5 Ceramic Analysis

A **contextual analysis of the UA-1 ceramics** provides important insights into site chronology and functional patterns. In this chapter, ceramic data from different depositional contexts are analyzed. In the first section, relative frequencies of types and subtypes are used to construct a ceramic sequence for Postclassic Cholula and to group contemporaneous assemblages for interpretations of the occupational context of the site. The second section focuses on vessel form, as well as the larger groupings of vessel type and vessel class to reconstruct the ceramic "tool kits" represented by the different contexts.

SERIATION ANALYSIS OF UA-1 CERAMICS

The refinement of the Postclassic Cholula ceramic sequence was one of the principal objectives of the UA-1 ceramic analysis. Clear differences emerge from a seriation analysis of relative ceramic frequencies from the various depositional contexts and lead to the definition of five distinct ceramic complexes. These correspond to the Colonial/Historical period, the Early and Late Cholollan phases (1200–1400 CE and 1400–1520 CE, respectively), and the Middle and Late Tlachihualtepetl phases (900–1050 CE and 1050–1200 CE, respectively).

The seriation analysis was multifaceted because of the number of depositional contexts present. This section is divided into six parts:

- stratigraphic analysis of the trash midden and well 3;
- detailed analysis of the four primary depositional contexts (that is, the trash midden and wells 1, 2, and 3);
- analysis of stratigraphic contexts associated with structure 1;
- analysis of additional features associated with structure 1;
- analysis of stratigraphic contexts associated with structure 2; and
- the stratigraphic analysis of selected units not significantly affected by construction disturbance.

Finally, these data on ceramic type frequencies are seriated to construct a sequence of the UA-1 features, and consequently, a revised ceramic chronology for Postclassic Cholula.

STRATIFIED CERAMICS FROM THE TRASH MIDDEN AND WELL 3

Layered deposits of ash and organic soils located in units S7/E1, S7/W1, S8/E1, and S8/W1 (and intervening balks) provided the richest source of material culture at the UA-1 excavation. In addition to the many other artifact classes recovered, a total of 4095 rim sherds were analyzed from these units. Unfortunately, the deposit was not excavated as a discrete feature, so there was the potential for mixing because of arbitrary unit boundaries, particularly in the uppermost levels. This section considers the evidence for homogeneity through a detailed analysis of ceramic frequencies from distinct stratigraphic levels of the feature.

The units were excavated in arbitrary 25-cm levels. The balks, on the other hand, were usually excavated by natural levels. Using information recorded on the pit forms and in the original field notes, all collection units were clustered into five "strata" (I, II, III, IV, and V), with each representing a 25-cm level. Stratum I was not

analyzed because it consisted of mixed plow zone. Stratum II was analyzed in this area because the field records indicated that the midden feature began in this level. This was the most contaminated of the analyzed strata since it also included the bottom of the plow zone.

One collection unit in the midden area stood out because it contained an unusually high concentration of Classic-period ceramics. Bag 8153, from S8/E1 level III, had a total of 186 identifiable rim sherds. Classic-period types included Tecola Polished (n= 14, 8%), Los Teteles Gray/Brown (n=10, 5%), Manzanilla Orange (n=13, 7%), Teotihuacan Thin Orange (n=4, 2%), and Imitation Thin Orange (n=2, 1%). In addition, Tepontla Burnished accounted for 15% of the assemblage, far more than its usual frequency in Postclassic contexts. Notably, these vessel fragments had a generally high degree-of-arc value, indicating that they were relatively large sherds and therefore probably from a primary depositional context of secondary refuse. The field notes from this level did not mention any anomalous features other than ash lenses, but it appears that this collection unit intersected a Classic-period trash lens. For the purpose of further analysis of the Postclassic midden deposit, these six types were eliminated from subsequent analyses of the bag 8153 collection unit.

The midden deposit ended at a depth of 125 cm below the ground surface. Three shallow borrow pits were found dug into sterile soil, and in the bottom of unit S7/E1 an oval stain indicated the presence of well 3. Well 3 was filled with dirt and cultural remains to a depth of 277 cm below ground surface. The stratigraphic relationship between the midden and well is problematic because although the initial report describes the well deposit as sealed beneath the midden deposit (Wolfman 1968), the original site map indicates that it was located to the side.

The ceramic frequencies from the trash midden and well 3 are presented in table 5.1. The most significant observation is the relative scarcity of Apolo, Aquiahuac, and Coapan Polychromes. These never occur as more than a trace, and are most common in stratum II, the most likely stratum to contain mixed deposits. This is consistent with the absence below stratum II of Minor types from either the Colonial/Historic period or Late Postclassic period.

A comparison of type frequencies from the different stratigraphic levels reveals that Torre and Cuaxiloa Polychromes were slightly more abundant in stratum II than in the lower strata, while Ocotlán Red Rim, Tepontla Burnished, and Xicalli Plain were slightly less common in stratum II. This contrast also appeared in the relative frequencies of subtypes of Cocoyotla Black on Natural and Ocotlán Red Rim. Cocoyotla subtype Banded was predominant in stratum II, but less common in lower strata, while subtypes Sencillo and Chalco Black on Orange were more common in the deeper strata. Ocotlán subtypes Elegante and Cristina Matte were slightly more common in stratum II, while subtype Sencillo was more common in the lower strata.

These differences might reflect temporal change or could be the result of contamination with later materials from the plow zone. The relative frequencies of other types (particularly utilitarian wares) remained fairly consistent throughout the stratigraphic levels.

Curiously, type frequencies in well 3 were most similar to those of stratum II, even though the well deposit was stratigraphically beneath stratum V. One possible explanation is that the observed differences do not exceed the normal range of variation of ceramic frequencies, therefore reflecting behavioral rather than temporal differences. An alternative interpretation, however, is that the well deposit was contemporary with the upper stratum and intruded into the the lower strata. If the well passed through the midden and was not recognized until it was outlined in the natural layer beneath stratum V, it would have passed through unit S7/E1; by extension the ceramic frequencies of deposits from unit S7/E1 should resemble stratum II and well 3. This is not borne out in the individual bags from S7/E1, which do not differ significantly from the general pattern for the midden strata.

The Kolmogorov-Smirnov test (Shennan 1988:55–61) was used to determine the significance of differences between the different strata. In this method, the totals of two samples are used to derive a minimum level of significant difference. In other words, a threshold of dissimilarity is estimated mathematically, with the data then compared to that figure to determine if and where it exceeds the threshold. The formula used is

$$1.36\sqrt{\frac{n_1 + n_2}{n_1 n_2}}$$

where n_1 and n_2 are the number of individuals in samples 1 and 2 and 1.36 is the theoretically derived multiplication factor used to obtain a significance level of 0.05.

Applying the Kolmogorov-Smirnov test to the ceramic

Table 5.1 Trash midden and Well 3 stratified ceramics

Stratum	II	III	IV	V	Well 3
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Major Decorated Types					
APOLO BLACK & RED/ORANGE	9 (1.5)	0	1 (0.1)	2 (.3)	0
AQUIAHUAC BURNT ORANGE	3 (0.5)	2 (0.2)	0	2 (.3)	0
COAPAN LACA	0	0	0	0	0
COCOYOTLA BLACK/NATURAL	42 (7)	55 (6)	51 (7)	49 (8)	20 (8)
Sencillo	4 (10)*	24 (44)*	16 (31)*	21 (43)*	0
Incised	0	1 (1.8)*	0	4 (8)*	0
Banded	37 (88)*	27 (49)*	29 (57)*	13 (27)*	17 (85)*
Banded Elegante	**	**	**	**	3 (15)*
Chalco Black/Orange	1 (2)*	3 (5)*	6 (12)*	11 (22)*	0
CUAXILOA MATTE	76 (13)	68 (8)	49 (6)	42 (07)	62 (25)
OCOTLAN RED RIM	48 (8)	112 (13)	101 (13)	66 (10)	21 (8)
Sencillo	26 (54)*	79 (71)*	81 (80)*	55 (83)*	16 (76)*
Elegante	5 (10)*	9 (8)*	3 (3)*	2 (3)*	2 (10) *
Cristina Matte	13 (27)*	22 (20)*	15 (15)*	5 (8)*	1 (5)*
Other subtypes	4 (8)*	2 (1.8)*	2 (2)*	4 (6)*	2 (10)*
SAN PEDRO POLISHED	20 (3)	7 (0.8)	21 (3)	16 (2)	3 (1.2)
TORRE RED & ORANGE (WHITE	71 (12)	58 (7)	52 (7)	43 (7)	27 (11)
Major Undecorated Types					
CERRO ZAPOTECAS SANDY PLAIN	21 (4)	25 (3)	25 (3)	26 (4)	4 (1.6)
MOMOXPAN METALLIC ORANGE	123 (21)	183 (21)	141 (18)	124 (19)	39 (16)
SAN ANDRES RED	52 (9)	52 (6)	58 (8)	49 (8)	25 (10)
TEPONTLA BURNISHED	8 (1.3)	14 (1.6)	24 (3)	25 (4)	3 (1.2)
XICALLI PLAIN	116 (19)	286 (33)	229 (30)	186 (29)	44 (18)
Minor Types					
COLONIAL/HISTORICAL	1 (0.2)	0	0	0	0
LATE POSTCLASSIC	1 (0.2)	0	0	0	0
EARLY POSTCLASSIC	1 (0.2)	3 (0.3)	5 (0.7)	2 (0.3)	1 (0.4)
CLASSIC	4 (0.7)	6 (0.7)	5 (0.7)	5 (0.8)	0
PRECLASSIC	1 (0.2)	1 (0.1)	1 (0.1)	1 (0.2)	0
UNIDENTIFIED	0	1 (0.1)	5 (0.7)	5 (0.8)	0
IDENTIFIABLE	597 (100) (71% of total)	873 (100) (72% of total)	768 (100) (82% of total)	643 (100) (80% of total)	249 (100) (95% of total)
UNIDENTIFIABLE					
ERODED/BURNT	14 (1.7)	22 (1.8)	16 (1.7)	15 (1.9)	3 (1.1)
TOO SMALL	225 (27)	321 (26)	148 (16)	148 (18)	10 (4)
TOTAL RIM SHERDS	836 (100)	1216 (100)	932 (100)	806 (100)	262 (100)

* Type frequencies are expressed as the proportion of the Identifiable subtotal; subtype frequency (*) relates to the proportion of the corresponding type.

** Subtype Banded Elegante was not recognized in the trash midden analysis.

data from the trash midden as a whole and well 3, where n_1=2881 and n_2=249, the threshold of significant difference is 9%. In this case, if any specific type comparison between the two samples exceeds 9%, then the two assemblages cannot be considered similar at the 0.05 level. In this comparison, the proportions for both Cuaxiloa Matte and Xicalli Plain exceed the 9% threshold, and therefore the two assemblages are considered significantly different.

The same comparative test when run on stratum II versus stratum III also shows significant differences for Xicalli Plain and, within the Cocoyotla type, subtypes Sencillo and Banded. Comparisons between strata III, IV, and V do not show significant differences. When comparing stratum II with well 3, a significant difference still exists in the Cuaxiloa type, but these two strata are more similar than either is to the other strata.

In summary, of the possible explanations for the apparent pattern in ceramic frequencies between the midden strata and well 3, neither is particularly satisfying. There is no evidence that the well was intrusive, yet the differences between the assemblages are statistically significant. Based on this discussion, I tentatively conclude that the trash midden and well 3 deposits were approximately contemporary, with the observed differences in ceramic frequencies within the normal range of variation. The possibility remains, however, that these differences do reflect slight chronological change, with Cuaxiloa Matte, Torre Polychrome, Cocoyotla subtype Banded, and Ocotlán subtypes Elegante and Cristina Matte occurring slightly later than Cocoyotla subtypes Sencillo and Chalco, Ocotlán subtype Sencillo, and Xicalli Plain. This trend is supported by stratified ceramics from structure 1.

The proportion of Unidentifiable Eroded/Burnt sherds was remarkably consistent throughout the midden strata and dropped slightly in well 3. In contrast, strata II and III contained higher amounts of Unidentifiable-Too Small sherds than strata IV and V, while well 3 contained a very low 4% of the category. Based on the suggestion that the relative frequency of small sherds compared to the total assemblage can be used to infer the degree of postdepositional disturbance, this indicates that the lower strata, and especially well 3, probably experienced relatively little disturbance.

The integrity of the assemblage is also reflected in the average of the degree-of-arc measurements, where values for the four strata of the midden are virtually identical at 21 degrees of arc, while well 3 had a higher value (27 degrees of arc). This supports the observation that the well was relatively less disturbed, but is in contrast with the possibility of different degrees of disturbance in the midden strata. This will be discussed further in the section on Vessel Form Analysis (below).

COMPARATIVE ANALYSIS OF PRIMARY CONTEXTS

Four depositional contexts are considered "primary" in the sense that they represent intentional refuse disposal in discrete features that have undergone minimal postdepositional disturbance. These contexts include well 1, well 2, the trash midden, and well 3. A comparative analysis of these ceramic assemblages provides a foundation for constructing a revised ceramic sequence.

Table 5.2 presents a detailed summary of all significant types and subtypes, including significant vessel forms for the Undecorated types. All Major types are included, with Minor types lumped into the temporal categories defined in chapter 4. All subtypes that made up at least 0.1% of the total assemblage are included, and vessel forms that constituted at least 0.5% of the total are listed. Note that rare subtypes and vessel forms are not included in the tabulated data. Type totals are summed as Total Identifiable, while subtypes (with single asterisk) are indicated as percentage of each individual type. Vessel form frequencies (with double asterisk) are also tabulated in reference to type.

Well 1 ceramics were dominated by a very high frequency (49%) of Apolo Polychrome, distributed evenly between the Sencillo and Geométrico subtypes. The only other decorated type that occurred as more than a trace was Aquiahuac Burnt Orange (4%), with the Zócalo subtype most common. Momoxpan Metallic Orange was the most common undecorated type (25%), while San Andrés Red appeared in moderate frequency (15%) and Xicalli Plain made up a very low (4%) proportion of the assemblage.

