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MISSION STATEMENT

Pottery Southwest, a scholarly journal devoted to the prehistoric and historic pottery of the Greater Southwest (<https://potterysouthwest.unm.edu>), provides a venue for student, professional, and avocational archaeologists to publish scholarly articles, as well as providing an opportunity to share questions and answers. Published by the Albuquerque Archaeological Society since 1974, *Pottery Southwest* is available free of charge on its website which is hosted by the Maxwell Museum of the University of New Mexico.

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AN UNUSUAL SHERD FROM TALUS UNIT NO. 1, CHACO CANYON, NEW MEXICO

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Among the collections at the Maxwell Museum of Anthropology at the University of New Mexico (Maxwell Acc. 37.32.186) is a polychrome sherd (Figure 1) that was identified as coming from University of New Mexico 1935 field school excavations at Talus Unit No. 1 in Chaco Canyon. Hayward Franklin and Peter J. McKenna identified it as a Glaze D/San Lazaro Glaze Polychrome sherd (personal communications 2018). This type is found at sites in the Middle Rio Grande Valley and is dated to about A.D. 1490-1515. Such a late dated sherd would be an anomaly in a site where ceramics suggest the last occupation of Talus Unit No. 1 was in the mid- to late-twelfth century or approximately 300 years earlier (Mathien and Windes 2018). The provenience for this accession number is the uppermost level of excavations (Level 1) in Room 18 (the northeast corner of the rectangular room that encloses Kiva D). An explanation for its presence was sought, and several possible reasons have been offered.

First, because glazeware was among the pottery types found in the Jemez District where the university also conducted a summer field school in 1935, McKenna thought it could have been one picked up by student excavators who attended both sessions (personal communication 2018). There is some overlap in the dates for the field schools for that season—Chaco was held from June 25 to August 10, while Jemez ran from August 4 to August 31 (Hewett 1935:9-10). Since the Chaco session was held prior to the Jemez session, it is not likely that this is the most promising explanation.

Second, the sherd could have been mixed into the Talus Unit No. 1 collection at some time after the excavations were completed. S. Elizabeth Murphey (1936), who analyzed the sherds from the 1935 excavations, did not include glazeware types in any of her ceramic analysis categories. For the other sherds from the same provenience, Murphey (1936) and Windes (Mathien and Windes 2018) generally agree regarding dating for sherd types. Windes's identification of types suggests a mid-to-late A.D. 1100s fill of this kiva enclosure area.

There has likely been considerable movement of the 1935 ceramic collection following its recovery in Chaco, probably to the University of Southern California where Murphey was a student, and finally to what is now the Maxwell Museum of Anthropology at the University of New Mexico. However, there is no paper trail to confirm how the ceramics moved from Chaco Canyon to the University of New Mexico. The Maxwell Museum 1937 accession date suggests that if the collection travelled with Murphey to California, it was returned fairly promptly.

In the interval between 1937 and today, collections of the Maxwell Museum have moved around. Boxes that were brought in decades ago were initially retained in the basement of Scholes Hall and later moved into the new, and current, museum facility that also includes a warehouse located on campus. During this long interval, some of the museum collections were subjected to deterioration of information due to such events as flooding of basement areas, and some mixing of artifacts and information could have resulted.



Figure 1. Interior and exterior views of the San Lazaro Polychrome sherd from the Talus Unit No. 1 ceramic collection.

Third, a sherd could have been left on the site by Pueblo people who returned to visit their ancestral homeland in Chaco or left during visits to the museum collections. Because the sherd was among those from the upper layer of fill in Kiva D, mixing of this sherd with other late sherds from the site is possible. That the sherd is a polychrome suggests either a Keresan or southern Tewa member. It is likely that some of the inhabitants of Chaco Canyon migrated eastward and southward to areas now populated by the Keres or southern Tewa (Roney 1996). Population clusters during the late twelfth century are found on the eastern Chacra Mesa, and a movement along the Rio Puerco of the East to the Rio Grande Valley is probable as farmers sought better watered agricultural lands. In their summary of Pueblo IV communities in the Central Rio Grande Valley, Eckert and Cordell (2004) indicate there is evidence for the production and use of black-on-white wares and glazewares, the latter being the predominant style in the area occupied by later Keres and southern Tiwa (Tiguex) speaking peoples. However, it seems extremely unlikely that a Chaco descendant left the sherd on the site prior to the field school or Murphey would have identified it as such. If it was left by a Chaco descendent, it would have been during a visit to the collection.

Fourth, someone working with the collection may have unintentionally mixed the glazeware sherd with the sherds from Talus Unit No. 1.

In summary, it appears that the glazeware sherd was not present during excavation and was integrated into the collection at a later date, possibly through mixing during transit from one institution or storage location to another or left by a visitor to the collection.

References Cited

- Eckert, Suzanne L., and Linda S. Cordell
2004 Pueblo IV Community Formation in the Central Rio Grande Valley. In *The Protohistoric Pueblo World, A.D. 1275-1600*, edited by E. Charles Adams and Andrew I. Duff, pp. 35-42. The University of Arizona Press, Tucson.
- Hewett, Edgar L.
1935 The Schools of American Research of the Archaeological Institute of America. Annual Report 1935. School of American Research, Santa Fe.
- Mathien, Frances Joan, and Thomas C. Windes
2018 Ceramics from Talus Unit No. 1. Manuscript on file, Chaco Culture NHP Museum Collection at the University of New Mexico, Albuquerque.
- Murphey, S. Elizabeth
1936 Description of Sherds found during Excavations of the Summer of 1935, Chaco Canyon, New Mexico. Manuscript on file, Chaco Culture NHP Museum Collection, Archive No. 32/3-03. University of New Mexico, Albuquerque.
- Roney, John R.
1996 The Pueblo III Period in the Eastern San Juan Basin and Acoma-Laguna Areas. In *The Prehistoric Pueblo World, A.D. 1150-1350*, edited by Michael A. Adler, pp. 145-169. The University of Arizona Press, Tucson.

AN UNUSUAL TRI-LOBED VESSEL FROM THE HOHOKAM VILLAGE OF PUEBLO GRANDE

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Introduction

Pueblo Grande was a prehistoric urban center that had ties throughout the American Southwest and northern Mexico, as evidenced by shell, minerals, obsidian, and non-local ceramics (Foster 1994a; Gregory 2020; Harbottle et al. 1994; Mitchell and Shackley 1995; Montero and Bostwick 2019). Occasional complete or almost complete examples of non-local ceramic vessels were also found at Pueblo Grande. This paper highlights a particularly uncommon vessel type—the tri-lobed vessel—found with two burials. One of the vessels was probably locally made, but the other vessel is Holbrook Black-on-white, a Little Colorado White Ware. The nature of pottery production in the Hopi Buttes, prehistoric exchange networks, the chronological and regional distribution of lobed vessels in the Southwest, and limited data on the archaeological contexts of lobed vessels all contribute to an understanding of the history of the Holbrook Black-on-white tri-lobed pitcher from Pueblo Grande and the identity of the person with whom it was buried.

Background

The prehistoric site of Pueblo Grande is located in the heart of metropolitan Phoenix, Arizona. Established as a City Museum in 1929, the site includes a platform mound, a ballcourt, a tower-like structure, and thousands of prehistoric features. The village began as a settlement in about A.D. 600, situated at a strategic location along the Salt River where several major irrigation canals were built. It appears there was a large influx of people to the village after A.D. 1100, and the platform mound and surrounding areas generally date to the Hohokam Classic period, between A.D. 1150 and 1450 (Figure 1).

Excavations by professional archaeologists, Civilian Conservation Corps and Works Progress Administration (WPA) workers, students, and volunteers were conducted at the Pueblo Grande platform mound and surrounding area as early as 1901, and continued through the 1980s. Two significant contract archaeology projects have taken place within the prehistoric village of Pueblo Grande since 1988. The first project was conducted between 1988 and 1990 in advance of State Route 143 (SR143) highway construction. Results of this project were published in a series of reports (Abbott 1994; Foster 1994b, 1994c; Kwiatkowski 1994; Mitchell 1994a, 1994b; Van Gerven and Sheridan 1994) and an edited book (Abbott 2003). This study documented over 3,000 archaeological features and greatly expanded knowledge of the site beyond the previous work that had been done around the platform mound itself (see Bostwick and Downum 1994; Downum and Bostwick 1993; Downum 1998; Mitchell et al. 2020). It also provided a baseline for all subsequent studies in terms of architectural and burial feature typologies, and artifact analyses.

Subsequent to the SR143 project, private development was occurring in all directions around Pueblo Grande. The largest archaeological investigation for a privately funded development was

conducted in an approximately 30-acre parcel immediately north of the Pueblo Grande Museum and Archaeological Park. The Sun America project was conducted by Soil Systems, Inc. between 1997 and 2002, and again in 2007, resulting in the discovery of over 2,000 features.

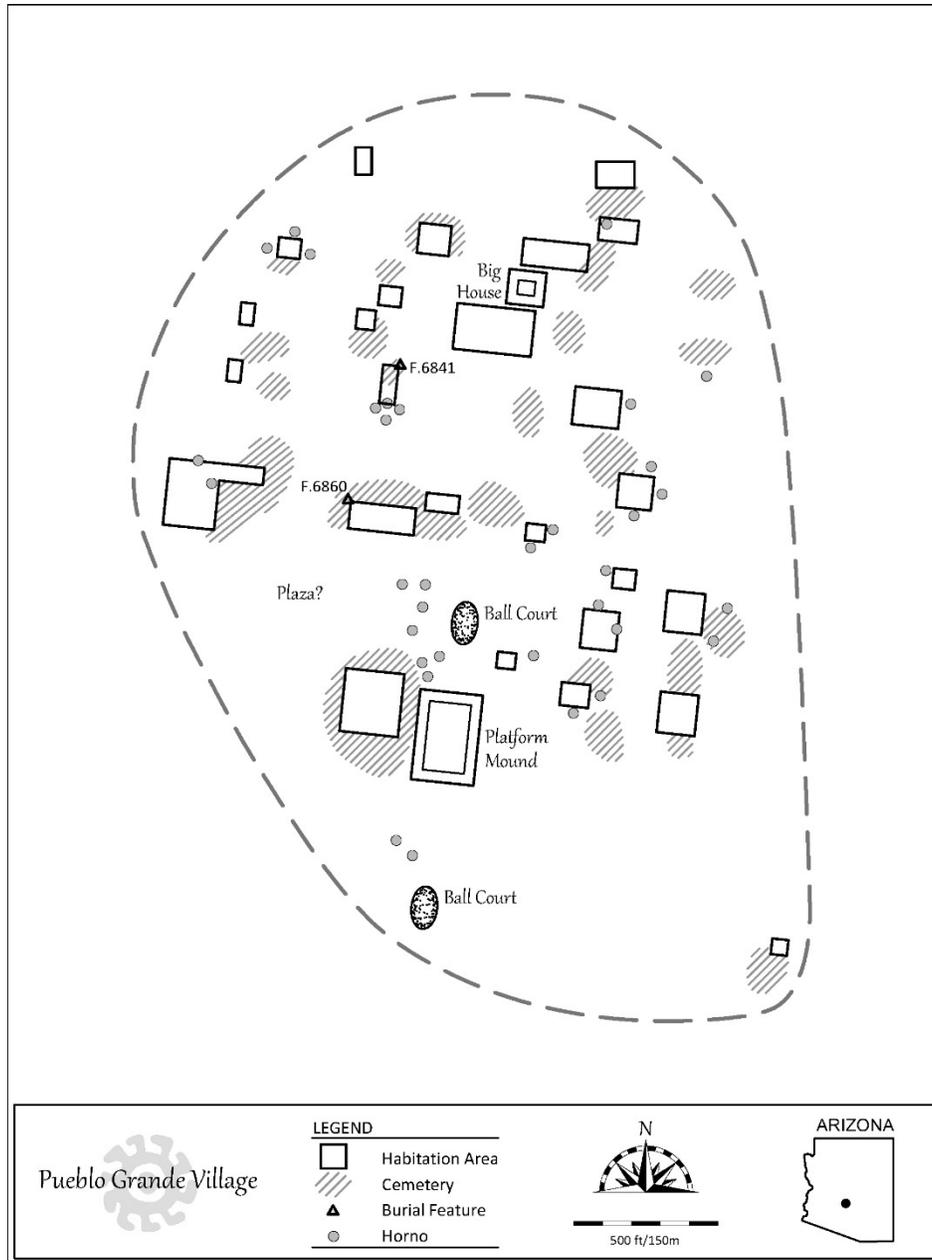


Figure 1. Schematic map of the prehistoric village of Pueblo Grande.

The thousands of features found during the SR143 and Sun America excavations included over 1,500 burials. The burials found in cemeteries and habitation areas included both cremations and inhumations. Both of these burial methods were common during the Hohokam Classic period. As with many past cultures, grave accompaniments were included with the Pueblo Grande

burials, representing a variety of social ties, personal possessions, and ritual items. The most common artifact type found with the burials was pottery. During the Hohokam Classic period, slipped and polished redware vessels replaced the red-on-buff style decoration common prior to AD 1150. Overall, plainware and redware bowls and jars accounted for the majority of the burial goods.

The Pueblo Grande Burials and Associated Pottery Vessels

Classic period Hohokam burials found in the Phoenix area have a number of common characteristics (see Mitchell 2003; Rice 2016). People who were not cremated were buried in pits generally oriented east-west with the person’s head at the east end of the pit. Most pits were simple, but about a quarter of the pits were more elaborate and included benches and niches. Artifacts were placed inside the grave pits, usually including pottery vessels but in many cases also items of personal adornment such as stone beads (including turquoise), shell beads, and pendants. The demographic profile of the burials at Pueblo Grande included people of all ages (newborns through the elderly). When sex could be determined, the proportion of women and men was essentially equal. For cremation burials, almost all consisted of secondary cremation burial features where the person’s body was cremated, and the remains were collected and placed into a pit or a pottery vessel within a pit.

A wide variety of non-local sherds was recovered from features at Pueblo Grande (Foster 1994a; Montero and Bostwick 2019), but only a very few non-local whole vessels were recovered. Of the 3,725 vessels recovered from burials in the SR143 (n=2,061) and Sun America projects (n=1,664), only 27 were non-local, and most of these were classified as Salado Polychrome (see Table 1). This assemblage also included vessels from the Sinagua, Ancestral Pueblo, and Salado culture areas in Arizona and New Mexico.

