POTTERY SOUTHWEST

Volume 36, No. 3-4 NOVEMBER 2020
FALL-WINTER ISSN 0738-8020

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 in which 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.

CONTENTS

Pottery Southwest is a non-profit journal of the Albuquerque Archaeological Society

CLASSIC MIMBRES POTTERY AND A PICTOGRAPH

Marc Thompson, Amelia Island, FL

Introduction

Petroglyphs have been identified as Mimbres based on style and similarities to pottery motifs in numerous locations. However, it is clear that pictographs (painted images) were not a usual part of the artistic and iconographic expressions of the Mimbres. Nevertheless, this paper discusses a probable Mimbres pictograph, identified on the basis of style and similarity to pottery motifs. I believe that this pictograph depicts a birthing posture, and so I compare it to Mimbres bowls with birthing images, as well as to other birthing images.

Mimbres Rock Art

Few publications or presentations have described rock art in the Mimbres region, and only one (Creel 1989) has identified pictographs, or painted images. Although Fewkes (1914:16) illustrated "pictographs" in the vicinity of "Cook's Range," New Mexico, those were pecked, what we now call petroglyphs. Nevertheless, he was probably the first researcher to comment on similarities between Mimbres ceramic and rock art images.

Initially Polly Schaafsma (1980) subdivided Jornada rock art into eastern and western (Mimbres) styles. Later (1992) she combined them, apparently based partially on the presence of goggle-eyed figures and other similarities in both. She noted that pictographs were common in the Jornada, including the Mogollon Red Style (A.D. 500-1200) (Schaafsma 1980) that overlaps and occurs in portions of both the eastern and western areas. These pictographs do not draw on Mimbres motifs.

Between the 1980 and 1992 Schaafsma publications, Creel (1989) published a study of anthropomorphic petroglyphs recorded in a five-kilometer section of the Mimbres River near the Mimbres NAN Ranch Ruin (LA 15049). Only one pictograph, located near a cave entrance, was recorded in this survey (Creel 1989:Figure 4F). The red figure (anthropomorph?) bears no resemblance to any ceramic motif or petroglyph recorded in the Mimbres Region and is not thought to be Mimbres.

In 2004, I presented a paper at the 13th Biennial Mogollon Conference on a rock art recording project at Map Cave (LA 19134), a shallow, non-habitational rock shelter with bedrock mortars and cupules, near Hanover, NM (Thompson 2004). The convex floor exhibited Late Archaic petroglyphs and what appeared to be a later isolated Mimbres Venus petroglyph. I presented another paper (Thompson et al. 2006) on petroglyphs in the Mimbres region at the 14th Biennial Mogollon Conference. Subsequently, I published an article on the topic (Thompson 2011) and made a presentation at the 17th Congress of the International Federation of Rock Art Organizations in Albuquerque on 13 rock art sites in the Mimbres region (Thompson 2013). These presentations and article focused on comparing and contrasting elements, icons, and motifs common to both Mimbres ceramics and petroglyphs in southwestern New Mexico.

A few years ago I visited an excavation at the Mimbres Twin Pines Village (LA 75947) near Winston, NM, sponsored by New Mexico State University. Nearby on a canyon wall, U.S. Forest Service Archaeologist Chris Adams directed me to three as yet unpublished red pictographs in a horizontal row, two of which were indistinct. The third was a quadruped zoomorph with a long tail and long ears (or horns), large dot-in-circle eye, and three horizontal dot-in-circle elements on a rectilinear body (see *geronimoranch/native-american-culture/* online). Chris related that a Zuni informant suggested the image might refer to a jaguar or young mountain lion as the cubs have spots. The long tail is suggestive of a feline, but the ears or horns are not. From a western perspective it might resemble a pinto horse. The execution of the Twin Pines quadruped is fluid, competent, and confident, suggesting that it could be a Classic Mimbres painting.

The Geronimo Trail Guest Ranch, also near Winston, has posted a few photos (*geronimoranch/native-american-culture/*) of other, less distinctive red pictographs apparently accessible on horseback. Most of these do not appear to recall imagery cognate with ceramic motifs from the Mimbres region although a rectangular goggle-eye figure is apparent, and a faint Mimbres-style Knife-wing icon may be present.

In 2016, Margaret K. Berrier directed a thorough rock art recording project with multicomponent loci at Apache Flats near Hatch, NM (LA 43952, LA 181620, LA 184216). She presented a paper on this project at the 19th Mogollon Archaeology Conference and published the well-illustrated results (Berrier 2017). In her 2017 report, Berrier recorded petroglyphs of three zoomorphic quadrupeds, two at LA 43952 and one at LA 184216. The first had a long tail and ears with no apparent body markings, the second was similar with rectangular crosshatching, and the third displayed an inverted X pattern on the body. These bore some resemblance to the pictograph near Twin Pines. She also provided drawings of two zoomorphic quadruped petroglyphs with two circle-in-dot elements from the Three Rivers Petroglyph Site near Tularosa, NM. One had a long tail, the other had long ears. These bear some resemblance to the pictograph near Twins Pines, but none, including the pictograph, appear to represent the same, or an identifiable, animal.

The Possible Mimbres Birthing Pictograph

In 2020 Karl Laumbach sent me an image from a cave in Cañada Alamosa, near Monticello, NM, where he and others have conducted a long-term research project, including excavation of a Classic Mimbres pueblo, the Montoya Site (LA 88891, ca. A.D. 950-1130). This anthropomorphic motif is distinct in style from others in two other caves near the base of Montoya Butte (LA 172547) and at the butte top that exhibit red pictographs. The source of the pigment is likely the nearby Red Paint Canyon where red clay rich in hematite occurs (Karl Laumbach, personal communication 2020).

The pictograph (Figure 1a) consists of a neck, upright arms and hands, face, and two crouching legs with feet. The torso is no longer visible between the neck and legs. The face shape is a rounded triangle, broader at the top, with brows, eyes, nose, and mouth. The image is nicknamed "screaming woman," although the mouth and placement of hands lack the immediacy and fervor

Figure 1a

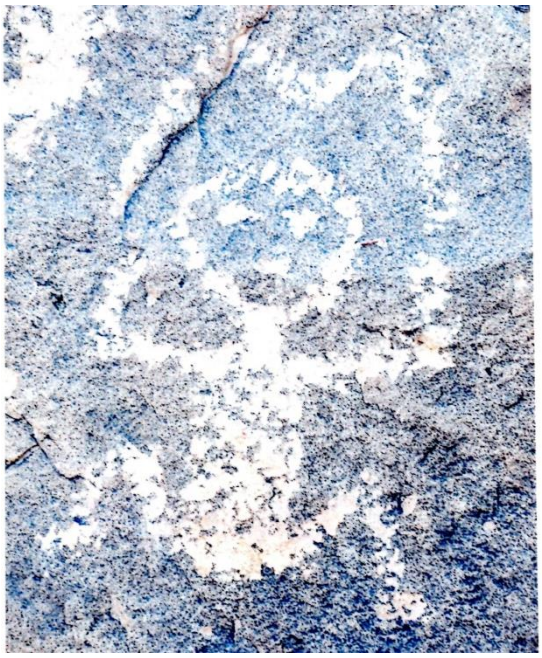


Figure 1b

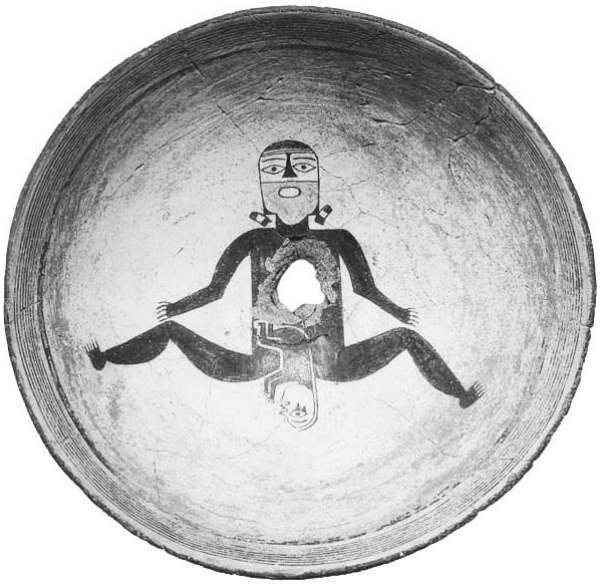


Figure 1c

Figure 1d

Figure 1. Mimbres rock art and pottery images: a) Pictograph, LA 172547. Photo by Gary Hein, Dstretch by Margaret K. Berrier. Image courtesy Karl of Laumbach. b) Petroglyph, LA 53792. Photo by Marc Thompson. c) Mimbres Style III Polychrome bowl, MimPPID No. 7984. Digital illustration by Mark Willis. d) Mimbres Style III negative Black-on-white bowl, MimPPID No. 2179. Digital illustration by Mark Willis.

of Edvard Munch's "The Scream." No anatomical features indicative sex or gender are present as is the case with some anthropomorphs depicted in bowls and petroglyphs from the Mimbres region. The implementation of the image, although eroded, is well executed and confident. However, the meaning, message, and function are elusive.

Other Birthing Images

I recorded a similar petroglyph (Thompson 2011, 2013) at McGee Canyon (LA 53792) in the vicinity of Cookes Range, near Fort Cummings, NM. The head shape with eyes and mouth is similar to the pictograph as are the positions of the arms and legs (Figure 1b). A curious M-shaped element is evident above the hands and head that resembles in style a Mimbres fish head. A similar figure is preserved on a kiva mural at Kuaua, near Bernalillo, NM (Dutton 1963:Figure 27). Although the head of the figure is gone the arms, torso, and legs depict the same posture as the pictograph and petroglyph. This figure is bisected longitudinally, light on its right side and dark on the left, suggesting duality. This is similar to the depiction, on a later layer, of the Hero Twins as light and dark fishmen on either side of a niche (Dutton 1963:Plate XXV; Thompson 1999:Figure 37). The mural fragments are on display at Coronado Historic Site in Bernalillo, NM.

Margarret Berrier (personal communication 2020) has provided photos of three birthing posture petroglyphs from Three Rivers, NM. One, with an eroded face, includes an earbob and necklace. She also recorded a birthing posture petroglyph at Taylor Mountain, Luna County, NM. More distant is a well-known petroglyph near Moab, UT, with a probable feet first birthing scene that includes an emergent neonate.

Here I distinguish between "birthing figure" and "birthing posture." The former includes a neonate; the latter does not. Both include raised arms, flexed knees in a squat, and an upright posture thought to enhance delivery. In this position the baby's head applies even and direct pressure on the cervix, aiding dilation.

Additionally, as Alexander Kurota observed (personal communication 2020), "numerous prehistoric Ancestral Pueblo petroglyphs and pictographs depicting 'fertility ceremonies' have been found in northern and central New Mexico where four or more flute players circle or move around a pueblo maiden who is depicted in a posture almost identical to that of the 'birthing posture' (also lacking the child)." For an example from a Rio Grande Glazeware bowl, see Franklin et al. 2018:Figures 5 and 6.

Mesoamerican depictions of birthing are uncommon, but childbirth motifs are illustrated in Late Postclassic codices from central México (Milbrath 1988). The Borgia Codex, a Mixteca-Puebla style codex (ca. A.D. 1400), contains four images of goddesses squatting, hands above heads, as birthing figures with emergent newborns (Díaz and Rogers 1993:Plates 31, 32, 40). Additionally, the Borbonicus Codex, a Mexica (Aztec) codex (ca. A.D. 1500), illustrates *Tlazolteotl*, goddess of purification and filth, in the same position. As Milbrath describes, "In this painting the mother goddess, Tlazolteotl, sensibly uses the force of gravity to aid in the birth of the maize god, who descends head first" (1988:153).

Mimbres Ceramic Birthing Images

Table 1 lists 35 Mimbres bowls and one sherd that include three birthing figures and 33 birthing postures from the Mimbres Pottery Image Digital Database. I eliminated three "batman" motifs that depict anthropomorphs with bat-like wings in similar configurations as not germane.

Table 1. Mimbres Bowls (36) with Birthing Posture Motifs

Mimbres Pottery Image Digital Database No.	*Site Name*	*Style*	*Color*	*Arms*	*Other Images/About Figure*	*Burial*	*Other*
178		III	B/W	Up	Venus glyphs above, below		Twins' father
507		III	B/W	Down	Apparent occiput posterior birth		
1734		III	B/W	Up	Netting below buttocks/ amniorrhexis(?)		
1737		III	B/W	Up	Venus glyphs above & probably below		Twins' father
2179	Swarts	III	B/W neg.	Up	Earbobs, necklace & pendant	6 mo.- 2 yr.-old	
2632	Swarts	III	B/W	Up	Horns, netting/amniorrhexis?	3-10-yr.-old	
2795	Galaz	III	B/W	Up		3-10 yr.-old	
3604	Old Town	III	B/W	Up			
3693	Mattocks	III	B/W neg.	Up	Goggle eyes, tail below	Burial	
4259	W. Smith	III	B/W	Up	Tail below		
4548	Mattocks	III	B/W neg.	Up	Necklace	Burial	
4937		III	B/W	Up	Big teeth		Flare rim
5513		?	B/W	Down	Exterior image		Flower pot; Style uncertain
5934		III	B/W	Down			
6062		III	B/W	Up	Bowl(?) below buttocks		
7313		III	B/W	Up	Fish(?) hat		
7967		III	Poly	Up	Venus glyphs R&L, quiver below		Twins' father
798		III	Poly	Down	Earbobs, tranverse position birth		
8092		III	Poly neg.	Up			
8133		II	B/W neg.	Up	Hachures below buttocks		
8173		III	B/W	Up	Pronghorns, animal head		
8722		III	B/W	Up	Feather on head, shell bracelets		
8783		III	B/W	Up	Feather cap, objects in hands		
8993		III	B/W neg.	Up			Sherd: R arm & knee only
9053		III	B/W	Bent/ midway	Lizards hanging from ears		

Table 1. Continued.

