being "from the platform", but its location is rather ambiguous as Platform 4 "was considerably damaged by cuts that were dug in preparation of the midden and by the post retrieval pit, so that its original edges can not be determined," (Stevanovic and Tringham 1998). The patterns of preservation, though, have more in common with the above platform samples in that the sample is composed of extremes - some pieces that are badly damaged, some that are well preserved, and a wide variety of materials found throughout the sample. The large amount of wood present is most likely a result of the samples association to the post retrieval pit.

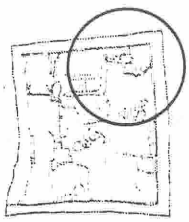
Dirty Roof Samples

Unit #2238, were all four of the dirty roof samples were taken from, was

> excavated layer by layer (in groups of 5-8 layers). Each layer is about 1 cm thick and represents the resurfacing of the roof, so that its different colours and bedding represents the effect of different factors/activities (soothing, burning etc.). (Stevanovic and Tringham 1998).

Thus, although the samples were taken from roughly the same depth, they do not represent a single roof surface, but rather a series of roof surfaces. Cereal remains dominate the samples here as well as a relatively strong presence of soft remains, especially seeds (Figure 2, Table 5b).

Figure 2. Location and Density of Remains (by count) for Dirty and Clean Roof Samples.



↑
N

Dirty Roof Samples
flot = 1631
flot = 1649
flot = 1664
flot = 1732

Clean Roof Samples
flot # 1853
flot # 1579
flot # 1634
flot # 1673

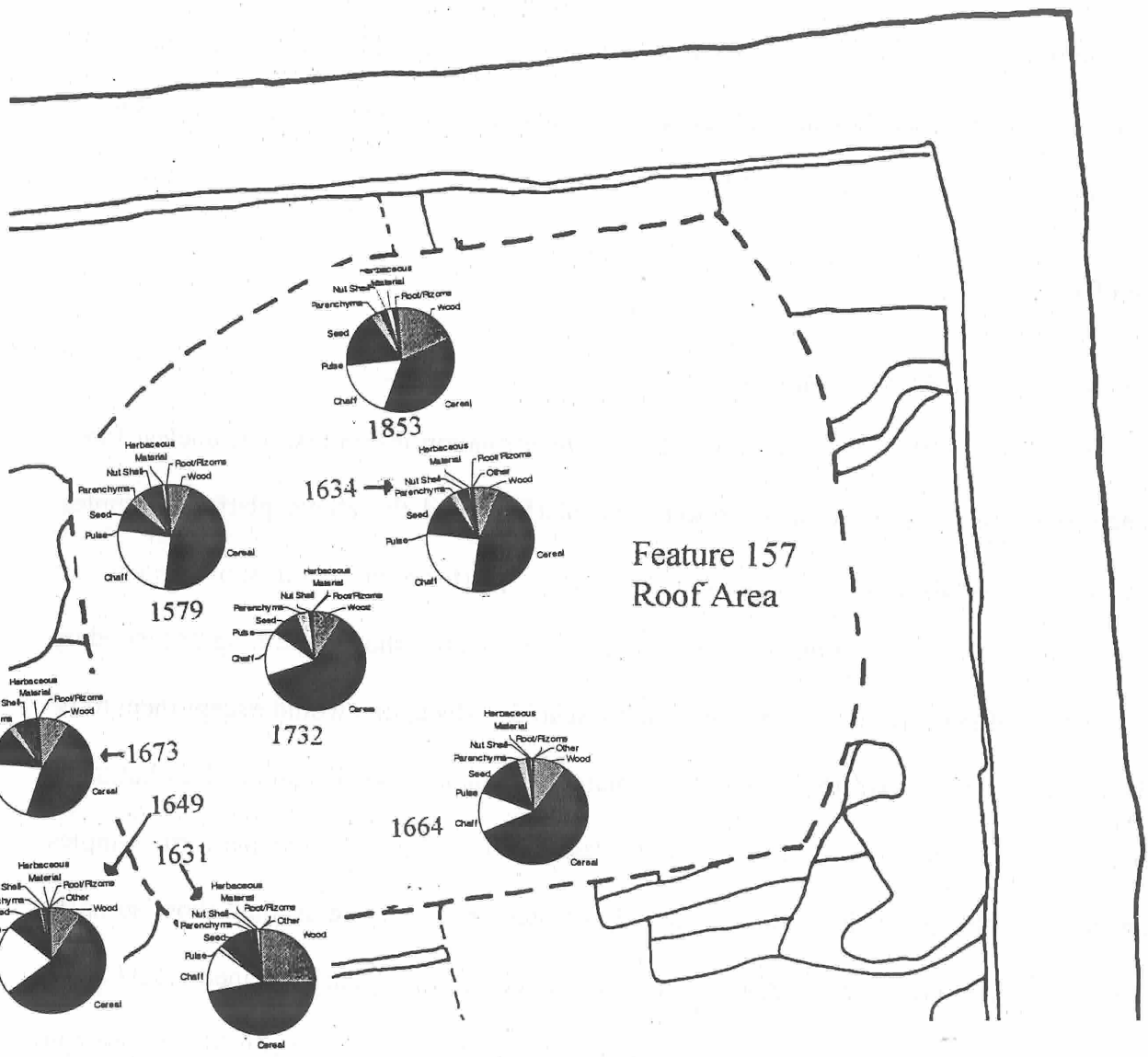


Figure 3. Overall Sample Density among all Contexts (weight in grams of botanical remains per liter of soil floated).

