CHAPTER 7

NATIVE AMERICAN POTTERY

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Prehistoric and Historic Native American pottery was recovered from three archaeological sites investigated as a part of the Rio Nuevo Archaeology project. A total of 17,073 sherds was recovered from the Clearwater site, AZ BB:13:6 (ASM), with 9,790 of those sherds recovered from features located at the San Agustín Mission locus of the site, 4,226 sherds from the Mission Gardens locus, and 3,057 sherds from the Congress Street and Brickyard loci. Another 950 sherds were recovered from canal features at AZ BB:13:481 (ASM). Finally, a total of 8,704 sherds was recovered from features located at the Tucson Presidio/Block 181, AZ BB:13:13 (ASM).

SAMPLING STRATEGY

The ceramic sampling strategy for the current project was designed by the author, in consultation with Project Directors Jonathan B. Mabry and J. Homer Thiel. It was structured to maximize information return by treating deposits recovered from the three sites somewhat differently. Emphasis was placed on identifying sherds of Early Agricultural period incipient plain ware pottery, regardless of recovery context, and temporally unmixed deposits of prehistoric, Spanish, Mexican, and American Territorial period O'odham pottery.

All potsherds recovered from deposits that were initially assigned to the Early Agricultural period (circa 2100 B.C.-A.D. 50) were inspected for the presence of incipient plain ware. Many of the Early Agricultural period features located in the San Agustín Mission locus were found to contain later, Hohokam ceramic types, and incipient plain ware sherds were also recovered from mission-occupation deposits at BB:13:6, indicating extensive temporal mixing had occurred in that part of the project area. When incipient plain ware sherds were found, they were analyzed following procedures developed previously (Heidke 2001).

All diagnostic sherds (that is, painted and/or slipped sherds and all rim sherds/reconstructible vessels) recovered from deposits initially assigned to the Early Ceramic (circa A.D. 50-450) and Hohokam (A.D. 500-1450) periods were analyzed, with the primary goal being to date the deposits. Few temporally unmixed deposits were identified; all that were are located at BB:13:6. They are: Features 3014 and 3038 (Agua Caliente phase, circa A.D. 50-500, described below), Feature 308 (Cañada del Oro phase, circa A.D. 750-850, described below), and Features 3001, 3005, and 3067 (definitely Classic period, circa A.D. 1150-1450, and probably Tanque Verde phase, circa A.D. 1150-1300). Due to the rarity of excavated Agua Caliente phase contexts in the Tucson area, all the plain ware body sherds recovered from Features 3014 and 3038 were analyzed.

All diagnostic and plain ware body sherds recovered from seven mission deposits at BB:13:6—Features 64, 161, 166, 177, 178, 193, and 203—were also analyzed; ceramicist Charla Hedberg analyzed the plain ware body sherds, while the author analyzed the remaining diagnostic sherds. Similarly, all diagnostic and plain ware body sherds recovered from seven Presidio-type deposits at BB:13:13—Features 373, 409, 420, 422, 423, 428, and 441—were analyzed; ceramicist Stacy Ryan analyzed the plain and red ware body sherds, while the author analyzed the diagnostic sherds. Finally, two features dating to the American Territorial period—BB:13:6 Feature 61 and BB:13:13 Feature 376—were analyzed. Charla Hedberg analyzed the plain ware body sherds recovered from Feature 61, Stacy Ryan analyzed the plain and red ware body sherds recovered from Feature 376, and the author analyzed all the diagnostic sherds recovered from both features. The format used to describe the Agua Caliente and Cañada del Oro phase prehistoric and historic ceramics recovered from Rio Nuevo Archaeology project sites is identical; thus, those sections may be somewhat repetitious. Identical conventions are used in all of those sections so that each section can stand alone, as well as to facilitate comparisons among sections.

ANALYSIS METHODS

Dating information was provided by the project directors for the Early Agricultural period, Agua Caliente phase, and Spanish, Mexican, and American Territorial period contexts, while the approximate age of contexts hypothesized by the project directors to be Hohokam was determined based on the types of pottery, especially the painted and/or red-slipped pottery, recovered from them. As mentioned above, all sherds other than unmodified, plain ware body sherds were closely examined by the author.

All painted and red-slipped pottery, as well as all plain ware rim sherds, reconstructible vessels, necks, and worked sherds from a feature were laid out at one time in the order of the strata and the levels excavated, in addition to any subfeatures present, such as hearths and postholes. In some cases, a number of sherds within a bag, or from different strata, levels, or bags within a feature, conjoined (that is, the pieces literally fit together); in other cases, aspects of the sherd's decoration or morphology and temper were similar enough to consider multiple sherds "matching" portions of a single vessel. When conjoins or matches were observed, the vessel was recorded in the provenience containing the largest portion of the pot.

Because all temporally diagnostic sherds recovered from a feature were laid out at one time, it was possible to quickly assess if the feature was mixed (that is, containing types of pottery inferred to have non-overlapping production date ranges), as well as if pieces of a pot were recovered from more than one vertical or horizontal excavation unit. Consequently, a more accurate estimate of the minimum number of vessels (MNV) present in each deposit could be obtained.

The coding index used to record provenience, typological, technological, morphological, and use-alteration data from the pottery recovered in BB:13:6 Features 61, 64, 161, 166, 177, 178, 193, and 203 (by Hedberg), and BB:13:13 Features 373, 376, 409, 420, 422, 423, 428, and 441 (by Ryan), is reproduced in Table 7.1. The index used by the author to record attributes of incipient plain ware pottery is reproduced in Table 7.2, while the index used to record attributes of later prehistoric and Historic era pottery is reproduced in Table 7.3. Three attributes of the pottery recovered from well-dated deposits are explained in detail here, because they are addressed repeatedly below for each point in time. These attributes are: temper type, temper provenance, and vessel function.

Temper Type and Provenance

Native American pottery produced in the Greater Southwest often contains abundant temper such as sand, disaggregated rock, and crushed sherd. For example, Tohono O'odham pottery is known to have been tempered with various types of material, including sand, crushed schist, ground potsherds, and dried and sifted horse manure (Fontana et al. 1962:57-58, 135). Both sand and crushed rock tempers can be used as indicators of provenance once their geological sources have been identified (Arnold 1985; Heidke et al. 2002; Shepard 1936, 1942).

In the current study, most of the sherds that were not manure-tempered were tempered with either sand or a mixture of sand and crushed potsherds (grog). Sherds of Historic era sand-tempered plain and red ware vessels are very difficult to separate from those made throughout prehistory (Haury 1975:343-344; Whittlesey 1997:453), which is why they are not referred to as "Papago" ceramic types in this chapter. Except the Agua Caliente phase, the practice of tempering a vessel's paste with a mixture of sand and crushed potsherds was never common among Tucson area prehistoric potters. However, recent archaeological studies indicate that practice was relatively common during the eighteenth and nineteenth centuries (Heidke et al. 2004:71-73; Thiel and Faught 1995:Table 7.7). This provides another confident means of identifying Historic era O'odham pottery (Whittlesey 1997:455).

Manure-tempered pots also contain sand. The presence of both sand and fiber casts (presumably from horse manure) in a sherd seems to contradict the assertion of Fontana et al. (1962:135) that Tohono O'odham potters added only one type of nonplastic temper to their clay. It is argued elsewhere that the likely reason why ceramicists see two types of temper is that the pedogenic clays used by Tohono O'odham potters usually contained a sand-sized component (Heidke and Wiley 1997a); accordingly, a potter may have added manure to a clay that already contained some sand-sized material. Petrographic analysis supports that conclusion (Chapter 6, this report).

During the last two decades an intensive program of wash sand sampling in the Tucson Basin has provided evidence that many spatially discrete sand temper compositions were available to Native American potters (Heidke and Wiley 1997b; Heidke et al. 1998a; Kamilli 1994; Lombard 1986, 1987a, 1987b, 1987c, 1987d, 1989, 1990; Miksa 2006). Therefore, analysis of the sand temper component of a sherd provides evidence about it if the pot was produced in the Tucson Basin, and, if it was, where it was likely to have been made.

Generic compositions are defined when the sands within a well-defined region are studied and it is determined that they can be broken into subsets based on similar compositions. Generic compositions are also visible in sand-tempered pottery, where they are characterized as "generic" temper resources. Further study of the sands within a well-defined region may determine that the generic sand compositions can be broken into subsets based on additional spatial and compositional information. When that is accomplished, petrofacies, or sand composition zones, are defined. Individual petrofacies compositions may also be visible in sand-tempered pottery, or pottery produced from a clay that naturally contains sand-sized

Table 7.1. Attribute index used to record provenience, typological, technological, morphological, and use-alteration data from pottery recovered at the Clearwater site, AZ BB:13:6 (ASM), and the Tucson Presidio, AZ BB:13:13 (ASM), and analyzed by Hedberg and Ryan. (Commonly used attributes are shown in italics.)

PROVENIENCE ATTRIBUTES

1. ASM Site Number [From bag-tag; use correct form] (ASMSITE)

2. Primary Feature Number [From bag-tag] (FEATNUM)

3. Field Number [From bag-tag] (FN)

MORPHOLOGICAL, TECHNOLOGICAL, AND USE-ALTERATION VARIABLES/ATTRIBUTES

4. Red Slip Location [Only recorded by Ryan] (LOCATION)

-9 = Indeterminate
0 = Slip absent (plain ware, red-on-brown, other decorated type, etc.)
1 = Interior only
2 = Interior and rim
3 = Interior, rim, and exterior band
4 = Full slip (for rims = all interior, rim, and exterior surfaces; for body = all interior and exterior surfaces)
5 = Exterior and rim
6 = Exterior only
7 = Other slip location (describe below in *COMMENTS* field)
8 = Exterior, rim, and interior band below rim

5. Painted Decoration Present? [Only recorded by Ryan] (DECTYPE)

-9 = Indeterminate
0 = Absent
1 = Present

6. Vessel Part (VESPART)

1 = Body (see also VESPART = 21, below)
2 = Rim
3.1 = Partial Reconstructible Vessel [RV] (25-50% complete)
3.2 = Partial Reconstructible Vessel [RV] (50-75% complete)
4.1 = Partial Reconstructible Vessel [RV] (75-99% complete)
4.2 = Reconstructible Vessel [RV] (100% complete)
5 = Gila shoulder
6 = Transitional Gila/Classic shoulder
7 = Classic shoulder
8.0 = Classic indented base (thickness/uniformity indeterminate or unspecified)
8.1 = Classic indented base (thickened)
8.2 = Classic indented base (uniform)
9 = Handle (unspecified type)
10 = Tabular handle/Spout
11 = Strap handle
12 = Tall, vertical jar neck
13 = Indeterminate shoulder type
14 = Miscellaneous appendage
15 = Base
16 = Knob handle
17 = Ladle handle
18.0 = Indeterminate coil handle
18.1 = Single coil handle

Table 7.1. Continued.

18.2 = Side-by-side coil handle
18.3 = Braided coil handle
19.0 = Indeterminate lug handle
19.1 = Solid lug handle
19.2 = Pierced lug handle
19.9 = Other lug handle
20 = Field identified RV; ceramic analysis indicates reworked/recycled sherd/vessel
21 = Body sherd with compound curvature, but no rim (in jars a "neck")

7. Sherd Size [Only recorded by Hedberg] (CERSIZE)
-9 = Indeterminate
99 = <5 cm^2
1 = 5-16 cm^2
2 = 16-49 cm^2
3 = 49-100 cm^2
4 = 100 cm^2-RV

8. Temper Type (TT)
-9 = Indeterminate
1 = High LMT (>25% gneiss/schist)
2 = High LMT/low sand (7-25% gneiss/schist)
3 = Low LMT/high sand (1-7% gneiss/schist)
4 = High sand (<1% gneiss/schist)
5 = High muscovite mica (>25% MUSC)
6 = Mixed sand and muscovite mica (1-25% MUSC)
7 = Gneiss/schist and muscovite mica (>25% LMT+MUSC)
8 = Mixed sand, gneiss/schist, and muscovite mica (1-25% LMT+MUSC)
9 = Sand and crushed sherd
10 = High phyllite (>25% LMTP)
11 = Sand and manure/fiber (Papago types)
12 = Sherd temper (no sand)
13 = Transitional (?) sand and manure/fiber (no black core and fewer casts than TT = 11)

9. Ceramic Type (CERTYPE)
251 = Unidentified/indeterminate red ware type
800 = Unspecified plain ware (just about any temper type other than manure)
1205 = Sobaipuri Plain (folded rim) (usually sand or sand+sherd tempered)
1250 = Papago Red (manure temper)
1251 = Possible Papago Red (unsure if it is slipped or manure-tempered)
1255 = Papago Red-on-brown
1256 = Possible Papago Red-on-brown
1257 = Papago Black-on-brown
1260 = Papago White-on-red
1265 = Papago Black-on-red
1267 = Papago Black-on-buff
1268 = Papago Red-on-buff
1270 = Papago Glaze
1275 = Papago Plain (manure temper)
1276 = Possible Papago Plain (unsure if it is manure temper)
1280 = (Indeterminate) Papago Red-on-buff or White-on-buff (only a buff surface is present)

Table 7.1. Continued.

10. Use-Alteration [List type in *COMMENTS*: soot, scratch marks, interior exfoliation] (USEALTER)
-9 = Indeterminate
0 = Absent
1 = Present

11. Quantity [A reconstructible vessel—VESPART = 3.1, 3.2, 4.1, 4.2—is counted as "1" with the total sherd count in *SHERDCNT* field] (QUANTITY)

12. Sherd Count. [During analysis, only used to tally the total count of sherds included in a reconstructible vessel; otherwise "0." Post-analysis SHERDCNT = 0 records will be replaced with QUANTITY.] (SHERDCNT)

13. Comments [Note, especially, if a Papago Red, Plain, or decorated type has a folded rim.] (COMMENTS)

grains, where they are characterized as "specific" temper resources. These specific temper resource zones are also referred to as petrofacies. Currently, 37 petrofacies are defined for the greater Tucson Basin (Figure 7.1).

The temper type and generic and specific sources of pottery recovered from Rio Nuevo project sites were characterized with respect to that petrofacies model. Temper attributes were recorded after examination of a sherd at 15x magnification, using a Unitron ZSM binocular microscope fitted with a Stocker and Yale Lite Mite Series 9 circular illuminator. Subsequently, 56 sherds were selected for petrographic analysis by Elizabeth Miksa and her colleagues (see Chapter 6). The results of her study are summarized in Table 6.8 and discussed below (see Tables 7.12-7.13, 7.17-7.18, 7.23-7.24, 7.29-7.30, 7.35-7.36, 7.41-7.42, 7.46-7.47, and 7.50-7.52).

Vessel Function

Two different approaches are utilized throughout this chapter to assess the likely uses that pottery played in the lives of the sites' residents at different points in time. The first approach is strictly typological, and entails the assignment of rim sherds and reconstructible vessels to vessel form categories originally created to classify the prehistoric pottery of the region (Kelly 1978). The second approach examines a subset of the rim sherds and, when present, reconstructible vessels—those with measurable orifice and/or aperture diameters—and places them into functional categories determined by their overall morphology and size. This approach is based on Braun's (1980) study of historic and modern Piman, Yuman, and Puebloan pottery. That study led Braun to formulate a model relating vessel form to use; the ethnographically based model that resulted from Braun's study provides an objective and replicable means to examine the function of prehistoric pottery, regardless of when or where a pot was made.

The approach begins with the assignment of large rim sherds and reconstructible vessels to one of 24 vessel form classes (Table 7.4). Vessel form classes are defined by the attributes of *containment security* and *frequency of access,* following procedures described in Braun (1980). Like Braun (1980), Henrickson and McDonald (1983) and Smith (1985), the current study assumes: (1) the function and morphology of ceramic vessels are related; (2) vessels within a functional class are designed and manufactured according to a specific set of morphological boundary conditions; and (3) generic morphological parameters are cross-cultural (Henrickson and McDonald 1983:630-631). These appear to be relatively safe assumptions. However, these attributes represent indirect evidence of use, and therefore, yield conclusions that must be phrased as "inferred uses" (Rice 1996:140).

Containment security is defined as the ability of a vessel to reduce spillage and to restrict the width of the angle at which its mouth can be entered (Braun 1980:172). Frequency of access is defined as the number of access events occurring per unit of time, and the volume of material flowing into and out of the vessel during that time (Braun 1980:172). These morphological attributes should reflect aspects of vessel function, although in the absence of additional ratio measures, these attributes cannot separate jars manufactured for cooking from those made for storage. It must also be noted that the data are unlikely to reflect the exact proportions of different vessel form classes when they were in use (Braun 1980:186). For example, small, frequently used pots probably broke far more often than large, infrequently used vessels, and cooking and serving pots probably broke far more often than storage vessels (David 1972; DeBoer 1974; Foster 1960; Longacre 1991; Mills 1989). Thus, the greater the number of trash-accumulation years represented by a deposit, the greater the amount of variation there will be between the original, systemic frequency of a vessel class and its frequency in the archaeological record.

Table 7.2. Attribute index used to record supplemental information from incipient plain ware sherds recovered at the Clearwater site, AZ BB:13:6 (ASM), and the Tucson Presidio, AZ BB:13:13 (ASM).

PROVENIENCE ATTRIBUTES

1. ASM Site Number (ASMSITE)

2. Primary Feature Number (FEATNUM)

3. Field Number (FN)

4. Clay Artifact Analyst [HARDNESS, TT, TSG, TSS, SIZEMODE, ORGANIC, CHARCOAL, WORKED recorded for all OBS] (ANALYST)

H = J. Heidke (all ceramic containers)

D = Deleted (lab PLAD indicated a ceramic container, but Heidke's analysis indicates otherwise)

X = Reassigned from Heidke to XCER analyst

A = Fired clay object recovered in ABONE (animal bone) bag

5. Observation Number [assigned 1-n for each FIELDNUM; written on object in pencil if >1 per FIELDNUM] (OBS)

6. Sherd Number (within bag conjoin/match) (SHERDNUM)

MORPHOLOGICAL, TECHNOLOGICAL, AND USE-WEAR/REUSE ATTRIBUTES

7. Sherd Size [NOTE: This variable has been used differently in other analyses] (CERSIZE)

-9 = Indeterminate

99 = <5 cm^2

1 = 5-16 cm^2

2 = 16-49 cm^2

3 = 49-100 cm^2

4 = 100 cm^2-RV

8. Ceramic Class (CERCLASS)

9. Ceramic Type (CERTYPE)

10. Incipient Plain Ware Variety (where ANALYST = ″H″) (IPWVAR)

-9 = Indeterminate

0 = Not an incipient plain ware

1.0 = Bumpy

2.0 = Coiled

2.1 = Coiled and incised

3.0 = Incised (no punctation or impression present)

3.1 = Incised and punctate

3.2 = Incised and impressed

4.0 = Interior impressed

5.0 = Punctate

11. Vessel Part (VESPART)

1 = Body (see also VESPART = 21, below)

2 = Rim

3.0 = Partial RV (25-75% complete)

3.1 = Partial RV (25-50% complete)

3.2 = Partial RV (50-75% complete)

4.0 = RV (75-100% complete)

Table 7.2. Continued.

4.1 = Partial RV (75-99% complete)
4.2 = RV (100% complete)
5 = Gila shoulder
6 = Transitional Gila/Classic shoulder
7 = Classic shoulder
8.0 = Classic indented base (thickess/uniformity indeterminate or unspecified)
8.1 = Classic indented base (thickened)
8.2 = Classic indented base (uniform)
9 = Handle (unspecified type)
10 = Tabular handle/Spout
11 = Strap handle
12 = Tall, vertical jar neck
13 = Indeterminate shoulder type
14 = Miscellaneous appendage
15 = Base
16 = Knob handle
17 = Ladle handle
18.0 = Indeterminate coil handle
18.1 = Single coil handle
18.2 = Side-by-side coil handle
18.3 = Braided coil handle
19.0 = Indeterminate lug handle
19.1 = Solid lug handle
19.2 = Pierced lug handle
19.9 = Other lug handle
20 = Field identified RV; ceramic analysis indicates reworked/recycled sherd/vessel
21 = Body sherd with compound curvature, but no rim (in jars a "neck")

12. Vessel Shape (SHAPE)

-9 = Indeterminate vessel form
0 = Indeterminate bowl or jar
1 = Bowl
2 = Jar
3 = Scoop
4 = Indeterminate "flare-rim"
5 = Pitcher
6 = Ladle
7 = Effigy vessel
8 = Legged vessel
9 = Cup
10 = Elongated vessel
11 = Ceramic censer
12 = Canteen
13 = Pinch pot
14 = Indeterminate bowl or seed jar
15 = Indeterminate bowl or scoop
16 = Cornucopia
17 = Ceramic pipe
90 = Other ceramic item

Table 7.2. Continued.

13. Vessel Form (VESFORM)

-9 = Indeterminate vessel form
0 = Indeterminate bowl or jar
100 = Indeterminate bowl
101 = Flare-rim bowl
102 = Plate/Platter
103 = Outcurved bowl
104 = Hemispherical bowl
105 = Cauldron
106 = Incurved bowl
107 = Indeterminate semi-flare-rim bowl form
108 = Semi-flare-rim, outcurved bowl
120 = Semi-flare-rim, hemispherical bowl
121 = Semi-flare-rim, incurved bowl
122 = Straight-walled or vertical-sided bowl
123 = Double bowl
124 = Recurved bowl
127 = Low-shouldered bowl
190 = Other bowl (list type in COMMENTS)
200 = Indeterminate jar
209 = Flare-rim, height indeterminate
210 = Tall flare-rim jar
211 = Short flare-rim jar
212 = Returned rim jar
213 = Short straight-collared jar
214 = Tall straight-collared jar
215 = Seed jar
216 = Knobby "datura" pot
217 = Neckless, or rimless, jar
218 = Semi-flaring tall straight-collared jar
219 = Incurved short straight-collared jar
230 = Double jar form
231 = Jar-in-a-bowl form
242 = Semi-flaring angled long-collared jar
243 = Semi-flaring short straight-collared jar
244 = Angled, straight-collared jar
290 = Other jar (list type in COMMENTS)
300 = Indeterminate-shaped scoop
310 = Teardrop-shaped scoop
320 = Oval-shaped scoop
330 = Keyhole-shaped scoop
340 = Elongated scoop
390 = Other scoop (list type in COMMENTS)
400 = Indeterminate flare-rim bowl or jar, or semi-flare-rim bowl or short straight-collared jar
500 = Indeterminate pitcher
600 = Indeterminate ladle
610 = Oval bowl ladle
620 = Circular bowl ladle
690 = Other ladle (list type in COMMENTS)
710 = Bird effigy vessel

Table 7.2. Continued.

720 = Anthropomorphic effigy vessel
730 = Shell effigy vessel
790 = Effigy vessel (describe in COMMENTS)
800 = Indeterminate legged vessel part
810 = Leg
890 = Other legged vessel part (describe part in COMMENTS)
900 = Indeterminate cup
1000 = Indeterminate elongated vessel
1100 = Indeterminate censer
1190 = Other censer (list type in COMMENTS)
1200 = Indeterminate canteen
1290 = Other canteen (list type in COMMENTS)
1400 = Indeterminate bowl or seed jar
1500 = Indeterminate bowl or scoop
1600 = Cornucopia
1700 = Indeterminate ceramic pipe
9000 = Other ceramic vessel/item (list type in COMMENTS)

14. Rim Length (RIMLENG)

-9 = Not a rim or indeterminate (i.e., unusual curvature of a scoop, etc.)
0 = 0-5%
1 = 5-10%
2 = 10-15%
3 = 15-20%
4 = 20-25%
5 = 25-30%
6 = 30-35%
7 = 35-40%
8 = 40-45%
9 = 45-50%
10 = >50%

15. Orifice Diameter [in cm] (ORIFDIA)

-9 = Not a rim, or indeterminate orifice diameter

16. Aperture Diameter [in cm] (APETDIA)

-9 = Not a jar rim, or indeterminate aperture diameter

17. Rim Shape (RIMSHAPE)

-9 = Not a rim
0 = Indeterminate rim shape
1.0 = Tapered (length unspecified)
1.1 = Long taper
1.2 = Short taper
2 = Rounded
3 = Squared
4.0 = Sharp bevel
4.1 = Sharp exterior bevel
4.2 = Sharp interior bevel

Table 7.2. Continued.

5 = Other or miscellaneous
6.0 = Rounded bevel
6.1 = Rounded exterior bevel
6.2 = Rounded interior bevel
7 = Flattened exterior bulge
8 = Flattened interior and exterior bulge
9 = Rounded exterior bulge
10 = Rounded interior and exterior bulge
11 = Rounded interior bulge

18. Vessel Wall Thickness [in mm] (BODTHICK)

19. Minimum Vessel Wall Thickness [in mm] (MINTHICK)

20. Maximum Vessel Wall Thickness [in mm] (MAXTHICK)

21. Fire Cloud (FIRE)
-9 = Indeterminate
0 = Absent
1 = Interior only
2 = Exterior only
3 = Interior and Exterior
4 = Rim only (<1 cm on interior and exterior surfaces)

22. Carbon Core (CARBON)
-9 = Indeterminate
0 = Absent
1 = Middle, thin (<half)
2 = Middle, thick (>half)
3 = Exterior edge
4 = Interior edge
5 = Fully carbonized
6 = Interior and exterior edges carbonized, core clear
8 = Present, location unspecified

23. Interior Surface Treatment (INTSURF)
-9 = Indeterminate, or not a rim
1.1 = Uniform polish/burnish, scrape marks absent (in early plain wares = light tool polish, not burnish); lustrous feel
1.2 = Polished/burnished, scrape marks present (in early plain wares = light tool polish, not burnish); waxy feel
1.3 = Light polish; smooth, chalky feel
2 = Wiped
3 = Hand-smoothed
4 = Anvil impressed
5 = Scraped
6 = Massed plant fiber or animal fur or basketry
9 = Not polished/burnished; other marks not recorded
10 = Basket impressed

Table 7.2. Continued.

24. Exterior Surface Treatment (EXTSURF)

-9 = Indeterminate, or not a rim
1.1 = Uniform polish/burnish, scrape marks absent (in early plain wares = light tool polish, not burnish); lustrous feel
1.2 = Polished/burnished, scrape marks present (in early plain wares = light tool polish, not burnish); waxy feel
1.3 = Light polish; smooth, chalky feel
2 = Wiped
3 = Hand-smoothed
4 = Paddle impressed
5 = Scraped
6 = Basket impressed
7 = Corrugated
9 = Not polished/burnished; other marks not recorded

25. Hardness (HARDNESS)

-9 = Indeterminate
0 = Less than Mohs' hardness scale of 2 (softer than gypsum, easily scratched by a fingernail)
1 = Equal or greater than Mohs' hardness scale of 2 (harder than gypsum)

26. Temper Type (TT)

-9 = Indeterminate
1 = High LMT (>25% gneiss/schist)
2 = High LMT/low sand (7-25% gneiss/schist)
3 = Low LMT/high sand (1-7% gneiss/schist)
4 = High sand (<1% gneiss/schist)
5 = High muscovite mica (>25% MUSC)
6 = Mixed sand and muscovite mica (1-25% MUSC)
7 = Gneiss/schist and muscovite mica (>25% LMT+MUSC)
8 = Mixed sand, gneiss/schist, and muscovite mica (1-25% LMT+MUSC)
9 = Sand and crushed sherd
10 = High phyllite (>25% LMTP)
11 = Sand and fiber (Papago types)
12 = Sherd temper (no sand)

27. Temper Source Generic (TSG)

-9 = Indeterminate
1 = Igneous volcanic sands (TSS = D, J1, J2, J3, L, R, T, W, and Y)
2 = Igneous plutonic sands (TSS = 3, E1, E2, E3, O, Q, and S)
3 = Metamorphic core complex sands (TSS = 4, 5, 8, A, B, BV, and N)
4 = Sedimentary sands
5 = Crushed rock [Gila or Wingfield Plain-like] (Temper Types = 1, 5, 7, or 10)
6 = Fine paste (low percentage of nonplastics, natural component of clay?)
7 = Mixed volcanic and granitic sands (TSS = C, M, MW, and U)
8 = Sherd, or grog, temper
9 = Mixed volcanic and sedimentary sands
10 = Mixed volcanic, granitic, and sedimentary sands
11 = Mixed metamorphic and sedimentary sands
21 = Santan/Gila Butte schist and sand
29 = Schist sand
30 = Igneous plutonic and mixed lithic (volcanic, metamorphic, and sedimentary) sands (TSS = 1, 2, 6, 9, F, G, H, I, K, and P)
31 = Other metamorphic source (TSS = V)

Table 7.2. Continued.

33 = Coarse muscovite schist: Santan/Gila Butte schist (crushed or sand)
39 = Sand and sherd
40 = Indeterminate igneous plutonic or metamorphic core complex sands

28. Temper Source Specific (TSS)

-9 = Indeterminate
1 = Santa Cruz River
2 = Brawley Wash
3 = Cañada del Oro
4 = Rillito Creek
5 = Pantano Wash
6 = McClellan Wash
8 = Tanque Verde Creek
A = Rincon
B = Catalina
BV = Catalina Volcanic
C = Samaniego
D = Avra
E1 = Western Tortolita
E2 = Central Tortolita
E3 = Eastern Tortolita
F = Durham
G = Santa Rita
H = Jaynes
I = Airport
J1 = Beehive
J2 = Twin Hills
J3 = Wasson
K = Black Mountain
L = Golden Gate
M = Rillito
MW = Rillito West
N = Owl Head
O = Sierrita
P = Green Valley
Q = Amole
R = Batamote
S = Sutherland
T = Recortado
U = Cocoraque
V = Dos Titos
W = Waterman
Y = Roskruge

29. Modal Temper Grain Size (SIZEMODE)

-9 = Indeterminate
0 = Clay
1 = Silt (<1/16 mm)
2 = Very fine sand (1/16-1/8 mm)
3 = Fine sand (1/8-1/4 mm)

Table 7.2. Continued.