Mimbres Pottery Image Digital Database No.	*Site Name*	*Style*	*Color*	*Arms*	*Other Images/About Figure*	*Burial*	*Other*
9220		III	B/W	Up			
9342		III	B/W	Up			
937		III	B/W	Up	Two opposed figures, buttocks to buttocks		
9552	Swarts	III	B/W	Down	Occiput posterior birth	Burial	Birth of left-handed Twin
9930		II/III	B/W neg.	Up			
9990		III	B/W neg.	Up	Hachures below buttocks		Similar to #8092
10240		III	B/W neg.	Up			
10426		II	B/W neg.	Up			
10919		II/III	B/W	Up	Two sets of opposed figures, buttocks to buttocks		

None of the three bowls with birthing figures depict typical births. Two are occiput posterior births with the baby's head facing away from the mother, Nos. 507 and 9552. These account for about 5 percent of human births. An explanation of these two caused some controversy when coauthors suggested the rare birth scenes were painted by men unfamiliar with the birthing process (Hegmon and Trevanthan 1996). However Carlson (1982), Thompson (1999), and Thompson et al. (2014) provided esoteric explanations indicating the birthing figure in No. 9552 represents the mother of the Mimbres Twins and the birth of the younger Twin waving his left-dominant hand. The third bowl, No.7894 (Figure 3), presents a rare transverse position (sideways) birth. These are exceedingly rare at 0.25%. This figure wears earbobs associated with females. In all three figures with an emergent child, the mother's arms are positioned downward perhaps following the emergence of the baby's head.

The remaining 32 bowls and sherd depict birthing posture motifs with anthropomorphic beings, some of which exhibit zoomorphic elements (see Table 1). Of the eight bowls with site provenience, six were recovered from burials and three of those were interred children, Nos. 2179, 2795, and 2632. Three others appear to illustrate the father of the Twins, with paired Venus glyphs above and below, Nos. 178, 1737, and right and left, No. 7967, i.e., Venus as evening star above (father of the Twins), and as morning star below (uncle of the Twins) or evening star in the west and morning star in the east, respectively (Thompson 1999, 2006, Thompson et al. 2014). Additionally No. 7967 includes an animal hide quiver below the buttocks of the Twins' father, emblematic of the Mimbres Twins as seen on No. 7974 (Thompson 2017).

Other bowls, Nos. 1734 and 2632, may depict amniorrhexis (afterbirth) below the buttocks. Two other figures are depicted with earbobs, Nos. 4548, 9053, seen elsewhere on females.

Discussion

Several bowl motifs resemble the pictograph (Figure 1a). A Classic Mimbres (Style III) bowl from Swarts Ruin included with a child inhumation, No. 2179 (Figure 1d), is a match. Although the arms are flexed, the position of the flexed legs and the feet is identical to the pictograph. The face shape is the same with brows, almond-shaped eyes, solid triangular nose, and rectangular mouth. Additionally, the figure on No. 2179 wears earbobs, a necklace (seen similarly on No. 4548), and pendant, typically associated with females.

Although the pictograph figure does not appear to be screaming, several observers have commented that the image "screams Mimbres." At this point the pictograph appears to be rare, but perhaps not unique. Other pictographs in two caves and atop Montoya Butte could be from Early or Late Mogollon pithouse occupations in Cañada Alamosa. Pictographs near Twin Pines Village could be from either or both pithouse and Classic Mimbres occupations.

Finally, as at Map Cave, with Late Archaic images and at least one, and possibly three, later Mimbres figures, the pictograph may be an example of Mimbres "tagging." (Tagging entails the use of a symbol or graffito to mark territory in strategically located areas.)

At Map Cave an outlined Venus glyph, seen on Mimbres petroglyphs and on pottery, is isolated about one meter west of the connected and abstracted designs. Additionally, at the mouth of the shelter, east and west respectively, are three pecked hand prints, one with six fingers, and a large spiral. These may be coeval with the Venus glyph.

The birthing posture pictograph from Cañada Alamosa is distinctive and elementally dissimilar to other figures in the cave. It ***is*** stylistically compatible with Classic Mimbres bowl motifs and a petroglyph within the Mimbres region.

Acknowledgments. I am grateful to the following colleagues for their contributions to this paper. Karl Laumbach provided the pictograph photo and graciously consulted on the preparation of the study. Margaret K. Berrier shared her extensive knowledge of, and insights on, pictographs and petroglyphs. Mark Willis generously prepared the figures of the two Mimbres bowls. Chris Adams kindly communicated and searched for additional pictographs in USFS archives. Gretchen Obenauf applied her considerable editorial skills and patience in production of this article. I offer my thanks to each and all.

References Cited

Berrier, Margaret K.
2017 2016 Rock Art Recording at Apache Flats, New Mexico. In *Collected Papers from the 19th Biennial Mogollon Archaeology Conference*, edited by Lonnie C. Ludeman, pp. 217-230. Edwards Brothers Malloy, Ann Arbor.

Carlson, Roy L.
1982 The Mimbres Kachina Cult. In *Mogollon Archaeology: Proceedings of the 1980 Conference*, edited by Patrick H. Beckett and Kira Silverbird, pp. 147-155. Acoma Books, Ramona, California.

Creel, Darrell
1989 Anthropomorphic Rock Art Figures in the Middle Mimbres Valley, New Mexico. *Kiva* 55(1):71-86.

Díaz, Gisele, and Alan Rogers (editors)
1993 *The Borgia Codex:. A Full Color Restoration of the Ancient Mexican Manuscript*. Dover Publications, New York.

Dutton, Bertha
1963 *Sun Father's Way: The Kiva Murals of Kuaua*. University of New Mexico Press, Albuquerque.

Fewkes, J. Walter
1914 Archaeology of the Lower Mimbres Valley. *Smithsonian Miscellaneous Collections* 63(10), Washington, D.C.

Franklin, Hayward H., Karen Armstrong, Alexander Kurota, and Ethan Ortega.
2018 Exposed-Coil Ceramic Vessels of the Classic Pueblo Period. In *Two Gentlemen of Chaco: Papers in Honor of Thomas C. Windes and Peter J. McKenna*, edited by Emily J. Brown, Carol J. Condie, and Marc Thompson, pp. 117-130. The Archaeological Society of New Mexico, Albuquerque.

Milbrath, Susan
1988 Birth Images in Mixteca-Puebla Art. In *The Role of Gender in Pre-Columbian Art and Architecture*, edited by Virginia Miller, pp. 153-177. University Press of America, Lanham.

Schaafsma, Polly
1980 *Indian Rock Art of the Southwest*. School of American Research and University of New Mexico Press, Santa Fe and Albuquerque.
1992 *Rock Art in New Mexico*. Museum of New Mexico Press, Santa Fe.

Thompson, Marc
1999 Mimbres Iconology: Analysis and Interpretation of Figurative Motifs. Unpublished Ph.D. dissertation, Department of Archaeology, University of Calgary.
2004 Mapping Map Cave. Paper presented at the 13th Biennial Mogollon Conference, Silver City, New Mexico.
2006 Precolumbian Venus: Celestial Twin and Icon of Duality. In *Religion in the Southwest*, edited by Christine S. VanPool, Todd L. VanPool, and David A. Philips, Jr., pp.165-183. AltaMira Press, Lanham, Maryland.
2011 Defining Mimbres Rock Art Sites. *NewsMAC, Newsletter of the New Mexico Archaeological Council* 2011(4):2-12.
2013 Wind in the Willows: Evidence of Economy, Esotericism, and Gender at Mimbres Rock Art Sites. Paper presented at the 17th Congress of the International Federation of Rock Art Organizations, Albuquerque.
2017 Divine Duality: The Mimbres Twins. *Archaeology Southwest* 31(1):21.

Thompson, Marc, Jason Jurgena, and Lora Jackson
2006 Mimbres Rock Art. Paper presented at the 14th Biennial Mogollon Conference, Tucson.

Thompson, Marc, Patricia A. Gilman, and Kristina C. Wyckoff
2014 The Hero Twins in the Mimbres Region: Representations of the Mesoamerican Creation Saga Are Seen on Mimbres Pottery. *American Archaeology* 18(2):38-43.

MCELMO PHASE CERAMICS AT TALUS UNIT NO. 1, CHACO CANYON, N.M.

Frances Joan Mathien and Thomas C. Windes
Department of Anthropology, University of New Mexico

Nestled against the cliff wall just northwest of Chetro Ketl in Chaco Canyon National Historical Park (NHP) is Talus Unit No. 1 (Figure 1). Excavations by the University of New Mexico/ School of American Research field schools during the 1930s (Walter 1933; Woods 1934, 1935, 1938) and a National Park Service stabilization project (Shiner 1959, 1961) exposed a site that was classified as neither a great house nor a typical small house (Figure 2). It consists of 30 to 35 ground story rooms, with two and perhaps three stories in the west block where a large subterranean room was discovered in the plaza. Although a comprehensive report on the excavations was never prepared, Lekson (1985) evaluated the architecture, and Windes' recent tree-ring studies (chacoarchive.org/chaco_tring.html accessed April 23, 2009) confirmed a mid-A.D. 1000s initial construction phase, with later reuse as indicated by the placement of Kiva E and the "buttress/watchtower/pier" (following Lekson [1985], we designate it as the pier). Just how late in the A.D. 1100s this occupation continued was uncertain. Refining the chronological placement of the kiva and the pier is our primary goal in this paper.

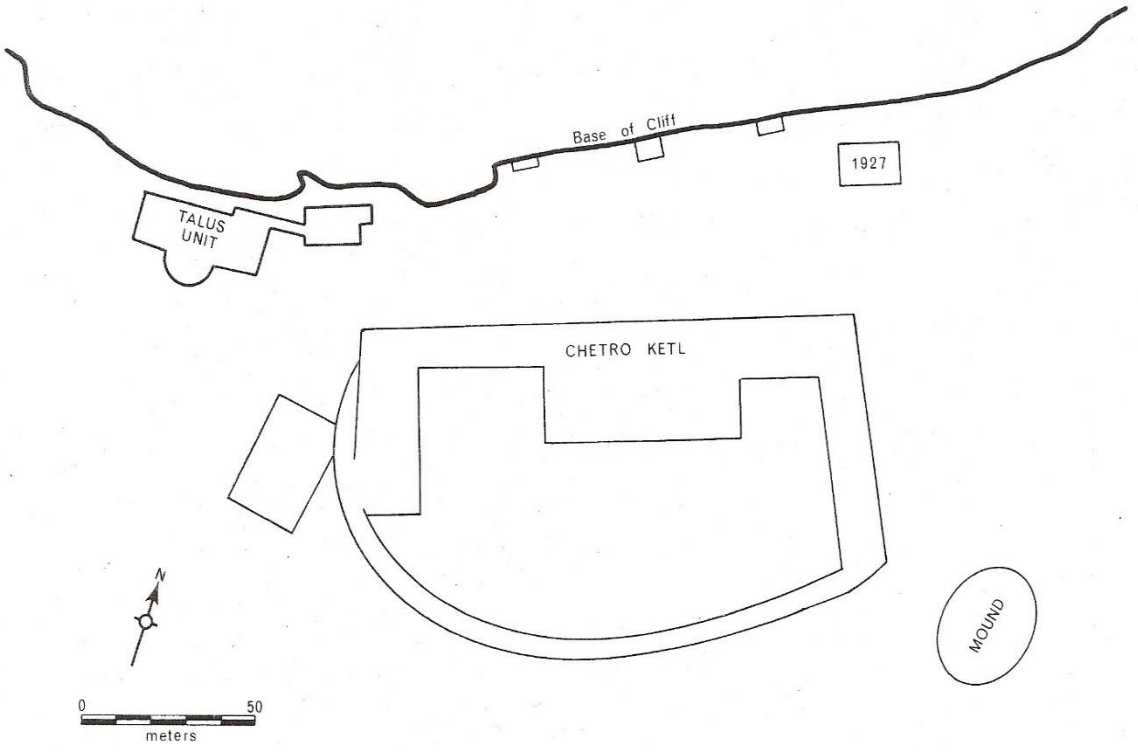


Figure 1. Location of Talus Unit No. 1 in relation to Chetro Ketl. (From Lekson 1985:Figure 1.)