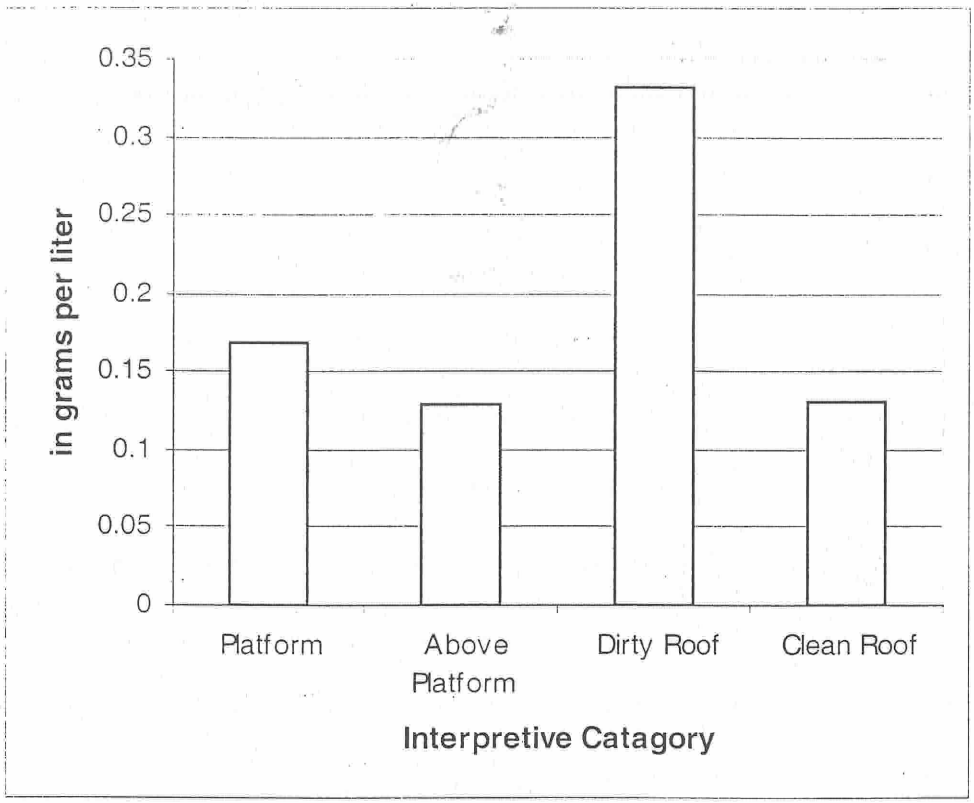
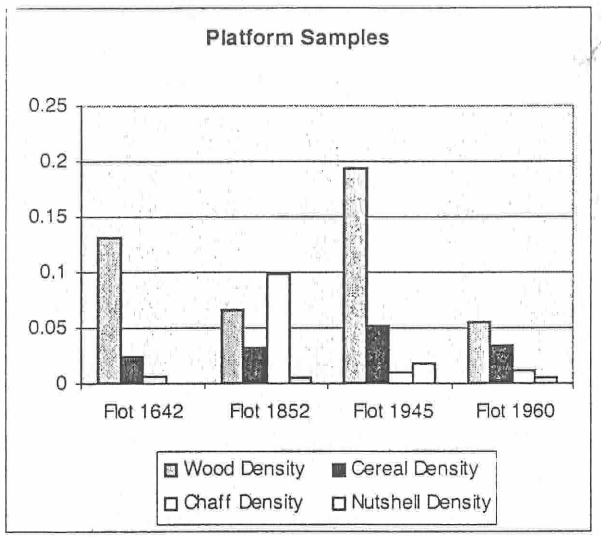
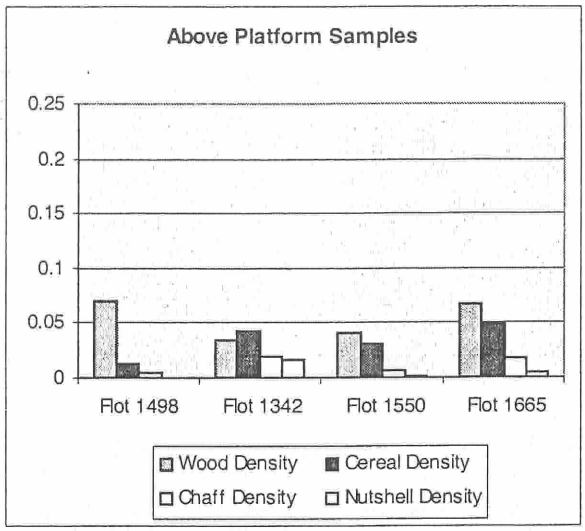