The well 2 assemblage differed markedly in terms of the decorated types. Apolo Polychrome made up a low percentage (6%) of the assemblage, while Aquiahuac, Cocoyotla, and San Pedro Polished were all present in very low frequency. The most abundant decorated category was the minor type Poblano Glaze Ware and the Colonial/Historical category made up 20% of the well 2 assemblage. San Andrés Red was the most common un-

Table 5.2 Ceramic frequencies from primary contexts

	Well 1 *n* (%)	Well 2 *n* (%)	Trash midden *n* (%)	Well 3 *n* (%)
Major Decorated Types				
APOLO BLACK & RED/ORANGE	163 (49)	24 (6)	12 (0.4)	0
Sencillo	73 (45)*	11 (46)*	10 (83)*	0
Geométrico	75 (46)*	9 (38)*	2 (17)*	0
Elegante	15 (9)*	3 (12)*	0	0
Other subtypes	0	1 (4)*	0	0
AQUIAHUAC BURNT ORANGE	14 (4)	16 (4)	7 (0.2)	0
Sencillo	5 (36)*	5 (31)*	2 (29)*	0
Santa Catarina	2 (14)*	1 (6)*	2 (29)*	0
Zócalo Black (Orange	7 (50)*	10 (62)*	3 (43)*	0
COAPAN LACA	1 (0.3)	0	0	0
COCOYOTLA BLACK/NATURAL	0	9 (2)	204 (7)	20 (8)
Sencillo	0	7 (78)*	65 (32)*	0
Incised	0	0	5 (2)*	0
Banded	0	1 (11)*	110 (54)*	17 (85)*
Banded Elegante	0	1 (11)*	0	3 (15)*
Chalco Black/Orange	0	0	24 (12)*	0
CUAXILOA MATTE	6 (1.8)	7 (1.9)	237 (8	62 (25)
Sencillo	2 (33)*	6 (86)*	199 (84)*	39 (63)*
Polished Cream	2 (33)*	1 (14)*	31 (13)*	20 (32)*
Xicotenco Black & Red/Orange	2 (33)*	0	0	1 (1.6)*
Other subtypes	0	0	7 (3)*	2 (3)*
OCOTLAN RED RIM	1 (0.3)	6 (1.6)	332 (11)	21 (8)
Sencillo	0	4 (67)*	246 (74)*	16 (76)*
Incised	0	0	6 (1.8)*	1 (5)*
Banded	0	0	5 (1.5)*	0
Banded Elegante	0	0	19 (6)*	1 (5)*
Elegante	1 (100)*	1 (17)*	0	2 (10)*
Cristina Matte	0	1 (17)*	56 (17)*	1 (5)*
SAN PEDRO POLISHED	2 (0.6)	16 (4)	65 (2)	3 (1.2)
Sencillo	2 (100)*	14 (88)*	12 (18)*	0
Incised	0	0	7 (11)*	1 (33)*
Graphite on Red	0	0	7 (11)*	0
Graphite on Red Incised	0	1 (6)*	27 (42)*	0
Graphite on Red Elegante	0	1 (6)*	12 (18)*	2 (67)*
TORRE RED & ORANGE/WHITE	2 (0.6)	4 (1.1)	228 (8)	27 (11)
Sencillo	2 (100)*	4 (100)*	216 (95)*	26 (96)*
Universidad	0	0	0	1 (4)*
Other subtypes	0	0	12 (5)*	0
Major Undecorated Types				
CERRO ZAPOTECAS SANDY PLAIN	3 (0.9)	14 (4)	97 (3)	4 (1.6)
Conical cazuela	1 (33)**	4 (29)**	28 (29)**	2 (50)**
Bracero	1 (33)**	0	34 (35)**	1 (25)**
Other forms	0	10 (71)**	35 (36)**	1 (25)**
MOMOXPAN METALLIC ORANGE	84 (25)	75 (20)	587 (20)	39 (16)
Comal	74 (88)**	71 (95)**	488 (83)**	38 (97)**
Subhemispherical bowl	4 (5)**	1 (1.3)**	25 (4)**	0
Conical bowl	3 (4)**	3 (4)**	66 (11)**	1 (3)**
Other forms	3 (4)**	0	8 (1.4)**	0

continued

Table 5.2 Ceramic frequencies from primary contexts, *continued*

	Well 1 *n* (%)	Well 2 *n* (%)	Trash midden *n* (%)	Well 3 *n* (%)
SAN ANDRES RED	50 (15)	108 (29)	216 (7)	25 (10)
Comal	11 (22)**	8 (7)**	1 (0.5)**	1 (4)**
Long-neck olla	17 (34)**	12 (11)**	45 (21)**	5 (20)**
Small-mouth olla	2 (4)**	8 (7)**	42 (19)**	1 (4)**
Wide-mouth olla	12 (24)**	12 (11)**	37 (17)**	4 (16)**
Hemispherical cazuela	4 (8)**	12 (11)**	23 (11)**	6 (24)**
Conical cazuela	0	13 (12)**	24 (11)**	2 (8)**
Cylindrical maceta	1 (2)**	10 (9)**	0	1 (4)**
Other forms	0	12 (11)**	44 (20)**	4 (16)**
Dark Red	3 (6)*	21 (19)*	0	1 (4)*
TEPONTLA BURNISHED	3 (0.9)	2 (0.5)	75 (3)	3 (1.2)
Subhemispherical bowl	0	1 (50)**	16 (21)**	0
Conical bowl	3 (100)**	1 (50)**	32 (43)**	2 (67)**
Other forms	0	0	23 (31)**	1 (33)**
Incised	0	0	0	0
Red Rim	0	0	4 (5)*	0
XICALLI PLAIN	15 (4)	21 (6)	841 (29)	44 (18)
Comal	1 (7)**	4 (19)**	91 (11)	16 (36)**
Outleaned-wall dish	5 (33)**	5 (24)**	295 (35)	11 (25)**
Shallow bowl	4 (27)**	2 (10)**	6 (0.7)	3 (7)**
Subhemispherical bowl	2 (13)**	8 (38)**	430 (51)	9 (20)**
Conical bowl	1 (7)**	0	**	4 (9)**
Lantern censer	1 (7)**	2 (10)**	16 (1.9)**	1 (2)**
Other forms	1 (7)**	0	3 (0.4)**	0
Minor Types				
COLONIAL/HISTORICAL	0	75 (20)	1 (0.03)	0
LATE POSTCLASSIC	7 (2)	0	1 (0.03)	0
EARLY POSTCLASSIC	0	0	11 (0.4)	1 (0.4)
CLASSIC	2 (0.6)	0	20 (0.7)	0
PRECLASSIC	1 (0.3)	0	4 (0.1)	0
UNIDENTIFIED	1 (0.3)	0	11 (0.4)	0
TOTAL IDENTIFIABLE	355 (100) (80% of total)	377 (100) (70% of total)	2949 (100) (76% of total)	249 (100) (95% of total)
UNIDENTIFIABLE				
ERODED/BURNT	17 (4)	36 (7)	67 (1.7)	3 (1.1)
TOO SMALL	73 (16)	129 (24)	842 (22)	10 (4)
TOTAL SHERDS	445 (100)	542 (100)	3858 (100)	262 (100)

Note: Type frequencies are expressed as the proportion of the Total Identifiable sherds; subtype frequency (*) relates to the corresponding type; and vessel-form frequency (**) relates to the proportion of the type.

** Subtype Banded Elegante was not recognized in the trash midden analysis.

decorated type (29%), but Momoxpan Metallic Orange was present in high frequency (20%). Cerro Zapotecas Sandy Plain and Xicalli Plain were both present in very low frequency.

Ocotlán Red Rim was the most abundant (11%) decorated type found in the trash midden, with Sencillo as its most common subtype. Also present in low frequencies were Cocoyotla Black on Natural (7%), Cuaxiloa Matte (8%), and Torre Polychrome (8%), with San Pedro Polished Red present in very low frequency (2%). In contrast to that found in wells 1 and 2, Xicalli Plain was the most common undecorated type (29%), although Momoxpan Orange was again present in high frequency (20%). San Andrés Red made up only 7% of the assemblage, and Cerro Zapotecas Sandy Plain (3%) and Tepontla Burnished (3%) were each present in very low frequencies.

Well 3 has a particularly high frequency of Cuaxiloa Matte (25%). Torre Polychrome was present in moderate frequency (11%), and both Cocoyotla (8%) and Ocotlán (8%) occurred in low frequencies. Xicalli Plain was the most abundant of the undecorated types at 18%, and Momoxpan Orange (16%) and San Andrés Red (10%) were present in moderate amounts.

To summarize, the ceramic assemblages from the trash midden and well 3 share the most similarities, although they are not identical. On the basis of the high frequency of Minor Colonial/Historical types, well 2 clearly dates to the post-Conquest era. The frequencies found in well 1 are very similar to those found in midden F-10 at UA-79 (Barrientos 1980) that Lind (1994) attributed to the Late Postclassic period. General similarities between well 1 and well 2, particularly in the relative abundance of Apolo and Aquiahuac Polychromes and the scarcity of other decorated types and Xicalli Plain, suggest that these two contexts were probably more similar to one another than either was to the trash midden and well 3 assemblages. It should be noted, however, that no Colonial/Historical types were recovered from well 1, and it is therefore likely that the well 1 deposit was pre-Conquest. Based on these primary assemblages, the most likely sequence for the primary contexts is that the trash midden and well 3 assemblages were the earliest, followed by well 1, with well 2 as the latest.

In terms of specific decorated types, Cocoyotla Black on Natural, Cuaxiloa Matte, Ocotlán Red Rim, and Torre Polychrome were all most common early in the sequence, with Apolo Polychrome and Aquiahuac Burnt Orange more abundant in excavated deposits from the Late Postclassic period. The frequency of San Pedro Polished Red remained very low but relatively consistent in all four contexts. Among the undecorated types, Xicalli Plain was predominant at the beginning of the sequence, but declined markedly in relative frequency, while San Andrés Red increased. The proportion of Momoxpan Metallic Orange increased slightly through time, although it was one of the most consistent of all of the major types. The evidence for Cerro Zapotecas Sandy Plain and Tepontla Burnished is less clear, in part because of the relative scarcity of these types in all four contexts. The importance of these two types in the Classic and Epiclassic periods, however, suggests that they had already declined in popularity before the UA-1 occupations.

Turning to diachronic changes in vessel form, particularly for utilitarian wares, Momoxpan Orange comales were the most common form in all contexts. Other comal types, however, varied in the different deposits, with Xicalli Plain comales common in the trash midden and well 3, San Andrés Red comales common in well 1, and San Andrés subtype Dark Red comales most numerous in well 2.

Some minor variation occurs in relation to the different forms of San Andrés ollas; long-neck ollas and wide-mouth ollas were most abundant in well 1, while small-mouth ollas were more common in the trash midden. Cazuelas, on the other hand, were relatively rare in well 1 and most abundant in well 3. These and other aspects of vessel form are discussed in greater detail below.

In considering the relative frequencies of the total Identifiable versus Unidentifiable types in relation to the total number of sherds, it has already been observed that well 3, with 95% Identifiable sherds, was probably relatively undisturbed. Well 2 had the lowest proportion of Identifiable sherds, with the highest frequencies of both Eroded/Burnt sherds and Too Small sherds. This evidence for disturbance may account for some of the anomalous values for early types such as Cocoyotla, Cerro Zapotecas, and Xicalli that may have been redeposited as mixed fill during the deposition of the midden refuse.

In summary, the ceramic frequencies from the four primary depositional contexts indicate significant differences relating to both Decorated and Undecorated types. Based on this data, Apolo Polychrome and Aquiahuac

Burnt Orange are tentatively identified as diagnostics of the Late Postclassic period, while Cocoyotla Black on Natural, Cuaxiloa Matte, Ocotlán Red Rim, Torre Polychrome, and Xicalli Plain occurred earlier. Further refinement of the sequence depends upon clarifying the relationship between Ocotlán and Cocoyotla on the one hand, and Torre and Cuaxiloa on the other.

STRUCTURE 1 DEPOSITIONAL CONTEXTS

Five depositional contexts were associated with structure 1, including materials from

- beneath the floor,
- beneath the porch areas,
- floor contact,
- porch contact, and
- fill from above the floor but sealed beneath and in association with the collapsed adobe walls.

A comparison of ceramic frequencies from these contexts helps to refine the ceramic sequence, particularly in relation to the ceramic complex associated with the occupation of structure 1 (table 5.3).

A small sample (n=29) of sherds was recovered from beneath the floor because in most units excavation stopped at the plaster surface. More than half were Unidentifiable, mainly due to their small size. Of the Identifiable pottery, more than half were either of the Ocotlán Red Rim (n=3, 21%) or Xicalli Plain (n=6, 43%), types that have been suggested as diagnostic of the earlier Postclassic occupation phase. Because of the small sample size, however, this evidence is tenuous.

The sample size for materials from below the porch is much larger (n=1,112), in part because the earthen walking surfaces were probably more difficult to identify during excavation and were often dug through. Levels from below the porch were arbitrarily defined as those more than 80 cm below the surface, but because these were usually not sealed deposits, there was a greater potential for postdepositional mixing. Evidence for a high level of disturbance appears in the very high proportion (33%) of Unidentifiable-Too Small sherds.

The most common Decorated type found below the porch was Ocotlán Red Rim (24%), with Sencillo as the most common of its subtypes. Cocoyotla Black on Natural occurred in low frequency (6%), with its Sencillo subtype as the most common. Xicalli Plain occurred in very high frequency (35%), while Momoxpan Orange (12%) was present in moderate frequency, San Andrés Red (9%) and Tepontla Burnished (5%) occurred in low amounts, and Cerro Zapotecas Sandy Plain (3%) was present in very low frequency.

Ceramic frequencies from the floor contact deposit (n=517) again contained Ocotlán (27%) and Cocoyotla (11%) as the most abundant decorated types, and Xicalli Plain (23%) and Momoxpan Orange (19%) as the most common undecorated types. Cuaxiloa Matte occurred in very low frequency (3%). Notably, 84% of the sherds found in direct association with the floor were Identifiable, one of the highest ratios of any context found at UA-1. This high frequency contrasts with the expectation of floor areas being regularly maintained to remove debris and supports the interpretation that the structure was destroyed catastrophically with artifacts left in situ. The relatively low frequency of Burnt/Eroded sherds, however, is not consistent with the interpretation that structure 1 was destroyed by fire.

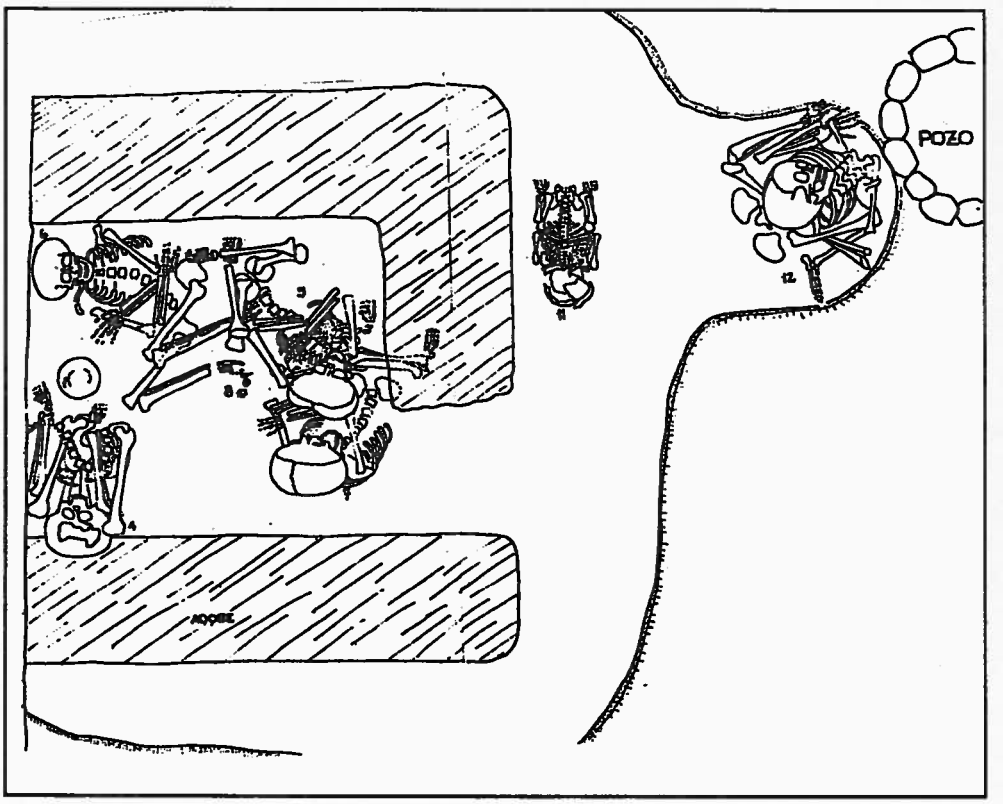
Ceramic frequencies from the porch contact (n=77) resembled the general trend for structure 1, with the exception of relatively more Apolo Polychrome (7%). Ocotlán Red Rim remained the most common decorated type (20%), and Xicalli Plain occurred in very high frequency (36%). In part because of difficulties in recognizing the porch surface, there were relatively few sherds in this assemblage; thus, problems of integrity as well as sample size make this a less reliable context for further analysis.