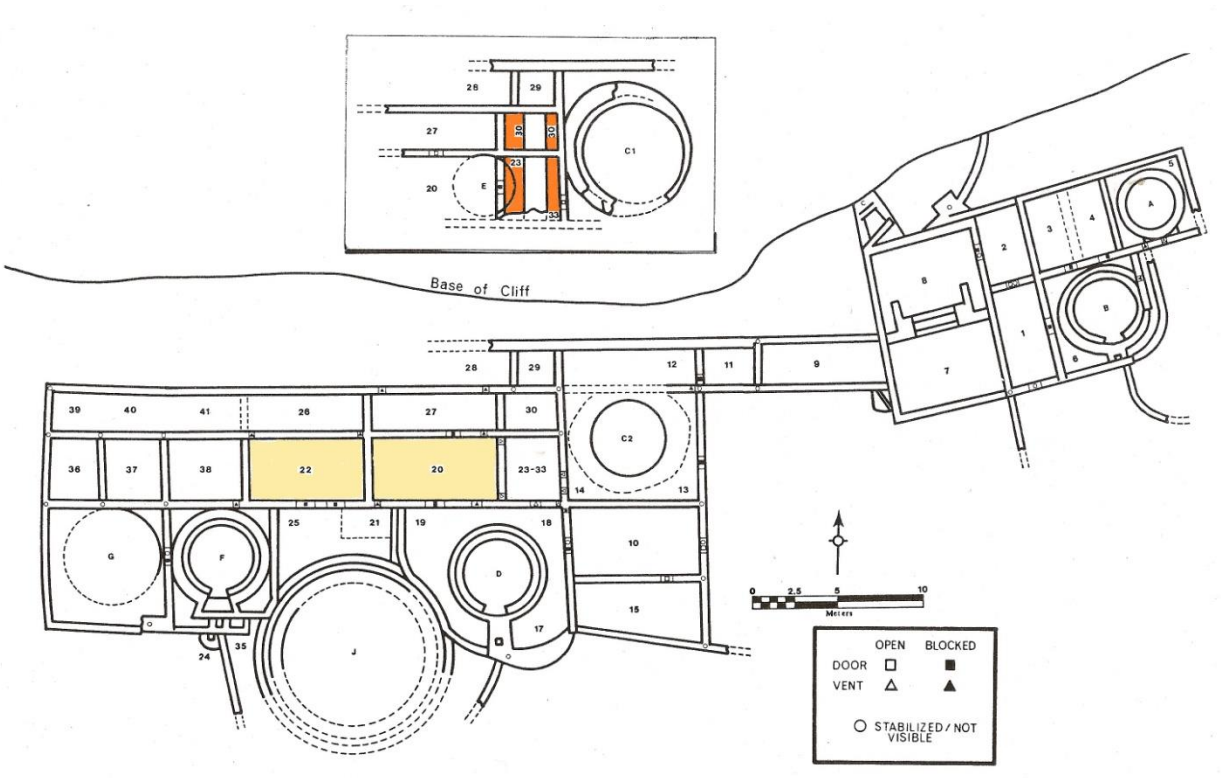


Figure 2. Plan view of Talus Unit No. 1. Rooms 20 and 22 (highlighted in cream on the first story) provided ceramics for this study; tree-ring dates from around the pier (highlighted in orange on the second story) place it in chronological context. (From Lekson 1985:Figure 2).

Ceramic Evidence

A previous analysis of sherds from the 1935 field season identified several ceramic types that suggested site use extended into the late A.D. 1100s and early 1200s. Wingate Black-on-red (n=79, 0.8 percent), Mesa Verde Black-on-white (n=52, 0.5 percent), and Puerco Black-on-red (n=50, 0.5 percent) were among the 9,807 sherds recovered during the 1935 excavations and analyzed by S. Elizabeth Murphey (1936). At the time of her analysis, whiteware categories were limited to polished and unpolished black-on-white; any carbon-painted ware with ticking on the rims was considered a Mesa Verde Whiteware. These and other types would later be named. Thus, there was little in Murphey' s report to refine the date of the late occupation.

A search for ceramics from Talus Unit No. 1 at numerous repositories revealed that small collections were held by the University of New Mexico's Maxwell Museum of Anthropology, the Museum of Indian Arts and Culture/Laboratory of Anthropology in Santa Fe, and the Peabody Museum of American Archaeology and Ethnology at Harvard University. Those in the Chaco Culture NHP Museum Collection were more extensive; thus, a rough sort of these bulk sherds was undertaken. The results suggested a McElmo phase occupation (Mathien and Windes 2018).

What follows is an example that reflects results across the site. The data compiled are from Room 20 and Room 22 (Figure 2), both of which are large rectangular rooms excavated in 1935 and 1937 (Woods 1935, 1938). They are located in the western half of the site in the section that Lekson (1985) indicated would probably be classified as a great house if it had been located elsewhere in the San Juan Basin. Room 20 had been filled from floor to ceiling prior to the construction of Kiva E above it. The depth of fill in Room 22 is unknown, but pre-excavation photographs of the site indicate ground level in 1933 was the same as that for Room 20. Both rooms have evidence for A.D. 1100s pottery that helps establish a probable construction date for Kiva E and possibly the pier, features indicative of the late occupation or use at this site.

A considerable number of sherds from these rooms that were previously housed at the Western Archaeological and Conservation Center in Tucson were found in the Chaco Culture NHP Museum Collections. The Maxwell Museum of Anthropology retains three bags with sherds that are considered parts of possibly restorable vessels. Several other restorable vessels with an unknown provenience are also included herein because the original numbers (e.g., TU/2) fit within a series of restorable vessels from Room 20. They probably were among the many items reported by Woods (1938) to have been recovered from that room.

Tom Windes identified the sherd types using the updated ceramic typology for Chaco Canyon (Windes 2018). (Additionally, the Chuska ceramic series has been revised [Reed and Goff 2003].) In Windes' framework, the years from A.D. 1120-1220 are divided into two parts: The Late Bonito phase (A.D. 1100-1140) includes Gallup, Puerco, Chaco-McElmo, and McElmo Black-on-white (local varieties). The McElmo phase (A.D. 1140-1200 or 1220) is identified by the presence of McElmo Black-on-white (San Juan variety), Nava Black-on-white, St. Johns Black-on-red, and Mesa Verde Corrugated. A later period, the Mesa Verde phase (A.D. 1200-1300), includes Crumbled House Black-on-white, Mesa Verde Black-on-white, St. Johns Polychrome, and Mesa Verde Corrugated.

The results of Windes' rough sort of the sherds from these two rooms are presented below. Because not all levels of fill from Rooms 20 and 22 are represented in the collections and not all of the provenience information is available, we sometimes combined counts from several catalog numbers into a single table. These combinations are noted below.

Room 20

Room 20 was excavated during two field seasons. In 1935, attention focused on Kiva E (Woods 1935). Constructed just west of the pier as part of the uppermost story, the kiva had suffered from destructive forces to the extent that only an outline of its lowest level remained. The upper east wall of Room 20 was used as part of the kiva bench. Woods recognized that the structure below was a different configuration but continued to label the excavated levels as part of the same provenience. Thus, artifacts from the eastern section of Room 20 were identified as coming from Kiva E with those found below Level 4 representing the lower room. In 1937 Woods excavated the western section of this room (identified then as Room 18b). She remarked upon the large number of restorable vessels that were recovered in the fill (Woods 1938). The following presentation follows her division of the room into two sections.

Room 20 (east side)

Murphey (1936) documented sherd types for ten fill levels (Kiva E, levels 5-14). In the Chaco Culture NHP collection, we found sherds for three of these levels.

Level 8. No white wares were identified among the 136 extant sherds from this level (Table 1). Murphey's total for Level 8 was 257 sherds; thus 121 are missing. She listed 147 corrugated sherds (versus the current 135) and no redwares. Her whiteware categories were polished (n=90) and unpolished black-on-white (n=18). There were no unprovenienced catalog numbers in the current collections attributed to Kiva E that might represent the missing whiteware; we assume these have been lost over the decades. In Table 1, after disregarding the grayware, the single Tsegi Orangeware sherd suggests a time frame that includes the Classic Bonito phase through the Late Bonito phase (A.D. 1040-1140).

Table 1. Room 20, Level 8 (CHCU 90343).

Ceramic Type	**Temper**			**Totals**	**Percent**
Grayware (jars)	Sand	Trachyte	Sherd		
Unclassified indented corrugated	123	0	0	123	90.4
PII-III rims (indented corrugated)	2	0	1	3	2.2
PIII rims (indented corrugated)	4	0	0	4	2.9
Rim fillets	5	0	0	5	3.7
Temper subtotals	134	0	1	135	[99.2]
	Form				
Redware	Bowl	Jar	Ladle		
Tsegi Orangeware	1	0	0	1	0.7
Form subtotals	1	0	0	1	[0.7]
TOTALS	1	135	0	136	99.9

Level 10. Again, Murphey (1936) accounts for more pottery from this provenience than the 10 sherds that are found in the collections (Table 2). Her total for graywares and whitewares combined was 506 sherds, all of which are missing. One catalog number attributed to either Room 20 or Room 22 (below) may represent part of the whiteware collection, but only contains 74 sherds. Three sets of data from unknown proveniences have a total of 299 whiteware sherds that also do not match Murphey's number.

Table 2. Room 20, Level 10 (CHCU 90279).

Ceramic Type	**Form**			**Totals**	**Percent**
Redware	Bowl	Jar	Ladle		
Smudged (polished black)	5	0	0	5	50.0
Wingate Black-on-red	5	0	0	5	50.0
TOTALS	10	0	0	10	100.0

Level 11. In Table 3, we combine sherds from eight Chaco Culture NHP catalog numbers. Included are graywares, whitewares, and redwares. A total of 370 sherds listed by Murphey is somewhat less than the 396 currently assigned to Level 11. The total of 10 redwares agrees in both counts, but we did not find Murphey's Tusayan Polychrome sherd. Murphey lists 214 corrugated wares versus the 128 in Table 3, a difference of 86 sherds. Murphey also lists 140 whiteware sherds versus 258 for a difference of 118 sherds. Some of the sherds may have been mislabeled and mixed with those from other proveniences. In Windes' rough sort (Table 3), the large number of Chaco-McElmo sherds indicates primarily an A.D. 1100s fill event. The few McElmo Black-on-white sherds from the Mesa Verde Whiteware series and the Nava Black-on-white sherd from the Chuska series, however, indicate this event may have occurred later than A.D. 1150 or may be mixed with intrusives (e.g., rodent burrows, etc.).

Table 3. Room 20, Level 11 (CHCU 90281-90287, CHCU 90292).

Ceramic Type	**Temper**				**Totals**	**Percent**
Grayware (jars)	Sand	SJ rock	Trachyte	Sherd		
Unclassified indented corrugated	112	0	0	0	112	28.2
PII rims (indented corrugated)	2	1	0	0	3	0.8
PII-III rims (indented corrugated)	2	1	0	0	3	0.8
PIII rims (indented corrugated)	1	0	2	0	3	0.8
Rim fillets	2	3	1	1	7	1.7
Temper subtotals	119	5	3	1	128	[32.3]
	Form					
Cibola Whiteware, Chaco series	Bowl	Jar	Ladle			
Kiatuthlanna Black-on-white	1	0	0		1	0.3
Red Mesa Black-on-white	1	2	0		3	0.8
Puerco Black-on-white	18	20	0		38	9.8
Gallup Black-on-white	11	32	1		44	11.1
Chaco Black-on-white	4	8	0		12	3.0
Chaco-McElmo Black-on-white	22	24	5		51	12.9
PII-III mineral-on-white	5	11	1		17	4.3
PII-III carbon-on-white	2	3	0		5	1.3
Whiteware (no paint)	13	56	2		71	17.9
Chuska Whiteware						
Chuska Black-on-white	4	0	0		4	1.0
Toadlena Black-on-white	3	1	0		4	1.0
Nava Black-on-white	1	0	0		1	0.3
Tusayan Whiteware						
Black Mesa Black-on-white	2	0	0		2	0.5
Sosi Black-on-white	1	0	0		1	0.3
Mesa Verde Whiteware						
McElmo Black-on-white	1	2	0		3	0.7
Unclassified Mesa Verde Whiteware	1	0	0		1	0.3
Redware						
Smudged (polished black)	7	0	0		7	1.8
Wingate Black-on-red	3	0	0		3	0.7
Form subtotals	100	159	9			[68.0]
TOTALS	100	287	9		396	100.3

Room 20 (west side)

Information for the west side of Room 20 was reported by Woods (1938) under the designation Room 18b. There is no record of a ceramic analysis from the 1937 field season so we have little information on the ceramic types or the levels excavated. We rely on what is currently in the collections. Three catalog numbers are combined in Table 4. Similarly, sherds from five catalog numbers are included in Table 5, all of which were designated as coming from fill. The presence of Nava Black-on-white and McElmo Black-on-white again places the assemblage in the mid- to late A.D. 1100s.

Table 4. Room 20, West Side, No Provenience (CHCU 43129-43131).

Ceramic Type	**Temper**			**Totals**	**Percent**
Grayware (jars)	Sand	Trachyte	Sherd		
Unclassified indented corrugated	42	0	0	42	72.4
Chaco Corrugated	3	0	0	3	5.2
Hunter Corrugated	0	2	0	2	3.4
Blue Shale Corrugated	0	3	0	3	5.2
PII-III rims (indented corrugated)	3	0	0	3	5.2
Temper subtotals	48	5	0	53	[91.4]
	Form				
Cibola Whiteware, Chaco series	Bowl	Jar	Ladle		
Chaco-McElmo Black-on-white	2	0	0	2	3.4
Whiteware (no paint)	0	1	0	1	1.7
Mesa Verde Whiteware					
McElmo Black-on-white	1	0	0	1	1.7
Redware					
Smudged (polished black)	1	0	0	1	1.7
Form subtotals	4	1	0	5	[8.6]
TOTALS	4	54	0	58	100.0

Room 22

Excavated in 1937, Woods (1938) recorded a decayed burial (Burial 5) on the floor of Room 22 (formerly Room 19b) next to a number of logs. The long bones and many other skeletal parts were scattered; there was also evidence of gopher action. Woods (1938:2) identified the soil in which the burial was found as kitchen refuse mixed with wind-blown sand. Near the head was a "Kayenta type" bowl with an effigy inside. Although the bowl is missing from collections, Windes identified the bowl from a photograph as Chaco-McElmo Black-on-white; the ceramic bird figure is typed as a Chaco Black-on-white effigy. This suggests a date from A.D. 1100 to 1140. Very few sherds from this room were found in the collections. Those listed in Table 6 supposedly came from the fill; the types also suggest a date of ca. A.D. 1100-1140.

