Feasting in Tiwanaku

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One

Introduction

People everywhere, always, have consumed food. Because archaeology is, theoretically, about studying all aspects of human behavior, their behavior towards food is a relevant question. Not many materials that are preserved in the archaeological record occur, without exception, across all times and places. So even though archaeology is about studying peoples in all places and times, studying food, in light of its pervasiveness, is something that can shed light on any culture – from the depths of pre-history to the present. Certainly food remains are not the most durable of material culture, but they have the potential of occurring anywhere bones are preserved and humans are eating meat and anywhere people cook their food.

However, because eating is a necessity the argument could possibly be made that it may reveal less about the cultures of its producers than less necessary objects. Culture is, in some ways, about choice—why one option that is not objectively better than another is chosen. It may be that the food (in some hypothetical pre-historic culture) was being consumed because that was what the environment they lived in supported, so the study of what they ate would reveal the nature of where they lived, rather than who they were. This is not much of an argument. Nearly all places where humans have lived provide more than one combination of consumables capable of sustaining human life and inhabitants of a place are, by virtue of being there, tied to it. Given, however, the multitude of factors contributing to the availability of food resources and the difficulty of knowing all these factors for any given point in time (not to mention archaeological recovery rates) some doubt is cast. Any given assertion about the mind-set of people

associated with any given archaeobotanical sample could be based on need rather than choice. It is in those contexts where we can, with reasonable certainty, know that the nature of eating was not based purely on physical necessity that we can know a people's culture was leaving its mark.

Possibly less universal than the practice of eating, but perhaps not much, is the practice of feasting. There are all sorts of reasons for feasting. Feasting might include eating large amounts of food (more than needed), unusual foods, an unusual variety of foods, or any combination thereof. A feast may be held to impress (Dietler 1996), to mark a special occasion simply by its unusual or specific nature, or because the act is thought to have some effect (perhaps supernatural) other than a physical one. The functions and intricacies of feasting, and how people use food for more than staying alive, is a well observed and studied human practice. (Appadurai 1981; Hayden 1986;Young 1979). A feast may also take place simply for enjoyment—because the foods being consumed are judged to be particularly enjoyable---but anyone who has eaten widely of different cuisines can attest to the subjectivity of good taste. Doubtless there are other reasons, but, some subjective choice is almost inevitably involved---and therefore the culture and values of those doing the choosing.

Certainly the criterion of non-necessity is possessed by many other, if not nearly all, forms of material culture, but perhaps there is something about the contrast of need versus intentional food choices and subjectively assigned value that is particularly illuminating. Whenever feasting occurs some choice is implied and the differences between the feast and the norm tell us something about the "tastes" of the feasters, especially when the choices made are contrary to necessity and practicality—for

example, when a food requires more effort to obtain. Comparing these choices with the contexts in which they occur might, in theory, bring us somewhere close to the archaeologically elusive reasoning of the people in question.

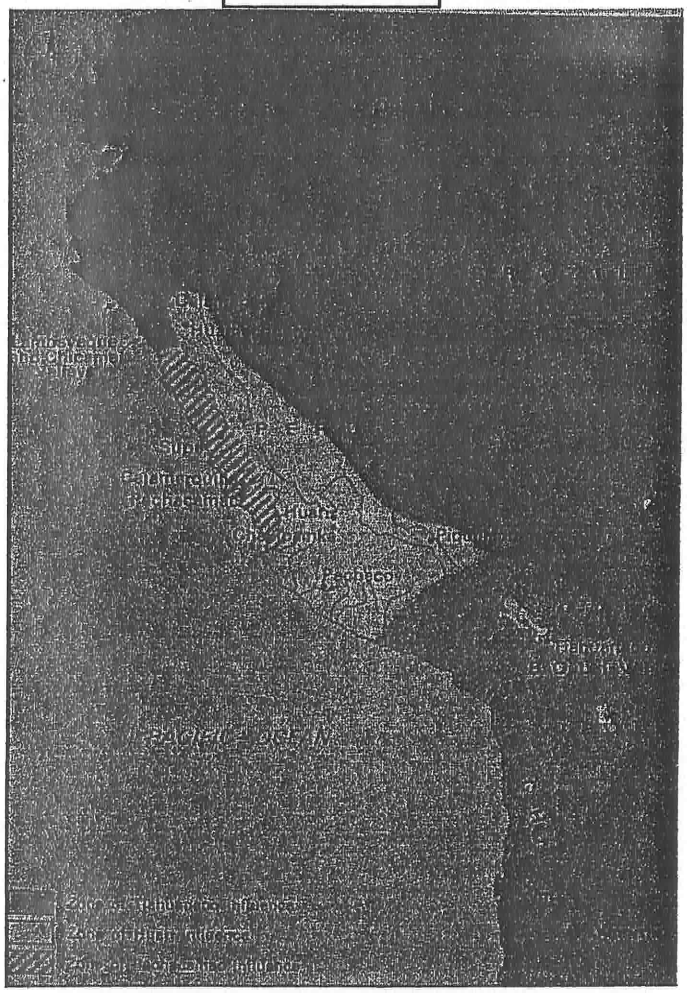
The ancient city of Tiwanaku is one such place where, in an environment that is perhaps less than an ecological cornucopia extra effort is clearly made to obtain particular foods over others and decisions are being made based on more than just what is most convenient. Nevertheless, the region is no exception to the rule that sometimes a food's value is more than its nutritional content, maize being one of the key examples (Johannessen and Hastorf 1994). This project is an attempt to find the patterns that are the result of these complex human choices.

Two

Tiwanaku

Tiwanaku is about 10 kilometers from the southern shore of Lake Titicaca in modern day Bolivia (Figures 1 and 2). It sits in a valley of the same name in the northern part of the Andean altiplano, which, in general ranges from 0 to 7 degrees Celsius and receives somewhat greater than 1000 millimeters of rain annually. The floor of the valley rests at a height of 3812 masl, with the mountain peaks around it reaching greater than 4600 masl. The site is roughly 50 kilometers west of modern day La Paz. Throughout most of its history its most significant neighbor was the Wari culture less than 800 kilometers away.

Figure 1

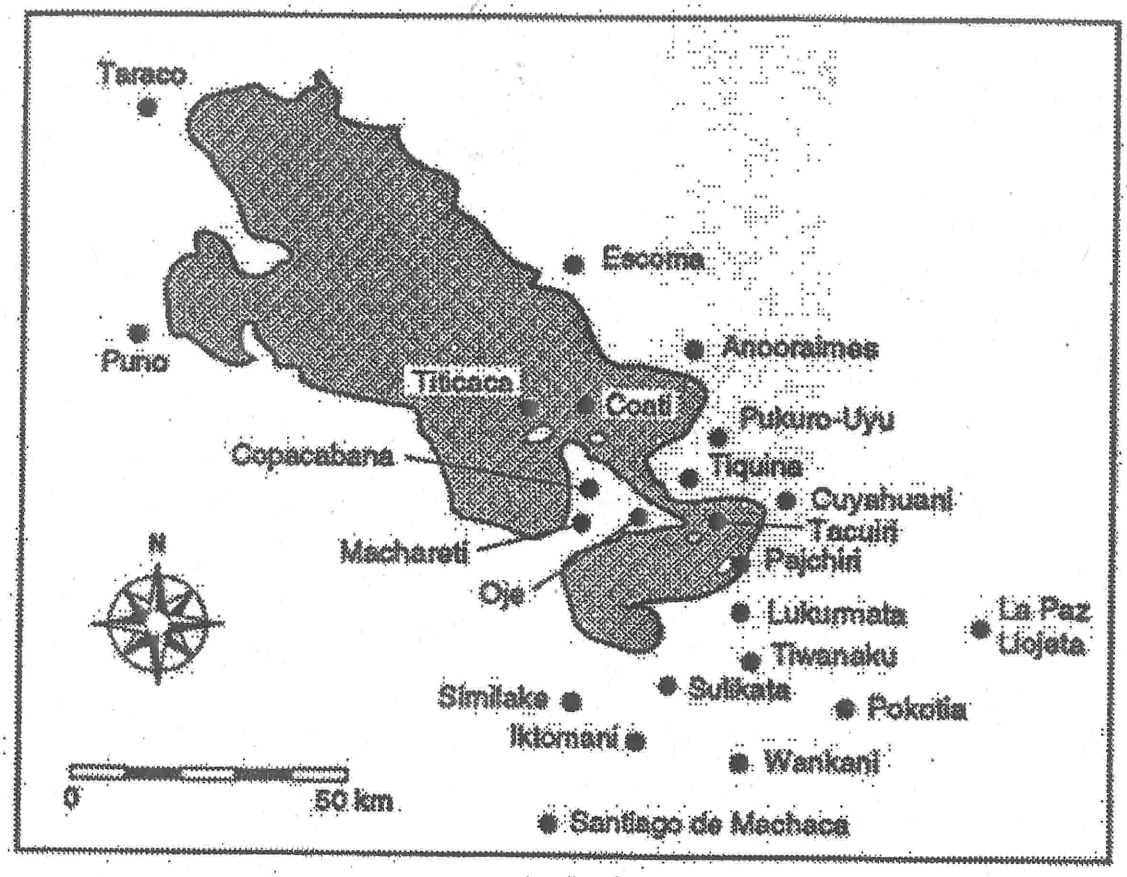


The earliest evidence of habitation in the area dates to the formative period and it is difficult to say exactly when it became "Tiwanaku." It spans all of the Middle Horizon (A.D. 600 – 1000) period of the Central Andes and parts of the Early Intermediate (200 B.C. – A.D. 600) and Late Intermediate (A.D. 1000 – 1400) periods on either "side." Tiwanaku has its own series of phases, based on architectural and ceramic features (Kolata 1995). These are Tiwanaku I (300 B.C.- A.D. 100), III (A.D. 100 – 375), IV (A.D. 375 – 750), and V (A.D. 750 – 1050). Tiwanaku II is no longer used. The exact dates vary, of course. Residential patterns in the Tiwanaku I period are "randomly distributed" and are "exclusively on the alluvial plane" (Kolata 1995, p 115). Tiwanaku II phase saw a population concentration around a ceremonial center. By the Tiwanaku IV period Tiwanaku had definite influence over the area and settlements of larger size and even spacing appeared along the Tiwanaku valley and architecture of the urban center developed further (Kolata 1995). The trends of Tiwanaku IV period continued in the Tiwanaku V period along with increased population size and density in urban Tiwanaku, leading up to its collapse roughly around A.D. 1000. Nevertheless, between phases, at least the latter two phases, there seems to have been a relatively steady continuation of broad cultural outlook (Janusek 2003).

The inhabitants had extensive, irrigated, raised, agricultural fields throughout the valleys under Tiwanaku influence. These fields where capable of producing several high-altitude, colder weather crops, most significantly various types of tuber and the grain quinoa. Other crops, which would not have been reliably producible (most notably maize) never the less appear in the archaeological record. In addition to farming the inhabitants

were able to exploit the resources provided by Lake Titicaca (which did not include drinkable water), and camelid herds (Kolata 1993).

Figure 2

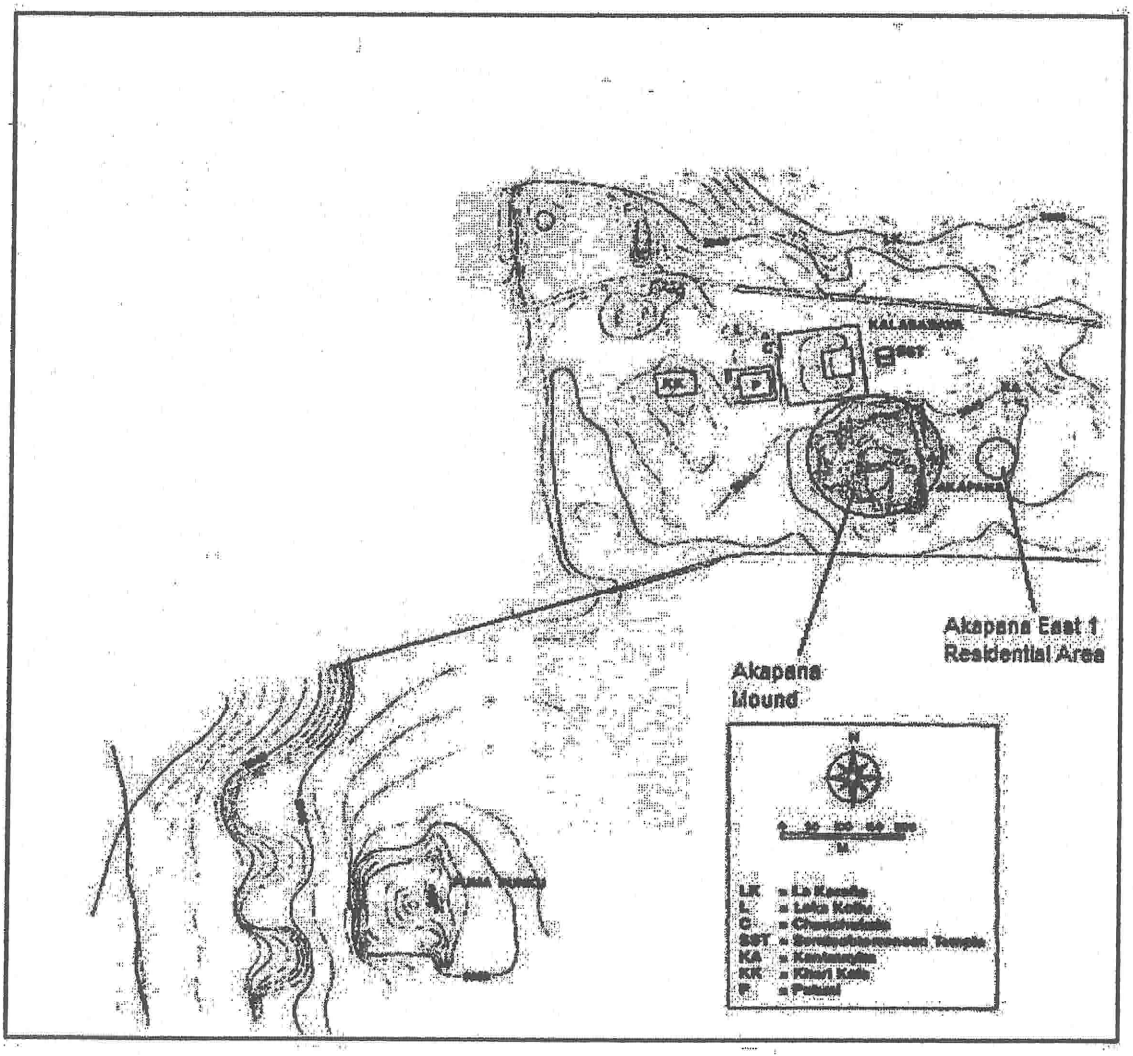


As is so often the case, population estimates vary in the literature and, of course, are difficult to create with confidence based on archaeological data. Alan Kolata, one of the principal investigators of the site, analyzes carrying capacity to arrive at a maximum population for the 19,000 hectare, three valley Tiwanaku "heartland" (Kolata 1993 p. 199). He provides a series of different ranges based upon two different estimates of persons supported by potato fields and planting strategies (Kolata suggests that various kinds of potato were "the principal food crop" (1993 p 200) of Tiwanaku. He cautiously

picks 570,000 – 1,111,500 as his preference for the 19,000 hectare area and 18,000 – 351,000 for the 6,000 hectare Tiwanaku valley.