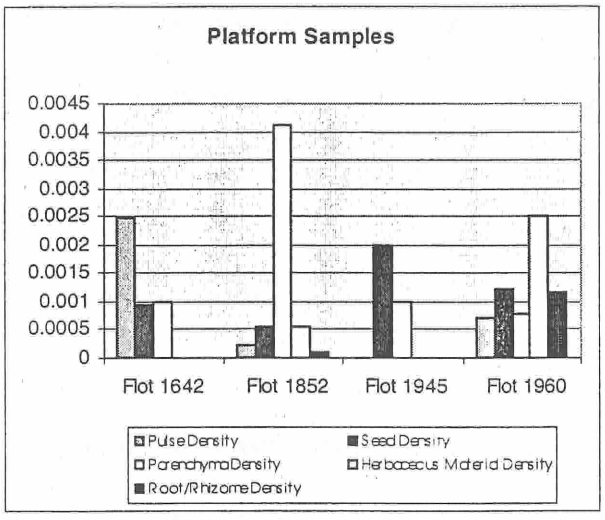
Figure 4. Density of Botanical Remains from Platform and Above Platform Samples (in grams of material per liter of soil floated).

a. Hard Remains





b. Soft Remains



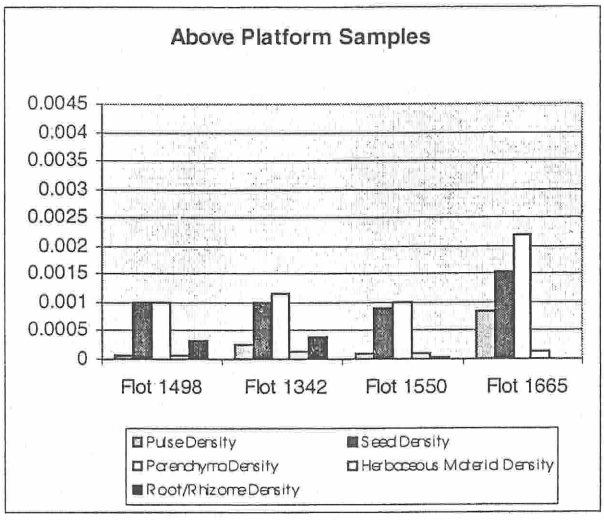
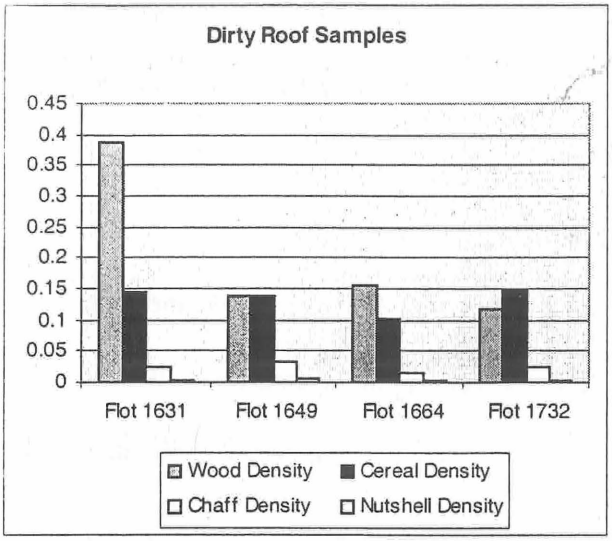
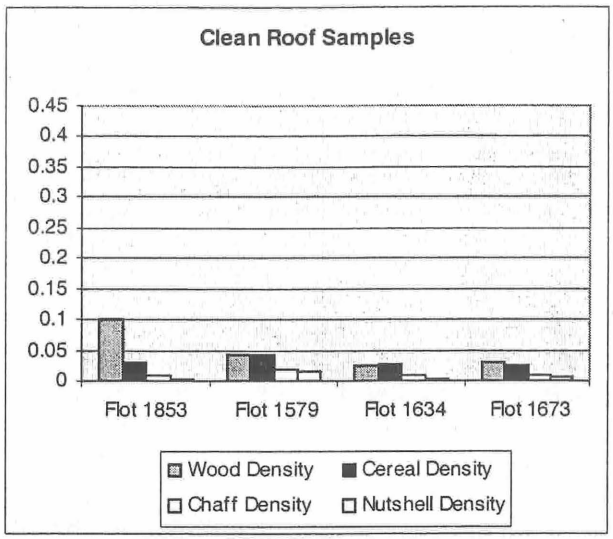


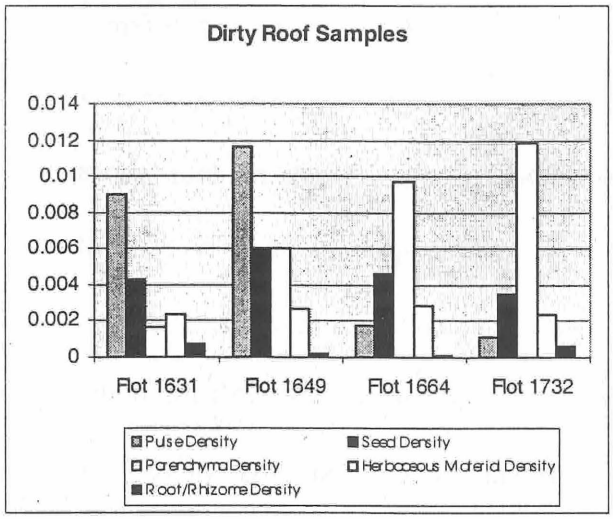
Figure 5. Density of Botanical Remains among Dirty and Clean Roof Samples (in grams of material per liter of soil floated).