Table 5. Room 20, West Side, Fill (CHCU 1940, CHCU 43088, CHCU 43132-43134).

Ceramic Type	**Temper**			**Totals**	**Percent**
Grayware (jars)	Sand	Trachyte	Sherd		
Unclassified indented corrugated	50	0	0	50	16.8
Chaco Corrugated	2	0	0	2	0.7
Mummy Lake Gray	1	0	0	1	0.3
Temper subtotals	53	0	0	53	[17.8]
	Forms				
Cibola Whiteware, Chaco series	Bowl	Jar	Ladle		
Red Mesa Black-on-white	0	1	0	1	0.3
Puerco Black-on-white	9	24	0	33	11.1
Gallup Black-on-white	5	17	0	22	7.4
Chaco Black-on-white	26	27	0	53	17.9
Chaco-McElmo Black-on-white	24	39	1	64	21.6
PII-III mineral-on-white	1	4	1	6	2.0
Whiteware (no paint)	1	22	0	23	7.7
Chuska Whiteware					
Brimhall Black-on-white	1	0	0	1	0.3
Chuska Black-on-white	18	0	0	18	6.1
Toadlena Black-on-white	1	0	0	1	0.3
Nava Black-on-white	1	0	0	1	0.3
Mesa Verde Whiteware					
McElmo Black-on-white	20	0	0	20	6.7
Redware					
Smudged (polished black)	1	0	0	1	0.3
Form subtotals	108	134	2	244	[82.2]
TOTALS	108	187	2	297	100.0

Table 6. Room 22, Fill (CHCU 43094, CHCU 43135).

Ceramic Type	**Form**			**Totals**	**Percent**
Cibola Whiteware, Chaco series	Bowl	Jar	Ladle		
Puerco Black-on-white	5	2	0	7	11.1
Gallup Black-on-white	6	0	0	6	9.5
Chaco-McElmo Black-on-white	23	0	0	23	36.5
Chuska Whiteware					
Nava Black-on-white	2	0	0	2	3.2
Mesa Verde Whiteware					
Mancos Black-on-white	6	0	0	6	9.5
Redware					
Puerco Black-on-red	1	0	0	1	1.6
Wingate Black-on-red	15	0	0	15	23.8
White Mountain Redware	3	0	0	3	4.8
TOTALS	61	2	0	63	100.0

Room 20 or Room 22

One catalog number in the Chaco Culture NHP collection was designated with this uncertain provenience. It included only whiteware sherds that are assigned late A.D. 1000s to early 1100s dates.

Table 7. Room 20 or 22 Sherds (CHCU 43095).

Ceramic Type	**Form**			**Totals**	**Percent**
Cibola Whiteware, Chaco series	Bowl	Jar	Ladle		
Puerco Black-on-white	4	0	0	4	5.4
Gallup Black-on-white	4	8	0	12	16.2
Chaco Black-on-white	0	25	0	25	33.8
Chaco-McElmo Black-on-white	10	0	0	10	13.5
Chuska Whiteware					
Toadlena Black-on-white	18	0	0	18	24.3
Tusayan Whiteware					
Sosi Black-on-white	5	0	0	5	6.8
TOTALS	41	33	0	74	100.0

Restorable Vessels

In addition to the bulk sherd collections, we compiled a list of restorable vessels from these two rooms. Two of the old catalog numbers (TU/n) indicated they were from Room 20. With the assumption that all were excavated and cataloged the same year in which Woods mentions numerous restorable vessels, all eight are listed on Table 8. Not all were located in 2018; some information presented below was taken from the Chaco Culture NHP catalog lists. Figures 3 through 15 illustrate several of the vessels that were located and examined.

The range of dates for these 26 ceramic vessels is broad. The earliest are two Early Bonito phase bowls (Late Red Mesa B/w; A.D. 900 to possibly A.D. 1040); one is illustrated in Figure 3. One Escavada Black-on-white vessel is featured in Figure 4. Several types have long time spans, e.g., Gallup, Puerco, Toadlena, and Mancos black-on-whites, that extend into the A.D. 1100s (Figures 5 through 10). Four examples of Chaco-McElmo Black-on-white pottery are featured in Figure 10 while Figure 11 illustrates the remains of a Wetherill or McElmo Black-on-white bowl. The redwares include Tusayan Black-on-red bowl sherds (Figure 12). Three bowls (Figures 13 and 14) are classified as White Mountain Redware. The Puerco/Wingate Black-on-red bowl sherds (Figure 13a) are dated to the early A.D. 1100s, along with Chaco-McElmo Black-on-white. It is especially the Late Wingate/St. Johns Black-on-red bowl (Figure 14) that extends the fill date into the late A.D. 1100s or 1200s. Figure 15 illustrates the smudged ware bowl that was among the restorable vessels. Based on these data, the filling episode in Rooms 20 and 22 took place after A.D. 1100 (and possibly post A.D. 1140) but before A.D. 1200. This reflects the range seen in the bulk sherd analysis (Mathien and Windes 2018).

Table 8. Restorable Vessels from Rooms 20 and 22.

Provenience	Ceramic Type	Description	Catalog No.	Fig. No.
Room 20 debris	Chaco-McElmo B/w	Bowl. Solid black lines separated by dots on interior. Two mending holes.	CHCU 1938 (formerly TU/4)	10a
Room 20 debris	Chaco B/w	Bowl composed of 7 sherds. Linear design with hatching. Two mending holes. One-quarter missing.	CHCU 1940 (formerly TU/6)	
Room 20 debris	Gallup B/w	Bowl	MAX Box 947	
Room 20 debris	Puerco B/w	Bowls (2)	MAX Box 947	
Room 20 debris	Puerco B/w	Bowl	MAX Box 1170	
Room 20	Chaco-McElmo B/w	Solid, horizontal line on interior.	CHCU 549	
Room 20	Chaco-McElmo B/w	Jar with flared rim. Solid black section, vertical and horizontal lines. Neck with 3 band lines.	CHCU 550	10d
Room 20	Chaco-McElmo B/w	Pitcher with cylindrical neck. Most of handle missing. Dotted rim, horizontal lines around base. Design on body includes rectangles with interior dots.	CHCU 551	10b
Room 20	Late Gallup or Chaco B/w	Pitcher	CHCU 552	6
Room 20 fill	Gallup B/w	Pitcher. Base missing.	CHCU 29346	7
Room 20 fill	Puerco B/w	Bowl fragment (half). Sherds for 1/3 more.	CHCU 29347	5
Room 20	Escavada B/w	Bowl, half present. Cross-hatching and interlocking scrolls with ticks.	CHCU 29385	4
Room 20	Wetherill or McElmo B/w	Bowl sherds (4 body, 7 rim).	CHCU 43088	11
Room 20	Tusayan B/r	Bowl sherds (7 body, 3 rim, 1 base) with 6 formerly glued together.	CHCU 43089	12
Room 20	Mancos B/w	Bowl (partial). Sherds (5 body, 10 rim, 2 base) with 8 formerly glued together	CHCU 43090	9b
Room 20	Wingate B/r	Bowl sherds (15 body, 9 rim, 1 handle, 1 base), 9 of partially restored vessel	CHCU 43091	13b
Room 20	Escavada B/w	Bowl fragment. Faded hatched design on interior.	CHCU 43092	
Room 20	Toadlena B/w	Bowl fragment. Linear design and triangles.	CHCU 43093	8
Room 22	Smudged ware	Bowl (15 sherds glued together). Orange exterior, smudged black interior. Two loose sherds, one mending hole.	CHCU 29388	15
Room 22	Puerco/Wingate B/r	Bowl sherds (5 body, 6 base, 6 rim).	CHCU 43094	13a
Room 22 west corner, Level 1	Chaco-McElmo B/w	Canteen. Side lugs near neck. Banded design, half with vertical hatching and half with white in a black band.	CHCU 1935 (formerly TU/1)	10c
Unknown	Chaco B/w	Bowl. Lugs on four sides, one incomplete. Rim painted. Slip on interior and exterior. Curvilinear design with hatching on interior.	CHCU 1936 (formerly TU/2)	
Unknown	Late Red Mesa B/w	Bowl. Banded designs include ticked triangles and interlocking scrolls.	CHCU 1937 (formerly TU/3)	3
Unknown	Late Mancos B/w	Pitcher. Vertical lines running from rim to shoulder. Vertical lines on handle. Indented base.	CHCU 1939 (formerly TU/5)	9a
Unknown	Wingate/ St. Johns B/r	Bowl. Interior and exterior slip and polish with polish over design. Design is composed of solid triangles and triangles with hatching.	CHCU 1941 (formerly TU/7)	14
Unknown	Red Mesa B/w	Bowl donated by UNM.	CHCU 1942 (formerly TU/8)	

Figure 3. Late Red Mesa Black-on-white restorable bowl (CHCU 1937) from an unknown provenience, but probably from Room 20 or Room 22. (Photograph by Joan Mathien.)

Figure 4. Escavada Black-on-white bowl sherd from Room 20 (CHCU 29385). (Photograph by Joan Mathien.)

Figure 5. Puerco Black-on-white bowl sherds (CHCU 29347) from Room 20 fill. (Photograph by Joan Mathien.)

Figure 6. Restored Late Gallup or Chaco Black-on-white pitcher (CHCU 552) from Room 20. (Photograph by Joan Mathien.)

Figure 7. Gallup Black-on-white pitcher (CHCU 29346) from Room 20 fill. (Photograph by Joan Mathien.)

Figure 8. Toadlena Black-on-white bowl fragments (CHCU 43093) from Room 20. (Photograph by Joan Mathien.)

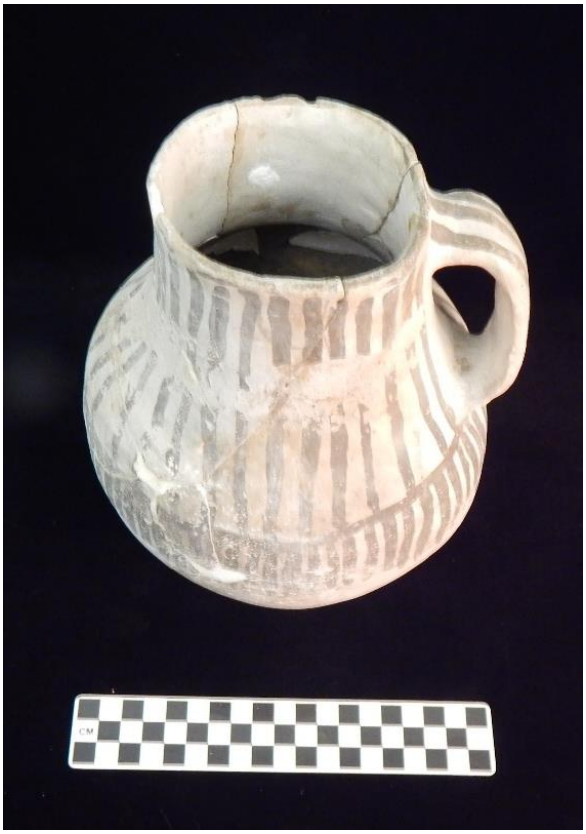


Figure 9a

Figure 9b

Figure 9. Mancos Black-on-white pottery. a) Jar (CHCU 1939) from unknown provenience. b) Bowl sherds (CHCU 43090) from Room 20. (Photographs by Joan Mathien.)

Figure 10a

Figure 10b

Figure 10c

Figure 10d

Figure 10. Chaco-McElmo Black-on white. a) Bowl (CHCU 1938) from Room 20 debris. b) Pitcher (CHCU 551) from Room 20. c) Canteen (CHCU 1935) from Room 22, West Corner, Level 1. d) Jar (CHCU 550) from Room 20. (Photographs by Joan Mathien.)

Figure 11. Wetherill or McElmo Black-on-white bowl sherds (CHCU 43088) from Room 20. (Photograph by Joan Mathien.)

Figure 12. Tusayan Black-on-red bowl sherds (CHCU 43089) from Room 20. (Photograph by Joan Mathien.)

Figure 13a

Figure 13b

Figure 13. White Mountain Redware bowl sherds. a) Puerco/Wingate Black-on-red sherds (CHCU 43094) from Room 22. b) Wingate Black-on-red sherds (CHCU 43091) from Room 20. (Photographs by Joan Mathien.)

Figure 14. Late Wingate/St. Johns Black-on-red bowl (CHCU 1941) from an unknown provenience. (Photograph by Joan Mathien.)

Figure 15a

Figure 15b

Figure 15. Reserve Smudged Ware bowl (CHCU 29388) from Room 22. a) Interior. b) Fine Indented Corrugated exterior. (Photographs by Joan Mathien.)

Discussion and Conclusions

When we compared the ceramic data from these two rooms with additional information on ceramics from the rest of the site, we concluded that a representative sample of the sherds recovered from Talus Unit No. 1 exists. We do not think, however, that the collection is amenable to more sophisticated analysis (Mathien and Windes 2018).