4 = Medium sand (1/4-1/2 mm)
5 = Coarse sand (1/2-1 mm)
6 = Very coarse sand (1-2 mm)
7 = Gravel (>2 mm)

30. Organic Temper (ORGANIC)
-9 = Indeterminate
0 = Casts absent
1 = Casts present

31. Charcoal Fragments in Paste (CHARCOAL)
-9 = Indeterminate
0 = Absent
1 = Present

32. Location of Incising [if necessary, describe further in COMMENTS, field previously named INCISED] (INCISLOC)
-9 = Indeterminate
0 = Incising absent
1 = Present, location indeterminate
2 = Exterior incised
3 = Interior incised
4 = Interior and rim lip incised
5 = Interior and exterior incised
6 = Rim lip incised
7 = Interior, exterior and rim incised

33. Clay's Moisture Content when Incised (INCISDRY)
-9 = Indeterminate
0 = Incising absent
1 = Soft, elevated margins present
2 = Hard, even margins present (indicating leather-hard clay)
3 = Dry, chipped margins present

34. Shape of Incision (INCISSHP)
-9 = Indeterminate
0 = Incising absent
1 = U-shaped
2 = V-shaped

35. Depth of Incision [in mm] (INCISDTH)
-9 = Indeterminate
0 = Incising absent

36. Width of Incision [in mm] (INCISWTH)
-9 = Indeterminate
0 = Incising absent

Table 7.2. Continued.

37. Coil Type [appearance in cross-section] (COILTYPE)
-9 = Indeterminate
0 = Flattened coil absent
1 = "Clapboard"
2 = "Shiplap"

38. Flattened Coils Visible (FLATCOIL)
-9 = Indeterminate
0 = Flattened coil absent
1 = Flattened coil visible (on interior and exterior surfaces)
2 = Flattened coil partially visible (in profile and/or remnant on smoothed-over surface)

39. Coil Width [in mm] (COILWIDE)
-9 = Indeterminate (includes all cases where coils are absent)

40. Worked Sherd (WORKED)
-9 = Indeterminate
0 = Not worked
1 = Mendhole
2.0 = One edge ground (shape indeterminate)
2.1 = One edge ground straight
2.2 = One edge ground rounded (convex)
3.1 = Two edges ground straight
3.2 = Two edges ground rounded (convex)
3.3 = Two edges ground, one straight and one rounded (convex)
4.0 = Indeterminate disc fragment
4.1 = Unperforated disk
4.2 = Semi-perforated disc (record diameter [in mm] and weight [in gm] in COMMENTS)
4.3 = Perforated disc (record diameter [in mm] and weight [in gm] in COMMENTS)
5 = Rim ground
6 = Shaped (list type in COMMENTS)
7 = Other type of working (list type in COMMENTS)
8 = Notched rim
9.0 = Scraper (edge type not specified)
9.1 = Scraper (*kajepe*, not bevel-edged)
9.2 = Scraper (bevel-edged)
10 = Puki
11 = Jar lid

COMMENTS
41. Comments [list] (COMMENTS)

Simulation studies by David (1972:Table 2) and DeBoer (1974:Table 1) indicate that, after 100 years of deposition, vessel class frequencies determined from archaeological deposits are likely to be in error by a maximum of ±12 percent. None of the Rio Nuevo deposits are thought to have accumulated trash for anywhere near 100 years; therefore, the magnitude of difference between the archaeological frequencies reported here and their original, systemic frequency should be less than 12 percent. It is also likely that the maximum error may be considerably less than ±12 percent, because: (1) cooking jars are likely to be among the most overrepresented of forms (due to their relatively short use-lives); (2) storage jars are probably the most underrepresented of forms (due to their relatively long use-lives) (David 1972:Table 2); and (3) it is difficult to discriminate between cooking and storage jars in archaeological collections of rim sherds.

Table 7.3. Attribute index used to record supplemental information from prehistoric, Protohistoric, and Historic sherds and vessels recovered at the Clearwater site, AZ BB:13:6 (ASM), and the Tucson Presidio, AZ BB:13:13 (ASM).

PROVENIENCE ATTRIBUTES

1. ASM Site Number (ASMSITE)

2. Primary Feature Number (FEATNUM)

3. Field Number (FN)

4. Observation Number [assigned 1-n for each FIELDNUM] (OBS)

5. Sherd Number (conjoin/match) (SHERDNUM)

MORPHOLOGICAL, TECHNOLOGICAL, AND USE-WEAR/REUSE ATTRIBUTES

6. Sherd Size (CERSIZE)

-9 = Indeterminate
99 = <5 cm^2
1 = 5-16 cm^2
2 = 16-49 cm^2
3 = 49-100 cm^2
4 = 100 cm^2-RV

7. Ceramic Class (CERCLASS)

8. Ceramic Type (CERTYPE)

9. Vessel Part (VESPART)

1 = Body (see also VESPART = 21, below)
2 = Rim
3.0 = Partial RV (25-75% complete)
3.1 = Partial RV (25-50% complete)
3.2 = Partial RV (50-75% complete)
4.0 = RV (75-100% complete)
4.1 = Partial RV (75-99% complete)
4.2 = RV (100% complete)
5 = Gila shoulder
6 = Transitional Gila/Classic shoulder
7 = Classic shoulder
8.0 = Classic indented base (thickness/uniformity indeterminate or unspecified)
8.1 = Classic indented base (thickened)
8.2 = Classic indented base (uniform)
9 = Handle (unspecified type)
10 = Tabular handle/Spout
11 = Strap handle
12 = Tall, vertical jar neck
13 = Indeterminate shoulder type
14 = Miscellaneous appendage
15 = Base
16 = Knob handle
17 = Ladle handle
18.0 = Indeterminate coil handle
18.1 = Single coil handle

Table 7.3. Continued.

18.2 = Side-by-side coil handle
18.3 = Braided coil handle
19.0 = Indeterminate lug handle
19.1 = Solid lug handle
19.2 = Pierced lug handle
19.9 = Other lug handle
20 = Field identified RV; ceramic analysis indicates reworked/recycled sherd/vessel
21 = Body sherd with compound curvature, but no rim (in jars a "neck")

10. Vessel Shape (SHAPE)

-9 = Indeterminate vessel form
0 = Indeterminate bowl or jar
1 = Bowl
2 = Jar
3 = Scoop
4 = Indeterminate "flare-rim"
5 = Pitcher
6 = Ladle
7 = Effigy vessel
8 = Legged vessel
9 = Cup
10 = Elongated vessel
11 = Ceramic censer
12 = Canteen
13 = Pinch pot
14 = Indeterminate bowl or seed jar
15 = Indeterminate bowl or scoop
16 = Cornucopia
90 = Other ceramic item

11. Vessel Form (VESFORM)

-9 = Indeterminate vessel form
0 = Indeterminate bowl or jar
100 = Indeterminate bowl
101 = Flare-rim bowl
102 = Plate/Platter
103 = Outcurved bowl
104 = Hemispherical bowl
105 = Cauldron
106 = Incurved bowl
107 = Indeterminate semi-flare-rim bowl form
108 = Semi-flare-rim, outcurved bowl
120 = Semi-flare-rim, hemispherical bowl
121 = Semi-flare-rim, incurved bowl
122 = Straight-walled or vertical-sided bowl
123 = Double bowl
124 = Recurved bowl
127 = Low-shouldered bowl
190 = Other bowl (list type in COMMENTS)

Table 7.3. Continued.

200 = Indeterminate jar
209 = Flare-rim, height indeterminate
210 = Tall flare-rim jar
211 = Short flare-rim jar
212 = Returned rim jar
213 = Short straight-collared jar
214 = Tall straight-collared jar
215 = Seed jar
216 = Knobby "datura" pot
217 = Neckless, or rimless, jar
218 = Semi-flaring tall straight-collared jar
219 = Incurved short straight-collared jar
230 = Double jar form
231 = Jar-in-a-bowl form
242 = Semi-flaring angled long-collared jar
243 = Semi-flaring short straight-collared jar
244 = Angled, straight-collared jar
290 = Other jar (list type in COMMENTS)
300 = Indeterminate-shaped scoop
310 = Teardrop-shaped scoop
320 = Oval-shaped scoop
330 = Keyhole-shaped scoop
340 = Elongated scoop
390 = Other scoop (list type in COMMENTS)
400 = Indeterminate flare-rim bowl or jar, or semi-flare-rim bowl or short straight-collared jar
500 = Indeterminate pitcher
600 = Indeterminate ladle
610 = Oval bowl ladle
620 = Circular bowl ladle
690 = Other ladle (list type in COMMENTS)
710 = Bird effigy vessel
720 = Anthropomorphic effigy vessel
730 = Shell effigy vessel
790 = Effigy vessel (describe in COMMENTS)
800 = Indeterminate legged vessel part
810 = Leg
890 = Other legged vessel part (describe part in COMMENTS)
900 = Indeterminate cup
1000 = Indeterminate elongated vessel
1100 = Indeterminate censer
1190 = Other censer (list type in COMMENTS)
1200 = Indeterminate canteen
1290 = Other canteen (list type in COMMENTS)
1400 = Indeterminate bowl or seed jar
1500 = Indeterminate bowl or scoop
1600 = Cornucopia
9000 = Other ceramic vessel/item (list type in COMMENTS)

Table 7.3. Continued.

12. Rim Length (RIMLENG)

-9 = Not a rim or indeterminate (i.e., unusual curvature of a scoop, etc.)
0 = 0-5%
1 = 5-10%
2 = 10-15%
3 = 15-20%
4 = 20-25%
5 = 25-30%
6 = 30-35%
7 = 35-40%
8 = 40-45%
9 = 45-50%
10 = >50%

13. Orifice Diameter [in cm] (ORIFDIA)

-9 = Not a rim, or indeterminate orifice diameter

14. Aperture Diameter [in cm] (APETDIA)

-9 = Not a jar rim, or indeterminate aperture diameter

15. Rim Shape (RIMSHAPE)

-9 = Not a rim
0 = Indeterminate rim shape
1.0 = Tapered (length unspecified)
1.1 = Long taper
1.2 = Short taper
2 = Rounded
3 = Squared
4.0 = Sharp bevel
4.1 = Sharp exterior bevel
4.2 = Sharp interior bevel
5 = Other or miscellaneous
6.0 = Rounded bevel
6.1 = Rounded exterior bevel
6.2 = Rounded interior bevel
7 = Flattened exterior bulge
8 = Flattened interior and exterior bulge
9 = Rounded exterior bulge
10 = Rounded interior and exterior bulge
11 = Rounded interior bulge

16. Vessel Wall Thickness [in mm] (BODTHICK)

-9 = Indeterminate

17. Carbon Core (CARBON)

-9 = Indeterminate
0 = Absent
1 = Middle, thin (<half)
2 = Middle, thick (>half)
3 = Exterior edge

Table 7.3. Continued.

4 = Interior edge
5 = Fully carbonized
6 = Interior and exterior edges carbonized, core clear
8 = Present, location unspecified

18. Slip Location (LOCATION)
-9 = Indeterminate
0 = Slip absent (plain ware, red-on-brown, etc.)
1 = Interior only
2 = Interior and rim
3 = Interior, rim, and exterior band
4 = Full slip (for rims = all interior, rim, and exterior surfaces; for body = all interior and exterior)
5 = Exterior and rim
6 = Exterior only
7 = Other slip location (describe in COMMENTS)
8 = Exterior, rim, and interior band below rim

19. Surface Cast of Organic Inclusion (CAST)
-9 = Indeterminate
0 = Absent
1 = Present

20. Multiple, Small, Round Voids of Perfect Preferred Orientation (VOIDS)
-9 = Indeterminate
0 = Absent
1 = Present

21. Temper Type (TT)
-9 = Indeterminate
1 = High LMT (>25% gneiss/schist)
2 = High LMT/low sand (7-25% gneiss/schist)
3 = Low LMT/high sand (1-7% gneiss/schist)
4 = High sand (<1% gneiss/schist)
5 = High muscovite mica (>25% MUSC)
6 = Mixed sand and muscovite mica (1-25% MUSC)
7 = Gneiss/schist and muscovite mica (>25% LMT+MUSC)
8 = Mixed sand, gneiss/schist, and muscovite mica (1-25% LMT+MUSC)
9 = Sand and crushed sherd
10 = High phyllite (>25% LMTP)
11 = Sand and fiber (Papago types)
12 = Sherd temper (no sand)
13 = Transitional (?) sand and manure/fiber (no black core and fewer casts than TT = 11)

22. Temper Source Generic (TSG)
-9 = Indeterminate
1 = Igneous volcanic sands (TSS = D, J1, J2, J3, L, R, T, W, and Y)
2 = Igneous plutonic sands (TSS = 3, E1, E2, E3, O, Q, and S)
3 = Metamorphic core complex sands (TSS = 4, 5, 8, A, B, BV, and N)
4 = Sedimentary sands
5 = Crushed rock [Gila or Wingfield Plain-like] (Temper Types = 1, 5, 7, or 10)
6 = Fine paste (low percentage of nonplastics, natural component of clay?)

Table 7.3. Continued.

7 = Mixed volcanic and granitic sands (TSS = C, M, MW, and U)
8 = Sherd, or grog, temper
9 = Mixed volcanic and sedimentary sands
10 = Mixed volcanic, granitic, and sedimentary sands
11 = Mixed metamorphic and sedimentary sands
21 = Santan/Gila Butte schist and sand
29 = Schist sand
30 = Igneous plutonic and mixed lithic (volcanic, metamorphic, and sedimentary) sands (TSS = 1, 2, 6, 9, F, G, H, I, K, and P)
31 = Other metamorphic source (TSS = V)
33 = Coarse muscovite schist: Santan/Gila Butte schist (crushed or sand)
39 = Sand and sherd
40 = Indeterminate igneous plutonic or metamorphic core complex sands
45 = Indeterminate igneous plutonic or igneous plutonic and mixed lithic sands
50 = Fine crystalline sand

23. Temper Source Specific [Petrofacies character variable] (TSS)

-9 = Indeterminate
1 = Santa Cruz River
2 = Brawley Wash
3 = Cañada del Oro
4 = Rillito Creek
5 = Pantano Wash
6 = McClellan Wash
7 = West Branch of the Santa Cruz River
8 = Tanque Verde Creek
A = Rincon
B = Catalina
BV = Catalina Volcanic
C = Samaniego
D = Avra
E1 = Western Tortolita
E2 = Central Tortolita
E3 = Eastern Tortolita
F = Durham
G = Santa Rita
H = Jaynes
I = Airport
J1 = Beehive
J2 = Twin Hills
J3 = Wasson
K = Black Mountain
L = Golden Gate
M = Rillito
MW = Rillito West
N = Owl Head
O = Sierrita
P = Green Valley
Q = Amole
R = Batamote
S = Sutherland

Table 7.3. Continued.

T = Recortado
U = Cocoraque
V = Dos Titos
W = Waterman
Y = Roskruge

24. Thin Section Number (TSNUM)

25. Worked Sherd (WORKED)
-9 = Indeterminate
0 = Not worked
1 = Mend hole
2.0 = One edge ground (shape indeterminate)
2.1 = One edge ground straight
2.2 = One edge ground rounded (convex)
3.1 = Two edges ground straight
3.2 = Two edges ground rounded (convex)
3.3 = Two edges ground, one straight and one rounded (convex)
4.0 = Indeterminate disc fragment
4.1 = Unperforated disk
4.2 = Semi-perforated disc (record diameter [in mm] and weight [in gm] in COMMENTS)
4.3 = Perforated disc (record diameter [in mm] and weight [in gm] in COMMENTS)
5 = Rim ground
6 = Shaped (list type in COMMENTS)
7 = Other type of working (list type in COMMENTS)
8 = Notched rim
9.0 = Scraper (edge type not specified)
9.1 = Scraper (*kajepe*, not bevel-edged)
9.2 = Scraper (bevel-edged)
10 = Puki
11 = Jar lid

COMMENTS
26. Illustrated? (ILLUS)

27. Comments [list] (COMMENTS)

As mentioned above, a matrix containing 24 potential vessel form classes, designated A-TT during analysis, was created by cross-tabulating values for the containment security and frequency of access attributes. Containment security follows from Shepard's (1995:230) geometric taxonomy of vessel shape.

> In terms of basic contour, the *unrestricted vessel* has an open orifice marked by an end-point tangent that is vertical or inclined outward, and at no point in the contour is there a constriction marked by a corner or inflection point. The tangent at the end point of *simple* and *dependent restricted vessels* is inclined inward, but the profile also lacks a constriction marked by a corner or inflection point. The third class includes most neck vessels. . . . The base of a neck is frequently marked by a corner point (angle at juncture of neck and body) or, if there is a smooth curve between neck and body, an inflection point occurs somewhere between constriction of neck and the equator of the body. This characteristic of contour, a corner point or an inflection point above a *major point* (point at the equator of the body), defines the third class, the *independent restricted vessel* (Shepard 1995:230, emphasis in original).

Braun (1980:181) makes a useful distinction between shallow, unrestricted vessels—representing plates and platters—and other, deeper unrestricted

vessels; that distinction is followed here. Therefore, each vessel was assigned to one of four shape classes based on its morphology: independent restricted vessels; simple and dependent restricted vessels; deep, unrestricted vessels; and shallow, unrestricted vessels. Class boundaries within the continuous frequency of access attribute follow Braun (1980) and previous studies of Tucson area pottery (Heidke 2000). The opening measurement in the unrestricted vessel forms represents the maximum diameter of the mouth of the vessel; the opening measurement in the restricted vessel forms represents the diameter at the point of maximum constriction below the mouth. Finally, the relationship between vessel form class and ceramic ware used throughout the rest of this chapter to interpret vessel function is shown in Table 7.5.

Many Historic era sherds could not be assigned to a vessel form; those rims were usually classified as an indeterminate flare-rim form. Indeterminate flare-rim vessels may represent as many as seven different Tohono O'odham vessel forms: the *hí-to-ta-kut*, *í-o-la-ki-ta-kut*, *bí-kut*, *há-a-i-cú-kai-tu-ta-kut*, *sú-u-te-ki-wá-i-kut, sí-to-ta-kut,* and the *wá-i-kut*. All seven of those vessel forms have everted, or flaring, rims and often cannot be differentiated in archaeological collections because the rim broke away from the body of the vessel at its neck.

Hí-to-ta-kut refers to any pot in which something is boiled, although the Tohono O'odham generally use the term to mean a bean boiling pot (Fontana et al. 1962:37, Figures 29-30). *Í-o-la-ki-ta-kut* refers to the pot used to make refried beans, or *refritos* (Fontana et al. 1962:47, Figures 31-32); *bí-kut* refers to a serving dish (Fontana et al. 1962:47-48, Figure 37). *Há-a-i-cú-kai-tu-ta-kut* refers to dry seed storage vessels (Fontana et al. 1962:47, Figure 36), and *sú-u-te-ki-wá-i-kut* refers to a large jar, or *olla*, used for both permanent water storage and as a drinking water container (Fontana et al. 1962:34, Figures 18-20). *Sí-to-ta-kut* refers to saguaro syrup and saguaro wine storage vessels; both small family and large ceremonial variants have been noted (Fontana et al. 1962:37, Figures 23-27). Finally, *wá-i-kut* refers to water transport vessels (Fontana et al. 1962:47, Figure 35).

EARLY AGRICULTURAL PERIOD POTTERY FROM THE CLEARWATER SITE, AZ BB:13:6 (ASM)

The pottery discussed in this section relates to the inception and development of the craft in the middle and lower Santa Cruz River Valley. The earliest pottery discussed in this section was recovered from contexts securely dated to the unnamed phase that falls between the end of the Middle Archaic (circa 2100 B.C.) and the beginning of the San Pedro phase (circa 1200 B.C.); a much larger sample of early pottery was recovered from Early Cienega phase (circa 800-400 B.C.) contexts. All of these sherds were recovered from BB:13:6.

Summary of Previous Early Agricultural Period Research

Kisselburg (1993) first described Late Cienega phase pottery in an analysis of the ceramics recovered from the Coffee Camp site, AZ AA:6:19 (ASM). Recently, seven additional collections of early pottery have been unearthed. San Pedro phase pottery has been recovered from two sites: Las Capas, AZ AA:12:111 (ASM) (Heidke 2005a), and El Taller, AZ AA:12:92 (ASM) (Stinson and Heidke 2006). Early Cienega phase pottery has also been recovered from two sites: Clearwater (Heidke and Ferg 1997) and Wetlands, AZ AA:12:90 (ASM) (Heidke 1998); the ceramics recovered during another phase of work at the Clearwater site are reported here. Late Cienega phase pottery has been recovered from Julian Wash, AZ BB:13:17 (ASM) (Heidke 2006); Los Pozos, AZ AA:12:91 (ASM) (Heidke 2005a; Heidke and Ferg 2001); and Santa Cruz Bend, AZ AA:12:746 (ASM) (Heidke et al. 1998a). Other Cienega phase sites, such as the Donaldson site, AZ EE:2:30 (ASM) (Huckell 1995), and Stone Pipe, AZ BB:13:425 (ASM) (Swartz and Lindeman 1997), have not yielded ceramics.

To date, only plain ware pottery has been recovered from typologically unmixed contexts, even though significant quantities of processed iron oxides (that is, ochre) have been recovered from some of the pottery-bearing sites (Miksa and Tompkins 1998). Given the position these pots hold at the beginning of the regional ceramic sequence, and the fact that they do not resemble later, Tucson Basin Hohokam plain ware (Kelly 1978:69-76), the term "Incipient Plain" has been proposed to refer to them (Heidke 2005a, 2005c; see also Heidke 1997, 1998, 1999; Heidke and Ferg 1997, 2001; Heidke and Habicht-Mauche 1999; Heidke and Stark 1996; Heidke et al. 1998a). Previously, five distinct kinds of incipient plain ware have been identified, based on differences in primary forming technique and surface treatment; the Early Cienega phase collection from the Clearwater site documents the presence of a sixth kind—Incipient Plain: Coiled and Incised variety.

A total of 219 incipient plain ware sherds, representing portions of 174 vessels, have been recovered and analyzed to date. Seven sherds (six vessels) were recovered from contexts dating to circa 2100 B.C., within the unnamed phase of the Early Agricultural

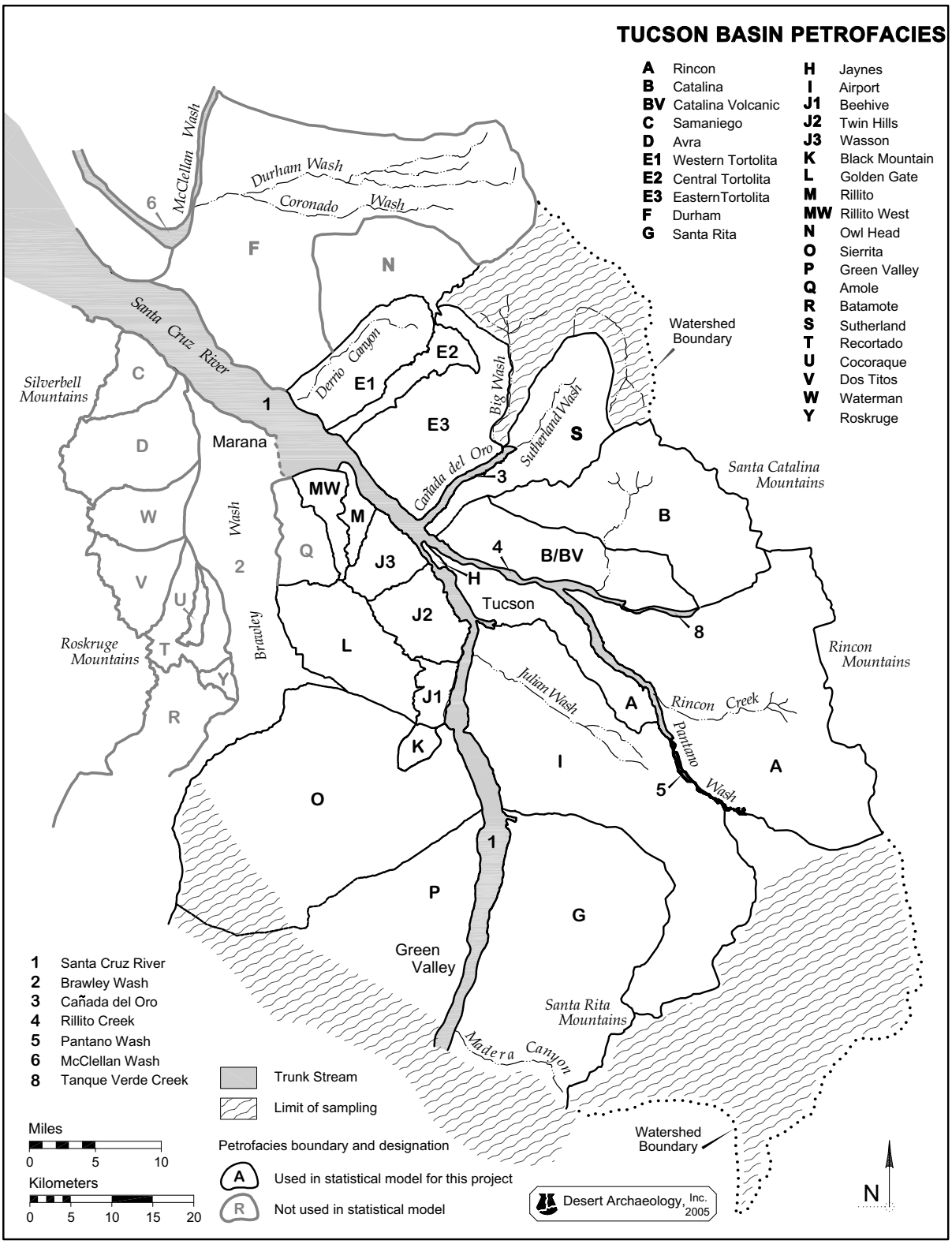

Figure 7.1. Current petrofacies map of the Tucson Basin and Avra Valley.

period (circa 2100-1200 B.C.) at Clearwater; 21 sherds (14 vessels) from the two San Pedro phase sites mentioned above (circa 1200-800 B.C.); 93 sherds (70 vessels) from the two Early Cienega phase sites mentioned above (circa 800-400 B.C.); and 90 sherds (76 vessels) from four Late Cienega phase sites (circa 400 B.C.-A.D.

Table 7.4. Vessel form classes, designated A-TT, created by cross-tabulating values for containment security and frequency of access (after Braun 1980).

Shepard/Braun Shape Class	Diameter of Opening (in cm)					
	<6.0	6.0-12.5	13.0-25.5	26.0-31.5	32.0-38.5	>38.5
Independent restricted vessels	A	B	C	D	E	EE
Simple and dependent restricted vessels	F	G	H	I	J	JJ
Unrestricted vessels (deep)	K	L	M	N	O	OO
Unrestricted vessels (shallow)	P	Q	R	S	T	TT

Table 7.5. Relationship between the vessel form class and ceramic ware.

Function	Ware	
	Plain[a, b, c]	Slipped and/or Decorated/Painted[b, c]
Cooking	C, D, E, EE, M, R, S, T, TT	N/A
Storage	A, B, F, G, H, I	A, B, C, D, E, EE, F, G, H, I
Individual serving	L, Q	L, Q
Small group serving	R	M, R
Large group serving	N, O, OO	N, O, OO, S, T, TT
Specialized	K, P	K, P
Unknown	J, JJ	J, JJ

[a]Untempered, Early Agricultural period incipient plain ware containers would not have made useful cooking vessels; therefore, incipient plain ware vessels assigned to category "R" are reassigned from cooking to the small group serving function.
[b]Historic era cups assigned to category "A" are reassigned from storage to a newly defined liquid serving function.
[c]Historic era pitchers assigned to category "B" are reassigned from storage to a newly defined liquid serving function.

50). The remaining eight sherds/vessels were recovered from temporally mixed or undatable contexts.

Most of the 174 analyzed vessels are represented by body sherds rather than rim sherds, a fact that limits our ability to understand vessel form and size. Most incipient plain ware vessels appear to have been small bowls, based on the rim sherds that have been recovered. The low diversity in vessel shape and size documented in the extant collection suggests these plain ware bowls served one or more highly specialized uses. Their untempered paste, small size, and rarity in the archaeological record suggest they were not used for domestic tasks, such as cooking or storage. Their low numbers and small size make it unlikely they were used in competitive feasting, as has been argued for many other early pottery traditions (Hayden 1995). However, the ritual use of small containers is reported in ethnographic descriptions of Sonoran (Tohono O'odham) and northern Mesoamerican (Huichol [Wixárika] and Cora [Náyari]) peoples, and the functions that those containers serve provides a way to speculate about how incipient plain ware pots may have been used during the Early Agricultural period, a topic addressed further below.

Incipient Plain Ware Production Sequence Attribute Data

This attribute analysis is structured in terms of the operational tasks involved in the production sequence of hand-made pottery (Rye 1981), and follow a format used in previous studies of Early Agricultural period pottery (Heidke 1998:Table 10.3, 2005a:Tables 9.2 and 9.4; Heidke and Ferg 1997:Table 7.3, 2001:Table 8.2; Heidke et al. 1998a:Table 13.7). Material correlates of multiple production steps were recorded: raw material procurement attributes; forming, finishing, and decorative attributes; and firing attributes. Provenience, contextual, and typological attributes were also recorded. Attributes recorded during analysis are defined in Heidke (2001; see also Table 7.2).

Pottery recovered from the 1995 excavation at Clearwater is discussed in Heidke and Ferg (1997); the material recovered from the 2000-2003 excavations is discussed here. Recovery contexts are listed in Table 7.6. Each row represents an individual vessel. The quantity of conjoining and/or matching sherds recovered from each vessel is reported in the "Number of Sherds" column; only four vessels are

Table 7.6. Incipient plain ware recovery contexts at the Clearwater site, AZ BB:13:6 (ASM).