The largest sample (n=4,234) came from above the floor, including materials deposited after the abandonment of the structure, but before the adobe walls had completely collapsed. The ceramic assemblage from this context was more diverse than those from lower levels. Ocotlán was still the most common decorated type, occurring in moderate frequency (15%). Apolo Polychrome was present in low frequency (9%), and Cocoyotla (4%), Aquiahuac (3%), Cuaxiloa (3%) and San Pedro (2%) were all found in very low frequencies. In this context Cocoyotla subtype Sencillo was only represented as 44% of the type total in contrast to its much higher proportion in lower levels, and subtypes Banded Elegante (29%) and Chalco Black on Orange (11%) were relatively more common. Among the undecorated types, the relative frequencies of Xicalli and Momoxpan were both 21%, while San Andrés Red was found in moderate frequency (13%).

Table 5.3 Structure 1 Ceramics

	Below floor *n* (%)	Below porch *n* (%)	Floor contact *n* (%)	Porch contact *n* (%)	Above floor *n* (%)
Major Decorated Types					
APOLO BLACK & RED/ORANGE	0	10 (1.4)	7 (1.6)	4 (7)	252 (9)
AQUIAHUAC BURNT ORANGE	0	4 (0.6)	3 (0.7)	0	93 (3)
COAPAN LACA	0	0	0	0	16 (0.5)
COCOYOTLA BLACK/NATURAL	0	42 (6)	47 (11)	1 (1.7)	111 (4)
Sencillo	0	35 (83)*	39 (83)*	1 (100)	49 (44)*
Incised	0	0	0	0	10 (9)*
Banded	0	2 (5)*	5 (11)*	0	8 (7)*
Banded Elegante	0	2 (5)*	1 (2)*	0	32 (29)*
Chalco Black/Orange	0	3 (7)*	2 (4)*	0	12 (11)*
CUAXILOA MATTE	0	9 (1.3)	15 (3)	0	80 (3)
OCOTLÁN RED RIM	3 (21)	169 (24)	118 (27)	12 (20)	439 (15)
Sencillo	3 (100)*	127 (75)*	91 (77)*	9 (75)	(340 (77)
Elegante	0	15 (9)*	16 (14)*	2 (17)	(36 (8)
Cristina Matte	0	15 (9)*	3 (3)*	1 (8)	(41 (9)
Other subtypes	0	12 (7)*	8 (7)*	0	(22 (5)
SAN PEDRO POLISHED	2 (14)	13 (1.8)	10 (2)	1 (1.7)	60 (2)
TORRE RED & ORANGE/WHITE	0	3 (0.4)	2 (0.5)	1 (1.7)	38 (1.3)
Major Undecorated Types					
CERRO ZAPOTECAS SANDY PLAIN	0	21 (3)	5 (1.2)	3 (5)	110 (4)
MOMOXPAN METALLIC ORANGE	3 (21)	88 (12)	84 (19)	8 (14)	618 (21)
SAN ANDRÉS RED	0	63 (9)	32 (7)	6 (10)	396 (13)
TEPONTLA BURNISHED	0	34 (5)	11 (3)	1 (1.7)	80 (3)
XICALLI PLAIN	6 (43)	246 (35)	98 (23)	21 (36)	624 (21)
Minor Types					
COLONIAL/HISTORICAL	0	1 (0.1)	0	0	16 (0.5)
LATE POSTCLASSIC	0	1 (0.1)	0	0	4 (0.1)
EARLY POSTCLASSIC	0	3 (0.4)	0	0	3 (0.1)
CLASSIC	0	2 (0.3)	1 (0.2)	1 (1.7)	8 (0.3)
PRECLASSIC	0	0	1 (0.2)	0	4 (0.1)
UNIDENTIFIED	0	1 (0.1)	0	0	1 (0.03)
IDENTIFIABLE	14 (100) (48% of total)	710 (100) (64% of total)	434 (100) (84% of total)	59 (100) (77% of total)	2953 (100) (70% of total)
UNIDENTIFIABLE					
ERODED/BURNT	1 (3)	32 (3)	11 (2)	0	166 (4)
TOO SMALL	14 (48)	370 (33)	72 (14)	18 (23)	1115 (26)
TOTAL SHERDS	29 (100)	1112 (100)	517 (100)	77 (100)	4234 (100)

Note: Type frequencies are expressed as the proportion of the Total Identifiable sherds, and subtype frequency (*) relates to the corresponding type.



5.1 Burials 4, 5, 6, 7, 11, and 12 in N2/W1

In summary, the ceramic frequencies from structure 1 show a high degree of consistency, with Ocotlán Red Rim and Cocoyotla Black on Natural as the predominant decorated types, and Xicalli Plain, Momoxpan Orange, and San Andrés Red the principal undecorated types. The higher proportions of types such as Apolo Polychrome and Aquiahuac Burnt Orange in the fill above the floor suggests that the occupation predated the Late Postclassic period, when these types predominated. Cuaxiloa Matte and Torre Polychrome were not well represented in the structure 1 contexts, indicating that they, too, probably postdate the occupation. There is relatively little difference in the frequencies of Ocotlán Red Rim subtypes among these contexts, whereas the proportion of Cocoyotla subtype Sencillo is very high in the floor contact level but drops sharply relative to the other subtypes in the fill level above the floor.

STRUCTURE 1 FEATURES

Several additional features were excavated in association with structure 1 that provide discrete depositional contexts. One was the oval structure located south of room 1 that has been identified tentatively as a temazcal. The other features include two group burials: in room 4 at unit N2/W1 and south of the structure at unit S6/W3 (table 5.4).

Stratigraphic evidence indicated that the temazcal was built and used at the same time as structure 1. Wolfman (1968:11) observed that the oval structure was constructed through an existing stucco floor associated with porch area C, but that it was probably abandoned at the same time as structure 1. Analysis of ceramics from the collapsed structure support the interpretation that the temazcal was used at the same time as structure 1.

Pottery from the temazcal (n=113) included a high frequency of Ocotlán Red Rim (21%), with low frequencies of Cocoyotla Black on Natural (6%) and Cuaxiloa Matte (5%), and a very low amount of Torre Polychrome (4%). Undecorated types included a very high frequency of Xicalli Plain (33%), moderate amount of Momoxpan Orange (18%), and low amounts of San Andrés Red (9%) and Tepontla Burnished (4%). Based on these frequencies, the temazcal assemblage is roughly contemporary with the ceramic complex of the trash midden and structure 1.

Excavations at unit N2/W1 encountered burials 4, 5, 6, 7, 11, and 12 in the northwest corner of room 4. The burials were placed in a walled chamber excavated through the structure floor (figure 5.1). The burials were obviously interred after the abandonment of the struc-

Table 5.4 Ceramics from structure 1 features

	Temazcal *n* (%)	N2/W1 burials *n* (%)	S6/W3 burials *n* (%)
Major Decorated Types			
APOLO BLACK & RED/ORANGE	0	2 (5)	0
AQUIAHUAC BURNT ORANGE	0	0	0
COAPAN LACA	0	0	0
COCOYOTLA BLACK/NATURAL	5 (6)	3 (7)	9 (8)
Sencillo	3 (60)*	1 (33)*	5 (56)*
Incised	0	1 (33)*	1 (11)*
Banded	1 (20)*	0	0
Banded Elegante	1 (20)*	0	0
Chalco Black/Orange	0	1 (33)*	3 (33)*
CUAXILOA MATTE	4 (5)	0	0
OCOTLÁN RED RIM	17 (21)	6 (15)	37 (33)
Sencillo	16 (94)*	5 (83)*	30 (81)*
Elegante	0	0	2 (5)*
Cristina Matte	1 (6)*	1 (17)*	5 (14)*
SAN PEDRO POLISHED RED	1 (1.2)	0	4 (4)
TORRE RED & ORANGE/WHITE	3 (4)	0	0
Major Undecorated Types			
CERRO ZAPOTECAS SANDY PLAIN	0	4 (10)	5 (4)
MOMOXPAN METALLIC ORANGE	15 (18)	7 (17)	17 (15)
SAN ANDRES RED	7 (9)	2 (5)	15 (13)
TEPONTLA BURNISHED	3 (4)	3 (7)	0
XICALLI PLAIN	27 (33)	13 (32)	26 (23)
Minor Types			
COLONIAL/HISTORICAL	0	0	0
LATE POSTCLASSIC	0	0	0
EARLY POSTCLASSIC	0	0	0
CLASSIC	0	1 (2)	0
PRECLASSIC	0	0	0
UNIDENTIFIED	0	0	0
IDENTIFIABLE	82 (100) (73% of total)	41 (100) (57% of total)	113 (100) (74% of total)
UNIDENTIFIABLE			
ERODED/BURNT	4 (4)	3 (4)	3 (2)
TOO SMALL	27 (24)	28 (39	37 (24)
TOTAL SHERDS	113 (100)	72 (100)	153 (100)

Note: Type frequencies are expressed as the proportion of the Total Identifiable sherds, and subtype frequency (*) relates to the corresponding type.

5.2 Burial 9 in S6/W3

ture because some of the bones were actually located above floor level. It is likely, however, that the burial occurred before the complete collapse of the adobe walls since no intrusive burial pit was noticed in the collapsed adobe. Ceramics from the burial context (n=72) included a moderate amount of Ocotlán Red Rim (15%), and low frequencies of Cocoyotla Black on Natural (7%) and Apolo Polychrome (5%). Undecorated types included a very high proportion of Xicalli Plain (32%), moderate amounts of Momoxpan Orange (17%) and Cerro Zapotecas Sandy Plain (10%), and low frequencies of Tepontla Burnished (7%) and San Andrés Red (5%). A complete Cocoyotla subtype Sencillo vessel (UA-1 10147) was associated with burial 4. The general characteristics of this assemblage resemble the ceramic complex of structure 1 and the trash midden, although the low frequency of Apolo Polychrome would indicate that it was later than either of those assemblages. It should also be noted that this was a relatively small sample, with an above average number of Unidentifiable-Too Small sherds suggesting the possibility of postdepositional disturbance.

The second burial context was located south of structure 1 in unit S6/W3. It was adjacent to the extension of the main north/south structure wall and was above the stucco floor layers associated with the wall. Five burials (9, 10, 14, 16 and 17) were found in this unit (figure 5.2) and burial 18 was located in the adjoining unit S5/W3. Since these burials were placed above a stucco floor it was inferred that they postdated structure 1 (Wolfman 1968). Ceramics from this burial context (n=153) included a very high proportion of Ocotlán Red Rim (33%), and a low amount of Cocoyotla Black on Natural (8%). Undecorated types included a high frequency of Xicalli Plain (23%) and moderate amounts of Momoxpan Orange (15%) and San Andrés Red (13%). These frequencies are consistent with the overall ceramic complex associated with structure 1, although the absence of either Cuaxiloa or Torre polychromes may indicate that these features predate the midden.

The ceramic data from these features conform to the general ceramic complex related with structure 1, the trash midden, and well 3. The temazcal was probably contemporary with the final occupation of the structure, and perhaps the filling of the trash midden. The burial deposit at N2/W1 followed the abandonment of structure 1, although probably not by a long time. The S6/W3 burials may have been interred before the final occupation of structure 1 or perhaps even at the time of the early structural remains found beneath the floor of structure 1.

STRUCTURE 2 CERAMICS AND SHERD CONCENTRATIONS

The limited excavations at structure 2 yielded ceramics from the floor contact and above floor deposits that provide a notable contrast to those from other contexts (table 5.5). Similar patterns are apparent in ceramics from an intrusive midden that passed through the floor of structure 2 and two sherd concentrations located between structures 1 and 2.

The ceramic frequencies associated with the floor contact of Structure 2 are tenuous because of the small sample size of analyzed sherds (n=21). The most common decorated types were Apolo Polychrome and Aquiahuac Burnt Orange. Xicalli Plain was the most common undecorated type, and Momoxpan Orange was present in moderate amount. The relatively high proportions of Apolo and Aquiahuac contrast with the patterns

Table 5.5 Structure 2 Ceramics and Associated Sherd Concentrations

	Floor contact *n* (%)	Above floor *n* (%)	Intrusive midden *n* (%)	Sherd conc. 1 *n* (%)	Sherd conc. 2 *n* (%)
Major Decorated Types					
APOLO BLACK & RED/ORANGE	2 (14)	43 (11)	6 (4)	14 (18)	101 (12)
Sencillo	1 (50)*	19 (44)*	2 (33)*	6 (43)*	56 (55)*
Geometrico	1 (50)*	16 (37)*	2 (33)*	6 (43)*	28 (28)*
Elegante	0	8 (19)*	2 (33)*	2 (14)*	17 (17)*
AQUIAHUAC BURNT ORANGE	2 (14)	30 (8)	36 (21	7 (9)	79 (10)
Sencillo	2 (100)*	13 (43)*	18 (50)*	1 (14)*	37 (47)*
Santa Catalina	0	1 (3)*	0	0	3 (4)
Zócalo	0	16 (53)*	18 (50)*	6 (86)*	(39 (49)*
COAPAN LACA	0	4 (1.0)	1 (0.6)	1 (1.3)	8 (0.1)
COCOYOTLA BLACK/NATURAL	0	8 (2)	10 (6)	0	13 (1.6)
Sencillo	0	2 (25)*	4 (40)*	0	3 (23)*
Banded	0	4 (50)*	3 (30)*	0	4 (31)*
Banded Elegante	0	0	3 (30)*	0	3 (23)*
Chalco Black on Orange	0	2 (25)*	0	0	3 (23)*
CUAXILOA MATTE	0	19 (5)	7 (4)	4 (5)	24 (03)
OCOTLÁN RED RIM	1 (7)	33 (8)	11 (6)	1 (1.3)	55 (7)
Sencillo	1 (100)*	21 (64)*	6 (55)*	1 (100)*	39 (71)*
Elegante	0	4 (12)*	2 (18)*	0	9 (16)*
Cristina Matte	0	6 (18)*	1 (9)*	0	7 (13)*
Other subtypes	0	2 (6)*	2 (18)*	0	0
SAN PEDRO POLISHED	1 (7)	6 (1.5)	4 (2)	0	20 (2)
TORRE RED & ORANGE/WHITE	0	16 (4)	6 (4)	1 (1.3)	14 (1.7)
Major Undecorated Types					
CERRO ZAPOTECAS SANDY PLAIN	1 (7)	12 (3)	2 (1.2)	5 (6)	24 (3)
MOMOXPAN METALLIC ORANGE	2 (14)	81 (20)	42 (25)	21 (27)	216 (27)
SAN ANDRÉS RED	1 (7)	52 (13)	17 (10)	11 (14)	133 (16)
TEPONTLA BURNISHED	1 (7)	9 (2)	4 (2)	0	15 (1.9)
XICALLI PLAIN	3 (21)	81 (20)	22 (13)	13 (17)	84 (10)
Minor Types					
COLONIAL/HISTORICAL	0	4 (1.0)	0	0	16 (2)
LATE POSTCLASSIC	0	0	1 (0.6)	0	3 (0.4)
EARLY POSTCLASSIC	0	1 (0.2)	0	0	1 (0.1)
CLASSIC	0	1 (0.2)	1 (0.6)	0	2 (0.2)
PRECLASSIC	0	0	0	0	0
UNIDENTIFIED	0	0	0	0	1 (0.1)
IDENTIFIABLE	14 (100) (67% of total)	400 (100) (68% of total)	170 (100) (68% of total)	78 (100) (76% of total)	809 (100) (73% of total)
UNIDENTIFIABLE					
ERODED/BURNT	1 (5)	31 (5)	14 (6)	17 (17)	66 (6)
TOO SMALL	6 (29)	160 (27)	65 (26)	8 (8)	226 (21)
TOTAL SHERDS	21 (100)	591 (100)	249 (100)	103 (100)	1101 (100)

Note: Type frequencies are expressed as the proportion of the Total Identifiable sherds, and subtype frequency (*) relates to the corresponding type.

associated with structure 1, suggesting that the two compounds were not contemporary.