a. Hard Remains





b. Soft Remains



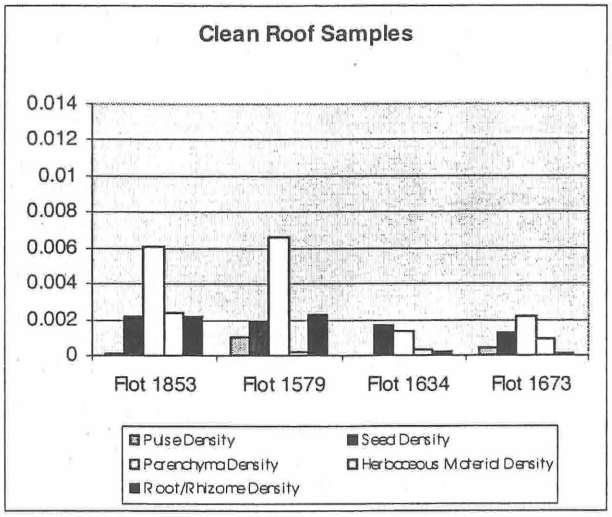
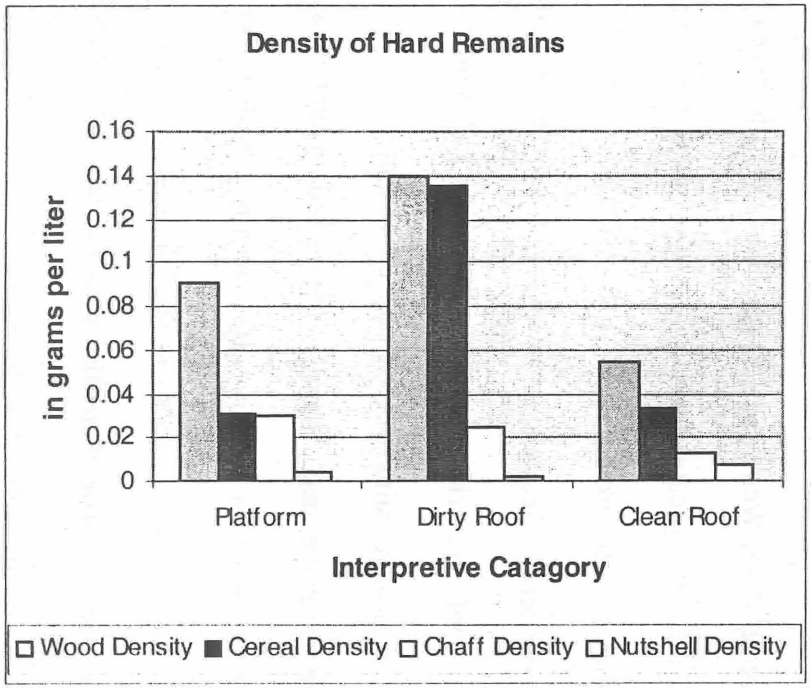
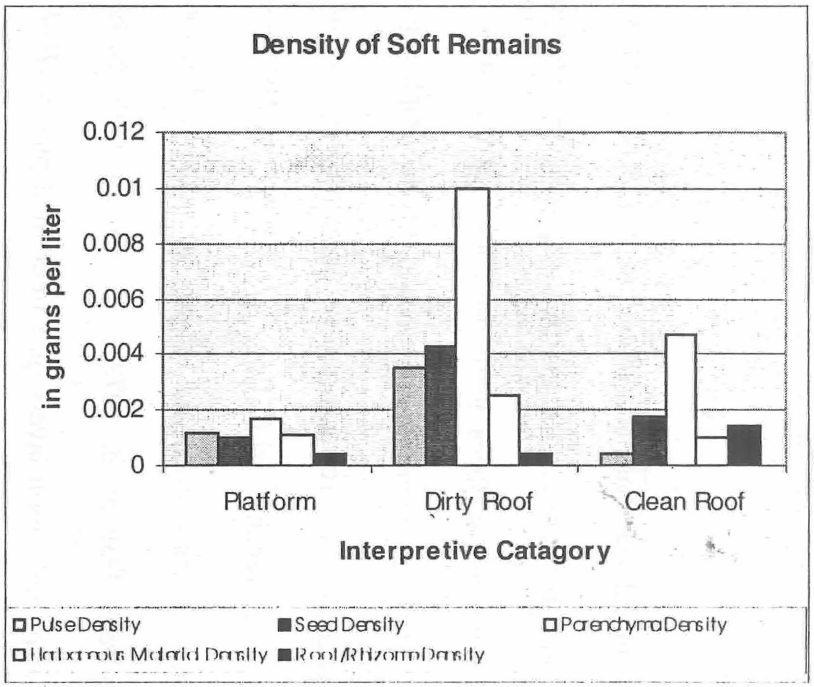


Figure 6. Density of Botanical Remains among all Interpretive Categories (in grams of material per liter of soil floated).

a. Hard Remains



b. Soft Remains



would have been ground away. In contrast, the replastering of the roof seems to have been a more informal process and it is possible that the plaster was applied directly over the botanical remains. If this was the case, the plaster would cover and preserve the more delicate remains. Thus, both the roof and platform surfaces could have been utilized in exactly the same manner in regards to household activities, but that differences in how each surface was maintained has affected the archaeobotanical record.