Feature Number	Stratum[a]	Incipient Plain Ware Variety	Number of Sherds	Sherd Size	Vessel Part	Phase or Occupation	Figure Number(s)
0	4	Incipient Plain: Coiled variety	1	<5 cm²	Body sherd	Mission	
1	4	Incipient Plain	1	5-16 cm²	Body sherd	Mission	–
64	4	Incipient Plain	1	<5 cm²	Body sherd	Mission	–
178	50	Incipient Plain	1	5-16 cm²	Rim sherd	Mission	–
178	50	Incipient Plain	1	5-16 cm²	Rim sherd	Mission	7.4c
178	50	Incipient Plain	1	<5 cm²	Rim sherd	Mission	7.4g
193	50	Incipient Plain	1	5-16 cm²	Rim sherd	Mission	–
15	11	Incipient Plain: Incised and Impressed variety	1	5-16 cm²	Body sherd	Early Cienega	7.2k
100	10	Incipient Plain	1	<5 cm²	Body sherd	Early Cienega	–
112	11	Incipient Plain	1	<5 cm²	Body sherd	Early Cienega	7.2g
3220	10	Incipient Plain: Coiled and Incised variety	1	<5 cm²	Rim sherd	Early Cienega	7.2n, 7.3, 7.4f
3294	10	Incipient Plain: Coiled variety	1	<5 cm²	Body sherd	Early Cienega	–
3294	10	Incipient Plain	1	<5 cm²	Body sherd	Early Cienega	–
3294	11	Incipient Plain: Coiled and Incised variety	1	<5 cm²	Rim sherd	Early Cienega	7.2m, 7.4b
3294	11	Incipient Plain: Coiled variety	1	<5 cm²	Body sherd	Early Cienega	–
3294	11	Incipient Plain: Coiled variety	2	<5 cm²	Body sherd	Early Cienega	–
3294	11	Incipient Plain: Coiled variety	1	<5 cm²	Body sherd	Early Cienega	–
3294	11	Incipient Plain: Coiled variety	1	<5 cm²	Body sherd	Early Cienega	–
3325.01	30	Incipient Plain: Coiled variety	1	<5 cm²	Body sherd	Early Cienega	–
3327	11	Incipient Plain: Coiled variety	1	<5 cm²	Rim sherd	Early Cienega	7.4d
3327	11	Incipient Plain: Coiled and Incised variety	1	<5 cm²	Rim sherd	Early Cienega	7.2l
3327	11	Incipient Plain	1	<5 cm²	Rim sherd	Early Cienega	7.4a
3332	11	Incipient Plain: Coiled variety	1	<5 cm²	Rim sherd	Early Cienega	7.2i, 7.4e
3332	11	Incipient Plain: Coiled variety	2	<5 cm²	Body sherd	Early Cienega	7.2j
3332	20	Incipient Plain	1	<5 cm²	Body sherd	Early Cienega	7.2h
3357	50	Incipient Plain	1	5-16 cm²	Rim sherd	Early Cienega	–
9372	11	Incipient Plain: Coiled variety	2	<5 cm²	Body sherd	Early Cienega	–
0	504	Incipient Plain: Incised variety	1	<5 cm²	Rim sherd	Unnamed	7.2c
581	10	Incipient Plain: Incised variety	1	<5 cm²	Body sherd	Unnamed	7.2d
628	50	Incipient Plain: Incised and Punctate variety	1	5-16 cm²	Rim sherd	Unnamed	7.2f
3359	10	Incipient Plain: Incised variety	1	<5 cm²	Body sherd	Unnamed	7.2
3359	10	Incipient Plain	1	<5 cm²	Body sherd	Unnamed	7.2b
3359	10	Incipient Plain	2	<5 cm²	Body sherd	Unnamed	7.2a

[a]Stratum 4 is sheet trash, Stratum 10 is undifferentiated structure fill, Stratum 11 is roof or wall fall, Stratum 20 is floor contact, Stratum 30 is fill of a secondary feature within a structure, Stratum 50 is fill of an extramural feature, Stratum 504 is that in which features belonging to the unnamed phase are located.

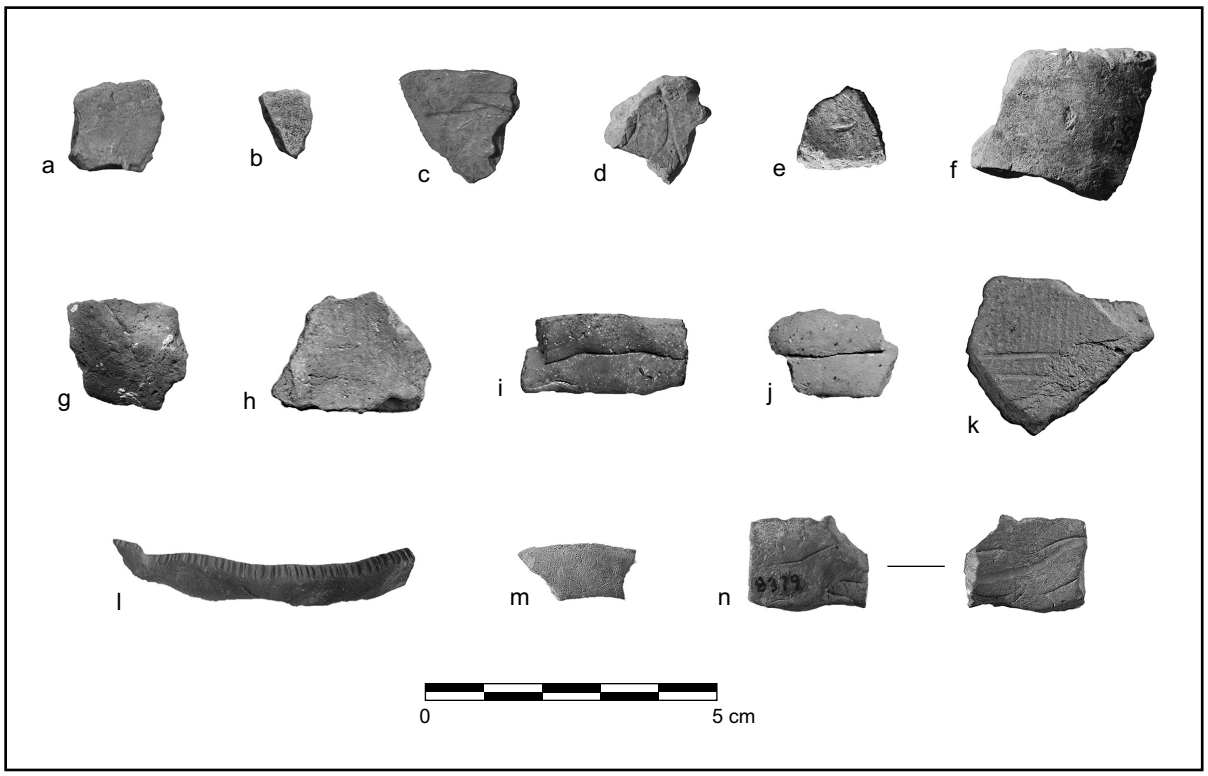

Figure 7.2. Incipient plain ware sherds recovered from the Clearwater site, AZ BB:13:6 (ASM): (a-f) were recovered from unnamed phase contexts dating to circa 2100 B.C.; (g-n) were recovered from Early Cienega phase contexts (circa 800-400 B.C.). (a-b, g-h) were typed as Incipient Plain; (c-e) were typed as Incipient Plain: Incised variety; (f) was typed as Incipient Plain: Incised and Punctate variety; (i-j) were typed as Incipient Plain: Coiled variety; (k) was typed as Incipient Plain: Impressed and Incised variety; (l-n) were typed as Incipient Plain: Coiled and Incised variety.

represented by more than one sherd. Thirty-eight additional "ceramic" objects were collected by field personnel. All were quite soft (less than 2.5 on the Mohs scale of hardness) and appear to be unfired, consolidated sediments. These objects were not discarded, and they are curated with the Clearwater ceramics, allowing others to examine them. They are not, however, discussed further in this chapter.

The incipient plain ware sherds are generally quite small (less than 5 cm^2), and none is larger than 16 cm^2. The collection contains portions of 20 vessels represented by body sherds and 13 vessels represented by rim sherds. Six of the vessels display incised decoration, one displays incised and punctate decoration, one displays an incised and impressed surface, and the remaining 25 vessels lack surface elaboration altogether. Six of the vessels were recovered from circa 2100 B.C. contexts, 20 were recovered from Early Cienega phase contexts, another six of the vessels were incorporated into mission deposits, and one sherd was recovered from a nonfeature sheet trash context. The latter seven vessels are not included in the following discussion of production sequence attribute data because they could not be assigned to a specific time span.

Materials Procurement

The manufacture of pottery begins with the collection of raw materials—primarily water, clay, temper (if added), and fuel (Crown and Wills 1995:247; Rye 1981:29). Material procurement attributes recorded in this study were limited to aspects of the temper, which provide evidence regarding production technology and resource provenance. The modal size of nonplastic grains was recorded after comparing the sand grains in the body of a vessel against reference samples mounted on a W. F. McCollough "sand-gauge."

Six raw material procurement attributes were recorded. Three of the attributes—temper type, generic temper source, and specific temper source—provided little information, because all the incipient plain ware recovered from the Clearwater site appears to have been made from untempered clay (Table 7.7). Seven of the sherds lacked silt- or sand-sized nonplastics altogether; the other 19 sherds contained less than 10 percent nonplastics in their paste, based on comparison with visual estimation charts reproduced in Matthew et al. (1991:240). The modal nonplastic grain size in those 19 sherds ranged from silt (<1/16 mm),

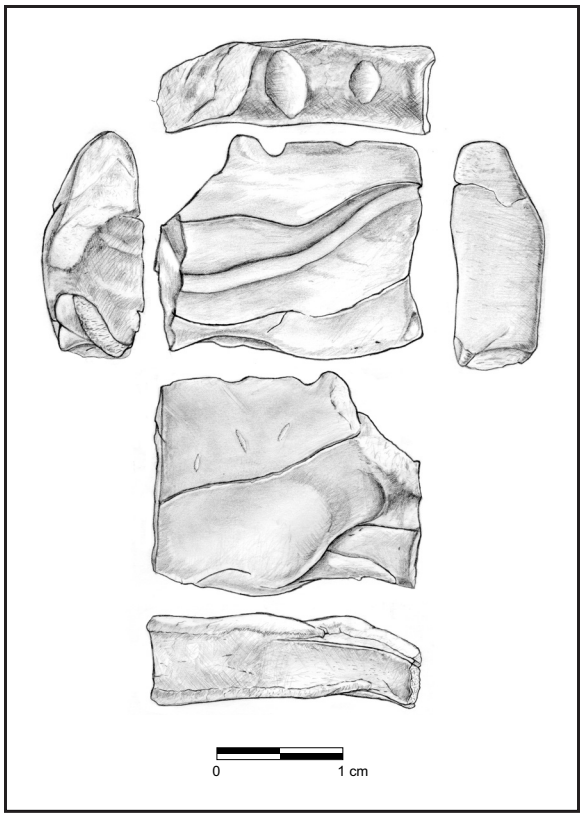

Figure 7.3. Illustration showing unusual aspects of the manufacture of one Early Cienega phase Incipient Plain: Coiled and Incised variety sherd from the Clearwater site, AZ BB:13:6 (ASM).

to fine sand (1/8-1/4 mm). Grain shapes ranged from subangular to rounded.

Based on binocular microscopic examination, natural nonplastics appear to have been present in the clay body, rather than added separately. Clay deposits located at the site or along the Santa Cruz River could have provided the raw material. None of the sherds displayed charcoal flecks in their paste, and only one sherd displayed casts resulting from organic material that had burned out of the paste during firing. Both of those characteristics were noted by Kisselburg (1993) in some of the Late Cienega phase incipient plain ware recovered from Coffee Camp.

Forming, Finishing, and Decorative Techniques

Rye (1981:62) distinguishes three main stages of vessel forming: primary forming, secondary forming, and surface modification. During primary forming, the prepared clay body is manipulated into a form resembling the finished vessel (Rye 1981:62); the vessel shape attribute qualitatively characterizes the primary form of a pot. During secondary forming, the shape of the vessel is further refined, and the final, relative proportions of the pot are established (Rye 1981:62). In the current study, the vessel form attribute qualitatively characterizes the final proportions of a pot, whereas the orifice diameter and vessel wall thickness measurements provide quantitative data on those proportions. The final shape of the lip of a vessel was characterized qualitatively by a rim shape attribute (Colton 1953). Surface modifications considered part of the forming sequence include polishing, scraping, smoothing, incising, impressing, and punctation (Rye 1981:62).

No attributes characterizing primary forming technique—such as coiling, pinching, preparation and joining of slabs, throwing, or molding (Rye 1981:62)—or secondary forming technique—such as coiling, joining, beating, scraping, trimming, turning, or throwing (Rye 1981:62)—were explicitly recorded in this study. Coiling and pinching (Rye 1981:70) appear to be the primary forming techniques used to create these incipient plain wares.

Portions of 13 vessels were definitely formed by coiling. Superficially, the coiled variety of incipient plain ware resembles later corrugated pottery. However, unlike corrugated wares, coil junctures are clearly visible on both the interior and exterior surfaces of nearly all specimens. Coils were pressed together and overlap. In cross section, some of the overlapping coils produce a "clapboard" appearance, while others produce a "shiplap" appearance (Heidke 1998:Figure 10.3). Coil widths range from 5.2 mm to 9.8 mm, with an average width of 6.9 mm. The rim of one vessel displays a tapered point at the end of its terminal coil; this aspect makes the rim resemble a basket made of clay. Another one of the coiled and incised sherds is unusual in that the coils were partially obliterated by first smoothing a thin layer of clay over them and then emphasizing coil junctures with fine incised lines (see Figures 7.2n, 7.3). Subsequently, unrelated wider lines were incised into the interior surface and lip of the vessel.

Vessel Shape and Form, Orifice Diameter, and Rim Shape. The vessel form of most incipient plain ware recovered from the Clearwater site could not be determined because most vessels are represented by body sherds. Among the sherds that could be determined, all are bowls. Four bowl vessel forms were documented: outcurved bowl (see Figure 7.4b-e), plate (see Figure 7.4a), hemispherical bowl (see Figure 7.4f), and incurved bowl (see Figure 7.4g). Nine bowl rim sherds were large enough to provide orifice diameter measurements. The orifice diameter of those pots ranged from 3.0-14.0 cm, with an average orifice diameter of 8.0 cm. The small size of these vessels may help explain why untempered clay was used in their manufacture. Tohono O'odham (Papago) potters temper clays intended for

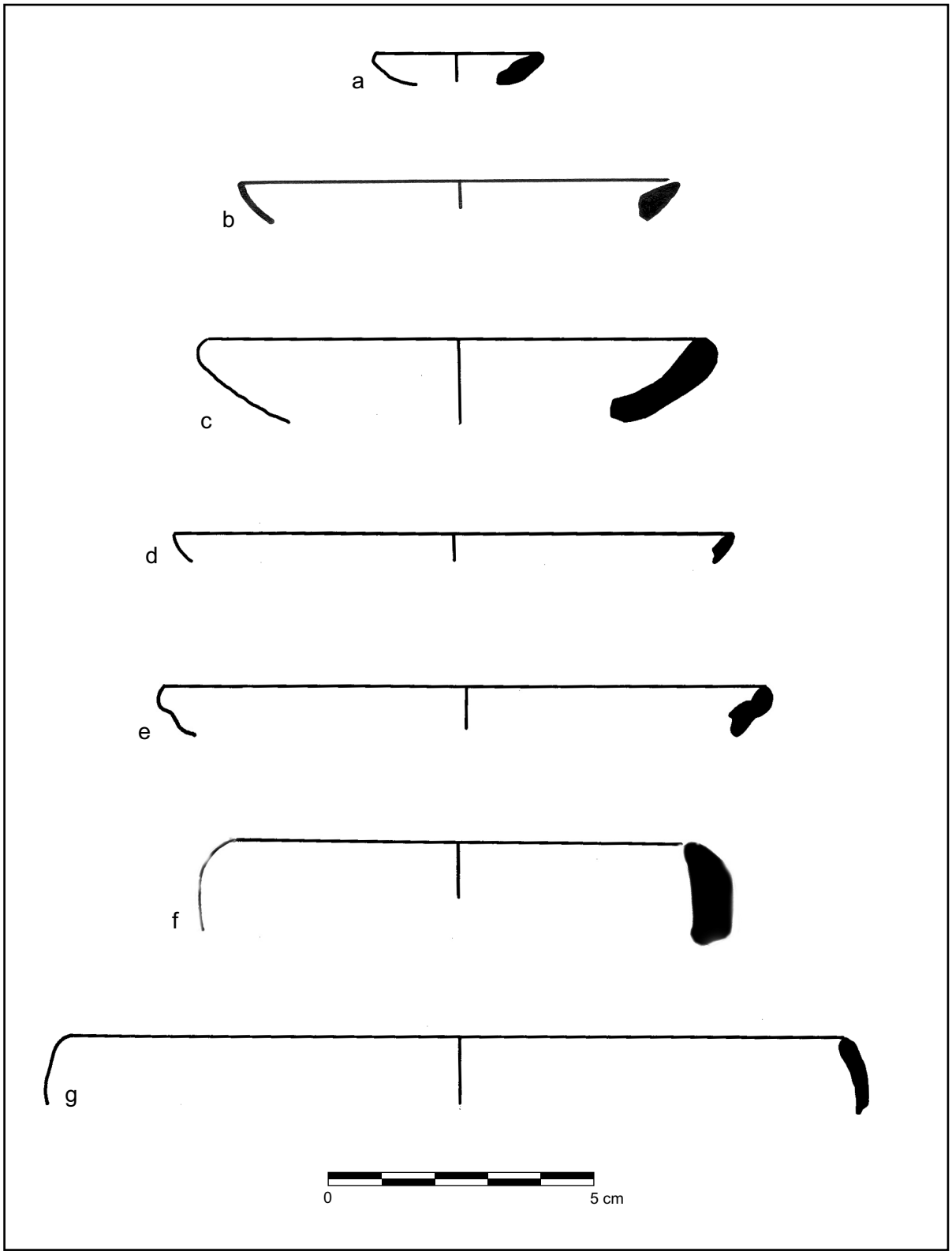

Figure 7.4. Incipient plain ware bowl vessel forms from the Clearwater site, AZ BB:13:6 (ASM): (a) plate; (b-e) outcurved bowls; (f) hemispherical bowl; and (g) incurved bowl. (a-b) and (d-f) were recovered from Early Cienega phase contexts (circa 800-400 B.C.); (c, g) were recovered from Feature 178, a mission deposit located at the San Agustín Mission locus.

Table 7.7. Clearwater site, AZ BB:13:6 (ASM), incipient plain ware production sequence attribute data.

	Unnamed Phase Varieties			Early Cienega Varieties			
Attribute	Incipient Plain	Incipient Plain: Incised Variety	Incipient Plain: Incised and Punctate Variety	Incipient Plain	Incipient Plain: Coiled Variety	Incipient Plain: Coiled and Incised Variety	Incipient Plain: Incised and Impressed Variety
Body Composition							
Untempered clay	2	3	1	6	10	3	1
Modal Nonplastic Grain Size							
Indeterminate	0	1	1	0	2	0	0
Clay	2	1	0	0	2	2	0
Silt	0	0	0	1	5	0	1
Very fine sand	0	1	0	4	1	1	0
Fine sand	0	0	0	1	0	0	0
Organic Temper Casts Visible							
Indeterminate	0	0	0	0	2	0	0
Absent	1	3	1	6	8	3	0
Present	1	0	0	0	0	0	1
Charcoal Fragments in Paste							
Indeterminate	0	0	0	0	2	0	0
Absent	2	3	1	6	8	3	1
Coil Type							
Indeterminate	–	–	–	–	1	0	–
"Clapboard"	–	–	–	–	5	3	–
"Shiplap"	–	–	–	–	4	0	–
Coil Width (mm)							
Number of cases	N/A	N/A	N/A	N/A	10	3	N/A
Range	–	–	–	–	5.20-9.00	5.20-9.80	–
Mean	–	–	–	–	6.83	7.13	–
Standard deviation	–	–	–	–	1.26	2.39	–
Vessel Form							
Indeterminate	2	1	0	4	8	0	1
Indeterminate bowl	0	1	1	0	0	0	0
Outcurved bowl	0	0	0	0	2	1	0
Plate	0	1	0	1	0	1	0
Hemispherical bowl	0	0	0	0	0	1	0
Incurved bowl	0	0	0	1	0	0	0
Bowl Orifice Diameter (cm)							
Number of cases	N/A	1	1	2	2	3	N/A
Range	–	8	5	3.00-5.00	10.00-11.00	8.00-14.00	–
Mean	–	–	–	4.00	10.50	10.00	–
Standard deviation	–	–	–	1.41	0.71	3.46	–
Rim Shape							
Rounded	–	0	1	2	2	2	–
Tapered	–	1	0	0	0	1	–

Table 7.7. Continued.

Attribute	Unnamed Phase Varieties			Early Cienega Varieties			
	Incipient Plain	Incipient Plain: Incised Variety	Incipient Plain: Incised and Punctate Variety	Incipient Plain	Incipient Plain: Coiled Variety	Incipient Plain: Coiled and Incised Variety	Incipient Plain: Incised and Impressed Variety
Average Vessel Wall Thickness (mm)							
Number of cases	1	2	1	4	10	3	–
Range	5.00	4.30-4.50	6.40	2.50-6.80	2.80-4.90	4.00-6.70	–
Mean	–	4.40	–	4.12	4.01	4.97	–
Standard deviation	–	0.14	–	1.86	0.58	1.50	–
Minimum Vessel Wall Thickness (mm)							
Number of cases	2	2	1	6	10	3	1
Range	3.40-4.40	2.00-3.30	5.60	2.00-7.00	2.00-4.60	2.00-5.40	4.40
Mean	3.90	2.65	–	3.88	3.64	3.50	–
Standard deviation	0.71	0.92	–	1.86	0.74	1.73	–
Maximum Vessel Wall Thickness (mm)							
Number of cases	2	2	1	6	10	3	1
Range	4.10-5.20	4.80-5.00	6.70	3.30-8.40	3.60-5.30	4.80-7.70	6.90
Mean	4.65	4.90	–	5.87	4.47	5.87	–
Standard deviation	0.78	0.14	–	2.42	0.54	1.59	–
Difference between Minimum and Maximum Vessel Wall Thickness (mm)							
Number of cases	2	2	1	6	10	3	1
Range	0.70-0.80	1.50-3.00	1.10	0.80-5.20	0.10-1.70	1.70-3.10	2.50
Mean	0.75	2.25	–	1.98	0.83	2.37	–
Standard deviation	0.07	1.06	–	1.72	0.57	0.70	–
Interior Surface Treatment							
Indeterminate	0	1	0	0	3	0	0
Hand-smoothed	1	0	0	5	4	0	0
Lightly polished ("chalky feel")	0	0	0	1	3	3	0
Lightly burnished ("waxy feel")	1	2	1	0	0	0	0
Basket-impressed	0	0	0	0	0	0	1
Exterior Surface Treatment							
Indeterminate	0	2	0	1	1	0	1
Hand-smoothed	1	0	0	4	4	0	0
Lightly polished ("chalky feel")	0	1	1	1	5	2	0
Lightly burnished ("waxy feel")	1	0	0	0	0	1	0
Location of Incising							
Interior	–	3	0	–	–	0	1
Rim lip	–	0	1	–	–	2	0
Interior, exterior, and rim lip	–	0	0	–	–	1	0

Table 7.7. Continued.

	Unnamed Phase Varieties			Early Cienega Varieties			
Attribute	Incipient Plain	Incipient Plain: Incised Variety	Incipient Plain: Incised and Punctate Variety	Incipient Plain	Incipient Plain: Coiled Variety	Incipient Plain: Coiled and Incised Variety	Incipient Plain: Incised and Impressed Variety
Moisture Content When Incised							
Leather-hard	–	1	0	–	–	3	0
Soft/Moist	–	1	1	–	–	0	1
Dry	–	1	0	–	–	0	0
Shape of Incision							
Indeterminate	–	1	0	–	–	0	0
U-shaped	–	1	1	–	–	1	1
V-shaped	–	1	0	–	–	2	0
Depth of Incision (mm)							
Number of cases	N/A	2	1	N/A	N/A	3	1
Range	–	0.20-0.60	0.50	–	–	0.40-0.50	0.20
Mean	–	0.40	–	–	–	0.43	–
Standard deviation	–	0.28	–	–	–	0.06	–
Width of Incision (mm)							
Number of cases	N/A	2	1	N/A	N/A	3	1
Range	–	0.80-1.10	0.90	–	–	0.30-0.60	0.70
Mean	–	0.97	–	–	–	0.43	–
Standard deviation	–	0.15	–	–	–	0.15	–
Carbon Core							
Indeterminate	0	0	0	0	4	0	0
Absent	1	3	1	6	6	3	1
Full (edge-to-edge)	1	0	0	0	0	0	0
Fire Cloud							
Indeterminate	0	1	0	0	2	1	0
Absent	2	2	1	4	7	1	1
Interior and exterior	0	0	0	2	0	1	0
Exterior	0	0	0	0	1	0	0

making large vessels, but do not add temper when making small bowls or plates (Fontana et al. 1962:57-58). Two rim shapes were observed: rounded and tapered.

Classification of vessel function, using the Shepard/Braun approach described above (Table 7.8), reveals that most incipient plain ware pots recovered from the Clearwater site would have made excellent individual serving vessels, although storage and unknown, specialized tasks are also indicated.

Vessel Wall Thickness. Analysis of the incipient plain ware pottery recovered from the Santa Cruz Bend site showed that the vessel wall thickness of individual pots can be highly variable (Heidke et al. 1998a). Therefore, four measurements of vessel wall thickness (average, minimum, maximum, and difference between minimum and maximum thickness) are reported in Table 7.7. The overall range of the incipient plain ware sherds is 2.0-8.4 mm, with a mean average vessel wall thickness of 4.38 mm.

Interior and Exterior Surface Treatments. All the incipient plain ware had interior and exterior surfaces displaying dull hand-smoothed surfaces (Rye 1981:89-90) or polishing/burnishing (Rye 1981:90). Exterior

Table 7.8. Frequency of incipient plain ware sherds in each vessel form class, reported by time, from the Clearwater site, AZ BB:13:6 (ASM).

	Recovery Context Date			
Functional Category (Final Vessel Form Class)	Unnamed Phase	Early Cienega	Mission	Row Total
Simple and Dependent Restricted Vessels				
F: Seed storage (<6.0 cm orifice diameter)	0	1	0	1
H: Specialized, temporary dry storage (13.0-25.5 cm orifice diameter)	0	0	1	1
Unrestricted Vessels (Deep)				
L: Individual serving in domestic context (6.0-12.5 cm orifice diameter)	0	4	1	5
Unrestricted Vessels (Shallow)				
P: Specialized, infrequently used miniature (<6.0 cm orifice diameter)	0	1	0	1
Q: Individual serving (6.0-12.5 cm orifice diameter)	1	0	0	1
R: Collecting, processing, and/or individual-to-large group serving (13.0-25.5 cm orifice diameter)	0	1	0	1
Column total	1	7	2	10

surfaces are often somewhat irregular ("bumpy"), while interior surfaces are less so and are usually uniformly curved.

Incising. Incising is a decorative forming technique produced by cutting into the surface of the pot (Rye 1981:66, 90). Eight incipient plain ware vessels display incised decoration. Three different design fields were documented. Four vessels were incised on their interior surface and nowhere else (see Figure 7.2c-e); one of those sherds also displays an impressed surface that may have resulted from pressing the wet clay against a basket (see Figure 7.2k). Three vessels were incised on the lip of their rim and nowhere else (see Figure 7.2l-m); one of the vessels also displays punctation (see Figure 7.2f). Finally, the eighth vessel displayed an incised design on the lip of its rim and on its interior and exterior surfaces (see Figures 7.2n, 7.3). Design elements include straight and curved lines; those elements are common in the contemporary Western Archaic rock art tradition (Wallace and Holmlund 1986:Figure D-3).

Examination of an incised surface can provide clues about the stage of drying a vessel was in when it was incised. Four of the sherds display clean lines, indicating the design was cut into the clay when it was in a leather-hard condition; three of the sherds display elevated ridges along both sides of the incised lines, indicating a soft, plastic condition; and one of the sherds displayed the chipped edges diagnostic of incising that occurred after the vessel has dried hard (Rye 1981:Figure 47).

In cross section, three of the four vessels incised when the clay was leather-hard display V-shaped incisions. The fourth vessel incised when the clay was leather-hard, as well as the three vessels incised when the clay was soft, display U-shaped incisions. The shape of the incised grooves on the eighth vessel could not be determined. Lines incised into leather-hard clay range from 0.4 mm to 0.5 mm deep (average 0.43 mm) and from 0.3 mm to 0.8 mm wide (average 0.52 mm). Lines incised into soft clay range from 0.2 mm to 0.6 mm deep (average 0.43 mm), and from 0.7 mm to 1.0 mm wide (average 0.87 mm). Lines incised into dry clay are 0.2 mm deep and 1.1 mm wide.

Firing Conditions

The purpose of firing is to subject the formed vessel to a high enough heat for a sufficient time to insure the complete destruction of the clay mineral crystals and to insure the vessel exhibits the performance characteristics required of it (Rye 1981:96). Core color and fire clouding—qualitative measures of firing conditions—were recorded in this study (Rice 1987:343-345, 476; Rye 1981:114-118). Carbon cores are black-to-gray areas observable in the interior cross section of a vessel wall and are associated with the incomplete removal of carbonaceous matter from the clay during firing (Rice 1987:474). Carbon cores were absent from most specimens, indicating vessels were probably fired in an incompletely oxidizing atmosphere (Rye 1981:115-116; Shepard 1995:221). Fire

clouds are darkened areas on the surface of a vessel and are characteristic of firing conditions in which fuel comes in contact with the vessel (Rice 1987:476). Eighteen of the incipient plain ware sherds lacked fire clouds, three displayed fire clouds on both their interior and exterior surfaces, one displayed fire clouds only on its exterior surface, and in four cases, the presence or absence of fire clouds was recorded as indeterminate.

Discussion

During the last decade, a previously unknown, early stage of ceramic development has been documented at numerous archaeological sites located in the middle and lower Santa Cruz River Valley (Heidke 1997, 1998, 1999, 2005a; Heidke and Ferg 1997, 2001; Heidke and Habicht-Mauche 1999; Heidke and Stark 1996; Heidke et al. 1998a; Kisselburg 1993; Stinson and Heidke 2006). The research presented here has furthered current knowledge of this stage in numerous ways.

First, the size of the incipient plain ware sample has increased greatly, from 141 to 174 vessels. Second, the time depth of ceramic container production has increased with evidence from contexts assigned to the interval between the end of the Middle Archaic and the beginning of the San Pedro phase. The incipient plain ware pottery recovered from unnamed phase contexts dating to circa 2100 B.C. (Chapter 19, this report) represents the earliest ceramic containers recovered from archaeological deposits in the Greater Southwest, and they are accompanied by other types of fired clay objects, including figurines (Chapter 8, this report).

Hill (1996) presented linguistic evidence that the diffusion of maize into the Southwest occurred during a period of coherence among the southern Uto-Aztecan languages, while the appearance of pottery occurred at a later time, when linguistic boundaries were starting to emerge among the languages. Evidence from the Clearwater site questions Hill's interpretation, however, as some of the earliest maize remains currently known from the Greater Southwest occur in the same deposits as the earliest pottery.