Ceramics collected above the floor provide a more extensive sample (n=591), and the relative proportions are very similar to the floor contact deposit. Apolo Polychrome again occurs in moderate amounts (11%), with low frequencies of Aquiahuac (8%), Ocotlán (8%), and Cuaxiloa Matte (5%). Torre Polychrome (4%) and Cocoyotla Black on Natural (2%) were present in very low frequencies. High frequencies of both Momoxpan Orange (20%) and Xicalli Plain (20%) were recovered, and San Andrés Red appeared in a moderate amount (13%). This assemblage probably relates to a fairly late period of deposition, but it represents a more varied ceramic complex than well 1, for example, where Apolo was the predominant type present. The relatively high frequencies of Aquiahuac, Cuaxiloa, and Torre suggest that these types relate to an intermediate period between the structure 1 and well 1 ceramic complexes.

The intrusive midden deposit (n=249) passed through the north side of structure 2 and was in turn sealed beneath the stone wall that passed along the north side of the structural remains. Since this deposit was not securely identified during the excavation, it is difficult to relate it stratigraphically to the above floor deposit. The most common decorated type found was Aquiahuac Burnt Orange (21%), with low to very low amounts of Apolo (4%), Cocoyotla (6%), Cuaxiloa (4%), Ocotlán (6%), and Torre (4%). Momoxpan Orange was the most common undecorated type (25%), with moderate amounts of Xicalli Plain (13%) and San Andrés Red (10%).

Concentration 1 (n=103) was recovered from unit S2/E4 where a sherd lens was found beneath a section of a north/south adobe wall that was stratigraphically later than the occupation of structure 2. Ceramics included a moderate amount (18%) of Apolo Polychrome and small quantities of Aquiahuac (9%) and Cuaxiloa (5%). Momoxpan Orange was the most abundant of the undecorated types (27%), with moderate amounts of Xicalli (17%) and San Andrés (16%).

Concentration 2 (n=1,101) may represent the northern extension of the concentration 1 sherd lens and was again found in stratigraphic association beneath the wall. Apolo was the most common decorated type found (12%), although Aquiahuac was also found in moderate frequency (10%), with a low amount of Ocotlán also present (7%). A high proportion of Momoxpan Orange was found (27%), with moderate amounts of San Andrés Red (16%) and Xicalli Plain (10%). The similarities in relative ceramic frequencies between the two sherd concentrations support the possibility that they relate to the same extensive sheet midden.

Ceramic frequencies from these contexts are substantially different from those associated with structure 1 and the trash midden. The relatively large amounts of Apolo Polychrome, Aquiahuac Burnt Orange, and Momoxpan Orange are balanced by the decrease in Ocotlán Red Rim, Cocoyotla Black on Natural, and Xicalli Plain. This evidence suggests that the two structural compounds were not contemporary. The abundance of Aquiahuac, and the relatively high frequencies of Cuaxiloa and Torre, however, contrast with the well 1 ceramic assemblage where Apolo predominated. Although the structure 2 ceramic complex is still not very well represented, I suspect that it and these associated features relate to an intermediate phase between the Early Postclassic structure 1 ceramic complex and the Late Postclassic well 1 assemblage.

SELECTED STRATIFIED UNITS

Two units, N4/E1 and N5/E1, were located north of structure 1 and its associated architectural features and produced stratified remains that were not severely impacted by construction disturbances. In these units, sterile soil was usually encountered at depths between 130 and 150 cm below ground surface. Note that this is approximately 50 cm lower than the plaster floors, indicating that structure 1 was built about 0.5 m above the natural surface.

Four levels were analyzed from unit N4/E1, ranging from 60 to 155 cm below the surface (the two plow-zone levels, 0 to 60 cm, were not analyzed). Levels III and IV (60 to 120 cm) contained large quantities of pottery mixed with fallen wall material. At a depth ranging from 130 to 137 cm, a layer of black muck was encountered that was culturally sterile.

Ceramic frequencies from unit N4/E1 are differentiated by level in table 5.6. In level III, Ocotlán Red Rim (12%) and Aquiahuac Burnt Orange (12%) were found in moderate proportions, while Apolo Polychrome was present in low frequency (8%). Undecorated types Momoxpan Orange (18%), Xicalli Plain (18%), and San Andrés Red (14%) were all found in moderate amounts. In level IV, the proportions of Aquiahuac (7%) and Apolo

Table 5.6 N4/E1 stratified ceramics (by level)

	III (60-87) *n* (%)	IV (87-120) *n* (%)	V (120-130) *n* (%)	VI (130-150) *n* (%)
Major Decorated Types				
APOLO BLACK & RED/ORANGE	13 (8)	12 (3)	0	0
Sencillo	7 (54)*	6 (50)*	0	0
Geometrico	2 (15)*	1 (8)	0	0
Elegante	4 (31)*	5 (42)*	0	0
AQUIAHUAC BURNT ORANGE	20 (12	33 (7)	0	1 (8)
Sencillo	2 (10)*	6 (18)*	0	0
Santa Catalina	0	1 (3)*	0	0
Zócalo	18 (90)*	26 (79)*	0	1 (100)*
COAPAN LACA POLYCHROME	5 (3)	1 (0.2)	0	0
COCOYOTLA BLACK/NATURAL	3 (1.8)	22 (5)	2 (4)	0
Sencillo	2 (67)*	14 (64)*	2 (100)*	0
Incised	0	3 (14)*	0	0
Banded	0	3 (14)*	0	0
Banded Elegante	1 (33)*	1 (5)*	0	0
Chalco Black on Orange	0	1 (5)*	0	0
CUAXILOA MATTE	4 (2)	7 (1.5)	1 (2)	0
OCOTLAN RED RIM	20 (12	69 (15)	13 (28)	6 (46)
Sencillo	15 (75)*	50 (72)*	10 (77)*	5 (83)*
Elegante	3 (15)*	9 (13)*	2 (15)*	0
Cristina Matte	1 (5)*	7 (10)*	0	1 (17)*
Other subtypes	0	3 (4)*	1 (8)*	0
SAN PEDRO POLISHED	1 (0.6)	5 (1.1)	3 (6)	0
TORRE RED & ORANGE/WHITE	3 (1.8)	7 (1.5)	0	0
Major Undecorated Types				
CERRO ZAPOTECAS SANDY PLAIN	5 (3)	9 (1.9)	1 (2)	0
MOMOXPAN METALLIC ORANGE	30 (18)	86 (18)	5 (11)	0
SAN ANDRÉS RED	23 (14)	46 (10)	3 (6)	1 (8)
TEPONTLA BURNISHED	5 (3)	23 (5)	2 (4)	2 (15)
XICALLI PLAIN	29 (18)	141 (30)	16 (34)	3 (23)
Minor Types				
COLONIAL/HISTORICAL	2 (1.2)	0	0	0
LATE POSTCLASSIC	0	1 (0.2)	0	0
EARLY POSTCLASSIC	0	1 (0.2)	0	0
CLASSIC	0	2 (0.4)	0	0
PRECLASSIC	0	1 (0.2)	1 (2)	0
UNIDENTIFIED	0	0	0	0
IDENTIFIABLE	163 (100) (65% of total)	466 (100) (78% of total)	47 (100) (77% of total)	13 (100) (76% of total)
UNIDENTIFIABLE				
ERODED/BURNT	9 (3)	11 (1.8)	1 (1.6)	0
TOO SMALL	77 (31)	120 (20)	13 (21)	4 (24)
TOTAL SHERDS	249 (100)	597 (100)	61 (100)	17 (100)

Note: Type frequencies are expressed as the proportion of the Total Identifiable sherds, and subtype frequency (*) relates to the corresponding type.

(3%) both decreased, with slight increases in the relative frequencies of Ocotlán (15%) and Cocoyotla (5%). The most dramatic increase was in the percentage of Xicalli Plain, which is present in very high frequency (30%). In levels V and VI Apolo was completely absent, while only one example of Aquiahuac was found in level VI. High to very high frequencies of Ocotlán Red Rim (28% and 46%) and Xicalli Plain (34% and 23%) were present in these two levels. A dramatic decrease in sample size in levels V and VI accentuates the differences in ceramic frequencies, but also introduces a potential for error.

Unit N5/E1 was also excavated in six levels to sterile soil reached at a depth of 137 cm. The bottom four levels were analyzed. The field notes from this excavation unit describe a high quantity of fallen adobe material in levels III to V, and a possible wall alignment in the northeast section of the unit. Beneath the collapsed wall at a depth of 125 cm, an adobe semicircle filled with charcoal was found immediately above sterile soil.

Other than levels III and IV, relatively few sherds were found in the analyzed levels, so sample size is a problem in the analysis of this unit (table 5.7). In level III there was an unusually high amount of the category "Unidentifiable-Too Small" (60% of total), so that even here the number of identifiable examples was relatively low. Decorated types included Aquiahuac, Coapan, and San Pedro Polished Red, and Minor types included examples from the Colonial/Historical and Late Postclassic periods. San Andrés Red was the most common undecorated type. In levels IV to VI, Ocotlán Red Rim was the most abundant of the decorated types, with Cocoyotla present in low frequencies. Xicalli Plain was present in high to very high proportions (20–30%).

Both of these stratified deposits contained mixed contents of collapsed adobe wall material approximately 50 to 120 cm below the surface and sterile soil at about 130 cm. Since no floors or walking surfaces were found associated with the mixed adobe, it is likely that the units were located outside of the walled area associated with the structure 1 compound, with the walls collapsing outward. The stratified ceramics have a similar pattern of Apolo and Aquiahuac polychromes in the upper levels of the wall debris but few examples of these types in the lower levels and beneath it. Instead, Ocotlán Red Rim and Xicalli Plain were the major types found, with a small amount of Cocoyotla Black on Natural. This pattern is consistent with the ceramic complex associated with structure 1, suggesting the possibility that the wall debris was associated with the compound, perhaps as part of the northern compound wall.

A second observation based on the analysis of these two stratified units is that the structure 1 compound (including the earlier structural remains) was built directly over natural soil. No evidence was found for occupation associated with the Terminal Formative/Classic-period platform found in the southern portion of the UA-1 project area (structure 3) and further exposed in the UA-69 and UA-70 excavations (Mountjoy and Peterson 1973).

SERIATION OF UA-1 CERAMIC ASSEMBLAGES

The analyses of the different depositional contexts produced varied distributions of relative ceramic frequencies, probably relating at least in part to temporal change. Since polychrome types made up significant portions of all of the major assemblages, they relate to the Postclassic period or later. Despite this basic similarity, however, distinctive patterns in the ceramic frequencies were apparent in the initial interpretations of the contexts. Thirteen assemblages were identified from discrete depositional contexts that contained a relatively high sample size (that is, at least seventy-five identifiable rim sherds). These assemblages are tabulated in table 5.8, using only the percentage of each type.

To order these assemblages into a linear series based on similarity, each pair of assemblages was converted into similarity coefficients using the Brainerd-Robinson Index of Agreement (Brainerd 1951; Robinson 1951; Marquardt 1982[1978]; Shennan 1988; Cowgill 1990). In this system, the total difference between the percentages of each type is calculated, and this total is subtracted from 200% (the maximum possible level of disagreement). This is expressed in the formula

$$IA_{jk} = 200 - \left(\sum_{i=1}^{m} | X_{ji} - X_{ki} | \right)$$

where the Index of Agreement (IA) of two assemblages (j and k) is 200 minus the sum of the absolute values of the differences between the percentages for each type. Thus a high index value will show greater similarity, and a low value will represent greater dissimilarity. For example,

Table 5.7 N5/E1 Stratified ceramics (by level)

	III (50–80) *n* (%)	IV (80–100) *n* (%)	V (100–112) *n* (%)	VI (112–137) *n* (%)
Major Decorated Types				
APOLO BLACK & RED/ORANGE	1 (1.6)	0	1 (3)	0
Sencillo	1 (100)*	0	0	0
Geométrico	0	0	0	0
Elegante	0	0	1 (100)*	0
AQUIAHUAC BURNT ORANGE	2 (3)	1 (1.4)	1 (3)	0
Sencillo	0	1 (100)*	1 (100)*	0
Santa Catalina	0	0	0	0
Zócalo	2 (100)*	0	0	0
COAPAN LACA POLYCHROME	2 (3)	0	0	0
COCOYOTLA BLACK/NATURAL	0	2 (3)	2 (6)	2 (7)
Sencillo	0	2 (100)*	1 (50)*	2 (100)*
Incised	0	0	1 (50)*	0
Banded	0	0	0	0
Banded Elegante	0	0	0	0
Chalco Black on Orange	0	0	0	0
CUAXILOA MATTE	0	1 (1.4)	0	0
OCOTLÁN RED RIM	0	16 (23)	7 (21)	8 (29)
Sencillo	0	13 (81)*	4 (57)*	6 (75)*
Elegante	0	0	1 (14)*	2 (25)*
Cristina Matte	0	2 (12)*	0	0
Other subtypes	0	1 (6)*	2 (29)*	0
SAN PEDRO POLISHED	2 (3)	3 (4)	1 (3)	0
TORRE RED & ORANGE/WHITE	0	1 (1.4)	0	0
Major Undecorated Types				
CERRO ZAPOTECAS SANDY PLAIN	3 (5)	6 (9)	2 (6)	3 (11)
MOMOXPAN METALLIC ORANGE	12 (19)	13 (19)	2 (6)	3 (11)
SAN ANDRÉS RED	22 (34)	9 (13)	6 (18)	1 (4)
TEPONTLA BURNISHED	4 (6)	3 (4)	1 (3)	3 (11)
XICALLI PLAIN	11 (17)	14 (20)	10 (30)	7 (25)
Minor Types				
COLONIAL/HISTORICAL	3 (5)	0	0	0
LATE POSTCLASSIC	2 (3)	0	0	0
EARLY POSTCLASSIC	0	0	0	0
CLASSIC	0	0	0	1 (4)
PRECLASSIC	0	0	0	0
UNIDENTIFIED	0	0	0	0
IDENTIFIABLE	64 (100) (33% of total)	69 (100) (64% of total)	33 (100) (75% of total)	28 (100) (80% of total)
UNIDENTIFIABLE				
ERODED/BURNT	13 (7)	10 (9)	3 (7)	0
TOO SMALL	116 (60)	29 (27)	8 (18)	7 (20)
TOTAL SHERDS	193 (100)	108 (100)	44 (100)	35 (100)

Note: Type frequencies are expressed as the proportion of the Total Identifiable sherds, and subtype frequency (*) relates to the corresponding type

Table 5.8 UA-1 Ceramic frequencies from major depositional contexts (by percentage)