Table 1. Non-local vessels from the SR143 and Sun America projects found with burials at Pueblo Grande.

Ceramic Type	Bowl	Jar	Pitcher	Sherd Plate	Mug
Salado Polychrome					
Cliff Polychrome	1				
Gila Polychrome	8	2		1	1
Tonto Polychrome	1	2			
Gila or Tonto Polychrome	2				
Cibola Whiteware					
Cibola Whiteware		1			
Snowflake Black-on-white		1			
Little Colorado Whiteware					
Holbrook Black-on-white	1	1			
Tusayan Whiteware					
Black Mesa Black-on-white		1			
Kai’ko Black-on-white		1	1		
Flagstaff Series					
Sunset Red A		1			
Tusayan Grayware					
Tusayan Corrugated		1			

Burials 6841 and 6860

Two burials investigated by the Sun America project at Pueblo Grande contained tri-lobed vessels, Features 6841 and 6860. Feature 6841 was located in a cemetery in the north-central part of the village (Figure 1) referred to as Burial Group 27 by the original excavators. The burial was that of a young child (1-5 years old) interred in a small burial pit with a niche-shaped cross section (Figure 2). Although it is not clear from the field notes or maps, it appears that this burial may have been within the floor of a house; floor burials for infants and very young children are not uncommon in the Southwest. The burial had five pottery vessels as grave accompaniments. Two of these vessels were decorated, a small jar and a small tri-lobed vessel. The tri-lobed vessel (Figure 3) was typed as Holbrook Black-on-white, a Little Colorado White Ware that dates between A.D. 1050-1150. The small decorated jar was originally typed as Walnut Black-on-white, but may have actually been Holbrook Black-on-white; the notes at Pueblo Grande Museum do not include any further information and all grave accompaniments have been repatriated. The three other vessels found with this burial included a redware bowl, a plainware bowl, and a plainware jar.

While the Feature 6841 burial and its tri-lobed vessel are a focus of this article, it is of interest that adjacent to this burial was an infant burial (Feature 6835) that contained five vessels, six obsidian projectile points, and eight copper bells.

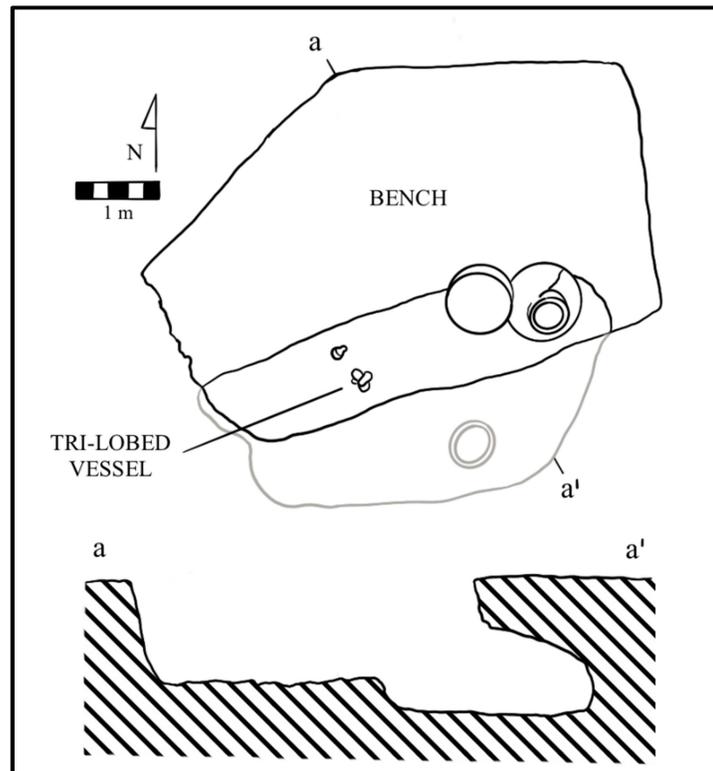


Figure 2. Inhumation burial Feature 6841 with tri-lobed vessel.

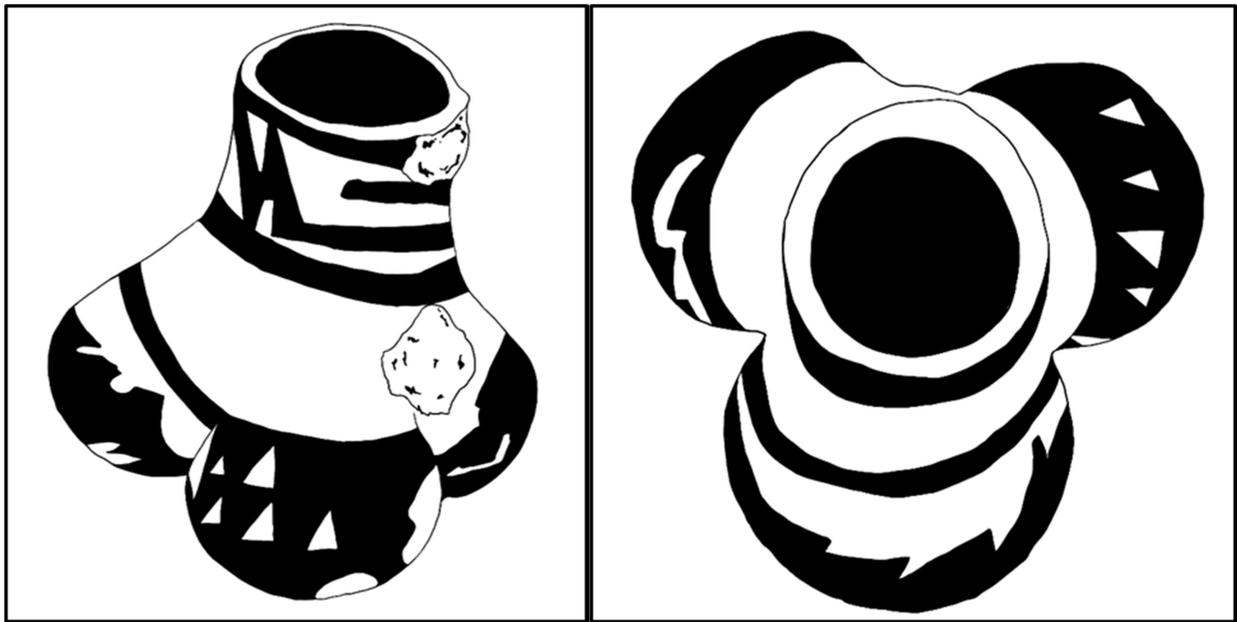


Figure 3. Holbrook Black-on-white tri-lobed vessel found with a child inhumation burial (Feature 6841) (handle is missing on the right-hand side).

Feature 6860 was a secondary cremation burial found in Burial Group 23, located closer to the platform mound (Figure 1) than Burial Group 27. It contained nine broken vessels—five plainware bowls, two plainware jars, one redware jar, and an apparently undecorated tri-lobed vessel (see Figures 4 and 5). This tri-lobed vessel had an unusual neck. During the SR143 project, a burial contained a jar with a similar neck that was referred to as a “bottle top”-style neck (Walsh-Anduze 1994:Figure 5.31).

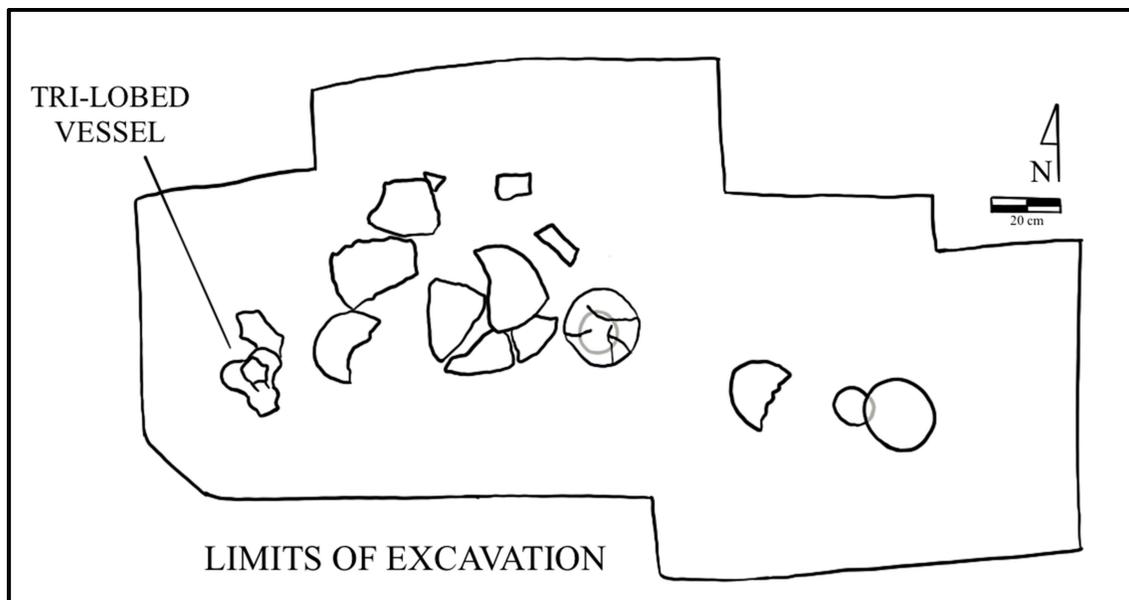


Figure 4. Secondary cremation burial (Feature 6860) showing tri-lobed vessel and other broken vessels.

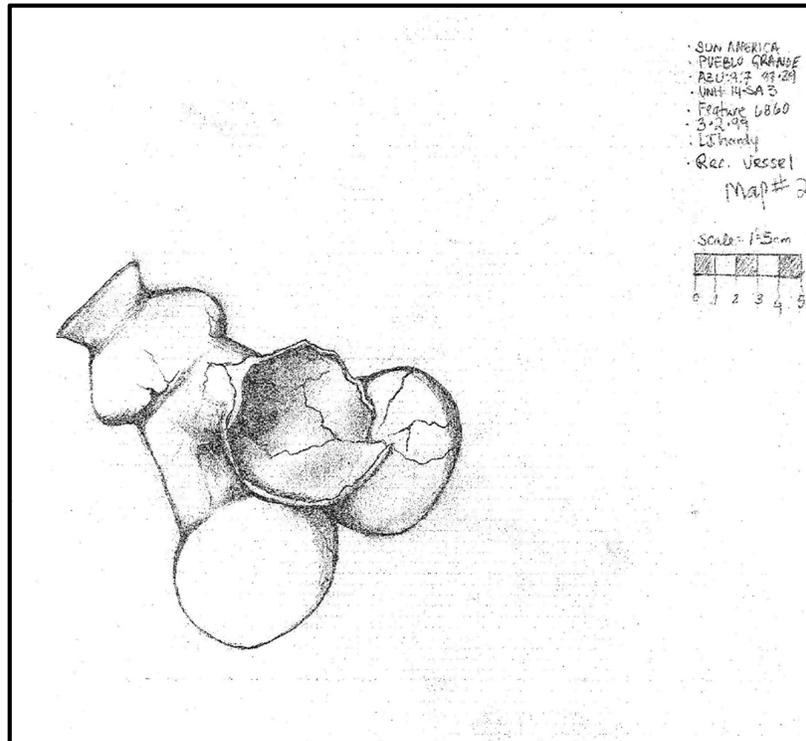


Figure 5. Plainware tri-lobed “bottle top” vessel from Feature 6860.

The Tri-lobed Vessel from Feature 6841

Vessel D.FS4 (Vessel D, Field Specimen No. 4) from Feature 6841 was a pitcher with a tri-lobed body and a cylindrical neck, missing its handle (Figure 3). The vessel was 6.6 cm high, 7.4 cm at its widest basal diameter, and with a 3 cm diameter mouth. The neck of the vessel was painted with medium-width straight and zigzag lines. One lobe was painted with checkerboarded triangles, one lobe was painted with triangles, and one lobe was painted with opposed triangles creating a negative white zigzag.

Classification

Vessels from burials were not photographed; instead, drawings were made, and the vessels were classified to the most specific taxon. Vessel D.FS4 from Feature 6841 was originally classified as Walnut Black-on-white.

Walnut Black-on-white is a Little Colorado White Ware (Colton 1955; Colton and Hargrave 1937) produced in the Hopi Buttes using clays deposited by Miocene-Pliocene Lake Bidahochi (Douglass 1990). Little Colorado White Ware has a dark gray paste, obvious sherd temper, white slip, and organic paint. It is distinctive enough that the original analyst was almost certainly correct in identifying the ware. Walnut Black-on-white (A.D. 1100-1250) has a Flagstaff Black-on-white design: triangular or barbed elements often in opposed alignments framing a white zigzag; hooked triangles; interlocking rectilinear scrolls; and medium-width straight lines. The

painted designs on Vessel D.FS4 from Feature 6841 have some attributes of Walnut design; the neck design of medium-width straight lines is within the range of Walnut designs, and the opposed triangles creating a negative white zigzag are similar to Walnut and Flagstaff, although Walnut and Flagstaff triangles are more barbed. Chris Downum (personal communication 2021) thought that the design of Vessel D.FS4 from Feature 6841 was Black Mesa style (A.D. 1025-1125) rather than Flagstaff style, which would make it Holbrook Black-on-white (A.D. 1050-1150), also a Little Colorado White Ware. Kelley Hays-Gilpin (personal communication 2021) and Dennis Gilpin concurred with Downum's assessment. Holbrook Black-on-white can be subdivided into a Black Mesa style (stripes and solids, often with pendant dots), Holbrook A, and a Sosi style (broad lines and solid triangles without pendant dots), Holbrook B. In the case of Vessel D.FS4 from Feature 6841, the neck is painted with a Black Mesa style design (Holbrook A), and the lobes are painted with Sosi style designs (Holbrook B).