Current knowledge is compatible with at least two hypotheses: either the diffusion of maize predates the beginning of the unnamed phase, or a different, perhaps extinct, word root was used to refer to the small fired clay containers described here. The second hypothesis seems more likely, given that maize remains are currently unknown from Middle Archaic contexts. Perhaps it is the well-made, tempered seed jars of the later plain ware horizon (Crown and Wills 1995:249; Deaver and Ciolek-Torrello 1995:484-485, 512; Di Peso 1979:92; Doyel 1991:239, 259; Fish et al. 1992:64; Gladwin et al. 1965:303; Haury 1978:16 in Weaver et al. 1978; Huckell 1993:6; LeBlanc 1982; Martin 1952:79; Sayles 1983:132; Schroeder 1982:9-10; Stark 1995:249; Wendorf 1953; Wheat 1955:84; Wilson and Blinman 1993; Wilson et al. 1992:2, 8-12) that linguistically mark the appearance of pottery noted by Hill (1996).

Third, pottery from the unnamed phase is very similar to that recovered from San Pedro phase contexts at Las Capas (Heidke 2005a), with plain, incised, and incised and punctate varieties present. Fourth, the hypothesis that Incipient Plain: Coiled variety pottery may be diagnostic of the Early Cienega phase (Heidke 1998; Heidke and Ferg 1997) is supported by the evidence from the Clearwater site. Fifth, a new variety—Incipient Plain: Coiled and Incised variety—was documented in two Early Cienega phase contexts, Features 3294 and 3327.

The exact function(s) of Early Agricultural period incipient plain ware containers remains something of a mystery. Analysis of their morphology, size, and performance characteristics (Heidke 2005a) indicates most were well suited to serving tasks, but begs the question as to what was served in them. Saguaro wine, decoctions containing tobacco or another member of the Solanaceae family (such as datura), medicinal infusions and/or teas made from creosotebush, globemallow, Mormon tea, morning-glory, pigweed, sage, sumac, and tansy mustard—all of which have been documented in the pollen and/or macrobotanical data recovered from Early Agricultural period sites and are documented uses by Native American peoples—have been suggested (Heidke 1999, 2005a). Alternatively, incipient plain ware vessels may have been used to hold offerings of food, sanctified water, or flowers (Coyle 2000:121-122; Kindl 2000; Vázquez 2000:65-66; Wyckoff 1990:16), or even to transfer live coals (Patencio 1969:43, 120 in Griset 1990:184). Residue analysis holds the promise of answering what purpose these vessels served (Longacre 1995:279), and is an avenue of research that should be pursued in the future.

Wilcox (1987:152, 1991:49; see also Bohrer 1994 and Hastorf and Johannessen 1994) has suggested that the quartered design layouts painted on Pioneer period, Hohokam bowl interiors may have symbolized a cosmological belief in a universe divided into four quarters, although a fifth direction, the center, forming an *axis mundi* linking zenith and nadir, was also likely implied by these designs (Coyle 2000; Kindl 2000; Neurath 2000; Vázquez 2000). That symbolism may reflect an ancient Uto-Aztecan cosmological view that has continued to be expressed to the present. Ancient because a five- or six-fold view of the world is expressed in Uto-Aztecan languages as far removed in time and space as Cora-Huichol and Hopi.

According to Miller (1983:Figure 2), the Hopi language branched from the rest of the Uto-Aztecan family somewhere between 6,000 B.C. and 5,500 B.C., yet contemporary Cora and Huichol bowl (Coyle 2000:121; Kindl 2000:49; Vázquez 2000:67-69) and Hopi altar (Hieb 1979) symbolism appears to be very similar. That similarity suggests belief in a universe divided into quarters with an *axis mundi* running through the center is: (1) at least as old as the split between the Cora-Huichol and Hopi languages; and (2) may well have been shared with other Uto-Aztecan speakers, as the Early Agricultural period inhabitants of the Clearwater site presumably would have been (Hill 2001). If the last points are true, the materialized expression of cosmology posited by Wilcox (1987, 1991) for Pioneer period pottery should be extended back in time. The small clay bowls produced throughout the Early Agricultural period may have provided their makers with a means to think about the larger, sacred territory that they, and their divine ancestors, inhabited.

Finally, sherds of incipient plain ware are relatively rare in the archaeological record. A recent study comparing Munsell colors of the surfaces and cores of incipient plain ware sherds with the Munsell color of fired clay samples (Roos 2005) suggests why that may be the case. In an extension of Roos' study, Heidke (2005c) found that 47 percent of incipient plain ware surface and core colors suggest some vessels were fired at temperatures less than 550°C, 28 percent of surface colors and 18 percent of core colors suggest firing temperatures between 550°C and 650°C, with the remaining surface and core colors suggesting firing temperatures greater than 650°C. These values confirm Kisselburg's (1993:294) hypothesis that incipient plain ware pottery was fired at relatively low temperatures. As Kisselburg (1993) suggested, and Roos (2005) has argued, incipient plain ware containers were almost certainly subjected to greater moisture-related weathering than pottery made later in time (when most settlements were located on better-drained soils and firing temperatures were higher), and this aspect of preservation likely lowered their incidence of recovery. It also leads one to wonder if, like the Huichol's gourd effigy bowls (Kindl 2000:57), their disintegration should be considered one aspect of a universe capable of regenerating and transforming itself as it passes through cycles of life and death.

AGUA CALIENTE PHASE POTTERY FROM THE MISSION GARDENS LOCUS, THE CLEARWATER SITE, AZ BB:13:6 (ASM)

A total of 812 pottery sherds—representing portions of at least 32 individual vessels—was recovered from Features 3014 and 3038 at the Mission Gardens locus of the Clearwater site (Table 7.9). Additional information regarding characteristics of the one red-slipped sherd recovered from those deposits is provided in Table 7.10, while Table 7.11 reports the size (diameter) of 12 perforated and unperforated worked sherd discs recovered from them.

An incised body sherd recovered from Feature 3014 is illustrated in Figure 7.5a. The raised margins of the incised design indicate it was inscribed while the clay was in a plastic condition (Rye 1981:66,

Table 7.9. Pottery types recovered from Agua Caliente phase deposits at the Mission Gardens locus, the Clearwater site, AZ BB:13:6 (ASM).

	Vessel Part[a]						Row Total	
	Body Sherd		Rim Sherd		Neck			
Ceramic Type	Sherd Count	MNV[b]	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV
Tucson Basin Types								
Plain ware[c]	763	N/A	33	29	6	N/A	802	29
Red ware	0	0	8	1	0	0	8	1
Indeterminate red-on-brown ware	1	1	0	0	0	0	1	1
Possible Papago Plain	1	1	0	0	0	0	1	1
Column total	765	2	41	30	6	0	812	32

[a]Plain ware body and neck sherds were not inspected for conjoins; therefore, minimum number of vessel estimates are not available (N/A) for those ware and vessel part combinations.

[b]MNV = Minimum number of vessels.

[c]Sherd count includes 15 worked plain ware sherds (12 discs and 3 sherds with one edge ground).

Table 7.10. Location of slip on Agua Caliente phase red ware rim sherd recovered from the Clearwater site, AZ BB:13:6 (ASM).

Slip Location	Bowl Rim Sherd
Fully slipped on all visible interior and exterior surfaces	1

Table 7.11. Plain ware sherd discs recovered from Agua Caliente phase features at the Mission Gardens locus, the Clearwater site, AZ BB:13:6 (ASM).

Type of Disk	Diameter (cm)	Quantity
Feature 3014		
Unperforated disc	2.5 to 3.0	1
Unperforated disc	4.0	1
Feature 3038		
Indeterminate disc fragment	4.0	1
Unperforated disc	2.4	1
Unperforated disc	2.6	3
Unperforated disc	2.7	1
Unperforated disc	3.0	1
Unperforated disc	4.5	1
Unperforated disc	6.0	1
Perforated disc	4.0 to 5.0	1

Figure 47). This is the first example of incised decoration documented in an Agua Caliente phase pottery collection. It is also one of the reasons why these two features were once thought to be Protohistoric in age (Heidke and Thiel 2003:10)—before radiocarbon samples drawn from both deposits proved that hypothesis wrong (see Chapter 19).

A small piece of a red-on-brown vessel was also recovered from Feature 3014 (Figure 7.5b). The red paint was applied to the interior surface of the pot. Approximately half of that surface is plain, while the other half displays the red-painted surface (on top of the base brown ware paste). A relatively straight line separates painted and unpainted parts. Ground stone analyst Jenny Adams examined the surfaces at 40x magnification. Her observations indicate that all surfaces—the painted and unpainted portions of the interior surface, as well as the unpainted exterior surface—were polished in the same way using a stone tool. Stone polishing gave the paint a smooth texture and created a feathered appearance at its border. These characteristics do not resemble those produced by ochre precipitates on sherds (Jenny Adams, personal communication 2005), lending credence to the idea that the vessel was indeed painted.

The area of the red-on-brown sherd is only about 5 cm^2; therefore, unfortunately, it is impossible to determine what the complete design may have been. However, the characteristic of polishing over paint has been noted on many other early Southwestern pottery types, such as Estrella Red-on-gray (Haury 1965), Dos Cabezas Red-on-brown (Sayles 1945), Anchondo Red-on-brown (Di Peso 1966; Di Peso et al. 1974:57-59), the unnamed red-on-brown Mogollon ceramics described by Haury (1936:9) and Wheat (1954:89), and the unnamed red-on-brown and purple-on-red Hohokam ceramics described by Heidke (1989:81-82, 1993:107, 2003c:163). All of those types were painted with broad lines, and use an iconography that Wallace (1995) has termed Style 1. The width of the Agua Caliente phase red-on-brown sherd from Clearwater is at least 13.5 mm, suggesting it was also painted with broad lines and probably, in a design comprised of Style 1 motifs.

Temper Attributes

Temper Type

The temper type data are summarized in Table 7.12. Two compositions dominate the collection: sand temper (69.0 percent of examined sherds) and a mixture of sand and crushed sherd temper (27.6 percent). The use of crushed sherd temper makes the ceramics from these two features distinct from most prehistoric pottery. No cases of sand and crushed sherd temper were recognized in a previous study of Agua Caliente phase ceramics (Heidke et al. 1998a:504, Tables 13.6 and 13.8); however, petrographic analysis of 10 rim sherds drawn from the same contexts

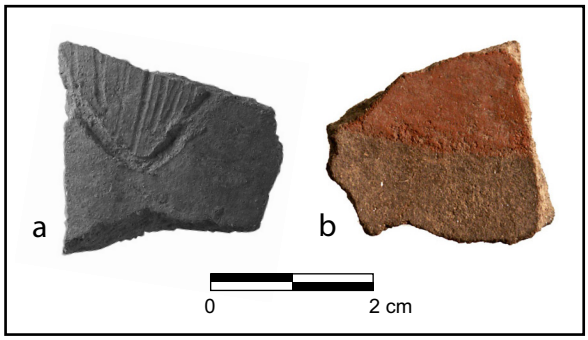

Figure 7.5. Incised Agua Caliente phase (circa A.D. 50-500) plain ware body sherd (a) and red-on-brown sherd (b) recovered from Feature 3014, the Mission Gardens locus, the Clearwater site, AZ BB:13:6 (ASM).

Table 7.12. Three-way classification of Agua Caliente phase pottery from the Mission Gardens locus, Clearwater site, AZ BB:13:6 (ASM), by ceramic type, vessel part, and temper type. (The "body" category includes body and neck sherds.)

	Plain Ware		Red Ware	Possible Papago Plain	
Temper Type	Rim	Body	Rim	Body	Row Total
Sand	17	534	1	0	552
Sand and crushed sherd	12	209	0	0	221
>25 percent gneiss/schist	0	8	0	0	8
>25 percent muscovite mica	0	1	0	0	1
Sand and fiber	0	0	0	1	1
Indeterminate	0	17	0	0	17
Column total	29	769	1	1	800

documented a small amount of crushed sherd temper in three of the samples (IFT-15, -22, and -23; see Heidke et al. 1998b:Table E.8). Therefore, the percentage of sherds tempered with a mixture of sand and crushed sherd documented in this study—27.6 percent—is nearly identical to the 30.0 percent figure that had been previously identified petrographically. Importantly, Agua Caliente phase potters generally used lesser amounts of grog temper than later, Historic era potters (less than 10 percent and greater than 10 percent, respectively).

Three additional temper types were also observed: greater than 25 percent crushed gneiss or schist temper, greater than 25 percent muscovite mica temper, and sand and fiber (presumably manure) temper. The gneiss/schist- and muscovite mica-tempered sherds may represent mixing of later, prehistoric sherds into the deposits, as those temper types are known to have been commonly used from approximately A.D. 850 to 1100 (Deaver 1984:397-398, Figure 4.69; Kelly 1978:72-76; Wallace et al. 1995:607, Figure 6). The sand- and fiber-tempered sherd may also represent mixing of a later sherd into those deposits, as that temper type is unknown prior to the Historic era.

Temper Provenance

The temper provenance data are summarized in Table 7.13. Half the characterized vessels contain sand temper from the volcanic Twin Hills Petrofacies, and approximately one-third contain sand from one of the area's volcanic sources (but could not be assigned with confidence to a specific source). The Clearwater site is located within the Twin Hills Petrofacies, indicating that at least half—and perhaps as much as 80 percent—of the pottery was locally produced. A few sherds contain sand from a granitic source (but, again, it could not be assigned with confidence to a specific petrofacies), while a single sherd contains sand from the volcanic Beehive Petrofacies.

Pottery Function

Two different approaches were utilized to assess the likely uses that pottery played in the lives of the Agua Caliente phase inhabitants of the Mission Gardens locus. The first approach was strictly typological and entailed the assignment of rim sherds to vessel form categories originally created to classify prehistoric pottery from the region. The second approach examined a subset of the rim sherds, placing them into functional categories determined by their overall morphology and size.

Typological Approach

The vessel forms of Agua Caliente phase pottery recovered from the Mission Gardens locus are reported in Table 7.14. Some of the common vessel forms are illustrated in Figures 7.6-7.7, with exterior and interior photographs of those rim sherds shown in Figures 7.8 and 7.9.

Shepard-Braun Approach

The count of sherds in each vessel form class are summarized in Table 7.15 by ceramic type. The functional interpretation of each vessel form class follows the method shown in Table 7.5. If the plain ware in vessel form class C is assumed to have been used for food preparation and cooking, and if the data set is representative, 7.7 percent of the Agua Caliente phase pottery from the Mission Gardens locus may have been used for cooking. Similarly, if

Table 7.13. Three-way classification of Agua Caliente phase pottery from the Mission Gardens locus, Clearwater site, AZ BB:13:6 (ASM), by ceramic type, vessel part, and temper source.

	Plain Ware	Red Ware	
Temper Source	Rim	Rim	Row Total
Twin Hills Petrofacies (volcanic)	15	0	15
Indeterminate volcanic source	9	0	9
Indeterminate granitic source	2	1	3
Beehive Petrofacies (volcanic)	1	0	1
Indeterminate source	2	0	2
Column total	29	1	30

Table 7.14. Frequency of Agua Caliente phase rim sherds in each vessel form class, reported by ceramic type, the Mission Gardens locus, the Clearwater site, AZ BB:13:6 (ASM).

	Ceramic Type		Row
Vessel Form	Plain	Red	Total
Bowl Forms			
Incurved	3	0	3
Plate/Platter	2	0	2
Semi-flare-rim, hemispherical	1	1	2
Outcurved	1	0	1
Indeterminate bowl form	4	0	4
Jar Forms			
Seed	8	0	8
Short straight-collar	2	0	2
Neckless	1	0	1
Indeterminate jar form	1	0	1
Indeterminate Forms			
Indeterminate flare-rim form	4	0	4
Indeterminate bowl or seed jar	1	0	1
Indeterminate form	1	0	1
Column total	29	1	30

the plain ware in vessel form classes G and H is assumed to have been used for storage, and if the data set is representative, 69.2 percent of the pottery may have been used for storage. Finally, 23.1 percent of the pottery may have been used for serving if the plain ware in vessel form class Q is assumed to have been used for individual servings, if the red ware in vessel form class M was used for small group servings, and if the data set is representative. Other collections of Agua Caliente phase pottery have also been dominated by storage containers (Heidke et al. 1998a; Huckell 1987a, 1987b; Whittlesey 1998).

CAÑADA DEL ORO PHASE POTTERY FROM THE CLEARWATER SITE, AZ BB:13:6 (ASM)

A total of 2,354 pottery sherds—representing portions of at least 173 individual vessels—was recovered from Cañada del Oro phase Feature 308 at the Clearwater site (Table 7.16).

Temper Attributes

Temper Type

The temper type data are summarized in Table 7.17. One composition dominates the collection—sand temper, 81.2 percent of examined sherds. Six additional temper types were observed: all six contain metamorphic rocks and/or minerals (gneiss/schist and/or muscovite mica [with or without sand]). The gneiss/schist- and muscovite mica-tempered sherds represent the beginning of a technological style that reached its peak in the subsequent Rillito phase (circa A.D. 850-950), and largely died out by A.D. 1100 (Deaver 1984:397-398, Figure 4.69; Kelly 1978:72-76; Wallace et al. 1995:607, Figure 6).

Temper Provenance

The temper provenance data are summarized in Table 7.18. Approximately 61 percent of the characterized vessels contain sand temper from the volcanic Twin Hills Petrofacies. Another 9 percent contain sand from one of the area's volcanic sources (but could not be assigned with confidence to a specific source). The Clearwater site is located within the Twin Hills Petrofacies, indicating at least 61 percent, and perhaps as much as 70 percent, of the pottery was locally produced. Two additional source areas were identified: the volcanic Beehive Petrofacies (four sherds) and the metamorphic Catalina Petrofacies (three sherds). The remaining sherds

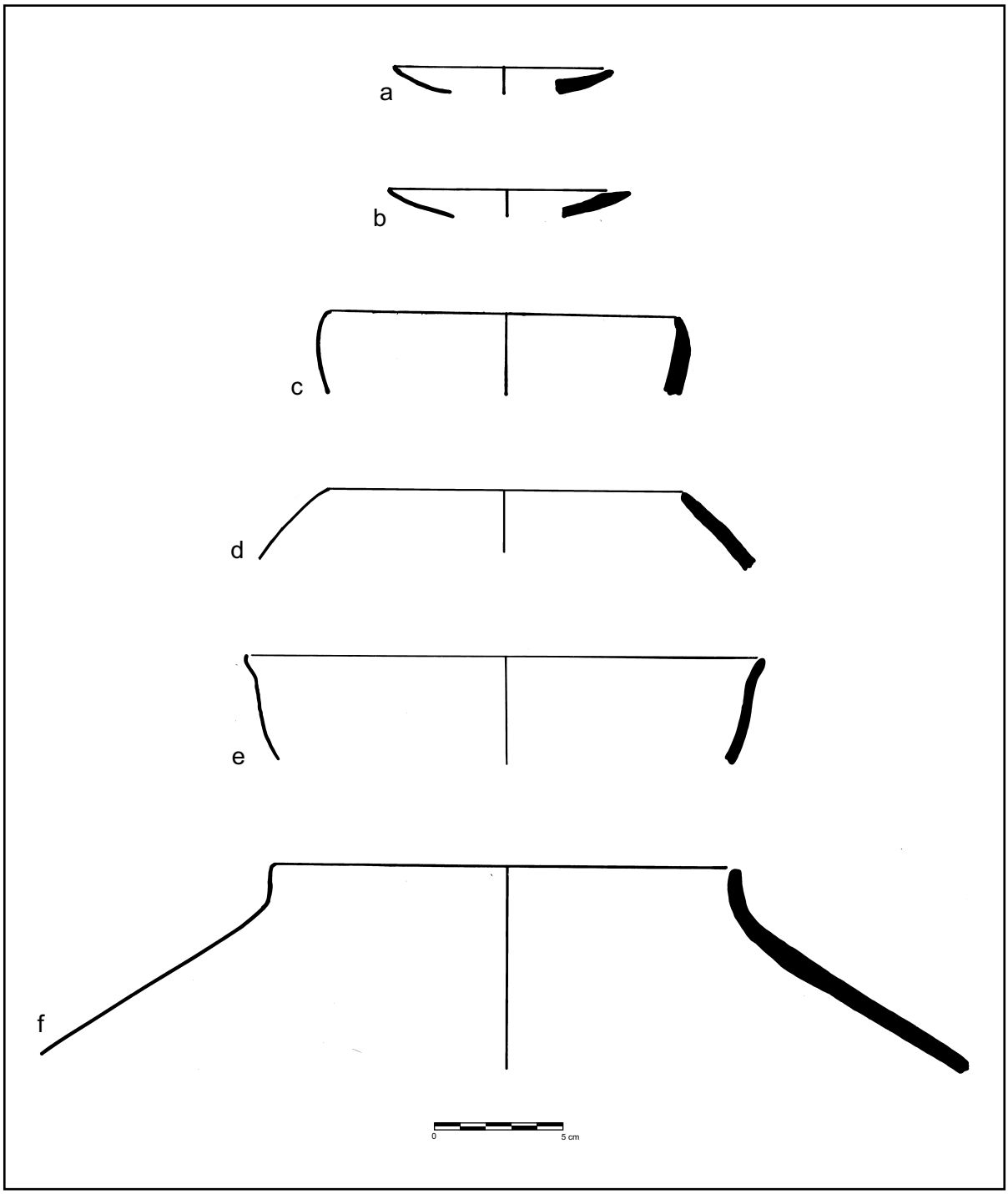

Figure 7.6. Agua Caliente phase (circa A.D. 50-500) vessel forms from the Clearwater site, AZ BB:13:6 (ASM): (a-b) plates; (c-d) incurved bowls; (e) semi-flare-rim, hemispherical bowl; (f) short straight-collared jar. (Vessel 7.6e is a red ware; all the other illustrated vessels are plain ware.)

could not be assigned to a specific source using only the binocular microscope. Six sherds contain sand from a granitic source, five sherds contain sand from either a granitic or metamorphic source, and four sherds contain sand from a metamorphic source.

Pottery Function

Two different approaches were used to assess the likely uses that pottery played in the lives of the Cañada del Oro phase inhabitants of the Clearwater site. The

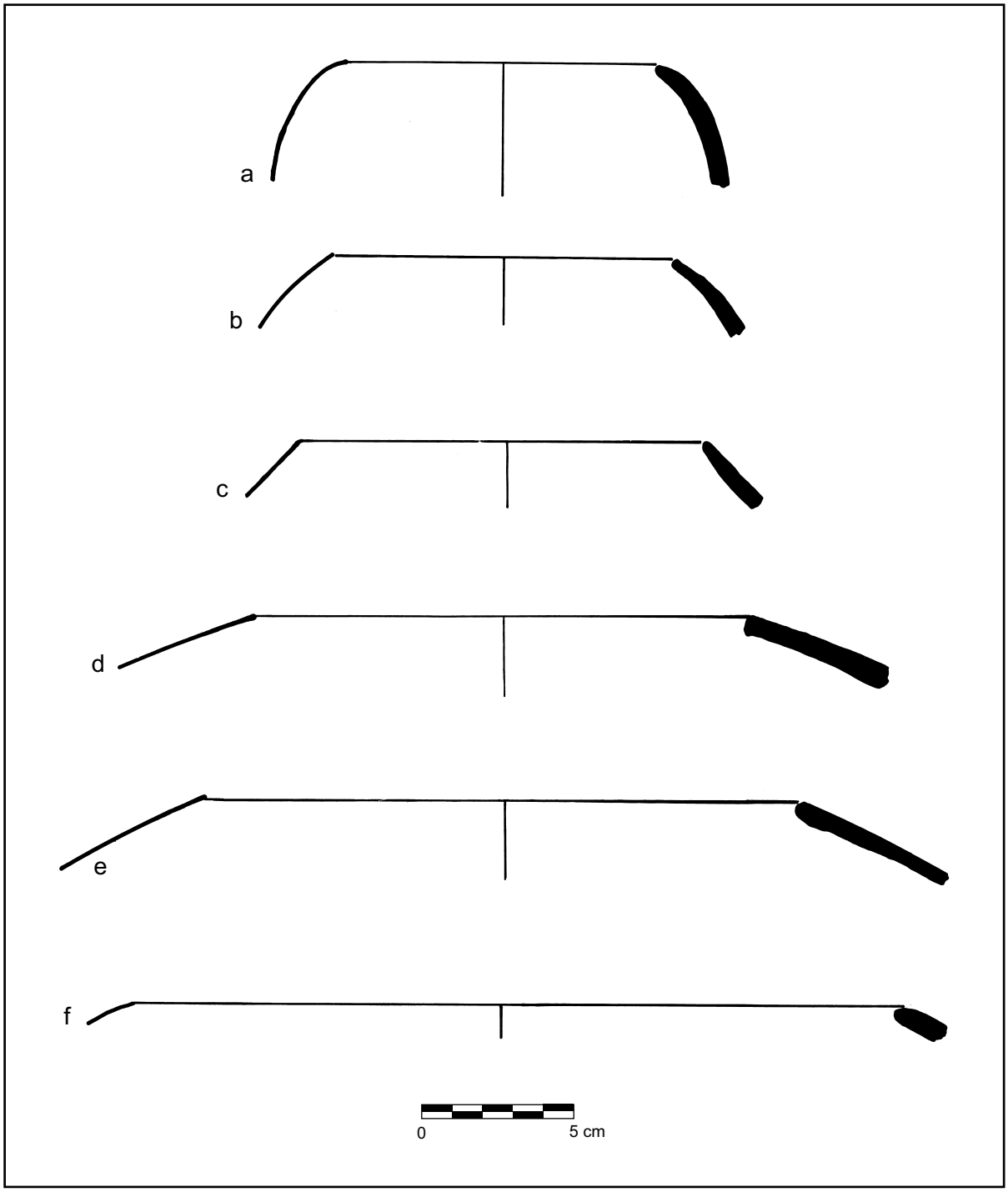

Figure 7.7. Agua Caliente phase (circa A.D. 50-500) seed jars from the Clearwater site, AZ BB:13:6 (ASM).

first approach was strictly typological and entailed the assignment of rim sherds to vessel form categories. The second approach examined a subset of the rim sherds, placing them into functional categories determined by their overall morphology and size.

Typological Approach

The vessel forms of Cañada del Oro phase Hohokam pottery recovered from the Clearwater site are reported in Table 7.19. The bowl-to-jar ratio is 3.7:1.

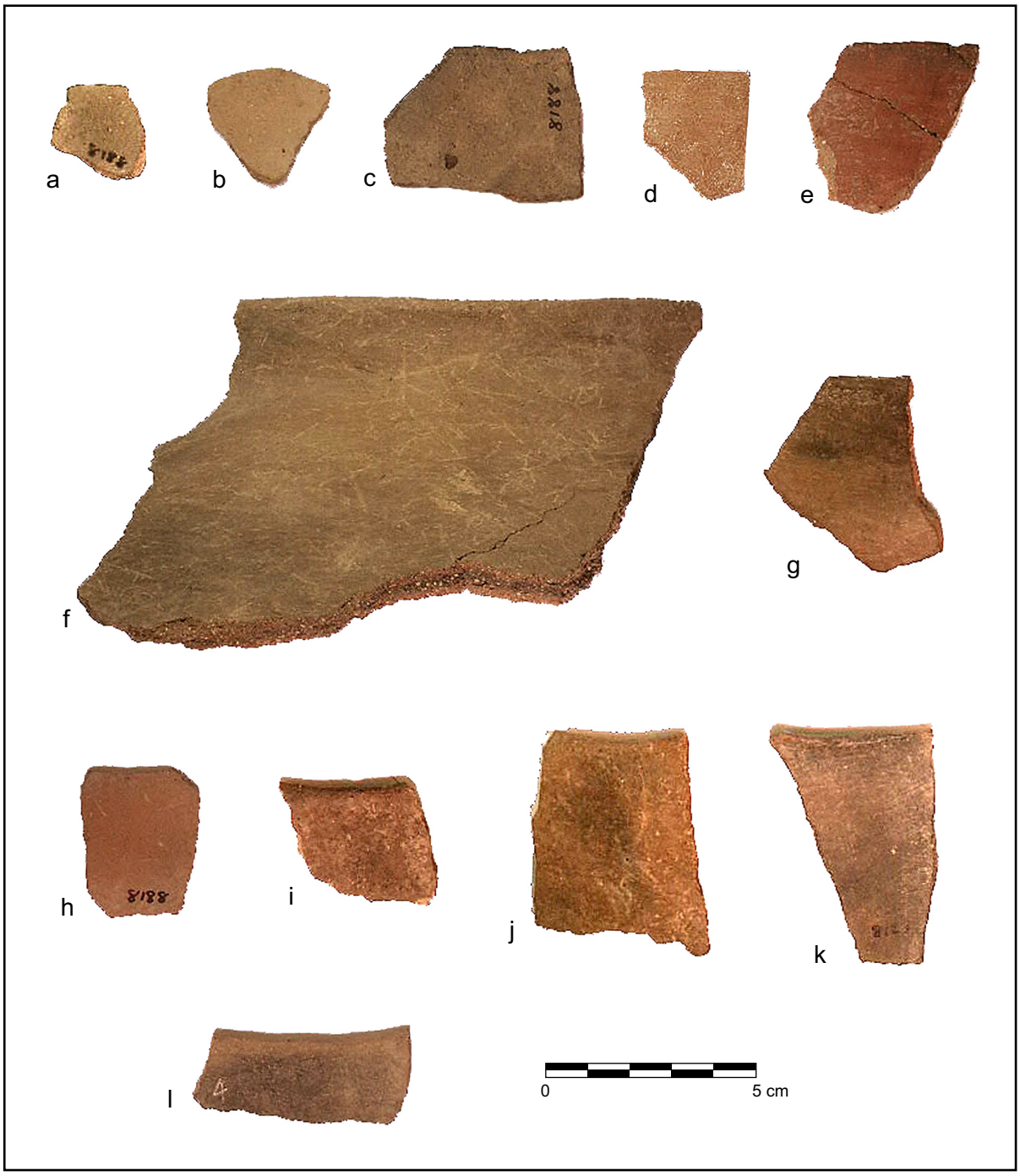

Figure 7.8. Exterior views of Agua Caliente phase (circa A.D. 50-500) rim sherds from the Clearwater site, AZ BB:13:6 (ASM): (a-b) plates; (c-d) incurved bowls; (e) semi-flare-rim, hemispherical bowl; (f) short straight-collared jar; (g-l) seed jars. (Vessel 7.8e is a red ware; all the other vessels are plain ware.)