	A	B	C	D	E	F	G	H	I	J	K	L	M
APOLO	46	6	0	0	1	2	9	0	0	11	4	18	12
AQUIAHUAC	4	4	0	0	1	1	3	0	0	8	21	9	10
COAPAN	0	0	0	0	0	0	1	0	0	1	1	1	1
COCOYOTLA	0	2	7	8	6	11	4	6	8	2	6	0	2
CUAXILOA	2	2	8	25	1	3	3	5	0	5	4	5	3
OCOTLÁN	0	2	11	8	24	27	15	21	33	8	4	1	7
SAN PEDRO	1	4	2	1	2	2	2	1	4	2	2	0	2
TORRE	1	1	8	11	0	1	1	4	0	4	4	1	2
C ZAPOTECAS	1	4	3	2	3	1	4	0	4	3	1	6	3
MOMOXPAN	24	20	20	16	12	19	21	18	15	20	25	27	27
SAN ANDRÉS	14	29	7	10	9	7	13	9	13	13	10	14	16
TEPONTLA	1	1	3	1	5	3	3	4	0	2	2	0	2
XICALLI	4	6	29	18	35	23	21	33	23	20	13	17	10
COLONIAL/ HISTORIC	0	20	0	0	0	0	1	0	0	1	0	0	2
LATE POSTCLASSIC	2	0	0	0	0	0	0	0	0	0	1	0	0
EARLY POSTCLASSIC	0	0	0	0	0	0	0	0	0	0	0	0	0
CLASSIC	1	0	1	0	0	0	0	0	0	0	1	0	0
PRECLASSIC	0	0	0	0	0	0	0	0	0	0	0	0	0
UNIDENTIFIED	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	100	100	100	100	100	100	100	100	100	100	100	100	100

Key: A = well 1; B = well 2; C = trash midden; D = well 3; E = below porch; F = structure 1 floor contact; G = structure 1 above floor; H = temazcal; I = S6/W3 burial ; J = structure 2 above floor; K = intrusive midden; L = sherd concentration 1; M = sherd concentration 2

Table 5.9 Similarity Matrix of UA-1 Assemblages

	A	B	C	D	E	F	G	H	I	J	K	L	M
1. A	200	106	76	71	62	77	110	70	67	115	108	136	128
2. B	106	200	92	85	80	91	124	82	91	125	110	116	134
3. C	76	92	200	153	150	155	150	168	137	147	130	110	118
4. D	71	85	153	200	117	128	127	135	124	134	121	105	109
5. E	62	80	150	117	200	163	144	174	159	123	106	92	102
6. F	77	91	155	128	163	200	157	165	166	136	123	107	115
7. G	110	124	150	127	144	157	200	148	147	175	138	146	156
8. H	70	82	168	135	174	165	148	200	149	137	122	102	108
9. I	67	91	137	124	159	166	147	149	200	126	103	101	105
10. J	115	125	147	134	123	136	175	137	126	200	151	161	171
11. K	108	110	130	121	106	123	138	122	103	151	200	140	154
12. L	136	116	110	105	92	107	.146	102	101	161	140	200	164
13. M	128	134	118	109	102	115	156	108	105	171	154	164	200

comparing the well 1 assemblage (A) with the well 2 assemblage (B) produces these results:

| 46 - 6 | = 40	
| 4 - 4 | = 0	
| 0 - 0 | = 0	
| 0 - 2 | = 2	
| 2 - 2 | = 0	
| 0 - 2 | = 2	
| 1 - 4 | = 3	
| 1 - 1 | = 0	
| 1 - 4 | = 3	
| 24 - 20 | = 4	
| 14 - 29 | = 15	
| 1 - 1 | = 0	
| 4 - 6 | = 2	
| 0 - 20 | = 20	
| 2 - 0 | = 2	
| 0 - 0 | = 0	
| 1 - 0 | = 1	
| 0 - 0 | = 0	$IA_{AB} = 200 - (94)$
| 0 - 0 | = 0	
94	$IA_{AB} = 106$

The Brainerd-Robinson Index of Agreement values for the thirteen assemblages are recorded in a "similarity matrix" (table 5.9), where each line represents the similarity coefficient of that assemblage compared with the assemblage of the corresponding column. The principal diagonal maintains a constant value of 200, since any assemblage compared to itself will be perfectly similar.

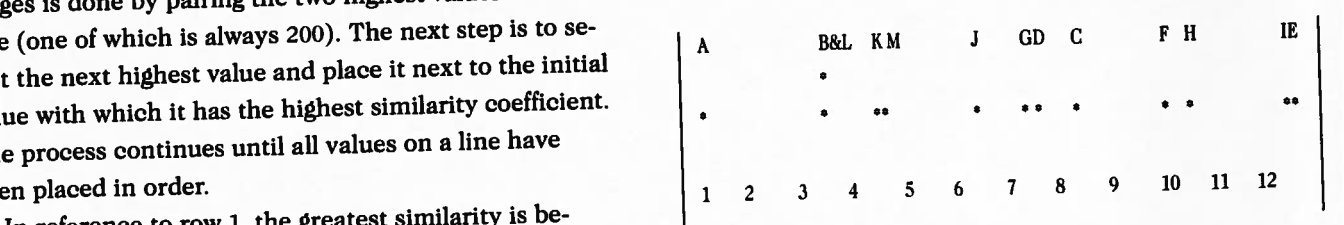
In simple, well-behaved data sets, this matrix can be rearranged heuristically to construct a seriation where the similarity coefficients decrease as they move away from the principal diagonal. A more rigorous and replicable method for generating a seriation has been suggested by Renfrew and Sterud (1969) and elaborated by Gelfand (1971). In Gelfand's Method II (see Marquardt 1982[1978]:419–421), the Brainerd-Robinson values are systematically sorted by order of similarity and then the rankings of each row are averaged to produce the best possible seriation. The actual ordering of the assemblages is done by pairing the two highest values on the line (one of which is always 200). The next step is to select the next highest value and place it next to the initial value with which it has the highest similarity coefficient. The process continues until all values on a line have been placed in order.

In reference to row 1, the greatest similarity is between A (200) and L (136). The next highest value is for M (128). To determine where M should be placed in relation to the initial pair, its coefficient of similarity is compared for MA (128) and ML (164). Since ML is greater, M is placed next to L, so that the string becomes A - L - M. The next highest value is J (115). The comparison is now made between JA (115) and JM (171), with the greatest value that of JM. The seriation is expanded to A - L - M - J. This systematic ordering continues until the entire row is complete, and is then repeated for each of the remaining rows. For the UA-1 data, the corrected seriation orders by row are:

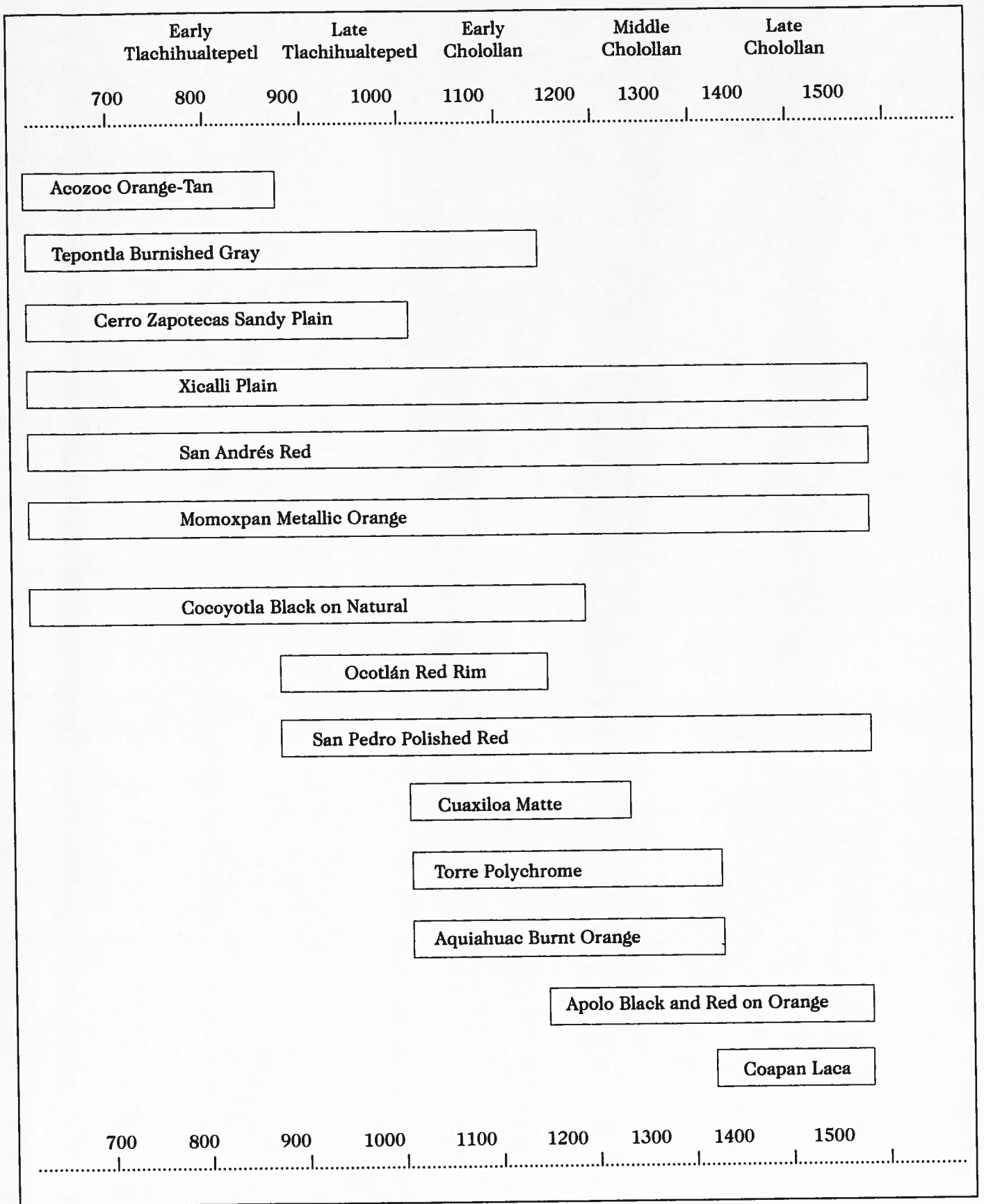
1. A - L - M - J - G - K - B - F - C - D - H - I - E
2. A - K - L - G - J - M - B - C - F - I - D - H - E
3. A - B - L - M - K - D - C - H - F - E - G - J - I
4. A - B - L - M - K - D - C - H - J - F - G - I - E
5. A - B - L - M - K - D - J - G - C - E - H - F - I
6. A - B - L - M - K - D - J - C - G - I - F - H - E
7. A - B - D - K - L - M - J - G - F - C - H - I - E
8. A - B - L - M - K - D - J - G - C - H - E - F - I
9. A - B - L - K - M - D - J - C - G - H - E - F - I
10. A - B - K - L - M - J - G - C - H - F - D - I - E
11. A - B - K - M - J - L - G - C - F - H - D - E - I
12. A - G - J - M - L - K - B - C - F - D - H - I - E
13. A - K - L - M - J - G - B - C - F - D - H - I - E

The final step is to calculate the average rank order for the thirteen different seriations. This is done by assigning a numerical rank to each assemblage per row and then totaling that rank for all rows. For example, in Row 1, A = 1, L = 2, M = 3, J = 4, and so on. The rank average is determined by dividing the rank totals by 13 (the number of assemblages). The rank average for each assemblage is: A=1; B=3.5; C=8.2; D=7.8; E=12.2; F=9.9; G=7.3; H=10.3; I=12.1; J=6.5; K=4.2; L=3.5; and M=4.4.

These rank averages can be graphed (figure 5.3) to show not only the order of the assemblages, but also clusters based on similarity. At the far left, is the well 1



5.3 Graph of averaged rank order of UA-1 ceramic assemblages



5.4 Battleship graph of Postclassic ceramic chronology

assemblage (A), which was the most dissimilar because of its exceptionally high concentration of Apolo Polychrome. The first cluster includes well 2 (B), concentrations 1 and 2 (L and M), and the intrusive midden (K). A more dispersed cluster includes the fill deposits from above the two floors (J and G), and the well 3 (D) and trash midden (C) assemblages. Another grouping is formed by the structure 1 floor contact deposit (F) and temazcal (H) materials. Finally, nearly identical rank averages were produced for the assemblages from the S6/W3 burials (I) and from below the structure 1 porch (E).

This ranking correlates well with an intuitive ranking based on stratigraphic relationships and diagnostic artifacts, with one significant exception. Well 2, with its high concentration of Colonial/Historic period ceramics (and other evidence for post-Conquest deposition), was clustered with assemblages of probable pre-Columbian origin, and appears earlier than well 1. A plausible explanation for this apparent error is that, with the exception of glazed serving wares, traditional pottery types continued in use, particularly as utilitarian types. Colonial/Historic pottery, possibly used for purposes of display, took the place of Apolo Polychrome, the predominant Late Postclassic serving type. I suspect that this assemblage may have also contained a small amount of redeposited fill based on the fairly high number of small sherds and the persistent presence of Early Postclassic types such as Xicalli Plain, Cocoyotla Black on Natural, and Ocotlán Red Rim.

Other aspects of the rank order, however, do correspond well with the stratigraphy. For example, the intrusive midden (K) and the sherd concentrations (L and M) fall to the left of, or later than, the structure 2 fill deposits; and the structure 1 fill (G) falls later than the floor contact (F), which in turn was later than the materials from below the porch (E). The relationship between the trash midden (C) and well 3 (D) is interesting because, although they are very close on the scale, the well assemblage is later than the midden. Based on this grouping, the temazcal assemblage was closely associated with the materials from the structure 1 floor contact, and the burials found at S6/W3 date to a period before the abandonment of structure 1.

To orient this seriation in time relative to the chronological framework suggested in chapter 2, the rank order and corresponding ceramic frequencies are used to construct a series of "battleship" curves (figure 5.4). This graphic presents an idealized perspective and future analyses of additional ceramic assemblages will further refine the sequence; note that recently analyzed assemblages such as the San Pedro well and R-106 (McCafferty 1996a) tend to support the current scheme. In general terms the pattern that emerges is of relatively rapid change in the popularity of decorated serving types, while undecorated utilitarian types undergo relatively little change. During the Middle Tlachihualtepetl phase (900–1050 CE), the principal serving wares were Xicalli Plain, Ocotlán Red Rim, and Cocoyotla Black on Natural, with utilitarian vessels of the types Momoxpan Orange, San Andrés Red, and Cerro Zapotecas Sandy Plain. By the Late Tlachihualtepetl phase (1050–1200 CE), Cuaxiloa Matte and Torre Polychrome were introduced as serving wares, and Cocoyotla subtype Banded became more common than the Sencillo subtype. During the Early Chololan phase (1200–1400 CE), the proportions of Xicalli, Ocotlán, and Cocoyotla were reduced, and Aquiahuac Burnt Orange and Apolo Black and Red on Orange Polychrome were introduced. The utilitarian types remained fairly constant. Finally, in the Late Chololan phase (1400–1520 CE) Apolo Polychrome was the predominant decorated type, with a minor presence of Aquiahuac and Coapan Laca. Momoxpan Orange and San Andrés Red remained as the major utilitarian types.

On the basis of this reconstruction of the Postclassic ceramic sequence, the materials from structures 1 and 2 are not contemporary. Structure 1 and its associated features (including the temazcal and the S6/W3 burials) date to the Middle Tlachihualtepetl phase, while the trash midden and well 3 date to the Late Tlachihualtepetl phase. Structure 2 was occupied several centuries later, in the Early Chololan period. The well 1 assemblage, with its very high proportion of Apolo Polychrome, dates to the Late Chololan period and passed intrusively through the structure 1 occupation levels.