Little Colorado White Ware Production and Exchange

Production

Douglass (1990) conducted petrographic analysis, x-ray diffraction, and microprobe analysis to demonstrate that Little Colorado White Ware was produced in the Hopi Buttes using clays of the Bidahochi Formation. Production of Little Colorado White Ware began about A.D. 825 but was most extensive from about A.D. 1050 to 1250. St. Joseph Black-on-white (presumably circa A.D. 825-1050) was famously defined based on a single sherd (see Gumerman 1988:56). Holbrook Black-on-white (A.D. 1050-1150), Padre Black-on-white (A.D. 1100-1250), Walnut Black-on-white (A.D. 1100-1250), and Leupp Black-on-white (A.D. 1200-1250) were produced in much greater quantities.

Although Douglass (1990:191) wrote, “[I]t has not been possible to determine which communities or settlement clusters within the Hopi Buttes were producing LCWW [Little Colorado White Ware],” archaeological survey and excavation in the Hopi Buttes provide information about production of Little Colorado White Ware in the region (Gumerman 1988; Gumerman and Skinner 1968; Eck 1994; Hough 1903; Reagan 1928; Wendorf et al. 1953). Residents of the Hopi Buttes lived in pit houses until about A.D. 1225, although they began building above-ground houses and kivas around A.D. 1050 (Eck 1994). Although most above-ground houses were small room blocks, some communities centered around above-ground houses with walled courtyards in front. The Plaza Site (NA9400) consisted of a six-room courtyard house, a square great kiva, and a circular small kiva (Gumerman 1988). The largest known Pueblo III community in the Hopi Buttes, the Malpais Spring site, which dates from about A.D. 1050 to 1300, covers 45 hectares and consists of two courtyard houses and 25 small house sites totaling 129 rooms and 5 kivas or pit houses. Beginning about A.D. 1250, the population of the Hopi Buttes concentrated in three large pueblos: Bidahochi Southwest, Bidahochi Southeast, and Bidahochi (Adams 1996; Hough 1903). Production of Little Colorado White Ware had largely ceased by the time these pueblos were occupied; Bidahochi Southwest is an orange ware pueblo, and Bidahochi and Bidahochi Southeast are yellow ware pueblos.

The low population of the Hopi Buttes during the production of Little Colorado White Ware and the dispersed settlement of that population among small habitation sites suggest household-level

production of Little Colorado White Ware. Excavations along the Transwestern Pipeline through the Hopi Buttes found evidence of pottery production (such as unfired sherds, pigments, and pottery-making tools) at four of the thirteen Puebloan sites investigated (Mills 1993:417).

Exchange

Despite the low population density and dispersed settlement pattern in the Hopi Buttes, the region produced substantial amounts of pottery for trade, especially to the Flagstaff area to the southwest, the eastern Grand Canyon, the upper Little Colorado River, and possibly the Chevelon area, as described by Douglass (1990). Douglass posits that trade in Little Colorado White Ware was intended to foster ties with people living in different environmental zones than the Hopi Buttes as a way of creating greater resilience for the Hopi Buttes population. She also notes that the largest sites in the areas receiving Little Colorado White Ware apparently did **not** function as distribution centers for the pottery; instead, Little Colorado White Ware seems to have been exchanged through transactions between individuals or households living in sites of various sizes. Although Little Colorado White Ware may be more common at ballcourts than at residential sites and more common in kivas than in residential rooms, the pottery is so commonly found in domestic refuse that Douglass proposes that it was also used domestically and was not exclusively a ritual or prestige item. Instead, in Douglass's view, the gatherings associated with ballcourts and kivas might have presented opportunities for exchange.

A Review of Lobed Vessels on the Colorado Plateau

Multi-lobed vessels are not common in pottery assemblages on the Colorado Plateau, although they have an interesting history. A search of selected studies of pottery and museum collections from the Colorado Plateau, while not comprehensive, suggests several patterns in the history and function of this vessel form.

The search identified 25 examples of lobed vessels, including 3 bi-lobed vessels, 18 tri-lobed vessels, and 4 four-lobed vessels (see Appendix). Eighteen of the vessels were pitchers, 6 were jars, and 1 was of unspecified form. At least 11 of the 25 vessels identified in our survey would be classified as miniatures according to the definition established by Morris (1939:164): "Any vessel measuring 10 cm or less in its largest dimension may be considered a miniature." See also Crotty (1983:56). Another type of tri-lobed vessel not considered in this paper is the "paint pot," formed by attaching two or more hemispherical bowls to each other to create a multi-lobed vessel. These vessels have been found with pigments still inside them, and although they were formed in a manner similar to the tri-lobed jars and pitchers we discuss, they clearly had a different function.

Five of the vessels in our review were Lino Gray (A.D. 550-850) tri-lobed pitchers, four of which came from the Whitewater district along the Rio Puerco of the West between the Petrified Forest and the Arizona-New Mexico border (Center for New Mexico Archaeology records; Peckham 1990:141, Figure 26; Roberts 1940:Plates 10a and 10b). A single example (Morris 1939:Plate 240) came from the La Plata River Valley in northwestern New Mexico. In addition, a bi-lobed pitcher of Boulder Gray (a plain gray type made by the Virgin Branch of Ancestral Puebloans) from the vicinity of Little Springs north of the Grand Canyon is in the collections of the Museum of Northern Arizona.

Multi-lobed vessels seem to have disappeared as a vessel form from about A.D. 850 to 1000, after which they had a slight resurgence, which lasted from about A.D. 1000 to 1300 or later. Our survey indicated that the Cibola region (from Chaco Canyon to Alma, New Mexico, and from St. Johns, Arizona to Reserve, New Mexico) was the center of production, although two examples each came from the Kayenta region, the Hopi Buttes, and the Phoenix Basin, and a single example came from the Mount Trumbull area.

This vessel form was also used in the Tonto Basin by the Salado culture. One example, reported from an early Classic period burial from the Vegas Ruin, was a “red plain” ware (Heckman et al. 2010:53, Figure 19). The Holbrook Black-on-white tri-lobed vessel from Feature 6841 (Figure 3) was produced in the cultural context of tri-lobed vessel production and use on the Colorado Plateau, but it might have been used at Pueblo Grande in a context more related to the production and use of Salado tri-lobed vessels and the plainware tri-lobed vessel from Feature 6860.

Cibola Whiteware and White Mountain Redware

Cibola Whiteware and White Mountain Redware were produced in the Cibola region of northwestern and west-central New Mexico and east-central Arizona (see Figure 6). Ten vessels in our sample are Cibola Whiteware: 2 Escavada Black-on-white, 2 Puerco Black-on-white, 2 Reserve Black-on-white, 1 Snowflake Black-on-white, and 3 Tularosa Black-on-white.

Lister and Lister (1978:55, Figure 26) depict an Escavada Black-on-white (A.D. 1000-1130) tri-lobed pitcher from Chaco Canyon. The Center for New Mexico Archaeology in Santa Fe has an Escavada Black-on-white tri-lobed vessel from the Rio Puerco of the East.

Cummings (1953:185) depicts a tri-lobed or four-lobed jar, which he classifies as “Tularosa type,” although he may not be referring to Tularosa Black-on-white. It appears to be closer to Puerco Black-on-white (A.D. 1030-1150). Its provenience is not known, but it was probably made in the Cibola region. The Barth Collection at the Museum of Northern Arizona contains a miniature tri-lobed pitcher of Puerco Black-on-white. Although the provenience of this vessel is not known, the Barth Collection was collected primarily around St. Johns, Arizona.

Nesbitt (1938:96, Plate 31B) reports a miniature Reserve Black-on-white (A.D. 1030-1200) tri-lobed pitcher from Starkweather Pueblo near Reserve, New Mexico. A miniature Reserve Black-on-white tri-lobed pitcher comes from the Round Valley (Springerville-Eager) area of Arizona (Martin and Willis 1949:Plate 80, Figure 2).

The Barth Collection at the Museum of Northern Arizona also contains a miniature tri-lobed pitcher of Snowflake Black-on-white (A.D. 1100-1250). This vessel is heavily oxidized, and the interior is lined with a lustrous residue.

The Vabre Collection at the Museum of Northern Arizona contains a miniature four-lobed jar of Tularosa Black-on-white (A.D. 1175-1300). The vessel has an effigy handle. Although Tularosa Black-on-white was produced in the Cibola region of west-central New Mexico and east-central Arizona, Father Cyprian Vabre (1872-1924) collected antiquities primarily in the Flagstaff area (Olberding 2021).

A Tularosa Black-on-white four-lobed pitcher (Martin and Willis 1949:Plate 84, Figure 6) and a Tularosa Black-on-white tri-lobed jar (Martin and Willis 1949:Plate 87, Figure 3) come from San Cosmos, Arizona, southeast of St Johns.

Three of the lobed vessels in the sample are White Mountain Red Ware and specifically Wingate Black-on-red (A.D. 1050-1200). In 1940, the University of New Mexico archaeological field school in Chaco Canyon recovered a tri-lobed pitcher of Wingate Black-on-red from Bc53, a 25-room small house with four kivas near the Casa Rinconada great kiva. This vessel is in the collection of the Maxwell Museum of Anthropology at the University of New Mexico (Carla Sinopoli, personal communication July 5, 2021). The Museum of Northern Arizona has a four-lobed jar of Wingate Black-on-red that Burt and Hattie Cosgrove collected from the WS Ranch Pueblo at Alma, near the state line in southwestern New Mexico. A Wingate Black-on-red four-lobed pitcher comes from San Cosmos, Arizona (Martin and Willis 1949:Plate 94, Figure 9).

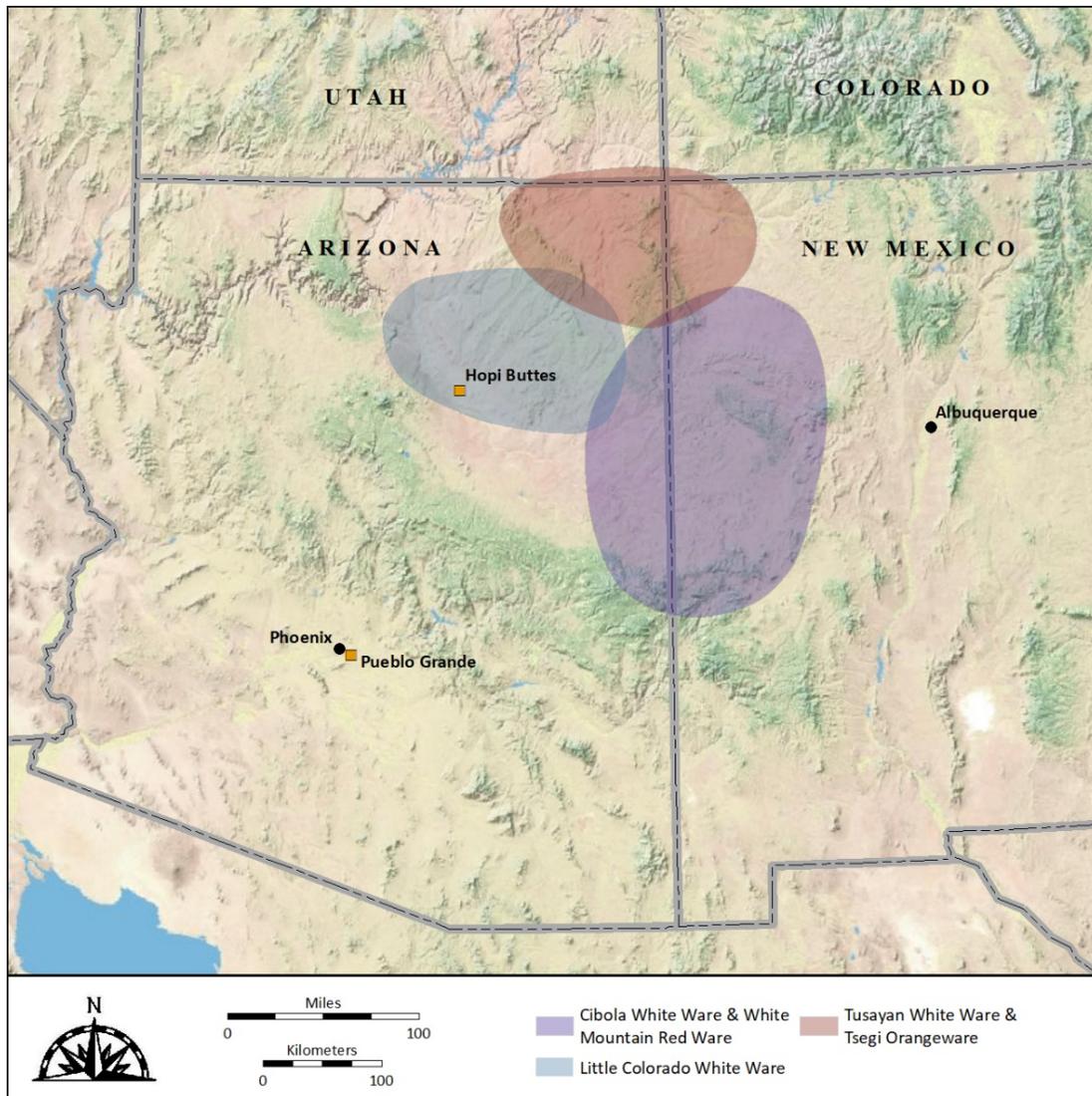


Figure 6. Pottery ware regions discussed in this paper.

Kayenta Region: Tusayan White Ware and Tsegi Orange Ware

Tusayan White Ware and Tsegi Orange Ware were produced in the Kayenta region of northeastern Arizona. Our sample includes one vessel from each of these two wares. The Rainbow Bridge-Monument Valley Expedition recovered a miniature Tusayan Black-on-white (A.D. 1200-1300) bi-lobed pitcher from a child's burial at Site RB 564 in Marsh Pass (Crotty 1983:Figure 54). The Rainbow Bridge-Monument Valley Expedition also recovered a miniature Tusayan Black-on-red (A.D. 1000-1300) bi-lobed pitcher from a grave at Site RB568 on Parrish Creek (Crotty 1983:Figure 54).

Hopi Buttes: Little Colorado White Ware

Two vessels in the sample are Little Colorado White Ware, and both are classified as Holbrook Black-on-white (A.D. 1050-1150). One is the miniature pitcher from Pueblo Grande discussed above. The other is a tri-lobed pitcher (Figure 7), which a Gallup, New Mexico Indian arts store donated to the Museum of Northern Arizona (MNA Specimen No. 7839).



Figure 7. Holbrook Black-on-white pitcher, MNA Specimen No. 7839, provenience unknown. Photograph by Kelley Hays-Gilpin.

