TWO AND A HALF CENTURIES OF POTTERY MOUND: NEW CHRONOLOGICAL EVIDENCE

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TABLE OF CONTENTS

Page

TABLE OF CONTENTS, *continued*

Page

FIGURES

FIGURES, *continued*

Page

TABLES

PREFACE AND ACKNOWLEDGMENTS

Under the direction of Isleta Pueblo Cultural and Historic Preservation Department, Pottery Mound is undergoing new interdisciplinary scientific research as well as stabilization. The current examination of the site's stratigraphic and depositional history will undoubtedly reveal new details of the depth of the ceramic history of Pottery Mound. Another goal of the ongoing investigations is to obtain more radiocarbon dates from the site. Michael Marshall and his colleagues already have gathered a considerable amount of new data that will provide a more accurate picture of an extraordinary community, which was a center of commerce and a true art colony.

I sincerely appreciate the Pueblo of Isleta's encouragement of continuing research at Pottery Mound and the opportunity provided by the Pueblo to continue the Annex ceramic analysis described in this report. Isleta's Historic Preservation Department (Daniel Waseta, Director, and Henry Walt, Tribal Historic Preservation Officer) and archaeologists Michael Marshall and Michael Bletzer are to be commended for their continuing efforts to preserve and interpret this important site. I especially value the longstanding friendship, encouragement, and archaeological expertise of my colleague Michael Marshall. Our collaboration both in the field and the lab has been interesting and productive. Thanks also to the Maxwell Museum of Anthropology, University of New Mexico. The Museum's stewardship of Pottery Mound over a number of years—an effort led by Dave Phillips, then the curator of archaeology—contributed to its preservation and interpretation. My association with Dave, during many trips to the site for site mapping and monitoring, has been very rewarding. His service as editor of the museum's Technical Series has resulted in more than 30 papers by a variety of authors, all available online. Thanks also to Diane Tyink and Karen Price of the Maxwell Museum staff. I also owe thanks to many individuals whose archaeological contributions and friendship are greatly appreciated, among them Karen Armstrong, Jean Ballagh, Steve Rospopo, Kari Schleher, Lou Schuyler, and David Snow.

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Chapter 1

INTRODUCTION

Pottery Mound (LA 416), west of Los Lunas, New Mexico, is one of the best known and most studied prehistoric Pueblo ruins of the Middle Rio Grande Region. Occupied during the Classic Period, the site began about A.D. 1300 or slightly later and lasted until at least 1550 (all dates herein are A.D.). This is not the date range usually assigned to the site; based on the dominant decorated ceramics, plus a few dates, in years past Pottery Mound was assigned only to the Glaze A horizon—about 1350 to 1450. The near-lack of absolute dates combined with a misunderstanding of the local pottery sequence to contribute to the chronological confusion. This report applies new ceramic and other dating evidence to show that the occupation of Pottery Mound lasted much longer than many believed.

My collaboration with Michael Marshall of the Isleta Pueblo Historic Preservation Division and David Phillips of the Maxwell Museum of Anthropology, University of New Mexico, has been most valuable in this project. Research at the site continues and will certainly reveal additional insights; the data in this paper are current as of November 2017.

The Significance of Pottery Mound

Renown for its striking kiva murals and finely made ceramics, Pottery Mound sits on the banks of the Rio Puerco of central New Mexico. This paper focuses on the ceramics, which have been extensively studied because of the variety of pottery types, their artistic quality, and evidence of extensive long-distance exchange.

A visitor to the site today might be puzzled about its notoriety, however. The first impression is of eroding low mounds perched on a rapidly eroding bluff, about 10 m above the incised floodplain of the Rio Puerco. The present mounds are partly melted adobe, but also backdirt—including from the misuse of heavy equipment in past. It is difficult to be aware of the site's many kivas and other rooms, possibly five hundred in all, and an unknown number of them have washed away over the centuries.

Most large Classic Period pueblos of the region were built along the Rio Grande (Marshall and Walt 1984); Pottery Mound is removed from the main cluster of villages, in what seems like an odd place for an important village. It was nevertheless strategically positioned between the Rio Grande pueblos to the east and the prehistoric centers of the Acoma-Zuni district to the west. Even farther west along this axis of travel were the Hopi mesas and contemporary large villages of the middle Little Colorado River. Pottery Mound's populace was in a prime location to send and receive many kinds of trade goods among the Pueblos. Furthermore, as a nexus for travel in central New Mexico, Pottery Mound must have received many visitors from distant towns. We can imagine a diverse population of permanent and temporary residents speaking Keres, Tiwa, Piro, Zuni, and Hopi dialects.

Excavation of portions of the site, over many years, revealed the existence of several major room blocks and different styles of kivas. Many of the kiva walls were repeatedly plastered and carefully painted, depicted ritual scenes and elaborate textile designs. While the murals became the focus of Frank Hibben's work at the site (Hibben 1975), Pottery Mound was noteworthy for other reasons. Goods from distant places included pottery, marine shell jewelry, at least one copper bell, and possibly a macaw.

Pottery Mound was a center of pottery production during Classic period, matching the creativity of the better-known murals. The local potters produced some of the finest wares in the prehistoric Southwest. Michael Marshall likes to describe Pottery Mound was an "art colony," reflecting the artistic creativity expressed at the site. Whatever its exact role, Pottery Mound was not an ordinary late prehistoric Pueblo village.

Chapter 2

THE RESEARCH CONTEXT

In the Southwest as elsewhere, using ceramics to make inference about time and space requires accurate identification of samples according to standard classification systems. Building on a hundred years or so years of effort, regional pottery "types" are based on consistent uses of clays, tempers, surface decorations, and firing techniques. This approach has yielded an excellent understanding of the technical and stylistic variations typical of given areas and periods. Another frequently used classificatory concept, "ware" (a group of types, usually sharing a basic manufacturing approach), represents larger slices of time and often larger areas of origin, and presumably multiple communities of potters. Less frequently, "varieties" are defined within types, usually on minor stylistic or technological variations; presumably, that variation occurred at the village level or lower and represented the work of communities of potters or even lineages of potters. Identification of interacting groups of potters has been one of the goals of current ceramic analyses (Cordell and Habicht-Mauche 2012).

All of the pottery types identified on this project have been identified and described elsewhere (e.g., Ellis 1936). The original definitions of Rio Grande Glaze Ware were proposed by A. V. Kidder and Anna O. Shepard (1936), based on Kidder's stratigraphic excavations at Pecos Pueblo. Shepard was a pioneer in the systematic study of pottery typology and technology (Shepard 1963), and her work on Rio Grande Glaze Ware temper types (Shepard 1942) set an example that has been followed in the Southwest ever since. In the 1930s a third pioneer, Harry Mera, visited many prehistoric sites in New Mexico, and established a temporal sequence of types which later was mostly confirmed by stratigraphic excavations and absolute dates. His publications (especially Mera 1933, 1940) continue to be important references, and many of the type names he assigned are still in use today. In later studies Mera also astutely classified the matte paint black-on-white wares of the northern and middle Rio Grande regions (or "districts").

Subsequent research revealed the geographical expanse and time depth of the Rio Grande Glaze Wares. As the name implies, vessels of this tradition were made and used in the Rio Grande Valley from Cochiti south to San Marcial. It was also made east of that valley, in the a broad area encompassing Santa Fe, the Galisteo Basin, Pecos Pueblo, and the Salinas Basin. The ware was also made and used in the Rio Puerco Valley to the west, at Pottery Mound and Hummingbird Pueblos. Faced with a mass of data, archaeologists convened several Ceramic Seminars in the 1960s to compare notes and standardize typology. The eighth, in 1966, expanded on Mera's work by adding types and varieties. Honea's (1966) compilation of the results of the seminar remains the foundation for studies of Rio Grande Glaze Ware. Of course, researchers continue to refine our knowledge of the tradition and types (e.g., Snow 1982). As appreciation of local variability grows—along with the sense that the local variations provide social insights—investigations continue to refine the descriptions and dating of glaze wares.

I will now provide a brief overview of the Rio Grand Glaze Ware sequence, since it is the tradition followed by Pottery Mound potters when making decorated vessels. Site-specific type descriptions include those by Charles Voll (1961), Suzanne Eckert (2003, 2008), and myself

(Franklin 2007). For more general references, please see Dyer (2008), Oppelt (2007), and Wilson (2007). A good online resource is the OAS Ceramic Typology Project (Wilson 2008–2017). Descriptions of the regional sites include Morales (1997) and Marshall and Walt (1984).

Rio Grande Glaze Ware

Rio Grande Glaze Ware was made over much of central New Mexico, from roughly 1300 to 1700. During this four century production run, finer temporal distinctions are mostly based on the shapes of bowl rims. Just as modern fads are widespread but brief, potters altered glaze ware bowl rim forms over surprisingly broad areas and with some regularity. Trade and other contact among the region's potters must have been almost continuous for these faddish, non-functional changes to have occurred so synchronously. This understanding of the regional tradition has not changed despite our increasing recognition of local diversity (e.g., Cordell and Habicht-Mauche 2012; Snow and Franklin 2015).

Figure 1 shows Mera's (1933) view of the bowl rim progression in Rio Grande Glaze Ware. The right column shows the sequence developed by Kidder and Shepard, while the left column shows his similar but not identical sequence based primarily on the Santa Fe area and Galisteo Basin. However, there was also a middle column, showing "borrowed" rim shapes. The lowest of these shapes was indeed borrowed—it represents a Spanish soup plate—but the others were indigenous forms that were showing up outside the two areas where the series were defined—primarily to the south, in the Albuquerque area and beyond. Apparently, Mera already recognized the existence of "variations on a theme," thanks to potters resident in certain districts or sub-areas. Subsequent work has added to the number of rim profile variations. For example, Figure 2 illustrates rim shapes in a space and time, as diagrammed by McKenna and Miles in 1991.

Table 1 summarizes the major changes in Rio Grande pottery production and use, starting before the regional production of glaze ware. About 1300, local communities evolved from importing White Mountain Red Ware (especially St. Johns Polychrome and Heshotauthla Polychrome) to creating look-alikes (Arenal and Los Padillas Glaze Polychrome). The imitative nature of the first Rio Grande Glaze Ware was recognized by the 1966 Ceramic Conference (Honea 1966). The major Glaze A type, Agua Fria Glaze-on-red, was soon in production, and it persisted for many generations. On Glaze A bowls, rims were straight and lips rounded. Black mineral paint included galena and had a shiny black quality. The red-slipped surfaces were carefully polished and the painted lines were carefully drawn. In terms of numbers made, this remained the most popular type until 1500.

Manipulation of bowl rim forms began about 1425. Glaze B bowls had thickened and then bulbous lips on bowls. The variety of design schemes increased. Bichrome vessels featured black glaze paint over red, white, and yellow slips. By adding red elements outlined with black glaze paint, the potters used those same slip backgrounds to create a polychrome styles.

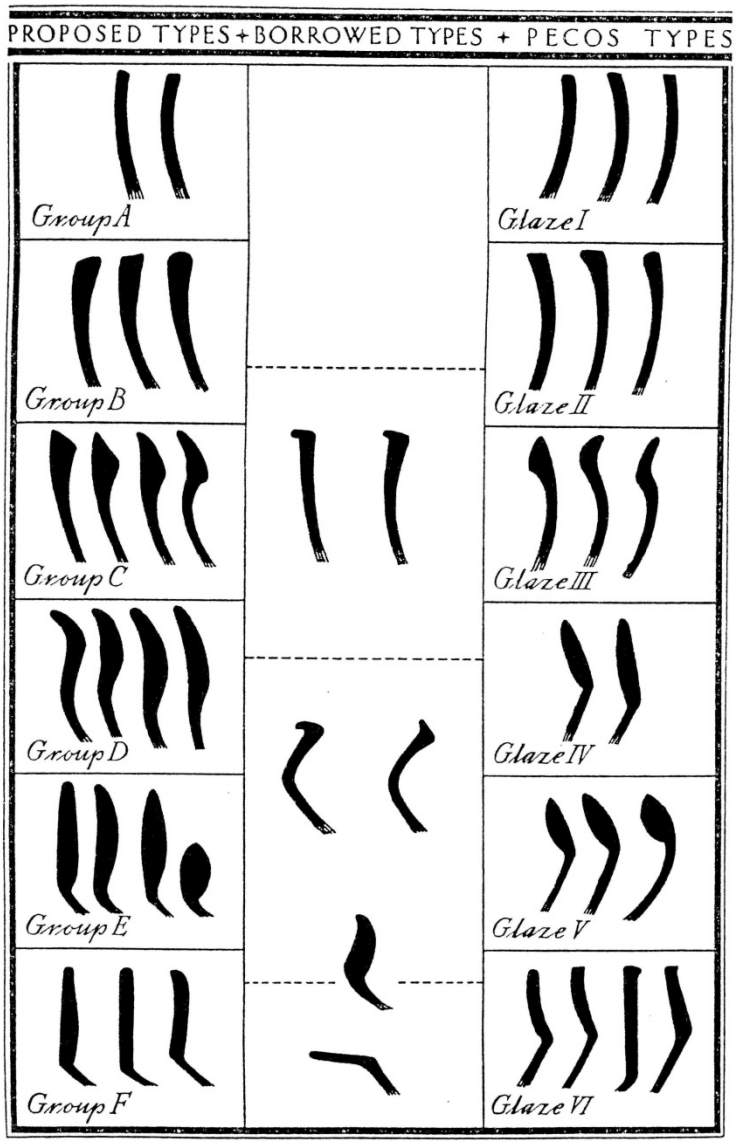


Figure 1. Mera's proposed glaze ware rim sequence. Source: Mera 1933.

By about 1450, further experimentation with bowl rims led to a wide variety of lip-rim profiles, referred to as Glaze C. At least some of this rim/lip variability appears to be geographical. S-shaped rims are typical on Espinoso Glaze Polychrome bowls of the Galisteo Basin and Tonque Pueblo area. Farther south, Glaze C rims have a beveled lip with, in profile, an exterior "tang" (Figure 1, center, and Figure 2). This lip is typical of Kuaua Glaze Polychrome, which occurs at Middle Rio Grande pueblos including Pottery Mound. My ongoing studies at Kuaua (LA 187) show that the "Kuaua rim" is very common there, so the name applied by Mera (1933) is appropriate. The Kuaua rim often occurs on bowls that curve in at the rim, sometimes strongly so. Such bowls may not include painted decoration on the interior, as the curved exterior surface is the primary field of view and received the painter's attention.

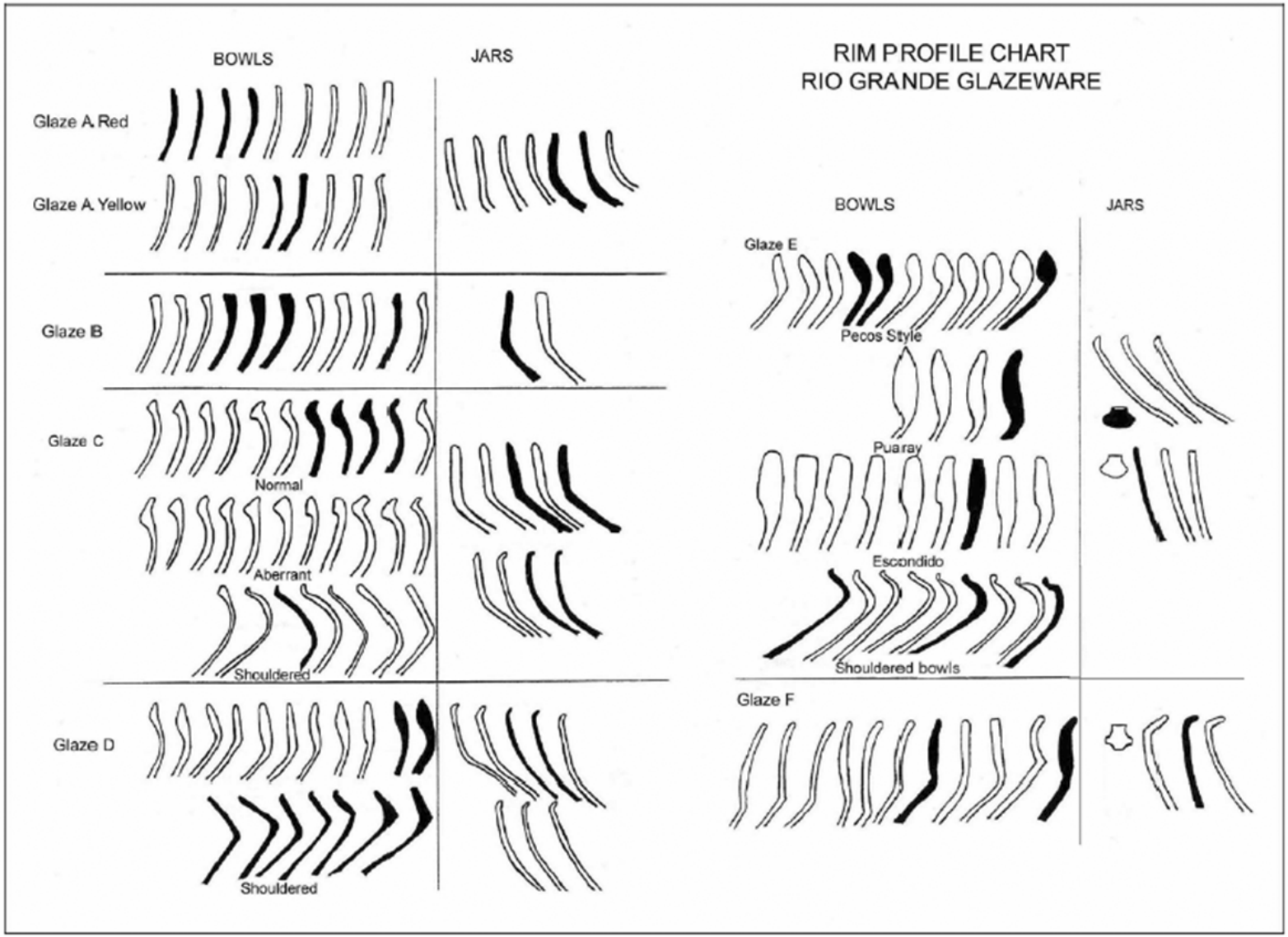


Figure 2. McKenna and Miles' rim profile chart for Rio Grande Glaze Ware. Source: McKenna and Miles (1991).