Shepard-Braun Approach

The count of sherds in each vessel form class is summarized, by ceramic type, in Table 7.20. The functional interpretation of each vessel form class follows the method shown in Table 7.5. If the plain ware in vessel form classes C and M is assumed to have been used for food preparation and cooking, and if the data set is representative, 54.5 percent of the Cañada del Oro phase pottery from the Clearwater site may have been used for cooking. Similarly, if the plain ware in vessel form class A and the red-on-brown pottery in classes F and G is assumed to have been used for storage, and if the data set is representative,

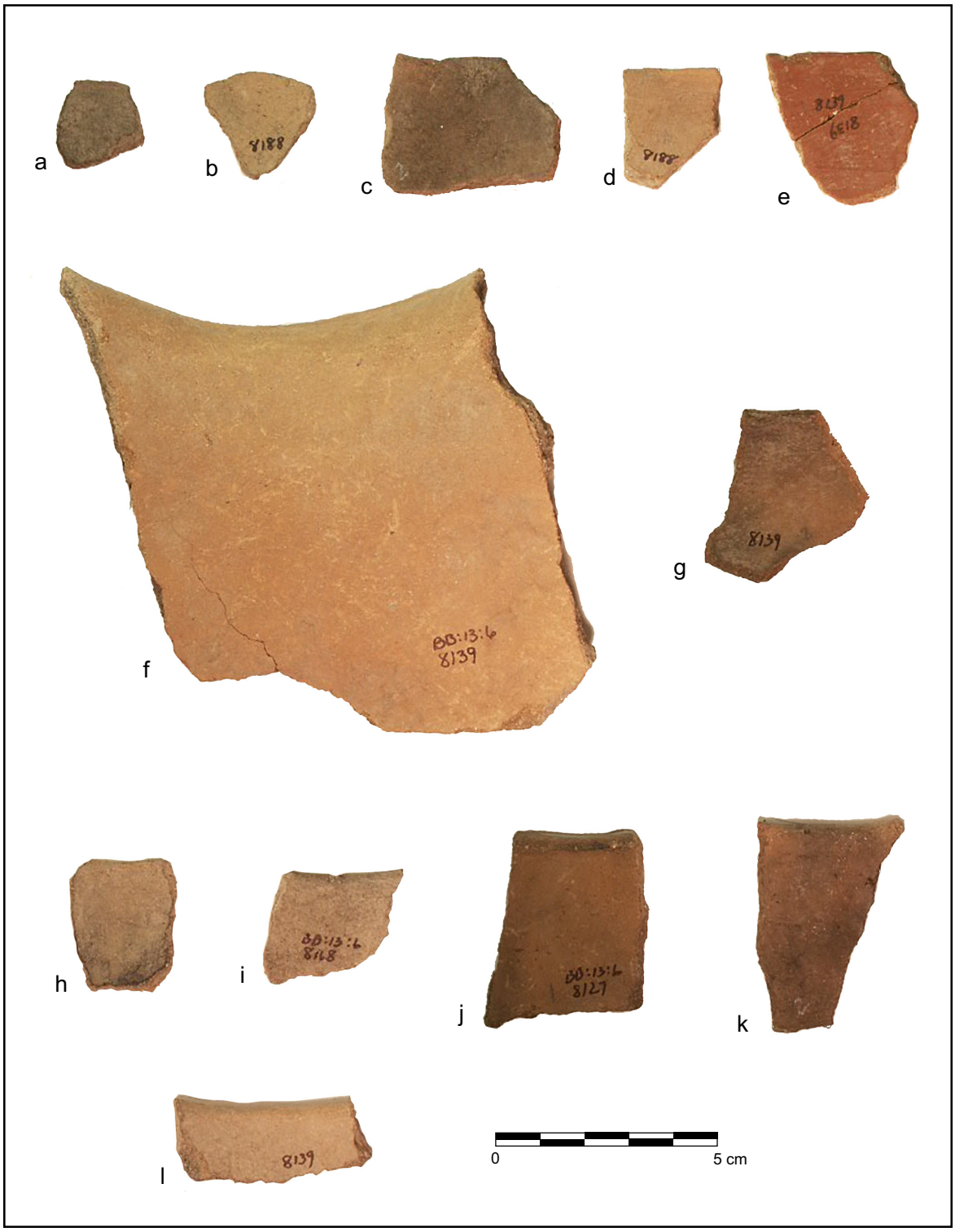

Figure 7.9. Views of the interior surface of the Agua Caliente phase (circa A.D. 50-500) rim sherds shown in Figure 7.8: (a-b) plates; (c-d) incurved bowls; (e) semi-flare-rim, hemispherical bowl; (f) short straight-collared jar; (g-l) seed jars. (Vessel 7.9e is a red ware; all the other vessels are plain ware.)

13.6 percent of the pottery may have been used for storage. Finally, 31.9 percent of the pottery may have been used for serving if the plain ware in vessel form classes L and Q was used for individual servings, if all the pottery in classes N and O was used for large group servings, and if the data set is representative.

Table 7.15. Frequency of Agua Caliente phase rim sherds in each functional category, reported by ceramic type, the Mission Gardens locus, the Clearwater site, AZ BB:13:6 (ASM).

Functional Category (Final Vessel Form Class)	Ceramic Type		Row Total
	Plain	Red	
Independent Restricted Vessels			
C: Cooking (small- to medium-sized groups), temporary storage, and/or water cooling (13.0-25.5 cm aperture diameter)	1	0	1
Simple and Dependent Restricted Vessels			
G: Specialized, temporary dry storage (6.0-12.5 cm orifice diameter)	3	0	3
H: Specialized, temporary dry storage (13.0-25.5 cm orifice diameter)	6	0	6
Unrestricted Vessels (Deep)			
M: Food preparation and/or small group serving (13.0-25.5 cm orifice diameter)	0	1	1
Unrestricted Vessels (Shallow)			
Q: Individual serving (6.0-12.5 cm orifice diameter)	2	0	2
Column total	12	1	13

Table 7.16. Hohokam pottery types recovered from Cañada del Oro phase Feature 308, the Clearwater site, AZ BB:13:6 (ASM).

Ceramic Type	Production Date Range (A.D.)	Vessel Part						Row Total	
		Body Sherd		Rim Sherd		Neck			
		Sherd Count	MNV[a]	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV
Tucson Basin Types									
Indeterminate red-on-brown		7	7	2	2	0	0	9	9
Indeterminate pre-Classic red-on-brown	700-1150	4	4	0	0	0	0	4	4
Snaketown Red-on-brown	700-750	1	1	0	0	0	0	1	1
Cañada del Oro Red-on-brown	750-850	44	31	82	13	0	0	126	44
Cañada del Oro or Rillito red-on-brown	750-950	1	1	5	1	0	0	6	2
Plain		2,020	N/A	110	105	68	N/A	2,198	105
Indeterminate red-on-brown or plain		1	1	1	1	0	0	2	2
Phoenix Basin Types									
Gila Butte Red-on-buff	750-850	3	2	0	0	0	0	3	2
Gila Butte or Santa Cruz red-on-buff	750-950	1	1	0	0	0	0	1	1
Indeterminate Red-on-buff		2	2	0	0	0	0	2	2
Indeterminate Buff		2	1	0	0	0	0	2	1
Column Total		2,086	51	200	122	68	0	2,354	173

[a]MNV = Minimum number of vessels.

HISTORIC ERA POTTERY

Rio Nuevo Archaeology project sites contain Historic era deposits that encompass Tucson's transition from a small Spanish outpost to a thriving American city. The Historic era Native American pottery belongs to the "Papago" (Tohono O'odham) ceramic series, discussed by Haury (1975), Fontana et al. (1962), Doelle (1983), Thiel and Faught (1995), Whittlesey (1997), and Heidke (2005d). Because most potters were probably women, Father Juan Baptista Llorens' 1801 census data suggest that not all of the locally produced Native American ceramics may have actually been made by Papago (Tohono O'odham) potters, as Piman, Gileño, and Papago residents—including married women, widows, and

Table 7.17. Three-way classification of Cañada del Oro phase Feature 308 ceramic types, vessel part, and temper type from the Clearwater site, AZ BB:13:6 (ASM).

Temper Type	Snaketown Red-on-brown	Cañada del Oro Red-on-brown		Cañada del Oro or Rillito red-on-brown		Indeterminate pre-Classic Red-on-brown	Indeterminate Red-on-brown		Plain	Row Total
	Body	Rim	Body	Rim	Body	Body	Rim	Body	Rim	
Sand	1	11	28	1	0	4	2	5	82	134
>25 percent gneiss/schist	0	0	2	0	0	0	0	0	12	14
Mixed sand and 1-7 percent gneiss/schist	0	0	1	0	1	0	0	1	2	5
Mixed sand and 7-25 percent gneiss/schist	0	0	0	0	0	0	0	0	2	2
Mixed sand and 1-25 percent muscovite mica	0	0	0	0	0	0	0	0	2	2
>25 percent gneiss/schist and muscovite mica	0	0	0	0	0	0	0	0	1	1
>25 percent muscovite mica	0	0	0	0	0	0	0	0	1	1
Indeterminate	0	2	0	0	0	0	0	1	3	6
Column total	1	13	31	1	1	4	2	7	105	165

Table 7.18. Three-way classification of Cañada del Oro phase Feature 308 ceramic type, vessel part, and temper source from the Clearwater site, AZ BB:13:6 (ASM).

Temper Type	Snaketown Red-on-brown	Cañada del Oro Red-on-brown		Cañada del Oro or Rillito red-on-brown		Indeterminate pre-Classic Red-on-brown	Indeterminate Red-on-brown		Plain	Row Total
	Body	Rim	Body	Rim	Body	Body	Rim	Body	Rim	
Twin Hills Petrofacies (volcanic)	1	7	25	0	1	3	0	1	62	100
Indeterminate volcanic source	0	2	2	0	0	0	1	1	9	15
Indeterminate granitic source	0	2	0	0	0	0	1	0	3	6
Indeterminate granitic or metamorphic source	0	1	1	0	0	1	0	1	1	5
Beehive Petrofacies (volcanic)	0	0	0	0	0	0	0	0	4	4
Indeterminate metamorphic source	0	0	0	0	0	0	0	0	4	4
Catalina Petrofacies (metamorphic)	0	0	0	0	0	0	0	0	3	3
Indeterminate source	0	1	3	1	0	0	0	4	19	28
Column total	1	13	31	1	1	4	2	7	105	165

Table 7.19. Frequency of rim sherds in each vessel form class recovered from Cañada del Oro phase Feature 308, reported by ceramic type, the Clearwater site, AZ BB:13:6 (ASM).

	Ceramic Type				
Vessel Form	Cañada del Oro Red-on-brown	Cañada del Oro or Rillito red-on-brown	Indeterminate Red-on-brown	Plain	Row Total
Bowl Forms					
Flare-rim	8	0	0	5	13
Outcurved	1	0	0	8	9
Hemispherical	0	0	1	4	5
Semi-flare-rim, outcurved	0	0	0	4	4
Incurved	1	0	1	1	3
Plate/Platter	0	0	0	2	2
Indeterminate bowl form	2	0	0	21	23
Jar Forms					
Tall flare-rim	0	0	0	12	12
Short straight-collar	0	0	0	1	1
Seed	0	1	0	0	1
Neckless	0	0	0	1	1
Indeterminate jar form	0	0	0	1	1
Scoop Forms					
Indeterminate scoop form	1	0	0	1	2
Indeterminate Forms					
Indeterminate flare-rim form	0	0	0	42	42
Indeterminate bowl or scoop	0	0	0	2	2
Column Total	13	1	2	105	121

spinsters—were counted (Dobyns 1976). Accordingly, it is assumed here that, while most of the historic Native American pottery was made by Tohono O'odham potters, the work of potters belonging to all three groups may be represented in the collections.

Protohistoric Period and Historic Era Ceramic Typology

In addition to the "Papago" ceramic series proposed by Fontana et al. (1962), two ceramic types proposed by Di Peso (1953) are of interest here: Whetstone Plain and Sobaipuri Plain. Whetstone Plain has been used as the diagnostic ceramic type for the Protohistoric period (circa 1450-1694; see Dart 1987; Doelle and Holmlund 1986; Heidke et al. 1994; B. Huckell 1984; L. Huckell 1981; Mabry 1992; McGuire and Villalpando 1993; Seymour 1997). Characteristics of Whetstone Plain (Di Peso 1953:154; Doyel 1977:126) that other archaeologists have found useful for its identification include: sand temper, finger- and/or anvil-impressed interior surfaces, thin vessel walls, dull luster, and sandy surface finish. The type Sobaipuri Plain has not been as widely accepted by the discipline. Sobaipuri Plain (Di Peso 1953:148-154) shares many characteristics with Fontana et al.'s (1962:105) ceramic type Papago Plain, Variant 1; both types exhibit casts of burned-out organic temper, medium-to-thick vessel walls, carbon cores, and rim coils.

Di Peso never actually defined what he meant by a rim coil. He refers to a passage in Haury (1950),

> One clear cut diagnostic feature, however, is seen in the rims of both bowls and jars. This is the addition of a coil at the rim, creating a band about the orifice (Haury 1975:344).

Di Peso (1953:Figure 14) illustrates a schematic cross section of a Sobaipuri Plain jar that clearly shows the coil separate from the body of the vessel. Fontana et al. (1962:103) use the term in much the same way, "'Rim-coiled' refers to one or two coils of clay added to the entire circumference of the rim. These added coils are not smoothed out." The author recently examined the type collection of Sobaipuri Plain and Whetstone Plain rim sherds recovered from the Presidio de Santa Cruz de Terrenate.

At 15x magnification, most Sobaipuri Plain coiled vessels appear to have had the rim folded over rather

Table 7.20. Frequency of rim sherds in each functional category recovered from Cañada del Oro phase Feature 308, reported by ceramic type, the Clearwater site, AZ BB:13:6 (ASM).

	Ceramic Type				
Functional Category (Final Vessel Form Class)	Cañada del Oro Red-on-brown	Cañada del Oro or Rillito red-on-brown	Indeterminate Red-on-brown	Plain	Row Total
Independent Restricted Vessels					
A: Water carrying/storage (including cups) and/or permanent storage (<6.0 cm aperture diameter)	0	0	0	1	1
C: Cooking (small- to medium-sized groups), temporary storage, and/or water cooling (13.0-25.5 cm aperture diameter)	0	0	0	7	7
Simple and Dependent Restricted Vessels					
F: Seed storage (<6.0 cm orifice diameter)	0	1	0	0	1
G: Dry storage (6.0-12.5 cm orifice diameter)	0	0	1	0	1
Unrestricted Vessels (Deep)					
L: Individual serving (6.0-12.5 cm orifice diameter)	0	0	0	1	1
M: Food preparation and/or small group serving (13.0-25.5 cm orifice diameter)	0	0	0	5	5
N: Communal serving/eating (26.0-31.5 cm orifice diameter)	1	0	0	2	3
O: Communal serving/eating (32.0-38.5 cm orifice diameter)	1	0	0	1	2
Unrestricted Vessels (Shallow)					
Q: Individual serving (6.0-12.5 cm orifice diameter)	0	0	0	1	1
Column Total	2	1	1	18	22

than applied separately, based on observation of sand and organic temper casts that follow the curvature of the paste up and over the inner vessel wall. The folding process itself usually yielded a smooth, rounded lip. Additionally, examples displaying erosion at the very top of the lip exhibit a homogeneous paste—*not* a coil distinct from the body, which is what would be expected if the coil was attached separately.

Occasionally, the coil looked as if it had been applied separately. In those cases a V- to U-shaped groove is visible at the top of the lip where the two pieces come together, or, if the rim was eroded at the very top of the lip, a line separating the coil paste from the body paste is visible. According to Di Peso (1953:147), Whetstone Plain vessels lack rim coils, but may exhibit a bead rim (Di Peso 1953:154). Again, he left the term undefined. However, examined at 15x magnification, most Whetstone Plain beaded rim vessels appear to have had a small portion of the rim folded over (Masse 1980), leading the author to think the technological procedure leading to vessels with coiled and beaded rims was usually the same.

That technological procedure was also followed by potters in the Tucson area, based on examination of Native American sherds recovered from many Historic era sites, including those from the current project. To track their occurrence, plain ware sherds with folded-over rim coils are reported as Sobaipuri Plain in this and earlier reports (Heidke 2002, 2003a, 2003b, 2005d; Thiel and Faught 1995). As discussed below, in the Tucson area, most of those vessels were tempered with sand or a mixture of sand and crushed potsherds (grog). Moreover, the category's name should not be taken to imply that Sobaipuri potters (Gilpin and Philips 1999; Masse 1981) made all the Sobaipuri Plain pots (e.g., Thiel and Faught 1995:202), just as we know that Tohono O'odham potters also made vessels exhibiting that morphological attribute (Fontana et al. 1962; Haury 1975).

Historic O'odham Pottery from the San Agustín Mission Locus, the Clearwater Site, AZ BB:13:6 (ASM), circa 1771-1821

A total of 3,554 pottery sherds—representing portions of at least 624 individual vessels—was recovered from Features 64, 161, 166, 177, 178, 193, and 203 at the San Agustín Mission locus of the Clearwater site (Table 7.21). These deposits likely date to

Table 7.21. Native American pottery types recovered from mission-time deposits at the San Agustín Mission locus, the Clearwater site, AZ BB:13:6 (ASM).

	Vessel Part[a]											
	Body Sherd		Rim Sherd		Reconstructible Vessel		Neck		Handle		Row Total	
Ceramic Type	Sherd Count	MNV[b]	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV
Prehistoric Native American Types												
Indeterminate red-on-brown	36	33	4	4	0	0	2	2	0	0	42	39
Indeterminate pre-Classic red-on-brown	14	13	0	0	0	0	0	0	0	0	14	13
Cañada del Oro Red-on-brown	1	1	0	0	0	0	0	0	0	0	1	1
Rillito or Early Rincon red-on-brown	1	1	0	0	0	0	0	0	0	0	1	1
Early Rincon, Middle Rincon, Late Rincon, or Tanque Verde red-on-brown	0	0	3	3	0	0	0	0	0	0	3	3
Early, Middle, or Late Rincon red-on-brown	1	1	0	0	0	0	0	0	0	0	1	1
Early or Middle Rincon red-on-brown	3	3	2	2	0	0	0	0	0	0	5	5
Middle Rincon Red-on-brown	1	1	0	0	0	0	0	0	0	0	1	1
Middle Rincon, Late Rincon, or Tanque Verde red-on-brown	3	2	0	0	0	0	0	0	0	0	3	2
Late Rincon or Tanque Verde red-on-brown	4	4	0	0	0	0	0	0	0	0	4	4
Tanque Verde Red-on-brown	6	6	4	4	0	0	0	0	0	0	10	10
Indeterminate red-on-buff	13	12	1	1	0	0	0	0	0	0	14	13
Indeterminate black-on-white	1	1	0	0	0	0	0	0	0	0	1	1
Indented Obliterated Corrugated	1	1	0	0	0	0	0	0	0	0	1	1
Historic Native American Types												
Plain ware	2,691	N/A	105	93	37	2	28	N/A	2	2	2,863	97
Sobaipuri Plain (folded-over rim coil)	0	0	32	26	0	0	0	0	0	0	32	26
Red ware[c]	306	263	129	69	0	0	13	10	0	0	448	342
Papago Plain	28	N/A	3	3	0	0	0	N/A	1	1	32	4
Possible Papago Plain	1	N/A	0	0	0	0	0	N/A	0	0	1	0
Papago Red	3	N/A	2	1	0	0	1	N/A	0	0	6	1
Possible Papago Red	1	N/A	0	0	0	0	0	N/A	0	0	1	0

Table 7.21. Continued.

	Vessel Part[a]											
	Body Sherd		Rim Sherd		Reconstructible Vessel		Neck		Handle		Row Total	
Ceramic Type	Sherd Count	MNV[b]	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV
Papago Black-on-red	1	1	0	0	0	0	0	0	0	0	1	1
Papago Red-on-brown	0	0	4	1	0	0	0	0	0	0	4	1
Possible Papago Red-on-brown	3	1	0	0	0	0	2	1	0	0	5	2
Papago Red-on-buff	1	1	0	0	0	0	0	0	0	0	1	1
Indeterminate Papago Buff	2	1	0	0	0	0	0	0	0	0	2	1
Indeterminate Native American												
Indeterminate Plain or Red ware	4	4	7	7	0	0	0	0	0	0	11	11
Indeterminate Plain or Red-on-brown ware	4	4	1	1	0	0	0	0	0	0	5	5
Indeterminate Red or Red-on-brown ware	11	8	5	5	0	0	1	1	0	0	17	14
Indeterminate Type	18	17	6	6	0	0	0	0	0	0	24	23
Column Total	3,159	379	308	226	37	2	47	14	3	3	3,554	624

[a]Historic plain ware and Papago Red body and neck sherds were not inspected for conjoins; therefore, minimum number of vessel (MNV) estimates are not available (N/A) for those ware and vessel part combinations.

[b]MNV = Minimum number of vessels.

[c]Two red wares have folded-over rim coils.

Table 7.22. Location of slip on historic red ware and Papago Red pottery from the San Agustín Mission locus, the Clearwater site, AZ BB:13:6 (ASM).

	Red Ware						Papago Red		
	Vessel Part						Vessel Part		
			Rim Sherds and Reconstructible Vessels						
Slip Location	Body Sherds	Neck Sherds	Bowl	Jar	Indeterminate Flare-rim form	Indeterminate Bowl or Scoop	Body Sherds	Neck Sherds	Row Total
Fully slipped on all visible interior and exterior surfaces	162	2	42	0	11	1	1	0	219
Interior only	36	1	2	0	0	0	0	0	39
Exterior only	28	3	0	0	0	0	1	1	33
Interior and rim	0	0	1	0	1	0	0	0	2
Exterior, rim, and interior band below rim	0	0	0	1	1	0	0	0	2
Lip only	0	0	1	0	0	0	0	0	1
Indeterminate slip location	37	4	5	0	3	0	1	0	50
Column total	263	10	51	1	16	1	3	1	346

mission times (circa 1771-1821), because fired adobe and/or plaster was recovered from five of the features—Features 166, 177, 178, 193, and 203. Additional information regarding characteristics of the red-slipped pottery types recovered from those deposits is provided in Table 7.22. Unfortunately, these mission features exhibit some temporal mixing, with prehistoric painted pottery comprising 2.8 percent of the sherds, or 15.2 percent of the vessels. Those values suggest some of the plain ware pottery is also likely to be prehistoric; however, as discussed above, it is essentially impossible to separate a prehistoric sand-tempered plain ware sherd from a historic sand-tempered plain ware.

Temper Attributes

Temper Type. The temper type data are summarized in Table 7.23. Two compositions dominate the collection: a mixture of sand and crushed sherd temper (49.7 percent of examined sherds) and sand temper (35.9 percent). This provides a confident way to identify early historic-era pottery (Ravesloot and Whittlesey 1987:94). Nine additional temper types were observed. They fall into two major groups: tempers containing fiber (presumably manure) and those containing metamorphic rocks and/or minerals (gneiss/schist, muscovite mica, and phyllite [with or without sand]). Nearly all examples of mixed sand and fiber temper occur in the "Papago" ceramic types (that is, Papago Red, possible Papago Red, Papago Plain, and possible Papago plain). Most of the gneiss/schist- and muscovite mica-tempered sherds may represent mixing of earlier, prehistoric sherds into the deposits, as those temper types are known to have been commonly used from approximately A.D. 850 to 1100 (Deaver 1984:397-398, Figure 4.69; Kelly 1978:72-76; Wallace et al. 1995:607, Figure 6). However, two vessels exhibiting a late ceramic trait—the folded rim—also contain metamorphic tempers (greater than 25 percent gneiss/schist and muscovite mica and greater than 25 percent phyllite), indicating the use of those types of temper continued into the Historic era (see also Fontana et al. 1962:57, 135).

Temper Provenance. The temper provenance data are summarized in Table 7.24. Approximately 3.5 percent of the characterized vessels contain sand temper from the volcanic Twin Hills Petrofacies. The Clearwater site is located within the Twin Hills Petrofacies, indicating little of the pottery was locally produced. At least three, and possibly four, additional source areas were identified: the volcanic Beehive Petrofacies (43.2 percent), the granitic and mixed lithic Airport Petrofacies (24.1 percent), and a granitic source representing the Black Mountain and/or Sierrita petrofacies (1.0 percent). The Beehive Petrofacies is located south of the site, while the Black Mountain and Sierrita petrofacies are located south of that resource area. The Airport Petrofacies is located immediately east of the site, on the other side of the Santa Cruz River.

The remaining sherds could not be assigned to a specific source using only the binocular microscope. Two sherds contained very little temper (which made it difficult to make a provenance determination), while another sherd contained sand from either a

Table 7.23. Three-way classification of historic ceramic types from the San Agustín Mission locus, the Clearwater site, AZ BB:13:6 (ASM), by vessel part and temper type. (The "rim" category includes rim sherds and reconstructible vessels; the "body" category includes body and neck sherds.)

	Plain Ware		Sobaipuri Plain (folded-over rim coil)	Red Ware		Papago Red		Possible Papago Red	Papago Plain		Possible Papago Plain	Papago Black-on-red	Papago Red-on-brown	Possible Papago Red-on-brown	Indeterminate Papago Red-on-buff or White-on-buff	Row Total
Temper Type	Rim	Body	Rim	Rim	Body	Rim	Body	Body	Rim	Body	Body	Body	Rim	Body	Body	
Sand and crushed sherd	50	1,412	12	19	105	0	0	0	0	0	0	1	0	1	0	1,599
Sand	30	916	8	45	153	0	0	0	0	0	0	0	1	0	0	1,155
Sand and fiber	0	0	1	0	2	1	4	1	3	28	1	0	0	2	0	41
>25% gneiss/schist	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	31
>25% muscovite mica	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	20
Mixed sand and 1-7% gneiss/schist	1	16	0	0	0	0	0	0	0	0	0	0	0	0	0	17
Mixed sand and 1-25% muscovite mica	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	16
Mixed sand and 7-25% gneiss/schist	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10
>25% gneiss/schist and muscovite mica	0	6	1	0	0	0	0	0	0	0	0	0	0	0	0	7
>25% phyllite	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2
Indeterminate	14	285	3	5	13	0	0	0	0	0	0	0	0	0	1	321
Column total	95	2,713	26	69	273	1	4	1	3	28	1	1	1	0	1	3,219

Table 7.24. Three-way classification of historic ceramic types from the San Agustín Mission locus, the Clearwater site, AZ BB:13:6 (ASM), by vessel part and temper source. (The "rim" category includes rim sherds and reconstructible vessels; the "body" category includes body and neck sherds.)

Temper Source	Plain Ware Rim	Sobaipuri Plain (folded-over rim coil) Rim	Red Ware Rim	Papago Red Rim	Papago Plain Rim	Papago Black-on-red Body	Papago Red-on-brown Rim	Possible Papago Red-on-brown Body	Indeterminate Papago Red-on-buff or White-on-buff Body	Row Total
Beehive Petrofacies (volcanic)	50	12	22	0	0	1	1	1	0	86
Airport Petrofacies (granitic and mixed lithic)	10	4	32	0	0	0	0	2	0	48
Twin Hills Petrofacies (volcanic)	5	0	2	0	0	0	0	0	0	7
Black Mountain or Sierrita petrofacies (granitic)	1	0	1	0	0	0	0	0	0	2
Indeterminate source (low temper percent)	1	0	1	0	0	0	0	0	0	2
Indeterminate granitic or metamorphic source	1	0	0	0	0	0	0	0	0	1
Indeterminate source	27	10	11	1	3	0	0	0	1	53
Column total	95	26	69	1	3	1	1	2	1	199

Table 7.25. Frequency of rim sherds and reconstructible vessels from the San Agustín Mission locus, the Clearwater site, AZ BB:13:6 (ASM), in each vessel form class, reported by ceramic type.

	Historic Native American Ceramic Type						
Vessel Form	Red Ware	Plain Ware	Sobaipuri Plain (folded-over rim coil)	Papago Red	Papago Red-on-brown	Papago Plain	Row Total
Bowl Forms							
Plate/Platter	2	6	0	0	0	0	8
Outcurved	6	0	0	0	0	0	6
Hemispherical	3	0	0	0	0	0	3
Incurved	1	2	0	0	0	0	3
Semi-flare-rim, incurved	0	2	0	0	0	0	2
Semi-flare-rim, hemispherical	0	0	1	0	0	0	1
Straight-walled or vertical-sided	1	0	0	0	0	0	1
Indeterminate bowl form	38	32	0	0	1	1	72
Jar Forms							
Tall flare-rim	0	0	2	0	0	0	2
Indeterminate jar form	1	0	0	0	0	0	1
Indeterminate Forms							
Indeterminate flare-rim form	16	46	23	0	0	1	86
Indeterminate bowl or seed jar	0	2	0	0	0	0	2
Indeterminate bowl or scoop	1	1	0	0	0	0	2
Indeterminate form	0	4	0	1	0	1	6
Column Total	69	95	26	1	1	3	195

granitic or a metamorphic source. The temper provenance of 53 sherds was recorded as indeterminate. Many of those sherds (62.3 percent) were small (less than 5 cm^2); sherds that small often lack a sufficient exposure of temper grains along their perimeter from which to make a provenance determination (Stark and Heidke 1992:140-141).

Pottery Function

Two different approaches were utilized to assess the likely uses O'odham pottery played in the lives of the inhabitants of the San Agustín Mission locus. The first approach was strictly typological and entailed the assignment of rim sherds and reconstructible vessels to vessel form categories originally created to classify prehistoric pottery from the region. The second approach examined a subset of the rim sherds and reconstructible vessels, placing them into functional categories determined by their overall morphology and size.

Typological Approach. The vessel forms of O'odham pottery recovered from the San Agustín Mission locus are reported in Table 7.25. Unfortunately, 86.7 percent of the rims could not be assigned to a vessel form, because most of the rim sherds recovered from the mission contexts are quite small (less than 5 cm^2). Even so, bowl vessel forms clearly must have been quite common, as 42.6 percent of the indeterminate forms represent bowls. Additionally, two of the bowl vessel forms have semi-flaring rims, suggesting some of the "indeterminate flare-rim forms" are probably also bowls.