The city itself (figure 3) has various size and population estimates, but may have been as large as 6 square kilometers contained 15,000 – 20,000 inhabitants (Kolata 1995 p 15).

Figure 3



There is a relatively compact urban core—some of which is surrounded by an extensive moat. The architecture in the core is both public and residential as well as being ritual and not. The largest structure is the Akapana pyramid which is close to 17 meters tall and is 200 meters at its widest and has seven tiers. The second largest structure is the Puma Punku – also a tiered mound. Its construction began later than the Akapana and it lies farther away, outside of the moat. Closer to the Akapana are the Semi-Subterranean Temple, the Kalasasaya, Putuni, Chunchukala, and Kheri Kala. The Semi-Subterranean Temple, Kalasasaya, Chunchukala, and Kheri Kala are all intricately carved monuments of a "non-residential character" (Kolata 1993 p 104). The former two, situated next to each other, are celestially aligned and have particularly striking standing carved stelae and sculpture. The Putuni or "the Palace of the Lords" is thought to have been a highly elite residential compound.

In addition to the monumental architecture archaeologists have named and delineated several residential complexes of varying degrees of prestige. Still inside the moat, directly east of the Akapana pyramid is the Akapana East 1 residential area with both Tiwanaku IV and V structures. Some 120 meters farther east (and outside the moat) is the Akapana 2 residential area. Still farther out from the urban core are the Ch'iji Jawira, La Karana, and K'karana residential and production centers (evidence indicates that Ch'iji Jawira was a specialized pottery production area).

After its fall the site and its area took on almost immediate historical significance at the hands of the Inka, whose origin myths feature Lake Titicaca prominently as their culture's and ancestor's birthplace. It remained a pilgrimage site throughout the Postcolonial period and into the present.

Three

Rationale

The interpretations and analysis here are based almost solely on the paleoethnobotanical data from standardized soil samples that were "floated" in the field at Tiwanaku, using water and agitation, to isolate the botanical remains and sent to a paleoethnobotany laboratory in the United States for analysis. In the lab these samples were separated by size using geological sieves (.5, 1, 2, and 4mm mesh sizes) and analyzed and identified under a dissecting stereoscope. The counts of the taxa are the result of the complete samples.

Throughout my analysis, when statistically necessary, the botanical counts retrieved from the samples were weighted based on volume of the sample to ensure that count from smaller or larger volumes of soil were not disproportionately represented. The mean volume size is 6.6 liters, the minimum value is 1.9 liters, the maximum is 9.0 liters, and the Standard Deviation is 1.5 liters. The adjusted counts have been standardized to a 10 liters. Unless counts mentioned are specifically referred to as "raw" they have been standardized.

I chose my research samples judgmentally. My focus was on primary and secondary deposition and those locations that were judged likely to illuminate feasting and food preparation activity. Obviously some subjective choices must be made and likely feasting locations must be chosen. One problem with exploring something like feasting behavior is that we need the location to tell us whether a particular deposit represents a feasting "occasion" and, in some cases, we need the deposit found there to tell us whether a spot was a feasting location. This is where analysis becomes

complicated and choosing locations must be carefully considered. This uncertainty will enter into the discussion in the latter two sections. My analysis focuses on 25 paleoethnobotanical samples taken from the structures at the summit of The Akapana pyramid (Tiwanaku V) and the Akapana East 1 residential area in Tiwanaku phases IV and V. The samples were taken during Linda Manzanilla (1989) and John Janusek's (1990-1991) excavations (respectively) (figure 3).

These locations were chosen for several reasons and under several assumptions. The first, the Akapana Mound, is as close to being without doubt a feasting location as is possible to say. I am assuming that the food remains found on the Akapana represent a very overt form of feasting behavior, in other words, that the feasting occasion that is recorded in the deposits was the most ceremonial or the choices about what was consumed or prepared were particularly conscious or "meaningful." This is based upon its conspicuous location and the large amounts of camelid bones visible there during excavation (Manzanilla 1989).

Of course, not all feasting may have occurred in such ostentatious a place and time. Part of my analysis will look in samples from the residential locations for similar patterns to what is found on the Akapana pyramid through the amount the prestige foods that are found. In the residential areas, effort was made to select a series of possible periodic feasting locations, as well as preparation areas. The Akapana East 1 domestic area was available, and provides an example of a residential setting. Yet, because of its privileged location (near to the center and inside the moat) and the artifactual and structural evidence that was uncovered during excavation (Janusek 2003), it might be reasonable to assume that the inhabitants were getting, to some degree, high value food.

The concerned contexts include kitchens with hearths (to access deposits arising from food preparation), living structures (rooms) in this wealthy neighborhood (where there is ceramic and botanical evidence of food consumption), middens, and outdoor patio areas adjacent to structures. The purpose of including these areas is less to determine what feasting behavior consisted of, but more (using the Akapana mound as a model) to look for the extent to which feasting seems to have occurred in these areas.

Four

Samples and their Assumptions

There are 25 samples being discussed here in all. Five come from the Akapana mound, 10 come from the Tiwanaku period V dwelling complex, and 10 come from the Tiwanaku IV residence. The twenty Akapana East 1 samples were chosen on the basis of context. For each phase there are three of what the excavators termed midden contexts or refuse dumps, six from floors, and one from a hearth. Within the floor context, for each phase, two are from kitchen floors, two are from indoor non-kitchen occupation spaces, and two are from outdoor "patio" areas.

The botanical samples were chosen to create as comparable a structure across and within time periods as possible. For each phase (Tiwanaku IV and V) the samples come from roughly the same stratagraphic and depth levels, allowing us to assume that the samples are from roughly the same time period. The locations from which these samples were taken from are recorded on figures 4 through 6. I am assuming that the floor and hearth contexts are primary deposits (deposited during the time of the activity they represent) but there is no way to know for certain that they were not disturbed and the deposits transplanted from some other location sometime in the archaeological past. This complication in compounded by the lack of availability of all samples and information (this project began over a decade after the excavation ended). Of course, even if it had been possible to have all samples from a time period be from the same level—the difficulty of delineating, judging, and standardizing archaeological levels would create essentially the same problem.

Regarding the plant remains themselves, I am assuming that plant identifications were correctly made. Towards standardized identification, all the samples, although sorted by different people, were checked by Christine Hastorf.

A third assumption, and the least strong, is that these samples are representative of the whole. 25 samples cannot form statistically strong conclusions. Of the samples taken by the excavators, these 25 samples are the best combination possible. The statistical difficulties arising from a small sample size are especially prevalent in archaeology. This is largely due to the fact that the size of the population can hardly ever be known and the samples we choose have already been effected by and the components selected by years of wind, rain, and disturbance (van der Veen 1985).

Five

Taxa

Certain taxa are more relevant to an exploration of feasting than others are. Taxa that were primarily used as food are much more central to the discussion than non-food taxa are—though they cannot be ignored either, and are useful for proportionate comparisons. Food taxa include parenchyma from Solanum spp., (including andigena and tuberosum) (potato), Oxalis tuberosa (oca), Ullucus tuberosus (ulluco), and Tropaelum tuberosum (mashua), Zea mays L., Chenopodium quinoa (quinoa), and domestic legumes (either Lupinus mutabolis and Phaseolus spp. (lunator and vulgaris). Straddling the line between food and non-food taxa are various cactus seeds and Nicotiana varieties, which may have been ritually consumed. Other frequently occurring or notable taxa are grass, wild legumes, Relbunium, Malvaceae, Rubus, and Cyperaceae.

Parenchyma is plant storage tissue. The majority of parenchyma appearing in the samples very likely comes from tubers, including the varieties of potatoes. It may be worth noting here that each "parenchyma count" showing up in the archaeological record through the flotation process does not represent a whole item even to the degree that individual seeds of different taxa do. The evidence suggests that potato and other tubers were consumed either boiled or baked. The quinoa grain would also have been either boiled or baked, and legumes would have been boiled (Wright et al 2003)

The crop that will figure most prominently into the feasting scenario is maize. Perhaps the most telling evidence for the significance (and therefore "feasting nature" of maize) is that the crop could not be grown locally and had to be "imported" from some

distance away, probably from the basin area. Since this distance decreases the possibility that the choice to consume maize was one of convenience it must have been one of preference (Hastorf and Johannessen 1991 ; Johannessen and Hastorf 1993). The amount of resources expended to bring maize into the valley would have been greater than the amount expended when consuming the crops that could have been grown there. Also, we know from organic analysis of some ceremonial drinking vessels (Alconini 1995), that maize beer was made and consumed—therefore it was being consumed in a ritual context. In addition to being ground and made into drink form, it was baked and boiled, sometimes as a component of stews.

Also, though not a part of my paleoethnobotanical analysis, and not figuring largely into my discussion, it is worth mentioning that meat was also consumed, primarily camelid and guinea pig meat.

There are many ways for non-food taxa to enter the archaeological record and be recovered in flotation samples. The plants that were either intentionally used as fodder or consumed by domesticated animals should represent a large portion of the non-food taxa, since, along with wood and grass, dung was used as fuel. Modern charred dung from the region consists mostly of Relbunium and grass. Other taxa were also present, including Malvaceae, and quinoa. (Hastorf and Wright 1998). Relbunium was also sometimes used as a red dye. Of the non-food taxa that appear in my 25 samples grass is most prevalent across the site. This is not surprising as it had a multitude of uses, including fodder, fuel, and matting (Wright et al 2003).

Laying out the framework of how, to date, it is understood how these taxa were used is critical to being able to interpret any of the patterns that appear as similarities and

difference between and within time periods and areas. It is the difference ratios and densities with which the taxa occur that provides a picture of what was happening in Tiwanaku, and where exactly it was happening. With this laid out, we turn now, to the data.

Six

Akapana Mound

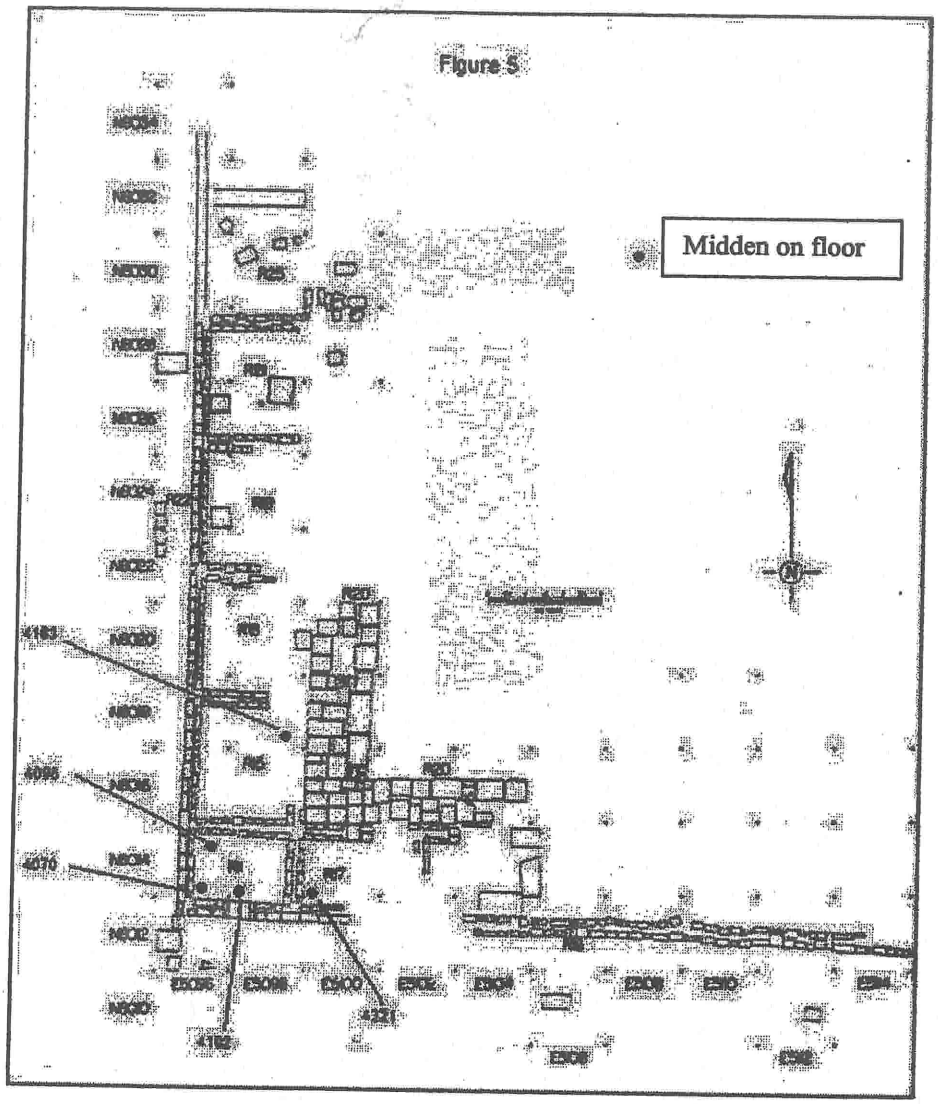
The tallest structure on the landscape and the center of a city surrounded by a moat, the Akapana mound meant something. Eating that took place at the summit probably represents a very civic and ritual nature form of eating, compared to domestic situations. The rooms at the summit of the Akapana mound were the site of an extremely large feasting ceremony, dated to the Tiwanaku V period, and was believed to be a closing ceremony (Manzanillla 1992). The massive amount of camelid bones (figure 4) is the most visible sign of this. The serving cups (keros) with maize residue found smashed

Figure 4

at the base of the mound (Alconini 1995) are another example of the types of feasting activities that probably took place at the Akapana.