Moving away from issues of preservation and refuse patterning, a final explanation is that these differences are actually an indication of differential activity uses among the three contexts. When the density of edible and non-edible botanical remains among platform and roof surfaces are considered (Figure 7, Table 9) it becomes evident that a far greater intensity (that is, there are more botanical remains found per liter of soil) of both kinds of remains exists in the dirty roof area. If we assume that the presence of edible remains indicates food consumption while non-edible remains represent diverse forms of food preparation, then it appears that the dirty roof was the main area for both kinds of activities. In addition, they seem to have been done in almost equal intensity. It is interesting to note that while the density of edible remains between the platform and clean roof areas are almost identical (and are far lower than those found on the dirty roof), there is a much greater intensity of non-edible remains within the platform samples. This is curious as one would not expect that more food preparation activities were being done within the house, even as food consumption activities were done with equal or greater intensity outside of the house.

Non-edible remains represent a wide variety of activities; one can narrow in on those activities by looking at specific remains which can signify specific functions. To begin with,

chaff is the direct by-product of cereal processing (Hillman 1984) while wood is a common source of fuel; thus one can associate chaff to food processing and wood to food preparation. When one compares the amount of chaff remains to the amount of wood remains (Figure 8a, Table 10), one finds that there is generally more wood found than chaff, signifying more food preparation activity in all areas than processing ones. In addition, the amount of chaff per wood in the platform samples is far greater than either of the two roof areas. Again, this is curious as one would not expect that more food processing, in relation to food preparation, was being done within the house than outside. However, when you look at the density of chaff found in each of the Platform samples (Table 8a, c, d), one finds that for most of the samples, chaff density is actually lower than all of the roof samples except in flot # 1852, which is located at the very edge of Platform 1 and relatively close to the hearth (Map1 and Figure 1). It is possible that, in general, crop processing was limited on the roofs and generally not done at all within the house except for in this specific area at the edge of Platform 1, perhaps as a last component of cereal processing before cooking at the hearth.

A comparison of the density of chaff remains to those of cereal remains seem to support the hypothesis that more food preparation was done in all three contexts than food processing (Figure 8b, Table 10). Cereal remains signify food consumption; that is, they are remnants of directly edible plant parts and often enter the archaeobotanical record accidentally, by falling into a fire during cooking (Miksicek 1987). The relation of chaff to cereal remains is very low in both roof areas, but extremely high within the platform context. Again, if you look at the actual densities (Table 8a, c, d) it is evident that cereal remains are actually equal to those found within the clean roof and that chaff remains are actually less in all samples except for flot # 1852. This

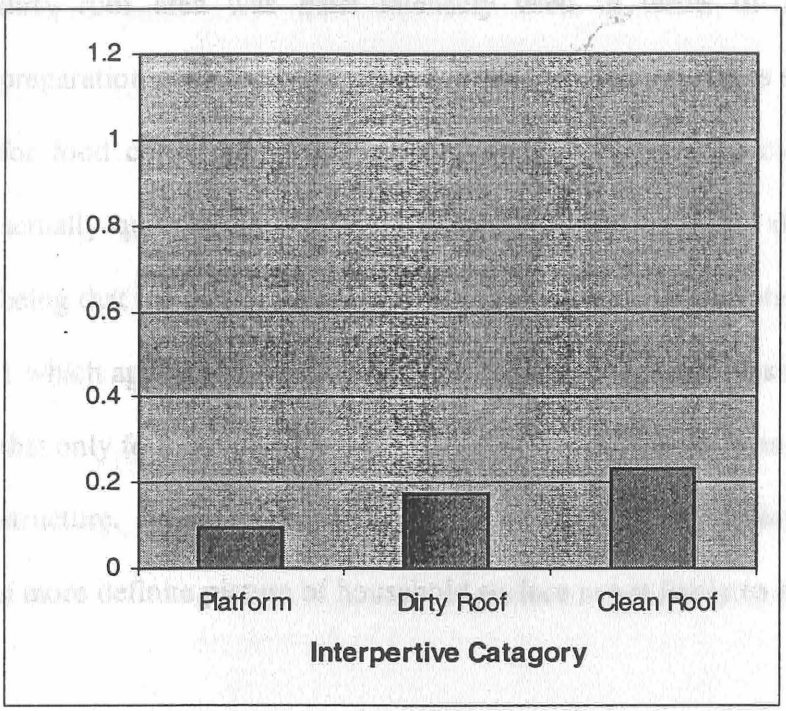
suggests that, in fact, more food consumption than food processing was done on the platform surfaces than both of the roof surfaces, except for at the edge of Platform 1. Again, this is possibly because the edge of the platform was used as a final spot of crop processing before cooking at the hearth.