Shepard-Braun Approach. The count of sherds in each vessel form class is summarized in Table 7.26, by ceramic type. The functional interpretation of each vessel form class follows the method shown above (see Table 7.5). If the plain ware, including Sobaipuri Plain, in vessel form classes C, M, and R is assumed to have been used for food preparation and cooking, and if the data set is representative, 42.9 percent of the O'odham pottery from the San Agustín Mission locus may have been used for cooking. Similarly, if all the pottery in vessel form classes B and H is assumed to have been used for storage, and if the data set is representative, 21.4 percent of the pottery may have been used for storage. Finally, 35.7 percent of the pottery may have been used for serving if the red ware in vessel form classes M and R was used for small group servings, if the red ware in vessel form classes N, O, and S was used for large group servings, and if the data set is representative.

Table 7.26. Frequency of rim sherds and reconstructible vessels from the San Agustín Mission locus, the Clearwater site, AZ BB:13:6 (ASM), in each functional category, reported by ceramic type.

	Historic Native American Ceramic Type			
Functional Category (Final Vessel Form Class)	Plain Ware	Sobaipuri Plain (folded-over rim coil)	Red Ware	Row Total
Independent Restricted Vessels				
B: Permanent, secure storage and/or water carrying (6.0-12.5 cm aperture diameter)	1	0	0	1
C: Cooking (small- to medium-sized groups), temporary storage, and/or water cooling (13.0-25.5 cm aperture diameter)	1	1	0	2
Simple and Dependent Restricted Vessels				
H: Specialized, temporary dry storage (13.0-25.5 cm orifice diameter)	1	0	1	2
Unrestricted Vessels (Deep)				
M: Food preparation and/or small group serving (13.0-25.5 cm orifice diameter)	0	1	1	2
N: Communal serving/eating (26.0-31.5 cm orifice diameter)	0	0	1	1
O: Communal serving/eating (32.0-38.5.5 cm orifice diameter)	0	0	1	1
Unrestricted Vessels (Shallow)				
R: Collecting, processing, and/or individual-to-large group serving (13.0-25.5 cm orifice diameter)	3	0	1	4
S: Collecting, processing, and/or communal serving (26.0-31.5 cm orifice diameter)	0	0	1	1
Column Total	6	2	6	14

Historic O'odham Pottery from the Tucson Presidio, AZ BB:13:13 (ASM), circa 1810s-1820s

A total of 340 pottery sherds—representing portions of at least 43 individual vessels—was recovered from presidio Feature 373 (Table 7.27). Additional information regarding characteristics of the red-slipped pottery recovered from that feature is provided in Table 7.28. Unfortunately, this presidio feature exhibits some temporal mixing, with prehistoric painted pottery comprising 1.8 percent of the sherds, or 9.3 percent of the vessels. Those values suggest some of the plain ware pottery is also likely to be prehistoric; however, as discussed above, it is essentially impossible to separate a prehistoric sand-tempered plain ware sherd from a sand-tempered plain ware made during the Historic era.

Temper Attributes

Temper Type. The temper type data are summarized in Table 7.29. Two compositions dominate the collection: sand temper (48.6 percent of examined sherds) and a mixture of sand and crushed sherd temper (43.4 percent). Six additional temper types were observed. They fall into two major groups: tempers containing fiber (presumably manure) and those containing metamorphic rocks and/or minerals (gneiss/schist and muscovite mica [with or without sand]). All examples of mixed sand and fiber temper occur in the ceramic type "Papago Plain." Many, or all, of the gneiss/schist- and muscovite mica-tempered sherds may represent mixing of earlier, prehistoric sherds into the deposit, as those temper types are known to have been commonly used from approximately A.D. 850 to 1100 (Deaver 1984:397-398, Figure 4.69; Kelly 1978:72-76; Wallace et al. 1995:607, Figure 6). However, as shown with the mission pottery from the Clearwater site (discussed above), some vessels exhibiting a late ceramic trait—the folded rim—also contain metamorphic tempers (greater than 25 percent gneiss/schist and muscovite mica), indicating the use of that temper type continued into the Historic era (see also Fontana et al. 1962:57, 135).

Temper Provenance. The temper provenance data are summarized in Table 7.30. Approximately 18.9 percent of the characterized vessels contain sand temper from the granitic and mixed lithic Airport Petrofacies. The Tucson Presidio is located in that petrofacies, indicating approximately one-fifth of the pottery recovered from Feature 373 was locally produced. Two or three additional source areas were identified: the volcanic Beehive Petrofacies

Table 7.27. Native American pottery types recovered from Feature 373, the Tucson Presidio, AZ BB:13:13 (ASM).

	Vessel Part[a]									
	Body Sherd		Rim Sherd		Reconstructible Vessel		Handle		Row Total	
Ceramic Type	Sherd Count	MNV[b]	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV
Prehistoric Native American Types										
Indeterminate red-on-brown	4	2	0	0	0	0	0	0	4	2
Tanque Verde Red-on-brown	0	0	1	1	0	0	0	0	1	1
Indeterminate red-on-buff	1	1	0	0	0	0	0	0	1	1
Historic Native American Types										
Plain ware	176	N/A	13	9	0	0	0	0	189	9
Sobaipuri Plain (folded-over rim coil)	0	0	16	5	15	1	0	0	31	6
Red ware[c]	68	N/A	21	18	0	0	1	1	90	19
Papago Plain	5	N/A	0	0	0	0	0	0	5	N/A
Possible Papago Red	0	0	1	1	0	0	0	0	1	1
Papago Black-on-red[d]	1	1	0	0	15	1	0	0	16	2
Papago Red-on-buff	1	1	0	0	0	0	0	0	1	1
Indeterminate Native American Type										
Indeterminate	1	1	0	0	0	0	0	0	1	1
Column Total	257	6	52	34	30	2	1	1	340	43

[a]Historic plain ware and red-slipped body sherds were not inspected for conjoins; therefore, minimum number of vessel estimates are not available (N/A) for those wares.
[b]MNV = Minimum number of vessels.
[c]One red ware has a folded-over rim coil.
[d]The Papago Black-on-red reconstructible vessel has a strap handle.

Table 7.28. Location of slip on historic red ware from Feature 373, the Tucson Presidio, AZ BB:13:13 (ASM).

	Vessel Part			
		Rim Sherds and Reconstructible Vessels		
Slip Location	Body Sherds	Bowl	Indeterminate Flare-rim form	Row Total
Fully slipped on all visible interior and exterior surfaces	24	12	2	38
Interior only	29	0	0	29
Exterior only	15	0	0	15
Interior and rim	0	1	0	1
Interior, rim, and exterior band	0	1	0	1
Indeterminate slip location	0	1	1	2
Column total	68	15	3	86

(35.1 percent), the granitic Black Mountain Petrofacies (32.4 percent), and two sherds (5.4 percent) with sand that may have come from the Black Mountain and/or Sierrita petrofacies. The Beehive Petrofacies is located southwest of the presidio, west of the Santa Cruz River, while the Black Mountain and Sierrita petrofacies are located south of that resource area. The remaining three sherds (8.1 percent) could not be assigned to a specific source using only the binocular microscope.

Table 7.29. Three-way classification of historic ceramic types, vessel part, and temper type from Feature 373, the Tucson Presidio, AZ BB:13:13 (ASM). (The "rim" category includes rim sherds and reconstructible vessels.)

	Plain Ware		Sobaipuri Plain (folded-over rim coil)	Red Ware		Possible Papago Red	Papago Plain	Papago Black-on-red		Papago Red-on-buff	Row Total
Temper Type	Rim	Body	Rim	Rim	Body	Rim	Body	Rim	Body	Body	
Sand	6	61	4	13	52	1	0	0	1	1	139
Sand and crushed sherd	3	97	2	5	16	0	0	1	0	0	124
Mixed sand and 1-7 percent gneiss/schist	0	6	0	0	0	0	0	0	0	0	6
>25 percent gneiss/schist	0	5	0	0	0	0	0	0	0	0	5
Sand and fiber	0	0	0	0	0	0	5	0	0	0	5
>25 percent muscovite mica	0	2	0	0	0	0	0	0	0	0	2
Mixed sand and 7-25 percent gneiss/schist	0	3	0	0	0	0	0	0	0	0	3
>25 percent gneiss/schist and muscovite mica	0	2	0	0	0	0	0	0	0	0	2
Column total	9	176	6	18	68	1	5	1	1	1	286

Table 7.30. Three-way classification of historic ceramic types, vessel part, and temper source from Feature 373, the Tucson Presidio, AZ BB:13:13 (ASM). (The "rim" category includes rim sherds and reconstructible vessels.)

	Red Ware	Plain Ware	Sobaipuri Plain (folded-over rim coil)	Possible Papago Red	Papago Black-on-red		Papago Red-on-buff	Row Total
Temper Source	Rim	Rim	Rim	Rim	Rim	Body	Rim	
Beehive Petrofacies (volcanic)	5	3	4	0	1	0	0	13
Black Mountain Petrofacies (granitic)	7	4	0	1	0	0	0	12
Airport Petrofacies (granitic and mixed lithic)	4	1	1	0	0	0	1	7
Black Mountain or Sierrita petrofacies (granitic)	1	1	0	0	0	0	0	2
Indeterminate source	1	0	1	0	0	1	0	3
Column total	18	9	6	1	1	1	1	37

Table 7.31. Frequency of rim sherds and reconstructible vessels in each vessel form class recovered from Feature 373, the Tucson Presidio, AZ BB:13:13 (ASM), reported by ceramic type.

	Historic Native American Ceramic Type					
Vessel Form	Red Ware	Plain Ware	Sobaipuri Plain (folded-over rim coil)	Possible Papago Red	Papago Black-on-red	Row Total
Bowl Forms						
Outcurved	7	1	1	0	0	9
Semi-flare-rim, incurved	2	0	2	0	0	4
Plate/Platter	2	1	0	0	0	3
Hemispherical	1	1	0	0	0	2
Semi-flare-rim, hemispherical	0	0	2	0	0	2
Semi-flare-rim, outcurved	0	1	0	0	0	1
Indeterminate bowl form	3	1	1	1	0	6
Jar Forms						
Tall flare-rim	0	1	0	0	0	1
Cup	0	0	0	0	1	1
Indeterminate Forms						
Indeterminate flare-rim form	3	2	0	0	0	5
Indeterminate bowl or scoop	0	1	0	0	0	1
Column Total	18	9	6	1	1	35

Pottery Function

Two different approaches were used to assess the uses O'odham pottery likely played in the lives of the presidio inhabitants. The first approach was strictly typological and entailed the assignment of rim sherds and reconstructible vessels to vessel form categories originally created to classify prehistoric pottery from the region. The second approach examined a subset of the rim sherds and reconstructible vessels, placing them into functional categories determined by their overall morphology and size.

Typological Approach. The vessel forms of O'odham pottery recovered from presidio Feature 373 are reported in Table 7.31. Examination of Table 7.31 shows that more than three-quarters are bowl vessel forms, including numerous semi-flare-rim forms. A Papago Black-on-red cup recovered from Feature 373 is illustrated in Figure 7.10.

Shepard-Braun Approach. The count of sherds in each vessel form class is summarized in Table 7.32, by ceramic type. The functional interpretation of each vessel form class follows the method displayed in Table 7.5. If the plain ware, including Sobaipuri Plain, in vessel form classes C, M, and T is assumed to have been used for food preparation and cooking, and if the data set is representative, 15.0 percent of the O'odham pottery from presidio Feature 373 may have been used for cooking. Similarly, if all the pottery in vessel form class B and the red ware in class C is assumed to have been used for storage, and if the data set is representative, 15.0 percent of the pottery may have been used for storage. Finally, 70.0 percent of the pottery may have been used for serving if the Papago Black-on-red cup in vessel form class A was used for individual servings of a liquid, if the plain ware in vessel form class L was used for individual

Figure 7.10. Papago Black-on-red cup, recovered from Feature 373, the Tucson Presidio, AZ BB:13:13 (ASM).

Table 7.32. Frequency of rim sherds and reconstructible vessels in each functional category recovered from Feature 373, the Tucson Presidio, AZ BB:13:13 (ASM), reported by ceramic type.

	Historic Native American Ceramic Type				
Functional Category (Final Vessel Form Class)	Plain Ware	Sobaipuri Plain (folded-over rim coil)	Red Ware	Papago Black-on-red	Row Total
Independent Restricted Vessels					
A: Cup (<6.0 cm aperture diameter)	0	0	0	1	1
B: Permanent, secure storage and/or water carrying (6.0-12.5 cm aperture diameter)	1	1	0	0	2
C: Cooking (small- to medium-sized groups), temporary storage, and/or water cooling (13.0-25.5 cm aperture diameter)	0	1	1	0	2
Unrestricted Vessels (Deep)					
L: Individual serving (6.0-12.5 cm orifice diameter)	1	0	0	0	1
M: Food preparation and/or small group serving (13.0-25.5 cm orifice diameter)	1	0	8	0	9
N: Communal serving/eating (26.0-31.5 cm orifice diameter)	0	2	0	0	2
O: Communal serving/eating (32.0-38.5 cm orifice diameter)	0	1	0	0	1
Unrestricted Vessels (Shallow)					
R: Collecting, processing, and/or individual-to-large group serving (13.0-25.5 cm orifice diameter)	0	0	1	0	1
S: Collecting, processing, and/or communal serving (26.0-31.5 cm orifice diameter)	1	0	0	0	1
Column Total	4	5	10	1	20

servings, if the red ware in vessel form classes M and R was used for small group servings, if the Sobaipuri Plain ware in vessel form classes N and O was used for large group servings, and if the data set is representative.

Historic O'odham Pottery from the Tucson Presidio, AZ BB:13:13 (ASM), circa 1820s-1830s

A total of 1,106 pottery sherds—representing portions of at least 121 individual vessels—was recovered from presidio Features 409 and 441 (Table 7.33). Additional information regarding characteristics of the red-slipped pottery types recovered from those features is provided in Table 7.34. Unfortunately, these presidio features exhibit some temporal mixing, with prehistoric painted pottery comprising 0.9 percent of the sherds, or 8.3 percent of the vessels. Those values suggest some of the plain ware pottery is also likely to be prehistoric; however, as discussed above, it is nearly impossible to separate a prehistoric sand-tempered plain ware sherd from a historic sand-tempered plain ware.

Temper Attributes

Temper Type. The temper type data are summarized in Table 7.35. Three compositions dominate the collection: a mixture of sand and crushed sherd temper (41.5 percent of examined sherds), sand temper (31.6 percent), and sand and fiber (presumably horse manure, 20.3 percent). Seven additional temper types were observed; all seven contain metamorphic rocks and/or minerals (gneiss/schist and/or muscovite mica [with or without sand]). Most, if not all, of the gneiss/schist- and muscovite mica-tempered sherds may represent mixing of earlier, prehistoric sherds into the deposit, as those temper types are known to have been commonly used from approximately A.D. 850 to 1100 (Deaver 1984:397-398, Figure 4.69; Kelly 1978:72-76; Wallace et al. 1995:607, Figure 6). However, as shown with the mission pottery from the Clearwater site (discussed above), some vessels exhibiting a late ceramic trait—the folded rim—also contain metamorphic tempers (greater than 25 percent gneiss/schist and muscovite mica), indicating use of that temper type continued into the Historic era (see also Fontana et al. 1962:57, 135).

Table 7.33. Native American pottery types recovered from Features 409 and 441, the Tucson Presidio, AZ BB:13:13 (ASM).

	Vessel Part[a]											
	Body Sherd		Rim Sherd		Reconstructible Vessel		Neck		Handle		Row Total	
Ceramic Type	Sherd Count	MNV[b]	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV
Prehistoric Native American Types												
Indeterminate red-on-brown	2	2	0	0	0	0	0	0	0	0	2	2
Indeterminate pre-Classic red-on-brown type	1	1	0	0	0	0	0	0	0	0	1	1
Rillito or Early Rincon red-on-brown	3	3	0	0	0	0	0	0	0	0	3	3
Early or Middle Rincon red-on-brown	1	1	0	0	0	0	0	0	0	0	1	1
Middle Rincon Red-on-brown[c]	1	1	0	0	0	0	0	0	0	0	1	1
Sacaton Red-on-buff	0	0	1	1	0	0	0	0	0	0	1	1
Tanque Verde Red-on-brown	1	1	0	0	0	0	0	0	0	0	1	1
Historic Native American Types												
Plain ware	565	N/A	35	30	0	0	1	N/A	1	1	602	31
Sobaipuri Plain (folded-over rim coil)	0	0	34	23	24	3	0	0	0	0	58	26
Red ware	86	N/A	43	29	5	1	0	N/A	0	0	134	30
Papago Plain	138	N/A	2	2	44	1	0	N/A	0	0	184	3
Possible Papago Plain	0	N/A	2	1	0	0	0	N/A	0	0	2	1
Papago Red	40	N/A	11	8	0	0	0	N/A	0	0	51	8
Possible Papago Red	0	N/A	4	3	0	0	0	N/A	0	0	4	3
Papago Black-on-red[d, e]	0	0	1	1	30	2	0	0	0	0	31	3
Papago Red-on-brown[f]	1	1	0	0	18	1	0	0	0	0	19	2
Possible Papago Red-on-brown	0	0	1	1	0	0	0	0	0	0	1	1
Indeterminate Papago Red-on-buff or White-on-buff	0	0	8	1	0	0	0	0	0	0	8	1
Indeterminate Native American Type												
Indeterminate plain or red ware	0	0	2	2	0	0	0	0	0	0	2	2
Column Total	839	10	144	102	121	8	1	0	1	1	1,106	121

[a]Historic plain ware and red-slipped body and neck sherds were not inspected for conjoins; therefore, minimum number of vessel (MNV) estimates are not available (N/A) for those ware and vessel part combinations.
[b]MNV = Minimum number of vessels.
[c]The Middle Rincon Red-on-brown body sherd is a sharp shoulder.
[d]The Papago Black-on-red rim sherd has a folded-over rim coil.
[e]The Papago Black-on-red reconstructible vessel is a handled pitcher.
[f]The Papago Red-on-brown reconstructible vessel has a folded-over rim coil.

Table 7.34. Location of slip on historic red ware and Papago Red pottery recovered from Features 409 and 441, the Tucson Presidio, AZ BB:13:13 (ASM).

	Red Ware		Papago Red		
	Vessel Part		Vessel Part		
Slip Location	Body Sherds	Bowl Rims	Body Sherds	Bowl Rims	Row Total
Fully slipped on all visible interior and exterior surfaces	32	27	2	7	68
Interior only	26	0	8	0	34
Exterior only	28	0	30	0	58
Interior and rim	0	1	0	0	1
Exterior and rim	0	0	0	1	1
Indeterminate slip location	0	2	0	0	2
Column total	86	30	40	8	164

Temper Provenance. The temper provenance data are summarized in Table 7.36. Approximately 16.7 percent of the characterized vessels contain sand temper from the granitic and mixed lithic Airport Petrofacies. The Tucson Presidio is located in that petrofacies, indicating one-sixth of the pottery recovered from Features 409 and 441 was produced locally. Three or four additional source areas were identified: the volcanic Beehive Petrofacies (31.5 percent), the granitic Black Mountain Petrofacies (23.1 percent), the granitic Black Mountain and/or Sierrita petrofacies (13.0 percent), and the volcanic Twin Hills Petrofacies (0.9 percent). The Twin Hills Petrofacies is located immediately west of the presidio, across the Santa Cruz River. The Beehive Petrofacies is located south of that resource area, while the Black Mountain and Sierrita petrofacies are located south of the Beehive Petrofacies. The remaining 16 sherds (14.8 percent) could not be assigned to a specific source using only the binocular microscope. One of them contains sand from either a granitic or metamorphic source; the temper provenance of the other 15 sherds was recorded as indeterminate.

Pottery Function

Two different approaches were used to assess the uses O'odham pottery likely played in the lives of the presidio inhabitants. The first approach was strictly typological and entailed the assignment of rim sherds and reconstructible vessels to vessel form categories originally created to classify prehistoric pottery from the region. The second approach examined a subset of the rim sherds and reconstructible vessels, placing them into functional categories determined by their overall morphology and size.

Typological Approach. The vessel forms of O'odham pottery recovered from presidio Features 409 and 441 are reported in Table 7.37. Examination of Table 7.37 shows that more than 64.5 percent are bowl vessel forms, including two semi-flare-rim forms. Figures 7.11 and 7.12 illustrate a Papago Black-on-red pitcher and outcurved bowl, respectively. An indeterminate Papago Red-on-buff or White-on-buff plate (Figure 7.13), a Papago Red-on-brown semi-flaring, angled long collar jar (Figure 7.14), and two Sobaipuri semi-flaring, angled long collar jars (Figures 7.15-7.16) recovered from Feature 409 are also illustrated.

Shepard-Braun Approach. The count of sherds in each vessel form class is summarized in Table 7.38, by ceramic type. The functional interpretation of each vessel form class follows the method shown in Table 7.5 (above). If the plain ware, including plain ware, Sobaipuri Plain, and Papago Plain, in vessel form classes C, D, M, R, S, T, and TT are assumed to have been used for food preparation and cooking, and if the data set is representative, 39.0 percent of the O'odham pottery from presidio Features 409 and 441 may have been used for cooking. Similarly, if all the pottery in vessel form classes B and G, the Papago Red-on-brown in class C, and the Papago Red in class D is assumed to have been used for storage, and if the data set is representative, 6.8 percent of the pottery may have been used for storage. Finally, 54.2 percent of the pottery may have been used for serving if the Papago Black-on-red pitcher in vessel form class B was used for serving a liquid, if the red-slipped types in vessel form classes M and R were used for small group servings, if all the pottery in vessel form classes N and O as well as the slipped types in vessel form classes S and T, were used for large group servings, and if the data set is representative.

Table 7.35. Three-way classification of historic ceramic types, vessel part, and temper type from Features 409 and 441, the Tucson Presidio, AZ BB:13:13 (ASM). (The "rim" category includes rim sherds and reconstructible vessels; the "body" category includes body and neck sherds.)

	Plain Ware		Sobaipuri Plain (folded-over rim coil)	Red Ware		Papago Red		Possible Papago Red	Papago Plain		Possible Papago Plain	Papago Black-on-red	Papago Red-on-brown		Possible Papago Red-on-brown	Indeterminate Papago Red-on-buff or White-on-buff	Row Total
Temper Type	Rim	Body	Rim	Rim	Body	Rim	Body	Rim	Rim	Body	Rim	Rim	Rim	Body	Rim	Rim	
Sand and crushed sherd	13	283	13	16	61	0	0	0	0	0	0	1	0	0	1	1	389
Sand	11	229	12	11	25	2	0	1	0	0	1	2	1	1	0	0	296
Sand and fiber	1	0	0	0	0	6	40	2	3	138	0	0	0	0	0	0	190
Mixed sand and 1-7% gneiss/schist	1	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
>25% gneiss/schist	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
Mixed sand and 7-25% gneiss/schist	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
>25% muscovite mica	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Mixed sand and 1-25% gneiss/schist and muscovite mica	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
>25% gneiss/schist and muscovite mica	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mixed sand and 1-25% muscovite mica	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Indeterminate	1	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	5
Column total	30	566	26	30	86	8	40	3	3	138	1	3	1	1	1	1	938

Table 7.36. Three-way classification of historic ceramic types, vessel part, and temper source from Features 409 and 441, the Tucson Presidio, AZ BB:13:13 (ASM). (The "rim" category includes rim sherds and reconstructible vessels.)

	Plain Ware	Sobaipuri Plain (folded-over rim coil)	Red Ware	Papago Red	Possible Papago Red	Papago Plain	Possible Papago Plain	Papago Black-on-red	Papago Red-on-brown		Possible Papago Red-on-brown	Indeterminate Papago Red-on-buff or White-on-buff	Row Total
Temper Source	Rim	Rim	Rim	Rim	Rim	Rim	Rim	Rim	Rim	Body	Rim	Rim	
Beehive Petrofacies (volcanic)	15	12	7	0	0	0	0	0	0	0	0	0	34
Black Mountain Petrofacies (granitic)	6	3	9	1	2	0	0	2	0	1	0	1	25
Airport Petrofacies (granitic and mixed lithic)	3	5	6	1	0	0	1	0	1	0	1	0	18
Black Mountain or Sierrita petrofacies (granitic)	1	1	3	6	0	3	0	0	0	0	0	0	14
Twin Hills Petrofacies (volcanic)	1	0	0	0	0	0	0	0	0	0	0	0	1
Indeterminate granitic or metamorphic source	1	0	0	0	0	0	0	0	0	0	0	0	1
Indeterminate source	3	5	5	0	1	0	0	1	0	0	0	0	15
Column total	30	26	30	8	3	3	1	3	1	1	1	1	108

Table 7.37. Frequency of rim sherds and reconstructible vessels in each vessel form class recovered from Features 409 and 441, the Tucson Presidio, AZ BB:13:13 (ASM), reported by ceramic type.

	Historic Native American Ceramic Type											
Vessel Form	Plain Ware	Sobaipuri Plain (folded-over rim coil)	Red Ware	Papago Red	Possible Papago Red	Papago Plain	Possible Papago Plain	Papago Black-on-red	Papago Red-on-brown	Possible Papago Red-on-brown	Indeterminate Papago Red-on-buff or White-on-buff	Row Total
Bowl Forms												
Outcurved	3	0	19	4	1	0	1	1	0	0	0	29
Plate/Platter	10	0	2	1	0	0	0	0	0	0	1	14
Semi-flare-rim, incurved	0	3	0	2	0	0	0	0	0	0	0	5
Hemispherical	0	0	3	1	0	0	0	0	0	0	0	4
Semi-flare-rim, outcurved	0	1	1	0	0	1	0	0	0	0	0	3
Indeterminate bowl form	6	0	5	0	1	0	0	1	0	1	0	14
Jar Forms												
Semi-flaring, angled long-collar	0	7	0	0	0	1	0	0	1	0	0	9
Tall flare-rim	4	0	0	0	0	0	0	0	0	0	0	4
Seed	1	0	0	0	0	0	0	0	0	0	0	1
Neckless	1	0	0	0	0	0	0	0	0	0	0	1
Pitcher	0	0	0	0	0	0	0	1	0	0	0	1
Indeterminate Forms												
Indeterminate flare-rim form	5	14	0	0	1	1	0	0	0	0	0	21
Indeterminate form	0	1	0	0	0	0	0	0	0	0	0	1
Column Total	30	26	30	8	3	3	1	3	1	1	1	107

Figure 7.11. Papago Black-on-red pitcher, recovered from Feature 409, the Tucson Presidio, AZ BB:13:13 (ASM).

Figure 7.12. Papago Black-on-red outcurved bowl, recovered from Feature 409, the Tucson Presidio, AZ BB:13:13 (ASM).

Historic O'odham Pottery from the Carrillo Household, circa 1860-1880

A total of 331 pottery sherds—representing portions of at least 44 individual vessels—was recovered from Carrillo household Feature 61 at the San Agustín Mission locus of the Clearwater site (Table 7.39). Additional information regarding characteristics of the red-slipped pottery types recovered from this feature is provided in Table 7.40. Unfortunately, this American Territorial period feature exhibits some temporal mixing, with prehistoric painted pottery comprising 2.7 percent of the sherds, or 18.2 percent of the vessels. Those values suggest some of the plain ware pottery is also likely to be prehistoric; however, as discussed above, it is essentially impossible to separate a prehistoric sand-tempered plain ware sherd from a sand-tempered plain ware made during the Historic era.

Temper Attributes

Temper Type. The temper type data are summarized in Table 7.41. Three compositions dominate the collection: sand temper (40.7 percent of examined sherds), sand and fiber (presumably horse manure, 40.7 percent), and a mixture of sand and crushed sherd temper (10.9 percent). Four additional temper types were observed; all four contain metamorphic rocks and/or minerals (gneiss/schist and/or muscovite mica [with or without sand]). Most, if not all, of the gneiss/schist- and muscovite mica-tempered sherds may represent mixing of earlier, prehistoric sherds into the deposit, as those temper types are known to have been commonly used from approximately A.D. 850 to 1100 (Deaver 1984:397-398, Figure 4.69; Kelly 1978:72-76; Wallace et al. 1995:607, Figure 6). However, as shown with the mission pottery from the Clearwater site (discussed above), some vessels exhibiting a late ceramic trait—the folded rim—also contain metamorphic tempers (greater than 25 percent gneiss/schist and muscovite mica), indicating use of that temper type continued into the Historic era (see also Fontana et al. 1962:57, 135).

Temper Provenance. The temper provenance data are summarized in Table 7.42. Two or three source areas were identified in the small collection from the Carrillo household: the granitic Black Mountain and/or Sierrita petrofacies (33.3 percent) and the volcanic Beehive Petrofacies (25.9 percent). The Beehive Petrofacies is located south of the site, while the Black Mountain and Sierrita petrofacies are located

Figure 7.13. Papago Red-on-buff or White-on-buff plate, recovered from Feature 409, the Tucson Presidio, AZ BB:13:13 (ASM).

Figure 7.14. Papago Red-on-brown semi-flaring, angled long-collared jar, recovered from Feature 409, the Tucson Presidio, AZ BB:13:13 (ASM).

south of that resource area. The remaining 11 sherds could not be assigned to a specific source using only the binocular microscope; the temper provenance of those sherds was recorded as indeterminate.

Pottery Function

Two different approaches were utilized to assess the uses O'odham pottery likely played in the lives of the Carrillo household inhabitants. The first approach was strictly typological, whereas the second approach placed the only large rim sherd from the feature into a functional category determined by its overall morphology and size.

Typological Approach. The vessel forms of O'odham pottery recovered from the Carrillo household are reported in Table 7.43. Unfortunately, 88.9 percent of the rims could not be assigned to a vessel form because most of the rim sherds recovered from the Carrillo household are quite small (less than 5 cm^2). Even so, bowl vessel forms clearly must have been quite common, as half of the indeterminate forms represent bowls.

Figure 7.15. Sobaipuri semi-flaring, angled long-collared jar, recovered from Feature 409, the Tucson Presidio, AZ BB:13:13 (ASM).

Figure 7.16. Sobaipuri semi-flaring, angled long-collared, jar, recovered from Feature 409, the Tucson Presidio, AZ BB:13:13 (ASM).

Shepard-Braun Approach. Only one of the three rim sherds assigned to a vessel form—the Papago Red cauldron—also had a measurable rim diameter. Following the method displayed in Table 7.5, it is classified as a small group serving vessel.

Historic O'odham Pottery from Block 181, Lot 1, circa Late 1870s-Early 1890s

A total of 1,319 pottery sherds—representing portions of at least 197 individual vessels—was recovered from Feature 376 at Block 181, Lot 1, the Tucson Presidio (Table 7.44). Additional information regarding

Table 7.38. Frequency of rim sherds and reconstructible vessels in each functional category recovered from Features 409 and 441, the Tucson Presidio, AZ BB:13:13 (ASM), reported by ceramic type.