The excavated rooms (figure 5) are approximately square, about 2 by 2 meters to 2 by 4 meters. These are all fairly uniform. The five samples (marked on figure 5) from

the top of the Akapana Mound for this project were taken during Linda Manzanilla's excavation (figure 4). They come from three different rooms out of a series (Manzanilla 1992).



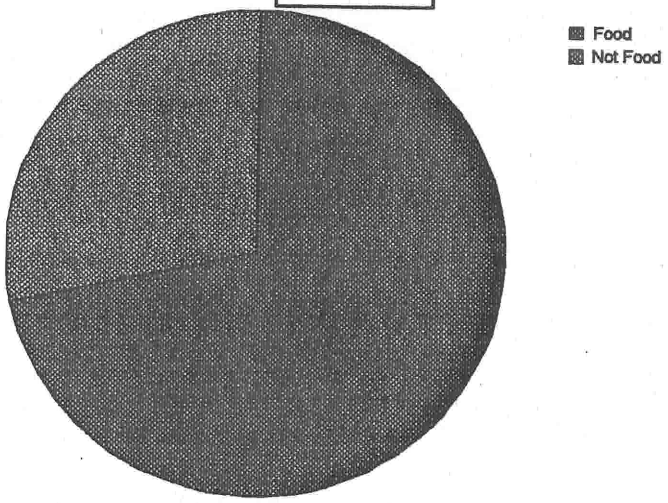
Functional contexts of these were not clearly distinguished on the flotation sample sheets, but their descriptions indicate that they all come from a feast midden on floor context. The southwest most room has three samples located in it and the rooms just to the north and east of it each have one. Because there is little context other than the samples to distinguish between the rooms, because two of the rooms only have one

sample, and because there are so many rooms not sampled, the analysis will not focus on spatial differences.

Food (figure 6) accounts for a very large percentage (nearly three-quarters) of the taxa. In figure 7 we can see that a very large portion of the food is made up of parenchyma. The dominant non-food taxon is grass. These counts (figure 7), as with the other locations, were adjusted to account for differences in volume of soil samples. Parenchyma makes up by far the largest portion of the sample (standardized counts of about 700 out of 990) with grass and quinoa following (roughly 150 each).

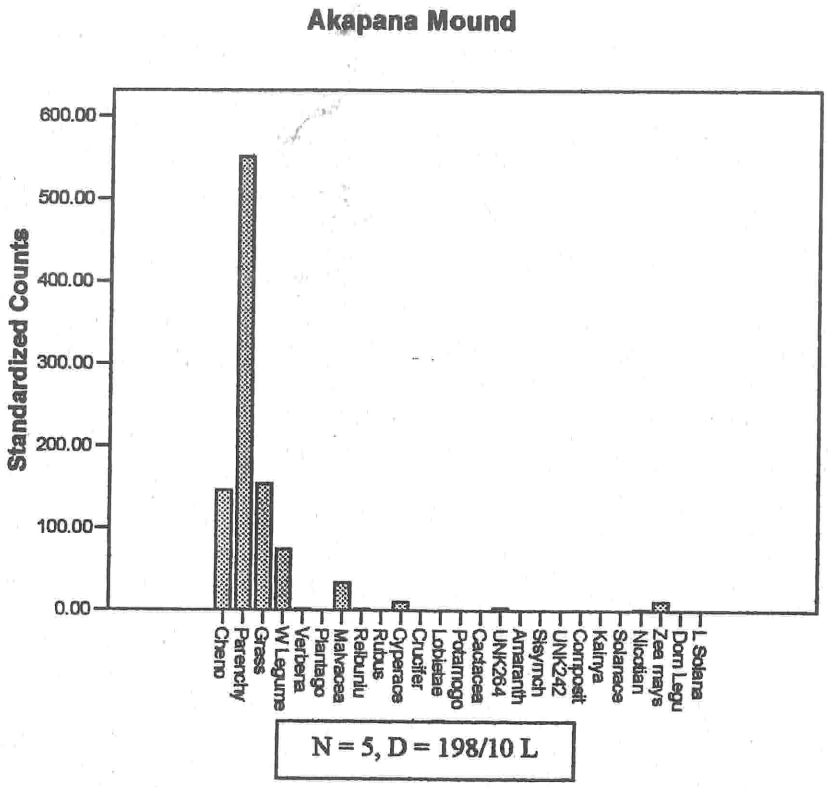
Akapana Mound

Figure 6



N = 5
D = 198/10 L

Figure 7



Of our important taxa maize is present in two out of the five samples (flotation numbers 4321 and 4098). Together, the two samples with maize present make up a standardized count of 11 (figure 7). Nicotiana is present in one sample (4102). Of the 25 taxa that were included in my analysis (all of which appear somewhere in the 25 samples) 11 are present in the five Akapana samples.

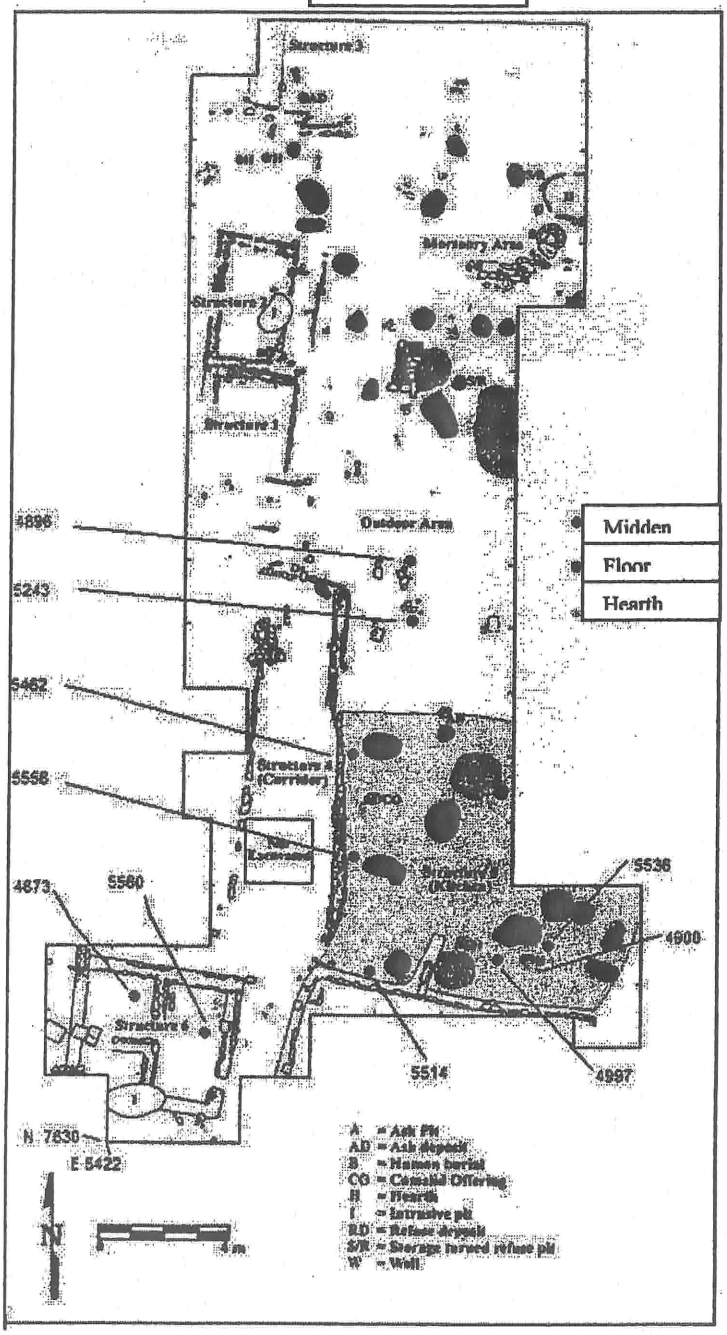
It would stand to reason the top platform of the Akapana mound, and the structures there represent a fairly controlled environment (compared to domestic areas) and that what was taking place there was relatively specific. The domestic areas are much more complicated situations. A broader range of activities probably took place there. This does not mean that it is not still likely that feasting took place, it just becomes harder to find.

Eight

Tiwanaku V Domestic Compound

The structure that Janusek's excavation dated to the Tiwanaku V period (figure 8) is clearly a more complex structure than the Akapana Mound was. There is much greater variation in the types of rooms and the structure of their placement is less regular. According to Janusek (2003) the bulk of the space of figure 8 is a communal area. There

Figure 8



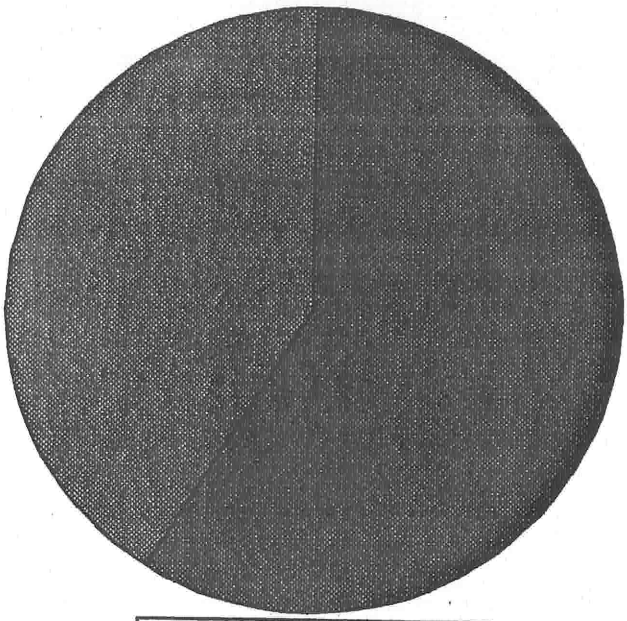
are smaller rooms surrounding this space (structures 1, 2, 3 and 6 on figure 8). This system could represent an extended family unit. The large, open, communal "patio" area includes a partially enclosed and covered kitchen area with a series of hearths, middens, and a well.

The excavators identified different contexts from which the samples came. The ones that were included in this analysis include floors, middens, and hearths. There were several other hearths, but flotation samples were not available for all of them. A total of six floor samples were selected: two in the patio area north of the kitchen, two in two separate rooms in structure six, and two in the kitchen. Three in room midden samples were included, all from the kitchen. The hearth sample (flotation number 4900) is from the southeast corner of the enclosure that was identified as a kitchen.

Quinoa is the dominant taxon here, across combined contexts and rooms, followed by grass, wild legumes, and parenchyma. Food makes up much less of the total amount of botanical remains than we saw on the mound (figure 9). The counts in figure 10, just as in the Akapana mound zone, are adjusted to eliminate differences based upon the volume of the soil sample.

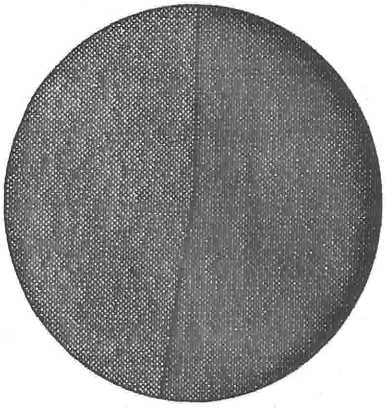
Tiwanaku V Domestic Compound

Figure 9



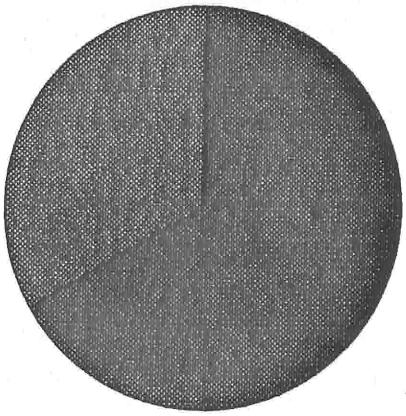
N = 10
D = 258 / 10 L

Tiwanaku V Floors



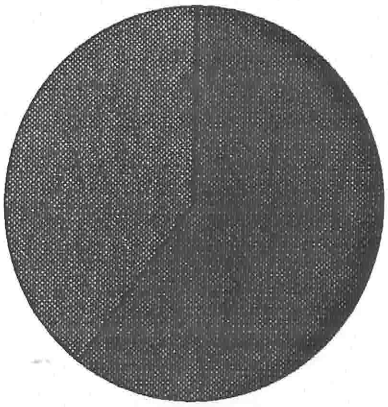
N = 6
D = 137/ 10 L

Tiwanaku V Middens



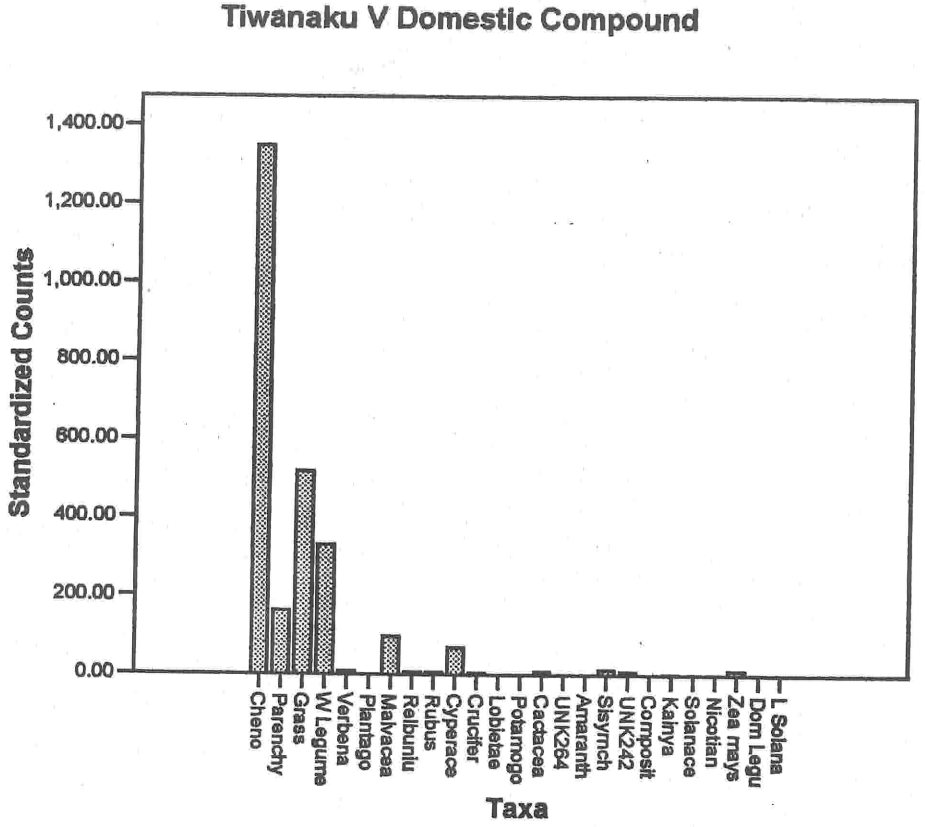
N = 3
D = 163 / 10 L

Tiwanaku V Hearth



N = 1
D = 1276 / 10 L

Figure 10


Tiwanaku V Domestic Compound
Standardized Counts
1,400.00
1,200.00
1,000.00
800.00
600.00
400.00
200.00
0.00
Cheno
Parenchy
Grass
W Leguma
Verbena
Plantago
Malvacea
Relbuniu
Rubus
Cyperace
Crucifer
Lobeliae
Potamogo
Cactacea
UNK264
Amaranth
Sisymch
UNK242
Composit
Kainya
Solanace
Nicotian
Zea mays
Dom Legu
L Solana
Taxa
N = 10
D = 258 / 10 L

The two most noticeable pattern in the contextual comparisons is that the hearth is extremely dense compared with the other two. Bizarrely, the middens are the least dense, which may show a possible problem with the classifications. Also, the middens have substantially fewer wild legumes and that the floors include substantially more parenchyma than the other contexts (figure 11 – 13).