Table 1. Dates for Pottery Types of the Middle Rio Grande Region.
(Adapted from Franklin 2007, Honea 1966, Mera 1933, Oppelt 2007, and Wilson 2007. Some types are not precisely dated, and regional variation exists.)

Type	Date Range
Modern Matte Paint Types	1700–present
Classic Period	
Glaze F:	
Kotyiti Glaze Polychrome	1650–1700
Kotyiti Glaze-on-yellow	1650–1700
Kotyiti Glaze-on-red	1650–1700
Trenaquel Glaze Polychrome	1650–1700?
Glaze E:	
Puaray Glaze Polychrome	1525–1650
Tiguex Glaze Polychrome	1525–1600?
Glaze D:	
San Lazaro Glaze Polychrome	1475–1525+
Glaze C:	
Kuaua Glaze Polychrome	1450–1500?
Espinoso Glaze Polychrome	1450–1500
Glaze B:	
Largo Glaze Polychrome	1425–1450
Largo Glaze-on-red	1425–1450
Largo Glaze-on-yellow	1425–1450
Glaze A:	
Pottery Mound Glaze Polychrome	1400–1490?
San Clemente Glaze Polychrome	1315–1425
Cieneguilla Glaze-on-yellow	1325–1425
Agua Fria Glaze-on-red	1315–1450 (or to 1500?)
Arenal Glaze Polychrome	1315–1350?
Los Padillas Glaze Polychrome	1300–1325?
Coalition Period	
Galisteo Black-on-white	1300–1400
Wiyo Black-on-white	1300–1400
Santa Fe Black-on-white	1200–1350
Socorro Black-on-white	1050-1300

Production of straight (Glaze A) rims continued after the introduction of newer rim styles (Glaze B and C). This parallel production (or at least continued use) of Glaze A forms in Glaze B and C times has been verified at several villages, including Pottery Mound (Franklin 2007). Glaze A, B, and C rim forms all continued until about 1490 or 1500. The region's potters then broke with the earlier traditions regarding rim shapes and painted designs. As Glaze D evolved in the early 1500s, creative manipulation of rim forms and slip/paint combinations disappeared. Instead, ceramic production became much more uniform. This change is reflected in the fact that at least eight types of Rio Grande Glaze Ware were named for the Glaze A–C period, but only one standard type each (with minor local variants) for periods D and E.

Glaze D bowl rims became longer and thicker (Figure 2). With time, this resulted in a noticeable angle between the long rim and the lower body, sometimes called a carina. The standard Glaze D type is San Lazaro Glaze Polychrome. Design approaches narrowed down to repeated red frets outlined by black glaze paint over buff, yellow, or orange slips. Also, the painted lines became less precise and the glaze paint began to sag during firing. On the plus side, many vessels continued to be brightly colored.

At about 1525–1530, Glaze E evolved from Glaze D, incorporating even longer and thicker bowl rims. The standard Glaze E type is Puaray Glaze Polychrome. The layout of painted designs did not change markedly, but colors became duller. Glaze D and E pottery found at Pottery Mound is consistent with the standard definitions for the types.

Appearing after about 1600, Glaze F is characterized by increasingly "sloppy" designs with runny and discolored glaze paint. Bichrome (glaze-on-red or glaze-on-yellow) designs again became common, as opposed to the previous emphasis on polychrome designs. The "decline and fall" of the glaze ware tradition has been subject of much discussion, and various causes have been proposed for its decline and end. In any case, the glaze ware sequence at Pottery Mound ends with Glaze E, before the end of the tradition itself.

Previous Archaeological Studies

This short review of some of archaeological work at Pottery Mound emphasizes site chronology.

In 1883, Adolf Bandelier stopped at the ruins now known as Pottery Mound. He could see that the "walls are still visible." His journal continues: "There is a remarkably brilliant display of pottery on the surface; glossy, and much more varied and handsome colors, for instance, a crimson chocolate-brown, a cream-yellow. The designs also are better executed, and the pottery is much better and thinner. All appears new. Fragments of metates, manos, and much obsidian in very large pieces. I never saw such a number of handsome fragments of pottery and of obsidian as here" (Lange and Riley 1970:26).

Decades later, in the course of his visits to Puebloan sites throughout New Mexico, H. P. Mera visited Pottery Mound and carried away a grab sample of 180 sherds. He observed that the "duration of occupation ... covered a span from A to E" (Mera 1940:18). In 2007, David Snow and Linda Cordell tallied his sherd collection from Pottery Mound, now at the Museum of New Mexico; their counts are included in Appendix A. The tally shows that Mera was correct about the length of the glaze ware period occupation of the site. Sherds with typical Glaze A rims and painted designs are present as expected. However, some sherds have Glaze A painted designs (Agua Fria Glaze-on-red, San Clemente Glaze Polychrome, Pottery Mound Glaze Polychrome) but B and C rims. Mera's grab sample also includes examples of typical Glaze B and C sherds, along with numerous bowl rims of San Lazaro (Glaze D) and Puaray (Glaze E) Glaze Polychrome. Intrusive types include Kechipawan and Kwakina Polychrome. We do not know what sections of the site Mera included in his grab sample but given our new information on the "Annex" area (see below), part of the collection may have been obtained there.

Excavations at Pottery Mound began in earnest in 1954, when University of New Mexico students took part in a field school directed by Frank C. Hibben. He also directed field schools in 1955, 1957, and 1958, led a research project funded by the National Science Foundation in 1960–1961, and afterwards led "salvage" digs, conducted by volunteers, as late as the 1980s (Hibben 1955, 1960, 1975, 1987). Hibben's efforts made it clear that Pottery Mound was a Classic (Pueblo IV) period site, dating mainly to the early part of that period when glaze ware pottery came into fashion and large villages became the norm. However, the exact dates for the site remained unclear. uncertain, due to the lack of absolute dates and Hibben's uncritical interpretation of the Rio Grande Glaze Ware sequence.

Samples of wood collected were collected for dating, but most proved to be juniper and cottonwood. According to Hibben (1975:10), four reliable tree-ring dates were obtained from the site:

> Kiva 6, pine, V 1411
> Kiva 6, pine, V 1427
> Trash near Kiva 10, pinyon, V 1418
> Trash in fill, piñon, V 1381

"V" dates are for specimens that lack outer rings, but presumably are close to cutting dates. Together, the four reported dates from Pottery Mound range from 1381 to 1427, a span of only 46 years. They suggest an occupation squarely in Glaze A times (generally taken to be 1300 to 1425). Hibben (1987) also reported an archaeomagnetic date from the "Shaman's Room,, run by Robert Dubois, of 1400 ± 33. Again, the date falls into the Glaze A period, consistent with the associated pottery.

Hibben's four tree-ring dates and archaeomagnetic date are unsupported in the surviving documents for the site, so perhaps should be taken with a grain of salt. Here, my concern is with Hibben's perceptions of the age of the site. Based on the dates he reported, occupation during the early 1400s was a given, but how much earlier or later did the occupation extend? Hibben settled on a span of 175 year, from 1300 to 1475, or "Glaze I" (Hibben 1975:2). In other words, Hibben's age estimate was based on more than the absolute dates he reported, and presumably considered the ceramic evidence as well.

Based on the presence of a small number of black-on-white sherds at Pottery Mound, Hibben suspected that a pre-glaze ware site component might be present beneath the main occupation. The recent work done on behalf of Isleta Pueblo suggests that this was the case. Such a component could date to the very early 1300s, however, so Hibben's guess as to when the site started may be accurate. Hibben's end date of 1475 would take the site into Glaze C times, and Glaze C bowl rims can be found among the sherds littering the main part of the site. In hindsight, however, Hibben's end date was too conservative. Although he recognized that the glaze ware sequence extended until at least 1600 in other areas, Hibben (1975:2) stated that "Pottery Mound, on the other hand, lies almost entirely within the Glaze I period." Furthermore, "The site of Pottery Mound seems to have terminated well before Glaze III times, or about AD. 1475" (Hibben 1975:2).

Hibben's use of Roman numerals shows his allegiance to the terminology developed by Kidder and Shepard at Pecos. That site is much farther from Pottery Mound than the areas Mera used to develop his own approach, and Hibben's decision to use the Kidder and Shepard scheme rather than the Mera scheme is a questionable one. The effect on his view of site chronology is obvious: Hibben thought in terms of a single glaze ware period (Glaze dating between 1300 and 1475, even though it was possible to speak of three different periods over much the same time: Glaze A from 1300 to 1425, Glaze B from 1425 to 1450, and Glaze C from 1450 to 1500 (Table 1).

Because of this mind set and the lack of absolute dates, it is not surprising that Hibben viewed the site as having the time span it did. This bias may have carried over to his ceramic counts, which were newly tallied by Curtis Schaafsma (2007). Those counts do not mention any glaze types later than A. However, Glaze B and C rims are not uncommon across the main ruin at Pottery Mound (Franklin 2007; Voll 1961). In any case, Hibben was probably more interested in using Pottery Mound to enhance his reputation (first through its kiva murals, then through claims for Mesoamerican attributes including a platform mound and ball court) than in building a detailed site chronology. Hibben's view of a single period of occupation came to affect the work done by many University of New Mexico students, who nonetheless succeeded in producing highly useful results.

The first major study of the ceramic assemblages was undertaken by Charles Voll, who completed his M.A. thesis in 1961. This careful study includes excellent descriptions of all the major local and imported types. His counts of decorated pottery are dominated by the established Glaze A types, Agua Fria Glaze-on-red and San Clemente and Pottery Mound Polychrome. However, Voll also recorded a fair number of sherds with Glaze B and C rim forms, despite being from bowls whose painted style was Glaze A. Voll specifically recognized the presence of "Kuaua" rims (sharply angled lips on incurved rims) and understood that they dated to Glaze C times (as had Mera). "The characteristic Group C rim form appeared fairly frequently on bowls which would normally be typed as Group A" (Voll 1961:51) Voll solution was to name several "hybrids" to handle his seemingly anomalous sherds.

Voll also recorded a few sherds of intrusive Espinoso Glaze Polychrome, confirming that the occupation continued into Glaze C times. He also stated that "some Espinosa was locally-made" (Voll 1961:38). Voll's astute analysis did not reveal any later types in his collections from the main part of the site: "No Group D, E, or F sherds or European glaze wares occurred" (Voll 1961:40). Of course, Voll was not aware of the Glaze D and E pottery later recovered from the Annex area (see below), nor did he or anyone else think to look for the Mera grab sample gathering dust in Santa Fe. Based on his work, Voll gave a date range of AD 1325–1350 to 1450–1490 (Voll 1961:53), and he was convinced that Pottery Mound was abandoned sometime during the Glaze C period.

In 1979, Linda Cordell assigned part of her field school crew to field studies at Pottery Mound. At the time, Frank Hibben was leading crews of untrained volunteers in "salvage" digs at the site and UNM's Anthropology Department vainly hoped that providing an example, they might induce the volunteers to adopt a more systematic field approach (L. Cordell, personal communication to D. Phillips, ca. 1995). The demonstration project did provide an opportunity to obtain information about the site that was not controlled by Hibben. The field school efforts at

the site included a site map, surface collections and, most important, a stratigraphic test in the site's north midden. The test measured 5 by 5 m and was excavated in 20 cm levels; 17 levels were completed in one quadrant and 15 levels in the opposite quadrant, until the students reached essentially sterile soil (Cordell 1980a:4; Cordell et al. 2008). The Cordell test continues to provide the only surviving systematic excavation sample from the site's middens. Hibben had obtained a very few stratigraphic samples from the site, but discarded those sherds (and many others) once they were tallied.

Cordell's preliminary report listed 24,321 sherds; about 49 percent of the sherds were utility ware and another 49 percent were Glaze A (including Agua Fria Glaze-on-red, Cieneguilla Glaze-on-yellow, and San Clemente and Los Padillas Glaze Polychrome). The remaining 2 percent of the sherds consisted of Pottery Mound Glaze Polychrome, small amounts of Jeddito and Sikyatki Yellow Ware from the Hopi area, Acoma-Zuni area glaze wares, and Galisteo Black-on-white (Cordell 1980a:7). In sum, the initial analysis from the 1979 test again indicated that Glaze A types dominated the painted ware. However, this tally might be considered a preliminary sorting, as it did not record bowl rim forms. Suzanne Eckert later used part of the sample from the Cordell's 1979 test for her dissertation research (Eckert 2003), which was later published (Eckert 2008). Eckert described the many variations in painted ceramic decoration and explored their regional and social implications.

In 2004, Polly Schaafsma brought scholars to the School of Advanced Research to discuss Pottery Mound and its implications for Southwestern archaeology. Three years later, her edited volume based on those meetings was published (P. Schaafsma 2007). The meetings and volume brought together much of the thinking about Pottery Mound from the Hibben era and succeeding years. Several of the participants had been students at the UNM field school, and all were influenced in one form or another by Hibben's views of the site's history. Other sources of ideas about the site included the kiva mural studies by Brody (1964) and Crotty (1995). In terms of chronology, views of the site continued to focus on a single occupation in Glaze A times.

One contributor to the compendium, Curtis Schaafsma (2007), compiled ceramic counts from Voll's (1961) M.A. thesis, Cordell's (1980a) tally of the1979 test, and Frank Hibben's (1987) late excavations at the Duck and the Big Man Units. Schaafsma characterized Voll's sample as almost entirely Glaze A, with a small percentage of intrusive Espinoso Glaze Polychrome (Glaze C) (C. Schaafsma 2007:277). Although this is correct, Voll had gone further, observing the existence of many B and C style rims among the sherds with Glaze A painted designs (as I mention above). Also, Shaafsma concluded that the evidence indicated a strictly Glaze A occupation with an estimated date rage of 1370–1450 (C. Schaafsma 2007:285), contrasting with Voll's estimate of 1325–1490.

In 2003, the Maxwell Museum of Anthropology began recovering and reorganizing collections and excavation records from the late Frank Hibben's emeritus lab, and undertook a field monitoring program at Pottery Mound—in part, to better understand the existing collections and records. Many of the reports on this work have appeared in the museum's online Technical Series. Jean Ballagh laboriously converted student notebooks from the Hibben years into descriptive reports on the 1954, 1995, and 1957 field schools (Ballagh 2011; Ballagh and Phillips, 2006, 2008). As a byproduct of this effort, Ballagh and Phillips (2014) describe

ceremonial rooms at the site. Recently, Lou Schuyler (2016) described the ornaments at Pottery Mound, complementing her earlier study of jewelry from Tijeras Pueblo (Schuyler 2011). She has also compiled a general guide to the excavations at the site (Schuyler et al. 2013).

In 2006 I undertook a reanalysis of the sherds from Cordell's 1979 test (Franklin 2007). While Eckert (2003, 2008) had used a large sample from that unit, the subsequent reorganization of the Pottery Mound collections made it possible for me to find and analyze all of the pottery from the test. At about the same time, the original profiles of the 1979 stratigraphic test were located (and later published; see Cordell et al. 2008). My analysis sought to extract the maximum amount of information about the wares, types, and varieties present. I paid particular attention to bowl rim forms and how they varied in practice, as opposed to as how those forms are expected to behave according to the named pottery types. Also, I checked the paste and temper of every sherd. I also documented ceramic raw materials and technology (Franklin 2010b).

The resulting type counts (Franklin 2007) showed the same mix of local and imported pottery types in the test pit as was known from the rest of the site. They also indicated a continuous ceramic sequence beginning about 1325 and lasting to 1500. The continuity of the sequence was indicated by two kinds of data: dates assigned to non-local pottery found at the site, and changes in locally made glaze ware vessel rims.