The ceramic types identified from the entire site included a few early and a few late sherds. The Red Mesa Black-on-white restorable vessel (Figure 3) definitely reflects an Early Bonito phase ceramic type, most likely an heirloom. Escavada Black-on-white may also be as early but is rare, poorly described, and inconsistently used as a ceramic type.

Ceramic types that are the hallmark of the Classic Bonito Phase (Gallup and Chaco Black-on-white) also continue to be present during the Late Bonito phase. The overall assemblages at Talus Unit No. 1, however, suggest an occupation that continued during the Late Bonito phase or post A.D. 1100. Sherds found predominantly in the fill of rooms and kivas include Chaco-McElmo Black-on-white, a type that lasts possibly as late as the late A.D. 1100s-early 1200s, while the McElmo Black-on-white period of use is assigned to A.D. 1140-1200/1220. The low number of Mesa Verde Black-on-white sherds (a few found in other provenience assemblages) may date in the A.D. 1200s, similar in time span to St. Johns Black-on-red and St. Johns Polychrome, which suggests some late, perhaps limited, use of the structure. We conclude, therefore, that most of the rooms at the site were filled with ceramic debris from local inhabitants who lived in or nearby throughout the A.D. 1100s but possibly into the Mesa Verde phase of post A.D. 1200 or by newer migrants.

Because our goal was to refine the dating of Kiva E and the pier based on the types of sherds identified in the bulk category, we conclude that Kiva E must have been built sometime after A.D. 1140. Although Woods (1935) cleared the upper stories of the pier and uncovered latillas from the first story ceiling of Rooms 23/33 and 30 on both the east and west sides of this feature, there were no excavations in the room beneath it, and there are no known ceramics from this area.

The use and meaning of the massive construction called the pier at Talus Unit No. 1, built in strikingly great house style (see Lekson 1985), has remained a mystery. It is unusual among the other great house features in the Pueblo Bonito-Chetro Ketl area, such as the great houses, great kivas, roads, amphitheater, Chetro Ketl "fields," and the large plaza area between Pueblo Bonito and Chetro Ketl. For this report, ceramics, masonry styles, and newer tree-ring dates help to refine the temporal placement of this unusual feature, along with that of adjacent Rooms 20 and 22. The latter data were unavailable for Lekson's (1985) treatise on the architecture of this site.

In the past, little effort had been taken to systematically document and sample wood until the Chaco Wood Project during which all the structural wood at the Talus Unit No. 1 was recorded and sampled, if possible, in 1992 and 1993 by Windes. Previous samples of wood were taken by Florence Hawley (Ellis) in 1933 and 1934, by Deric O'Bryan in 1940, and by Gordon Vivian in

1959. Of the wood elements we encountered, only the middle viga (GP-2214; FS 7053) in the first story of Room 23-33 had been sampled and dated by O'Bryan. Earlier efforts concentrated on the large beams at the site, typically the vigas, while the small-diameter lintels, latillas, and lesser pieces of wood were ignored, as were elements of non-datable *Populus* sp. (typically cottonwood and aspen). Overall, the earliest tree-ring dates came from the lower features in the first story, while the latest came from the second story, as they should have, stratigraphically.

The first story of the south half of Room 23-33 was partially open and accessible to O'Bryan and to Windes, who later mapped it (it is now sealed with masonry). The three 19-cm-diameter ponderosa pine vigas in the ceiling are set 40-50 cm apart—closer than usual; and the nearly side-by-side overlying *Populus* sp. latillas (Figure 16) suggest that the first story ceiling was indeed built to sustain the massive weight of the solid mass of stone and mortar above it in the upper stories of Rooms 23-33 and 30. The vigas dated at 1058++v, 1060v and 1065r, suggesting that they were cut at about the same time in A.D. 1065. Such large timbers, however, are typically dried for five years or so at the source before hauling them long distances across the San Juan Basin (Snygg and Windes 1998). If so, this would suggest use at around A.D. 1070.

Below these vigas were sets of ventilators in the east, south, and west walls, all located at a level below the doorway lintels, an unusual position (Figures 17, 18, and 19). Typically in other canyon great houses, these features are built in the wall corners almost at ceiling level, presumably to ventilate out warmer air and any smoke. Dates from wood specimens from these features provide additional clues to the construction strategy of this room. These ventilators are the lowest observable features and provide the earliest tree-ring dates (in the A.D. 1040s) for the foundation room below the pier, notwithstanding the possibility that an earlier unobserved story might lurk further below. Twenty-three of the 24 ventilator lintels were sampled. Most failed to date and comprise—atypically—a mixture of tree species of Douglas fir, juniper, piñon, ponderosa pine, *Populus* sp., and spruce-fir (white fir being likely), whereas in the canyon great houses, except for nearby Chetro Ketl, such lintels were of the same species or perhaps mixed with similar tree associated species; juniper, piñon, ponderosa pine, and *Populus* sp. (cottonwood), if early (A.D. 800s-900s; local), and mainly ponderosa pine, with occasionally Douglas fir, spruce-fir and *Populus* sp. (aspen), if late (A.D. 1040s-1100s; high altitude; non-local) (e.g., see Windes 2010:85).

The two east side ventilators of this first story room are close together and share six lintels (Figure 18), but the interior is blocked inside to suggest that these might have been niches instead of ventilators or that they more likely were converted from ventilators to niches. In addition, the southern feature may have been a ventilator for the adjacent Kiva C1 but Windes was unable to recently recheck this in the field. One of the lintels dated at 1043vv, but this is certainly a cutting or near-cutting date (O'Bryan's sample GP2220 from the same lintel dated at 1043v). The two south side ventilators (Figure 17) with five or more lintels of juniper, ponderosa pine, and spruce-fir failed to yield dates, as did the five *Populus* sp. lintels of the central doorway. The latter, oddly, only support the south half of the doorway ceiling, with the remaining space filled with masonry in the 65-cm-wide wall. The west side also exhibits two

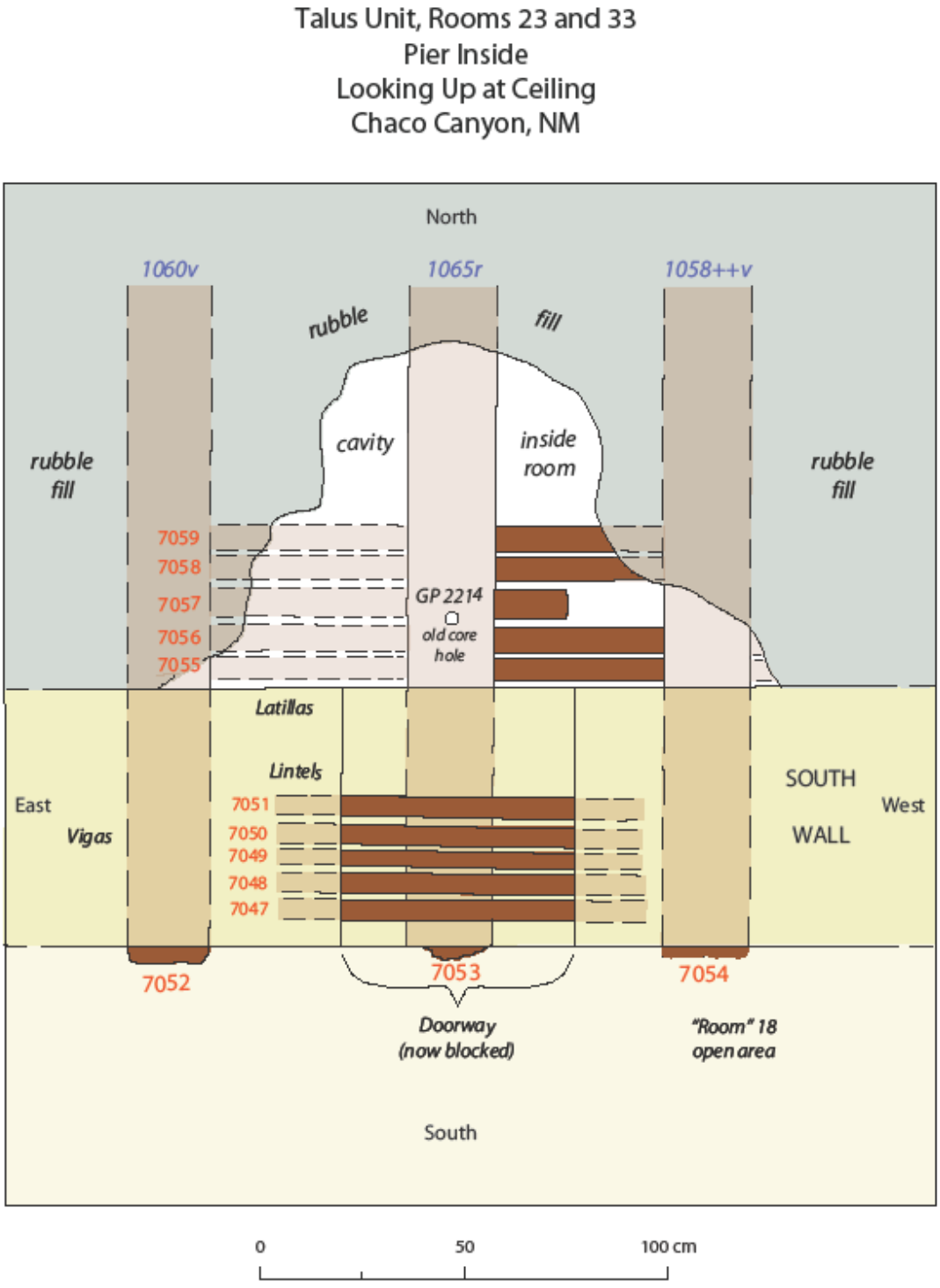


Figure 16. Talus Unit No. 1 Ceiling of the First Floor of Rooms 23 and 33. Note the perspective is as if one were lying on the floor with head to the north; thus, east and west seem opposite of what we expect for a plan view. (Map plan view by Tom Windes; digital copy by Clay Mathers.)

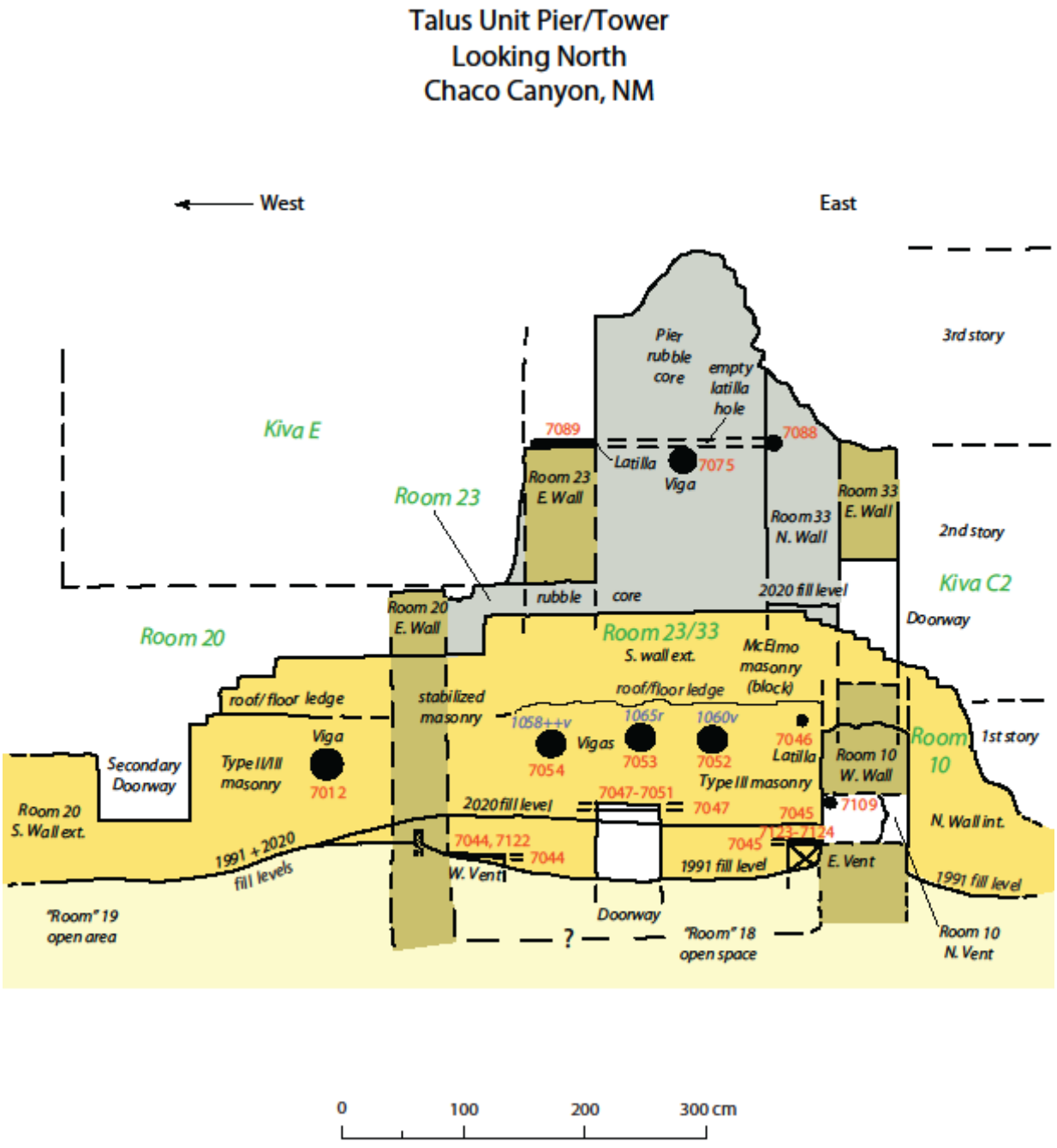


Figure 17. Talus Unit No. 1 Pier Looking North. (Elevation map by Tom Windes; digital copy by Clay Mathers.)