Figure 11

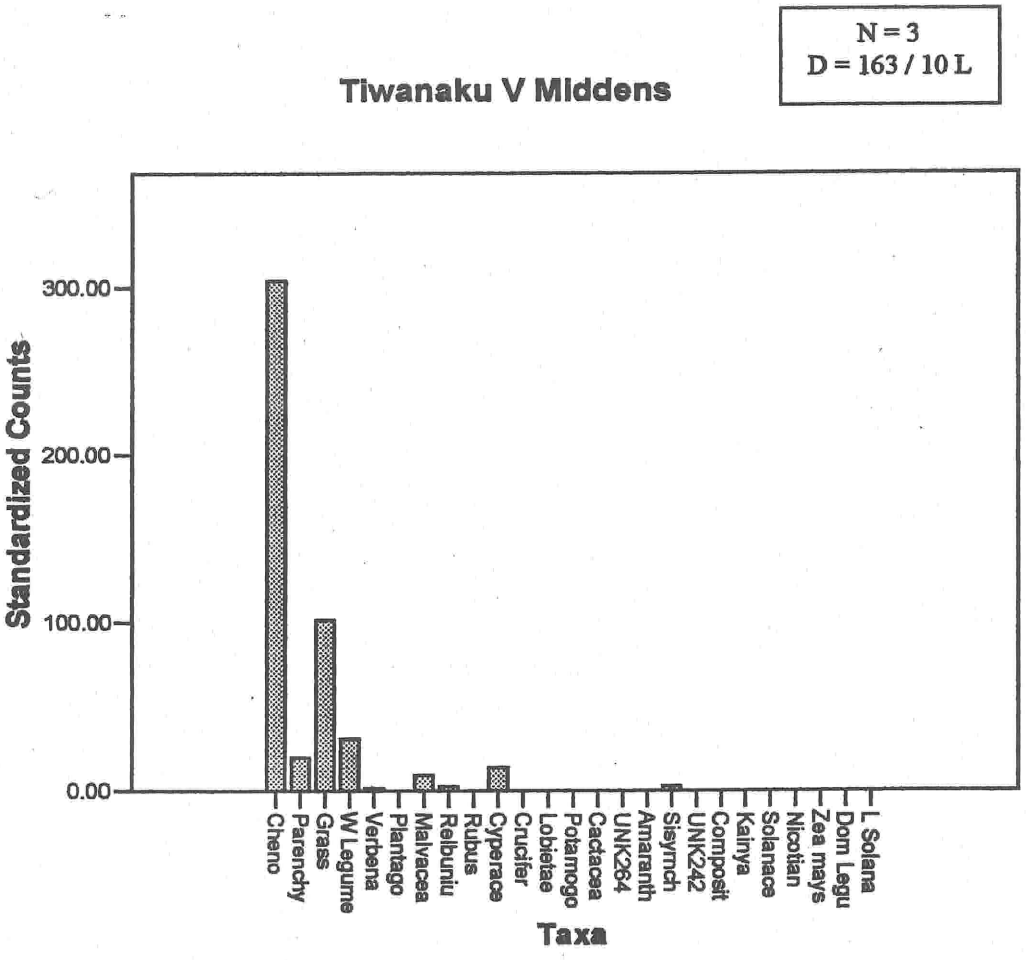


Figure 12

Tiwanaku V Floors

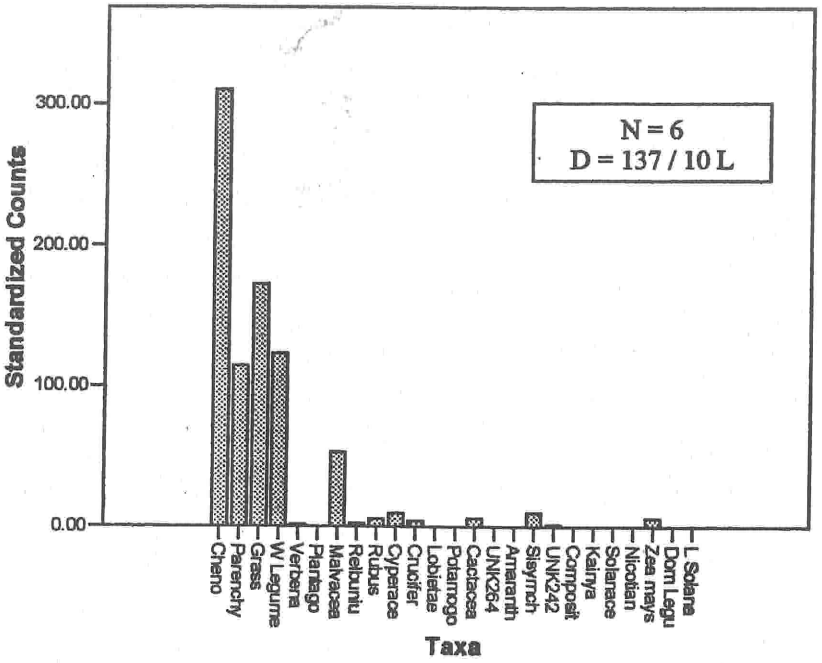
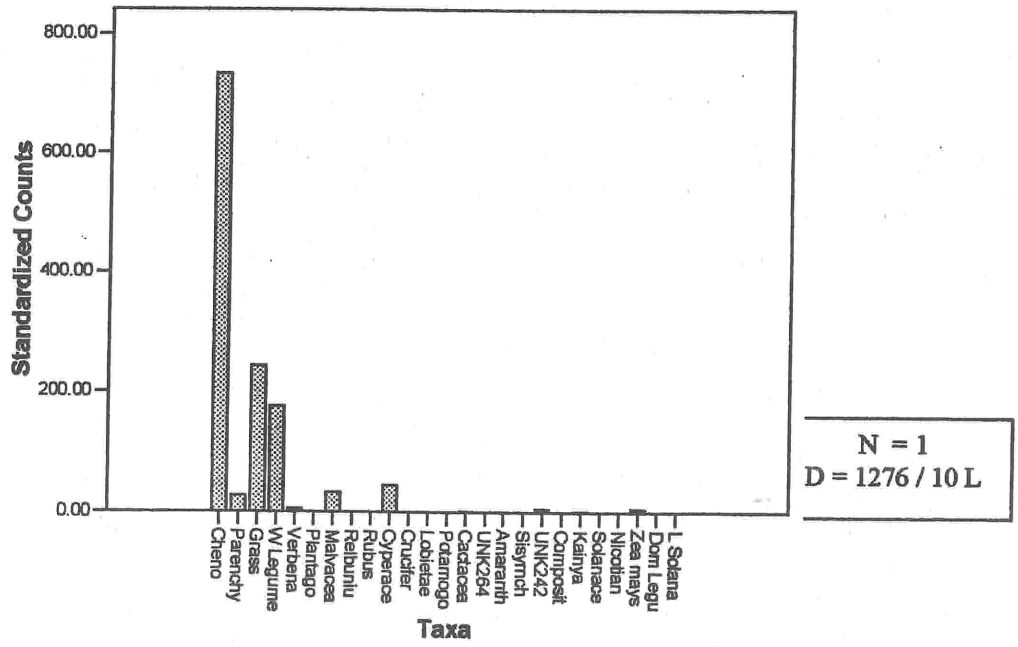


Figure 13

Tiwanaku V Hearth



Looking for patterns in the taxa across functional context is not the only way to find information. In fact, although there is a great deal of difference in how a floor is used and how a hearth is used, by the time the features enter the archaeological record the variation in use as represented by the taxa may not be intact. Plus, identifying contexts can be subtle and ambiguous. Comparing differences between rooms involves less of this uncertainty (though it is also possible that they may have been less distinct to begin with). It is to this approach that we turn next.