Imported ceramics found in small quantities, but securely dated elsewhere in the Southwest, suggest trade with (and therefore occupation of) Pottery Mound from 1300 to about 1500. Collectively, the end dates for the imported types fall near or slightly beyond 1500 (Table 2).

Based on the 1979 test, the glaze ware pottery made in abundance at Pottery Mound also show both occupational continuity and stylistic change. Here I will discuss rims and decorative types in turn, reflecting my sense that the two analytical categories are largely cross-cutting (Figure 3). Glaze A (straight) rims were abundant throughout the strata. Glaze B (bulbous) and C (usually "Kuaua," sometimes S-shaped) rims increased through time. "Kuaua" Glaze C and D rims occurred only in the upper levels of the test (Levels 1–6). Glaze B rims, never dominant, peaked in the middle levels. As a group, Glaze C rims were most common in Level 3; the 138 "Kuaua" style rims did not occur below Level 10, with a "steady increase after that, peaking in Level 2" (Franklin 2007:75). Glaze D rims were rare throughout the upper levels where they occurred.

Although all of the locally utilized decorative styles occurred through most of the stratigraphic sequence, Agua Fria Glaze-on-red declined in popularity as San Clemente and Pottery Mound Polychrome became more popular (Franklin 2007:67). Levels 6 and above contained all of the Kuaua and San Lazaro Glaze Polychrome, along with much of the Pottery Mound Glaze Polychrome, all of the Chupadero Black-on-white, and almost all of the Biscuit B (Bandelier Black-on-white) pottery (Franklin 2007:71). The time span for the strata sampled the 1979 test was from before 1350 to about 1500 (Franklin 2007:73).

When the two approaches are combined, we see B and C rims becoming more common as painted designs shift from Agua Fria to Cieneguilla to San Clemente to Pottery Mound. Fully 40 percent of the Pottery Mound Glaze Polychrome rims are Glaze C in form (Figure 3; see Franklin 2007:84).

Table 2. Dates for Imported Pottery Types.
(Based on Oppelt [2007]; Wilson et al. [2008–2017]).

Type	Date Range (A.D.)
Chupadero Black-on-white	1050–1550
Biscuit A (Abiquiu Black-on-white)	1375–1450
Biscuit B (Bandelier Black-on-white)	1425–1550
Sankawi Black-on-cream	1500–1650
St. Johns Polychrome	1200–1300
Heshotauthla Polychrome	1275–1400
Kwakina Polychrome	1285–1380
Pinnawa Glaze-on-white	1350–1450
Kechipawan Polychrome	1375–1475
Jeddito Black-on-Yellow	1350–1450
Sikyatki Polychrome	1400–1625
Kuaua Glaze Polychrome	1425–1525
San Lazaro Glaze Polychrome	1470–1525

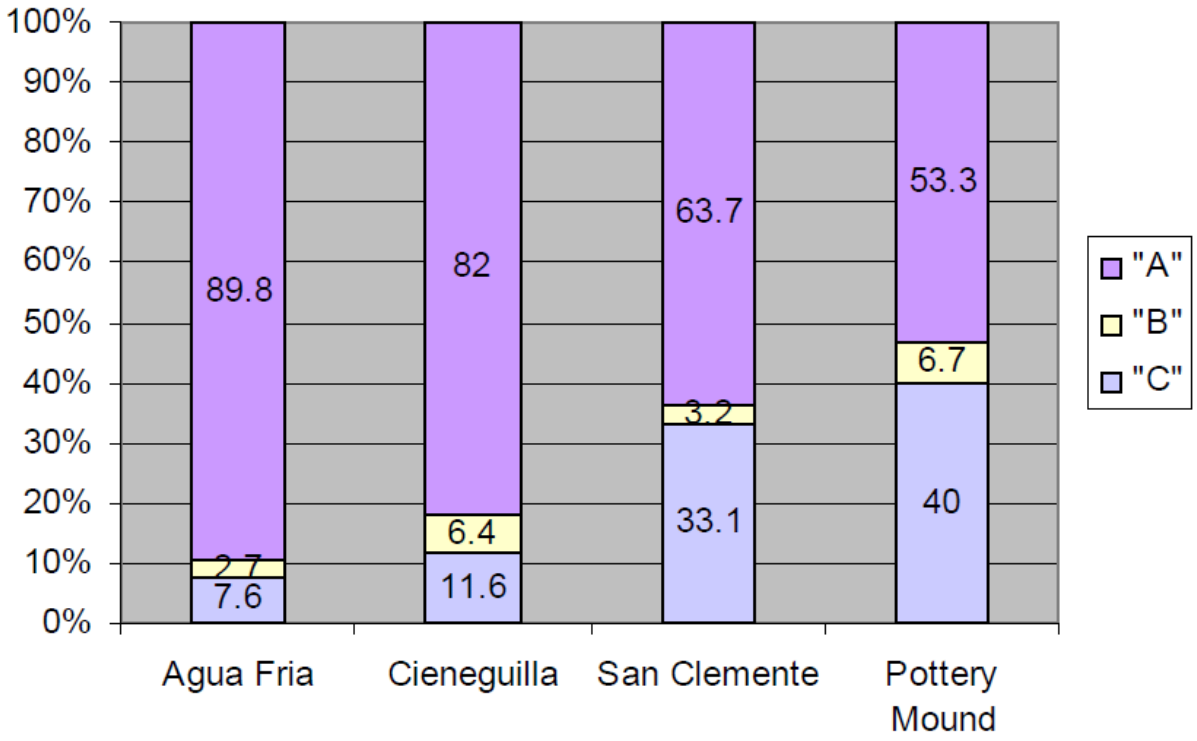


Figure 3. Percentages of glaze ware rim forms by decorative type.
Based on Franklin 2007, Figure 40.

In assessing the evidence from the 1979 test—both the local ceramic trends and the dates suggested by imported pottery—I concluded that "the regional sequence for Rio Grande Glaze Ware, formulated by Kidder and Shepard, and extended by Mera, does, in fact apply to Pottery Mound" (Franklin 2007:88). However, the need for absolute dates from the stratigraphic test was obvious. In 2008, I obtained three AMS radiocarbon dates from maize cob fragments from the latest deposits (Levels 2–4) (Franklin 2008). I sampled these levels because I hoped to date the upper end of the stratigraphic sequence. The midpoints of the two sigma ranges are at 1450, 1460, and 1475; while the upper ends of the ranges (at 2 sigmas) are at 1480, 1500, and 1520.

Levels 1-4 yielded the largest proportions of late non-local types, including Biscuit A, Biscuit B, Sapawe Micaceous, Sikyatki Polychrome, and Espinoso and Kuaua Glaze Polychrome. These are also the levels with an increased proportion of locally produced glaze ware bowls with Glaze C rims. Thus, the three dates were not just consistent among themselves, they supported the conclusions derived from the ceramic analysis. I therefore stated that "there seems little doubt that at least some residents were present after 1490" (Franklin 2008:7).

Pottery Mound sits next to (and has been partly consumed by) a large "bay" (embayment) carved in the local alluvial terrace by the Rio Puerco. On the far side of that bay, additional Glaze Ware period remains, which we dubbed the Annex, are found (Figure 4). This portion of Pottery Mound does not appear on earlier maps, including the comprehensive map by Phillips (2007). In 2009, David Phillips recorded that location as LA 161791. Inspection of the ceramic assemblage suggested an occupation from 1350 to 1500 or later. Specifically, the pottery suggested that this outlying area persisted for some time after the abandonment of the main part of the village. The Annex lies outside the parcel then owned by the University of New Mexico, so detailed recording, sampling, and testing were not then possible. This report remedies that shortcoming in the previous studies.

Following the transfer of Pottery Mound from UNM to Isleta Pueblo in 2012, the Pueblo sponsored evaluations of the site, its condition, and possibilities for slowing the erosion caused by the Rio Puerco. As part of this program, Michael Marshall looked closely at the local geomorphology and the depositional evidence. At ten locations, cut bank profile maps were drawn, artifact assemblages were evaluated and, where available, material was collected for radiocarbon dating. Three of the locations are worth mentioning in this report. Marshall's work at Profile 9 is summarized in Chapter 3; the other two locations within the Annex are summarized below.

In Profile 10, at Room 3 of the "Duck Unit" room block, Marshall found a floor partly excavated by Hibben (1987). Below the floor was 45 cm of midden, with an earlier floor below the trash. Together, the upper floor, the sealed midden, and lower floor yielded more than 100 sherds. The upper floor yielded Arenal Glaze Polychrome, the earliest locally made glaze type, and its major successor, Agua Fria Glaze-on-red. The sealed midden and lower floor yielded Arenal Glaze Polychrome and also its non-local progenitors: White Mountain Red Ware (St. Johns and Heshotauthla Polychrome) and early Acoma-Zuni glaze ware types. The midden and lower floor assemblages also included numerous examples of corrugated utility ware and carbon-painted white ware (Marshall 2017:42).

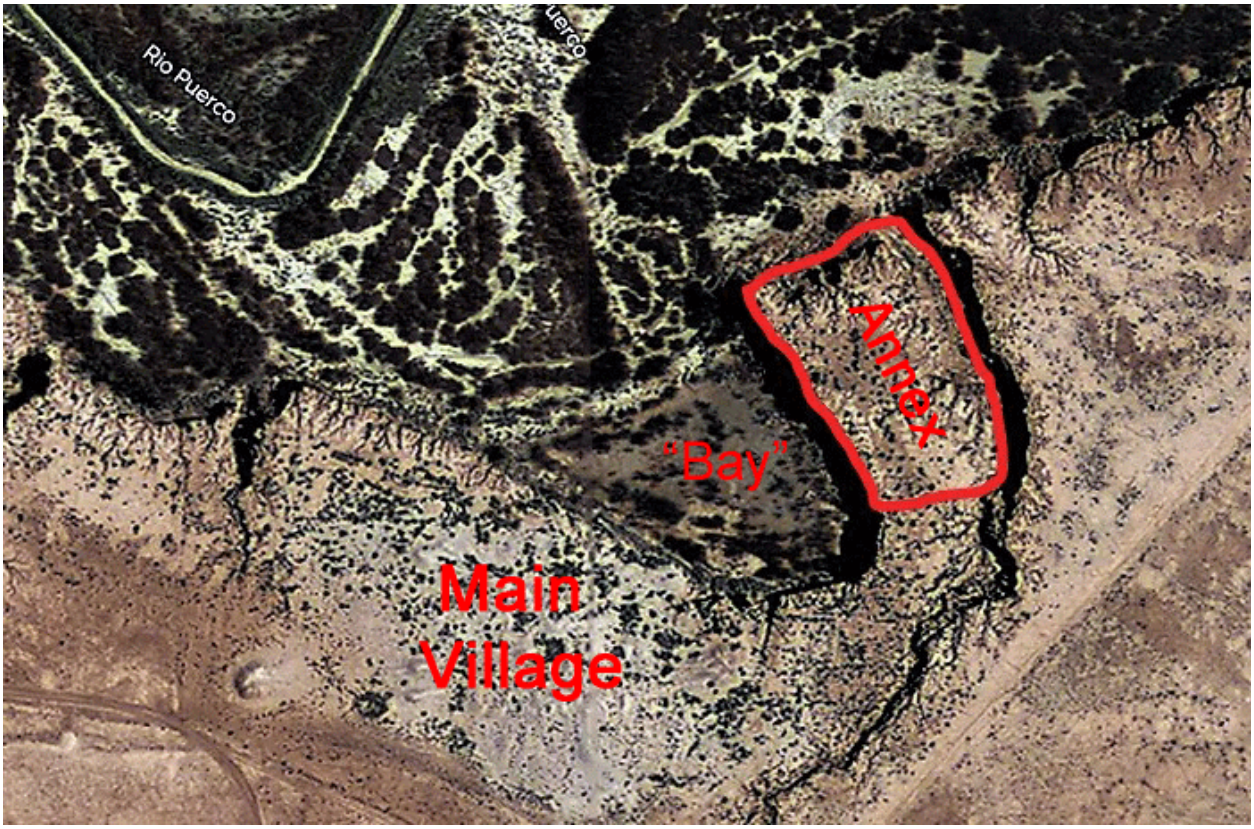


Figure 4. Aerial view of Pottery Mound. The surviving extent of the Annex (LA 161791) is marked with a red line. North is roughly to the top of the page.

Marshall (2017:37) concluded that "Ceramic samples taken from [the] lower midden ... represent the earliest evidence of ... occupation at the site, some 50 to 75 years before the period documented in earlier studies of Pottery Mound." He added, "The sample indicates that the site was first established during the PIII–PIV transition period around 1250–1300 A.D. ... Ceramic artifacts from ... Profile 10 indicate that the pueblo was first colonized by Pueblo groups coming from different culture areas" (Marshall 2017:44).

Marshall's Profile 7A was at the north edge of the Macaw Gallery (as named by Hibben), at an erosional notch in the bank of the Rio Puerco. More than 3 m of distinct strata were visible (Marshall 2017: 29). A few "Glaze A, C and E rims were recovered from ... the latest midden deposit in this area" (Marshall 2017:29).

Marshall (2017:29) also states that Spanish chain mail armor was recently found on an undisturbed slope not far from Profile 7A—in the same quadrant of the site where more than half a century earlier, Bruce Ellis (1956) found a fragment of chain mail.

In summary, Marshall's recent investigations at Pottery Mound revealed remains both earlier and later than those found during previous studies: early 1300s deposits at Profile 10, and 1500s (Glaze E) ceramics materials at Profiles 7 and 9. These new discoveries form the basis for his

extending the site occupation “from ca. 1250 to 1500 or perhaps 1550 A.D.” (Marshall 2017:5). My analysis of ceramics from the Annex confirms Marshall’s finding of late occupational persistence at Pottery Mound. Future research at the site will no doubt provide new surprises as well as improved dating.

Chapter 3

INTRODUCTION TO THE ANNEX

In 2008, during the site monitoring program at Pottery Mound, David Phillips and I encountered a nearby location with glaze ware pottery. Phillips recorded the location under its own site number, LA 161791 (Phillips 2009), but it was clearly related to the occupation of Pottery Mound and we quickly dubbed it "the Annex." Today, the site is on a finger of land, separated from Pottery Mound by an embayment carved by the Rio Puerco between 1953 and 1981 (Phillips and Ballagh 2007:7).[1] However, Marshall's (2015) studies suggest that the Annex was never continuous with the house mounds of the main village. Instead, the main village and the Annex may have been separated by a shallow arroyo.

In 1981 the Corps of Engineers erected a diversion dike in the floodplain of the Rio Puerco, across the mouth of the embayment, and since then the gross configuration of the local alluvial terrace has changed little. However, erosion continues to be an issue: arroyos are actively cutting into the alluvial terrace, which is also experiencing soil stripping and piping (Phillips 2009, Marshall 2015). (The Pueblo of Isleta, which now owns the site, is attempting to limit the erosional damage [Marshall 2017].) The Annex has been especially hard hit; to the southwest is the embayment, to the northwest is the floodplain of the Rio Puerco, and to the northeast is a rapidly deepening arroyo. As a result, the Annex is now on a roughly 10 m tall peninsula of soft alluvial deposits. As those deposits wash away, the Annex is disappearing (Figures 5 and 6).

Given the artifacts eroding from the Annex, it must have been a habitation area with at least one block of rooms. At present, no traces of rooms can be seen, but two lines of evidence bolster the inference that rooms had been present. The first was a comment by Frank Hibben:

> Although Glaze III and later types of sherds were almost completely absent at Pottery Mound itself, late glazes were found at a small pueblo of twenty-four rooms which formerly lay on the brink of the Rio Puerco cutbank just north of Pottery Mound. This outlying pueblo was completely obliterated by the floods of 1956 and 1957, but was fortunately tested before its demise [Hibben 1975:2].

Hibben provides no details that would allow us to confirm that his "small pueblo of twenty-four rooms" is the Annex. However, a map in the Maxwell Museum archives most likely was created during partial excavation of the Annex, possibly by the UNM Anthropology Club in 1962 (Schuyler et al. 2013). Figure 7 appears to show some seven to 10 rooms along the edge of the local alluvial terrace. Room F-4 includes two stone bins of unknown use, an unfinished room south of Room F-8 included a hearth, and Room F-9 appears to include a milling bin with three metates. The rooms were small and may mostly have been for storage or other limited activities. The room walls abutted in an unplanned way. If these rooms were excavated in 1962 or later, and if they were part of the 24 room pueblo described by Hibben in 1975, the site was not completely washed away in 1956 and 1957 as he stated.

[1] Early observations indicate that the Rio Puerco had started to erode the north and east sides of the site as early as the 1920s (Warner 1928; Wilcox 2007).

Figure 5. The Annex, looking toward Hidden Mountain. View to northwest.

Figure 6. Erosion at the edge of the Annex. View to west.