Phoenix Basin

Two tri-lobed vessels in our sample appear to have been manufactured in the Phoenix Basin. One was a Gila Red tri-lobed jar (A.D. 1150-1300) illustrated by Gladwin and Gladwin (1930:Plate 11). The other was the tri-lobed plainware jar from Feature 6860 at Pueblo Grande, described above (Figure 5).

Discussion of the Vessels in the Appendix Sample

Based on the ware, it is possible to ascertain the regions in which all the vessels were produced. There is less information on the archaeological contexts from which the vessels were recovered.

Production of multi-lobed vessels was rare in Lino Gray times (A.D. 550-850) but was concentrated along the Rio Puerco of the West, extending to the La Plata River Valley. From about A.D. 1000 to 1300, production of multi-lobed vessels was concentrated in the Cibola region but also extended into the Hopi Buttes and the Kayenta region. Within the Cibola region, production of multi-lobed vessels seems to have been most concentrated from St. Johns, Arizona, to Reserve, New Mexico.

Data are limited on the archaeological contexts from which the vessels in the Appendix sample were recovered. For eleven vessels, the archaeological provenience is limited to the nearest town or geographic feature: four Lino Gray tri-lobed pitchers from the Whitewater District at Allantown, Arizona; the miniature Lino Gray tri-lobed pitcher from the La Plata River Valley; the miniature Boulder Gray bi-lobed pitcher from Little Springs, Arizona; the Escavada Black-on-white tri-lobed pitcher from Chaco Canyon; the miniature Reserve Black-on-white tri-lobed pitcher from Round Valley; the Wingate Black-on-red four-lobed pitcher from San Cosmos; and the Tularosa Black-on-white four-lobed pitcher and Tularosa Black-on-white tri-lobed jar from San Cosmos. Specific site provenience is known for only six vessels: the miniature Tusayan Black-on-red bi-lobed pitcher from RB568 on Parrish Creek; the miniature Reserve Black-on-white tri-lobed pitcher from Starkweather Pueblo; the miniature Holbrook Black-on-white tri-lobed pitcher from Pueblo Grande; the Wingate Black-on-red tri-lobed pitcher from Bc53 in Chaco Canyon; the Wingate Black-on-red four-lobed jar from the WS Ranch Pueblo; the miniature Tusayan Black-on-white bi-lobed pitcher from RB 564; and the plainware tri-lobed vessel from Pueblo Grande. In the only four cases where we know the specific context of a vessel (RB564, RB568, and the two from Pueblo Grande), the vessels come from burials.

Twenty-two of the 25 vessels found in our search could have been recovered from sites in the regions in which they were produced. Only three vessels are likely to have been traded outside of the area in which they were manufactured: the miniature Holbrook Black-on-white tri-lobed pitcher from Pueblo Grande; the Wingate Black-on-red tri-lobed pitcher from Site Bc53 in Chaco Canyon; and the Tularosa Black-on-white four-lobed jar possibly collected in the Flagstaff area.

Discussion of the Pueblo Grande Tri-Lobed Vessels

The miniature Holbrook Black-on-white tri-lobed pitcher recovered from a burial at Pueblo Grande provides insights into social interactions that occurred within Pueblo Grande and that

connected Pueblo Grande to far-flung regions of the American Southwest. Based on the review above, lobed vessels were not common in prehistoric Arizona or New Mexico, but do occur in small numbers. This vessel form was quite rare in the Hohokam area (only 2 out of 3,725 vessels at Pueblo Grande), and only one of them was painted. What was the purpose of these lobed vessels? Perhaps they were the result of decorative experimentation, specific secular functions, or for ritual use. Until we have more information on the archaeological contexts in which these vessels are found, their function will remain unknown. They do appear to occur frequently as miniature vessels, and they also appear to have commonly been placed in burials.

The decorative style of the Holbrook Black-on-white vessel from Pueblo Grande indicates that it dates from about A.D. 1050 to 1150 and conveys information about the production and exchange systems in which the vessel was manufactured and transported to the Phoenix Basin. Little Colorado White Ware was produced in the Hopi Buttes by a small population living in small, dispersed settlements, practicing household-level pottery production. It was widely traded, but not through distribution centers, instead moving through individual trade relations. Trading partners, though, were not evenly dispersed across the region but were concentrated in a few areas, including the southeastern Flagstaff area, the eastern Grand Canyon, the upper Little Colorado River, and possibly the Chevelon area (Figure 6).

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References Cited

Abbott, David R. (editor)

1994 *The Pueblo Grande Project, Volume 3: Ceramics and the Production and Exchange of Pottery in the Central Phoenix Basin.* Soil Systems Publications in Archaeology No. 20. Soil Systems, Inc., Phoenix.

2003 *Centuries of Decline during the Hohokam Classic Period at Pueblo Grande.* The University of Arizona Press, Tucson.

Adams, E. Charles

1996 The Pueblo III-Pueblo IV Transition in the Hopi Area, Arizona. In *The Prehistoric Pueblo World, A.D. 1150-1350*, edited by Michael A. Adler, pp. 48-58. University of Arizona Press, Tucson.

Bostwick, Todd W., and Christian E. Downum (editors)

1994 *Archaeology of the Pueblo Grande Platform Mound and Surrounding Features, Volume 2: Features in the Central Precinct of the Pueblo Grande Community.* Pueblo Grande Museum Anthropological Papers No. 1. Pueblo Grande Museum, Phoenix.

- Colton, Harold S.
1955 *Pottery Types of the Southwest: Wares 8A, 8B, 9A, 9B, Tusayan Gray and White Ware, Little Colorado Gray and White Ware*. Museum of Northern Arizona Ceramic Series 3A, Northern Arizona Society of Science and Art, Flagstaff.
- Colton, Harold Sellers, and Lyndon Lane Hargrave
1937 *Handbook of Northern Arizona Pottery Wares*. Museum of Northern Arizona Bulletin 11. Northern Arizona Society of Science and Art, Flagstaff.
- Crotty, Helen K.
1983 Burial Associations at RB 568: A Case Study in the Social Dimensions of Mortuary Practice. In *Honoring the Dead: Anasazi Ceramics from the Rainbow Bridge-Monument Valley Expedition*, by Helen K. Crotty, pp. 24-63. University of California, Los Angeles Museum of Cultural History Monograph Series No. 22. Museum of Cultural History, University of California, Los Angeles.
- Cummings, Byron
1953 *First Inhabitants of Arizona and the Southwest*. Cummings Publication Council, Tucson.
- Douglass, Amy A.
1990 *Prehistoric Exchange and Sociopolitical Development in the Plateau Southwest*. Garland Publishing, Inc., New York and London.
- Downum, Christian E. (editor)
1998 *Archaeology of the Pueblo Grande Platform Mound and Surrounding Features, Volume 4: The Pueblo Grande Platform Mound Compound*. Pueblo Grande Museum Anthropological Papers No. 1, Pueblo Grande Museum, Phoenix.
- Downum, Christian E., and Todd W. Bostwick (editors)
1993 *Archaeology of the Pueblo Grande Platform Mound and Surrounding Features, Volume 1: Introduction to the Archival Project and History of Archaeological Research*. Pueblo Grande Museum Anthropological Papers No. 1, Pueblo Grande Museum, Phoenix.
- Eck, David C.
1994 *Across the Colorado Plateau: Anthropological Studies for the Transwestern Pipeline Expansion Project, Volume 11: The Anasazi of Wide Ruin Wash and the Hopi Buttes* (2 volumes). Office of Contract Archeology and Maxwell Museum of Anthropology, University of New Mexico, Albuquerque.
- Foster, Michael S.
1994a Intrusive Ceramics. In *The Pueblo Grande Project, Volume 4: Material Culture*, edited by Michael S. Foster, pp. 119-166. Soil Systems Publications in Archaeology No. 20. Soil Systems, Inc., Phoenix.
1994b *The Pueblo Grande Project, Volume 1: Introduction, Research Design, and Testing Results*, edited by Michael S. Foster. Soil Systems Publications in Archaeology No. 20. Soil Systems, Inc., Phoenix.
1994c *The Pueblo Grande Project, Volume 4: Material Culture*, edited by Michael S. Foster. Soil Systems Publications in Archaeology No. 20. Soil Systems, Inc., Phoenix.

- Gladwin, Winifred, and Harold S. Gladwin
1930 *Some Southwestern Pottery Types, Series I*. Medallion Papers No. 8. Gila Pueblo, Globe, Arizona.
- Gregory, Andrea
2020 Shell Artifacts. In *Archaeology of the Pueblo Grande Platform Mound and Surrounding Feature, Volume 5: Special Studies*, edited by Douglas R. Mitchell, Laurene G. Montero, Todd W. Bostwick, and Lindsey Vogel-Teeter, editors, pp. 187-208. Pueblo Grande Museum Anthropological Papers No. 1. Pueblo Grande Museum, Phoenix.
- Gumerman, George J.
1988 *The Archaeology of the Hopi Buttes District, Arizona*. Center for Archaeological Investigations Research Paper No. 49. Southern Illinois University at Carbondale, Carbondale.
- Gumerman, George J., and S. Alan Skinner
1968 A Synthesis of the Prehistory of the Central Little Colorado Valley, Arizona. *American Antiquity* 33(2):185-199.
- Harbottle, Garman, Phil C. Weigand, and Michael S. Foster
1994 Archaeological Turquoise from Pueblo Grande and Comparison with the Turquoise Database. Appendix A in *The Pueblo Grande Project, Volume 4: Material Culture*, edited by Michael S. Foster. Soil Systems Publications in Archaeology No. 20. Soil Systems, Inc., Phoenix.
- Heckman, Robert A., William L. Deaver, and Eric Eugene Klucas
2010 Ceramic Analysis. In *The State Route 188–Cottonwood Creek Project: The Sedentary to Classic Period Transition in Tonto Basin*, Volume 2, edited by Eric Eugene Klucas, Richard Ciolek-Torello, and Holly Warner, pp. 13-73. Technical Series No. 78. Statistical Research, Inc., Tucson, Arizona and Redlands, California.
- Hough, Walter
1903 Archaeological Field Work in Northeastern Arizona: The Museum-Gates Expedition of 1901. In *Annual Report of the Smithsonian Institution for 1901*, pp. 279-358. Smithsonian Institution, Washington, D.C.
- Kwiatkowski, Scott (editor)
1994 *The Pueblo Grande Project, Volume 5: Environment and Subsistence*. Soil Systems Publications in Archaeology No. 20. Soil Systems, Inc., Phoenix.
- Lister, Robert H., and Florence C. Lister
1978 *Anasazi Pottery: Ten Centuries of Prehistoric Ceramic Art in the Four Corners Country of the Southwestern United States, as Illustrated by the Earl H. Morris Memorial Pottery Collection in the University of Colorado Museum*. Maxwell Museum of Anthropology and University of New Mexico Press, Albuquerque.
- Martin, Paul S., and Elizabeth S. Willis
1949 *Anasazi Painted Pottery in Field Museum of Natural History*. Field Museum of Natural History Anthropology Memoirs Volume 5. Field Museum of Natural History, Chicago.

Mills, Barbara J.

- 1993 Synthesis of Ceramic Interpretations. In *Across the Colorado Plateau: Anthropological Studies for the Transwestern Pipeline Expansion Project, Volume 16: Interpretation of Ceramic Artifacts*, by Barbara J. Mills, Christine E. Goetze, and Maria Nieves Zadeño, pp. 413-423. Office of Contract Archeology and Maxwell Museum of Anthropology, University of New Mexico, Albuquerque.

Mitchell, Douglas R.

- 1994a *The Pueblo Grande Project, Volume 2: Feature Descriptions, Chronology, and Site Structure*. Soil Systems Publications in Archaeology No. 20. Soil Systems, Inc., Phoenix.
- 1994b *The Pueblo Grande Project, Volume 7: An Analysis of Classic Period Mortuary Patterns*. Soil Systems Publications in Archaeology No. 20. Soil Systems, Inc., Phoenix.
- 2003 Burial and Society. In *Centuries of Decline during the Hohokam Classic Period at Pueblo Grande*, edited by David R. Abbott, pp. 107-127. The University of Arizona Press, Tucson.

Mitchell, Douglas R., and M. Steven Shackley

- 1995 Classic Period Hohokam Obsidian Studies in Southern Arizona. *Journal of Field Archaeology* 22(3):291-304.

Mitchell, Douglas R., Laurene G. Montero, Todd W. Bostwick, and Lindsey Vogel-Teeter (editors)

- 2020 *Archaeology of the Pueblo Grande Platform Mound and Surrounding Features, Volume 5: Special Studies*. Pueblo Grande Museum Anthropological Papers No. 1, Pueblo Grande Museum, Phoenix.

Montero, Laurene, and Todd W. Bostwick

- 2019 Ceramic Evidence for Prehistoric Long Distance Interactions: Non-local Ceramics from AZ U:9:1(ASM) (Pueblo Grande). *Journal of Arizona Archaeology* 7(1):1-25.

Morris, Earl H.

- 1939 *Archaeological Studies in the La Plata District, Southwestern Colorado and Northwestern New Mexico*. Carnegie Institution of Washington Publication 519. Carnegie Institution of Washington, Washington, D.C.

Nesbitt, Paul H.

- 1938 *Starkweather Ruin: A Mogollon-Pueblo Site in the Upper Gila Area of New Mexico, and Affiliative Aspects of the Mogollon Culture*. Logan Museum Publications in Archaeology, Bulletin No. 6. Logan Museum, Beloit College, Beloit, Wisconsin.

Olberding, Susan Deaver

- 2021 Ask a Ranger: A Father, the Daughters, and Walnut Canyon. *Arizona Daily Sun*, June 24.

Peckham, Stewart

- 1990 *From This Earth: The Ancient Art of Pueblo Pottery*. Museum of New Mexico Press, Santa Fe.

Reagan, Albert B.

- 1928 The Small House and Semi-Pueblo Ruins of the Painted (and Shiny Painted) Ware Series in the Cornfields-Hopi Volcanic Buttes' Field, in the Navajo Country, Arizona. *El Palacio* 25(14-17): 232-250.

Rice, Glen E.
2016 *Sending the Spirits Home: The Archaeology of Hohokam Mortuary Practices*. University of Utah Press, Salt Lake City.