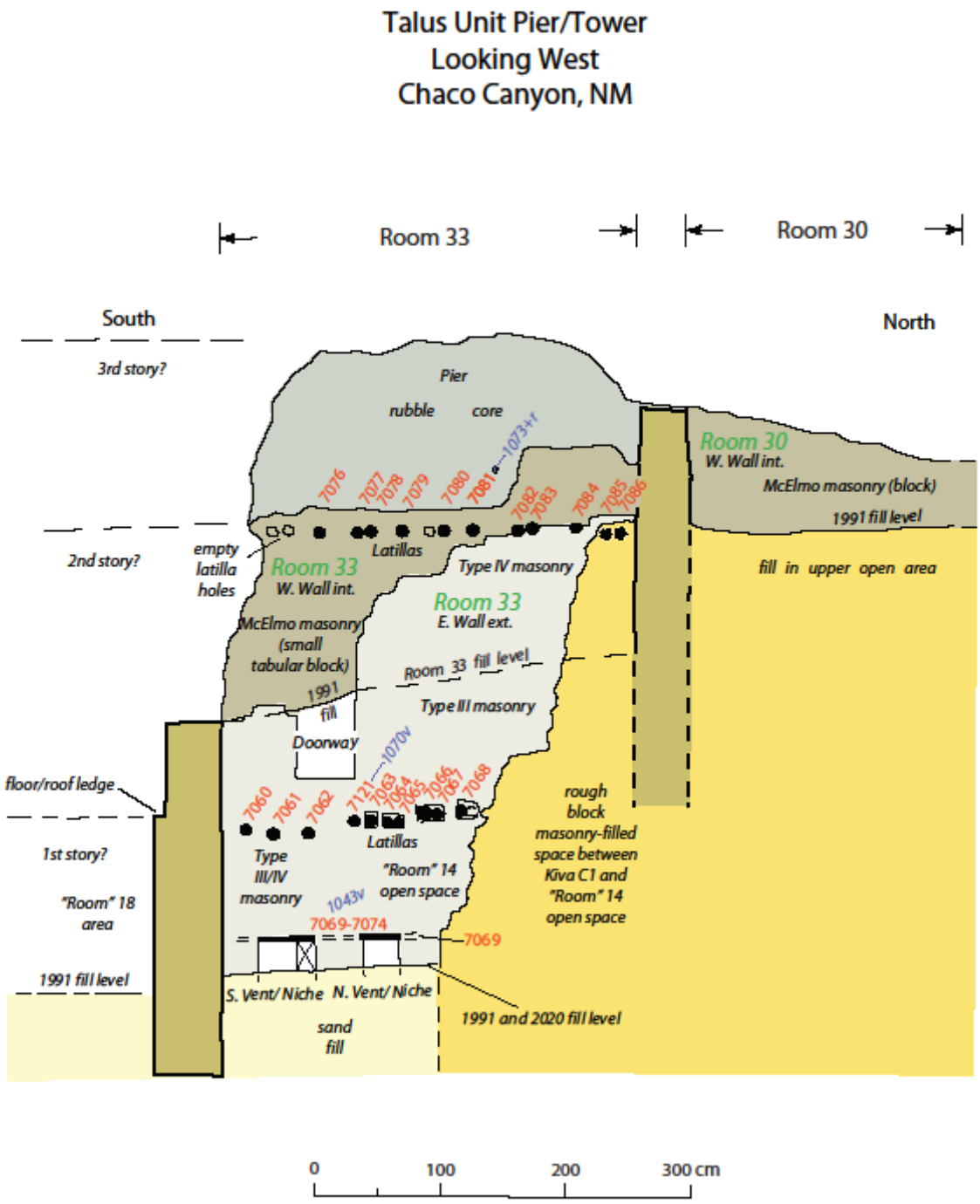


Figure 18. Talus Unit No. 1 Pier Looking West. (Elevation map by Tom Windes; digital copy by Clay Mathers.)

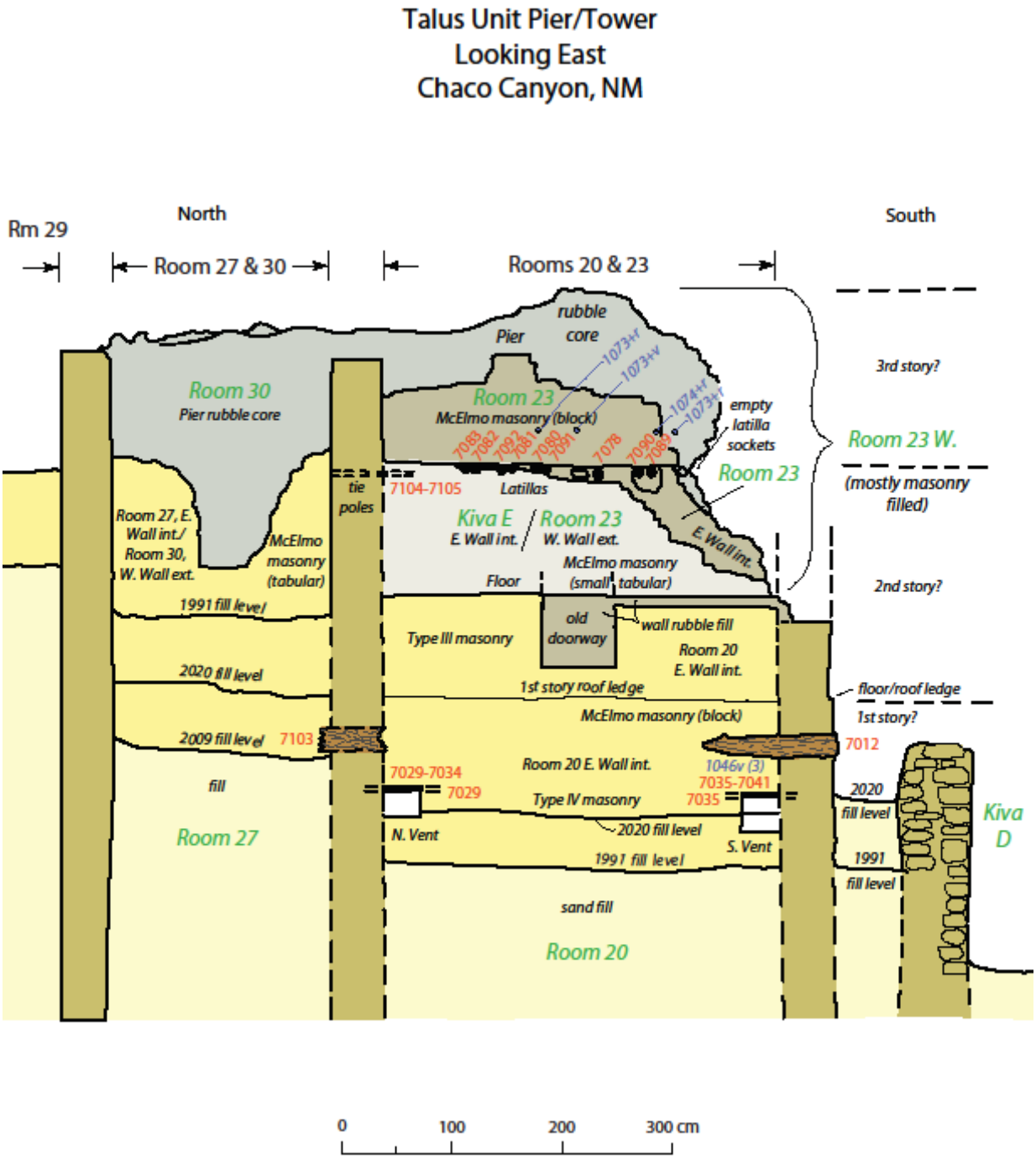


Figure 19. Talus Unit No. 1 Pier looking East. (Elevation map by Tom Windes; digital copy by Clay Mathers.)

ventilators set against the east-west cross walls (Figure 19) and just below the Room 20 ceiling vigas (40 cm) in typical great house fashion but much lower than the ceiling in Room 23-33. Their 13 lintels were of mixed species—Douglas fir, piñon, ponderosa pine, *Populus* sp., and spruce-fir—but only the piñon dated, all at 1046; two of these lintels came from the same tree, all from the south ventilator.

The ceiling of the second story is also marked by numerous "latillas" slightly larger in diameter than those of the first story. They seemingly mark a second story containing the solid masonry of the pier, but probably created roofs for the narrow second stories of Rooms 23 and 33 with a mass of masonry between them. A 20-cm-diameter viga, probably of pine but rotted and undatable, once "supported" them but seems unnecessary. Of the 17 latillas, all of ponderosa pine except for one *Populus* sp., 12 were sampled—the rest were rotted. Some have since disappeared from stabilization efforts. These latillas provided the latest tree-ring dates for the pier in the A.D. 1070s (n=5), along with one dated latilla in the first story roof. Three of the dates were tentative—their ring series were too short to cross date—but are supported by two adjacent latilla near-cutting or cutting dates of 1070v and 1073+r (Figure 19).

In summary, the earliest observed architecture in Room 23-33 is the presumed (lower) first story that supports the upper two stories that contain the massive pier. This lower story yields tree-ring dates in the A.D. 1040s but only from the lowest features' ventilator lintels. There is space inside Room 23-33 but it is limited, and most of the room strangely is filled with sand and debris so that a true look at the actual inner room is not possible. Was it ever used as an enclosed space? One would think so, considering its doorway and the many ventilators. The few scattered tree-ring dates cluster, suggesting that they mark the period of construction in about the A.D. 1040s, which coincides with the Type III masonry style (sometimes mixed with Type IV; see Lekson 1984:17-19). The mix of tree species used as ventilator lintels, however, is unusual and might suggest that these are reused elements. Adjacent Chetro Ketl has much building and reuse of elements from the 1030s, 1040s, and 1050s (see Dean and Warren 1983). The pier lintels may have come from two Chetro Ketl North Roomblock stockpiles of 1037-1040 and 1045-1047 poles (Dean and Warren 1983:227) rather than being displaced from renovated earlier construction at Chetro Ketl or the Talus Unit No. 1. At Chetro Ketl, "With one exception, no spruce-firs or Douglas firs were felled prior to 1030, while peak cutting activity for both, like that of pine, took place in the 1030-1060 interval" in the North Roomblock (Dean and Warren 1983:217). This holds true for the pier elements as well.

The best sequenced dated room in Chetro Ketl, Room 93, close to the Talus Unit, shows construction in the A.D. 1040s (Dean and Warren 1983:161-162) and A.D. 1050s (Windes 1990-2007) and suggests that contemporary construction was also occurring at Talus Unit No.1. Chetro Ketl is plagued with poor locational information for much of its wood; some was reused during its primary construction periods and much more was emplaced during various stabilization efforts (see Dean and Warren 1983:118-122, 227-228). But Room 93 does not have that problem with its ventilators, which are original but of Type II-style masonry; and individual ventilator date clusters at A.D. 1045 and A.D. 1051-1052 for the two stories. These consist of ponderosa pine and spruce-fir lintels, with one second story ventilator having Douglas fir,

ponderosa pine, and a single piñon lintel. The problem of prehistoric reuse of timbers in Chacoan great houses, however, is remarkably minor in all the other park great houses and Aztec Ruin that were sampled extensively by Windes during the Chaco Wood Project in the 1980s and 1990s. In short, the lower level early dates in the first story room below the pier are probably original and not from reuse despite the problems of reuse at Chetro Ketl. The upper part of the first story, however, with its irregular changes in masonry style suggests that the room was rebuilt along its upper walls, probably in the A.D. 1070s.

The interpretation of the pier's upper construction in the A.D. 1070s is strengthened by the tree-ring dates from adjacent Room 20 and the similar masonry styles employed there. The seven lintels in the north ventilator of Room 20 (in the east corner) yielded dates of 1041+r, 1051v, and a tentative date of 1050, all seven of spruce-fir. Here its three dated vigas yielded dates of 1068v, 1069vv, and 1069+r (sampled by earlier expeditions), that correspond closely with the 1070 dates from the upper stories of the pier. The post-deposition of the mass of ceramics from Rooms 20 and 22 is in tune with the tree-ring dates as being primarily represented by ceramics typologically that that are either dominated by a group of ceramic types produced between about A.D. 1050 to about 1150 but clearly post-date the construction tree-ring dates in this case. But above that in the pier, the masonry erratically changes to McElmo style, both classical—of large squarish blocks of soft sandstone—and a Windes' sub-style that is of small tabular stones set in rows, which is typically found as the uppermost masonry layers in many great houses. This latter style in Chaco is often associated with stabilization work, but it is also found in large and small canyon sites dating to the late A.D. 1100s and 1200s. The McElmo masonry corresponds to our A.D. 1070s tree-ring dates in the upper part of the pier.