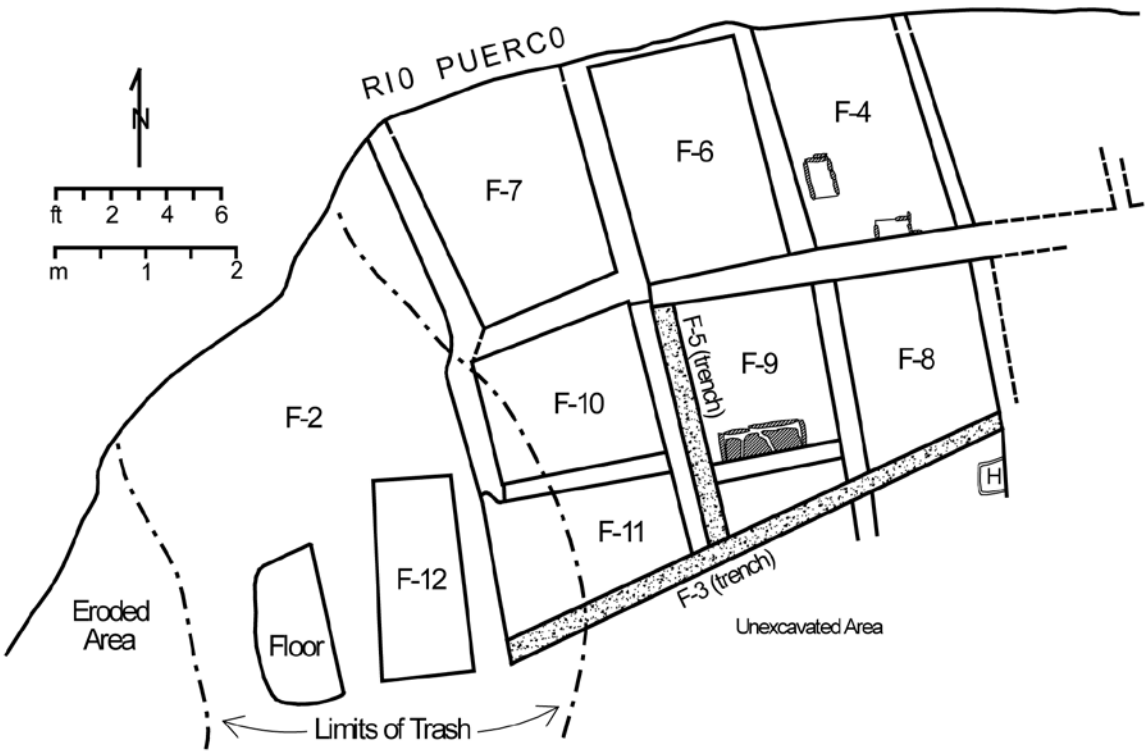


Figure 7. A map that may show part of the Annex. From Schuyler et al. 2013, Figure A.8.

A search at the Maxwell Museum (with the help of the archivist, Diane Tyink) did not reveal any notes, photographs, or additional maps from the excavation shown in Figure 7. Our reason for suspecting that the rooms were excavated by the UNM Anthropology Club in 1962 is based on its activities elsewhere on the site. In 1961 Frank Hibben ended his formal excavations at Pottery Mound, after which the club's digging would not have impinged on Hibben's turf. The Maxwell Museum archives include 1962 field notes by Alan Skinner on the excavation of a ceremonial room (later published as Skinner 1966). The archives also include typed notes (by John Speth) and photographs of a second room excavated that year. However, both those rooms were in the main village, towards its west end, and not in the Annex. In other words, the evidence that Figure 7 derives to the 1962 dig by the Anthropology Club is circumstantial.

In 2015, as part of his work for Isleta Pueblo, Michael Marshall noted structural remain, midden deposits, and artifact scatters at the Annex, but also the severe erosion taking place. In discussing a room block Marshall (2015) stated, "Unfortunately much of this ... area is subject to ... bank collapse and an extensive set of deep erosional pipes. Any effort to stabilize this site ... will be difficult. In 2017 he reiterated that "Most of the Annex Site has been destroyed and removed by erosion, especially along the south edge facing the [embayment]. Thus the exact original size of the Annex Pueblo cannot be determined. It is unlikely to have been contiguous with the main pueblo." Marshall (2017:34) added, "Despite the extensive damage, the Annex Site has considerable research value in that it appears to be the last or one of the last areas in Pottery Mound complex to be inhabited."

Marshall prepared his Profile 9 at the northeast end of the "peninsula" where the Annex is located. The profile documented a shallow arroyo that filled to the height of the present ground surface (Marshall 2017:35). The sediment filling the arroyo contained pottery, burned wood, and maize derived from the occupation of the Annex; initial study indicated the presence of Glaze A, C, and E rims. The items from the arroyo fill are important because the rest of the assemblage from the Annex was collected from its present, highly disturbed surface. Two radiocarbon dates based on samples obtained by Marshall from Profile 9 are discussed below.

Figure 8 shows the edge of the alluvial terrace near Marshall's Profile 9, with a line of buried sherds lying flat on buried surface.

Figure 8. Sherds in an erosional exposure near Marshall's Profile 9.

Chapter 4

CERAMIC ANALYSIS

My first collections of sherds from the Annex area were grab samples, which may have been skewed in favor of glaze ware rims. Later I collected of all surface pottery available and added Michael Marshall's Profile 9 sample, yielding a much larger sample and reducing the effect of any initial collecting bias. This aggressive collection approach was justified by the fact that the surface assemblage at the Annex is rapidly washing away. I consider the resulting sample of 1,742 sherds to be both adequate and representative of pottery at the Annex.

Methods

The following analysis was conducted on the 1,742 collected sherds larger than 1 cm^2.

1. Assignment to a generally accepted taxon. All sherds were clipped to help ensure accurate type assignments, as well as to assist the assessment of constituent materials.

2. Identification of vessel form (jar, bowl, etc.) and the portion of the vessel represented by the sherd (rim, body, etc.).

3. Identification of tempering material. The freshly clipped exposures were examined using a binocular microscope at 10X–30X. Selected samples were also photographed through the microscope. In the future, it would be useful to further examine selected specimens of each pottery type using thin section petrography.

4. Refiring of selected samples clipped from sherds. This step is designed to eliminate vagaries in the original firing regime by uniformly raising sherd temperatures to 900 degrees C for 10 minutes, in a consistent oxidizing atmosphere, followed by slow cooling (Rice 1987). The refired samples provide clues as to differences in clays used to make pottery, and may indicate variations in local also clay sources.

My previous work on Pottery Mound pottery ensured that the results reported here were methodologically consistent with results obtained from the main village.

Type Frequencies

Table 3 shows that the pottery encountered at Pottery Mound was also present at the Annex. As would be expected for a late site, the decorated sherds are dominated by Rio Grande Glaze Ware. These sherds were divided into bowl rim sherds versus jar rims, jar body sherds, and bowl body sherds. While slips, designs, and paint colors all changed, rim forms continue to be the definitive attribute for temporal assignment of glaze ware sherds. As a result, only the rim sherds were assigned to a named type. The remaining Rio Grande Glaze Ware sherds were tallied in terms of slip and paint attributes, yielding general information on those sherds.

Table 3. The Sherd Assemblage from the Annex.

Pottery Type	Analysis Code	Count	Percent (Group)	Percent of Total
Group 1A: Rio Grande Glaze Ware, excluding bowl rims, no paint				
Red to orange interior/exterior slip	91	474	52.3%	27.2%
Contrasting red and white slips (interior vs. exterior)	93	9	1.0%	0.5%
White to yellow interior/exterior slip	94	1	0.1%	0.1%
Group 1B: Rio Grande Glaze Ware, excluding bowl rims, painted				
Red to orange interior/exterior slip	97	175	19.3%	10.0%
Contrasting red and white slips (interior vs. exterior)	98	143	15.8%	8.2%
Polychrome	99	104	11.5%	6.0%
Group 1 Subtotal		**906**	**100.0%**	**52.0%**
Group 2: Rio Grande Glaze Ware bowl rims				
Glaze A, Agua Fria Glaze-on-red	110	60	25.5%	3.4%
Glaze A, San Clemente Glaze Polychrome	115	33	14.0%	1.9%
Glaze A, Pottery Mound Glaze Polychrome	125	9	3.8%	0.5%
Glaze B, Largo Glaze-on-yellow	201	4	1.7%	0.2%
Glaze B, Largo Glaze-on-red	205	4	1.7%	0.2%
Glaze B, Largo Glaze Polychrome	206	2	0.9%	0.1%
Glaze C, Espinoso Glaze Polychrome	301	4	1.7%	0.2%
Glaze C, Kuaua Glaze Polychrome	302	46	19.6%	2.6%
Glaze C–D polychrome	400	4	1.7%	0.2%
Glaze D, San Lazaro Glaze Polychrome	401	52	22.1%	3.0%
Glaze E, Puaray Glaze Polychrome	501	17	7.2%	1.0%
Group 2 Subtotal		**235**	**100.0%**	**13.5%**
Group 3: Rio Grande utility ware				
Clapboard corrugated	701	5	0.9%	0.3%
Indented corrugated	705	6	1.1%	0.3%
Obliterated-wiped corrugated	706	3	0.5%	0.2%
Plain gray utility	710	537	97.3%	30.8%
Exposed-coil exterior	799	1	0.2%	0.1%
Group 3 Subtotal		**552**	**100.0%**	**31.7%**
Group 4: Non-glaze decorated ware				
White slip, no paint	9	1	2.0%	0.1%
Puerco or Escavada Black-on-white	11	1	2.0%	0.1%
Socorro Black-on-white	12	3	6.1%	0.2%
Abiquiu Black-on-white	25	1	2.0%	0.1%
Wingate Black-on-red	51	1	2.0%	0.1%
Acoma-Zuni area, Kwakina Glaze Polychrome	810	6	12.2%	0.3%
Acoma-Zuni area, Pinnawa Glaze-on-red	820	4	8.2%	0.2%
Acoma-Zuni area, Kechipawan Glaze Polychrome	821	6	12.2%	0.3%

Table 3. The Sherd Assemblage from the Annex.

Pottery Type	Analysis Code	Count	Percent (Group)	Percent of Total
Acoma-Zuni area, glaze ware	830	5	10.2%	0.3%
Acoma-Zuni area, unpainted	831	16	32.7%	0.9%
Hopi area, Jeddito Black-on-yellow	850	3	6.1%	0.2%
Hopi area, Sikyatki Polychrome	860	2	4.1%	0.1%
Group 4 Subtotal		**49**	**100.0%**	**2.8%**
Grand Total		**1742**		**100.0%**

Rio Grande Glaze Ware

As Table 3 indicates, most of the sherd assemblage is Rio Grande Glaze Ware (n = 1,141, 65 percent). Of those sherds, 235 (20.6 percent of the ware; 13.5 percent of the assemblage) are diagnostic bowl rims. Those bowl rims include at least a few examples of Glaze A through E, suggesting a more or less continuous occupation during those periods. No late Glaze E or Glaze F sherds were seen, indicating that the villagers left before the late 1500s. This broad occupation span indicates that the Annex, like the main village, was not just a Glaze A site.

The identified Glaze A types (Agua Fria Glaze-on-red and San Clemente and Pottery Mound Glaze Polychrome) are the three major types of this period at the main site, so it is not surprising to find so many of them at the Annex. These 102 Glaze A rim sherds are the largest single subset within the Rio Grande Glaze Ware bowl rims.

Glaze B is represented by just 10 specimens of the Largo series (including glaze-on-yellow, glaze-on-red, and polychrome variants). Glaze B was short-lived is (being made over perhaps as little as 25 years) and was a minor type in the southern part of the glaze ware domain. Nevertheless, bowl sherds with B rims have made a consistent part of the Pottery Mound ceramic repertoire.

The assemblage includes 50 sherds with Glaze C bowl rims, including the Espinoso Glaze Polychrome and more common Kuaua Glaze Polychrome forms. Like Glaze B, Espinoso Glaze Polychrome's S-shaped rim is more common to the north (in the Santa Fe-Galisteo Basin area). In contrast, incurving rims with beveled lips were much more popular in the Albuquerque area and along the Rio Grande to the south (see Franklin (2017). The "Kuaua rim" was the most popular Glaze C rim in the main village, and so it was not surprising to find it at the Annex.

Glaze D equates to a single type with little internal variation, San Lazaro Glaze Polychrome. The assemblage from the Annex includes 56 bowl rim sherds of this type. The sherds displayed the polychrome designs typical of San Lazaro Glaze Polychrome at sites to the north.

Glaze E also equates to a single pottery type, in this case Puaray Glaze Polychrome. Seventeen bowl rim sherds are unequivocally Glaze E in form, and the painting style (including moderately

sloppy and runny paint) confirms the identification based on rim forms. Glaze E has a long time span (about 1525 to 1600), so the vessels assigned to this type show changes through time. Knowing this, a closer examination of the Annex specimens shows them to be typical of early Glaze E: the rim shapes are less exaggerated than on later bowls, and the paint and slip are not as altered as on those bowls. I infer that the Annex Glaze E examples were made between 1525 and 1550. None is the late Glaze E–F hybrid of about 1600, found at Albuquerque area pueblos such as Piedras Marcadas (Franklin 2017).

Figure 9 shows the bowl rim forms that occur at the main village and Annex, with an indication of which forms are more common. In the sample of 235 Rio Grande Glaze Ware bowl rims from the Annex, the distribution is as follows: Glaze A, 43 percent (n = 102); Glaze B, 4 percent (n = 10); Glaze C, 21 percent (n = 50); Glaze D, 24 percent (n = 56); Glaze E, 7 percent (n = 17). Taken together, the Glaze C, D, and E rims are 52 percent of all glaze ware bowl rims; taken together, all post-A rims are 57 percent of the total. Again, we see strong evidence for a continuous and fairly long village occupation.

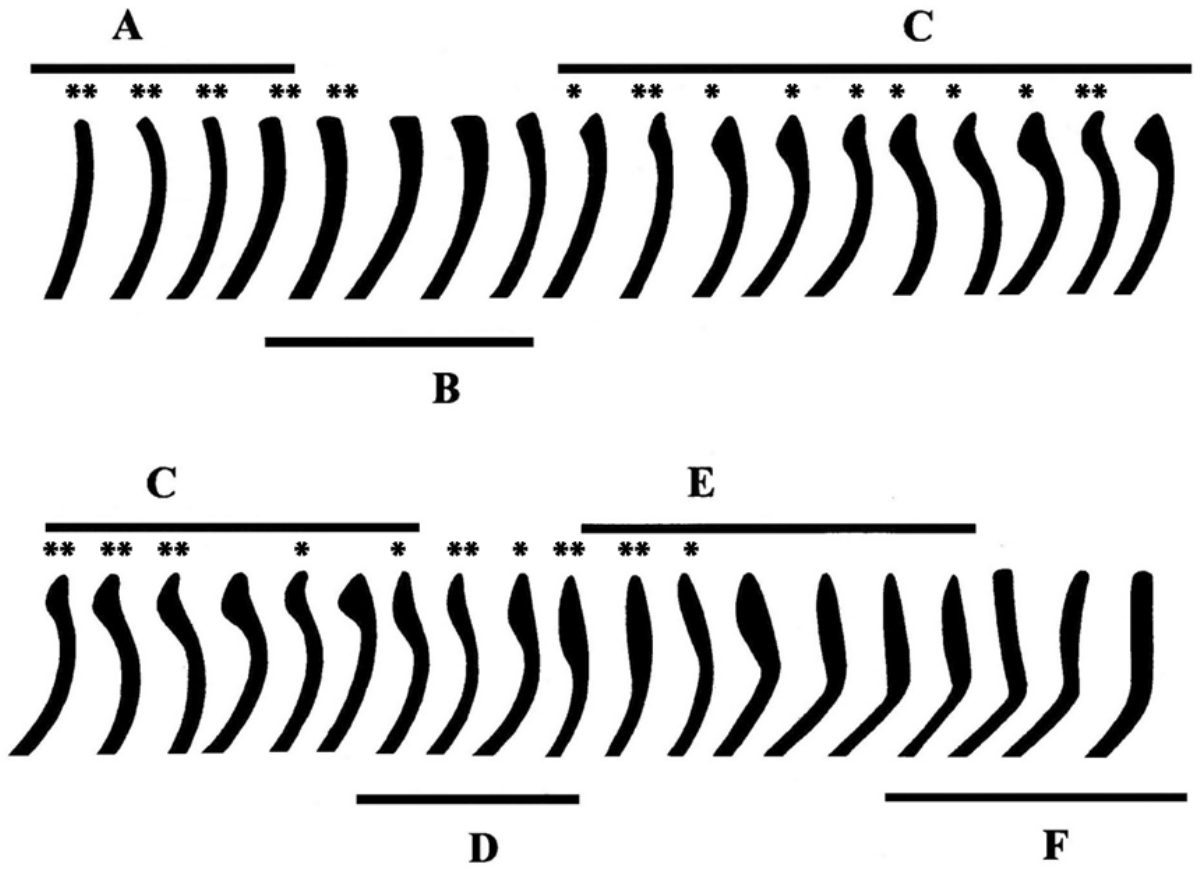


Figure 9. Glaze ware rim profiles at Pottery Mound and the Annex. The relative abundance is indicated by the number of asterisks.