VESSEL-FORM ANALYSIS OF UA-1 CERAMICS

This section focuses on vessel form as a means of inferring vessel function. The analysis combines specific forms into functional vessel types and vessel classes for subsequent interpretations. These include a comparison of vessel-form frequencies from the trash midden, using both sherd counts and degree-of-arc measurements; a comparison of vessel-form frequencies from the four pr

Table 5.10 Vessel-form analysis from the UA-1 trash midden

Vessel form	Sherd count *n* (%)	Degree of arc *n* (%)	Min. # of vessels
Plate	13 (0.5)	276 (0.5)	0.77
Comal	571 (20)	7981 (13)	22.2
Outleaned-wall dish	429 (15)	11051 (19)	30.7
Flared rim	181 (42)*	4358 (39)*	12.1*
Subhemispherical dish	6 (0.2)	160 (0.3)	0.44
Outleaned-wall bowl	8 (0.3)	114 (0.2)	0.32
Everted lip	1 (12)*	15 (13)*	0.04*
Subhemispherical bowl	657 (23)	13156 (22)	36.5
Everted "L" lip	3 (0.5)*	(63 (0.5)*	0.18*
Hemispherical bowl	40 (1.4)	722 (1.2)	2.0
Flared rim	1 (2)*	20 (3)*	0.06*
Conical bowl	522 (18)	10636 (18)	29.5
Finger-impressed rim	1 (0.2)*	20 (0.2)*	0.06*
Flared rim	214 (41)*	4414 (42)*	12.3*
Everted lip	19 (4)*	340 (3)*	0.94*
Cylindrical bowl	2 (0.07)	46 (0.08)	0.13
Flared rim	2 (100)*	46 (100)*	0.13*
Superhemispherical bowl	269 (9)	6025 (10)	16.7
Composite silhouette bowl	3 (0.1)	44 (0.07)	0.12
Long-neck olla	51 (1.8)	1839 (03)	5.1
Everted "L" lip	7 (14)*	198 (11)*	0.55
Small-mouth olla	43 (1.5)	978 (1.6)	2.7
Wide-mouth olla	37 (1.3)	850 (1.4)	2.4
Hemispherical cazuela	23 (0.8)	343 (0.6)	0.95
Flared rim	8 (35)*	170 (50)*	0.47*
Conical cazuela	52 (1.8)	830 (1.4)	2.3
Flared rim	27 (52)*	405 (49)*	1.1*
Everted lip	25 (48)*	425 (51)*	1.2*
Conical maceta	26 (0.9)	382 (0.6)	1.1
Brasero	34 (1.2)	781 (1.3)	2.2
Tecomate	9 (0.3)	238 (0.4)	0.66
Inverted rim	6 (67)*	130 (55)*	0.36*
Vertical rim	2 (22)*	95 (40)*	0.26*
Biconical copa	34 (1.2	1362 (2)	3.8
Tripod incense burner	7 (0.2)	275 (0.5)	0.76
Sahumador	26 (0.9)	674 (1.1)	1.9
Florero	2 (0.07)	255 (0.4)	0.71
Ladle	1 (0.03)	**	**
Miniature vessel	1 (0.03)	8 (0.01)	0.02
Lantern censer	15 (0.5)	345 (0.6)	0.96
TOTALS	2881 (100)	59371 (100)	165.49

* Form frequencies are expressed as the proportion of the total, and rim form frequency relates to the corresponding vessel form.

** Degree-of-arc measurement could not be made for the elongated ladle form.

mary depositional contexts;the combination of vessel forms into vessel types and classes for the primary contexts; and the tabulation of vessel type and class frequencies in other depositional contexts.

TRASH MIDDEN VESSEL FORMS

The extensive trash midden located south of structure 1 contained the highest concentration of vessel fragments of any of the primary contexts. Furthermore, since artifactual evidence links the midden with the terminal occupation phase of structure 1, it therefore provides a potential source for comparing an assemblage of secondary refuse with materials from the same behavioral system that were either abandoned as de facto refuse or dropped as primary refuse (Schiffer 1987).

Table 5.10 presents the distribution of different vessel forms found in the trash midden using two distinct methods for characterizing the amount present. In the first column vessel forms are listed together with rim form variants. The second column provides the number of sherds present per form, as well as its proportion in the total assemblage. For example, 429 sherds were identified as outleaned-wall dishes, or 15% of the total assemblage. For alternative rim forms, the number in parenthesis represents the count and percentage of the total form. Again using the outleaned-wall dish vessel form, 181 examples were identified with a flared rim, making up 42% of the form total.

Based on sherd counts, subhemispherical bowl fragments were the most abundant vessel form present, occurring as 23% of the total assemblage. Comal fragments were also found in high proportion (20%). Conical bowl (18%) and outleaned-wall dish (15%) fragments were present in moderate amounts, and superhemispherical bowl fragments were found in low frequency (9%). Surprisingly, other than comales, utilitarian vessel forms were rare, with long-neck ollas (1.8%), small-mouth ollas (1.5%), wide-mouth ollas (1.3%), and conical cazuelas (1.8%) each present as less than 2% of the total assemblage.

A second measure of vessel-form frequency was determined based on the total degrees of arc for each vessel form. Degree-of-arc measurements have potential for controlling bias introduced by vessel forms with unusually large or small orifice dimensions (for example, comales versus copas). In the third column of the table, the degree-of-arc total is given, followed by its percentage of the total assemblage. Thus, for the outleaned-wall dish category, the degree-of-arc total was 11,051, making up 19% of the total assemblage.

In comparing the degree-of-arc totals with the sherd counts, the most obvious difference is, as expected, in the relative frequency of comal fragments. Based on degrees of arc, this form made up only 13% of the total assemblage as opposed to 20% based on sherd count. The other significant difference is in terms of outleaned-wall dish fragments, as noted. Other than these two exceptions, the results of the different methods of analysis were quite similar.

The fourth column of table 5.10 presents the minimum number of vessels for each form. Using the degree-of-arc measurement, it is possible to estimate the minimum number of individual vessels for each form by dividing the total degree-of-arc value by 360, the number of degrees in a complete rim. The 11,051 degrees of arc for the outleaned-wall dish form can therefore be reduced to a minimum of 30.7 vessels. Based on the figures in column four, the trash midden contained a minimum of 166 vessels; this total does not include the eighty-one complete or reconstructable vessels that were not available for analysis, but were identified in the original object cards.

Relating the minimum number of vessels to the kitchen tool kit assumes a constant breakage rate. For example, the high relative frequency of serving wares in contrast to utilitarian wares (121:38) does not necessarily imply the actual proportion of these vessel classes in the average kitchen assemblage because the breakage rates may have varied considerably (Isaac 1986). A comparison of the trash midden ratio with one from the structure 1 floor contact (discussed below) provides a means for evaluating the breakage rate.

George Foster (1960) studied the ethnographic use life of pottery vessels from Tzintzuntzan, Michoacan. One notable result was an estimate that comales were replaced approximately once every six months. A similar rate was calculated for modern comal users from the Cholula area (Mountjoy and Peterson 1973:35). Peterson (1972; Mountjoy and Peterson 1973:35–36) used this rate to calculate the possible duration of midden use (based on varying number of households sharing a single midden) for the Faculty Housing Complex trash pit.

Comal fragments from the UA-1 trash midden can also be used cautiously to estimate the duration of deposi-

Table 5.11 Vessel forms from primary contexts

Vessel form	Well 1 *n* (%)	Well 2 *n* (%)	Trash midden *n* (%)	Well 3 *n* (%)
Plate	6 (1.7)	2 (0.5)	13 (0.5)	1 (0.4)
Comal	89 (25)	105 (28)	571 (20)	56 (22)
Outleaned-wall dish	55 (15)	18 (5)	429 (15)	23 (9)
Flared rim	55 (100)*	16 (89)*	181 (42)*	16 (70)*
Subhemispherical dish	4 (1.1)	2 (0.5)	6 (0.2)	3 (1.2)
Outleaned-wall bowl	0	1 (0.3)	8 (0.3)	2 (0.8)
Flared rim	0	0	0	1 (50)*
Everted lip	0	0	1 (12)*	0
Subhemispherical bowl	21 (6)	69 (18)	657 (23)	34 (14)
Flared rim	0	1 (1.4)*	0	0
Everted lip	1 (5)*	3 (4)*	0	0
Everted "L" lip	0	0	3 (0.5)*	0
Hemispherical bowl	13 (4)	0	40 (1.4)	12 (5)
Flared rim	0	0	1 (2)*	3 (25)*
Conical bowl	109 (31)	73 (19)	522 (18)	48 (19)
Finger-impressed rim	0	0	1 (0.2)*	0
Flared rim	3 (3)*	7 (10)*	214 (41)*	23 (48)*
Everted lip	0	2 (3)*	19 (4)*	0
Cylindrical bowl	0	0	2 (0.07)	0
Flared rim	0	0	2 (100)*	0
Superhemispherical bowl	12 (3)	15 (4)	269 (9)	41 (16)
Composite silhouette bowl	0	0	3 (0.1)	0
Long-neck olla	17 (5)	12 (3)	51 (1.8)	5 (2)
Ridged neck	(11 (65)	(6 (50)	0	0
Flanged neck	(6 (35)	(1 (8)	0	1 (20)*
Everted "L" lip	0	0	7 (14)*	0
Small-mouth olla	2 (0.6)	8 (2)	43 (1.5)	1 (0.4)
Conical neck	1 (50)*	0	**	0
Short neck	0	2 (25)*	**	0
Flared rim	1 (50)*	4 (50)*	**	1 (100)*
Bolstered lip	0	2 (25)*	**	0
Wide-mouth olla	12 (3)	16 (4)	37 (1.3)	4 (1.6)
Flanged neck	0	4 (25)*	**	0
Flared rim	4 (33)*	3 (19)*	**	4 (100)*
Everted rim	8 (67)*	5 (31)*	**	0
Bolstered rim	0	1 (6)*	**	0
Outleaned-wall cazuela	1 (0.3)	6 (1.6	0	0
Hemispherical cazuela	4 (1.1)	12 (3)	23 (0.8)	6 (2)
Flared rim	1 (25)*	6 (50)*	8 (35)*	3 (50)*
Conical cazuela	1 (0.3)	19 (5)	52 (1.8)	4 (1.6)
Square lip	0	2 (11)*	0	0
Flared rim	0	0	27 (52)*	1 (25)*
Everted lip	1 (100)*	5 (26)*	25 (48)*	1 (25)*
Conical maceta	0	1 (0.3)	26 (0.9)	2 (0.8)
Cylindrical maceta	1 (0.3)	10 (3)	0	1 (0.4)
Low wall	0	5 (50)*	0	0
Square lip	1 (100)*	5 (50)*	0	1 (100)*
Superhemispherical Maceta	0	3 (0.8)	0	0
Bracero	1 (0.3)	0	34 (1.2)	1 (0.4)
Tecomate	0	0	9 (0.3)	1 (0.4)
Inverted rim	0	0	6 (67)*	0
Vertical rim	0	0	2 (22)*	0
Biconical copa	1 (0.3)	1 (0.3)	34 (1.2)	2 (0.8)
Biconical bowl	0	1 (0.3)	0	1 (0.4)
Tripod incense burner	0	0	7 (0.2)	0
Sahumador	1 (0.3)	1 (0.3)	26 (0.9)	0
Florero	0	0	2 (0.07)	0
Ladle	0	0	1 (0.03)	0
Miniature vessel	4 (1.1)	0	1 (0.03)	0
Lantern censer	1 (0.3)	2 (0.5)	15 (0.5)	1 (0.4)
TOTALS	355 (100)	377 (100)	2881 (100)	249 (100)

Note: Form frequencies are expressed as the proportion of the total, and rim form frequency (*) relates to the corresponding vessel form. Rim form not distinguished during trash midden analysis (**).

tion. Based on an estimated minimum of twenty-two comales in the deposit, it could have accumulated over a period of eleven years if the deposit was used exclusively by a single nuclear family, 5.5 years if used by two families, or a single year if used by eleven families. A variety of variables could affect this estimate, including the presence of additional comales among the missing vessels. Nevertheless, the estimated duration of the UA-1 midden deposit suggests a relatively short use life for the feature, on the order of less than a single generation. Evidence from mendable vessels with pieces found in different levels of the feature supports this estimate.

VESSEL-FORM ANALYSIS FROM PRIMARY CONTEXTS

Detailed vessel-form analysis of the four primary contexts relating to secondary refuse disposal provides an opportunity to study possible diachronic changes in kitchen assemblages during the Postclassic and Early Colonial periods. Table 5.11 presents the sherd count data and relative frequencies for well 1, well 2, the trash midden, and well 3.

In well 1 conical bowls were the most abundant vessel form present (31% of the total assemblage). Comales were also present in high proportion (25%), and outleaned-wall dishes were moderately common (15%). Forms present in low and very low amounts included subhemispherical bowls (6%), hemispherical bowls (4%), superhemispherical bowls (3%), long-neck ollas (5%), and wide-mouth ollas (3%).

Well 2 was distinctive in that comal fragments made up the most abundant vessel form (28% of the total). Subhemispherical bowls (18%) and conical bowls (19%) were both present in moderate amounts, and other forms found in low and very low percentages included outleaned-wall dishes (5%), superhemispherical bowls (4%), long-neck ollas (3%), small-mouth ollas (2%), wide-mouth ollas (4%), hemispherical cazuelas (3%), conical cazuelas (5%), and cylindrical macetas (3%).

As described above, subhemispherical bowls (23%) and comales (20%) were the most common vessel forms found in the trash midden on the basis of sherd count. Outleaned-wall dishes (15%), conical bowls (18%), and superhemispherical bowls (9%) were also common.

The well 3 assemblage had a high proportion of comal fragments (22%). Forms present in moderate amounts included conical bowls (19%), subhemispherical bowls (14%), and superhemispherical bowls (16%). Outleaned-wall dishes (9%) and hemispherical bowls (5%) were found in low proportions, and long-neck ollas (2%) and hemispherical cazuelas (2%) were both present in very low percentages.

Comparison of the vessel forms from these primary depositional contexts indicates a general consistency in the abundance of comales and scarcity of other utilitarian forms. This is most apparent in the trash midden deposit, where no other utilitarian forms accounted for more than 2% of the assemblage. The well 2 deposit had the highest relative frequency of utilitarian forms. The low proportions of utilitarian forms, however, may relate to longer use life of these vessel types and also to the very high proportions of serving wares. It should be noted that the general forms found remain fairly constant, with the possible exception of outleaned-wall cazuelas and conical and cylindrical macetas, which are not found in all assemblages.

The primary contexts also displayed variation in the specific forms of serving wares. Conical bowls, for example, were most common in wells 1, 2, and 3, while subhemispherical bowls were more abundant in the trash midden. While direct rim conical bowls were predominant from wells 1 and 2, nearly half of the conical bowls from the trash midden and well 3 had flared rims. Superhemispherical bowls were more common in the trash midden and well 3 than in the other contexts. Outleaned-wall dishes were fairly consistent in the well 1, trash midden, and well 3 deposits, but the percentage dropped dramatically in well 2.

Several possible explanations can be suggested for these observed differences. Changing cultural foodways in the types of foods prepared and the manner of consumption may account for the higher numbers of superhemispherical bowls in the earlier trash midden and well 3 assemblages. This form may have been used for drinking liquid foods such as atole, and the evidence for burning that was common on this vessel form indicates that it may also have been used for heating liquids. In contrast, the decline in outleaned-wall dishes in well 2 may indicate a reduction in the consumption of dry foods in favor of a greater reliance on stews eaten out of bowls.