The lowest story with evidence for the pier is shown on Figure 16; the roof construction for Room 23/33 is the foundation that holds the mass of the feature above. This room is in the lowest excavated story of the roomblock and matches what we see elsewhere elevation wise at the site and nearby Chetro Ketl. Three vigas in the ceiling provide dates of 1058++v (No. 7054), 1065r (No. 7053), and 1060v (No. 7052); they suggest construction probably occurred in the late A.D. 1060s (Figure 17). However, one latilla spread across these beams (No. 7121; Figure 18) provides a date of 1070v, which suggests remodeling or reinforcement of the ceiling of this first-story (floor of the second-story) shortly thereafter, perhaps when the lower half or core of the pier was constructed in the second story room. (Note also the type III/IV masonry assigned to the outer south wall and outer east and west walls of Room 23/33 in Figures 16, 18, and 19.) The wood in the ceiling of the first floor of Room 23/33 is set like a roof and is exactly on level with the adjoining roof elements.

Of particular interest is the second story ceiling of Room 33 where 11 tree-ring samples were taken but only one date of 1073+r was obtained (Figure 18). This latilla is in the interior west wall that was constructed with the McElmo-style masonry consisting of small tabular blocks; it also is the exterior east wall of the support for the upper story of the pier. This date corresponds well with four dates returned on the nine samples from latillas in the east wall of Room 23 also set in small tabular block masonry (Figure 19). They include the opposite end of the previous latilla (Sample 7081 that dates 1073r). The remaining three provide similar dates (1073+v,

1074+r, and 1073+r). This suggests the support for the pier that is found in the second story of Room 23-33 was possibly constructed in the A.D. 1070s using the small tabular block McElmo style masonry before a roof was put in place. The closeness of the dates for the floor and ceiling of this second-story room suggest that prior to placement of the core of the pier in this room the builders reroofed the first-story.

The pier extends above the second-story ceiling (Figure 16). Only the masonry provides hints as to its construction date at this third-story level. The second story west wall exterior of Room 23 is classified by Windes as small tabular style McElmo masonry while the third story is classified as block style McElmo masonry. This would place the construction of the upper level of the pier in the A.D. 1100s.

Based on these data, it seems reasonable to assign a post A.D. 1050 (possibly 1065) date to the construction to the first story of Room 23/33. The ceiling of this room/floor of second story was probably remodeled not too many years later as the date of 1070v would place this event in the 1070s. This probably occurred in the earlier few years because of the second story ceiling dates of 1073. If this is true, it suggests the initial construction of the pier foundation would have occurred around 1073 if the latillas were fresh. Yet we cannot discount reuse of beams from another section of the site or from another nearby site.

In conclusion, our examination of old collections and careful evaluation of recent tree-ring dates reinforces Lekson's (1985) suggestion of use at Talus Unit No. 1 late in the Chaco sequence, or after A.D. 1100. That so many sherds from the A.D. 1100s were recovered in the fill in Rooms 20 and 22, along with a few that suggest a date that may extend up to the A.D. 1200s, supports the continuing use of the site by people living there or at other nearby sites up until the Mesa Verde phase. The extent of late use of the site, however, remains uncertain.

References Cited

Dean, Jeffrey S., and Richard L. Warren

1983 Dendrochronology. Chapter V in *The Architecture and Dendrochronology of Chetro Ketl, Chaco Canyon, New Mexico*, edited by Stephen H. Lekson, pp. 105-240. Reports of the Chaco Center No. 6, National Park Service, Albuquerque.

Lekson, Stephen H.

1984 *Great Pueblo Architecture of Chaco Canyon*. Publications in Archeology 18B, Chaco Canyon Studies. National Park Service, Albuquerque.

1985 The Architecture of Talus Unit, Chaco Canyon, New Mexico. In *Prehistory and History in the Southwest. Papers in Honor of Alden C. Hayes*, edited by Nancy Fox, pp. 43-59. Papers of the Archaeological Society of New Mexico 11, Albuquerque.

Mathien, Frances Joan, and Thomas C. Windes

2018 Ceramics from Talus Unit No. 1. Ms. on file, Chaco Culture NHP Museum Collection. University of New Mexico, Albuquerque.

Murphey, S. Elizabeth
1936 Description of Sherds found during Excavations of the Summer of 1935, Chaco Canyon, New Mexico. Ms. on file, Chaco Culture NHP Museum Collection Archive No. 32/3-03. University of New Mexico, Albuquerque.

Reed, Lori Stephens, and Joell Goff
2003 A Reappraisal of the Chronology of the Chuska Pottery Sequence. In *Anasazi Archaeology at the Millenium. Proceedings of the Sixth Occasional Anasazi Symposium*, edited by Paul F. Reed, pp. 97-110. Center for Desert Archaeology, Tucson.

Shiner, Joel
1959 *The Stabilization of Talus Unit, Chaco Canyon National Monument, 1959.* National Park Service, U.S. Department of the Interior, Washington, D.C.
1961 Excavation of a Chaco-Type Kiva, Chaco Canyon, New Mexico. Ms. on file, Chaco Culture NHP Museum Collection Archive No. 7/2.5-02. University of New Mexico, Albuquerque.

Snygg, John, and Thomas C. Windes
1998 Long, Wide Roads and Great Kiva Roofs. *Kiva* 64(1):7–25.

Walter, Paul A.F.
1933 Report on Excavation Work at Talus Unit No. 1 of Chetro Ketl Ruin, Chaco Canyon, San Juan County, New Mexico, in Summer of 1933. Ms. on file, Chaco Culture NHP Museum Collection Archive No. 32/3-05. University of New Mexico, Albuquerque.

Windes, Thomas C.
1990- Chaco Wood Project Field Notes, Chetro Ketl. Ms. on file, Chaco Culture NHP Museum
2007 Collection Archive No. 15/002.004. University of New Mexico, Albuquerque.

2010 Dendrochronology and Structural Wood Use at Pueblo del Arroyo, Chaco Canyon, New Mexico. *Journal of Field Archaeology* 35(1):75-95.
2018 Temporal Control at Early Sites. Chapter 6 in *Early Pueblo Occupations in the Chaco Region. Volume I: Excavations and Survey of Basketmaker III and Pueblo I Sites, Chaco Canyon, New Mexico*, by Thomas C. Windes, pp. 435-490. Arizona State Museum Archaeological Series 120, Arizona State Museum, The University of Arizona Press, Tucson. (Revised and reissued.)

Woods, Margaret S.
1934 Report on the Excavation in 1934 of Talus Unit #1, Chetro Ketl, Chaco Canyon, N.M. Ms. on file, Chaco Culture NHP Museum Collection Archive No. 32/3-02. University of New Mexico, Albuquerque.
1935 Talus Unit #1, Chetro Ketl, Chaco Canyon, N.M. 1935 Excavation Notes. Ms. on file, Chaco Culture NHP Museum Collection Archive No. 7/9.1.1-10.4. University of New Mexico, Albuquerque.
1938 Preliminary Report of the 1937 Excavations of Talus Unit #1 (Chaco Canyon). Ms. on file, Laboratory of Anthropology, Santa Fe.

POKING THE DRAGON: CHANGING THE TYPOLOGY OF SAN JUAN REDWARE AND ITS TYPES FOR DATA REPORTING

William A. Lucius, Independent Scholar and Ceramic Analyst

Abstract

The insertion of temper type as the primary sorting variable for type distinction during ceramic analysis unambiguously links diorite-tempered San Juan Red Ware types to manufacture in the Blanding Tract of the larger Mesa Verde Region. The addition of refiring analysis further allows for matching individual sherds to resource production locales within the tract. Computerized ceramic analysis attribute data revealed that two type descriptions need to be revised. Further, subsuming Pueblo I orange types within a San Juan Red Ware taxon is indefensible. Rather than adding a San Juan Orange Ware category to an already cumbersome typology, this paper demonstrates how replacement of San Juan with Mesa Verde, removal of red from ware and insertion of a color variety simplifies analysis and reporting. Reorganization of the traditional systematics of ceramic typology requires elaboration and justification, which is presented prior to data presentation and discussion.

Introduction

The process of developing the ceramic analysis procedures and computerized database for the Dolores Archaeological Program (DAP) revealed inconsistencies and typological confusion in the taxonomic structure designed to inform a cultural historical approach. Subsequent refinements and application of the approach have also documented errors in the type descriptions of two types of San Juan Red Ware of the Mesa Verde Region of the Ancestral Pueblo occupation of the northern Southwest.

The initial response to the taxonomic problems was to insert a culture category variable that serves to identify the specific regional subdivision (such as the Mesa Verde Region) where the types in the analysis were made. This allowed for removal of the problematic San Juan modifier from San Juan Red Ware and removal of the Red modifier, which returns the ware concept to its original definition as functional category of intended use. The resulting hierarchical structure connects sherds with a region, with a utility or serving ware category, with one or more associated color varieties, and with specific types organized into series arranged from early to late. In large part the following paper formally documents, with justifications, the otherwise hidden structure of the non-traditional ceramic analysis format used for data creation and defines the terminology used in the data tables and their discussion.

The correct assignment of sherds to named types is critical because those types allow for the unambiguous assignment of a Pueblo I or Pueblo II occupation by their association with a site or site component. Initiation of the Blanding Red Ware (BRW) Project, followed by the ongoing San Juan Red Ware Sourcing and Exchange Research Study (SJRWS&ERS), allowed for the analysis of a large number of sherds of all orange and red types. It became readily apparent that

there was a mismatch between published type descriptions of Bluff B/r and Deadmans B/r and the analysis data, primarily in terms of the presence or absence of a red slip. Because an applied slip was never observed on any Bluff sherd, the type name Bluff B/o is used to report sherd analysis data (Hargrave 1936:29-34; Windes 1977:290). The types Abajo Red-on-orange (Abajo R/o), Abajo Polychrome, and Bluff B/o are assigned to the orange color variety of Mesa Verde serving ware types. Deadmans B/r is described as exhibiting a red slip, but analysis data revealed that no slip was required if the body clay used returned a red surface color when fired. Therefore, the presence of a red surface color alone is sufficient for type assignment. The type is assigned to the red color variety of Mesa Verde serving ware.

Although the taxonomic and typological analysis approach outlined above was designed to be broadly applicable for Southwestern ceramic analysis, the following paper addresses only the Red and Orange color varieties of serving wares in our database, which, with rare exceptions, represent manufacture in the Mesa Verde Region.

Revisiting and Redefining the Structure of Ceramic Analysis

Southwestern ceramic typology references a Linnaean model to organize prehistoric pottery artifacts using binomial nomenclature (Colton 1953:52) to describe types in terms of a geographic name followed by a color designation (Colton 1953:51). The correlation of pottery types with dated periods of site occupation (Breternitz 1966) serves to place the sites where the pottery types occur into a matrix of time, space, and cultural association for the data accumulation necessary for synthesis (Spencer and Jennings 1965) of culture histories (Binford 1972; Rouse 1953). In contrast, the theoretical orientation of this paper derives from ceramic ecology (Matson 1965:202-217; Arnold 1975:183-205) with a procedural focus dedicated to the creation of ceramic analysis data pertinent to the investigation of the topics of ceramic production, exchange, and interaction (Plog 1995:276).

In terms of the traditional, hierarchical structure of Southwestern ceramic taxonomy, oxidation-fired types associated with the Mesa Verde Region of the Ancestral Pueblo occupation of the northern Southwest (Breternitz et al. 1974) are subsumed into the San Juan Red Ware category, which arranges them in a temporal series from early to late (Colton 1953:52). The initial Pueblo I types Abajo R/o and Abajo Polychrome (A.D. 750-800) were replaced by Bluff B/o (A.D. 800-900). Deadmans B/r of the Early Pueblo II period (A.D. 950-1050) is the final type in the series (Breternitz et al. 1974). All subsequent red or orange ceramics in the Mesa Verde Region are imports from the south (Lucius and Breternitz 1992:35).

The term San Juan Red Ware is a prime example of taxonomic confusion (Abel 1955:4). The type Deadmans B/r was initially described as La Plata B/r (Morris 1939:179-184; Shepard 1939: 270-272) of the Mesa Verde Region. Subsequently this Pueblo II type was transferred into the Kayenta Red Ware Series, placed into the arbitrarily named San Juan Red Ware category (Colton and Hargrave 1937), and renamed as Deadmans B/r (Abel 1955). Later it was returned to the Mesa Verde Region Series while retaining its Kayenta ware and type designations. The subsequent placement of Pueblo I orange and red types into San Juan Red Ware only serves to amplify the confusion.

In this paper the San Juan modifier been removed and replaced by Mesa Verde, which properly associates the ware with its region of manufacture (Abel 1955:4), which additionally facilitates computerized database management and manipulation. The use of color designations in ware names is redundant and therefore unnecessary. Its removal leaves only the term ware, which was originally defined as "… a group of pottery types which consistently show the same methods of manufacture" (Colton 1953). In this paper this content-free definition is discarded and a ware is redefined as a bimodal, functional category reflecting the intended use of vessels (Roberts 1929:107). The presence or absence of surface compaction (stone polish) is sufficient for ware distinction—serving ware vessels are always polished and utility ware vessels never exhibit polished surfaces (Habicht-Mauche and Burgess 2016:135). Mesa Verde serving ware has three different color varieties—orange, red, and white. The hierarchical placement of types in a taxonomic system has been adjusted and their type descriptions have been refined, but they retain their original names and temporal associations (Figure 1).