A final comparison to consider is that between cereal, that is food consumption, and wood, that is food preparation (Figure 8c, Table 10). The ratio between cereal and wood remains is greatest in the dirty roof area which indicates that an equal amount of food preparation was done as food consumption. This confirms the earlier observation, made when considering edible versus non-edible remains, that the dirty roof surface was not only the main area of activity for both food preparation and processing, but that both activities were performed in almost equal intensity. The ratios are a bit less in the clean roof area, which would be expected given the lack of fire evidence across this context. Lastly, the platform area shows the least amount of food consumption in relation to food preparation which could be indicative of the platforms being more carefully kept areas than either roof area. As stated, Cereal remains are preserved when they fall accidentally onto a floor and into a fire; the lack of cereal remains in relation to wood remains indicates that food was being prepared, but that less amounts of cereal were accidentally spilled.

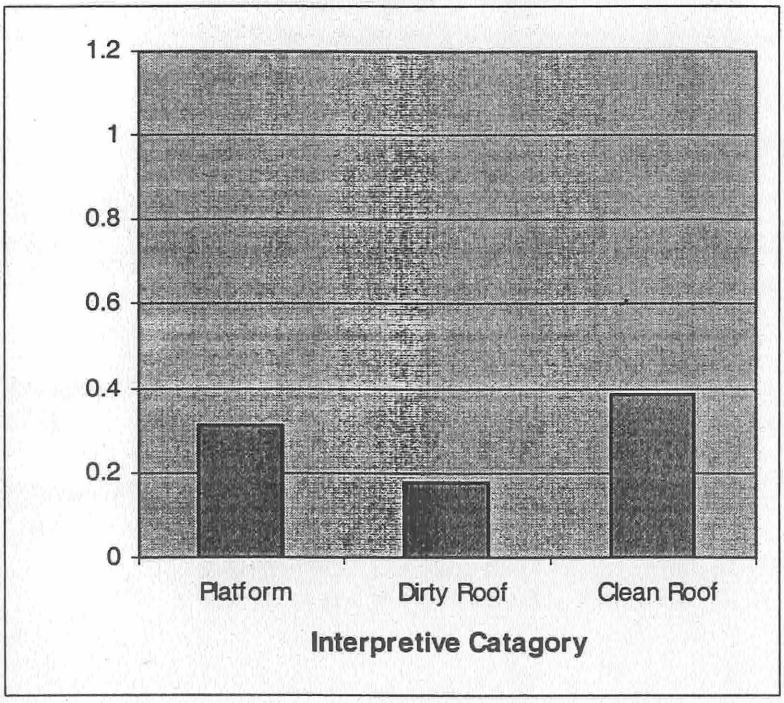
That the platform surfaces are more carefully kept seems to be one of the only real difference between the platform and clean roof samples. One finds that they both are of the same overall density (Figure 3, Table 7). Moreover, if one considers the various comparisons between chaff, wood, and cereal (again, ignoring the chaff in flot # 1852), it is apparent that the platform samples and dirty roof samples are usually the extremes while the clean roof samples have a ratio

Figure 9. Comparison Ratios of Chaff, Wood, and Cereal for Platform and Roof Contexts without the inclusion of flot # 1852 in the platform samples.

a. Comparison of Chaff to Wood Remains



b. Comparison of Chaff to Cereal Remains



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1999b *Çatalhöyük 1998 Archive Report*. http://catal.arch.cam.ac.uk/catal/Archive_rep98.html.

Map 1. The House 3 Structure.

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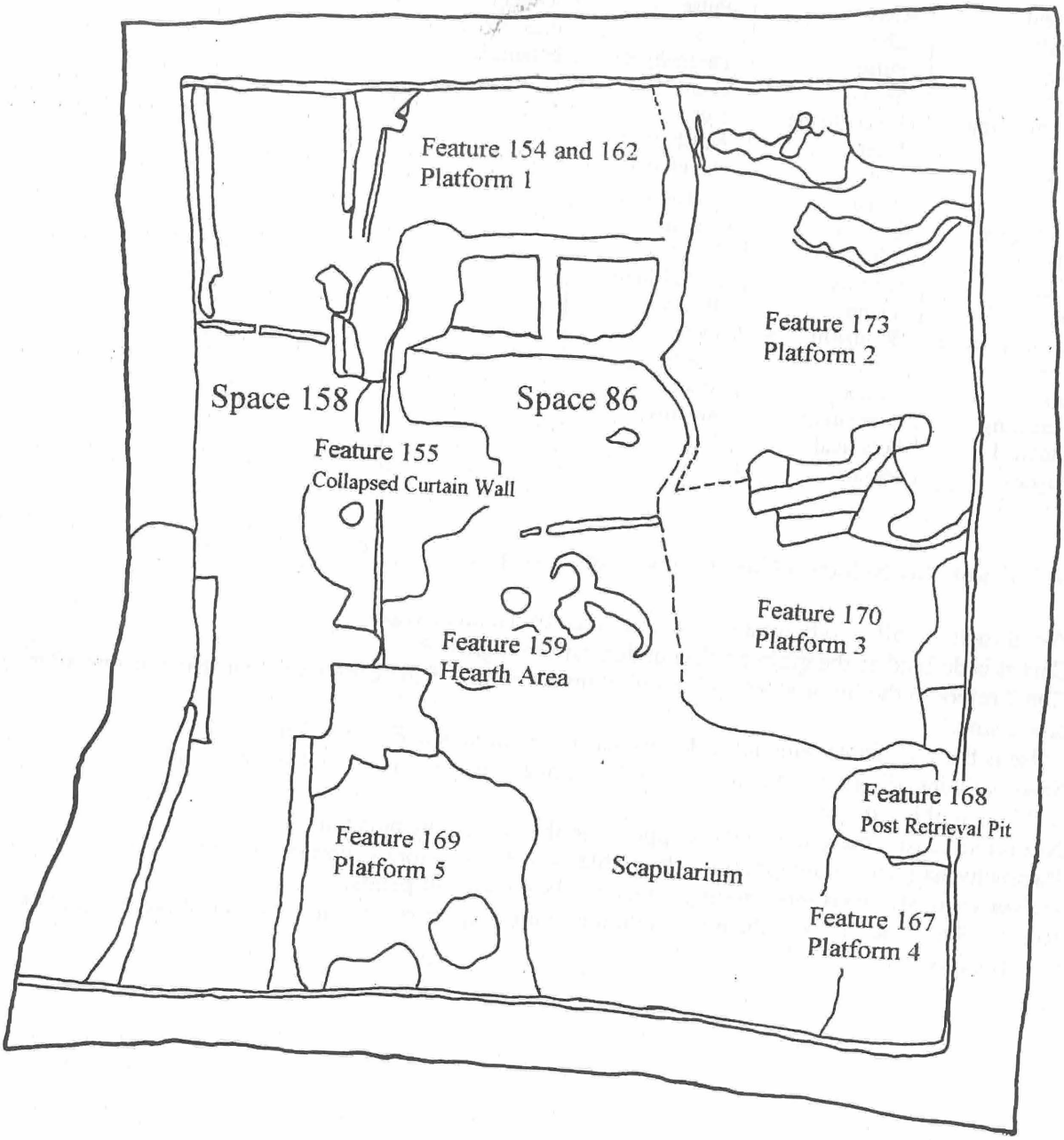