Glaze ware sherds that that are not from bowl rims convey additional information, even though they are not as helpful for chronology building. Analysis Codes 91 through 99 were used to classify these sherds by decorative style. Table 3 reveals that various slip and paint combinations were employed, consistent with the artistic creativity documented at Pottery Mound proper. Of these non-rim sherds, 52 percent have bichrome layouts (with glaze paint on red or orange slips), but common alternatives include red and white contrasting slips (one color inside, the other outside) and, more rarely, white slips on both sides of bowls. Polychrome paint-slip combinations are visible on 12 percent of these sherds. The use of multiple colors was a hallmark of glaze ware production at Pottery Mound, culminating in the "fancy" slip-paint combinations seen on Pottery Mound Glaze Polychrome.

Painted Non-Glaze and Trade Sherds

Non-glaze ware pottery in the Annex assemblage includes 49 pieces of a wide variety of pottery types (Table 3). The small amounts of Puerco–Escavada and Socorro Black-on-white reflect continued manufacture (or at least use) of Cibola White Ware, the tradition that had dominated the Middle Rio Grande and Middle Puerco Valleys during the late Developmental and Coalition periods. It is not unusual to find small amounts of Socorro Black-on-white in assemblages at Pottery Mound; indeed, it is the most common non-glazed pottery at the site. Coalition period villages nearby produced it in abundance, and production probably did not end until the early 1300s.

A few pieces of White Mountain Red Ware consistently show in early Classic period settlements such as Pottery Mound. Originating in the Upper Little Colorado region to the southwest, such pottery had been popular during the Coalition period; many sherds of Wingate Black-on-red, Wingate Polychrome, and especially St. Johns Polychrome have been found at pit house village sites where the potters made Socorro Black-on-white. As I have mentioned, White Mountain Red Ware vessels inspired the Rio Grande Glaze Ware tradition.

The abundant imported pottery from the Acoma-Zuni district indicates consistent contact with population centers in that direction (Eckert 2003; Franklin 2014). The Acoma-Zuni district pottery can bear a superficial resemblance to local types such as Agua Fria Glaze-on-red and the glaze-on-white or glaze-on-red layouts of San Clemente, but their white paste and sherd temper (sometimes with very fine black basalt inclusions) immediately give away their true identity. Given the abundance of Acoma-Zuni district pottery in the main village, it is not surprising that the Annex assemblage includes, in approximate chronological order, Kwakina Polychrome, Pinnawa Glaze-on-white, and Kechipawan Glaze Polychrome. These three imports cover the same time span as Glaze A, B, and C in the Rio Grande Glaze Ware series (1300–1475). In all, 37 sherds of the Acoma-Zuni series were recovered at the Annex, making them by far the most numerous imported painted pottery. The presence of the latest of these types, Kechipawan Glaze Polychrome, which dates to 1375–1475 (D. Wilson 2008–2017), is consistent with the elevated frequency of Glaze C and D sherds compared to the main village. In counts for Pottery Mound proper, Kwakina is quite common but the Kechipawan is extremely rare.

The Annex assemblage include five pieces of Hopi area yellow ware (Jeddito Black-on-yellow and Sikyatki Polychrome). As at the main village, these imports are obvious indicators of long-distance contacts with the Hopi area, a connection that has drawn a great deal of archaeological attention. However, imports from the Acoma-Zuni district were much more numerous (Franklin 2014), indicating that the ties to that district were far stronger.

One sherd of "exposed coil" pottery was found. This statistically unusual and clearly special variety involves coils that are exaggerated rather than reduced or obliterated. Most examples are bowls painted on both surfaces. The assemblage from the main village includes a whole bowl of this variety, and pieces of such bowls have been found at several Classic period pueblo ruins in the area.

Utility Ware

The 552 utility ware sherds tallied in Table 3 were from vessels used for cooking, storage, and possibly transport, supporting the interpretation of the Annex as a habitation area. Early Classic period utility pottery underwent a transition from exposed and manipulated ("corrugated") outside coils to wiped or "obliterated" coils to smoothed surfaces; by about 1425, the coils were invisible once the pot was finished. In this sample, the 14 pieces of obviously corrugated utility ware are overshadowed by the huge amount (n = 537) of utility sherds with completely plain surfaces. At the main village as well, the custom of corrugating went into decline and then was abandoned.

Additional changes may include be the increased use of intentional smudging and polishing of jar interiors. This was made possible, in part, by wider jar mouths (see below), and would have helped make the jars more impervious to any liquids they held. We may also be seeing the occasional appearance of utility ware bowls, also with smudged and somewhat polished interior surfaces. Such bowls may have developed from the Los Lunas Smudged bowls of Coalition times. In turn, the Classic period bowls just mentioned may foreshadow the red- or yellow-slipped bowls with polished and smudged interiors of the early historic period. Examples of the late end of this trend include Kapo and Manzano Black as well as Isleta Red-on-tan (Franklin 1997). These postulated trends in utility wares require additional verification, which would be an interesting study in itself.

Vessel Forms

Painted Vessels

The Classic period ceramic repertoire usually includes a mix of painted open forms (bowls) and closed forms (ollas) with short necks and flaring lips, with minor variations on these themes. The Rio Grande Glaze Ware sherds include 561 jar sherds, along with 579 bowl sherds including 235 rims (Table 4). This rough equality in numbers of jar and bowl sherds is typical, but does not reflect the ratio of whole jars to bowls.

Table 4. The Annex: Pottery Types by Vessel Form.

Pottery Type	Analysis Code	Jars	Bowls	Other	Total
Group 1A: Rio Grande Glaze Ware, excluding bowl rim, no paint					
Red to orange interior/exterior slip	91	321	153		474
Contrasting red and white slips (interior vs. exterior)	92, 93	5	4		9
White to yellow interior/exterior slip	94	1			1
Group 1B: Rio Grande Glaze Ware, excluding bowl rims, painted					
Red to orange interior/exterior slip	97	99	76		175
Contrasting rad and white slips (interior vs. exterior)	98	52	91		143
Polychrome	99	77	27		104
Group 1 Subtotal		**555**	**351**		**906**
Group 2: Rio Grande Glaze Ware bowl rims					
Glaze A, Agua Fria Glaze-on-red	110		60		60
Glaze A, San Clemente Glaze Polychrome	115-119	2	31		33
Glaze A, Pottery Mound Glaze Polychrome	125	4	5		9
Glaze B, Largo Glaze-on-yellow	201		4		4
Glaze B, Largo Glaze-on-red	205		4		4
Glaze B, Largo Glaze Polychrome	206		2		2
Glaze C, Espinoso Glaze Polychrome	301, 300		4		4
Glaze C, Kuaua Glaze Polychrome	302		46		46
Glaze C-D Glaze Polychrome	400		3	1	4
Glaze D, San Lazaro Glaze Polychrome	401, 402		52		52
Glaze E, Puaray Glaze Polychrome	501		17		17
Group 2 Subtotal		**6**	**228**		**235**
Group 3: Rio Grande utility ware					
Clapboard corrugated	701	5			5
Indented corrugated	705	6			6
Obliterated-wiped corrugated	706	3			3
Plain gray utility	710	533	4		537
Exposed-coil exterior	799		1		1
Group 3 Subtotal		**547**	**5**		**552**
Group 4: Non-glaze decorated ware					
White slip, no paint	9		1		1
Puerco or Escavada Black-on-white	11		1		1
Socorro Black-on-white	12	2	1		3
Abiquiu Black-on-white	25		1		1
Wingate Black-on-red	51		1		1
Acoma-Zuni area, Kwakina Glaze Polychrome	810		6		6
Acoma-Zuni area, Pinnawa Glaze-on-red	820	1	3		4
Acoma-Zuni area , Kechipawan Glaze Polychrome	821	2	4		6
Acoma-Zuni area, glaze ware	830	5			5

Table 4. The Annex: Pottery Types by Vessel Form.

Pottery Type	Analysis Code	Jars	Bowls	Other	Total
Acoma-Zuni are, unpainted	831	11	5		16
Hopi area, Jeddito Black-on-yellow	850		3		3
Hopi area, Sikyatki Polychrome	860	1	1		2
Group 4 Subtotal		**22**	**27**		**49**
Grand Total		**1130**	**611**	**1**	**1742**

On average, painted ollas had about twice the surface area of the painted hemispherical bowls, so fractured (under similar circumstances) into about twice as many sherds as did the bowls. Thus, the residents of the Annex may have had about two painted bowls for every painted olla.

Two sherds represented unusual painted forms. One is the small fragment of an exposed-coil bowl just mentioned. The other is the rim of a small jar having with interior lugs that allowed attachment of a cord for suspension (Appendix B). These are known from Pottery Mound proper and from Kuaua (Dutton 1963; Franklin 2010a).

The imported painted wares include slightly more bowl sherds than jar sherds. For the imported painted wares in general, and for the Acoma-Zuni district painted wares in particular, the preferences regarding bowls versus jars were about the same as for locally produced vessels.

Utility Vessels

Almost all of the utility ware vessels at the annex were large jars whose necks had flared rims. Changes in utility vessel form during over the 350 years of the Classic period are not well studied, but certain long-term trends may be suggested. I suspect that through time, the mouths of utility jars became wider. Also, while the jar necks were 5 cm or taller at the start of the Classic period, later examples had shorter, recurved necks.

Sources of Temper

Previous studies of Pottery Mound temper, by Voll (1961), Garrett (1976), and Eckert (2003) showed that potters at Pottery Mound often used crushed basalt as temper. Crushed rock temper was a common ingredient of contemporary pottery made at other sites of the Middle Rio Grande region. More recent examination of Pottery temper, by Schleher (2010a) and myself (Franklin 2010b), confirms that the major tempering material was basalt in several forms. Outflows of such material occur at Hidden Mountain, 8 km (5 miles) away, and at other peaks not quite as close to the village. Between Pottery Mound and the outcrops, sizeable deposits of basalt cobbles are lacking, so villagers had to travel to the outcrops to obtain their basalt. They may have gone to the outcrops to quarry blanks for manos, metates, and other tools, later recycling the broken or exhausted tools into temper. Fragments of such tools litter the site surface. Examples of temper in sherds and of parent rocks are illustrated in Appendix C.

Closer examination of the basalt (both as raw material from Hidden Mountain and as temper in pottery) reveals some variation in mineralogical content. The outflows varied locally in composition and texture, from reddish vesicular basalt to a darker, harder diabase (Franklin 2010b, Schleher 2010a). The reddish vesicular (vitrophyric) basalt displays scoria-like bubbles caused by rapid extrusion. The diabase (intergranular/ophitic basalt) has a finely granular texture with fine clasts of hornblende, augite, and plagioclase feldspar. This dark, dense basalt often forms angular fragments and has a "salt and pepper" appearance. Despite differences in terminology and technique, Schleher and I independently recognized these two kinds of basalt.

In previous studies I classified a second, less common tempering material in generic terms, calling it intermediate igneous rock or IIR. Viewed with a binocular microscope, this rock type includes fragments of quartz, feldspar, and occasional hornblende in a fine matrix (Franklin 2010:29). Schleher's (2010a:67) petrographic analysis did not identify IIR in the local glaze ware sherds, but several of her samples included some sand or sandstone along with basalt. Her result is interesting because I was unable to pin down a source for IIR—the area does not include outcrops of granite, diorite, or other rocks of that general type—but the local alternatives to basalt include a variety of coarse sandstones. Specifically, such sandstones occur in the Santa Fe formation, which is exposed in the vicinity of Hidden Mountain, about 9 km (5.5 miles) west of the site (Anderson and Jones 1994, Maldonado 2003). In fact, at Hidden Mountain the basalt flows overlie sandstone. I therefore suspect that the coarse sandstones of the Santa Fe Formation are the rock source for the temper I formerly identified as IIR. Some of the Santa Fe formation sandstones incorporate coarse grains of quartz, feldspars, and mafic materials such as augite or hornblende, but no mica. Independently, Marshall (2017) mentions the presence of sandstone in Pottery Mound glaze ware pottery he has studied.

The surface of the main village is littered with sandstone fragments derived from grinding tools, as well as with the basalt fragments already mentioned (see Franklin 2010, Figures 19–22). Thus, for both the igneous temper and the sandstone temper, potters could have processed fragments of tools instead of walking to outcrops of those materials.

Temper Frequencies

Table 5 shows the temper frequencies for each pottery type. Some deliberate mixing of basalt and sand or sandstone temper took place, and small amounts of dirt and sand may have found their way into clay during pottery production. Typically, however, the paste for any given vessel included a single temper type, so intentional mixture must have been rare.

Among the Rio Grande Glaze Ware sherds as a group (1,141 sherds), basalt is by far the most common tempter type. Sherds with dark hard diabase temper numbered 169 (14.8 percent), while most (n = 793, 69.5 percent), were tempered with reddish vesicular basalt. Sandstone and sandstone-basalt mixes account for 154 of the sherds (13.5 percent). Taken together, 97.8 percent of the Rio Grande Glaze Ware sherds were tempered with (usually) one of two major rock types found naturally within 9 km (5.5 miles) of Pottery Mound.

Table 5. The Annex: Pottery Type by Temper.

Pottery Type	Code	No Temper	Potsherd	Black Dia-base Basalt	Red Vesi-cular Basalt	Quartz Sand	Sandstone or Mix w/ Basalt	Hornblende Latite	Mica or Schist	Gray Diabase?	Tuff	Total
		0	**1**	**2**	**3**	**6**	**8**	**9**	**10**	**12**	**14**	
Rio Grande Glaze Ware, Not Bowl Rims, No Paint												
Red/orange slip interior/exterior	91		2	69	328		70	5				474
Red, white contrasting (int. vs. ext.) slips	93, 92		2		5		1	1				9
White/yellow slip interior/exterior	94			1								1
Rio Grande Glaze Ware, Not Bowl Rims, With Paint												
Red/orange slip interior/exterior	97			26	123		26					175
Red, white contrasting (int. vs. ext.) slips	98		1	17	99		22	4				143
Polychrome	99		1	13	72	1	12	5				104
Subtotal, Rio Grande Glaze Ware, not rims			**6**	**126**	**627**	**1**	**131**	**15**				**906**
Rio Grande Glaze Ware, Bowl Rims												
Glaze A, Agua Fria Glaze-on-red	110			10	46		4					60
Glaze A, San Clemente Glaze Polychrome	115–119			5	27		1					33
Glaze A, Pottery Mound Glaze Polychrome	125			2	6		1					9
Glaze B, Largo Glaze-on-yellow	201			3			1					4
Glaze B, Largo Glaze-on-red	205			2	2							4
Glaze B, Largo Glaze Polychrome	206				2							2
Glaze C, Espinoso Glaze Polychrome	300, 301				4							4
Glaze C, Kuaua Glaze Polychrome	302			4	38		2	2				46
Glaze C–D Glaze Polychrome	400			2	2							4
Glaze D, San Lazaro Glaze Polychrome	401, 402			10	34		8					52
Glaze E, Puaray Glaze Polychrome	501			5	5		6			1		17
Subtotal, Rio Grande Glaze Ware, rims				**43**	**166**		**23**	**2**		**1**		**235**

Table 5. The Annex: Pottery Type by Temper.

Pottery Type	Code	No Temper	Potsherd	Black Dia-base Basalt	Red Vesi-cular Basalt	Quartz Sand	Sandstone or Mix w/ Basalt	Hornblende Latite	Mica or Schist	Gray Diabase?	Tuff	Total
		0	**1**	**2**	**3**	**6**	**8**	**9**	**10**	**12**	**14**	
Rio Grande Utility Ware												
Clapboard corrugated	701			4			1					5
Indented corrugated	705			2	4							6
Obliterated-wiped corrugated	706			3								3
Plain gray utility	710		2	330	173	1	29		2			537
Exposed coil exterior	799			1								1
Subtotal, Rio Grande utility ware			**2**	**340**	**177**	**1**	**30**		**2**			**552**
Non-Glaze Ware Decorated												
White slip, no paint	9			1								1
Puerco-Escavada Black-on-white	11		1									1
Socorro Black-on-white	12		3									3
Abiquiu Black-on-white	25										1	1
Wingate Black-on-red	51		1									1
Acoma-Zuni area, Kwakina Glaze polychrome	810		6									6
Acoma-Zuni area, Pinnawa Glaze-on-red	820		4									4
Acoma-Zuni area, Kechipawan Glaze Poly.	821		3	3								6
Acoma-Zuni area, glaze paint	830		3	2								5
Acoma-Zuni area, unpainted	831		15	1								16
Hopi area, Jeddito Black-on-yellow	850	1	2									3
Hopi area, Sikyatki Polychrome	860	2										2
Subtotal		3	38	7							1	49
Grand Total		**3**	**46**	**516**	**970**	**2**	**184**	**17**	**2**	**1**	**1**	**1742**

Paste Clays

My studies at Pottery Mound included a search for clays suitable for creating, slipping, and painting ceramic vessels (Franklin 2010b). At present, Michael Marshall is conducting a similar but broader search for clay sources. During the study of the Annex sample, studies of paste clays were confined to refiring tests. The goal was to learn whether there was any change in body clays over the Glaze A–Glaze E time span.