Other variations in specific vessel forms may not represent functional differences in cultural foodways, but instead may be evidence of isochrestic variation in morphology, perhaps related to changing social definitions of

Table 5.12 Vessel types from primary contexts

Vessel form	Well 1 *n* (%)	Well 2 *n* (%)	Trash midden *n* (%)	Well 3 *n* (%)
UTILITARIAN WARES				
Comal	89 (25)	105 (28)	571 (20)	56 (22)
Olla	31 (9)	36 (10)	131 (5)	10 (4)
Cazuela	6 (1.7)	37 (10)	75 (3)	10 (4)
Maceta	1 (0.3)	14 (4)	26 (0.9)	3 (1.2)
Tecomate	0	0	9 (0.3)	1 (0.4)
SERVING WARES				
Plato	65 (18)	22 (6)	448 (16)	27 (11)
Cajete	155 (44)	158 (42)	1501 (52)	137 (55)
Copa	1 (0.3)	2 (0.5)	34 (1.2)	3 (1.2)
CEREMONIAL WARES				
Brasero	1 (0.3)	0	34 (1.2)	1 (0.4)
Tripod censer	0	0	7 (0.2)	0
Sahumador	1 (0.3)	1 (0.3)	26 (0.9)	0
Lantern censer	1 (0.3)	2 (0.5)	15 (0.5)	1 (0.4)
Miniature vessel	4 (1.1)	0	1 (0.03)	0
TOTALS	355 (100)	377 (100)	2878 (100)	249 (100)

Table 5.13 Vessel class analysis from primary contexts

Vessel class	Well 1 *n* (%)	Well 2 *n* (%)	Trash midden *n* (%)	Well 3 *n* (%)
Utilitarian wares	127 (36)	192 (51)	812 (28)	80 (32)
Serving wares	221 (62)	182 (48)	1983 (69)	167 (67)
Ceremonial wares	7 (2)	3 (0.8)	83 (3)	2 (0.8)
TOTALS	355 (100)	377 (100)	2878 (100)	249 (100)

Table 5.14 Vessel types from additional contexts

Vessel form	Structure 1 floor contact n (%)	Structure 2 intrusive midden *n* (%)	Concentrations 1 & 2 *n* (%)
UTILITARIAN WARES			
Comal	87 (20	40 (24	259 (29)
Olla	19 (4	7 (4	63 (7)
Cazuela	9 (2	7 (4	59 (7)
Maceta	0	1 (0.6	17 (1.9)
Tecomate	0	0	5 (0.6)
Serving wares			
Plato	9 (2	31 (18	114 (13)
Cajete	303 (70	83 (49	349 (39)
Copa	0	0	2 (0.2)
CEREMONIAL WARES			
Brasero	3 (0.7)	0	6 (0.7)
Tripod censer	1 (0.2)	1 (0.6)	0
Sahumador	2 (0.5)	0	4 (0.5)
Lantern censer	1 (0.2)	0	4 (0.5)
Miniature vessel	0	0	5 (0.6)
TOTALS	434 (100)	170 (100)	887 (100)

prototypical vessel forms (Kempton 1981). Examples of this kind of change might be seen in the shifting importance of superhemispherical and conical bowls, both of which would be used for consuming liquid foods such as stews, and also in the changing ratios of direct and flared rim conical bowls. Variation between these forms may not necessarily relate to changes in foodways, but could be sensitive to other aesthetic principles that structured ceramic consumption.

ANALYSIS OF VESSEL TYPE AND CLASS FROM PRIMARY CONTEXTS

The detailed analysis of vessel forms from the four primary contexts identified variations in specific forms, particularly serving wares. Lumping forms into functional vessel types provides a means of eliminating isochrestic variation from the analysis. This step is important for generalizing a kitchen tool kit for functional interpretations of different features. Vessel type data from the primary contexts are summarized in table 5.12.

The most significant differences in the relative frequencies of vessel types involve the utilitarian types olla, cazuela, and maceta. There were roughly twice as many of these types in well 2 as in either the trash midden or well 3. Ollas occurred in well 1 in comparable proportion to those in well 2, but the number of cazuelas and macetas were relatively low. Among the serving wares, well 2 had a notably low percentage of platos in contrast to the other assemblages. In addition, the trash midden and well 3 had larger amounts of cajetes and copas than the other assemblages. The relatively low number of copa fragments, and also ceremonial types, makes sample size a potential bias for interpreting the quantitative significance of these vessel types.

Overall, the distribution of vessel types was relatively consistent among the primary contexts. The greatest differences occurred in well 2 especially in the types cazuela, maceta, and plato. Assuming that breakage rates remained constant, this suggests that the well 2 kitchen tool kit contained relatively more of the utilitarian types but fewer platos. Functionally, this difference may again be related to an increased importance of foods of stew-like consistency. As the deposit that differs most from the other assemblages, well 2 can be interpreted as the greatest example of discontinuity in cultural foodways in this sequence. Because well 2 dated to the Colonial/Historical period, the kitchen tool kit probably reflects changes related to the introduction of new foods, food customs, and/or access to food goods, and therefore hints at the potential significance of studying foodways in relation to culture contact.

The relative frequency of serving to utilitarian wares is more clearly revealed when types are collapsed into vessel classes. This quantification is shown in table 5.13. Here the obvious feature is that more than half of the fragments from well 2 were utilitarian wares, in contrast to the other assemblages where utilitarian types made up 28 to 36% of the assemblage. The proportion of ceremonial wares remained relatively constant in all of these contexts.

Several possible explanations could account for this pattern. If these contexts all represent domestic refuse rather than deposits from other specialized activities, then it could suggest that these represent differences in socioeconomic status (Drennan 1974; Smith 1987b). Following this approach, household units of higher status consume relatively greater amounts of serving wares through ritual and social obligations such as feasting. The relatively low ratio of serving wares to utilitarian wares in well 2 may therefore be an indication of reduced status in the Colonial/Historical period. Alternatively, it may reflect changes in the display of status vis-à-vis group consumption, or even a change in household organization and consumption patterns. Obviously additional research is needed to investigate these aspects of cultural foodways.

VESSEL TYPE AND CLASS FROM ADDITIONAL DEPOSITS

The vessel type and vessel class data from the four primary deposits can be contrasted with that of other deposits, including the structure 1 floor contact, the intrusive midden in structure 2, and the extensive sheet midden identified as sherd concentrations 1 and 2. These data are presented in table 5.14.

The structure 1 floor contact deposit is of interest because of the potential for comparing secondary refuse from the trash midden with remains of primary and possible de facto refuse relating to the structure floor. This potential is enhanced by the possibility that the two contexts relate to the same systemic context.

The most significant difference between the two assemblages is in the very low percentage of platos in the floor contact collection. There is an increase, however, in

the number of cajetes. This may indicate a ritual role for platos that created a specialized depositional pattern in the trash midden that was not reflected in the floor contact assemblage. Although only present as a trace in relation to other vessel forms in the trash midden, a relatively large number of copa fragments (1.2%, n=34) were found, in contrast to the absence of copas from the floor contact assemblage. Apart from these differences, however, the assemblages are quite similar.

The intrusive midden and sherd concentration deposits were both associated with the well 2 deposit in the seriation analysis, although it was noted that this association may reflect a degree of mixing of earlier material into the Colonial/Historical deposit. In comparing these features to wells 1 and 2, the percentages of platos are more similar to well 1. This may indicate that these additional features predate the change in socioeconomic status and/or food practice suggested by the decrease in this vessel type in the Colonial/Historic assemblage. The frequencies of cazuelas were intermediate between the two values from the well deposits.

6 Summary and Discussion

The UA-1 ceramic analysis concentrated on assemblages from thirteen depositional contexts relating to the two Postclassic structures and stratigraphically associated features such as the intrusive wells 1 and 2. These ceramic remains were analyzed by type and subtype, and the contexts were seriated to construct a diachronic sequence for the Middle and Late Tlachihualtepetl phases, Early and Late Cholollan phases, and Colonial/Historic period. The deposits were also analyzed by vessel form to interpret differences in consumption practices through time and between specific contexts.

Decorated serving ware types went through relatively rapid changes in terms of consumption patterns. Polychrome ceramics were not present at the Early Tlachihualtepetl phase (700–900 CE) assemblage from the Patio of the Carved Skulls at the Great Pyramid of Cholula where the predominant serving wares were Tepontla Burnished and Cocoyotla Black on Natural (McCafferty and Suárez C. 1995; McCafferty 1996a). Utilitarian wares also included a combination of Classic (Acozoc Tan/Orange) and Postclassic diagnostics (Momoxpan Metallic Orange and San Andrés Red).

The Middle Tlachihualtepetl phase (900–1050 CE) assemblages found at UA-1, including the structure 1 floor contact, temazcal, and S6/W3 burials, featured Ocotlán Red Rim and Cocoyotla Black on Natural (especially the Sencillo subtype) as the principal decorated types. Xicalli Plain, an undecorated serving ware, was the most abundant type used. Postclassic utilitarian types Momoxpan Orange and San Andrés Red were already well-established elements of the kitchen tool kit. This complex of types compares closely with the ceramic assemblage found at the San Pedro Cholula well from which two C14 dates were recovered: 892 –1018 CE (INAH 1102) and 905–1220 CE (INAH 1103; McCafferty 1996a).

The Torre and Cuaxiloa Matte polychrome types, as well as different subtypes of Ocotlán Red Rim (subtype Cristina Matte) and Cocoyotla Black on Natural (subtype Banded), are diagnostic of the Late Tlachihualtepetl phase (1050–1200 CE). This ceramic complex is represented at UA-1 by the trash midden and well 3 deposits. A similar assemblage was found in a midden deposit at the Transito site (R-106) in San Pedro Cholula (McCafferty, Suárez C., and Edelstein N.D.).

The Early Cholollan phase (1200–1400 CE) featured a diversity of polychrome types, including Aquiahuac, Apolo, and Torre. At UA-1 it was best represented by an intrusive midden that passed through the floor of structure 2, but also by deposits above the structure 2 floor and a sherd concentration found between structures 1 and 2. The Early Cholollan ceramic complex was also encountered at the UA-70 Faculty Housing Complex midden that produced a single C14 date of 1250 ± 95 CE (Mountjoy and Peterson 1973:30).

The Late Cholollan phase (1400–1520 CE) was represented by the assemblage from well 1 that passed through the floor of structure 1, room 4. It is characterized by a very high proportion of Apolo Polychrome, almost to the exclusion of any other decorated types. This is the period to which the famous Coapan Laca Polychrome belongs although it was rare at UA-1, perhaps because it was used by a more elite segment of Cholula society. This ceramic complex has also been found at

UA-79 (Lind 1979; Barrientos 1980), the San Andrés Cholula mass burial (Suárez C. 1989, 1994), and in a well from the UDLA campus that produced a date of 1450±80 CE (Uruñuela and Alvarez-Méndez 1989:70; in Lind 1994:81, n. 4).

A final depositional context, well 2, featured a high frequency of glazed ware and therefore represents a post-Contact assemblage.

Notably, whereas the decorated ceramics changed stylistically throughout the Postclassic period, utilitarian wares such as Momoxpan Orange and San Andrés Red remained relatively consistent. This would suggest a general cultural continuity on a fundamental level, but it is in contrast to the relatively rapid changes in the more symbolically charged serving ware types. It is likely that the polychrome serving vessels may have functioned symbolically to signal ethnic, status, and political boundaries within a complex, plural society (Wobst 1977). This would fit with the ethnohistoric accounts of successive in-migrations of Tolteca-Chichimeca groups that overlaid, rather than replaced, the original Olmeca-Xicallanca population (Olivera and Reyes 1969; Carrasco 1971; McCafferty 1989).

Based on the relative stability of the forms of utilitarian ware, there were few changes in foodways during the Postclassic period. Use of the comal was already well established at UA-1 by the Middle Tlachihualtepetl phase, while recent discoveries at the Patio of the Carved Skulls indicate that comales were introduced in the preceding Early Tlachihualtepetl phase. The use of superhemispherical bowls was more common in the Tlachihualtepetl period, perhaps relating to the preparation and consumption of a particular variety of liquid food. Platos became more common in the Cholollan period, suggesting an increased importance of dry foods.

The ceramic complexes defined herein require further investigation of additional assemblages from discrete depositional contexts. The fundamental problem faced, however, is the need for additional chronometric dates with which to calibrate the ceramic sequence (McCafferty 1996a).

The development of a revised ceramic classification and sequence provides an opportunity for analyzing and interpreting culture change at Postclassic Cholula. As a result of the UA-1 analysis, previous interpretations of the culture history of Cholula can be challenged. In the remainder of this chapter the UA-1 data are used to re-evaluate the Classic to Postclassic transition, particularly in reference to the contradictory "histories" produced from archaeological and ethnohistoric sources. Second, the UA-1 data are related to ongoing debate about the origin and development of the Mixteca-Puebla stylistic tradition.

CULTURE HISTORY OF POSTCLASSIC CHOLULA

Information on the culture history of Cholula is available both from extensive archaeological excavations (Noguera 1954; Marquina 1970a; Mountjoy and Peterson 1973; Suárez C. 1985, 1989; Suárez C. and Martínez A. 1993; summarized in McCafferty 1996a), and from an equally detailed ethnohistorical record (Cortés 1986 [1519–1521]; Motolinía 1951 [1540]; Sahágun 1950-82 [1547 –1585]; Historia Tolteca-Chichimeca 1976 [ca. 1550]; Durán 1971 [1576–1579]; Díaz del Castillo 1963 [1580]; Rojas 1927 [1581]; Ixtlilxochitl 1975–1977 [1615]; Torquemada 1975–1983 [1625]). Since most of the excavations have concentrated on the early architectural features of the Great Pyramid, however, the combination of these two data sets have often been more confusing than helpful. Whereas the ethnohistorical accounts have usually been interpreted as indicating a continuous occupation of the city following the Classic period (Jiménez Moreno 1966; Chadwick 1966, 1971b; Weaver 1972), the archaeological evidence has been interpreted as indicating at least a temporary site abandonment at the end of the Classic period (Dumond and Müller 1972; Dumond 1972; Davies 1977; Weaver 1981, 1993; Mountjoy 1987; but see Sanders 1989; McCafferty 1996a).

As a result of recent reinterpretations of the construction history of the Great Pyramid of Cholula (McCafferty 1996b), I suggest that the pyramid continued in use into the Early Postclassic period (see also Sanders 1989). In fact, construction activity was possibly at its peak during the Epiclassic period, when stages 3 and 4 of the Great Pyramid were built (McCafferty 1996b, 2000), and the Patio of the Altars complex was built in a sequence of six successive stages (Acosta 1970). If this historical reconstruction is accurate, then the archaeological evidence for continuous occupation would become more consistent with the ethnohistorical record.

While the UA-1 data do not necessarily contribute specific information relating to the alleged abandonment of Cholula, revision of the Postclassic chronology and evaluation of the diagnostic ceramics from the different

phases can be used to interpret possible cultural traditions or changes that may have occurred. By extending the origin of the polychrome ceramic tradition to as early as 900 CE, and through the recent discovery of an Early Tlachihualtepetl occupation at the Patio of the Carved Skulls (McCafferty and Suárez C. 1995), the cultural divide between the Epiclassic and Early Postclassic periods disappears (McCafferty 1996a, 2000).

Second, the ethnohistorical "invasion" of Cholula by Nahua Tolteca-Chichimeca in the late twelfth/early thirteenth centuries would be expected to have resulted in changes in the material culture (Olivera and Reyes 1969; McCafferty 1989). Ceramics and other remains predating the ethnohistoric event should relate to the Olmeca-Xicallanca occupation of the site. UA-70 artifacts associated with the radiocarbon date of 1250 ± 95 CE (Mountjoy and Peterson 1973:30) possibly relate to this period of transition, while those recovered from UA-79 (Barrientos 1980) would certainly postdate it. By organizing the UA-1 ceramic data around these two assemblages through seriation, comparisons of how and approximately when changes in the ceramic assemblage took place may be used to interpret possible cultural changes.