Roberts, Frank H. H., Jr.
1940 *Archaeological Remains in the Whitewater District, Eastern Arizona, Part 2: Artifacts and Burials*. Bureau of American Ethnology Bulletin 126. Smithsonian Institution, Bureau of American Ethnology, Washington, D.C.

Van Gerven, Dennis P., and Susan Guise Sheridan (editors)
1994 *The Pueblo Grande Project, Volume 6: The Bioethnography of a Classic Period Hohokam Population*. Soil Systems Publications in Archaeology No. 20. Soil Systems, Inc., Phoenix.

Walsh-Anduze
1994 The Pueblo Grande Whole Vessel Study: An Examination of Production and Short-Distance Exchange. In *The Pueblo Grande Project, Volume 3: Ceramics and the Production and Exchange of Pottery in the Central Phoenix Basin*, edited by David R. Abbott, pp. 149-260. Soil Systems Publications in Archaeology No. 20. Soil Systems, Inc., Phoenix.

Wendorf, Fred, Nancy Fox, and Orian L. Lewis (editors)
1956 *Pipeline Archaeology: Reports of Salvage Operations in the Southwest on El Paso Natural Gas Company Projects, 1950-1953*. Laboratory of Anthropology, Santa Fe, and the Museum of Northern Arizona, Flagstaff.

Appendix. Known Tri-Lobed Pitcher and Jar Vessels in the Southwest
(Dimensions: Height [H], Diameter [D], Orifice Diameter [O])

Catalog No.	Type	Date (A.D.)	Form	Dimensions	Provenience	Reference
	Lino Gray	550-850	Tri-lobed pitcher	Miniature H=ca 8.0 cm D=ca 8.4 cm O=ca 2.7 cm	La Plata River	Morris 1939: Plate 240
	Lino Gray	550-850	Tri-lobed pitcher	Miniature H=8.89 cm D=8.25 cm O=3.17 cm	Whitewater	Roberts 1940:37, Plate 10a
	Lino Gray	550-850	Tri-lobed pitcher	H=12.06 cm D=9.52 cm O=3.81 cm	Whitewater	Roberts 1940:37, Plate 10b
8243/11	Lino Gray	550-850	Tri-lobed pitcher	H=12.3 cm D=10.3 cm O=3.5 cm	Whitewater	Peckham 1990:141, Figure 26; CNMA* records
8291/11	Lino Gray	550-850	Tri-lobed pitcher	H=12.2 cm D=9.5 cm O=4.0 cm	Whitewater	CNMA records
A5609	Boulder Gray		Bi-lobed pitcher	Miniature H=6.5 cm D=9.5 cm O=3.0 cm	Little Springs	MNA* records
UCM No. 9480	Escavada B/w	1000-1130	Tri-lobed Chacoan pitcher	H=25 cm D=11.1 cm O=9.5 cm	Chaco Canyon	Lister and Lister 1978:55, Figure 26
	Escavada B/w	1000-1130			Rio Puerco of the East	CNMA records
RB 568-474	Tusayan B/r	1000-1300	Bi-lobed pitcher	Miniature D=9 cm	Parrish Creek, RB 568, Burial 50	Crotty 1983: Figure 54
	Puerco B/w	1030-1150	Tri-lobed or four-lobed jar		Unknown	Cummings 1953:185
A6300	Puerco B/w	1030-1150	Tri-lobed pitcher	Miniature H=9.0 cm D=10.0 cm O=3.4 cm	Unknown (Barth Collection, St. Johns)	MNA records
	Reserve B/w	1030-1200	Tri-lobed pitcher	Miniature H=5.6 cm D=4.4 cm	Starkweather Pueblo, Reserve, NM	Nesbitt 1938:96, Plate 31B
74996	Reserve B/w	1030-1200	Tri-lobed pitcher	Miniature H=10 cm D=ca 10 cm O=ca 4 cm	Round Valley	Martin and Willis 1949: Plate 80, Figure 2
D.FS4	Holbrook A B/w	1050-1150	Tri-lobed pitcher	Miniature H=6.6 cm D=7.4 cm O=3 cm	Pueblo Grande	Figure 3

Catalog No.	Type	Date (A.D.)	Form	Dimensions	Provenience	Reference
A7839	Holbrook A B/w	1050-1150	Tri-lobed pitcher	H=11.5 cm D=10.1 cm O=4.5 cm	Unknown	MNA records
40.29.20	Wingate B/r	1050-1200	Tri-lobed pitcher		Bc53, Chaco Canyon	Maxwell Museum records, UNM
73675	Wingate B/r	1050-1200	Four-lobed pitcher	H=12.8 cm D=ca 18.7 cm O=ca 7.7 cm	San Cosmos	Martin and Willis 1949: Plate 94, Figure 9
NA3290.5	Wingate B/r	1050-1200	Four-lobed jar	H=12.8 cm D=15.3 cm	WS Ranch Pueblo, Alma, NM	MNA records
A6079	Snowflake B/w	1100-1250	Tri-lobed pitcher	Miniature H=5.9 cm D=8.6 cm O=3.0	Unknown	MNA records
OC18	Tularosa B/w	1175-1300	Four-lobed jar	Miniature H=7.0 cm D=8.7 cm O=3.8 cm	Unknown	MNA records
73674	Tularosa B/w	1175-1300	Four-lobed pitcher	H=12.2 cm D=ca 21.45 cm O=ca 9.1 cm	San Cosmos	Martin and Willis 1949: Plate 84, Figure 6
73687	Tularosa B/w	1175-1300	Tri-lobed jar	H=9.8 cm D=ca 12.1 cm O=ca 3.3 cm	San Cosmos	Martin and Willis 1949: Plate 87, Figure 3
RB 564-1	Tusayan B/w	1200-1300	Bi-lobed pitcher	Miniature D=11.6 cm	Marsh Pass, RB 564, child's burial	Crotty 1983: Figure 54
	Gila Red	1200-1400	Tri-lobed jar	Unknown	Unknown	Gladwin and Gladwin 1930:Plate 11
	Plain	Unknown	Tri-lobed jar	H=ca 22.0 cm D=ca 19.8 cm O=ca 5.5 cm	Pueblo Grande	Figure 5

* CNMA = Center for New Mexico Archaeology, Santa Fe; MNA = Museum of Northern Arizona, Flagstaff

A PROVENIENCE MODEL FOR SAN JUAN RED WARE POTTERY: A CASE STUDY OF PREHISTORIC INTERACTION AND EXCHANGE

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Winston Hurst, Independent Consulting Archaeologist, and William A. Lucius, Independent Scholar

Keywords: Ceramic Sourcing Analysis, Prehistoric Exchange Networks, Pottery Production, Portable X-Ray
Fluorescence, Clay Geochemistry, Landscape Archaeology, Archaeometry, San Juan Red Ware

Abstract

The study of cultural interaction is often viewed within the context of material exchange in anthropology. Tracing the pathways of artifacts from their origin of manufacture to their point of deposition reveals patterns of interaction and exchange among prehistoric people. Previous archaeometric approaches in southeastern Utah have been limited in their ability to source ceramics at such fine spatial scales as neighboring communities where the examination of interaction and exchange is most challenging. The study reported here focused on an archaeometric method aimed at solving this problem through examination of geological materials and prehistoric pottery sherds. The abbreviated results presented here highlight the relationship between two large Ancestral Puebloan sites, and reveal that pottery recovered from a site in southwest Colorado originated almost exclusively from a single producer of red ware in Montezuma Canyon, Utah. The two sites are among nearly one hundred sites currently under evaluation in the study area, which covers some 3,500 km² in the Four Corners region of the American Southwest.

A Tale of Two Villages

We demonstrate the efficacy of our model as it applies to two uniquely related sites, Champagne Spring (CS) (5DL2333) in southwest Colorado (Dove 2006, 2012), and Nancy Patterson Village (NPV) (425A2110) in Montezuma Canyon in southeast Utah. CS was occupied from about A.D. 925-1050 with a short abandonment around A.D. 1000-1020. The site consists of an estimated 250 rooms and 50 kivas distributed between two adjacent ridges. Excavations in seven subterranean structures that were arrayed around a great kiva revealed that all were ritually decommissioned, some in spectacular ways. Two pit structures from about A.D. 1000 held the remains of over 100 formally buried sacrificed animals, including many turkeys, dogs, rabbits, and American crows, as well as a beheaded rattlesnake. Evidence of large-scale feasting activity was found in another structure dating to about A.D. 950.

NPV had an extended sedentary village population between the A.D. 700s and middle 1200s, occupying the top, sides, and foot of a small mesa. It eventually grew to encompass over 250 rooms and several dozen kivas by the mid-1200s, but during the period of the Champagne Spring occupation, it appears to have encompassed up to about 120 rooms and a dozen pitstructures/kivas (Thompson et al. 1986:39-40). Although the two sites are separated by roughly 42 km, they are closely connected geographically by natural canyon-bottom and mesa-top trail routes (Figure 1). In our pursuit to reveal patterns of interaction and exchange among our study sites through ceramic sourcing analysis, we defined a provenience model that is specific to our area of interest.

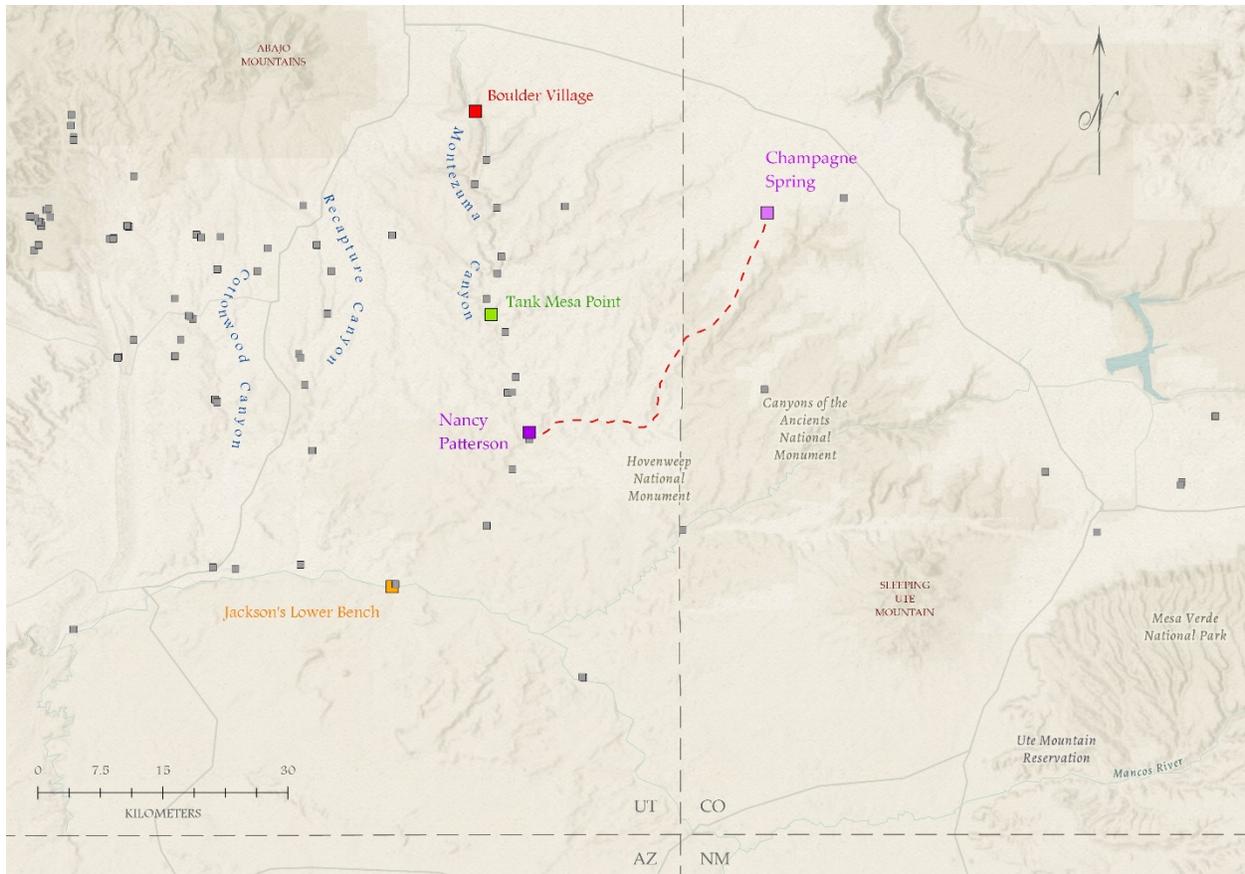


Figure 1. Study area and sites. Highlighted route (red dashed line) is by way of Cross Canyon and overland mesa, one of several least-cost pathways between Nancy Patterson Village and Champagne Spring. Colored symbols correspond with Figure 4. Map is based on Esri 2022a and Esri 2022b.

A Provenience Model

Rather than making any assumptions about our data, we first applied, and later tested, two basic tenets of ceramic sourcing theory, the *Criterion of Abundance* and the *Provenience Postulate*. Production is usually assumed to correspond with site provenience where the *Criterion of Abundance* states “pottery of a specific paste compositional group should normally have been manufactured in the locality it is best represented” (Rands and Bishop 1980:20). Per the *Criterion*, if prehistoric potters gathered clay from nearby outcrops, locally-produced pottery recovered from the site will exhibit geochemical properties similar to that of the surrounding landscape. According to the *Provenience Postulate*, sourcing is possible if “there exist differences in chemical composition between natural resources that exceed, in some recognizable way, the differences observed within a given source” (Weigand, Harbottle, and Sayre 1977:24). In accordance with the *Postulate*, if clay geochemistry varies sufficiently across the landscape, the geochemical signatures of pottery assemblages should also vary as a function of distance and direction. Through analysis of clay *and* sherds, we can validate their applicability as part of a larger ceramic sourcing theorem.