Figure 13

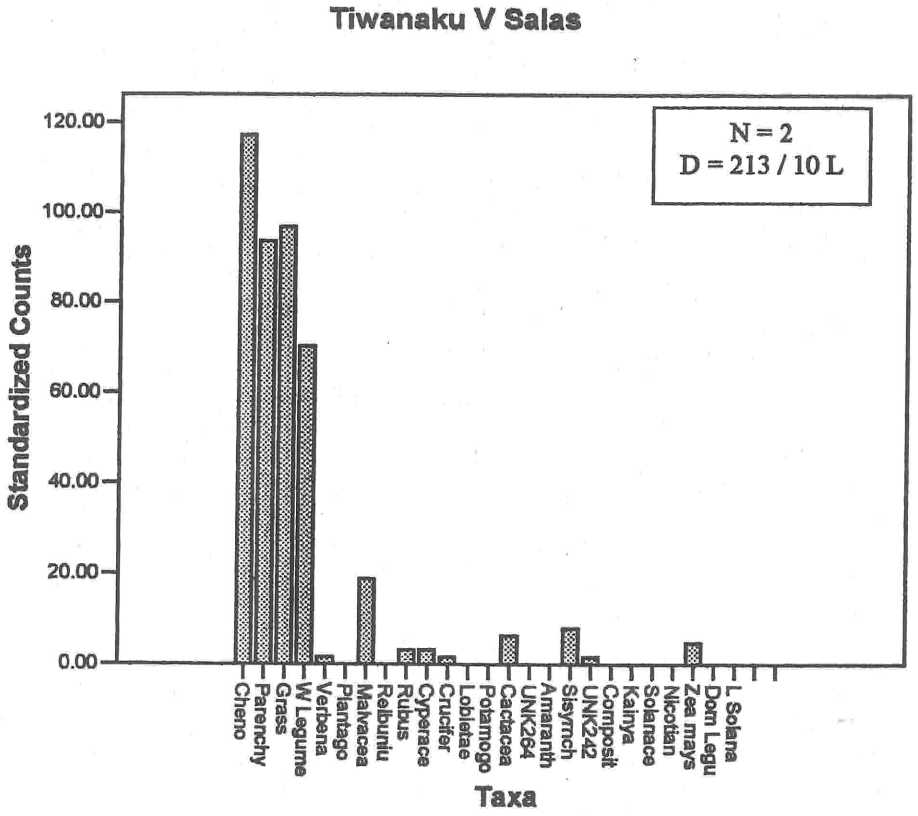


Figure 14

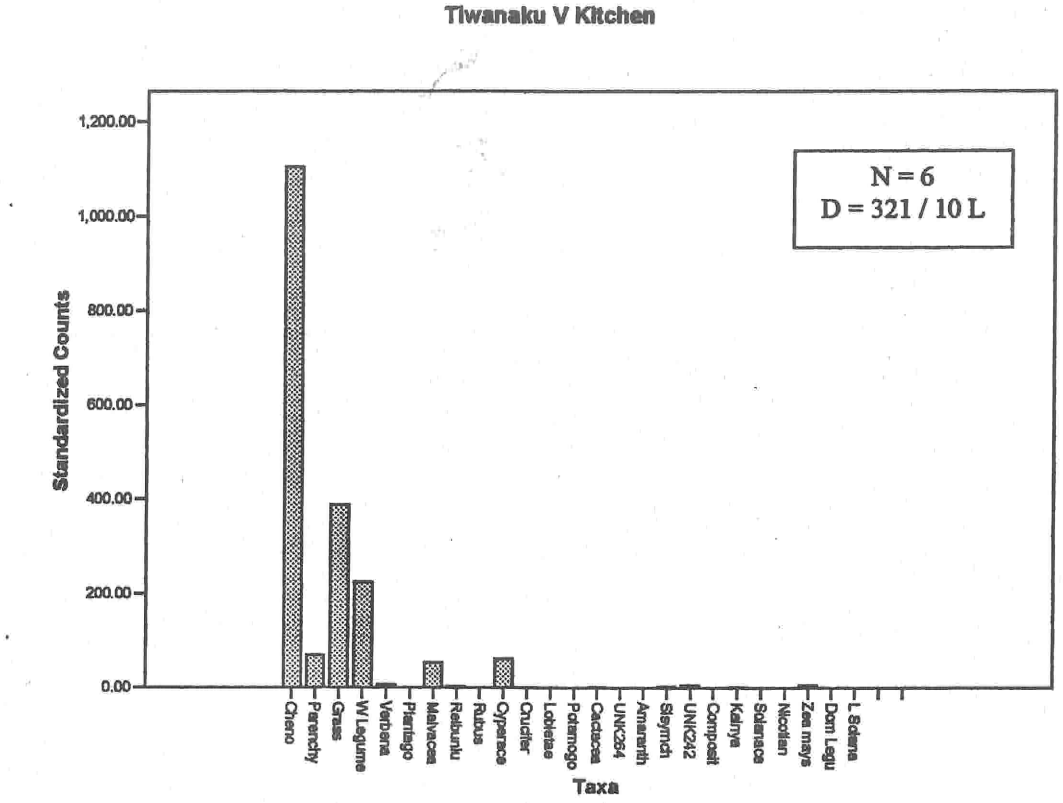
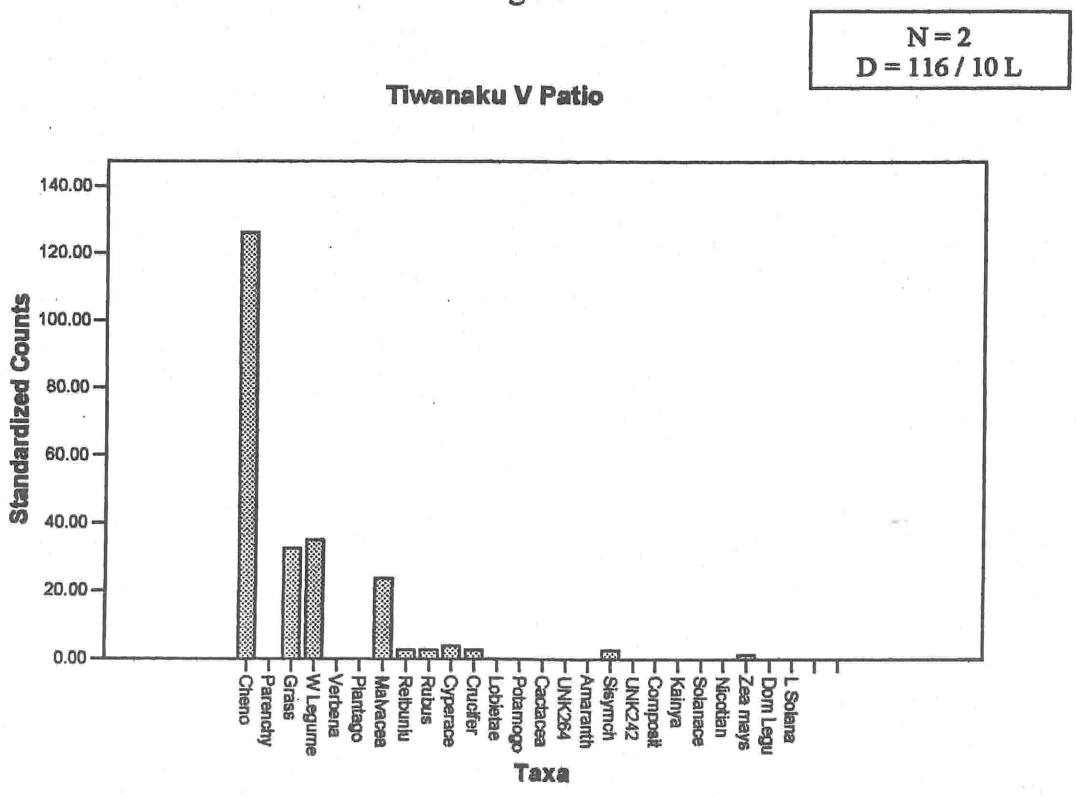


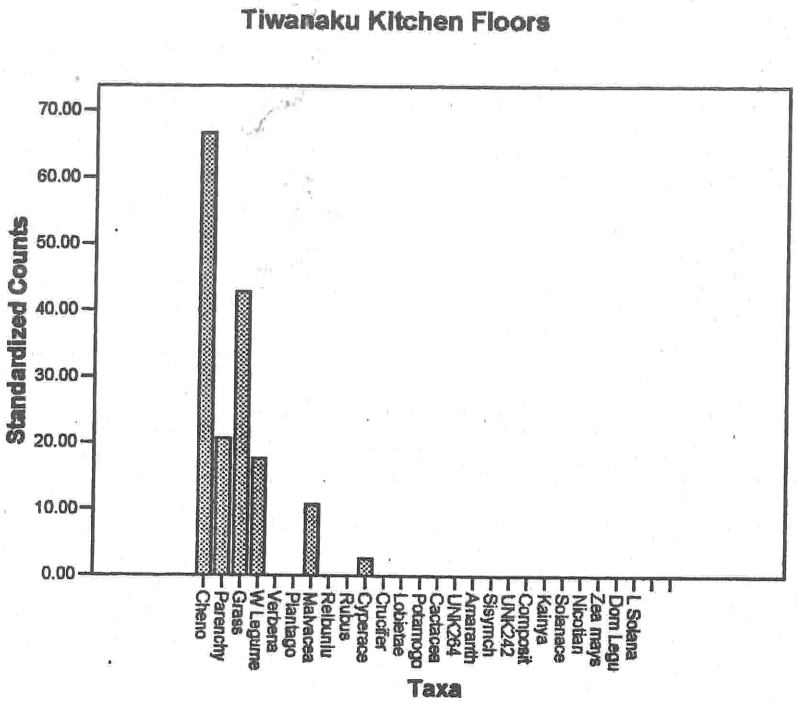
Figure 15



The Tiwanaku V dwelling area that is being used to represent that period is much more complex than the Tiwanaku IV dwelling area. There are a wider variety of features, including several hearths, a camelid offering, and wells. This makes any attempt to understand what was happening with the taxa more complex as well. Percentage-wise the context with the most food remains in the Tiwanaku V dwelling are the middens, closely followed by the hearth. The floors have substantially less (figures 9). So despite the similarities between the densities of the floors and middens (figures 11 and 12) they have different compositions. Differences in taxa across the rooms seem to be fairly pronounced, however, the patio and sala areas have only one context (floors). The sala rooms have strikingly low counts, but are comparatively dense in regards to food, even maize, especially considering that the floors have, across the Tiwanaku V living area, the lowest percentages of food compared to non-food. This seems like good evidence that the inhabitants were consuming food there, since there was no evidence for features (such as hearths) that would suggest preparation. The kitchen has three-times the amount of samples as the other rooms, but the counts for quinoa, for example, are much more than three times as high (roughly nine times). This is not surprising, since four out of six of these samples are middens and hearths. Taking just the two kitchen floors (figure 16) and comparing them with the other two rooms it becomes clear that the kitchen floors are substantially less dense.

Figure 16

N = 2
D = 147 / 10 L



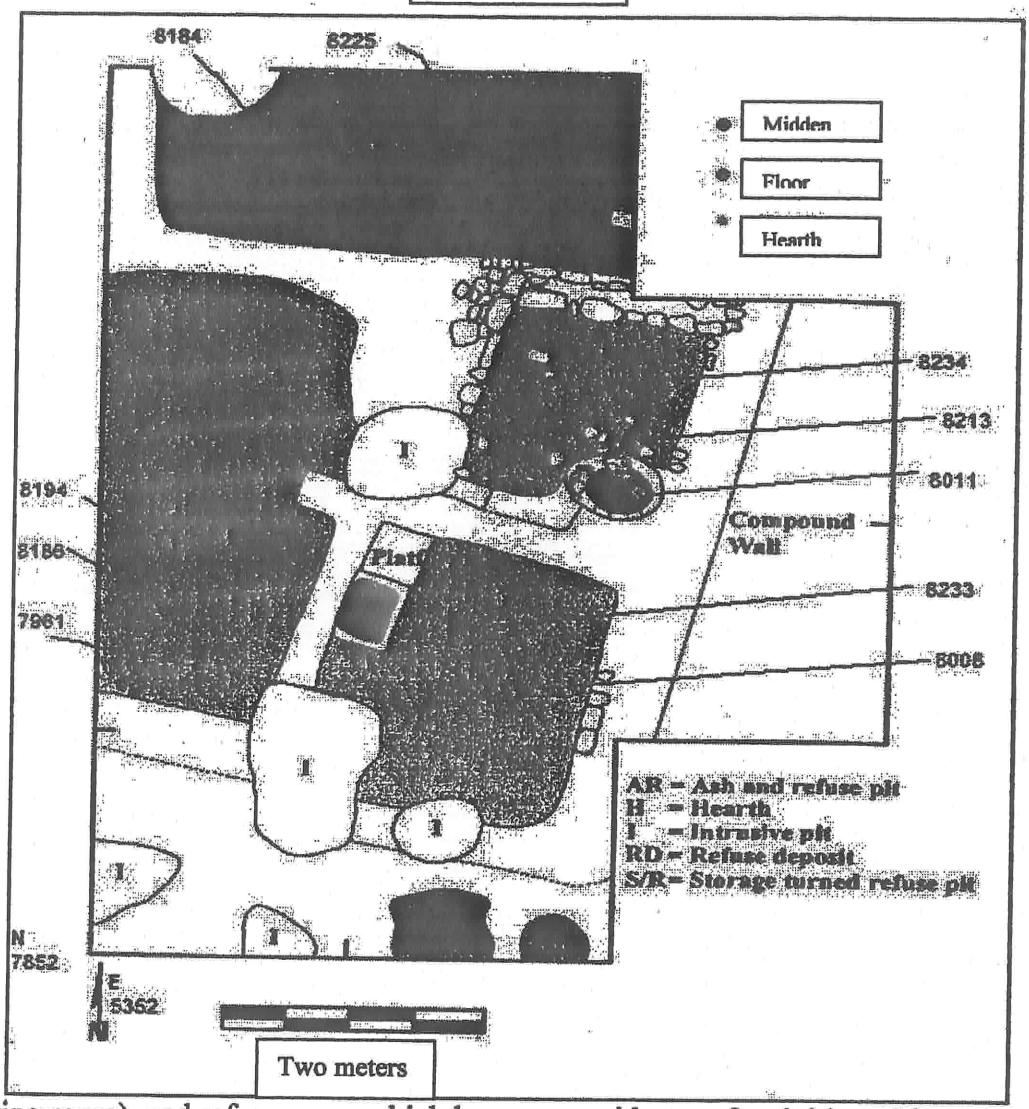
To access another view of feasting we turn now not to another distinct location, but another time period—a Tiwanaku IV residence which was built over in the Tiwanaku V phase (Janusek 2003).

Nine

Tiwanaku IV House

The house in the Akapana East 1 area that Janusek excavated and dubbed structure one (figure 17) has four distinct rooms, or dwelling spaces: A kitchen, patio, sala (living room), and refuse zone, which has some evidence of activities taking place in that space as well (Janusek 2003). The most striking aspect of this Tiwanaku IV structure, compared to the Tiwanaku V compound, is the seemingly smaller scale. The entire IV structure is smaller than the V kitchen.

Figure 17



The rooms were identified based on structural evidence and artifacts and features that were found in the different locations. The kitchen has a hearth in the southeast corner, the refuse area has an ash and refuse dump, the sala has a bin and platform in the northwest corner, and the patio has a storage turned refuse pit. The dots on the map indicate the location from which each sample was taken as indicated by the level forms filled out in the field. The dominant taxon is grass, followed by wild legumes, quinoa, and parenchyma.

Figure 18 shows the food versus non-food ratio. Non-food taxa constitute most of the samples' composition, most dramatically in the middens. The middens here, unlike in the Tiwanaku V residential area, are extremely dense. The floors are quite sparse, and the hearths fall in the middle. Figure 19 shows that the bulk of these are grass and wild legumes.

Figure 18

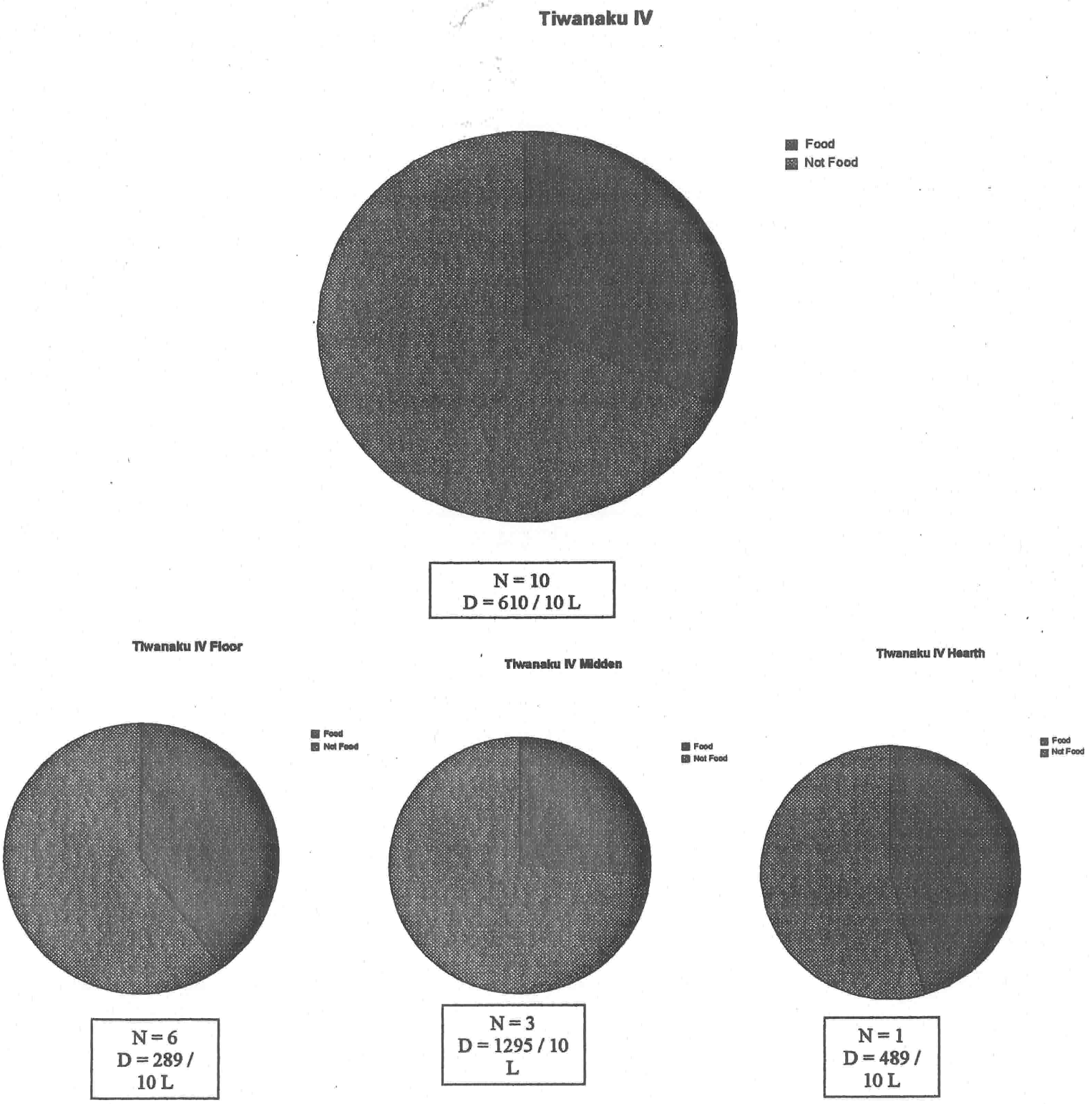

Tiwanaku IV
Food
Not Food
N = 10
D = 610 / 10 L
Tiwanaku IV Floor
Food
Not Food
N = 6
D = 289 / 10 L
Tiwanaku IV Midden
Food
Not Food
N = 3
D = 1295 / 10 L
Tiwanaku IV Hearth
Food
Not Food
N = 1
D = 489 / 10 L