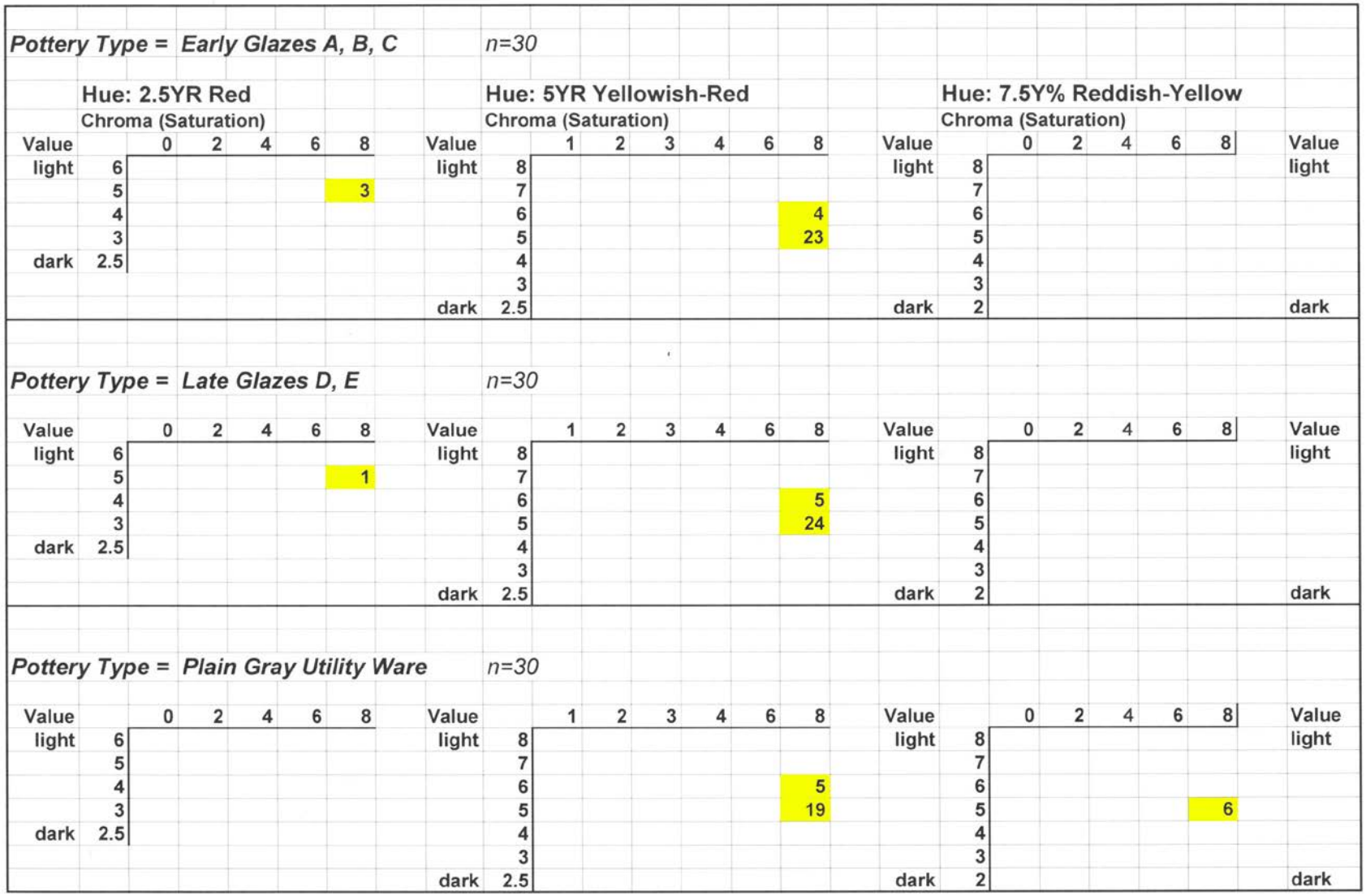
Figure 10 compares the early glaze wares (A–C), the later glazes (D and E), and plain gray utility ware. The refired sample included 30 sherds from each category. The early glaze group fired solidly in the color block of 5YR 5/8 (n = 23), 5YR 6/8 (n = 4), and 2.5YR 5/8 (n = 3). The colors are bright yellowish-red to light red. The late glaze group fired to the same color chips on the Munsell chart, and in almost the same amounts: 5YR 5/8 (n = 24), 5YR 6/8 (n = 5), and 2.5YR 5/8 (n = 1). In other words, the early and late glaze vessels at the Annex probably were manufactured from the same clay sources.

Once refired in an oxidizing atmosphere, the utility ware paste colors are substantially the same as those for the glaze wares: 5YR 5/8 (n = 19), 5YR 6/8 (n = 5), and 7.5YR 5/8 (n = 6). The last group displays lighter shades of reddish-yellow, or tan, not seen in the glaze ware sample. This suggests that while almost all of the utility pottery was made from the same clays as the glaze wares, a few such vessels may have been made from a different local clay or possibly elsewhere.

Comparison to test tiles of seven raw clays from the immediate vicinity of Pottery Mound shows substantial agreement between the refired raw clays and the refired sherds from the Annex. The test tiles refired to 2.5YR 6/8 (n = 3), 5YR 7/6 (n = 3), and 7.5YR 7/6 (n = 1) (Franklin 2010b:14) Those results are not precisely those for of the sample from the Annex, but the values represent either color chips for the samples refired here, or adjacent color chips. In other words, the refired Annex glaze ware and utility ware samples and the raw clay samples all yielded values in in the same parts of the same Munsell pages. This reinforces the conclusion that most if not all of the Annex pottery, both glaze ware and utility, was made from essentially the same local clay.

Discussion

In examining the late glazed pottery from the Annex, I asked whether it showed the same paste and temper as the earlier types. In other words, was there a evidence for continued glaze ware production at Pottery Mound, through Glaze E times, or were the later types made elsewhere in the glaze ware production region and brought to Pottery Mound? The data in Table 5 show no discernible change in pottery tempering materials from the early glazes to the late ones. The same mixes—two types of ground basalt and a basalt-sandstone mix—were the dominant choices by potters for more than two hundred years.



Pottery Type = Early Glazes A, B, C *n=30*

Value	Hue: 2.5YR Red, Chroma (Saturation) 0	2	4	6	8
light 6					
5					3
4					
3					
dark 2.5					

Value	Hue: 5YR Yellowish-Red, Chroma (Saturation) 1	2	3	4	6	8
light 8						
7						
6						4
5						23
4						
3						
dark 2.5						

Value	Hue: 7.5Y% Reddish-Yellow, Chroma (Saturation) 0	2	4	6	8	Value
light 8						light
7						
6						
5						
4						
3						
dark 2						dark

Pottery Type = Late Glazes D, E *n=30*

Value	0	2	4	6	8
light 6					
5					1
4					
3					
dark 2.5					

Value	1	2	3	4	6	8
light 8						
7						
6						5
5						24
4						
3						
dark 2.5						

Value	0	2	4	6	8	Value
light 8						light
7						
6						
5						
4						
3						
dark 2						dark

Pottery Type = Plain Gray Utility Ware *n=30*

Value	0	2	4	6	8
light 6					
5					
4					
3					
dark 2.5					

Value	1	2	3	4	6	8
light 8						
7						
6						5
5						19
4						
3						
dark 2.5						

Value	0	2	4	6	8	Value
light 8						light
7						
6						
5					6	
4						
3						
dark 2						dark

Figure 10. Munsell colors of sherds refired in an oxidizing atmosphere.

For Rio Grande Glaze Ware sherds from the site, the only other consistently used temper type is hornblende latite. Noted for long black laths of hornblende in a light ground matrix, this temper type occurs in pastes that are yellow or buff—a combination that stands out from the red paste and basalt tempers of local production at Pottery Mound. Instead, vessels with hornblende latite temper were trade pieces from the north. It is not certain, however, whether all such pottery emanated exclusively from Tonque Pueblo, where this type paste and temper was first identified (Warren 1969). Similar pastes and tempers are also typical for vessels from the Classic period pueblos of the Galisteo Basin (Schleher 2010b). Moreover, granitic and andesitic rocks were employed at Classic period towns in the Albuquerque district (Franklin 2012, 2017; Kurota n.d.; Shepard 1942). At present it is not possible to discriminate among these ceramic manufacturing areas, so all of them could have supplied glaze ware pieces to Pottery Mound. Whatever the specific source or sources, imports were minimal compared to the number of glaze ware vessels produced at Pottery Mound.

For the imported ceramic types, pastes and tempers were typical for their districts of origin. Sherds of the Cibola White Ware types, Puerco-Escavada and Socorro Black-on-white, are mostly tempered with crushed potsherds, with occasional tiny bits of black basalt. Abiquiu Black-on-white shows the typical Biscuit Ware attributes: a fine but porous paste and spicules of tuff, in a thick vessel wall. Pottery arriving from the Little Colorado and Acoma-Zuni areas (Wingate, Kwakina, Pinnawa, and Kechipawan) has prominent fragments of potsherd, but some sherds also include tiny pieces of basalt. the Hopi area yellow ware has fine yellow paste with no visible temper or else very fine sand.

Utility pottery often is thought of the most typically “local” ceramic category. While this is mostly true, examination of corrugated and plain utility sherds at Pottery Mound revealed that even utility vessels were at times transported long distances, from the Acoma-Zuni and Hopi regions (Franklin 2014). In the Annex sample, importing of utility pottery is indicated by the two utility sherds with potsherd temper and two others with mica schist temper. The latter are undoubtedly trade pieces from the pueblos on the Rio Grande, where micaceous utility jars were common (Warren 1981). Otherwise, utility ware temper posed no surprises. The two kinds of basalt utilized in utility ware were those utilized in painted glaze ware (although the darker basalt was preferred for the utility vessels, and the temper was ground more finely when intended for painted vessels). Between them, the two basalts account for the temper in 94 percent of the utility sherds. Very little sandstone or sandstone-basalt was seen.

In sum, the sherd sample from the Annex, whether glaze ware or utility pottery, closely matches the clays and tempers documented from the main village of Pottery Mound. Combining the data from both locations, there is no discernible change in paste or temper materials during the 250 years of local production. The sherds that do deviate from this pattern are mostly verified imports arrived from the Hopi, Acoma-Zuni, Middle Rio Grande Valley, and Santa Fe-Bandelier areas.

Chapter 5

RADIOCARBON DATES

As this paper was nearing completion, new radiocarbon dates were obtained from several of the profiles studied by Marshall. Two of the new dates are from the Annex; they were obtained from maize cobs and cupules found in a shallow depression at the north end of the embankment (at Profile 9), and derive from activities associated with the uppermost Annex deposits. The dates thus relate to the pottery collected from the Annex surface and described in this report.

The samples were processed by Beta Analytic (see Appendix D). The two resulting calibrated dates are identical: A.D. 1470–1640 at the 95.4 percent confidence level. Michael Bletzer recalibrated the dates using the Oxcal program, but his results were essentially the same as the calibrated dates from Beta. The midpoint of this date range is consistent with the latest ceramics found on the surface of the Annex nearby: mid-Glaze E, made about the mid-1500s. Taken together, the sherd sample, the Euroamerican artifacts found by Bruce Ellis and Michael Marshall, and the two radiocarbon dates indicate that a few people were still at Pottery Mound at the time of the Spanish *entradas.*

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Chapter 6

DISCUSSION AND CONCLUSIONS

Pottery Mound's spectacular kiva murals and apparent contacts with the Hopi area have distracted attention from basic but important matters such as ceramic typology. Even when scholars did examine the pottery (e.g., Voll 1961, Eckert 2008), differences in samples and methods may mean that the resulting sherd counts are not entirely compatible with my own. These caveats aside, the basic patterns of ceramic production and consumption are now becoming clear.

Pottery Mound Polychrome was a unique achievement, not being made anywhere but at Pottery Mound. Otherwise, the local sequence of glaze ware vessel forms and rim shapes is remarkably close to that defined by Mera (1933) and refined by Eighth Southwestern Ceramic Seminar (Honea 1966). Although Pottery Mound is a geographical outlier of the Middle Rio Grande District, it should be considered part of that district. Thus, the context for interpreting Pottery Mound includes recent research in Classic period pueblos in the Albuquerque area—at Alameda (Kurota 2008), Chamisal (Franklin 2012, Kurota n.d.), Piedras Marcadas (Franklin 2017), Montaño Bridge (Franklin and Schleher 2012), and the in the South Valley near Valencia (Franklin 1997). Those studies have allowed further refinements in the glaze ware sequence, sometimes with the help of AMS radiocarbon dates. These studies have confirmed that the glaze ware bowl rims adhere to the following approximate pattern:

Glaze A bowl rims: 1300 to 1425
Glaze A and B bowl rims: 1425 to 1450
Glaze A and C bowl rims: 1450 to 1475 or 1490
Glaze D rims: 1490 to 1525 or later
Glaze E rims: 1525 to 1600
Glaze F rims: 1600 to 1680

Continuity and Change at Pottery Mound

Ceramic production at Pottery Mound was both substantial and continuous from Glaze A through Glaze C times. At both the main village and the Annex, glaze ware bowl rims are dominated by Glaze A forms. The early end of its local time range is indicated by an undisturbed, stratigraphically early deposit found by Michael Marshall, containing Glaze A (Arenal Glaze Polychrome) sherds along with White Mountain Red Ware (Heshoutauthla and St. Johns types), and black-on-white pottery. The deposit indicates that the occupation of Pottery Mound—and local production (or at least use) of glaze ware vessels—began no later than the very early 1300s. Ceramic evidence at Pottery Mound and elsewhere in the Middle Rio Grande district indicate that bowls with Glaze A rims were made until about 1490.

Glaze B and especially Glaze C rims are less common, but occur consistently across the main village. In the one good stratigraphic sample from the main village, collected by Linda Cordell's students in 1979, Glaze B and C bowl rims became more common through time.

Several Glaze D sherds were recovered from Levels 2 and 3 of the Cordell test, near the top of the deposits (Franklin 2007). Three AMS radiocarbon dates from the upper levels of the test suggest that the upper levels may have been deposited between 1450 and 1490 (Franklin 2010). In the main village as a whole, however, Glaze D sherds were rare, indicating that Pottery Mound was in decline. The near absence of Glaze E sherds in the main village indicates that after about 1490, the main village lay empty,

What makes the Annex stand out from the main village is the many examples of late glaze ware types. In fact, the amount of late Glaze C (Kuaua), Glaze D (San Lazaro), and E (Puaray) from the Annex far exceeds the count from the main village, even though the Annex sample is much smaller. It is clear that after the main part of the village was no longer in use, a few families persisted in the area known as the Annex. The Glaze E found there is early Glaze E, not the technically degenerate Glaze E–F to F seen at elsewhere in the Middle Rio Grande district. I interpret the assemblage to mean that the final families did not leave until about 1550 or even slightly later, but were gone well before 1600. The two recently obtained radiocarbon dates, based on samples from Profile 9 at the Annex, also indicate occupation into the mid-1500s. Based on this reconstruction, Pottery Mound was occupied at least 75 years beyond the end dates found in many publications.

Because of the slightly different historical trajectories for the main village and the Annex, it is important to note the continuity in ceramic production and use. The pastes and tempers used in Annex sherds (both Rio Grande Glaze Ware and local utility ware) were those used in the main site. Moreover, pastes and tempers did not change during the local occupation. As this report indicates, for example, the early (A through C) and late (D and E) sherds from the Annex have the same pastes and temper types. What we see is a "community of practice" that spanned the main village and the Annex, and that drew on clays and rocks found nearby (Eckert 2003, 2008; Franklin 2010; Voll 1961). This continuity of ceramic production and use suggests a continuity of settlement and society from the early 1300s until the mid-1500s.

Pottery Mound as a Contact Period Site

In 1950, Bruce Ellis discovered a piece of Spanish chain mail at Pottery Mound, within the main part of the village (Ellis 1956). Frank Hibben dismissed the discovery by stating that "there is no mention of an occupied pueblo in the Puerco area in the journals of the Spanish" (Hibben 1975:3). He added, "Such an omission would have been most unusual, since the Spanish conquistadors and the priests accompanying them were very meticulous in recording all they found" (Hibben 1975:88). Recently, however, additional pieces of chain mail have been found on the site (Michael Marshall, 2018 personal communication). As we have just seen, the ceramic evidence indicates that a small population was still in residence at the Annex when the Spanish began exploring central New Mexico in 1540.