Table 1b. List of Taxa Present (present in all samples except where stated).

Material Category	Scientific Name	Common Name	Observations
Cereal	*Triticum* spp. *Hordeum* spp.	Wheat Barley	*Triticum* type cereals are the most common type found
Chaff	*Triticum* spp.	Wheat	
Pulse	*Lens* spp. other Leguminosae Family	Lentil	*Lens* type pulses are the most common type found.
Seed and Fruit	*Chenopodium* spp. *Scirpus* spp. *Silene* spp. *Linum* spp. other Cyperaceae Family Gramineae Family	Goosefoot flax or wild legume Grass	*Chenopodium* and *Scirpus* type seeds are the most common seeds found. *Silene* type are found only in the roof samples. Other, unidentifiable seeds where also present. One fruit remain was found in flot # 1665 and is too charred to be identified.
Parenchyma and Rhizome	Compisitae Family Cyperaceae Family Leguminosae Family Polygonaceae Family		Parenchyma is extremely difficult to identify (Hather 1988). Based on ethnographic and archaeobotanical evidence, these are the most likely Families that the parenchyma and rhizome remains came from (Hather 1988, Ertug-Yaras 1997).
Nutshell and Nut	*Pistacia* spp. *Prunus* spp. *Amygdalus* spp.	Pistachio Almond Wild Almond	These are the most likely identifications based on ethnographic and archaeobotanical evidence (Near 1998, Ertug-Yaras 1997, Renfrew 1973). One piece of nut meat was found in flot # 1550.
Herbaceous Material	Gramineae Family Caryopyllaceae Family Chenopodiaceae Family Compositae Family Cruciferae Family Malvaceae Family Polygonaceae Family		These are the most likely Families based on ethnographic and archaeobotanical evidence (Ertug-Yaras 1997).
Hackberry	*Celtis* ssp.		One hackberry was found in flot # 1642

Table 3a. Botanical Remains for Platform Samples (by weight, in grams unless otherwise noted)

Material	Platform #4 Unit 2294, s. 1 Flot 1642	Platform #1[1] Unit 3513, s. 4 Flot 1852	Platform #1 Unit 3519, s. 1 Flot 1945	Platform #1 Unit 3520, s. 2 Flot 1960
Wood	1.701	.602	.388	.77
Cereal	.308	.284	.103	.476
Chaff	.089	.879	.019	.167
Pulse	.032	.002	---	.01
Seed	.012	.005	.004	.017
Parenchyma	.013	.037	.002	.011
Nut Shell	.002	.042	.036	.066
Hackberry	.048	---	---	---
Herbaceous Material	---	.005	---	.035
Dung	---	---	---	---
Root/Rhizome	---	.001	---	.016
Other	.013	.068	.0004	.002
Bones	.013	.038	.001	.068
Total Weight (botanical remains plus bones)	2.246	1.963	.5534	1.638
Total Weight (after floatation, including non botanical material)	16.29	31.826	6.405	85.806
Total Weight of Soil Sample (before flotation, in liters)	13	9	2	14

Table 3b. Botanical Remains for Platform Samples (by absolute counts)

Material	Platform #4 Unit 2294, s. 1 Flot 1642	Platform #1 Unit 3513, s. 4 Flot 1852	Platform #1 Unit 3519, s. 1 Flot 1945	Platform #1 Unit 3520, s. 2 Flot 1960
Wood	264	73	34	162
Cereal	347	162	83	591
Chaff	300	146	143	28
Pulse	3	8	---	5
Seed	68	27	11	97
Parenchyma	16	9	6	23
Nut Shell	4	25	14	37
Hackberry	1	---	---	---
Herbaceous Material	---	2	---	12
Dung	---	---	---	---
Root/Rhizome	---	1	---	2
Other	2	49*	1	2
Bones	171	80	1	149
Total Count	1,019	582	178	1,380

--- indicates that none of this type of material was found

[1] This sample was filled with charred modern seeds to test the accuracy of the flotation method. The large amount of "other" reflects the modern seeds that were found.