The Middle and Late Tlachihualtepetl phase occupation of structure 1 predated both of these previously described ceramic complexes. Similarities link the structure 1 ceramic complex with materials from the San Pedro well, especially through the importance of Ocotlán Red Rim and Cocoyotla Black on Natural. It may also relate to the final occupation of the Great Pyramid, which featured polychrome pottery on its surface (Noguera 1937, 1954:225–226).

Ethnohistorical accounts of the Epiclassic and Early Postclassic period occupation by the Olmeca-Xicallanca also suggest that this ethnic group (or confederation of ethnic groups) had close affilations with the Gulf Coast. Stylistic motifs diagnostic of the Gulf Coast are prominent in the architecture and carved stone monuments at the Great Pyramid, especially after stage 3A, and at the Patio of the Altars (McCafferty 1996b). Evidence for the Olmeca-Xicallanca occupation of Cholula is also present at the household level, as seen in the material culture found at UA-1. Gulf Coast influences were found in pottery decoration, particularly on Cuaxiloa Matte Polychrome and Ocotlán Red Rim subtype Cristina Matte; in plastered architectural façades; in the use of bitumen coating on spindle whorls; in the use of shell ornaments; and in a figurine that included blue paint (McCafferty 1992a).

CHOLULA AND THE MIXTECA-PUEBLA STYLISTIC TRADITION

One aspect of Mesoamerican history in which Cholula has often been discussed is in speculation about the development of the Postclassic Mixteca-Puebla horizon. Since the initial formulation of the Mixteca-Puebla concept in the 1930s (Vaillant 1938, 1941; Nicholson 1960, 1982, 1994; Nicholson and Quiñones Keber 1994), Cholula has been considered the point of origin of the style. Jiménez Moreno (1942:128–129) and Nicholson (1982) have suggested the possibility that the Mixteca-Puebla style was developed by the Olmeca-Xicallanca ethnic group in the Cholula region.

Michael Smith and Cynthia Heath-Smith (1980) advanced an important critique of the Mixteca-Puebla concept in which they argued that instead of being indicative of an overarching "culture complex," the Mixteca-Puebla concept combined three distinct elements:

> (1) the *Postclassic Religious Style,* a collection of standardized religious symbols that were popular throughout Mesoamerica, beginning in the Early Postclassic period;
>
> (2) the *Mixtec Codex Style,* a highly-distinctive Late Postclassic polychrome narrative style most commonly associated with codices, murals and ceramics of the Mixteca-Puebla region; and
>
> (3) the *Mixteca-Puebla Regional Ceramic Sphere,* the local ceramic complexes of the Mixteca-Puebla which share several stylistic features (Smith and Heath-Smith 1980:15).

In distinguishing these three phenomena, Smith and Heath-Smith suggested that while the Postclassic Religious Style was relatively widespread, the other elements were local developments that retained a high degree of regional specificity. The significance of the critique is the suggested model for the transmission of the Religious Style, that is, through "processes of trade, communication and religious interpretation" (Smith and Heath-Smith 1980:39), and especially for the critical evaluation of often simplistic ascriptions of cultural contact.

In evaluating this model, Cholula is central to all three of these phenomena. As the center of the Quetzalcoatl cult, it was at the origin of the Postclassic Religious

Style. As the probable source for the *Codex Borgia* and other pre-Columbian codices, as well as *tipo codice* polychrome pottery, Cholula was an important center for the Mixtec Codex Style, or at least the Borgia-group branch of it. And Cholula was certainly a major source for the production of Mixteca-Puebla polychrome ceramics.

One of the pervasive themes of the Postclassic Religious Style is the prevalence of iconographic elements of the Quetzalcoatl cult, including feathered serpent motifs and *xicalcoliuhqui* patterns (McCafferty 1999; Nicholson 1960, 1982). Ethnohistoric sources clearly place Cholula at the center of this religious movement (Durán 1971 [1576–1579]:133; Rojas 1927 [1581]:160–161; Torquemada 1975–1983 [1615], Book 1:387). Quetzalcoatl was a deity whose priesthood preserved sacred knowledge, and the temple complex at Cholula may have housed a vast library and university where scribes trained in codex-style painting.

The mechanism for the diffusion of the Postclassic Religious Style remains to be explicated. In addition to the possibility of religious souvenirs carried back from pilgrimages (Ringle, Gallareta Negrón, and Bey III 1998), the iconography of Quetzalcoatl may have been transmitted by the pochteca, professional merchants affiliated with their patron, Quetzalcoatl/Yacatecuhtli, and their cult centered in Cholula (Durán 1971 [1576–1579]:262; Rojas 1927 [1581]).

A possible ethnographic analogue of this process may be found in the spread of Islam in Africa by ethnically organized Hausa merchants (Cohen 1969; Curtin 1984; Helms 1993). The Hausa established a trading diaspora based on concepts of ethnic and religious identity. The network was maintained through the distribution of religious icons, forming a safety net of religious partisans.

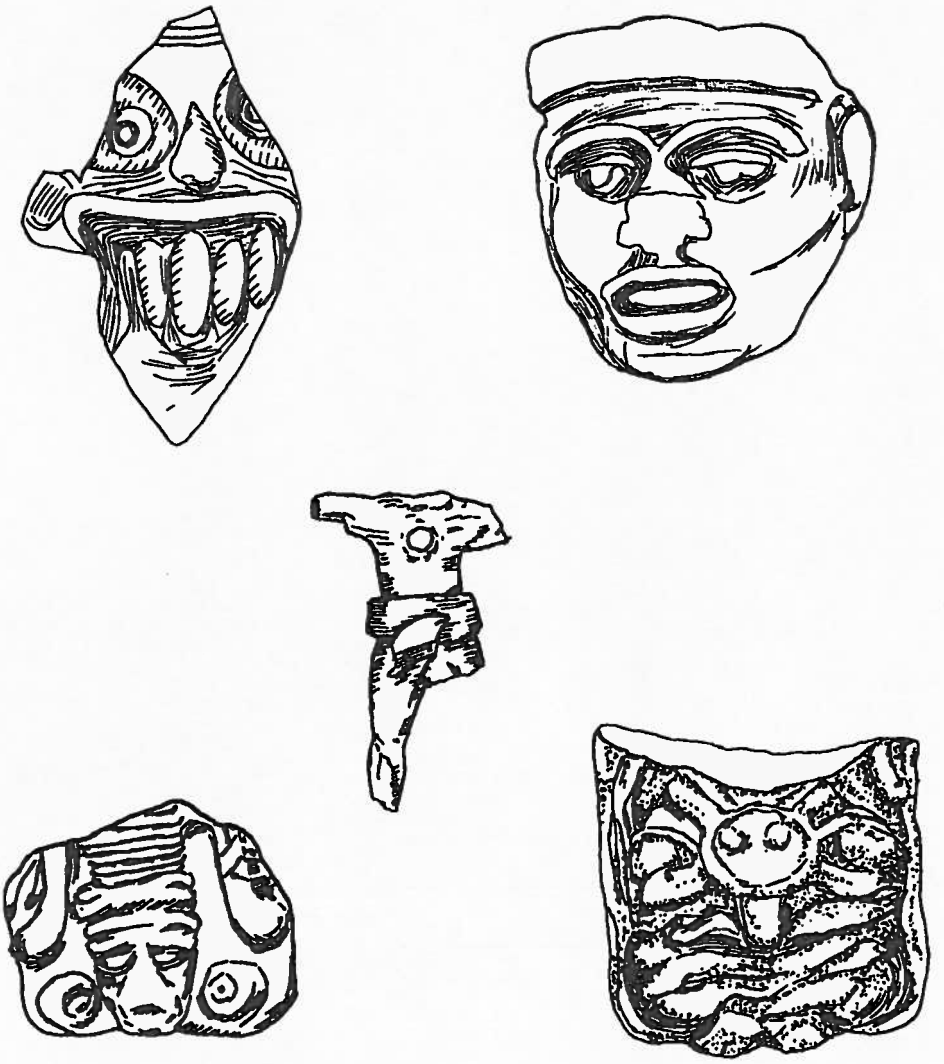
In regard to the Mixtec Codex Style, Nicholson (1960, 1982:229) suggested that the *Codex Borgia* was the definitive example of the Mixteca-Puebla style, based on its use of glyphic symbols relating to the religious pantheon and calendrical system. The *Codex Borgia* and related texts are distinguishable from examples of the Mixtec group of codices (Nicholson 1966), probably relating to both regional differences in provenience and thematic differences in content. Yet, Nowotny claimed that the *Codex Becker II* originated "in the neighborhood of Cholula" (1961: 27), even though it is stylistically a member of the Mixtec-group of codices. The Mixtec codices themselves refer to the Cholula area, with depictions of the snow-covered volcanoes and references to a ceremonial nose-piercing at the site of the Cattail-Frieze, which may have been Cholula itself (Smith 1973; Byland and Pohl 1995).

Architectural features of the Great Pyramid provide evidence of the Mixtec Codex Style, for example, in the diagonal painted bands on murals from the Patio of the Altars, the woven *petate* (mat) motif on stage 3C of the pyramid and structure 3-1 of the Patio of the Altars, and the greca-frieze motif that occurs on the *talud* (sloped facade) around the Patio of the Altars (McCafferty 1996b, 2001). The use of the petate and greca-frieze motifs as architectural elements on the Great Pyramid are evidence that its architects shared a similar vocabulary of symbolic meaning with the artists who painted the Mixtec codices. Not only were the motifs similar but the contexts in which they were used were stylistically or grammatically appropriate. The possibility is consistent with the concept of a Mixteca-Puebla culture complex because it implies an eclectic blending of culture traits from the central highlands, the Mixteca Alta, and includes the Gulf Coast and Maya region. The use of the petate mat motif as an architectural feature is closely parallel to the Mat House discovered at Copán (Fash 1991:130–134), interpreted as a council house associated with the ruler.

The final aspect of Smith and Heath-Smith's (1980) model involves the identification of "Mixteca-Puebla Regional Ceramic Spheres," with the implication that a variety of distinctive subtraditions should co-occur. The famous Cholula polychrome pottery is the classic example of this overarching polychrome style (Smith and Heath-Smith 1980:35–37; Nicholson 1982:243); yet, contradictions between the two previous ceramic studies conducted at Cholula (Noguera 1954; Müller 1978) created problems relating to the developmental sequence of Cholula polychrome pottery. When Müller claimed that all Cholula polychromes dated to post-1325, Cholula became one of the last sites in the central highlands to use Mixteca-Puebla polychrome pottery. This position can now be challenged by the UA-1 ceramic sequence and the chronometric evidence associated with early polychromes from the UA-70 midden (Mountjoy and Peterson 1973) and the San Pedro Cholula well (Suárez C. 1994; McCafferty 1996a).

What, then, can the UA-1 excavation contribute to an understanding of a Mixteca-Puebla culture complex of shared religious ideology and stylistic traits? In refer-

6.1 Figurines representing deities of the Mixteca-Puebla Religious Style



ence to the tripartite model proposed by Smith and Heath-Smith (1980), the UA-1 material culture does in varying degrees indicate Mixteca-Puebla traits in each of the three categories.

Smith and Heath-Smith (1980:19–20) suggested that the xicalcoliuhqui pattern and variations of the feathered serpent motif may be considered symbolic manifestations of the "Postclassic Religious Style." Examples of these stylistic motifs occur frequently on polychrome ceramics at UA-1, particularly Cuaxiloa Matte and Ocotlán subtype Elegante. While evidence for the cult of Quetzalcoatl was not identified among the figurines, other central Mexican deities that were present included Tlaloc, Xipe Totec, and members of the Mother Goddess complex (figure 6.1).

Examples of the Mixtec Codex Style occurred in what Müller (1978) called the tipo codice style, incorporating stylistic elements similar to those found in the codices. In addition to the xicalcoliuhqui and feathered serpent motifs, other symbolic elements included crossed bones, eagle feathers, and tule grass. Figurines also represent the Codex Style, especially in the stylization of specific deities such as Tlaloc.

The most significant example of the Codex Style is the set of five Torre Polychrome dishes found both in the trash midden and in association with the structure 1 house floor (figure 6.2). Although these figures were not painted in a style clearly identifiable with either Mixtec or Borgia Group codices, they do comply with what Nicholson (1960, 1982:229) referred to as a "Disney type"

6.2 *a-e*, Torre Polychrome platos with anthropomorphic motif on interior base

caricature and may represent an early stage in the development of the style. Other examples from decorated Torre Polychrome bases conform closely to codex-style figures, for example depictions of Macuilxochitl and a monkey as illustrated in Müller (1978).

Finally, the quantity and diversity of polychrome pottery found in association with Middle Tlachihualtepetl contexts suggests a relatively early presence of the Mixteca-Puebla Regional Ceramic Style. The predominant type found in association with the floor of structure 1 was Ocotlán Red Rim, including examples of the subtypes Elegante and Cristina Matte. The trash midden and well 3 from the Late Tlachihualtepetl phase had more diverse polychrome assemblages, with moderate amounts of Torre Polychrome and Cuaxiloa Matte, in addition to Ocotlán Red Rim.

Comparisons of the Tlachihualtepetl period ceramic complex with ceramics from other regions provides useful information for interpreting the cultural interactions that may have contributed to the early Mixteca-Puebla

ceramic assemblage found at Cholula. Cocoyotla Black on Natural has parallels with Early Postclassic pottery from the southern Valley of Mexico (Noguera 1954:282–283; Hodge and Minc 1991), but it is also similar to X-Fine Orange from the Gulf Coast. Pottery similar to Torre Polychrome is also found in the Valley of Mexico (Séjourné 1983).

Other types with similarities to pottery of the Gulf Coast include Cuaxiloa Matte Polychrome and Ocotlán subtype Cristina Matte. Illustrated examples of Isla de Sacrificios pottery are virtually indistinguishable from pottery found at UA-1 (García Payón 1971:535–536). This possible Gulf Coast connection is further supported by decorative motifs that include marine animals as well as an individual in elaborate feathered headdress painted on the base of an Ocotlán subtype Cristina Matte bowl (figure 6.3). Further evidence for the possible importance of Gulf Coast ceramics in the development of the Early Postclassic ceramic complex comes from the Patio of the Carved Skulls, where several examples of Isla de Sacrificios White on Cream were found in the Early Tlachihualtepetl assemblage (McCafferty and Suárez C. 1995).

CONCLUSION

Analysis of the UA-1 material culture sheds light on the culture history of Early Postclassic Cholula and particularly on its role in the development of the Mixteca-Puebla stylistic tradition. Cholula had a vibrant polychrome tradition in the Middle and Late Tlachihualtepetl phases and some of the closest stylistic similarities were with the Gulf Coast. This conclusion seems to support Jiménez Moreno's (1942) and Nicholson's (1982) hypotheses that the Mixteca-Puebla horizon may have originated during the Olmeca-Xicallanca occupation of Cholula in the Epiclassic/Early Postclassic period. It further supports the architectural evidence from the Great Pyramid for Gulf Coast interaction during the Epiclassic period and strengthens assertions that Cholula was never abandoned.

Cholula was one of the major urban centers of pre-Columbian Mexico, with important religious, economic, cultural, and artistic contributions to Mesoamerican civilization. At the same time, however, Cholula remains one of the most enigmatic sites in terms of its culture history. The abundant archaeological record is poorly understood, with broad gaps in the sequence still to be bridged. In order to move on to more anthropologically interesting questions involving social organization, economic production, and religious hegemony of the Cholula empire, a solid foundation in chronology is needed. This study of ceramics from UA-1 is intended as a stepping stone to more theoretically significant investigations. Without such basic information, however, higher level inferences would be tenuous.

6.3 Ocotlán Red Rim subtype Cristina Matte plates: *a*, octopus motif (UA-1 bag 8076); *b*, anthropomorphic motif of figure with feathered headdress (UA-1 10927)

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