David Snow provides tantalizing clues that the final residents of Pottery Mound were recorded by at least one Spanish *entrada*. Although distances and directions recorded by the chroniclers are at times vague, several references appear to describe travel into the Rio Puerco drainage and the existence of a native settlement there. During the Coronado expedition of 1540–1541, Castañeda recorded a route from Acoma and Laguna down the Rio San José to its confluence with the Rio Puerco (Hammond and Rey 1940), and then down the Puerco. The route would have taken them past Pottery Mound, which may have been Castañeda's village of Tutahaco (Snow 2007:165).

Similarly, the records of the Chamuscado-Rodriguez expedition of 1581–1582 tell of a pueblo on a tributary of the Rio Grande; the explorers called the village Nueva Tlaxcala. Snow (2007:170) believes that these more detailed journals of this expedition show that "the route up a side tributary of the Rio Grande could only have been the Rio Puerco."

Finally, an addendum to Benavides' Memorial of 1630 provides a brief description of nine "provinces" to be found within New Mexico. The description mentions a village called La Ciudad in the Tihues (Tiguex) province. While we are again plagued by geographic uncertainty, this "city" appears to have been located in the vicinity of Pottery Mound. The ceramic evidence reported here indicates that Pottery Mound was abandoned by 1630, but Snow (2007:170) believes that Pottery Mound "is a good candidate for the enigmatic La Ciudad/Nueva Tlaxcala."

In summary, lines of evidence including Glaze E Pottery, radiocarbon dates, and multiple finds of chain mail suggest that Pottery Mound survived just long enough to be visited by some of the first Spanish to reach New Mexico. This appears to be the case whether or not we can tie Pottery Mound to one of the villages mentioned in Spanish documents. We can no longer accept Frank Hibben's (1975:11) contention that "No evidence was found to suggest that Pottery Mound was inhabited as late as the sixteenth century ... Thus, in 1540, when Coronado and his Spanish soldiers marched up the Rio Grande, Pottery Mound was already only a pile of rubble."

Pottery Mound in Time and Space

Prior to the explosion of glaze wares during the Classic period, the small pit house villages in the lower Rio Puerco Valley made and used Cibola White Ware, with Socorro Black-on-white being the most common local type. Cibola White ware was carefully made and featured designs in black mineral paint on a white slip background. Surveys from the 1950s (Fenenga 1956; Fenenga and Cummings 1956) through recent times have revealed how prevalent these villages were.

After 1300, the shift to large adobe pueblos changed the cultural landscape dramatically. The shift in building styles, construction materials, and town size and layout coincided with a shift in decorated pottery from Cibola White Ware to Rio Grande Glaze Ware. There were, undoubtedly, concomitant shifts in religion, social interactions, and world view.

Given new evidence that Pottery Mound was established near the start of the 1300s, while Socorro Black-on-white was still being made, there appears to be little or no time gap between the multiple local pit house villages and the single large village along the local stretch of the

lower Puerco. If so, it is reasonable to surmise local population continuity between the Coalition and Classic periods. Taking a wider perspective, we can see that Pottery Mound was occupied as early as any of the other major Classic period pueblos along the Middle Rio Grande. It was probably occupied as early as Tijeras Pueblo, which has yielded the earliest tree-ring date (A.D. 1313) associated with Rio Grande Glaze Ware (Cordell 1980b:66). Indeed, the "big picture" is that in the Middle Rio Grande area, glaze ware production and use spread quickly over a wide area, along with changes in architecture and settlement patterns. One likely trigger of such rapid and widespread change is the arrival of new ideas from elsewhere, perhaps brought by immigrants.

During its heyday, from 1325 to 1475, Pottery Mound must have been a cultural mecca. Connections to the west were first indicated by imports of White Mountain Red Ware (mainly St. Johns and Heshotauthla Polychrome). During the glaze ware production period, the village received large quantities of decorated and utility pottery from the Acoma-Zuni villages (Kwakina, Pinnawa, and Kechipawan types) and lesser amounts of yellow ware vessels from the Hopi area (Jeddito and Sikyatki types). The connections in that direction extended as far as 360 km (225 miles) away. Arriving from shorter distances (up to 130 km or 80 miles away), other vessels indicated ties to the pueblos to the north and east. Both painted and utility pottery arrived from the Middle Rio Grande Valley (Albuquerque area), while Biscuit Ware came from the Santa Fe–Pajarito Plateau areas.

At some point after 1475, Pottery Mound went into decline, and by about 1490 the main part of the village may have lain empty. When this happened, occupants of the "barrio" known as the Annex held on for at least another two generations. This claim is based on is the abundant Glaze D and E rims and radiocarbon dates falling in the mid-1500s. The chain mail found by Bruce Ellis and Michael Marshall, along with the passing references documented by David Snow, indicate that the Spanish stopped at Pottery Mound when the final residents were still present. But sometime after the Coronado expedition of 1540–1541, those few families moved away, no doubt to join some other Pueblo community. In the Albuquerque Basin, not far away, such communities persisted until at least 1600, and in some cases until the Revolt of 1680. Thus, the final residents of the Annex could have found new homes at villages such as Alameda Pueblo (Kurota 2008), Chamisal Pueblo (Franklin 2012; Kurota n.d.), and Piedras Marcadas (Franklin 2017). The same places may have taken in the families that left the main village between 1475 and 1490.

We do not know why the people of Pottery Mound moved away. We can say that the collapse of the community was not abrupt, but took at least half a century. It is easy to imagine a process of attrition, in which families or other small groups of Pottery Mound residents left for other villages. No doubt, many instances of village abandonment involved a similar process. In any case, the last villager was gone by about 1550. Pottery Mound then lay unnoticed until 1883, when Bandelier marveled at its "brilliant display of pottery."

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Appendix A

H. P. MERA'S POTTERY MOUND SURFACE COLLECTION

David H. Snow

The following types identifications and counts were prepared by Linda Cordell and myself on October 16, 2007, using the surface collection from Pottery Mound (LA 416) made by H. P. Mera during the late 1920s. A note on the accompanying slip in the sherd drawer, in Mera's handwriting, states that "An intensive search yielded rim forms from A to E with other sherds showing certain techniques that point very strongly to Group F." Neither Linda nor I observed the "certain techniques" indicated, but it is possible that Mera left those sherds in place (might not portions of Pottery Mound have been utilized as a refugee place?). No effort was made to examine sherd temper during the tabulation.

Agua Fria Glaze-on-red, with direct rims (n =28)
Agua Fria with overall orange slips and direct rims (color is close to that of Heshotauthla Polychrome) (n = 3)
Agua Fria with direct rims and light and dark contrasting pale to dark red slips (the lighter slip colors are consistently on the interiors of bowls) (n =17)
Agua Fria Glaze-on-red with Glaze C rim (n = 1)
Sanchez Glaze-on-red with ticked rim (n = 1)
Cieneguilla Glaze-on-yellow (n = 7)
Cieneguilla Glaze Polychrome (n = 2)
San Clemente Glaze Polychrome (n = 17)
San Clemente Glaze Polychrome with B rim ("Medio Glaze Polychrome") (n = 1)
San Clemente Glaze Polychrome with C rims (n = 8)
Pottery Mound Polychrome with direct rims (n = 13)
Pottery Mound Polychrome with B rims (n = 3)
Pottery Mound Polychrome with C rims (n = 25)
Pottery Mound Poly with exaggerated angular rim, *à la* Mera's Kuaua Glaze Polychrome (n = 6)
Largo Glaze Polychrome (n = 1)
Largo Glaze-on-yellow (n = 5)
Kuaua Glaze-on-red (n = 1)
Espinoso Glaze Polychrome (n = 10)
San Lazaro Glaze Polychrome (n = 11)
Puaray Glaze Polychrome (n = 7)
Acoma Gamma-Delta rim (n = 1)
Kechipawan Glaze-on-white (n = 4)
Kwakina Polychrome (n = 6)

Two sherds have black carbon paint on white and red interior elements. One is quite thick and reminiscent of Biscuit B. The other is quite thin. The design styles are not readily identifiable, but the former might be called Biscuit Polychrome. These are not identifiable historic Tewa series, but the possibility remains!

Total count, 180 sherds. Of the Rio Grande Glaze Ware sherds, 49 percent have A rims, 6.5 percent have B rims, 33 percent are Glaze C, 7 percent have D rims, and 4.5 percent have E rims. Here, Pottery Mound Polychrome here is counted as Glaze C regardless of rim form; if Pottery Mound Polychrome with direct rims are considered Glaze A, the A and C percentages would be altered considerably.

Uncounted sherds include a minimum of 10–15 Socorro Black-on-white, a similar number of Biscuit B sherds, and 15+ Jeddito or Awatovi Yellow Ware.

Appendix B

PHOTOGRAPHS OF POTSHERDS FROM THE ANNEX AT POTTERY MOUND

Figure B.1. Glaze A bowl rims (interior views).

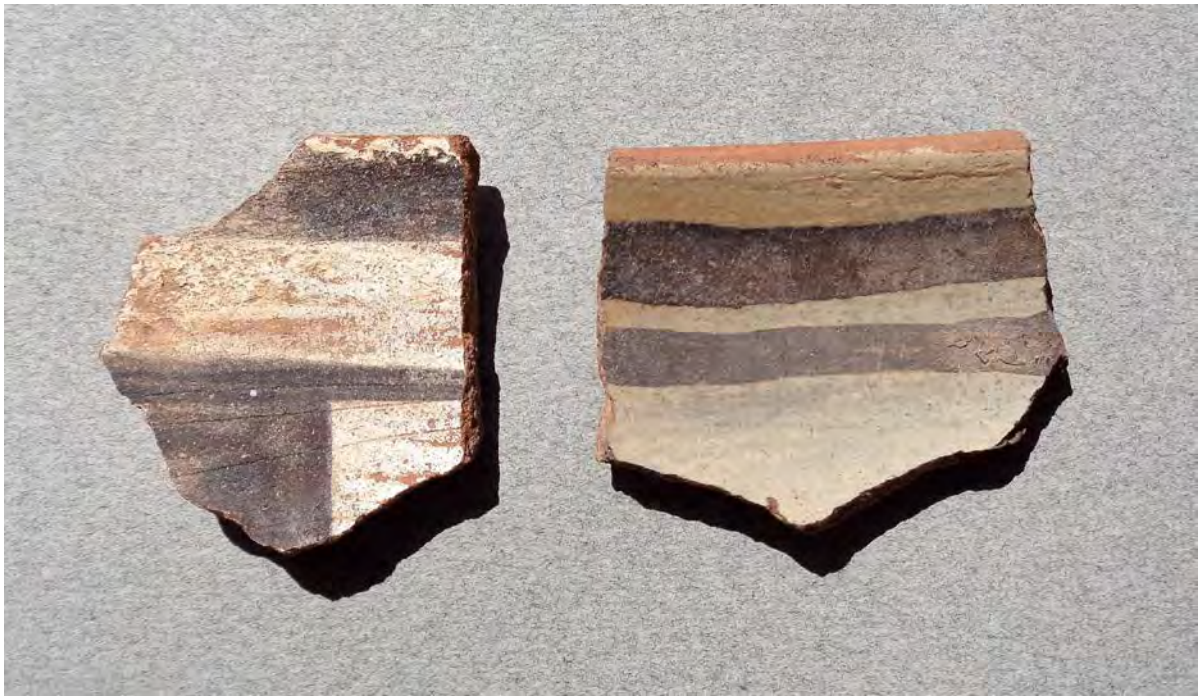


Figure B.2. San Clemente Glaze Polychrome bowl rims (interior views).

Figure B.3. Additional San Clemente Glaze Polychrome bowl rims (interior views).

Figure B.4. Pottery Mound Glaze Polychrome bowl interior, “Hopi” style.

Figure B.5. Pottery Mound Glaze Polychrome jar fragment.

Figure B.6. Pottery Mound Glaze Polychrome jar sherd.

Figure B.7. Pottery Mound Glaze Polychrome bowl rim.

Figure B.8. Glaze C rims (interior views). Left: Espinoso Glaze Polychrome. Right: Kuaua Glaze Polychrome.

Figure B.9. Glaze C rims (exterior views). Left; Espinoso Glaze Polychrome. Right: Kuaua Glaze Polychrome.

Figure B.10. Three Glaze C, Kuaua Glaze Polychrome bowl rims (exterior views).

Figure B.11. Three Glaze C, Kuaua Glaze Polychrome bowl rims (interior views).

Figure B.12. Kuaua Glaze Polychrome bowl rims with exterior decorations (exterior views).

Figure B.13. Kuaua Glaze Polychrome bowl rims with exterior decorations (interior views).

Figure B.14. Kuaua Glaze Polychrome bowl rim, yellow slip (exterior view).

Figure B.15. Kuaua Glaze Polychrome bowl rim, yellow slip (interior view).

Figure B.16. Glaze D, San Lazaro Glaze Polychrome bowl rims (interior views).

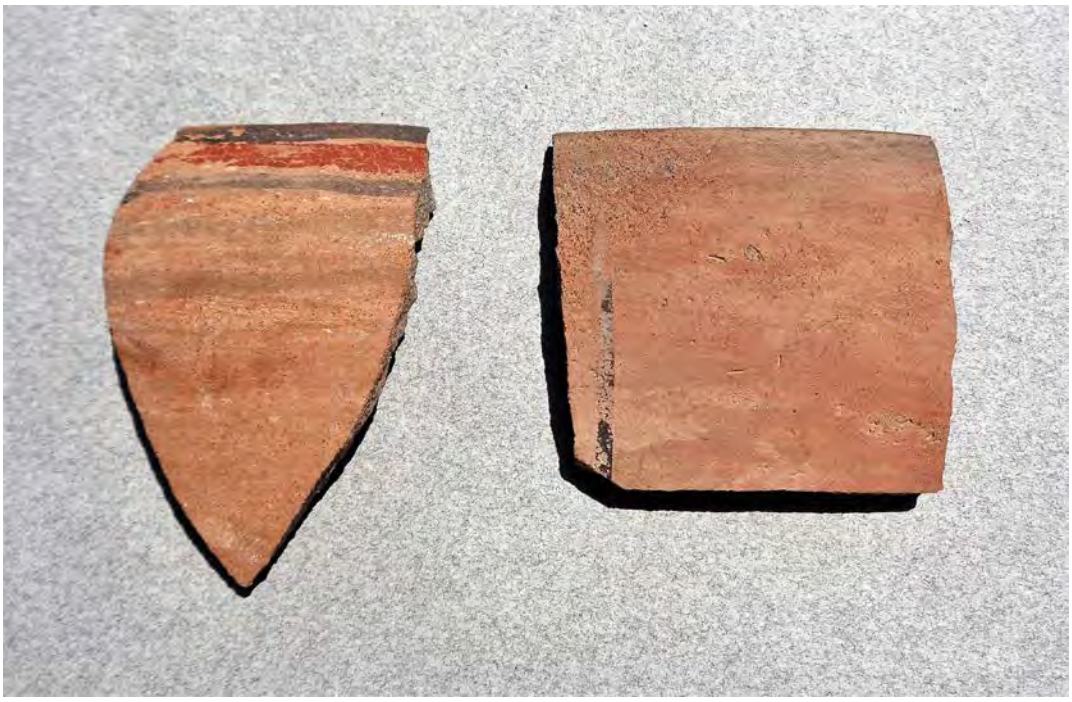


Figure B.17. Glaze D, San Lazaro Glaze Polychrome bowl rims (exterior views).

Figure B.18. Glaze D carinated shoulder.

Figure B.19. San Lazaro Glaze Polychrome bowl rim (interior view).

Figure B.20. San Lazaro Glaze Polychrome bowl rim (exterior view).

Figure B.21. Glaze E, Puaray Glaze Polychrome, bowl rims (interior views).

Figure B.22. Glaze E, Puaray Glaze Polychrome, bowl rims (exterior views).

Figure B.23. Glaze E bowl rim (exterior view).

Figure B.24. Glaze E bowl rim with bubbly glaze (exterior view).

Figure B.25. Glaze E bowl rim with unusual decoration (exterior view).

Figure B.26. Glaze E bowl rim with unusual decoration (interior view).

Figure B.27. Hopi area yellow ware: Jeddito and Sikyatki sherds.

Figure B.28. Wingate Black-on-red bowl sherd.

Figure B.29. Pinnawa Glaze-on-white bowl rim (interior view).

Figure B.30. Pinnawa Glaze-on-white bowl rim (exterior view).

Figure B.31. Kechipawan Polychrome bowl (interior view).

Figure B.32. Interior handle in jar.

Figure B.33. Sherd of exposed-coil bowl (exterior view).

Figure B.34. Polychrome worked sherd (gaming piece).

Figure B.35. Corrugated utility jar sherd (exterior view).

Figure B.36. Micaceous plain utility jar rim (interior view).

Appendix C

PHOTOGRAPHS OF POTTERY TEMPERS AND ROCKS

Figure C.1. Socorro Black-on-white, showing white paste and sherd temper.