Figure 19

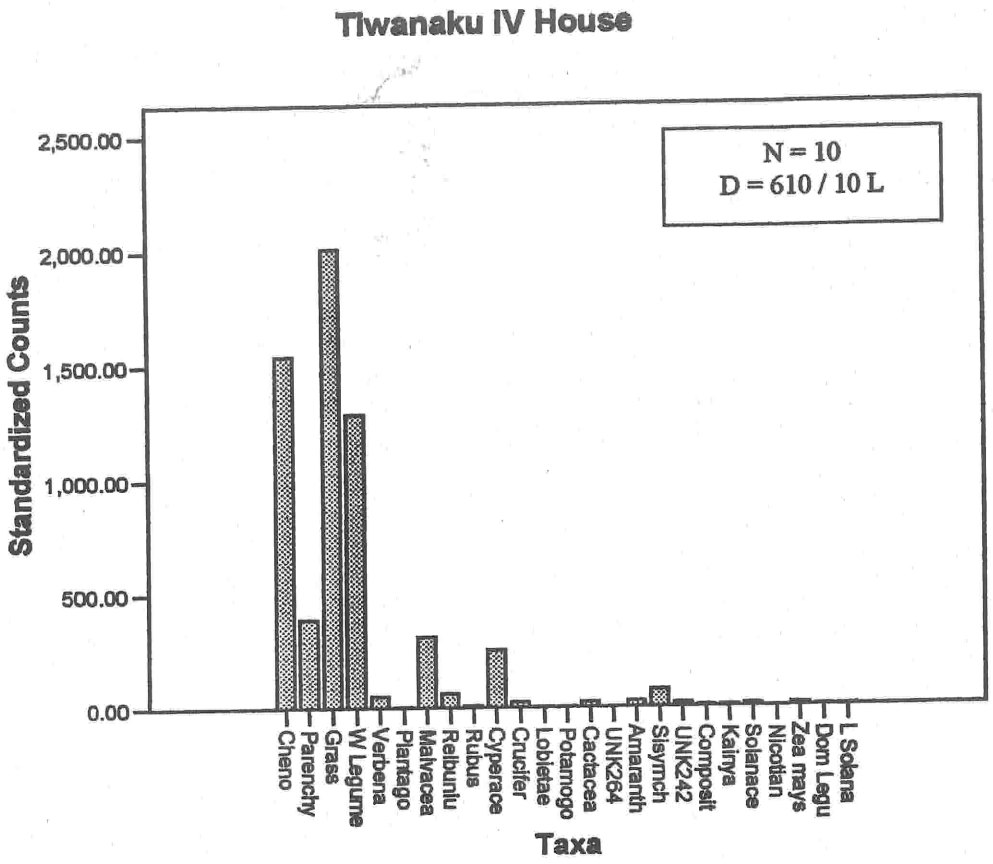


Figure 20 shows that taxa breakdown of middens (3 samples) in structure 1, figure 21 shows floors (6 samples), and figure 22 shows the hearth.

Figure 20

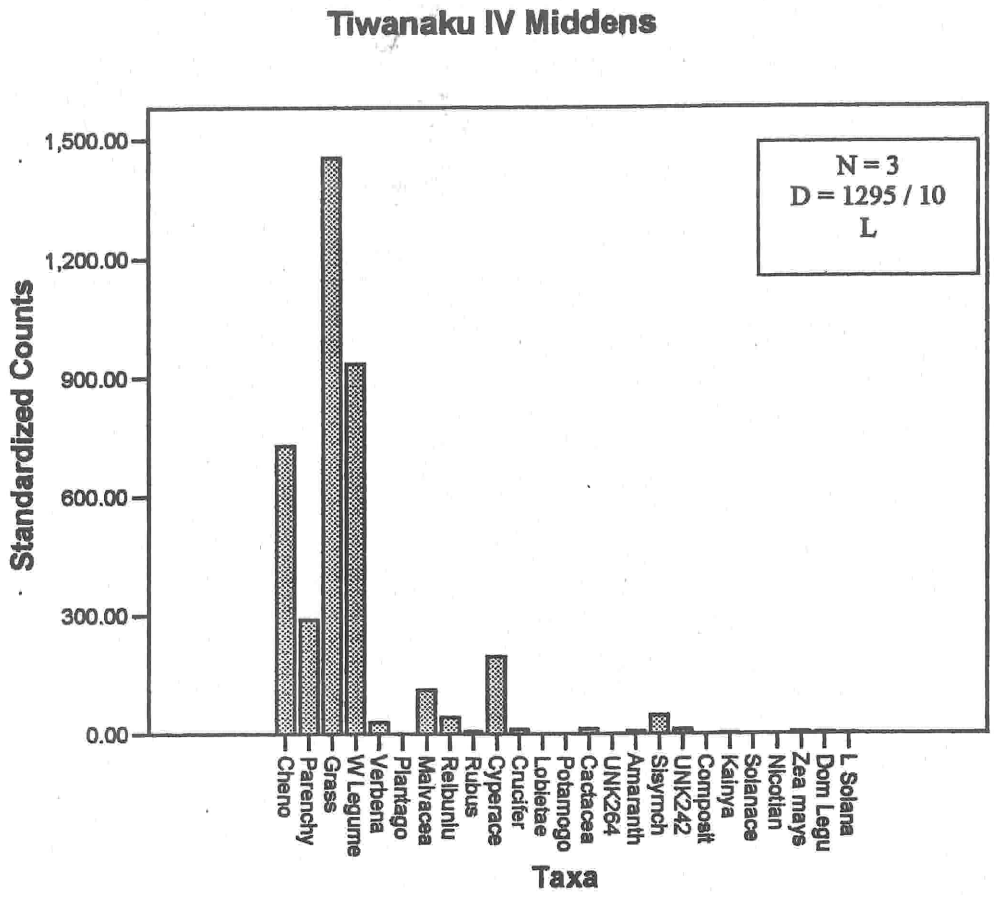

Tiwanaku IV Middens
N = 3
D = 1295 / 10
L
Standardized Counts
1,500.00
1,200.00
900.00
600.00
300.00
0.00
Chero
Parenchy
Grass
W Legume
Verbena
Plantago
Malvacea
Relbuniu
Rubus
Cyperace
Crucifer
Lobietae
Potamogo
Cactacea
UNK264
Amaranth
Sisymnch
UNK242
Composit
Kainya
Solanace
Nicotian
Zea mays
Dom Legu
L Solana
Taxa

Figure 21

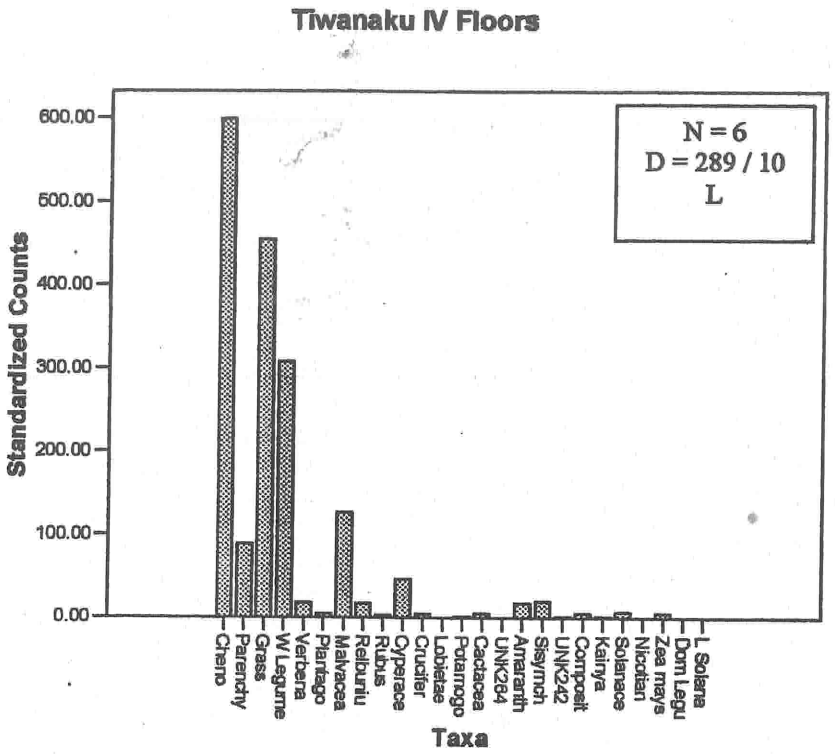
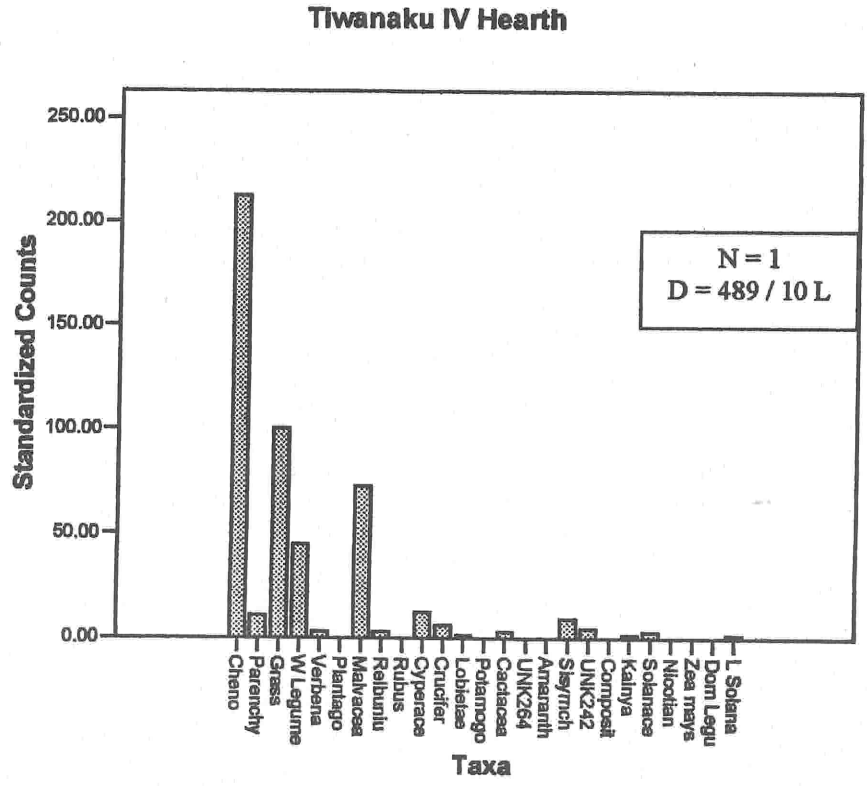


Figure 22

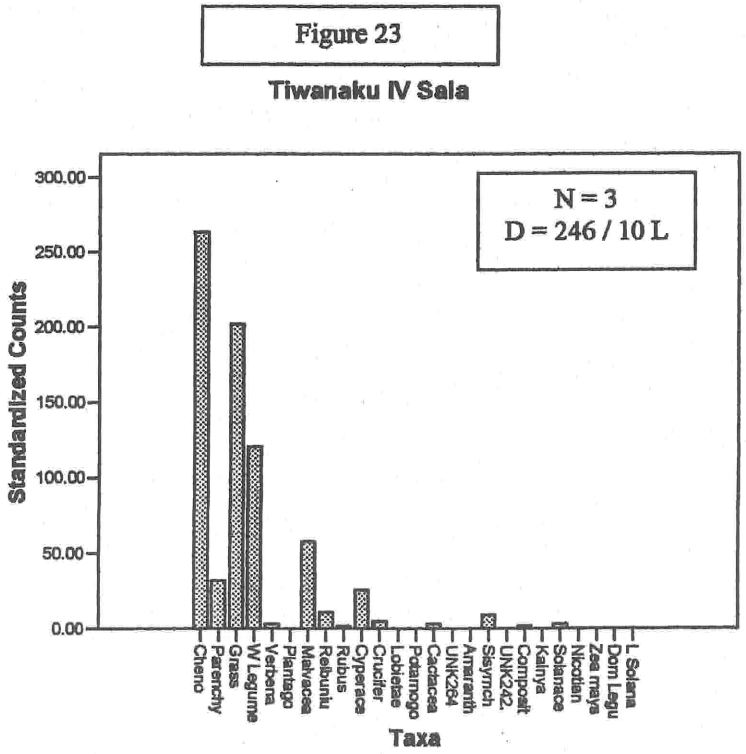


The taxa that are not primarily food make up most of the taxa, but food taxa make up close to half in both the floor and hearth contexts. This would indicate that the area labeled "refuse dump" of the map (figure 17), which is where two-thirds of the midden samples came from, was that indeed, and may not have been "lived in" or was used quite differently.

Ideally, the botanical evidence from the rooms of the Akapana East 1 dwelling would reveal differences in the activities taking place in these rooms (or conclusively show that there is no difference). Depending on the differences in activities, they may not result in a difference in the taxa recovered in the flotation samples. Figures 10 through 13 show the differences in the Akapana East 1 house.

The biggest difference between taxa is between the refuse zone and the other contexts. The patio area is also somewhat different from the other two. It is worth noting that these two areas are the ones that have only one context (midden for the refuse area and floor in the patio area). The other two (kitchen and sala) are made up of floors and a hearth and floors and a midden (respectively).