The Spatio-Compositional Approach (Di Naso 2018; Di Naso and Dove 2022) expounds upon these tenets using geostatistical and spatio-statistical analyses of clays within the context of their

natural environment (geographic space), and analyses of clays and ceramics within various multivariate contexts (compositional space) such as Principal Components Analysis (PCA). The approach expounds upon the *Resource Proposition*, which states that potters lived in residential proximity to the bulky clay and temper resources selected for pottery production (Lucius 1988), supporting the argument that the materials used in the production of prehistoric ceramics would not have been gathered from beyond an ethnoarchaeologically defined distance of roughly three to four kilometers (Arnold 1975). We began with an intensive clay-sampling strategy and geological reconnaissance of the NPV locality, covering some 2 square kilometers. The physical and chemical properties of over 70 representative clay samples and their fired complements were recorded, including classification by clay type (e.g., illite, montmorillonite, kaolinite, illite-chlorite, and other mixed layer types), native and fired Munsell color, identification of clasts, and viability as potting clay. Study of the Morrison Formation (Upper Jurassic) stratigraphy (Figure 2), coupled with geostatistics, refire analysis, and replication studies (Lucius 2010) illuminated several viable red and gray beds that may have been used to manufacture red ware pottery at NPV.

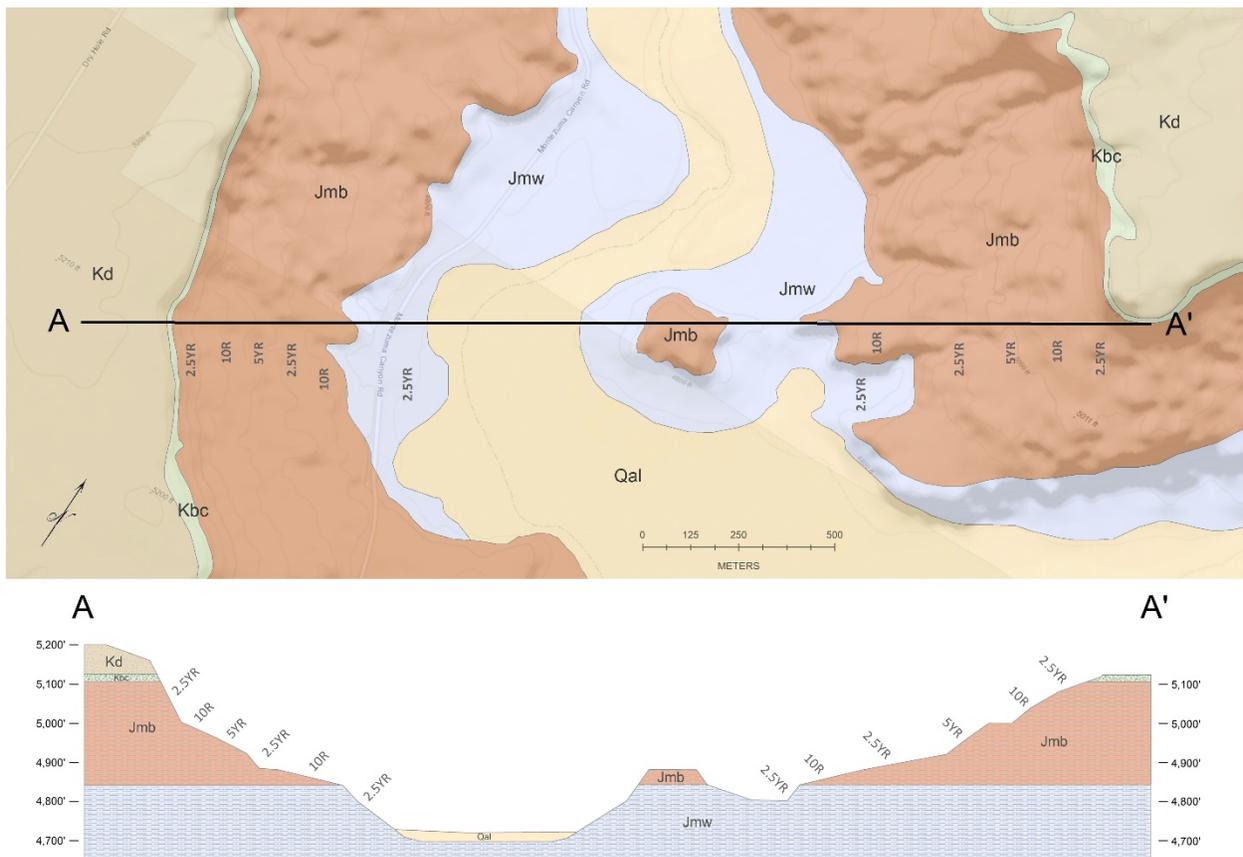


Figure 2. Geological map, cross section and stratigraphy, and generalized location and Munsell color of fired test tiles of selected red and gray clay beds exposed at Nancy Patterson Village.

These mixed-layer clay types, along with a selection of 40 sherds from NPV and 50 sherds from CS, were subject to geochemical analysis using portable X-Ray Fluorescence (pXRF), and/or

Inductively Coupled Plasma Mass Spectrometry (ICP-MS), and Neutron Activation Analysis (NAA). For brevity, we present only the pXRF results, as the same conclusions were drawn using the other analytical techniques (Di Naso and Dove 2022).

Identifying Red Ware Producers

The geochemical fingerprints of individual clay beds exposed at NPV were compared to sherds recovered from NPV and CS, and a random selection of sherds from our compositional database from adjacent canyons using RQ-mode principal components analysis (see Zhou et al. 1983) and other statistical methods. Figure 3 illustrates pottery production at select villages in four predominant sub-regions within the study area. Hereafter, emphasis is placed on the NPV locale in Montezuma Canyon, and CS in the uplands of Colorado. Our PCA resulted in extraction of two components explaining 70.47 percent of the total variance (KMO and Bartlett's Test 0.715, sig. <0.001) using six key-diagnostic elements.

The PCA biplot in Figure 3 reveals several key patterns in the compositional morphology of the data:

- The clay geochemistry at NPV is similar to the geochemical fingerprint of sherds recovered from NPV, and dissimilar to the geochemical fingerprint of all other sherds produced from Alkali Canyon, Montezuma Canyon, Recapture Canyon, and Cottonwood Canyon clays.
- With the exception of a few sherds, the geochemical signature of the CS sherd assemblage is similar to that of the NPV sherd assemblage.
- Representative sherds recovered in Alkali, Recapture, and Cottonwood canyons, can be readily distinguished from NPV sherds, which were produced in Montezuma Canyon, demonstrating the efficacy of the *Provenience Postulate*.

To dismiss CS as a producer of red ware, or the possibility of a compositionally-similar clay occurring at or near CS, clay samples were gathered at the site and in adjacent Squaw Canyon. Analyses of numerous clay exposures failed to produce a match to CS sherds, and thus we concluded that the majority of sherds recovered from CS were produced at NPV. Additionally, we compared the CS assemblage to selected sites in Montezuma Canyon that also exhibit well-defined production signatures. The sites that were chosen represent pottery production in the extreme north and south, and central areas of Montezuma Canyon. Figure 4 illustrates that we are able to distinguish among these production villages, and it is evident that the *Provenience Postulate* is applicable to intra-canyon ceramic sourcing studies in our study area. Our PCA resulted in extraction of two components explaining 82.16% of the total variance (KMO and Bartlett's Test 0.525, sig. <0.001) using six key-diagnostic elements.

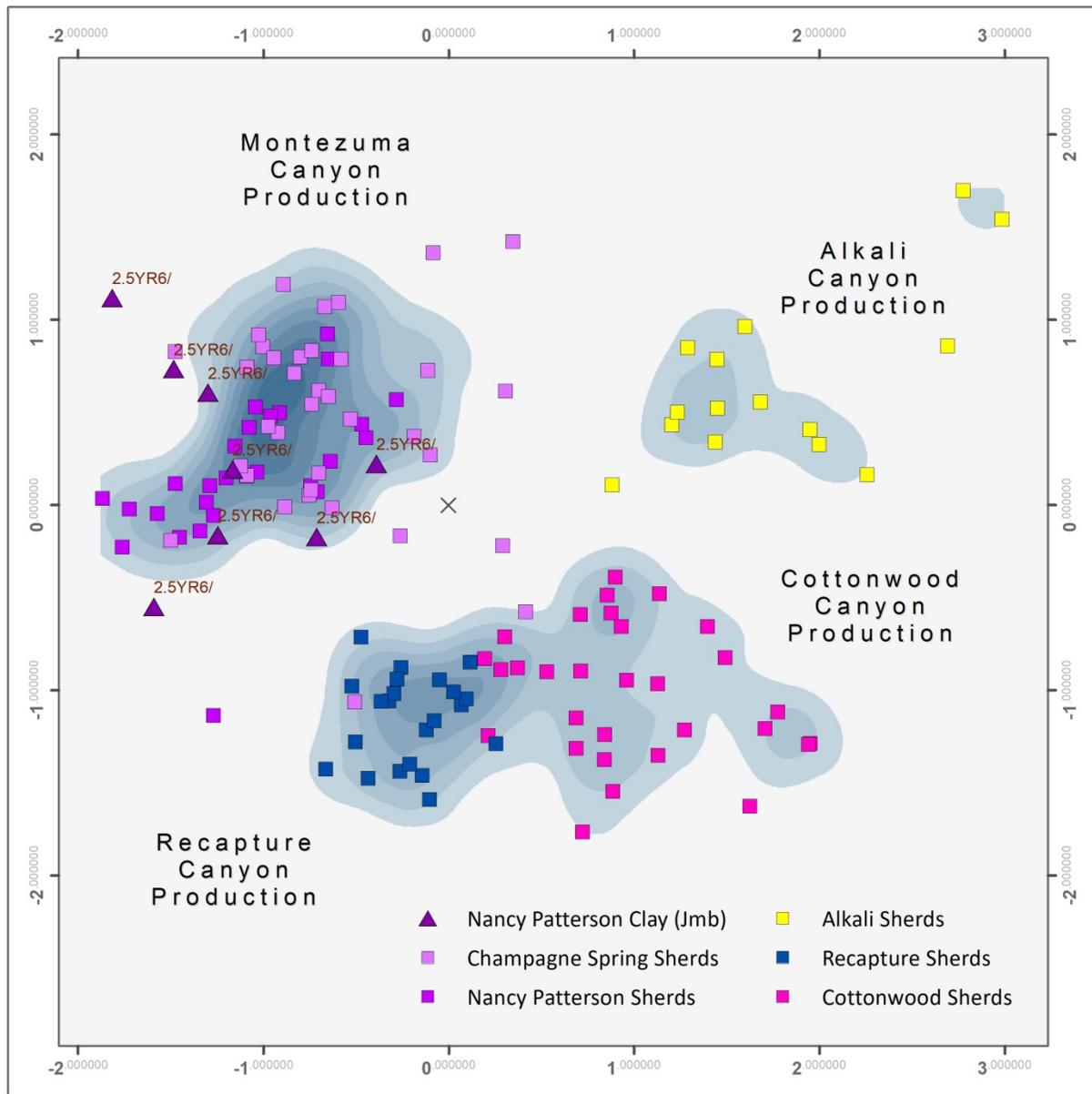


Figure 3. Principal Components Analysis biplot of Components 1 and 2. Representative geochemical signatures of sites producing red ware from clay exposed in Cottonwood, Recapture, Alkali, and Montezuma canyons. Note that sherds collected from the Champagne Spring site are mostly derived from Nancy Patterson Village.

The PCA biplot in Figure 4 reveals several key patterns in the compositional morphology of the data:

- The clay geochemistry at NPV is similar to the geochemical fingerprint of sherds recovered from NPV, and is dissimilar to the geochemical fingerprint of sherds produced at selected villages in other areas of Montezuma Canyon.

- Six CS sherds fall outside of the NPV agglomeration. Three are outliers that have not been assigned a production provenience. Three others fall within the Tank Mesa Point (TMP) production agglomeration and appear to have been produced there. Final provenience of these sherds will be assigned with the addition of established production clays.
- The separation of the production village agglomerations is indicative of relatively discrete resource exploitation, and also supports the *Provenience Postulate*.

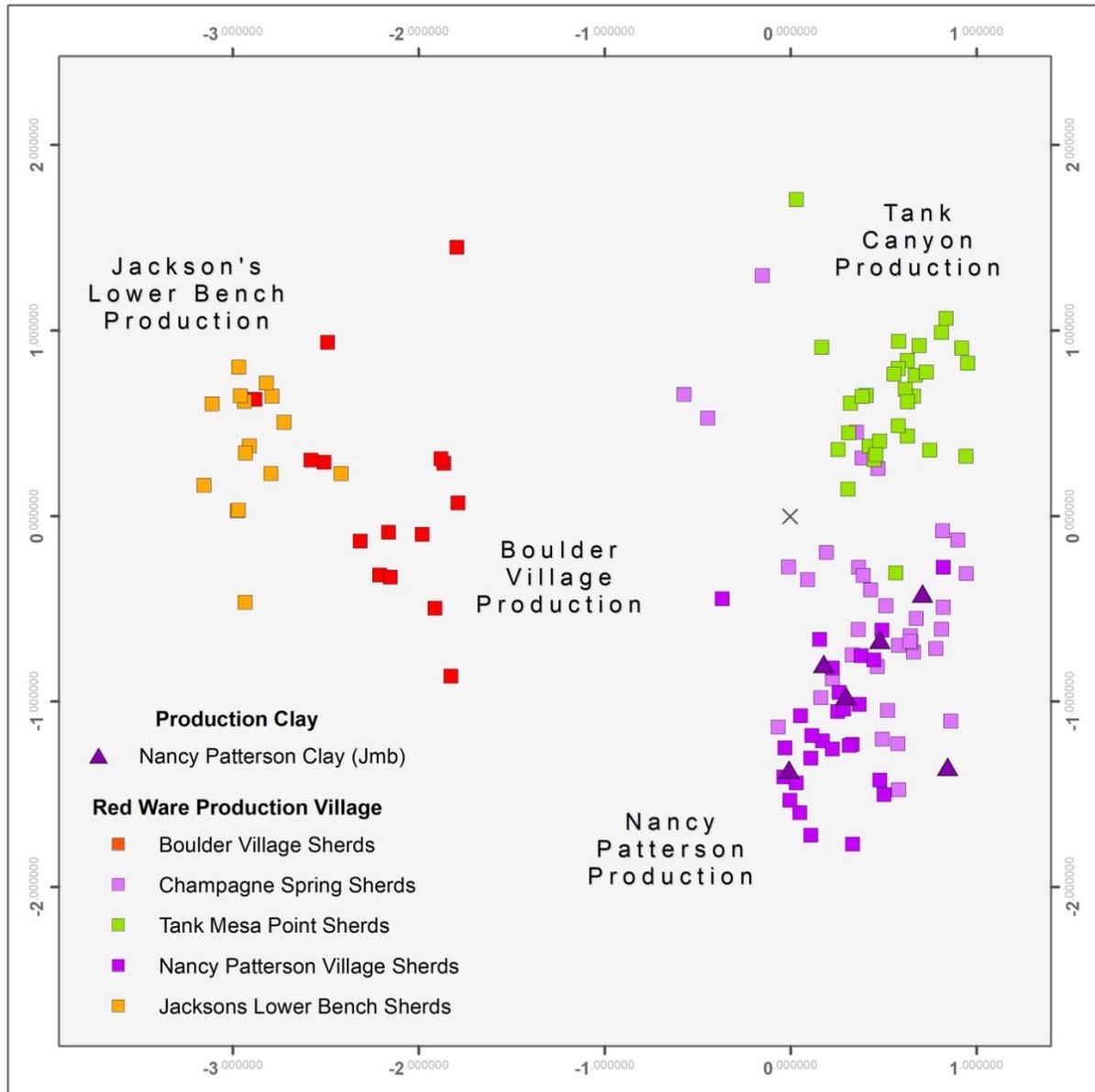


Figure 4. Principal Components Analysis biplot of Components 1 and 2. Representative geochemical signatures of selected sites producing red ware from clay exposed in Montezuma Canyon. Note matching geochemical signatures of Jurassic Morrison Formation Brushy Basin (Jmb) clay and Nancy Patterson Village pottery, indicative of local production. Colored symbols correspond with Figure 1.