Figure C.2. Kechipawan Polychrome, showing white paste and sherd temper.

Figure C.3. Glaze D, showing dark basalt temper.

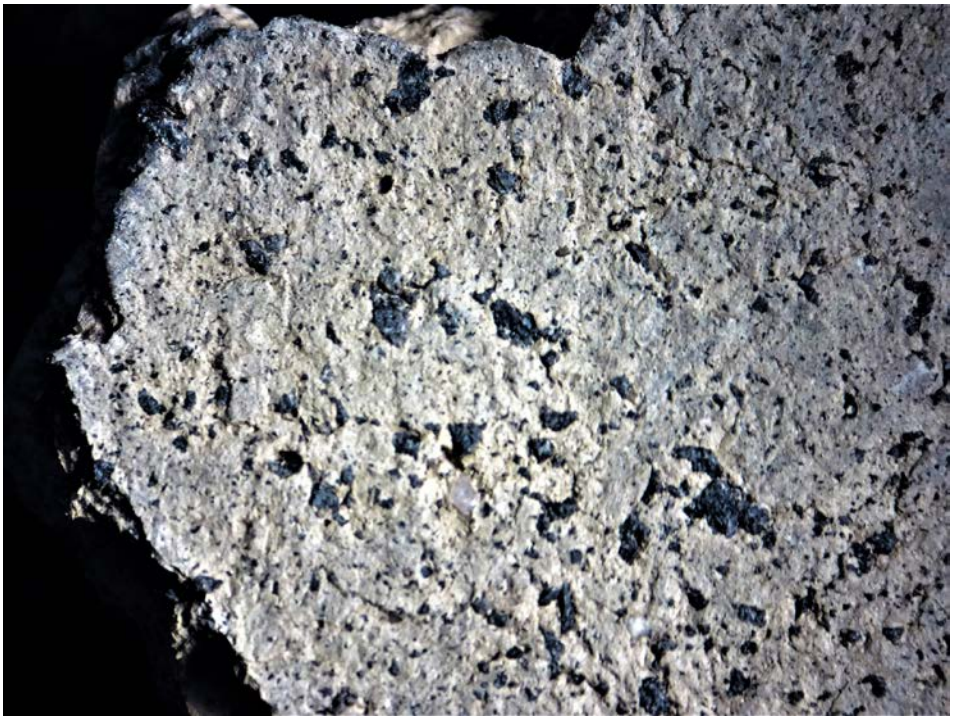


Figure C.4. Rio Grande plain gray utility ware, showing black basalt temper.

Figure C.5. Rio Grande plain gray utility ware, showing black basalt temper.

Figure C.6. Rio Grande plain gray utility ware, showing black basalt temper.

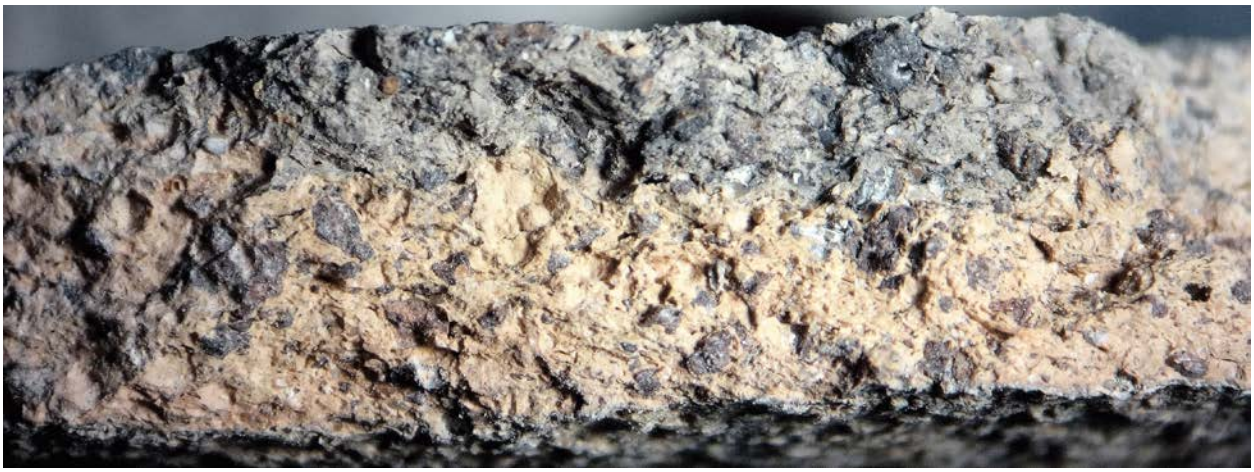


Figure C.7. Rio Grande plain gray utility ware, showing red basalt temper.

Figure C.8. Glaze D, showing red and black basalt temper.

Figure C.9. Rio Grande plain gray utility ware, showing sandstone temper.

Figure C.10. Glaze polychrome showing sandstone temper.

Figure C.11. Rio Grande plain gray ware, showing sandstone temper.

Figure C.12. Glaze D, showing sandstone temper.

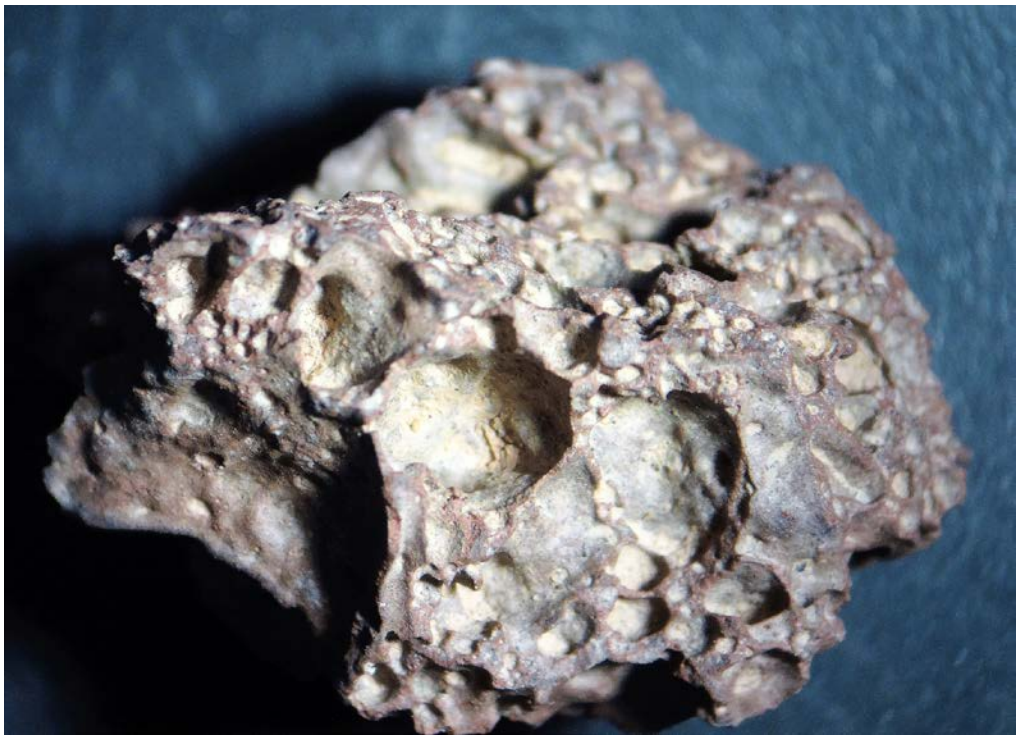


Figure C.13. Red vesicular basalt sample from Annex.

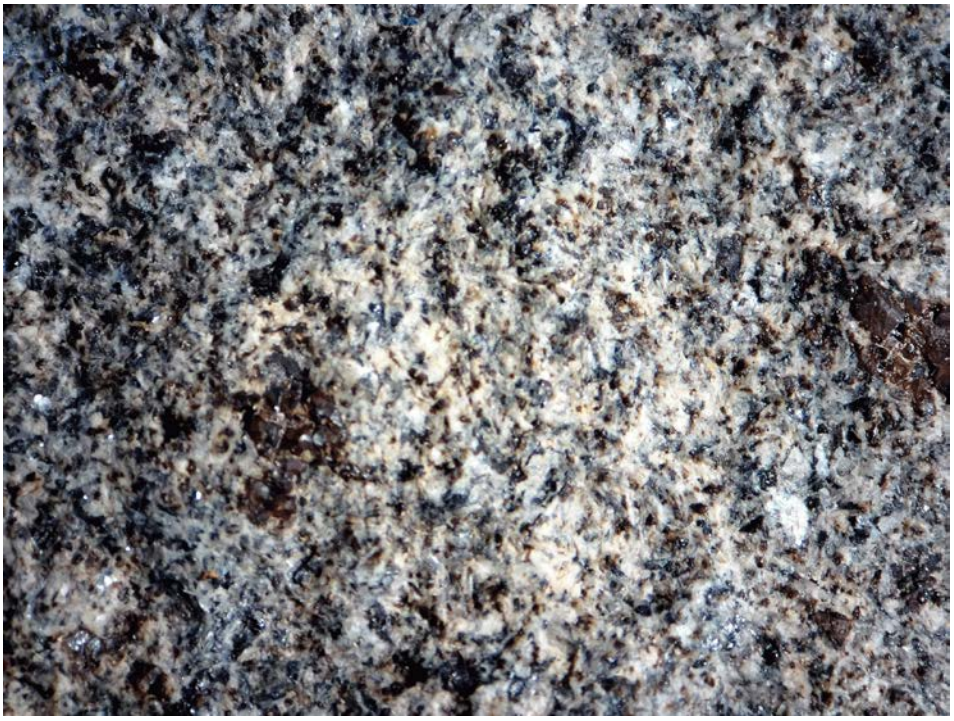


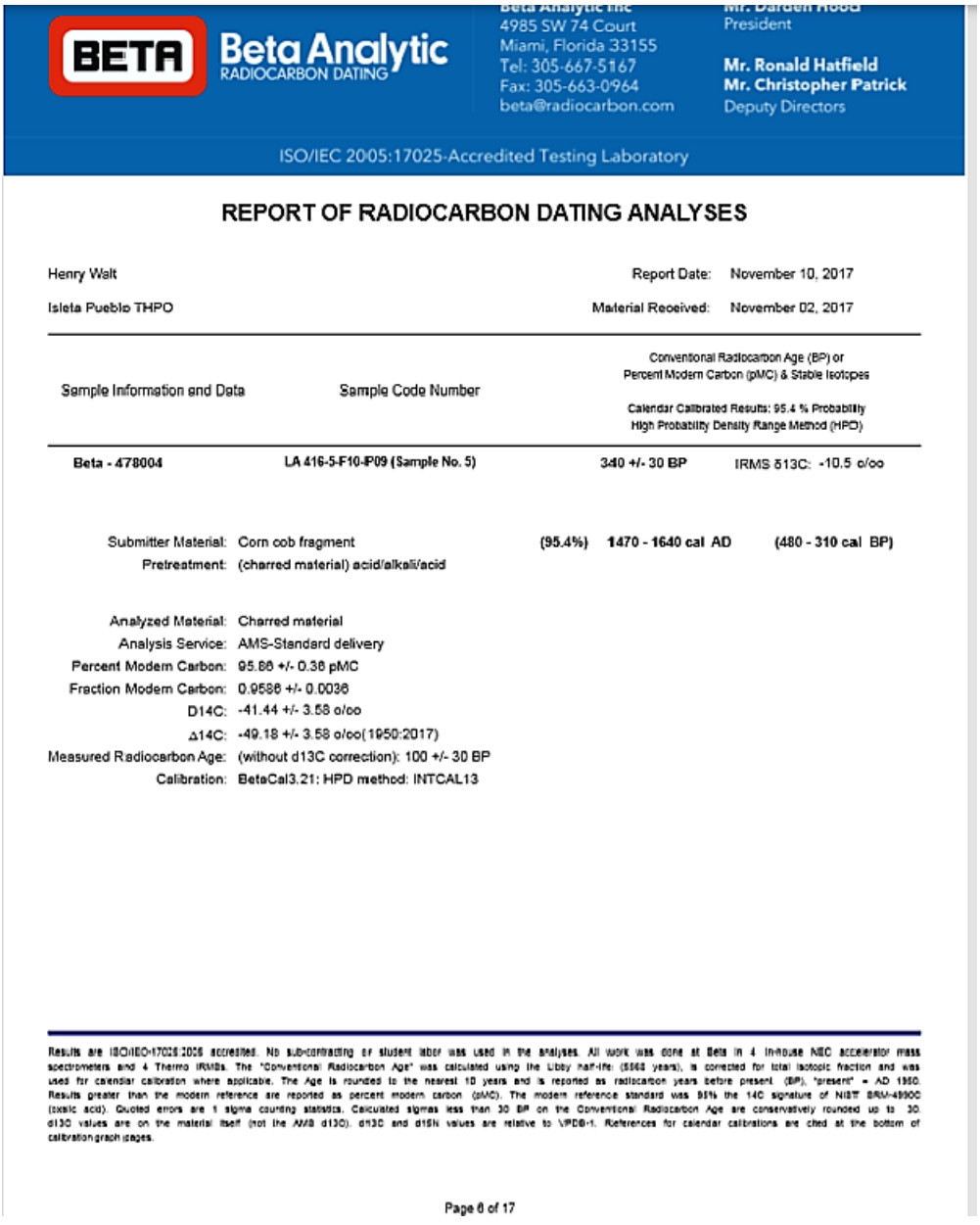
Figure C.14. Basalt rock sample from Annex.

Figure C.15. Sandstone sample from Annex.

Figure C.16. Red vesicular basalt and dark diabase basalt from Annex.

Appendix D

RADIOCARBON DATES FROM PROFILE 9 AT THE ANNEX



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Mr. Christopher Patrick
Deputy Directors

Beta Analytic
RADIOCARBON DATING

ISO/IEC 2005:17025-Accredited Testing Laboratory

REPORT OF RADIOCARBON DATING ANALYSES

Henry Walt — Report Date: November 10, 2017

Isleta Pueblo THPO — Material Received: November 02, 2017

Sample Information and Data	Sample Code Number	Conventional Radiocarbon Age (BP) or Percent Modern Carbon (pMC) & Stable Isotopes Calendar Calibrated Results: 95.4 % Probability High Probability Density Range Method (HPD)	
Beta - 478004	**LA 416-5-F10-P09 (Sample No. 5)**	**340 +/- 30 BP**	IRMS δ13C: -10.5 o/oo

Submitter Material: Corn cob fragment
Pretreatment: (charred material) acid/alkali/acid

(95.4%) 1470 - 1640 cal AD (480 - 310 cal BP)

Analyzed Material: Charred material
Analysis Service: AMS-Standard delivery
Percent Modern Carbon: 95.86 +/- 0.36 pMC
Fraction Modern Carbon: 0.9586 +/- 0.0036
D14C: -41.44 +/- 3.58 o/oo
Δ14C: -49.18 +/- 3.58 o/oo(1950:2017)
Measured Radiocarbon Age: (without d13C correction): 100 +/- 30 BP
Calibration: BetaCal3.21: HPD method: INTCAL13

Results are ISO/IEC+17025:2005 accredited. No subcontracting or student labor was used in the analyses. All work was done at Beta in 4 in-house NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP), "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the 14C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. d13C values are on the material itself (not the AMS d13C). d13C and d15N values are relative to VPDB-1. References for calendar calibrations are cited at the bottom of calibration graph pages.

Page 6 of 17

Beta Analytic
RADIOCARBON DATING

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REPORT OF RADIOCARBON DATING ANALYSES

Henry Walt
Isleta Pueblo THPO

Report Date: November 10, 2017
Material Received: November 02, 2017

Sample Information and Data	Sample Code Number	Conventional Radiocarbon Age (BP) or Percent Modern Carbon (pMC) & Stable Isotopes Calendar Calibrated Results: 95.4 % Probability High Probability Density Range Method (HPD)
Beta - 478005	LA 416-G-F11-F09 (Sample No. 6)	340 +/- 30 BP IRMS δ13C: -10.5 o/oo

Submitter Material: Corn cupules
Pretreatment: (charred material) acid/alkali/acid

(95.4%) 1470 - 1640 cal AD (480 - 310 cal BP)

Analyzed Material: Charred material
Analysis Service: AMS-Standard delivery
Percent Modern Carbon: 95.86 +/- 0.36 pMC
Fraction Modern Carbon: 0.9586 +/- 0.0036
D14C: -41.44 +/- 3.58 o/oo
Δ14C: -49.18 +/- 3.58 o/oo(1950:2017)
Measured Radiocarbon Age: (without d13C correction): 100 +/- 30 BP
Calibration: BetaCal3.21: HPD method: INTCAL13

Results are ISO/IEC-17025:2005 accredited. No sub-contracting or student labor was used in the analyses. All work was done at Beta in 4 inhouse NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP), "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the 14C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. d13C values are on the material itself (not the AMS d13C). d13C and d15N values are relative to VPDB-1. References for calendar calibrations are cited at the bottom of calibration graph pages.


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