Figure 23



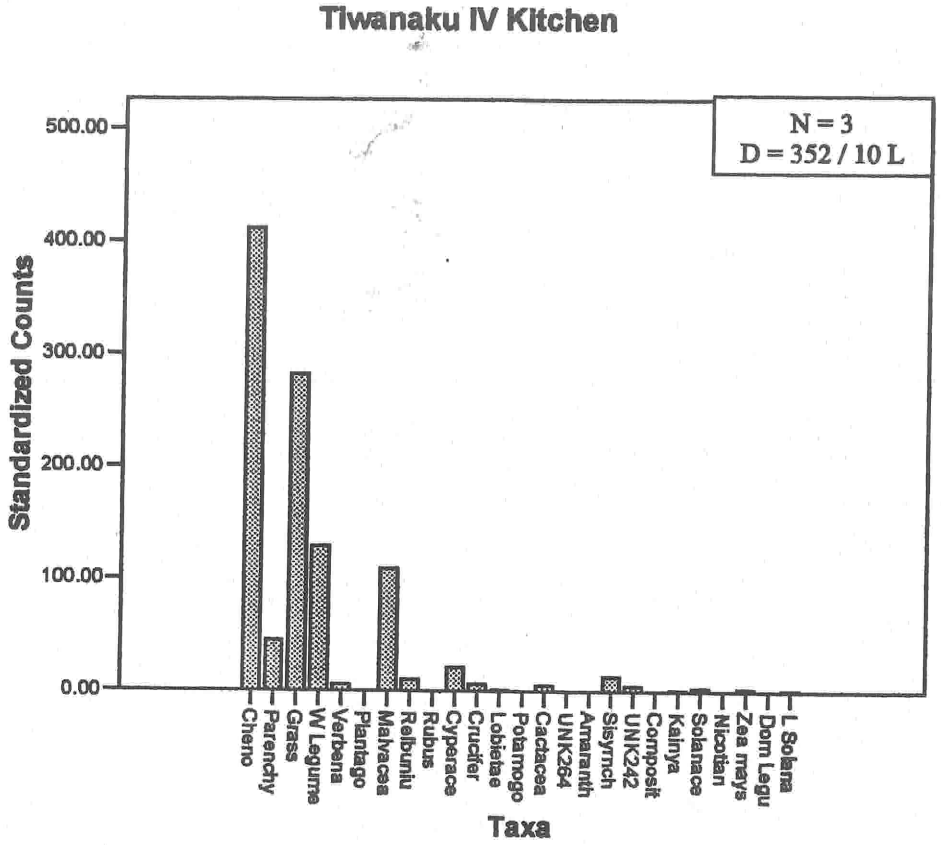

Tiwanaku IV Kitchen
N = 3
D = 352 / 10 L
Standardized Counts
500.00
400.00
300.00
200.00
100.00
0.00
Cheno
Parenchy
Grass
W Legume
Verbena
Plantago
Malvacea
Relbuniu
Rubus
Cyperace
Crucifer
Lobietae
Potamogo
Cactacea
UNK264
Amaranth
Sisymnch
UNK242
Composit
Kainya
Solanace
Nicotian
Zea mays
Dom Legu
L Solana
Taxa

Figure 25

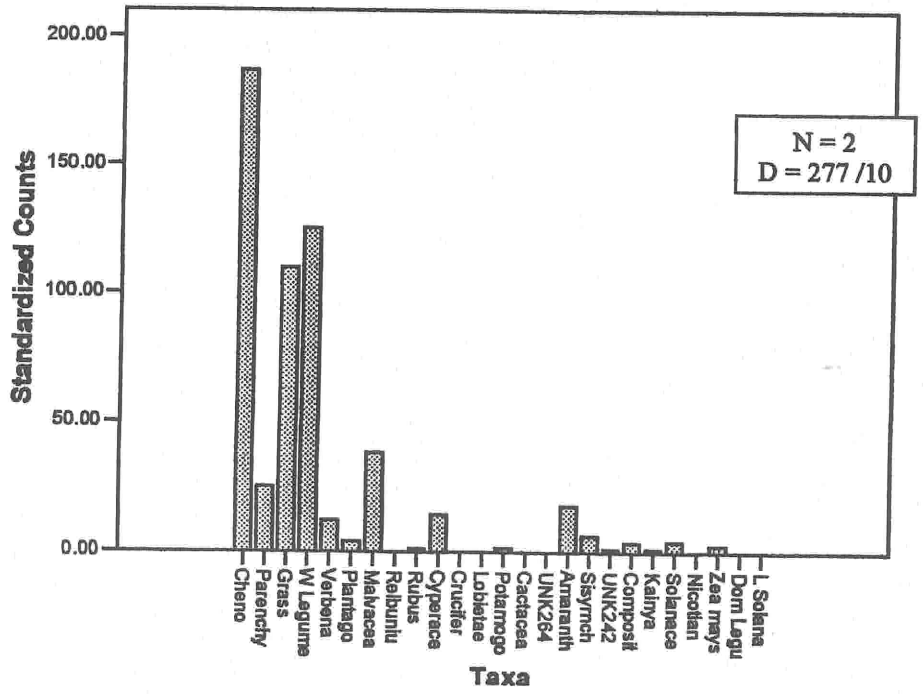
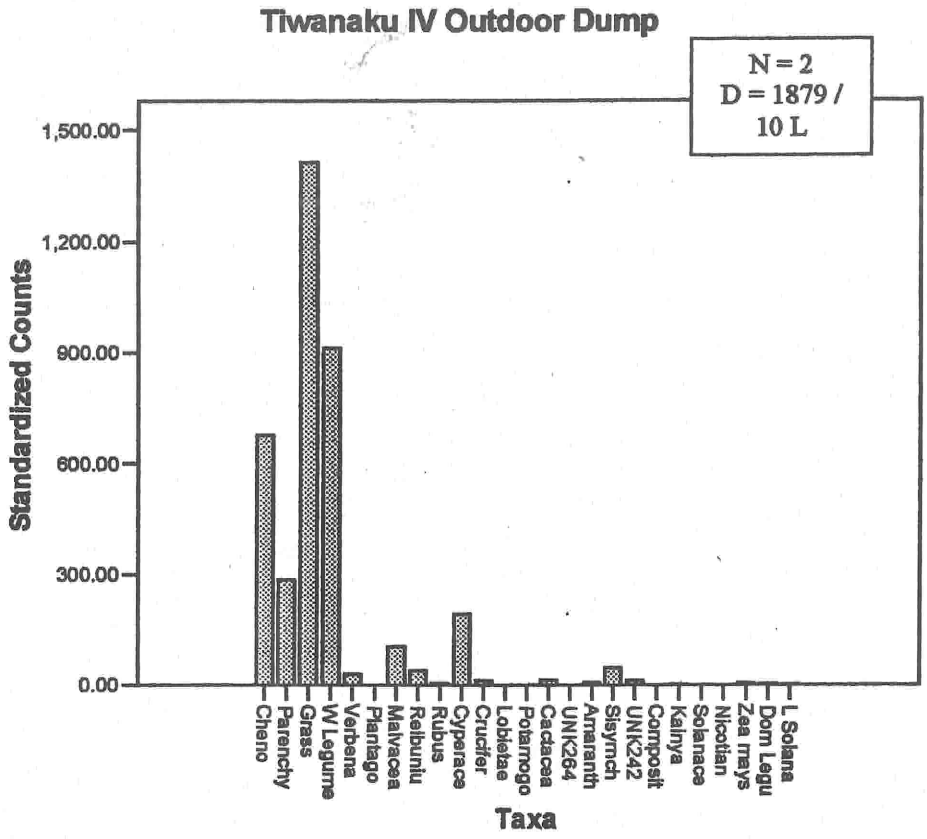

Tiwanaku IV Patio
N = 2
D = 277 /10
Standardized Counts
200.00
150.00
100.00
50.00
0.00
Cheno
Parenchy
Grass
W Legume
Verbena
Plantago
Malvacea
Relbuniu
Rubus
Cyperace
Crucifer
Lobietae
Potamogo
Cactacea
UNK264
Amaranth
Sisymnch
UNK242
Composit
Kainya
Solanace
Nicotian
Zea mays
Dom Legu
L Solana
Taxa

Figure 26



The kitchen, sala, and patio locations are fairly similar to each other in both counts and content. There was probably not nearly as stringent a difference in the types of activities that were going on as there was between these three areas together, and the refuse area.

Nine

Conclusions

The Tiwanaku V and IV residences show many of the same patterns in the distribution of their taxa. Overall, the Tiwanaku IV samples are significantly denser than the Tiwanaku V residential samples, and the Tiwanaku IV samples have a much lower ratio of food to non-food. However, this seems mostly to be accounted for by an increase in the non-food taxa, rather than a decrease in the food taxa (since the IV residential samples are denser than the V residential samples). Comparing Tiwanaku IV and V residential contexts (floor, middens, and hearths) we see very similar trends across the board. The only exception being that the Tiwanaku V middens are much less dense than the Tiwanaku IV middens. Across floors, for example there are interesting similarities. The "sala" floors being the densest by a significant amount followed by the kitchen floors, which are very closely followed by the patio floors.

There are substantial differences between the three different areas (the Akapana mound, the Tiwanaku V residence, and the Tiwanaku IV residence). These differences are in the amounts of individual taxa found, the densities of the samples, and the variety of taxa that make up the samples.

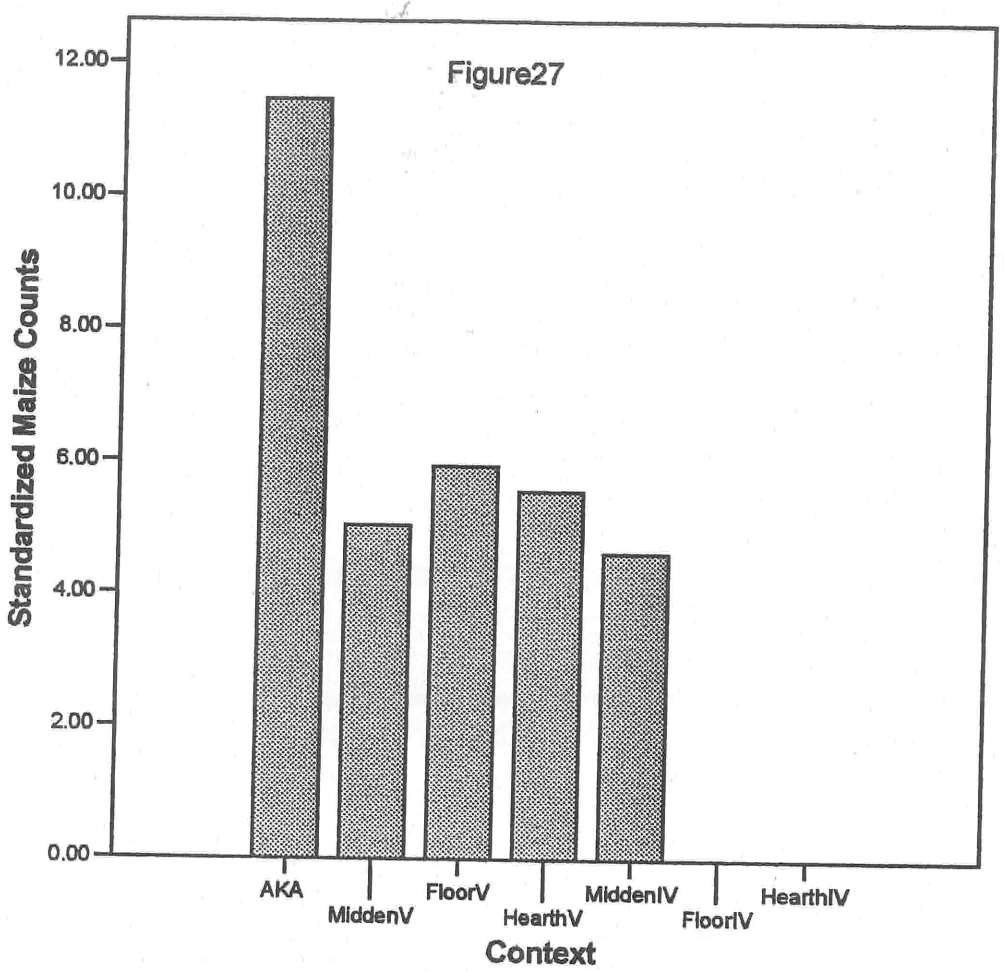
The Akapana Mound has fewer taxa, less variation in the amounts of the taxa, and the most food. Of this food, parenchyma makes up a very large percentage compared to anywhere else sampled. It is much simpler area than anywhere else sampled. It was simply feasting. Incidentally, it was also where the only Nicotiana seed was found (raw count). Feasting, at least in this context, seems to have consisted of meat and potatoes,

with a smattering of maize. It is difficult to assess which of the other two areas is closer to resembling the makeup of the five Akapana Mound samples. Neither shows definitively all of the same features to a greater degree than the other. The Tiwanaku IV structure has more parenchyma than the Tiwanaku V compound, but the Tiwanaku V compound is much closer to the Akapana mound samples' percentage of food overall.

The pie charts of food to non-food taxa of the V residence look much more like the Akapana mound samples than the IV residence samples do, but within the food taxa the Tiwanaku IV samples resemble the Akapana much more than the residential V samples resemble the Akapana samples. Nevertheless these difference between the two phases do not amount to much in the way of broad pattern changes-- the most striking difference being the ratio of food to non-food taxa. This similarity is mirrored by broad trends in the ceramic data (Janusek 1994), which, although specific patterns vary in frequency, stay proportionately about equal in regards to type (serving, storage, cook) between the time periods. Looking just at the most clear feasting food (maize) and using it to synthesize a summary of feasting, it seems that special foods were used with about the same frequency in these elite residences through both the Tiwanaku V and IV periods.

There is more maize in the Tiwanaku V period. The Akapana mound has the most (considering that the maize counts come from five samples rather than the 10 at each of the other two), but the V domestic area has significantly more than the IV domestic area (figure 27). This may be accounted for by increased preference, trade, wealth of the specific location or any other number of factors. This does not necessarily mean that more feasting was taking place, however. Assuming that the high parenchyma counts

found in the Akapana mound samples is characteristic of a feasting location, then there is more evidence for that type of feasting in the period IV samples (with a IV count twice as high as the of the V domestic area).