	Historic Native American Ceramic Type										
Functional Category (Final Vessel Form Class)	Plain Ware	Sobaipuri Plain (folded-over rim coil)	Red Ware	Papago Red	Possible Papago Red	Papago Plain	Possible Papago Plain	Papago Black-on-red	Papago Red-on-brown	Indeterminate Papago Red-on-buff or White-on-buff	Row Total
Independent Restricted Vessels											
B: Permanent, secure storage and/or water carrying (6.0-12.5 cm aperture diameter)	0	1	0	0	0	0	0	1	0	0	2
C: Cooking (small- to medium-sized groups), temporary storage, and/or water cooling (13.0-25.5 cm aperture diameter)	1	6	0	0	0	1	0	0	1	0	9
D: Cooking (large group) and/or temporary storage (26.0-31.5 cm aperture diameter)	1	2	0	1	0	0	0	0	0	0	4
Simple and Dependent Restricted Vessels											
G: Specialized, temporary dry storage (6.0-12.5 cm orifice diameter)	1	0	0	0	0	0	0	0	0	0	1
Unrestricted Vessels (Deep)											
M: Food preparation and/or small group serving (13.0-25.5 cm orifice diameter)	2	1	17	4	1	0	0	0	0	0	25
N: Communal serving/eating (26.0-31.5 cm orifice diameter)	0	0	1	0	0	1	0	0	0	0	2
O: Communal serving/eating (32.0-38.5 cm orifice diameter)	1	0	0	0	0	0	1	1	0	0	3
Unrestricted Vessels (Shallow)											
R: Collecting, processing, and/or individual-to-large group serving (13.0-25.5 cm orifice diameter)	2	0	1	1	0	0	0	0	0	0	4
S: Collecting, processing, and/or communal serving (26.0-31.5 cm orifice diameter)	1	0	1	0	0	0	0	0	0	0	2
T: Collecting, processing, and/or communal serving (32.0-38.5 cm orifice diameter)	5	0	0	0	0	0	0	0	0	1	6
TT: Collecting, processing, and/or communal serving (>38.5 cm orifice diameter)	1	0	0	0	0	0	0	0	0	0	1
Column Total	15	10	20	6	1	2	1	2	1	1	59

Table 7.39. Native American pottery types recovered from Feature 61, the Carrillo household, at the San Agustín Mission locus, Clearwater site, AZ BB:13:6 (ASM).

	Vessel Part[a]						Row Total	
	Body Sherd		Rim Sherd		Neck			
Ceramic Type	Sherd Count	MNV[b]	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV
Prehistoric Native American Types								
Indeterminate red-on-brown	2	2	0	0	2	1	4	3
Indeterminate pre-Classic red-on-brown	1	1	0	0	0	0	1	1
Early Rincon, Middle Rincon, Late Rincon, or Tanque Verde red-on-brown	0	0	1	1	0	0	1	1
Tanque Verde Red-on-brown	2	2	0	0	0	0	2	2
Indeterminate red-on-buff	1	1	0	0	0	0	1	1
Historic Native American Types								
Plain ware	149	N/A	5	5	4	N/A	158	5
Sobaipuri Plain (folded-over rim coil)	0	0	2	1	0	0	2	1
Red ware	9	9	5	5	0	0	14	14
Papago Plain	79	N/A	10	10	7	N/A	96	10
Papago Red[c]	34	N/A	11	6	4	N/A	49	6
Possible Papago Red	3	N/A	0	0	0	N/A	3	0
Column Total	280	15	34	28	17	1	331	44

[a]Historic plain ware and Papago Red body and neck sherds were not inspected for conjoins; therefore, minimum number of vessel estimates are not available (N/A) for those ware and vessel part combinations.
[b]MNV = Minimum number of vessels.
[c]Two Papago Red have folded-over rim coils.

Table 7.40. Location of slip on historic red ware and Papago Red pottery recovered from Feature 61, the Carrillo household, at the San Agustín Mission locus, the Clearwater site, AZ BB:13:6 (ASM).

	Papago Red				Red Ware			
	Vessel Part				Vessel Part			
			Rim Sherds and Reconstructible Vessels			Rim Sherds and Reconstructible Vessels		
Slip Location	Body Sherds	Neck Sherds	Bowl	Indeterminate Flare-rim form	Body Sherds	Bowl	Indeterminate Flare-rim form	Row Total
Fully slipped on all visible interior and exterior surfaces	10	1	2	2	6	2	2	25
Exterior only	9	3	0	0	0	0	0	12
Interior only	0	0	0	0	2	0	0	2
Exterior, rim, and interior band below rim	0	0	1	0	0	0	0	1
Indeterminate slip location	1	0	0	1	1	1	0	4
Column total	20	4	3	3	9	3	2	44

Table 7.41. Three-way classification of historic ceramic types, vessel part, and temper type from Feature 61, the Carrillo household, at the San Agustín Mission locus, the Clearwater site, AZ BB:13:6 (ASM). (The "body" category includes body and neck sherds.)

	Plain Ware		Sobaipuri Plain (folded-over rim coil)	Red Ware		Papago Red		Possible Papago Red	Papago Plain		Row Total
Temper Type	Rim	Body	Rim	Rim	Body	Rim	Body	Body	Rim	Body	
Sand	1	109	1	2	7	0	1	2	0	0	123
Sand and fiber	0	0	0	0	0	6	22	1	9	85	123
Sand and crushed sherd	2	25	0	3	2	0	0	0	1	0	33
>25% gneiss/schist	1	5	0	0	0	0	0	0	0	0	6
Mixed sand and 1-25% muscovite mica	0	2	0	0	0	0	0	0	0	0	2
>25% muscovite mica	0	1	0	0	0	0	0	0	0	0	1
>25% gneiss/schist and muscovite mica	0	1	0	0	0	0	0	0	0	0	1
Indeterminate	1	10	0	0	0	0	1	0	0	1	13
Column total	5	153	1	5	9	6	24	3	10	86	302

Table 7.42. Three-way classification of historic ceramic types, vessel part, and temper source from Feature 61, the Carrillo household, at the San Agustín Mission locus, the Clearwater site, AZ BB:13:6 (ASM). (The "body" category includes body and neck sherds.)

	Papago Red	Papago Plain	Plain Ware	Sobaipuri Plain (folded-over rim coil)	Red Ware	Row Total
Temper Source	Rim	Rim	Rim	Rim	Rim	
Black Mountain or Sierrita petrofacies (granitic)	3	6	0	0	0	9
Beehive Petrofacies (volcanic)	0	1	3	1	2	7
Indeterminate	3	3	2	0	3	11
Column total	6	10	5	1	5	27

Table 7.43. Frequency of rim sherds and reconstructible vessels in each vessel form class recovered from Feature 61, the Carrillo household, at the San Agustín Mission locus, the Clearwater site, AZ BB:13:6 (ASM), reported by ceramic type.

	Historic Native American Ceramic Type					
Vessel Form	Red Ware	Plain Ware	Sobaipuri Plain (folded-over rim coil)	Papago Red	Papago Plain	Row Total
Bowl Forms						
Plate/Platter	1	0	0	0	1	2
Cauldron	0	0	0	1	0	1
Indeterminate bowl form	2	4	0	2	4	12
Indeterminate Forms						
Indeterminate flare-rim form	2	1	1	3	5	12
Column Total	5	5	1	6	10	27

Table 7.44. Native American pottery types recovered from Feature 376 at Block 181, Lot 1, the Tucson Presidio, AZ BB:13:13 (ASM).

	Vessel Part[a]											
	Body Sherd		Rim Sherd		Reconstructible Vessel		Neck		Handle		Row Total	
Ceramic Type	Sherd Count	MNV[b]	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV	Sherd Count	MNV
Prehistoric Native American Types												
Indeterminate red-on-brown	1	1	0	0	0	0	0	0	0	0	1	1
Indeterminate pre-Classic red-on-brown	3	3	0	0	0	0	0	0	0	0	3	3
Rillito Red-on-brown	2	2	1	1	0	0	0	0	0	0	3	3
Rillito or Early Rincon red-on-brown	6	5	0	0	0	0	0	0	0	0	6	5
Early Rincon Red-on-brown	1	1	0	0	0	0	0	0	0	0	1	1
Early or Middle Rincon red-on-brown	3	2	2	2	0	0	0	0	0	0	5	4
Middle Rincon Red-on-brown	6	4	2	2	0	0	0	0	0	0	8	6
Tortolita Red	1	1	0	0	0	0	0	0	0	0	1	1
Indeterminate red-on-buff	1	1	0	0	0	0	0	0	0	0	1	1
Historic Native American Types												
Plain ware	229	N/A	12	12	0	0	7	N/A	0	0	248	12
Sobaipuri Plain (folded-over rim coil)	0	0	1	1	0	0	0	0	0	0	1	1
Red ware	4	N/A	2	1	0	0	0	N/A	0	0	6	1
Papago Plain[b=c]	509	N/A	111	87	41	4	0	N/A	1	1	662	92
Possible Papago Plain	2	N/A	0	0	0	0	0	N/A	0	0	2	0
Papago Red[d]	282	N/A	72	54	3	1	0	N/A	0	0	357	55
Possible Papago Red	0	0	3	3	0	0	0	0	0	0	3	3
Papago Black-on-red	1	1	1	1	0	0	2	1	0	0	4	3
Papago White-on-red	1	1	0	0	0	0	0	0	0	0	1	1
Indeterminate Papago Buff	4	2	0	0	0	0	0	0	0	0	4	2
Zuni Polychrome	1	1	1	1	0	0	0	0	0	0	2	2
Column Total	1,057	25	208	165	44	5	9	1	1	1	1,319	197

[a]Historic plain ware and red-slipped body and neck sherds were not inspected for conjoins; therefore, minimum number of vessel estimates are not available (N/A) for those ware and vessel part combinations.
[b]MNV = Minimum number of vessels.
[c]One Papago Plain ware has a folded rim.
[d]One Papago Red ware has a folded rim.

Table 7.45. Location of slip on historic red ware and Papago Red pottery recovered from Feature 376 at Block 181, Lot 1, the Tucson Presidio, AZ BB:13:13 (ASM).

	Papago Red				Red Ware		
	Vessel Part				Vessel Part		
		Rim Sherds and Reconstructible Vessels			Rim Sherd		
Slip Location	Body Sherds	Bowl	Jar	Indeterminate Flare-rim form	Indeterminate Flare-rim form	Body Sherds	Row Total
Exterior only	243	0	0	0	0	1	244
Fully slipped on all visible interior and exterior surfaces	31	10	1	23	0	1	66
Exterior, rim, and interior band	0	0	9	1	0	0	10
Interior only	7	0	0	0	0	1	8
Exterior and interior band	1	0	0	0	0	0	1
Indeterminate slip location	0	1	1	9	1	0	12
Column total	282	11	11	33	1	3	341

characteristics of the red-slipped pottery types recovered from the feature is provided in Table 7.45. Unfortunately, this American Territorial period feature exhibits some temporal mixing, with prehistoric painted pottery comprising 2.2 percent of the sherds, or 12.7 percent of the vessels. Those values suggest some of the plain ware pottery recovered from this feature is also likely to be prehistoric; however, as discussed above, it is essentially impossible to separate a prehistoric sand-tempered plain ware sherd from a historic sand-tempered plain ware.

Temper Attributes

Temper Type. The temper type data are summarized in Table 7.46. One composition dominates the collection: sand and fiber (presumably manure, 78.4 percent of examined sherds). Eight additional temper types were observed. These fall into to three major groups: tempers containing a mixture of sand and crushed sherd, sand alone, and those containing metamorphic rocks and/or minerals (gneiss/schist and/or muscovite mica [with or without sand]). Most of the gneiss/schist- and muscovite mica-tempered sherds may represent mixing of earlier, prehistoric sherds into the deposits, as those temper types are known to have been commonly used from approximately A.D. 850 to 1100 (Deaver 1984:397-398, Figure 4.69; Kelly 1978:72-76; Wallace et al. 1995:607, Figure 6).

Temper Provenance. The temper provenance data are summarized in Table 7.47. A very large percentage (87.5 percent) contains nonlocal sands from the granitic Black Mountain and/or Sierrita petrofacies. Three additional source areas were identified: the volcanic Beehive Petrofacies (5.4 percent), the volcanic Twin Hills Petrofacies (1.2 percent), and the granitic Black Mountain Petrofacies (0.6 percent). The Twin Hills Petrofacies is located immediately west of the Block 181, across the Santa Cruz River. The Beehive Petrofacies is located south of that resource area, while the Black Mountain and Sierrita petrofacies are located south of the Beehive Petrofacies. The remaining eight sherds (4.8 percent) could not be assigned to a specific source using only the binocular microscope; their temper provenance was recorded as indeterminate.

Pottery Function

Two different approaches were utilized to assess the uses O'odham pottery likely played in the lives of Block 181 inhabitants. The first approach was strictly typological and entailed the assignment of rim sherds and reconstructible vessels to vessel form categories originally created to classify prehistoric pottery from the region. The second approach examined a subset of the rim sherds and reconstructible vessels, placing them into functional categories determined by their overall morphology and size.

Typological Approach. The vessel forms of American Territorial period O'odham pottery recovered from Feature 376 are reported in Table 7.48.

Shepard-Braun Approach. The count of sherds in each vessel form class is summarized in Table 7.49, by ceramic type. The functional interpretation of each vessel form class follows the method shown in Table 7.5. If all the plain ware types (i.e., plain ware and Papago Plain) in vessel form classes C, M, and R are assumed to have been used for food preparation and cooking, and if the data set is representative, 40.9 percent of the pottery may have been used

Table 7.46. Three-way classification of historic ceramic types, vessel part, and temper type from Feature 376 at Block 181, Lot 1, the Tucson Presidio, AZ BB:13:13 (ASM). (The "rim" category includes rim sherds and reconstructible vessels; the "body" category includes body and neck sherds.)

	Papago Plain		Papago Red		Possible Papago Red	Possible Papago Plain	Papago Black-on-red		Papago White-on-red	Indeterminate Papago Buff Type	Zuni Glaze		Plain Ware		Sobaipuri Plain (folded-over rim coil)	Red Ware		Row Total
Temper Type	Rim	Body	Rim	Body	Rim	Body	Rim	Body	Body	Body	Rim	Body	Rim	Body	Rim	Rim	Body	
Sand and fiber	88	509	55	282	3	1	1	2	1	0	0	0	0	0	0	0	0	942
Mixed sand and 1-7% gneiss/schist	0	0	0	0	0	0	0	0	0	0	0	0	1	72	0	0	0	73
Sand and crushed sherd	0	0	0	0	0	1	0	0	0	0	0	0	9	46	1	1	2	60
Sand	1	0	0	0	0	0	0	0	0	1	0	0	0	50	0	0	1	53
>25% gneiss/schist	0	0	0	0	0	0	0	0	0	0	0	0	1	43	0	0	0	44
Mixed sand and 7-25% gneiss/schist	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	22
Mixed sand and 1-25% muscovite mica	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
Mixed sand and 1-25% gneiss/schist and muscovite mica	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Crushed sherd	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Indeterminate	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3
Column total	91	509	55	282	3	2	1	2	1	1	1	1	12	236	1	1	3	1,202

Table 7.47. Three-way classification of historic ceramic types, vessel part, and temper source from Feature 376 at Block 181, Lot 1, the Tucson Presidio, AZ BB:13:13 (ASM). (The "rim" category includes rim sherds and reconstructible vessels; the "body" category includes body and neck sherds.)

	Papago Plain	Papago Red	Possible Papago Red	Papago Black-on-red		Papago White-on-red	Indeterminate Papago Buff Type	Plain Ware	Sobaipuri Plain (folded-over rim coil)	Red Ware	Row Total
Temper Source	Rim	Rim	Rim	Rim	Body	Body	Body	Rim	Rim	Rim	
Black Mountain or Sierrita petrofacies (granitic)	86	54	3	1	2	1	0	0	0	0	147
Beehive Petrofacies (volcanic)	0	0	0	0	0	0	0	9	0	0	9
Twin Hills Petrofacies (volcanic)	0	0	0	0	0	0	0	2	0	0	2
Black Mountain Petrofacies (granitic)	1	0	0	0	0	0	0	0	0	0	1
Indeterminate granitic or metamorphic source	1	0	0	0	0	0	0	0	0	0	1
Indeterminate source	3	1	0	0	0	0	1	1	1	1	8
Column total	91	55	3	1	2	1	1	12	1	1	168

Table 7.48. Frequency of rim sherds and reconstructible vessels in each vessel form class recovered from Feature 376 at Block 181, Lot 1, the Tucson Presidio, AZ BB:13:13 (ASM), reported by ceramic type.

	Historic Native American Ceramic Type							
Vessel Form	Papago Plain	Papago Red	Possible Papago Red	Papago Black-on-red	Plain Ware	Sobaipuri Plain (folded-over rim coil)	Red Ware	Row Total
Bowl Forms								
Semi-flare-rim, outcurved	12	3	0	0	1	0	0	16
Semi-flare-rim, hemispherical	5	1	0	0	0	0	0	6
Outcurved	3	2	0	0	0	0	0	5
Semi-flare-rim, incurved	3	1	0	0	0	0	0	4
Plate/Platter	2	0	0	0	1	0	0	3
Flare-rim	1	0	0	0	0	0	0	1
Hemispherical	0	1	0	0	0	0	0	1
Incurved	1	0	0	0	0	0	0	1
Straight-walled or vertical-sided	0	0	0	0	1	0	0	1
Indeterminate bowl form	4	3	0	0	3	0	0	10
Jar Forms								
Tall flare-rim	7	9	0	0	0	0	0	16
Semi-flare-rim angled long-collar	1	2	0	0	0	0	0	3
Neckless	0	0	0	0	1	0	0	1
Indeterminate jar form	1	0	0	0	1	0	0	2
Indeterminate Forms								
Indeterminate flare-rim form	51	33	3	1	4	1	1	94
Column Total	91	55	3	1	12	1	1	164

for cooking. Similarly, if all the pottery in vessel form classes B and H and all of the Papago Red pottery in class C are assumed to have been used for storage, and if the data set is representative, 20.5 percent of the pottery may have been used for storage. Finally, 38.6 percent of the pottery may have been used for serving if the Papago Red in vessel form class M was used for small group servings, if all the pottery in vessel form classes N, O, and OO was used for large group servings, and if the data set is representative.

Review of Vessel Function

The findings reported above can be compared with similar data drawn from ethnographic studies. Rice (1987:Table 9.5) reports the percentage of cooking, storage, and serving vessels in 10 different cultures. The average percentage of cooking vessels in those 10 cultures is 53 (range = 26-87 percent; standard deviation = 19 percent), the average percentage of storage vessels is 16 (range = 2-31 percent; standard deviation = 11 percent), and the average percentage of serving vessels is 23 (range = 8-41 percent; standard deviation = 14 percent). By those measures, the inferred percentage of cooking vessels recovered from presidio Feature 373 falls below that documented ethnographically, while the percentage of serving vessels recovered from Feature 373, as well as presidio Features 409 and 441, exceeds the documented range. The inferred percentages of cooking, storage, and serving vessels recovered from the San Agustín Mission deposits and the Tucson Presidio's American Territorial period Feature 376 fall within the ethnographic ranges.

Papago Red vessels assigned to categories C and D were probably used for storing and cooling water (Hand 1994:15, 41, 44, 83, 105, 135, 154, 172, 175; Hosmer et al. 1991:56-57; Naranjo 2002), although that practice probably ended as the municipal water supply became available throughout the project area. Also, the high percentage of deep, unrestricted vessels is consistent with a cuisine that featured soups and stews. Indeed, the ubiquitous semi-flaring bowl forms recovered from the Historic era contexts closely resemble the flanged plates and bowls produced by contemporary Hispanic potters in New Mexico for

Table 7.49. Frequency of rim sherds and reconstructible vessels in each functional category recovered from Feature 376 at Block 181, Lot 1, the Tucson Presidio, AZ BB:13:13 (ASM), reported by ceramic type.

	Historic Native American Ceramic Type			
Functional Category (Final Vessel Form Class)	Papago Red	Papago Plain	Plain Ware	Row Total
Independent Restricted Vessels				
B: Permanent, secure storage and/or water carrying (6.0-12.5 cm aperture diameter)	1	1	0	2
C: Cooking (small- to medium-sized groups), temporary storage, and/or water cooling (13.0-25.5 cm aperture diameter)	6	9	1	16
Simple and Dependent Restricted Vessels				
H: Specialized, temporary dry storage (13.0-25.5 cm orifice diameter)	0	1	0	1
Unrestricted Vessels (Deep)				
M: Food preparation and/or small group serving (13.0-25.5 cm orifice diameter)	1	5	1	7
N: Communal serving/eating (26.0-31.5 cm orifice diameter)	2	7	0	9
O: Communal serving/eating (32.0-38.5 cm orifice diameter)	2	3	0	5
OO: Communal serving/eating (>38.5 cm orifice diameter)	0	2	0	2
Unrestricted Vessels (Shallow)				
R: Collecting, processing, and/or individual-to-large group serving (13.0-25.5 cm orifice diameter)	0	1	1	2
Column Total	12	29	3	44

their own use and for sale within their communities (Carrillo 1997:11, 103, 221). Finally, the large, shallow, unrestricted plain ware vessels in categories R, S, T, and TT may well have been used as griddles, or *comales*, for cooking tortillas—based on the dimensions of 176 *comales* reported by Arnold (1978:Appendices 2A-2C).

O'odham Pottery Systematics: A Review of Technological Attributes Exhibited by Material Recovered from Well-dated, Tucson-area Historic Era Deposits

Fontana et al.'s (1962:101-116) discussion of "Papago" pottery types is generally considered the classic work on the subject. However, although they drew upon ceramic collections from an expansive area "... all of this material is flawed by a frustrating lack of chronological control" (Fontana et al. 1962:102). Five recent archaeological projects at six sites located in the central Tucson area have yielded a number of well-dated deposits containing historic Native American pottery (Heidke 2002, 2003a, 2003b, 2005b). That material provides the type of chronological control that Fontana et al. (1962) thought they lacked, although the samples themselves are drawn from a much smaller area. Additionally, variability related to social and economic factors needs to be explored further (Whittlesey 1997:439). Therefore, it would be inappropriate to extend the findings reported here at this time. More well-dated samples, covering a broader range of social and economic statuses, need to be recovered from deposits located within and, especially, outside the Tucson area before that can happen.

Tables 7.50 and 7.51 summarize information recorded from pottery recovered from well-dated deposits at the sites that reflect decisions made by the potters—temper source and type, occurrence of folded rim coils, location of red slips, and decorated type color schemes—as well as those that reflect consumer preference (type frequency). All of these are characteristics of "Papago" pottery that contributed to the Fontana et al. (1962) typology. The temper type, folded rim, slip location, and ware frequency data are based on sherd counts, whereas the temper source data are based on minimum number of vessel counts. Figure 7.17 shows the date ranges of the contexts included in the summary; examination of that figure makes it clear where the date ranges overlap *and* where there are gaps in the dating. The two, dashed, vertical lines indicate changes in administration between the Spanish and Mexican governments

Table 7.50. Summary of temporal changes in select technological attributes of Native American pottery from Spanish and Mexican period deposits.

Contexts and Technological Attributes	Period			
	Spanish		Mexican	American Territorial
Date Range	1694-1821		1821-1856	1856-1912
Site Name	San Agustín Mission	Tucson Presidio	Tucson Presidio	León Farmstead
AZ ASM Site Number	BB:13:6	BB:13:13	BB:13:13	BB:13:505
Feature Number(s)	64, 161, 166, 177, 178, 193, 203	373	409, 441	4 (Stratum 50.03), 14, 25, 28
Feature Date Range	1771-1821	1810s-1820s	1820s-1830s	1840-1869
Maximum Sample Sizes: Sherd Count (MNV)[a]	3,396 (476)	333 (38)	1,094 (109)	831 (123)
Temper Source				
Percentage volcanic production locale[b]	64.6	38.2	37.6	29.5
Percentage granitic and mixed lithic production locale[b]	33.3	20.6	19.3	6.3
Percentage granitic production locale[b]	1.4	41.2	41.9	64.2
Temper Type				
Percentage sand-tempered[c]	39.8	48.6	31.7	34.7
Percentage sand and crushed sherd-tempered[c]	55.2	43.4	41.7	16.0
Percentage sand and fiber-tempered[c]	1.4	1.7	20.4	47.6
Folded Rims				
Percentage folded rim coils[d]	14.4	20.0	26.2	14.5
Type Frequency				
Percentage plain ware pottery[e]	85.2	66.1	60.3	34.3
Percentage red ware pottery[f]	13.2	27.0	12.2	2.6
Percentage Papago Plain pottery[g]	1.0	1.5	17.0	41.9
Percentage Papago Red pottery[h]	0.2	0.3	5.0	18.9
Percentage decorated pottery	0.4	5.1	5.4	2.3
Slip Location				
Percentage interior-slipped[i]	87.8	82.1	63.6	44.5
Percentage exterior-slipped[j]	11.8	17.9	36.4	55.5

Table 7.50. Continued.

Contexts and Technological Attributes	Period			
	Spanish		Mexican	American Territorial
Date Range	1694-1821		1821-1856	1856-1912
Site Name	San Agustín Mission	Tucson Presidio	Tucson Presidio	León Farmstead
AZ ASM Site Number	BB:13:6	BB:13:13	BB:13:13	BB:13:505
Decorated Types Present ("P")				
Papago Black-on-red	P	P	P	P
Papago Red-on-brown	P	–	P	P
Papago Red-on-buff	P	P	?	–
Papago Black-on-buff	–	–	–	–
Papago White-on-red	–	–	–	–

[a]Prehistoric types and indeterminate wares not included in sherd and MNV counts (MNV = Minimum number of vessels).

[b]Volcanic production locales include Beehive and/or Twin Hills petrofacies observations; granitic and mixed lithic production locale includes Airport Petrofacies observations; granitic production locales include Black Mountain and/or Sierrita petrofacies observations; indeterminate temper source observations were deleted before percentage values were calculated.

[c]Indeterminate temper type observations were deleted before percentage values were calculated.

[d]Calculation based on the MNV count of all historic Native American rim sherds and reconstructible vessels; percentage figures include Sobaipuri Plain and any other cases of folded-over rim coils noted in other types.

[e]Calculation based on the sherd count of all historic Native American types. The "plain ware" category includes plain ware and Sobaipuri Plain observations.

[f]Calculation based on the sherd count of all historic Native American types.

[g]Calculation based on the sherd count of all historic Native American types; the "Papago Plain" category includes Papago Plain and possible Papago Plain observations.

[h]Calculation based on the sherd count of all historic Native American types; the "Papago Red" category includes Papago Red and possible Papago Red observations.

[i]Percentage based on all sherds slipped on their: (1) interior surface; (2) interior and rim; (3) interior, rim, and exterior band; and (4) fully slipped on all interior and exterior surfaces; indeterminate observations were deleted before percentage values were calculated.

[j]Percentage based on all sherds slipped on their exterior surface and those slipped on their exterior, rim, and a band below the rim; indeterminate observations were deleted before percentage values were calculated.

Table 7.51. Summary of temporal changes in select technological attributes of historic Native American pottery from the American periods deposits.

Contexts and Technological Attributes	Period							
	American Territorial							American Statehood
Date Range	1856-1912							1912-present
Site Name	Carrillo Household	León Farmstead	Block 181	León Farmstead	Block 139	Block 172	Block 136	Block 136
AZ ASM Site Number	BB:13:6	BB:13:505	BB:13:13	BB:13:505	BB:13:644	BB:13:668	BB:13:513	BB:13:513
Feature Number(s)	61	4 (Stratum 50.02)	376	4 (Stratum 50.01)	19	46, 54	60	7, 41
Feature Date Range	1860-1880	1870-1880	Late 1870s-early 1890s	1880-1890	1890-1895	1891/1892-1900	1898-1911	1916-1929
Arrival of City Water	1940s	1930s	1883	1930s	1910s-1920s	1901	Early 1900s	Early 1900s
Maximum Sample Sizes: Sherd Count (MNV)[a]	322 (36)	116 (16)	1,288 (170)	1,054 (150)	1,098 (44)	1,131 (36)	188 (16)	139 (6)
Temper Source								
Percentage volcanic production locale[b]	43.7	15.4	6.9	4.8	0.0	0.0	0.0	16.7
Percentage granitic and mixed lithic production locale[b]	0.0	0.0	0.0	0.0	15.6	0.0	0.0	0.0
Percentage granitic production locale[b]	56.2	84.6	92.5	95.2	84.4	100.0	100.0	83.3
Temper Type								
Percentage sand-tempered[c]	42.6	20.5	4.4	11.2	2.3	0.0	1.7	11.7
Percentage sand and crushed sherd-tempered[c]	11.4	3.6	5.0	2.3	0.0	0.0	0.0	0.0
Percentage sand and fiber-tempered[c]	42.6	72.3	78.6	85.5	97.7	100.0	98.3	88.3
Folded Rims								
Percentage folded rim coils[d]	11.1	0.0	1.8	2.8	0.0	0.0	0.0	0.0
Type Frequency								
Percentage plain ware pottery[e]	49.7	7.8	19.3	8.5	0.4	1.3	0.5	0.7
Percentage red ware pottery[f]	4.3	0.0	0.5	0.2	0.0	0.0	0.0	0.0
Percentage Papago Plain pottery[g]	29.8	75.0	51.5	58.3	46.5	14.9	15.4	47.5
Percentage Papago Red pottery[h]	16.1	17.2	27.9	19.6	38.5	82.8	84.0	51.8
Percentage decorated pottery	0.0	0.0	0.7	13.3	14.6	0.9	0.0	0.0

Table 7.51. Continued.

Contexts and Technological Attributes	Period							
	American Territorial							American Statehood
Date Range	1856-1912							1912-present
Site Name	Carrillo Household	León Farmstead	Block 181	León Farmstead	Block 139	Block 172	Block 136	Block 136
AZ ASM Site Number	BB:13:6	BB:13:505	BB:13:13	BB:13:505	BB:13:644	BB:13:668	BB:13:513	BB:13:513
Slip Location								
Percentage interior-slipped[i]	67.5	56.2	22.5	20.8	11.0	8.5	14.1	47.1
Percentage exterior-slipped[j]	32.5	43.8	77.5	79.2	89.0	91.5	85.9	52.9
Decorated Types Present ("P")								
Papago Black-on-red	–	–	P	P	P	P	–	–
Papago Red-on-brown	–	–	–	P	–	–	–	–
Papago Red-on-buff	–	–	?	P	–	–	–	–
Papago Black-on-buff	–	–	?	P	–	–	–	–
Papago White-on-red	–	–	P	–	–	–	–	–

[a]Prehistoric types and indeterminate wares not included in sherd and MNV counts (MNV = Minimum number of vessels).