Interaction and Exchange

Ceramic exchange is the material consequence of cultural interaction. Confirmation of exchange at minimum requires determination of where the pottery was made (its production provenience) and where it was collected (its recovery provenience). In lieu of excavated ceramic assemblages from sites with associated kiln features and unfired sherds that inductively allow for identification of which clay beds in the immediate resource catchment may have been selected for use (Lucius 2022), our research design is based on the collection of clay and sherds from numerous sites across the Mesa Verde region and includes all pottery types subsumed in the San Juan Red Ware series. In this manner, the study of clay and sherds resulted in plausible relationships between the natural and cultural landscapes. This connectivity, a bond between people and land, was revealed through the archaeometric methods applied in this study.

Three important assumptions about resource use were validated. First, the production provenience of the prehistoric pottery demonstrates that Ancestral Puebloans at NPV lived within proximity of the geological resources they exploited; second, the pottery clays that were gathered were used in their natural state with little, if any, modification; third, our research tested, but failed to fully support the long-held *Criterion of Abundance* axiom, demonstrating that caution should be exercised when inferring ceramic production sources based on sherd abundance alone without including potential production clay in the analysis. We can place this notion within the context of our case study using Champagne Springs as an example. In the course of our excavations, we have learned that in most tenth century contexts at CS, imported San Juan Red Ware is at least twice as abundant as locally produced whiteware that served similar purposes. We also learned that our CS sherd assemblage exhibits compositional similarity to the Nancy Patterson Village locale, and that prehistoric potters targeted discrete resource constituents at NPV. Without establishing an accurate provenience, application of the *Criterion* would have suggested that our Champagne Spring sherd assemblage was produced locally when in fact it was not.

An Ongoing Initiative

Hundreds of sites in the study area are proximal to geological resources that could have been used to produce red ware, including numerous sites in Montezuma Canyon that are closer to Champagne Spring. Nevertheless, as much as eighty-three percent of the CS red ware analyzed to date was manufactured at the Nancy Patterson Village locale. This tantalizing evidence of interaction and exchange between NPV and CS raises many new questions. There was clearly a strong export-import pattern of red pottery from NPV into CS, but why and by what mechanism(s)? Were red pots themselves the primary objects of importation, or did they arrive as containers for something else? Did they enter CS as gifts or tribute, or as food containers in feasting episodes? Or did they enter as a simple trade/exchange market commodity and if so, in exchange for what? Were the two communities “Sister Cities” in a binary systemic relationship who partnered to buffer crop failure by cropping at higher and lower elevations simultaneously or by sharing resources unique to their geography? Overlain on the environmental geography, the pattern suggests a complementary interdependence between food-rich but red-clay-poor upland Colorado farmers with a (ritual?) demand for red pottery and food-poor but red-clay-rich lowland Utah farmers with a demand for risk-buffering food resources (Dove et al. 2022). But why such a strong tie between these two specific villages? Was it rooted in or reinforced by kinship

connections? How were networks of production and exchange structured among our other sites, and what factors controlled the distribution and range of pottery across this area of the Colorado Plateau?

Our research seeks to investigate and answer some very complex and extensively discussed questions in southwestern archaeology. Answering these questions necessarily requires robust testing of the *Criterion of Abundance* and the *Provenience Postulate* using a clay-focused approach to sourcing analysis. These questions and others can be answered through application of the Spatio-Compositional Approach by demonstrating where artifacts were made and where they were found with emphasis on an intimate familiarity and study of the landscape. As with any ongoing scientific analysis, our interpretation of the patterning evolves as more specimens are added to the study. After nearly two decades of clay sampling and clay and sherd analysis, the pieces of this archaeometric puzzle are coming together.

Sherd specimens used in this study were provided under permit number U17HT0288 (Hurst and Dove 2021), USDI Bureau of Land Management, and State of Utah School and Institutional Trust Lands Administration. Photographs of many of the sherds collected from the sites used in this study can be found in Figures 5, 6, and 7. Table 1 is an index to accompany the sherd figures. Note: Here we define “Early Deadmans” as transitional, with Deadmans style designs but with little or no slip. When present, slip is often applied as streaks, patches, or as a thin wash.

Acknowledgments. Special thanks to Jennifer Latimer, Ph.D. Geological Sciences, Chair, Department of Earth and Environmental Sciences, Indiana State University, for use of the Biogeochemistry Laboratory and access to pXRF and ICP-MS. Mark Johnson, for preparing the many specimen photos. We would sincerely like to acknowledge the generous help and support that was provided by the USDI Bureau of Land Management Monticello Office and the State of Utah School and Institutional Trust Lands Administration. Additionally, we want to express our gratitude to the Edge of the Cedars Museum and the Museum of People and Cultures in Salt Lake City.



Figure 5. San Juan Red Ware pottery recovered from Nancy Patterson Village.



Figure 6. San Juan Red Ware pottery recovered from Champagne Spring (CS) and Boulder Village (BV).



Figure 7. San Juan Red Ware pottery recovered from Tank Mesa Point (TMP), Jackson's Lower Bench (JBL), and Jackson's Lower Bench Sprawl (JBS).

Table 1. Index to sherd photos in Figures 6, 7, and 8.

ANID	Site	Hardness	Type	Type	Temper	Slip	Polish	Paste	Paint
NP002	NPV	hard	bowl	Deadmans B/r	igneous, coarse sand	buff	yes	buff umber	black, deteriorated
NP003	NPV	med	bowl	Deadmans B/r	igneous, coarse sand	yes	yes	gray	brownish black
NP004	NPV	hard	jar	Deadmans B/r	igneous, coarse sand	no	no	buff	brownish black
NP007	NPV	hard	bowl	Deadmans B/r	igneous, coarse sand	smooth	smooth	umber buff umber	black, strong
NP008	NPV	hard	bowl	Deadmans B/r	igneous	yes, light	yes, light	umber	brownish black, strong
NP009	NPV	med hard	jar	Early Deadmans	igneous, coarse sand	yes, light	semi smooth	umber gray	brownish black
NP010	NPV	soft	bowl	Early Deadmans	igneous, coarse sand	yes, light	yes, light	umber	black
NP011	NPV	hard	bowl, rim	Early Deadmans	igneous	yes, interior	yes, light	umber gray	brownish black
NP012	NPV	hard	bowl, rim	Early Deadmans	igneous, coarse sand	smooth	yes, patchy	gray core umber margins	brownish black
NP013	NPV	hard	bowl, rim	Deadmans B/r	igneous, coarse sand	yes	yes, patchy	gray	brownish red
NP015	NPV	hard	bowl, rim	Early Deadmans	igneous, coarse sand	yes, light	yes	umber gray	brownish black, faded
NP016	NPV	hard	jar	Early Deadmans	igneous, coarse sand	yes	yes, light	gray	brownish black
NP017	NPV	hard	jar	Early Deadmans	igneous, coarse sand	yes, little	smooth	umber	brownish black
NP018	NPV	hard	bowl	Deadmans B/r	igneous, coarse sand	yes	yes	gray core umber margins	black
NP019	NPV	med soft	bowl, rim	Early Deadmans	igneous, coarse sand	yes, light	smooth	umber gray	black, faded
NP020	NPV	hard	bowl, rim	Deadmans B/r	igneous, coarse sand	yes	smooth	gray core umber margins	black, faded
NP021	NPV	hard	bowl, rim	Deadmans B/r	igneous, coarse sand	yes	smooth	umber to gray	black
NP022	NPV	med hard	bowl	Deadmans B/r	igneous, coarse sand	yes, patchy	smooth	gray	black
NP023	NPV	hard	jar	Deadmans B/r	igneous, coarse sand	yes	smooth	umber to gray	black, strong
NP024	NPV	hard	bowl	Deadmans B/r	igneous, coarse sand	yes, light	smooth	umber	brownish black
NP025	NPV	hard	bowl, rim	Deadmans B/r	igneous, coarse sand	yes, light	yes, light	umber	black
CS140	CS	hard	bowl	Deadmans B/r	igneous, rose quartz sand	light, patchy	yes	gray	black, faded
CS141	CS	med hard	bowl	Deadmans B/r	coarse sand	light, patchy	yes, outside	orange to buff to orange	black, faded
CS142	CS	hard	bowl	Deadmans B/r	igneous, coarse sand	yes, light	yes	orange to buff	brownish black, faded
CS143	CS	med soft	jar, effigy	Deadmans B/r	igneous, coarse sand	yes	yes, patchy	buff	brownish black
CS147	CS	hard	bowl, rim	Deadmans B/r	igneous, coarse sand	yes, light	yes	gray	black, faded
CS152	CS	hard	jar	Deadmans B/r	igneous, coarse sand	yes	yes	yes	black
CS154	CS	hard	bowl, rim	Deadmans B/r	igneous	smooth	yes	gray	black
CS157	CS	hard	bowl	Deadmans B/r	igneous, coarse sand	yes	yes	orange to buff	black, faded
CS162	CS	hard	bowl, rim	Deadmans B/r	igneous, coarse sand	yes	yes	varies gray to buff	black, worn
BV001	BV	hard	bowl	Bluff B/r	igneous	no	smooth	umber throughout	black
BV002	BV	hard	bowl	Bluff B/r	igneous, coarse sand	no	yes	umber throughout	black
BV003	BV	soft	bowl	Bluff B/r	igneous	no	light	umber throughout	black
BV005	BV	hard	bowl	Abajo R/o	igneous	no	no	gray w thin umber margins	reddish brown
BV004	BV	hard	bowl	Abajo R/o	igneous	no	no	gray core w umber margins	reddish brown
BV007	BV	medium	bowl	Abajo R/o	igneous, coarse sand	no	yes	pure umber baby	red
BV009	BV	hard	bowl	Bluff B/r	igneous, coarse sand	no	yes	tan w umber margins	black faded
BV015	BV	soft	bowl	Bluff B/r	igneous	no	yes	umber	black
BV131	BV	hard	bowl	Bluff B/r	igneous	no	yes	lt gray core w umber margins	black
BV132	BV	medium	bowl	Early Deadmans	igneous, coarse sand	streaky	yes	grayish brown	black strong
BV134	BV	medium	bowl	Bluff B/r	coarse sand	no	no	brownish gray	black faded
BV135	BV	soft	bowl	Bluff B/r	igneous, coarse sand	no	no	gray ext, umber int	brownish black
TMP033	TMP	hard	bowl	Early Deadmans	coarse sand	no	smooth	umber	black
TMP028	TMP	soft	bowl	Bluff B/r	igneous, coarse sand	no	smooth	umber w lt gray thin core	black
TMP027	TMP	hard	bowl	Bluff B/r	igneous, coarse sand	no	no	lt gray core w umber margins	black
TMP026	TMP	hard	bowl	Early Deadmans	coarse sand	light	yes	lt gray core w umber margins	reddish brown
TMP025	TMP	hard	bowl	Bluff B/r	igneous, coarse sand	no	no	brownish tan	black
TMP024	TMP	hard	bowl	Bluff B/r	igneous	no	no	lt gray	reddish brown
TMP001	TMP	hard	bowl	Bluff B/r	coarse sand	no	no	lt gray core w umber margins	reddish brown
TMP022	TMP	hard	bowl	Bluff B/r	igneous, coarse sand	no	no	tan w umber margins	black
TMP002	TMP	soft	bowl	Bluff B/r	unknown	no	no	gray	brownish black
TMP003	TMP	medium	bowl	Bluff B/r	igneous	no	no	lite gray w umber margins	brown
TMP021	TMP	medium	jar	Early Deadmans	igneous, coarse sand	yes, little	no	umber	brownish
JBL016	JBL	hard	bowl	Deadmans B/r	igneous	yes	no	gray ext w umber int	black
JBS001	JBS	hard	jar	Deadmans B/r	igneous, coarse sand	light	light	umber throughout	black
JBS002	JBS	hard	bowl	Early Deadmans	igneous	trace	no	gray throughout	black
JBS003	JBS	hard	bowl	Deadmans B/r	igneous	yes	yes	umber throughout	black
JBS004	JBS	med hard	jar	Deadmans B/r	igneous, coarse sand	yes	yes	tan throughout	black
JBS005	JBS	hard	bowl	Early Deadmans	igneous	trace	trace	gray core w umber margins	black
JBS006	JBS	hard	bowl	Deadmans B/r	igneous	yes	no	umber throughout	black deteriorating
JBS007	JBS	hard	bowl	Deadmans B/r	igneous, coarse sand	yes	light	lt gray w umber margins	black
JBL001	JBL	hard	bowl	Deadmans B/r	igneous, coarse sand	yes	yes	gray core w umber margins	black
JBL024	JBL	hard	bowl	Deadmans B/r	igneous	yes	yes	umber throughout	black