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Appendix 1

AKE 1 Tiwanaku IV

FLOTNUM	CULTCON	PHASE	IDNO	SITE	CUAD	NIVEL	BAGNUM	UNIDAD1	UNIDAD2	RASGO	FLOTVOL
8184	200	t4	4342	TIW	AKE	12	37144	N7858	E5350		7
8225	200	t4	4343	TIW	AKE	9	37219	N7858	E5352		6.5
8234	342	t4	4198	TIW	AKE	10	37045	N7856	E5352		9
8213	311	t4	4199	TIW	AKE	9E	34127	N7856	E5352		7
8011	420	t4	4339	TIW	AKE		34068	N7856	E5352	2	6.5
8233	310	t4	4189	TIW	AKE	9	37039	N7854	E5352		6.5
8008	310	t4	4188	TIW	AKE	7	34115	N7854	E5352		7.5
8186	343	t4	4330	TIW	AKE	12	37153	N7854	E5350		8
8194	310	t4		TIW	AKE	13		N7854	E5350		7.5
7961	220	t4	4187	TIW	AKE	6	33929	N7854	E5352		7.5

AKE 1 Tiwanaku V

FLOTNUM	CULTCON	PHASE	IDNO	SITE	CUAD	NIVEL	BAGNUM	UNIDAD1	UNIDAD2	RASGO	FLOTVOL
5462	311	t5	3830	TIW	AKE	3	27355	N7841	E5428		8
5514	311	t5	4315	TIW	AKE	3	27548	N7835	E5430		7.2
4873	311	t5	4311	TIW	AKE	2	30751	N7835	E5422		6.4
5560	311	t5	3828	TIW	AKE	2	28738	N7833	E5424		6.4
4896	312	t5	3901	TIW	AKE	3	23433	N7847	E5430		4
5243	312	t5	3810	TIW	AKE	4	23571	N7845	E5430		8
5536	221	t5	3809	TIW	AKE	3	27592	N7835	E5432		7.2
5558	221	t5	3815	TIW	AKE	4	27485	N7837	E5427		6.4
4997	221	t5		TIW	AKE	2		N7835	E5432		7.2
4900	420	t5	4140	TIW	AKE		30936	N7835	E5434	1	7.2

Akapana

FLOTNUM	CULTCON	PHASE	IDNO	SITE	CUAD	NIVEL	BAGNUM	UNIDAD1	UNIDAD2	RASGO	FLOTVOL
4102		t5	3552	TIW	AK	3F	13416	N8014	E5098	R11C1CS	5.7
4098		t5	3606	TIW	AK	3F	13412	N8014	E5096	R11C1NW	6.3
4163		t5	3560	TIW	AK	3G	14087	N8018	E5096	R11C2EX	1.9
4321		t5	3559	TIW	AK	3D	15425	N8014	E5100	R17C3SW	5.7
4070		t5	3607	TIW	AK	3G	13471	N8014	E5096	R11C1SW	5

LFPICK	COLLTYPI	LRGCHEN	SMLCHEN	LUMP	SMLGRAS	LRGGRAS	WILDLEG	SCIRPUS	VERBENA	PLANTAG	MALVACE	RELBUN
2.81	101	1	332	129	760	4	412	.	20	.	60	28
2.46	101	7	124	66	202	5	210	.	.	.	12	.
1.26	101	6	73	18	110	7	53	.	1	.	18	4
0.7	101	7	71	10	35	.	18	.	1	.	12	2
0.61	101	3	135	7	63	2	29	.	2	.	47	2
0.92	101	11	196	19	66	3	45	.	2	.	23	6
0.53	101	7	30	.	37	.	22	.	.	.	12	.
0.98	101	7	71	18	38	2	35	.	.	.	21	.
		8	59	2	44		61		9	3	9	
0.17	101	3	35	2	30	.	17	.	.		5	1

LFPICK	COLLTYPI	LRGCHEN	SMLCHEN	LUMP	SMLGRAS	LRGGRAS	WILDLEG	SCIRPUS	VERBENA	PLANTAG	MALVACE	RELBUN
0.12	101	.	20	1	12	.	3	.	.	.	3	.
0.36	101	3	27	14	20	.	10	.	.	.	5	.
2.15	101	2	34	26	28	.	17	.	.	.	2	.
0.83	101	2	37	34	33	1	28	.	1	.	10	.
0.14	101	.	15	.	9	.	12	.	.	.	8	1
0.79	101	8	63	.	8	.	4	.	.	.	3	.
0.14	101	1	27	2	10	.	1	.	.	.	1	1
0.35	101	17	152	11	50	1	19	.	1	.	5	1
		1			6							
0.83	101	64	464	20	160	15	126	.	4	.	24	.

LFPICK	COLLTYPI	LRGCHEN	SMLCHEN	LUMP	SMLGRAS	LRGGRAS	WILDLEG	SCIRPUS	VERBENA	PLANTAG	MALVACE	RELBUN
0.7	101	.	10	25	10	.	6	.	.	.	.	.
1.1	101	1	38	115	47	1	31	0	1	.	10	.
0.7	101	.	4	5	6	.	1	.	.	.	3	.
0.8	101	.	10	15	5	.	1	.	.	.	1	1
1.8	101	1	13	136	10	.	4	.	.	.	.	

MEDGRAS	RUBUS	CYPERAC	CRUCIFEF	UNK224	POTAMOC	CEREUS	UNK264	POPPY	AMARANT	UNK270	UNK242	COMPOSI
.	4	76	8	.	.	8	.	.	.	20	8	.
2	.	54	.	.	.	.	.	.	4	12	.	.
1	.	3	.	.	.	.	.	.	.	.	.	.
1	.	4	.	.	.	.	.	.	.	3	.	.
.	.	8	4	1	.	2	.	.	.	6	3	.
5	1	14	3	.	.	2	.	.	.	6	.	1
.	.	1	.	.	.	.	.	.	.	.	.	.
1	1	6	.	.	.	.	.	.	12	5	1	3
		5			1				2			
.	.	2	.	.	.	.	.	.	.	.	.	.

MEDGRAS	RUBUS	CYPERAC	CRUCIFEF	UNK224	POTAMOC	CEREUS	UNK264	POPPY	AMARANT	UNK270	UNK242	COMPOSI
.	.	1	.	.	.	.	.	.	.	.	.	.
.	.	1	.	.	.	.	.	.	.	.	.	.
.	1	.	1	.	.	.	.	.	.	4	.	.
.	1	2	.	.	.	.	.	.	.	1	1	.
.	1	1	1	.	.	.	.	.	.	1	.	.
.	.	1	.	.	.	.	.	.	.	.	.	.
.	.	1	.	.	.	.	.	.	.	2	.	.
.	.	8	.	.	.	.	.	.	.	.	.	.
.	.	32	.	.	.	.	.	30	.	.	4	.

MEDGRAS	RUBUS	CYPERAC	CRUCIFEF	UNK224	POTAMOC	CEREUS	UNK264	POPPY	AMARANT	UNK270	UNK242	COMPOSI
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	4	.	.	.	.	1	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	1	.	.	.	.
.	.	2	.	.	.	.	.	.	.	.	.	.

UNK265	LABIATAE	KAINYA	UNK261	JUNCUS	UNK248	CARYOPH	UNK266	SOLANAC	NICOTIAN	SISYRINC	ZEAKERN	ZEAEMBR
	1										1	2
			1									
	2											
			1					2				
								2				
			1					1			2	
								2				

UNK265	LABIATAE	KAINYA	UNK261	JUNCUS	UNK248	CARYOPH	UNK266	SOLANAC	NICOTIAN	SISYRINC	ZEAKERN	ZEAEMBR
	2											
	2										3	
	1		1								2	

UNK265	LABIATAE	KAINYA	UNK261	JUNCUS	UNK248	CARYOPH	UNK266	SOLANAC	NICOTIAN	SISYRINC	ZEAKERN	ZEAEMBR
									1			
											2	

COBCUP	CAPSICUI	DOMLEGL	POLYGON	OXALIS	UNK202	OENOTHE	LSOLANA(	UNK271	UNK235	PORTULA	UNK201	TRITHORI
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COBCUP	CAPSICUI	DOMLEGL	POLYGON	OXALIS	UNK202	OENOTHE	LSOLANA(	UNK271	UNK235	PORTULA	UNK201	TRITHORI
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COBCUP	CAPSICUI	DOMLEGL	POLYGON	OXALIS	UNK202	OENOTHE	LSOLANA(	UNK271	UNK235	PORTULA	UNK201	TRITHORI
.	.	.	.	.	.	.	.	.	.	.	.	.
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CACTUS	UNK279	BORAGE	UNK305	UNIDSEEI	TUBER	WOODCT	WOODWT	TWGBRN(	STALK	DUNG	LLAMADN	CUYDUNG
.	.	.	.	252	.	123	1.44	.	.	298	.	.
.	.	.	.	252	.	56	1.34	.	.	423	.	.
.	.	.	.	.	.	66	0.56	3	.	52	.	.
.	.	.	.	.	1	52	0.48	.	.	.	.	.
.	.	.	.	55	.	18	0.09	.	.	29	.	2
.	.	.	.	51	.	38	0.51	.	.	36	.	.
.	.	.	.	.	.	40	0.44	.	.	.	.	.
.	.	.	.	59	.	75	0.61	.	.	35	.	.
				17		107	1.14		4			
.	.	.	.	.	.	39	0.27	1	.	.	.	.

CACTUS	UNK279	BORAGE	UNK305	UNIDSEEI	TUBER	WOODCT	WOODWT	TWGBRN(	STALK	DUNG	LLAMADN	CUYDUNG
.	.	.	.	15	.	8	0.09	.	.	.	.	.
.	.	.	.	66	.	24	0.27	.	.	.	.	.
.	.	.	.	32	.	89	1.84	.	.	.	.	.
.	.	.	.	50	.	54	0.52	1	.	3	.	.
.	.	.	.	4	.	7	0.14	.	.	.	.	.
.	.	.	.	12	.	28	0.66	2	.	.	.	.
.	.	.	.	1	.	3	0.02	.	.	.	.	.
.	.	.	.	38	.	9	0.15	.	.	.	.	.
									2			
.	.	.	.	4	.	33	0.24	10	.	17	.	.

CACTUS	UNK279	BORAGE	UNK305	UNIDSEEI	TUBER	WOODCT	WOODWT	TWGBRN(	STALK	DUNG	LLAMADN	CUYDUNG
.	.	.	.	13	.	9	0.1	.	.	.	.	.
.	.	.	.	20	3	60	0.9	0	0	3	.	.
.	.	.	.	3	.	6	0.1	.	.	.	.	.
.	.	.	.	.	.	6	0.1	.	.	.	.	.
.	.	.	.	5	1	14	0.1	.	.	.	.	.

WIRAKOA	LEAVES	TRITRACH	PEDUNCL	SORTTYP	FAUNAL	BOXSIZE	YEAR	LRGLUMP	SMLLUMP	LGLUMP	CONTEXT	NEWPHAS
	4	.	.	6	.	M		91	27	102	occup	MIDDLE
	2	.	.	6	1	M		91	5	61	occup	MIDDLE
.	.	.	.	5	.	S		91	2	16	occup	MIDDLE
.	.	.	.	5	1	S		91	6	4	occup	MIDDLE
	2	.	.	5	.	M		91	.	7	hearth	MIDDLE
.	.	.	.	5	1	S		91	.	19	occup	MIDDLE
.	.	.	.	5	1	S		91	.	.	occup	MIDDLE
.	.	.	.	5	1	M		91	1	17	occup	MIDDLE
.	.	.	.	5	1	S		91	2	.	midden	MIDDLE

WIRAKOA	LEAVES	TRITRACH	PEDUNCL	SORTTYP	FAUNAL	BOXSIZE	YEAR	LRGLUMP	SMLLUMP	LGLUMP	CONTEXT	NEWPHAS
.	.	.	.	5	.	M	.		1	0	occup	LATE
.	.	.	.	5	.	S		90	.	14	occup	LATE
.	.	.	.	5	1	M		90	.	26	occup	LATE
.	.	.	.	5	1	M	.		3	31	occup	LATE
.	.	.	.	5	.	S		90	.	.	occup	LATE
.	.	.	.	5	1	M	.		0	.	occup	LATE
.		1	.	5	.	S	.		1	1	midden	LATE
.	.	.	.	5	1	S	.		1	10	midden	LATE
.	.	.	.	2	1	M		90	13	7	hearth	LATE

WIRAKOA	LEAVES	TRITRACH	PEDUNCL	SORTTYP	FAUNAL	BOXSIZE	YEAR	LRGLUMP	SMLLUMP	LGLUMP	CONTEXT	NEWPHAS
.	.	.	.	1	1	S		89	0	25	offering	LATE
.	.	.	.	1	1	M		89	15	100	offering	LATE
.	.	.	.	1	1	S		89	0	5	feature	LATE
.	.	.	.	1	1	S		89	0	15	fill	LATE
.	.	.	.	1	1	M		89	11	125	offering	LATE

UNK280	ROSAC	UNK306	UNK307	UNK308	UNK309	UNK310	UNK311	UNK312	UNK313	UNK314	UNK315	UNK316
.	.	24	4	0	24	0	0	0	0	0	0	0
.	.	8	18	0	8	0	0	0	0	0	0	2
.	.	0	1	0	1	0	0	0	0	0	0	1
.	.	0	0	0	0	0	0	0	0	0	0	0
.	.	2	2	5	2	0	0	0	0	0	0	0
.	.	5	3	0	5	0	0	0	0	0	0	3
.	.	0	0	0	0	0	0	0	0	0	0	0
.	.	4	4	0	4	0	0	0	0	0	0	0
.	.	0	0	0	0	0	0	0	0	0	0	0

UNK280	ROSAC	UNK306	UNK307	UNK308	UNK309	UNK310	UNK311	UNK312	UNK313	UNK314	UNK315	UNK316
.	.	0	0	0	0	0	0	0	0	0	0	0
.	.	0	3	0	0	0	0	0	0	0	0	0
.	.	0	1	5	0	0	0	0	0	0	0	0
.	.	0	0	0	0	0	0	0	0	0	0	0
.	.	0	0	0	0	0	0	0	0	0	0	0
.	.	0	0	0	0	0	0	0	0	0	0	0
.	.	0	0	0	0	0	0	0	0	0	0	0
.	.	0	0	0	0	0	0	0	0	0	0	0
.	.	0	0	0	0	0	0	0	0	0	0	0

UNK280	ROSAC	UNK306	UNK307	UNK308	UNK309	UNK310	UNK311	UNK312	UNK313	UNK314	UNK315	UNK316
.	.	0	0	0	0	0	0	0	0	0	0	0
.	.	0	0	0	0	0	0	0	0	0	0	0
.	.	0	0	0	0	0	0	0	0	0	0	0
.	.	0	0	0	0	0	0	0	0	0	0	0
.	.	0	0	0	0	0	0	0	0	0	0	0