[b]Volcanic production locales include Beehive and/or Twin Hills petrofacies observations; granitic and mixed lithic production locale includes Airport Petrofacies observations; granitic production locales include Black Mountain and/or Sierrita petrofacies observations; indeterminate temper source observations were deleted before percentage values were calculated.

[c]Indeterminate temper type observations were deleted before percentage values were calculated.

[d]Calculation based on the MNV count of all historic Native American rim sherds and reconstructible vessels; percentage figures include Sobaipuri Plain and any other cases of folded-over rim coils noted in other types.

[e]Calculation based on the sherd count of all historic Native American types; the "plain ware" category includes plain ware and Sobaipuri Plain observations.

[f]Calculation based on the sherd count of all historic Native American types.

[g]Calculation based on the sherd count of all historic Native American types; the "Papago Plain" category includes Papago Plain and possible Papago Plain observations.

[h]Calculation based on the sherd count of all historic Native American types; the "Papago Red" category includes Papago Red and possible Papago Red observations.

[i]Percentage based on all sherds slipped on their: (1) interior surface; (2) interior and rim; (3) interior, rim, and exterior band; and (4) fully slipped on all interior and exterior surfaces; indeterminate observations were deleted before percentage values were calculated.

[j]Percentage based on all sherds slipped on their exterior surface and those slipped on their exterior, rim, and a band below the rim; indeterminate observations were deleted before percentage values were calculated.

in 1821 and the Mexican and American governments in 1856.

Examination of the temper source data indicates three important temporal trends (Figure 7.18): (1) a decrease over time in the amount of pottery tempered with volcanic sands; (2) a decrease over time in the amount of pottery tempered with granitic and mixed lithic sands; and (3) a concomitant increase in the amount of pottery tempered with granitic sands. The highest percentage of Historic era pottery tempered with volcanic sand occurs in the deposits recovered from the San Agustín Mission locus of the Clearwater site. Examination of the temper source data indicates a small amount of the volcanic sand-tempered pottery may have been made at the site, because some sherds contain the locally available Twin Hills Petrofacies sand. However, nearly half the pots are tempered with Beehive Petrofacies sand, the closest source of which is located approximately 3.2 km south of the site. Almost one-quarter of the pots contain sand temper from the Airport Petrofacies, located east of the mission on the other side of the Santa Cruz River. The Tucson Presidio was located in the Airport Petrofacies, and the presidio era contexts there also contain appreciable amounts of pottery tempered with that local sand composition.

A marked decrease in the amount of pottery tempered with volcanic sand occurs around 1870. After 1870, pots tempered with granitic Black Mountain and/or Sierrita petrofacies sands comprise anywhere from 83 percent to 100 percent of a site's collection; however, after 1890, the average number of vessels represented per feature declines rapidly from 44 (1890-1895) to three (1916-1929). The San Xavier District of the Tohono O'odham Reservation was established in 1874, and much of it lies within the Black Mountain and Sierrita petrofacies. Those facts suggest potters residing somewhere within that district made the vessels commonly recovered from American Territorial period deposits—a suggestion supported by historic accounts (Hand 1994:15, 134). Indeed, two O'odham villages shown on Chillson's 1888 map of the area lie within easy reach of sand and clay resources located in the Black Mountain and Sierrita petrofacies (Figure 7.19).

Some aspects of the temper type data follow the trends discussed above (Figure 7.20). The percentage of pottery tempered with a mixture of sand and crushed potsherd (grog) declined over time, while the percentage tempered with sandy pedogenic clay and manure increased. The transition between those two approaches to tempering appears to have occurred largely between 1820 and 1880, with marked increases in the amount of pottery tempered with manure noted at about 1820, between 1830 and 1840, and again between 1860 and 1870. Vessels tempered

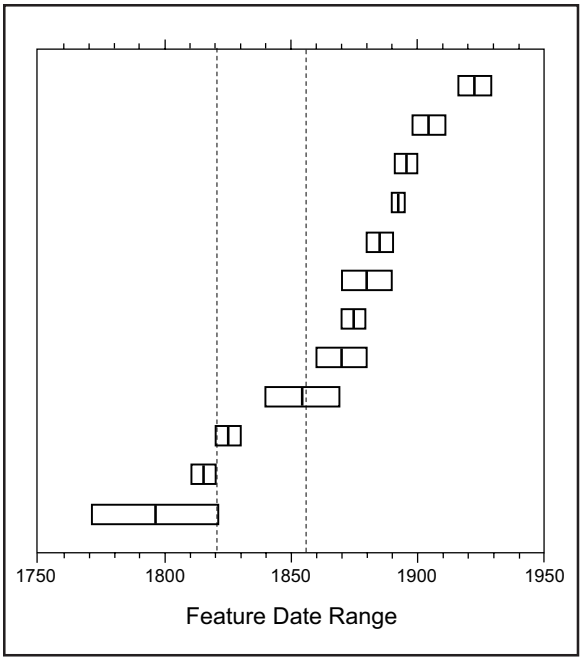

Figure 7.17. Date ranges of features summarized in Tables 7.50 and 7.51.

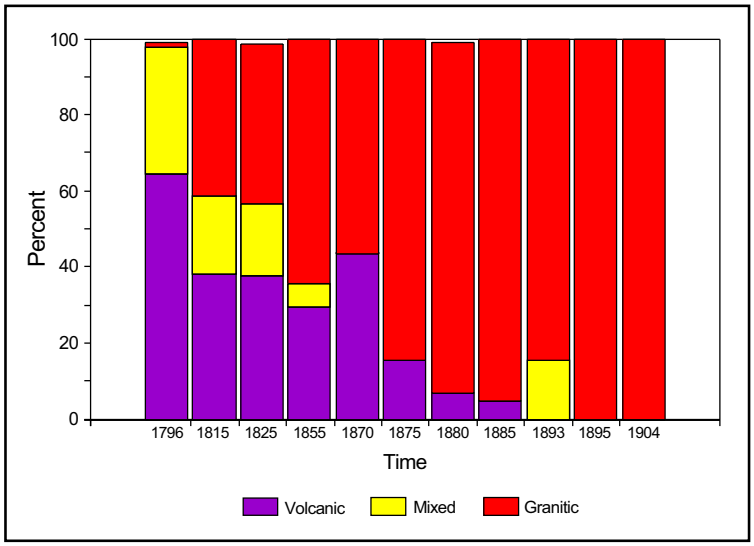

Figure 7.18. Temporal trends in Historic Native American pottery temper provenance. (Data batches are ordered by the midpoints of the feature date ranges reported in Tables 7.50 and 7.51.)

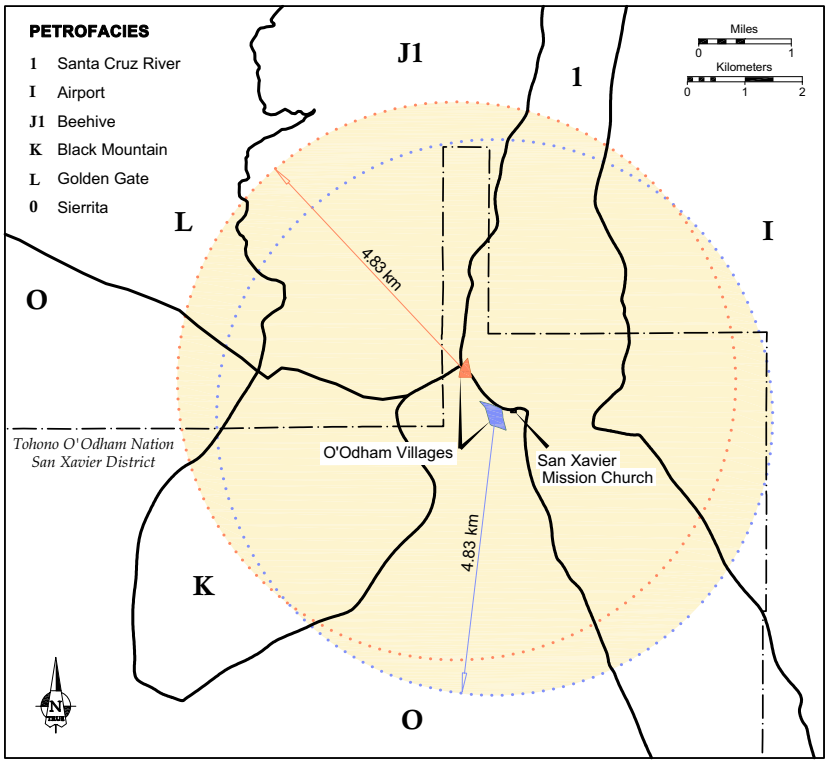

Figure 7.19. Detail of Tucson area petrofacies map showing the location of two Tohono O'odham villages in relation to the Black Mountain and Sierrita temper sources (after Chillson 1888). (The 4.83-km-radius circles depict the likely maximum distances that potters in both villages would travel by foot to collect clays containing natural nonplastics or clays to be mixed with sand temper [after Arnold 1985; Heidke et al. 2006]).

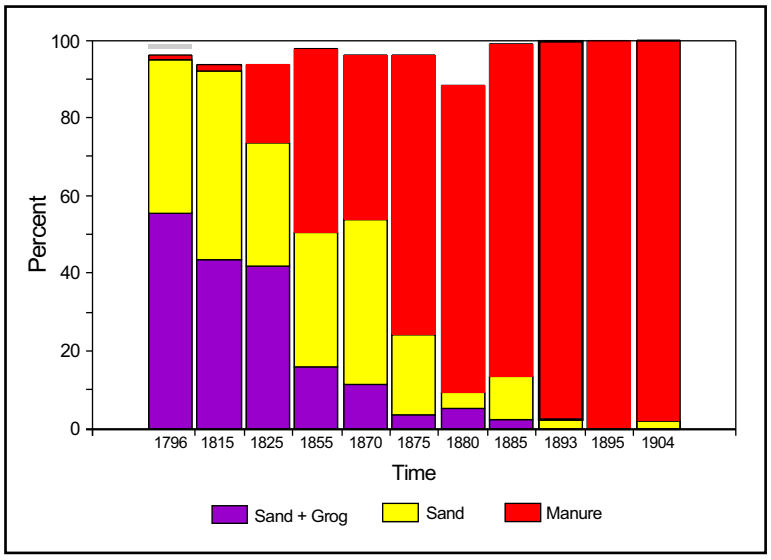

Figure 7.20. Temporal trends in Historic Native American pottery temper type. (Data batches are ordered by the midpoints of the feature date ranges reported in Tables 7.50 and 7.51.)

with sand and grog become increasingly rare after the 1830s. Cross-tabulation of the temper source and type data indicates a relationship between the two attributes. While some potters working in both areas used only sand temper, most of the vessels tempered with grog contain volcanic sand, and most vessels tempered with manure contain granitic sand.

The folded rim coil attribute also follows the temper source and type trends discussed above (Figure 7.21). Vessels with folded rim coils are relatively common through about 1870, and, in the well-dated deposits summarized in Tables 7.50 and 7.51, are absent after 1890 (although they likely continued to be produced even later in time). The latest examples known to the author were recovered from Block 172, AZ BB:13:668 (ASM), Feature 23; the fill of that feature is dated 1891-1911 (Thiel et al. 2003). Six Sobaipuri Plain and two Papago Red sherds with rim coils were present among the 228 rims recovered from Feature 23. Fontana et al. (1962:109) thought that red wares with rim coils were not produced after 1860; the evidence from Feature 23 suggest at least one potter continued to make red-slipped vessels with a folded rim after that time.

Table 7.52 summarizes the production locale and tempering technology used to produce the folded rim coil vessels recovered from the sites, including a number of sherds that were not recovered from well-dated deposits. Examination of Table 7.52 shows that half the plain ware vessels with folded rim coils were produced in either the volcanic Beehive or Twin Hills petrofacies, and almost three-quarters of them contain grog temper. Approximately 20 percent were made in either the granitic Black Mountain or Sierrita petrofacies, and two-thirds of those pots

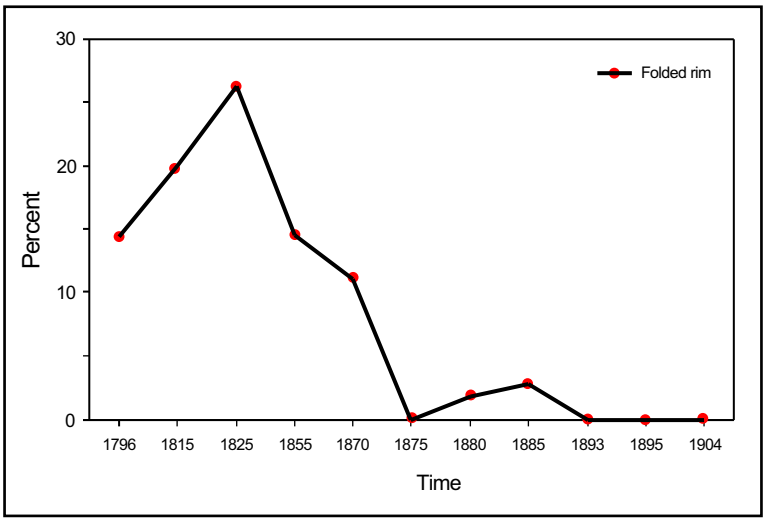

Figure 7.21. Temporal trends in the folded rim coil attribute. (Data batches are ordered by the midpoints of the feature date ranges reported in Tables 7.50 and 7.51.)

contain manure temper. Finally, about 8.5 percent of the plain ware vessels exhibiting a folded rim coil contain Airport Petrofacies sand temper.

Four red ware, 8 Papago Red, 3 Papago Plain, 1 Papago Black-on-red, 1 Papago Red-on-brown, and 1 Papago Red-on-buff also display the folded rim coil feature. Nine of those vessels are tempered with fiber and sand from either the Black Mountain or the Sierrita petrofacies, two just contain sand from those sources, and three are tempered with sand from the Airport Petrofacies. The production locale of the remaining folded rim vessels is unknown. However, based on the temper descriptions of Fontana et al. (1962), it is possible that the pots containing metamorphic tempers (that is, gneiss/schist, muscovite mica, and phyllite) were manufactured somewhere west of Tucson in the Papaguería.

Through the 1880s, unslipped pottery comprises approximately 75 percent of each Historic era archaeological collection; after that time, the percentage of red-slipped pottery increased markedly (Figure 7.22). The typical surface that was slipped also changed at about this time: before 1880, the interior surface was usually red-slipped, but after 1880 the exterior surface was usually the one slipped red (Figure 7.23). Together, the abundance and slip location data suggest red-slipped vessels were used rather differently before and after the 1880s. Prior to 1880, red-slipped vessels make up 13-27 percent of the Historic era collections, and most vessels were interior slipped bowls; however, after 1890, red-slipped vessels comprise anywhere from 39 percent to 84 percent of each collection, and most pots were exterior slipped jars.

Five decorated types—consisting of designs painted on plain brown, red-slipped, and cream- or buff-slipped backgrounds—were recovered. They are generally uncommon in the collections summarized in Tables 7.50 and 7.51, except two deposits spanning 1880-1895. The most common type—Papago Black-on-red—occurs in deposits dating from 1771 through the 1830s, 1840-1869, and the late 1870s through 1900, suggesting that, at a minimum, it was manufactured from the 1810s-1892 and, at a maximum, from 1771-1900.

The early ends of the date ranges (1771/1810s) modify Fontana et al.'s (1962:106-109) opinion about when this type was first made. They thought Papago Black-on-red was not produced before 1860. Further, the 1892/1900 end date suggested by these Tucson area deposits may be too early, as Doelle (1983:93) provides evidence that Papago Black-on-red manufacture continued in the Papaguería until the 1920s. Fontana et al. (1962:106) also indicate that most Papago Black-on-red vessel forms were eccentric and beyond the range of traditional Tohono O'odham forms. However, the vessel forms of Papago Black-on-red vessels recovered from the sites listed in Tables 7.50 and 7.51, summarized in Table 7.53, does not support their position: nearly all of the forms fall within the range of serving and storage vessels that they illustrate (Fontana et al. 1962). Doelle (1983:93-95) came to a similar conclusion with regard to the Papago Black-on-red vessels recovered from the Nolic site, AZ AA:13:19 (ASM). However, it should be noted that during the Tucson Presidio occupation, O'odham potters utilized traditional pottery manufacturing techniques to make some nontraditional, black-on-red vessel forms—such as cups and pitchers—which likely met the needs and expectations of the soldiers (and their families) stationed there.

The second-most common decorated type—Papago Red-on-brown—occurs in deposits dating from 1771-1821, 1820s-1830s, 1840-1869, and 1880-1890, suggesting that, at a minimum, it was made from 1821-1880 and, at a maximum, from 1771-1890. Those ranges fall within that proposed by Fontana et al. (1962:103-105, 109): 1700-1930. Papago Red-on-buff, Papago Black-on-buff, and Papago White-on-red occur less frequently. Papago Red-on-buff was documented in deposits dating from 1771-1821 and 1880-1890, Papago Black-on-buff was documented in a deposit dated 1880-1890, and Papago White-

Table 7.52. Temper source and type of Historic Native American pottery exhibiting a folded rim recovered from the sites shown in Tables 7.50 and 7.51.

		Ceramic Type with Folded-over Rim Coil							
Temper Source	Temper Type	Plain Ware	Red Ware	Papago Red	Papago Plain	Papago Black-on-red	Papago Red-on-brown	Papago Red-on-buff	Row Total
Beehive Petrofacies	Sand and grog	43	0	0	0	0	0	0	43
Beehive Petrofacies	Sand	13	0	0	0	0	0	0	13
Beehive Petrofacies	Indeterminate	1	0	0	0	0	0	0	1
Twin Hills Petrofacies	Sand	1	0	0	0	0	0	0	1
Black Mountain or Sierrita petrofacies	Sand and fiber	16	0	7	1	0	0	0	24
Black Mountain or Sierrita petrofacies	Sand	4	0	0	2	0	0	0	6
Black Mountain or Sierrita petrofacies	Sand and grog	1	0	0	0	0	0	0	1
Black Mountain Petrofacies	Sand	3	1	0	0	0	0	0	4
Airport Petrofacies	Sand	10	2	0	0	0	1	0	13
Indeterminate	Sand and grog	10	0	0	0	0	0	0	10
Indeterminate	Sand	4	0	1	0	1	0	1	7
Indeterminate	Sand and fiber	2	0	0	0	0	0	0	2
Indeterminate	>25 percent gneiss/schist and muscovite mica	1	0	0	0	0	0	0	1
Indeterminate	>25 percent phyllite	1	0	0	0	0	0	0	1
Indeterminate	Indeterminate	7	1	0	0	0	0	0	8
Column total		117	4	8	3	1	1	1	135

on-red was documented in a deposit that accumulated from the late 1870s through the early 1890s.

Discussion: Spatial and Temporal Variability in Historic Era Native American Ceramics

Temper Type. Spatial and temporal variability in the temper type of Tohono O'odham pottery is easily summarized from published reports, because nearly every author discusses that aspect of ceramic production. As mentioned above, except the Agua Caliente phase, prehistoric pottery made in the Tucson Basin was rarely tempered with sand and crushed potsherds. This fact leads one to wonder how and why so much of the Historic era pottery came to contain that type of temper. Late prehistoric sherds recovered from sites located in the Phoenix area and Protohistoric period sherds recovered from two sites located in the San Pedro River Valley provide tantalizing clues that suggest one possible answer to this mystery.

Henderson (1995:107) has noted that crushed sherd temper is a distinctly Classic period trait among the Phoenix area Hohokam. Heidke (2005d:Table 7.13) summarized the percentage of sand- and crushed sherd-tempered plain and red ware pottery in the ceramic collections recovered from 11 Phoenix area sites with Classic period components. Three of the sites—Grand Canals, AZ T:12:14 (ASU) and AZ T:12:16 (ASU); Pueblo Blanco, AZ U:9:95 (ASM); and AZ U:9:97 (ASM)—have collections that are temporally mixed with pre-Classic material and were not addressed further. The ceramic collections from the other sites are well-dated and lack evidence of temporal mixing. The median percentage of sand- and sherd-tempered plain ware in those collections is 10.2 (range = 2.0-23.1), while the median percentage of sand- and sherd-tempered red ware in those collections is 29.1 (range = 11.4-73.2). Further, the collection from Pueblo Grande displays monotonic increases over time, from the early Soho phase through the Polvorón phase, in the amount of plain and red ware pottery tempered with sand and crushed sherds.

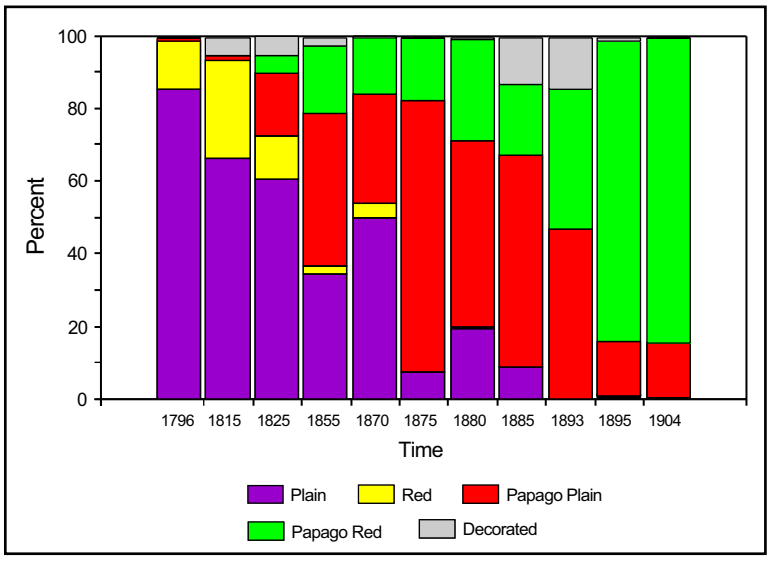

Figure 7.22. Temporal trends in Historic Native American pottery ware abundance. (Data batches are ordered by the midpoints of the feature date ranges reported in Tables 7.50 and 7.51.)

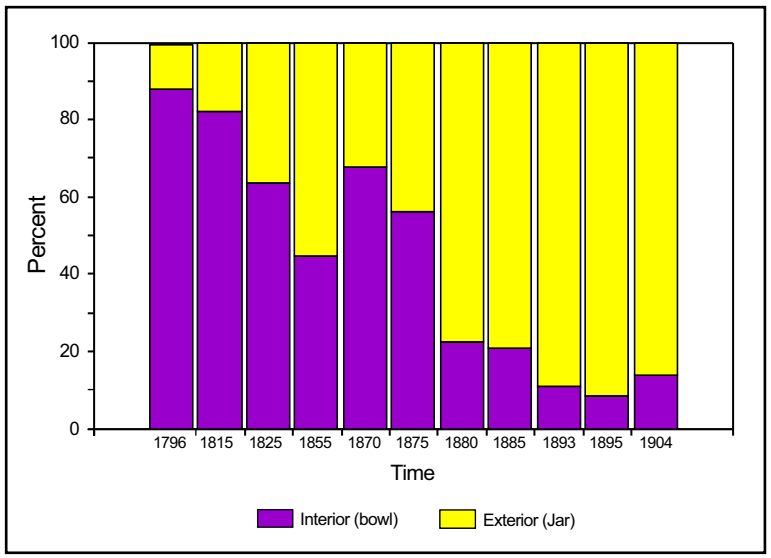

Figure 7.23. Temporal trends in the location of red-slipped surfaces on Historic Native American pottery. (Data batches are ordered by the midpoints of the feature date ranges reported in Tables 7.50 and 7.51.)

Heidke (2005d) also examined the temper type of some Whetstone Plain rim sherds recovered from the Alder Wash Ruin, AZ BB:6:9 (ASM). In the sample of 28 Whetstone Plain sherds examined, 28.6 percent were found to be tempered with a mixture of sand and crushed potsherds. Masse (1980) did not mention that type of temper. However, as with Historic era sherds from the Tucson area, it would have been nearly impossible to identify grog temper in these Whetstone Plain sherds without the aid of a

Table 7.53. Frequency of Papago Black-on-red vessel forms identified in rim sherds and reconstructible vessels recovered from the sites shown in Tables 7.50 and 7.51.

Vessel Form	Quantity
Bowl Forms	
Semi-flare-rim, outcurved	6
Outcurved	4
Semi-flare-rim, hemispherical	2
Incurved	1
Cauldron	1
Indeterminate bowl form	5
Jar Forms	
Tall flare-rim	6
Short flare-rim	1
Pitcher	1
Cup	1
Indeterminate jar form	3
Indeterminate Forms	
Indeterminate flare-rim form	11
Indeterminate form	1
Column Total	43

microscope. The temper type of some Whetstone Plain and Sobaipuri Plain rim sherds recovered from the Presidio de Santa Cruz de Terrenate was also examined at 15x magnification. In the sample of 18 Whetstone Plain sherds examined, 16.6 percent were found to be tempered with a mixture of sand and crushed potsherds. Like Masse, Di Peso (1953) did not mention that type of temper. The presence of sand and crushed sherd temper in Classic period plain and red ware pottery, two collections of Protohistoric period plain ware, and Historic era plain and red ware suggests continuity in this aspect of a technological style (Gosselain 1992) over hundreds of years. In 1762, some 250 Sobaipuris were relocated from the San Pedro River Valley to Tucson (Dobyns 1976:20, 189; Officer 1987:40, 340). Assuming that potters were among them, the local introduction of grog-tempering technology may have occurred at this time, as the earliest San Agustín Mission deposits postdate 1762.

The reason why manure temper was adopted and supplanted the use of sand tempers, or mixtures of sand and grog, is another interesting question. The earliest well-dated deposits containing that temper type were recovered from the Presidio de Santa Cruz de Terrenate, which was occupied from 1775 to 1780 (O'Conor 1952:64-65, cited in Gerald 1968:18). Di Peso (1953:148) reported that 94 percent of the plain ware recovered from the site was Sobaipuri Plain tempered with sand and "some vegetable matter" (Di Peso 1953:149). Waugh (1995:23) reported that 72 percent of the plain ware recovered from excavation units placed in the site's eastern midden were tempered with "a mixture of sand and organic inclusions." Those percentage values are much higher than either the roughly contemporary San Agustín Mission deposits (1.4 percent; see Table 7.50), or the earliest Tucson Presidio, León farmstead, and Carrillo household deposits. Interestingly, the actual abundance of organic temper in the paste of Sobaipuri Plain rim sherds from the Presidio de Santa Cruz de Terrenate seemed to be less than that usually observed in nineteenth century Papago Plain and Papago Red specimens from the Tucson Basin.

Whittlesey (1997) examined a small sample of pottery recovered from the Tohono O'odham village of Batki, AZ Z:16:6 (ASM), located in the Papaguería. Haury (1975) thought that village was destroyed by Apache raiders around 1850; none of the 11 vessels Whittlesey (1997:459) examined displayed organic temper casts. Rancho Punta de Agua, AZ BB:13:18 (ASM), located on the San Xavier District of the Tohono O'odham Reservation, was occupied only a few years later, between 1857 and 1877, by a German immigrant and his Mexican wife, and later, by a Mexican family (McGuire 1979). Nearly all the Tohono O'odham pottery recovered from that site—92.8 percent—contained casts of organic temper in the fired paste (McGuire 1979:Table 1).

Compared with contemporary deposits recovered from sites located in the Tucson area, the percentage of sand and fiber-tempered pottery in the Batki collection is low, while the percentage in the Rancho Punta de Agua collection is high. Whittlesey (1997:462) summarized the evidence regarding the first occurrence and adoption of fibrous, organic (manure) temper in this way: its first use was likely a Spanish-inspired innovation, the practice was most common in acculturated Tohono O'odham settlements, and the custom did not become widespread until the late nineteenth century. All the evidence reviewed here supports her conclusions.

Folded Rim Coils. The origins of the rim coil attribute are even less clear than those of crushed sherd temper. Masse (1977:22, Figure 9b) reports the presence of a plain ware jar with a rim coil in a late Classic period Hohokam context at Las Colinas, AZ T:12:10 (ASM). Further, numerous late Classic period sites located along the San Pedro River—such as Curtis, AZ BB:11:100 (ASM); Reeve, AZ BB:11:26 (ASM); Elliott, AZ BB:11:27 (ASM); and Davis Ranch, AZ BB:11:36 (ASM)—have yielded plain ware pottery with folded rim coils in association with Gila Polychrome ceramics (Patrick Lyons, personal communication 2003). Some Protohistoric Whetstone Plain sherds recovered from sites located in the same general area display the narrower folded bead rim (Di Peso 1953; Masse 1980), and three vessels with

wider, folded rim coils were observed by the author during an inspection of 28 rim sherds recovered from the Alder Wash Ruin. Later still, folded rim coils are common on Sobaipuri Plain vessels recovered from the Presidio de Santa Cruz de Terrenate (circa 1775-1780).

The presence of folded rim coils in late Classic period plain ware, Protohistoric period Whetstone Plain ware, and Historic era pottery suggests this may also be an aspect of technological style that continued from late prehistory into the Historic era. However, other archaeologists think that folded rims were introduced into southern Arizona twice: once during the Classic period (by immigrants from the north) and again during the Historic era via the Spanish and/or Yumans (Patrick Lyons, personal communication 2003). Regardless of how or when this morphological characteristic originally came to be adopted, it is clear that after 1880, it is relatively rare throughout the region (Haury 1975:351; McGuire 1979:24).

SUMMARY

Analysis of the Native American pottery recovered from six archaeological sites revealed that Tucson's eighteenth and nineteenth century Spanish, Mexican, and American residents made extensive use of storage, cooking, and serving vessels produced by O'odham potters. A change over time in production locale—from predominantly volcanic sand temper resource areas to predominantly granitic ones—was documented, which likely reflects the establishment of the San Xavier District of the Tohono O'odham Reservation in 1874 (see also Thiel and Faught 1995:202, 212). The arrival of the railroad in 1880 is also reflected in the data. The average number of Native American vessels recovered per archaeological deposit declines rapidly after that time, as Euro-American pottery replaced locally made O'odham vessels. Further, vessel form and slip location data suggest that most O'odham pots sold after 1880 were water storage jars. From 1883 through the 1940s, the need for water storage jars declined markedly as the municipal water supply became available throughout the study area.

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