References Cited

- Arnold, Dean E.
1975 Ceramic Ecology of the Ayacucho Basin, Peru: Implications for Prehistory. *Current Anthropology* 16(2):183-205.
- Di Naso, Steven M.
2018 *An Investigation and Analysis of Jurassic Mudstones and Quaternary Soils for Application in Spatio-Compositional Archaeological Provenance Studies*. PhD dissertation, Department of Earth and Environmental Systems, Indiana State University, Terre Haute, Indiana.
- Di Naso, Steven M., and David M. Dove
2022 Application of NAA and pXRF in the Identification of Possible Red Ware Producer and Consumer Sites in the Northern San Juan. Manuscript in preparation for submittal to Archaeometry.
- Dove, Donald E. (preparer)
2006 *Topographical Mapping, Geophysical Studies and Archaeological Testing of an Early Pueblo II Village near Dove Creek, Colorado*, with contributions by Steven M. Di Naso, David M. Dove, Kimberly Gerhardt, Vincent P. Gutowski, Harvey Henson, Patricia L. Lacey, Diane McBride, Robert McBride, Jonathan Till, and Larry Tradlener. Funding provided by a Colorado Historical Society Assessment Grant, Project No. 2004-AS-014, Deliverable No. 4: Final Assessment Report.
- Dove, David M.
2012 Multiple Animal Offerings in an Early Kiva: Champagne Spring (Greenlee) Ruins, 5DL2333. *Southwestern Lore: Journal of Colorado Archaeology* 78(2):1-17.
- Dove, David M., Steven M. Di Naso, and Winston B. Hurst
2022 From Bears Ears to Mancos Valley - Late Ninth-Century Climate Change and its Impact on the Production and Exchange of San Juan Red Ware Pottery. *Academia Letters*, Article 4818, March 2022. <https://doi.org/10.20935/AL4818>.
- Hurst, Winston B., and David M. Dove,
2021 San Juan Red Ware Sourcing and Exchange: Final Descriptive Report on 2017-2020 Utah Field Investigations (U17HT0288). Report submitted to the USDI Bureau of Land Management and State of Utah School and Institutional Trust Lands Administration.
- Esri
2022a ArcGIS Map Services, Terrain: Elevation Tinted Hillshade. Sources: USGS, NGA, NASA, CGIAR, GEBCO, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, GSA, and the GIS User Community. <https://elevation.arcgis.com/arcgis/services/WorldElevation/Terrain/ImageServer>, accessed April 2022.
2022b ArcGIS Map Services, World Hillshade. Sources: Esri, Airbus DS, USGS, NGA, NASA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap, and the GIS User Community. https://services.arcgisonline.com/arcgis/rest/services/Elevation/World_Hillshade/MapServer, accessed April 2022.

Lucius, William A.

- 1988 *Village Formation and Social Interaction: A Test of the Interaction Hypothesis*. PhD dissertation, Department of Anthropology, University of Toronto, Toronto.
- 2010 Tracking Pueblo I, Mesa Verde Region Orange Pottery Production, Exchange and Cultural Interaction: A Personal Journey of a Ceramic Archaeologist. *Pottery Southwest* 29(2):2-12.
- 2022 Pottery Kilns, Unfired Sherds, and Landscape Archaeology: Early Pueblo I Ceramic Production and Exchange in the White Mesa Production Zone, Southeastern Utah. *Pottery Southwest* 37(3-4):2-24.

Rands, Robert L., and Ronald L. Bishop

- 1980 Resource Procurement Zones and Patterns of Ceramic Exchange in the Palenque Region, Mexico. In *Models and Methods in Regional Exchange*, edited by Robert E. Fry, pp. 19-46. SAA Papers No. 1. Society for American Archaeology, Washington, D.C.

Thompson, Charmaine, Shane A. Baker, James R. Allison, and Kenneth L. Wintch

- 1986 *The Nancy Patterson Village Archaeological Research Project: Field Year 1985—Preliminary Report No. 3*, Brigham Young University Museum of Peoples and Cultures Technical Series No. 86-27. Brigham Young University Museum of Peoples and Cultures, Provo, Utah.

Weigand, Phil C., Garman Harbottle, and Edward V. Sayre

- 1977 Turquoise Sources and Source Analysis: Mesoamerica and the Southwestern U.S.A. In *Exchange Systems in Prehistory*, edited by Timothy K. Earle and Jonathan E. Ericson, pp. 15-34. Academic Press, New York.

Zhou, Di, Theodore Chang, and John C. Davis

- 1983 Dual Extraction of R-Mode and Q-Mode Factor Solutions. *Journal of the International Association of Mathematical Geology* 15(5):581-606.

EXHIBITS AND EVENTS

Registration is now open for the 2022 **Southwest Kiln Conference** hosted by Western New Mexico University October 7-9 and taking place on the WNMU campus. Presentations are scheduled on Friday the 7th, painting classes will follow Friday evening, and firings will begin Saturday morning. There will be a silent auction, a tour of the WNMU's pottery collection, and a catered dinner followed by trade blanket fun. The trench kiln will be opened Sunday morning. Conference registration and attendance are free. To join the Saturday dinner or to get a t-shirt, pay via one of the contacts on the SWKC website once registered. Visit the SWKC website to register: <https://www.swkiln.com>.

The 2023 **Southwest Symposium** will be held January 5-7 in Santa Fe at the beautiful and historic La Fonda Hotel. The conference theme is “Attributes to Networks: Multi-scalar Perspectives on Understanding the Past in the Southwest US and Northwest Mexico.” Visit the Southwest Symposium website for further details: <https://southwestsymposium.org>.

The **Museum of Indian Arts and Culture** on Museum Hill in Santa Fe has two exhibits of interest:

Grounded in Clay Clay: The Spirit of Pueblo Pottery, a unique exhibition curated by the Native American communities it represents, features more than 100 historic and contemporary works in clay from the School of American Research (SAR) collections. Organized by SAR and the Vilcek Foundation, the exhibition offers a visionary understanding of Pueblo pots as vessels of community-based knowledge and personal experience. The exhibition will be open at MIAC through May 29, 2023 when it will move to The Metropolitan Museum of Art and the Vilcek Foundation in New York (July 2023-June 2024), The Museum of Fine Arts in Houston (October 2024-January 2025), and the Saint Louis Art Museum (March-June 2025).

More than 60 members of 21 tribal communities known as the Pueblo Pottery Collective (including New Mexico's 19 Pueblos, the Ysleta del Sur Pueblo of West Texas and the Hopi Tribe of Arizona) selected and wrote about artistically distinctive pots from the collections of the SAR Indian Arts Research Center in Santa Fe and the Vilcek Foundation in New York. The innovative exhibition commemorates the 100th anniversary of SAR's Pueblo Pottery Fund pottery collection and the 90th anniversary of the completion of the Laboratory of Anthropology (the Lab). During the Santa Fe presentation of the exhibit, MIAC and the Lab also will feature 11 pottery pieces that will include examples from the Pueblos in present day New Mexico to enhance the exhibition.

Painted Reflections: Isomeric Design in Ancestral Pueblo Pottery will be open at MIAC through March 12, 2023. Never before the subject of a museum exhibition, Painted Reflections explores the designs painted on ancestral and contemporary Pueblo pottery, offering new insights into the study of Pueblo art through an analysis of the visual structure of ceramic design.

The **El Paso Museum of Archaeology's** exhibit **Working Ancient Themes into New Combinations: A Tribute to Lucy M. Lewis, Acoma Potter from the James P. And Dorothy S. Barufaldi Collection of Native American Pottery** has been extended through

November 30, 2022. Lucy Lewis (ca. 1895-1992) was born at Acoma Pueblo, New Mexico, and began making pottery at the turn of the century, mainly teaching herself by observing her great aunt Helice Vallo. Lucy received many accolades and awards for her pottery and became known as one of Acoma's leading "matriarch" potters. She is known for working ancient themes and patterns she observed from ancient Ancestral Pueblo and Mimbres pottery sherds into new combinations on her pottery. Four of Lucy's daughters and a granddaughter also became renowned potters in their own rights. Over the years, Lucy Lewis pottery has been collected and displayed by museums the world over. Her artwork is also prized by private collectors such as James P. and Dorothy S. Barufaldi, whose collection makes up the entirety of this exhibition which also includes some pieces made by Lucy's relatives and descendants.

The **Museum of Northern Arizona** in Flagstaff has an ongoing exhibition called **Histories in Clay** in the Babbitt Gallery. MNA co-founder Harold Colton was instrumental in creating the classification system still in use to sort the vast array of prehistoric Southwestern ceramic design styles, manufacturing techniques, and cultural traits. The coalescence of these views is expressed in the exhibit *Histories in Clay*, which features about 150 prehistoric and contemporary ceramic vessels from both the Babbitt Collection and MNA Collections. Also in the Babbitt Gallery is a display specifically covering ancient to modern Zuni pottery, a display of contemporary Navajo pottery, and the Tim's Cave pottery and basket fragments. Tim's Cave, a site abandoned for 500 years, was discovered in 1991 in cliffs near Sedona. The display covers the discovery, the loss, and return of the objects in the cave, and the touching story of how the cave got its name. The Archaeology Gallery exhibits also include many ceramic artifacts.

The **Arizona State Museum** in Tucson has an ongoing exhibit called **The Pottery Project** which celebrates indigenous pottery-making traditions in the U.S. Southwest and northwest Mexico by showcasing 500 choice specimens from the larger, renowned collection of 24,000 whole vessels. The exhibit features interactive displays, interviews with archaeologists and Native potters, videos, and hands-on experiences.

The **Western New Mexico University Museum** in Silver City is the home of the NAN Ranch Collection—the largest and most complete collection of Mimbres materials in existence from a single prehistoric Mimbres site, and the largest and most comprehensive permanent interpretative exhibition of Mimbres pottery and artifacts in the world. Other collections include the Eisele Collection of prehistoric Southwestern pottery and artifacts, including basketry; and the Back Collection of historic Maria and Julian Martinez San Ildefonso Pueblo pottery and Santa Clara Pueblo pottery.

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Bice, Richard A., and William L. Sundt

1968 *An Early Basketmaker Campsite: Report on AS-1, a Field Project of the Albuquerque Archaeological Society*. Albuquerque Archaeological Society, Albuquerque.

Bice, Richard A.

1968 *Tonque Pueblo, Docent Handbook*, for Exhibition Prepared by the Albuquerque Archaeological Society for the Museum of Albuquerque, September 7, 1968.

Barnett, Franklin

1969 *Tonque Pueblo: A Report of Partial Excavation of an Ancient Pueblo Indian Ruin in New Mexico*. Albuquerque Archaeological Society, Albuquerque.

Bice, Richard A.

1970 *Basketmaker III-Pueblo I Manifestations on the Rio Puerco of the East*. Technical Note No. 1, Albuquerque Archaeological Society, Albuquerque.

Bice, Richard A., and William M. Sundt

1972 *Prieta Vista: A Small Pueblo III Ruin in North-Central New Mexico*. Report of the Excavation of the AS-3 Site by the Albuquerque Archaeological Society in Cooperation with Eastern New Mexico University. Albuquerque Archaeological Society, Albuquerque.

Barnett, Franklin, and William M. Sundt

1973 *San Ysidro Pueblos: Two Prehistoric Pueblo IV Ruins in New Mexico*. Albuquerque Archaeological Society, Albuquerque.

Barnett, Franklin

1974 *Sandstone Hill Pueblo Ruin, Cibola Culture in Catron County, New Mexico*. Albuquerque Archaeological Society, Albuquerque.

Wiseman, Regge N.

1986 *An Initial Study of the Origins of Chupadero Black-on-white*. Technical Note No. 2, Albuquerque Archaeological Society, Albuquerque.

Schroeder, A. H.

1987 *Vidal Great Kiva Site, LA 16254, Progress Report for 1986*. Albuquerque Archaeological Society, Albuquerque.

Sundt, William M., and Richard A. Bice

1989 *Tijeras Canyon Site AS-10: Preliminary Report*. Albuquerque Archaeological Society, Albuquerque.

Bice, Richard A., Sheila Brewer, Bettie Terry, Phyllis Davis, Gordon Page, Elizabeth Kelley, William Sundt, and Joan Wilkes

1990 *The Vidal Great Kiva Near Gallup, New Mexico*, Summary Status Report. Albuquerque Archaeological Society, Albuquerque.

- King, Dudley W., and Richard A. Bice
1992 *Subfloor Channels in Prehistoric Ruins: Anasazi Region of the Southwest*. Albuquerque Archaeological Society, Albuquerque.
- Olson, Nancy H., and Richard A. Bice, edited by Alan M. Shalette
1995 *The Albuquerque Archaeological Society: The First Twenty-Five Years, 1966-1991*. Albuquerque Archaeological Society, Albuquerque.
- Bice, Richard A.
1997 *Field Guide to Mid-Rio Grande Pottery*. Technical Note No. 4. Albuquerque Archaeological Society, Albuquerque.
- Bice, Richard A.
1998 *Prehispanic Pueblo Pottery*, second edition, Albuquerque Archaeological Society, Albuquerque.
- Bice, Richard A., Phyllis S. Davis, and William M. Sundt
1998 *The AS-8 Pueblo and the Cañada de las Milpas, a Pueblo III Complex in North-Central New Mexico*. Albuquerque Archaeological Society, Albuquerque.
- Bice, Richard A., Phyllis S. Davis, and William M. Sundt
2003 *AS-5, Indian Mining of Lead for Use in Rio Grande Glaze Paint*, Report of the AS-5 Bethsheba Project Near Cerillos, New Mexico. Albuquerque Archaeological Society, Albuquerque.

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**Prehistoric Southwestern Pottery Types and Wares
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When *Pottery Southwest's* editor emerita was asked where to find Ted Oppelt's *Prehistoric Southwestern Pottery Types and Wares: Descriptions and Color Illustrations*, Ted's widow, Pat Oppelt, generously offered us her only remaining copy of Ted's 2010 expanded edition. At our suggestion, she agreed that AAS could digitize the volume to make it available on a CD. This volume responded to Ted's concern that "written descriptions were inadequate to understand what a pottery type looked like" (Oppelt 2010:i). Thus, he scanned sherds and whole vessels to produce a volume with illustrations and descriptions of 27 wares and 228 types. The order form for this CD is on the last page of this volume.

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