Table 5a. Botanical Remains for Dirty Roof Samples (by weight, in grams unless otherwise noted)

Material	Dirty Roof Unit 2238, s. 43 Flot 1631	Dirty Roof [1] Unit 2238, s. 44 Flot 1649	Dirty Roof Unit 2238, s. 50 Flot 1664	Dirty Roof [2] Unit 2238, s. 56 Flot 1732
Wood	1.162	1.798	2.475	4.625
Cereal	.433	1.807	1.6212	5.914
Chaff	.069	.441	.229	.999
Pulse	.027	.151	.028	.047
Seed	.013	.079	.074	.14
Parenchyma	.005	.079	.156	.476
Nut Shell	.01	.089	.025	.062
Herbaceous Material	.007	.034	.045	.096
Dung	.004	.0004	---	---
Root/Rhizome	.002	.002	.001	.023
Other	---	.002	.0001	---
Bones	.137	.029	.973	.09
Total Weight (botanical remains plus bone)	1.766	4.8494	4.6873	12.544
Total Weight (after flotation, including non botanical materials)	24.239	193.666	66.869	331.93
Total Weight of Soil Sample (before flotation, in liters)	3	13	40	16

Table 5b. Botanical Remains for Dirty Roof Samples (by absolute count)

Material	Dirty Roof Unit 2238, s. 43 Flot 1631	Dirty Roof Unit 2238, s. 44 Flot 1649	Dirty Roof Unit 2238, s. 50 Flot 1664	Dirty Roof Unit 2238, s. 56 Flot 1732
Wood	217	397	392	1,100
Cereal	400	2,158	2,193	7,004
Chaff	116	846	470	1,730
Pulse	11	13	8	30
Seed	81	393	529	973
Parenchyma	7	38	120	515
Nut Shell	9	49	27	123
Herbaceous Material	9	21	38	57
Dung	2	1	---	---
Root/Rhizome	1	2	4	46
Other	---	1	3	---
Bones	135	803	211	969
Total Count	988	4,722	3,995	12,482

--- indicates that no material of this kind was found

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[1] Because of its size this sample was split during sorting. 50% of the light residue > 0.5mm was sorted. Thus weights and absolute counts were estimated to compensate.

[2] This sample was also split during sorting. 50% of the light residue > 1mm and 25% of the light residue > 0.5 mm was sorted. Weights and absolute counts were also estimated to compensate.

Table 7. Density of All Samples (grams of botanical remains*/liter of soil floated)

Interpretive Catagory	Sample (by flot number)	Total Weight of All Botanical Remains* (in grams)	Total Weight of Soil Floated (in liters)	Density of Sample (grams/liter)
Platform	1642	2.246	13	.17277
	1852	1.963	9	.21811
	1945	.553	2	.2767
	1960	1.638	14	.117
Above Platform	1498	1.618	16	.24398
	1342	4.148	17	.10113
	1550	.853	35	.02438
	1665	3.4	10	.34
Dirty Roof	1631	1.766	3	.58867
	1649	4.849	13	.37303
	1664	4.687	40	.11718
	1732	12.544	16	.784
Clean Roof	1853	1.839	11	.16718
	1579	1.813	13	.13946
	1634	.6702	6	.1117
	1673	.6601	8	.08251

* includes bone remains that were pulled, but does not include other non-botanical material.

Table 8. continued

c. Dirty Roof Samples

Material	Flot 1631	Flot 1649	Flot 1664	Flot 1732
Wood	.58867	.37303	.08534	.2
Cereal	.01381	.04226	.0309	.04929
Chaff	.023	.03392	.01431	.02498
Pulse	.009	.01162	.00175	.00118
Seed	.00433	.00608	.00463	.0035
Parenchyma	.00127	.00608	.00975	.0119
Nutshell	.00333	.00685	.00156	.00155
Herbaceous Material	.00233	.0262	.00281	.0024
Dung	.00133	.00003	---	---
Root/Rhizome	.00067	.00015	.00006	.00058
Other	---	.00015	.00001	---
Bone	.01133	.02823	.00206	.00405

d. Clean Roof Samples

Material	Flot 1853	Flot 1579	Flot 1634	Flot 1673
Wood	.10164	.04323	.02383	.0315
Cereal	.02955	.04239	.027	.02513
Chaff	.00982	.01862	.01017	.00838
Pulse	.00009	.001	.00003	.00034
Seed	.00218	.00185	.00167	.00125
Parenchyma	.00609	.00654	.00133	.00213
Nutshell	.00273	.01377	.00233	.00688
Herbaceous Material	.00236	.00023	.00033	.00089
Dung	---	---	.00083	---
Root/Rhizome	.00218	.00223	.00017	.00013
Bone	.01055	.00962	.044	.00588

--- indicates that no material of this kind was found