The Ceramic Assemblage and Analysis Procedures

The ceramic artifacts reported herein were collected by two distinct and ongoing multi-year research projects and represent surface grab samples from numerous sites that have neither been previously analyzed nor published. The Blanding Red Ware (BRW) Project was initiated in the year 2000 by the author with two primary objectives: identification of Pueblo I orange pottery production locales in the Blanding, Utah area and reconstruction of the exchange system that moved pottery from there across and beyond the Mesa Verde region (Lucius 2010:2-12). The San Juan Red Ware Sourcing and Exchange Research Study (SJRWS&ERS) (Di Naso et al. 2019) was initiated in the year 2017 to expand the focus on production and exchange into the Pueblo II period through additional collections of Pueblo I orange and Pueblo II red sherds from sites within the larger Mesa Verde Region.

At minimum, the investigation of ceramic exchange requires knowledge of where the pots were made—their production provenience, as well as where they were found—their recovery provenience (Earle 1982:3-4). The map distance between those two proveniences documents a between-hands transfer representing ceramic exchange (Renfrew 1977). Contrary to generally accepted and at best questionable assumptions, where a sherd was found is not informative of where the original pot was made (Kidder 1942:i), except in only general association of types with regional subdivisions of the Ancestral Pueblo occupation of the Northern Southwest. A fundamental goal of the ceramic analysis is to assign a typological identity to every sherd in the assemblage and to link it to its recovery provenience. Although the Smithsonian site number contains rudimentary state and county locational data, a unique GPS waypoint was assigned for each sherd collected by the BRW research, which effectively documents the precise coordinates of where the sherd was collected within the site, always from midden deposits. The SJRWS&ERS project similarly assigned unique GPS waypoint locations to each sherd at the time of collection. Due to their sensitive nature, those locational data are not reported.

Ceramic analysis is the intermediate stage of a stepwise research design that begins with the fieldwork that creates sherd collections for analysis. The resulting types are important for

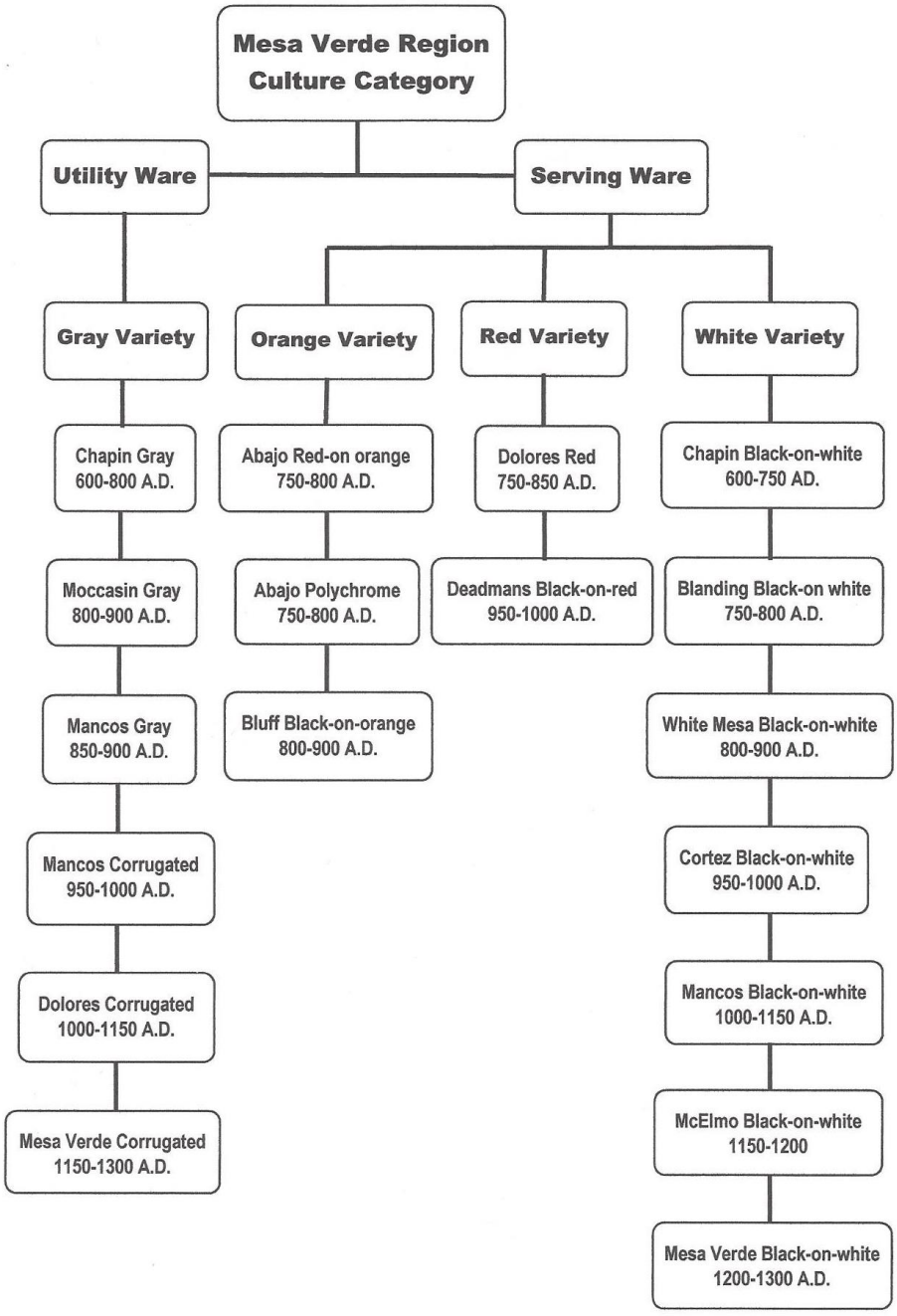


Figure 1. Mesa Verde Region restructured ceramic typology systematics.

summarizing analysis data, but type status is not informative of production provenience within the Mesa Verde Region. Because every piece of pottery was made by potters who lived in residential association with the temper and clay sources used for ceramic production, the formal attributes of temper type and clay type record a specific production landscape with matching temper and clay resources. The third step is application of an archaeometry-driven approach to

sourcing analysis that results in determination of production provenience in terms of shared elemental signatures of sherds and clay sources. The ultimate research goal is to unambiguously link individual sherds to individual resource production and provenience zones (Rands and Bishop 1980:20). The zone is the geographic locale where a community of potters exploited a 5-kilometer ceramic resource catchment (Roper 1979:120). The procedures, compositional data, and interpretations of the sourcing analysis will be presented in forthcoming reports.

The analysis structure is an updated version of the "Resource Approach to Ceramic Analysis" created coincident with the author's tenure as ceramic specialist at the Dolores Archaeological Program (Breternitz 1993; Lucius 1988:33). The master database was recorded using Microsoft Access, which allows for the use of Microsoft Excel to manipulate and summarize those data; see the tables and graphs below. The resulting attribute analysis approach serves to record values for each sherd as it passes through the analysis procedures (Lucius 1988:30-39). The compositional attribute of temper type was inserted into the analysis framework even though it is not generally considered to be a type determinant in traditional classification (Hargrave 1972:80-81). Those data are required for the association of types to locales within the larger Mesa Verde Region, as well as identification of imports from other regions. Temper type is determined by inspection of a freshly fractured cross-section of every sherd using a binocular microscope at 30-power magnification (Shepard 1936:406).

Examination of the diagnostic attributes of temper type, surface cover (slip), paste color, and paint type reveals that Pueblo I orange and Pueblo II type assignments can be made without reference to the decorative painted individual motifs and design layouts associated with those types (Colton and Hargrave 1937:Chapter IV). Iron red is the diagnostic paint type of Abajo R/o. Abajo Polychrome combines both iron red and manganese black paints. Bluff B/o exhibits manganese black paint. Orange body sherds lacking diagnostic paint lines are recorded as the grouped type Early Pueblo Orange (Lucius and Breternitz 1992:6). Dolores Red is a rare Pueblo I slipped red type that is basically Tallahogan Red (Daifuku 1961:50-51) with crushed diorite instead of the quartz sand found in Tallahogan Red. Both types exhibit a bright red slip over a white paste. Painted decorations do not occur on either type (Lucius and Wilson 1981:2.7). The primary type determinant for the Pueblo II type Deadmans B/r is the presence of its red surface colors, many of which represent the addition of a red clay slip over a range of various-colored body clays or the use of an iron-rich clay. Deadmans B/r sherds often exhibit manganese black paint lines, but the simple presence of a red surface color is sufficient for type placement given that it was the only Pueblo II red type made in the Mesa Verde Region. Typical examples of Bluff B/o and Deadmans B/r are illustrated in Figure 2.

Mixed Pueblo I orange and Pueblo II red sherd assemblages exhibit poorly controlled firing temperatures and atmospheres that hinder and often prevent direct observation of surface and paint colors. Recognition of temper type is enhanced by, and often only possible after, sherd refiring. Subjecting all sherds to refiring analysis prior to ceramic analysis brings them to a comparable state. Refiring analysis using a research kiln with a target temperature of 950°C in a fully oxidizing atmosphere serves to remove the effects of variable firing, use, and post-depositional environments. Iron oxide is the primary coloring oxide in body and slip clays

Figure 2. Bluff B/o (L) and Deadmans B/r (R) sherds. (Images courtesy of New Mexico Office of Archaeological Studies Southwest Ceramic Typology Project.)

(Shepard 1936:400) and the resulting attribute values of surface, paste, and slip color are recorded in terms of Munsell Soil Color values of hue, value, and chroma (Munsell Color 1976). Doing so serves to quantify color terms such as orange or red and in turn documents and allows for recognition of those clays in the resource landscape, a compositional attribute generally not considered necessary for typological placement.

The Ceramic Analysis Database

Table 1 summarizes the ceramic analysis database in terms of percentages of sherd counts and sherd weights. Sherd counts summarize breakage whereas sherd weights are informative of the mass of pottery from diverse locations with the same constellation of attribute values (Chase 1985). In terms of relative frequency of occurrence, both measures return similar percentages, and by choice sherd weights have been selected for use in the construction of the following tables and pie charts.

Pueblo I orange pottery types reveal only crushed diorite temper, which is diagnostic of manufacture in the Blanding Tract in Southeastern Utah (Figure 3) where potters had ready access to diorite river cobbles ultimately derived from the Abajo Mountains laccolith (Mutschler et al. 1998:243) to the north. The southern boundary of the tract is the San Juan River; Cottonwood Wash and Montezuma Creek form the west and east boundaries. The occurrence of red clays associated with the Brushy Basin Member of the Morrison Formation (Skipp and Aubry 1992) is presented in light green on Figure 3. Deadmans B/r sherds are also predominantly tempered with crushed diorite, with occasional substitution of sherd tempers with attendant minerals including conglomerate, diorite, or unidentifiable rock fragments. Deadmans B/r with crushed conglomerate or sherd and conglomerate temper documents manufacture in the Cedar Point Tract, located adjacent to and east of the Blanding Tract (Lucius 1988:Map 4).

Table 1. All Typed Sherds by Culture Category, Ware, Color Variety Type, and Temper Type.
Italicized entries represent internal temper type counts and percentages that add up to 100% for each type.

Ancestral Pueblo Culture Category	**Sherd Count**		**Sherd Weight**		**Color Category**		**Culture Category**	
	#	**%**	**Sum**	**%**	**Count %**	**Weight %**	**Count %**	**Weight %**
Cibola	3	100.0					0.3	0.2
Red	3	100.0	9.3	100.0	100.0	100.0		
Wingate B/r sherd & crushed rock	3	100.0	9.3	100.0				
Kayenta	18	100.0					1.7	1.8
Red	18	100.0	69.2	100.0	100.0	100.0		
Late Pueblo Red sherd & quartz sand	10	55.6	27.2	39.3				
Medicine B/r sherd & quartz sand	1	5.6	11.3	16.3				
Tallahogan Red quartz sand	3	16.7	9.4	13.6				
Tusayan Polychrome sherd & quartz sand	4	22.2	21.3	30.8				
Mesa Verde	1056	100.0	3814.4	100.0			98.1	98.0
Orange	597	56.5	2114.4	100.0	56.5	55.4		
Abajo Polychrome diorite	2	0.3	7.6	0.4				
Abajo R/o	76	12.7	260	12.3				
crushed conglomerate	*2*	*2.6*	*11.6*	*4.5*				
diorite	*74*	*97.4*	*284.4*	*95.5*				
Bluff B/o	295	49.4	1114.9	52.7				
crushed conglomerate	*2*	*0.7*	*7.4*	*0.7*				
diorite	*293*	*99.3*	*1107.5*	*99.3*				
Early Pueblo Orange diorite	224	37.5	731.9	34.6				
Red	459	43.5	1700.0	100.0	43.5	44.6		
Deadmans B/r	458	99.8	1688.0	99.3				
crushed conglomerate	*25*	*5.5*	*101.5*	*6.0*				
crushed rock	*11*	*2.4*	*31.4*	*1.9*				
diorite	*410*	*89.5*	*1524.6*	*90.3*				
sherd	*1*	*0.2*	*3.0*	*0.2*				
sherd & conglomerate	*2*	*0.4*	*4.2*	*0.2*				
sherd and crushed rock	*1*	*0.2*	*2.0*	*0.1*				
sherd &diorite	*8*	*1.7*	*21.3*	*1.3*				
Dolores Red diorite	1	0.2	12.0	0.7				
Grand Total	1077		3892.9				100	100

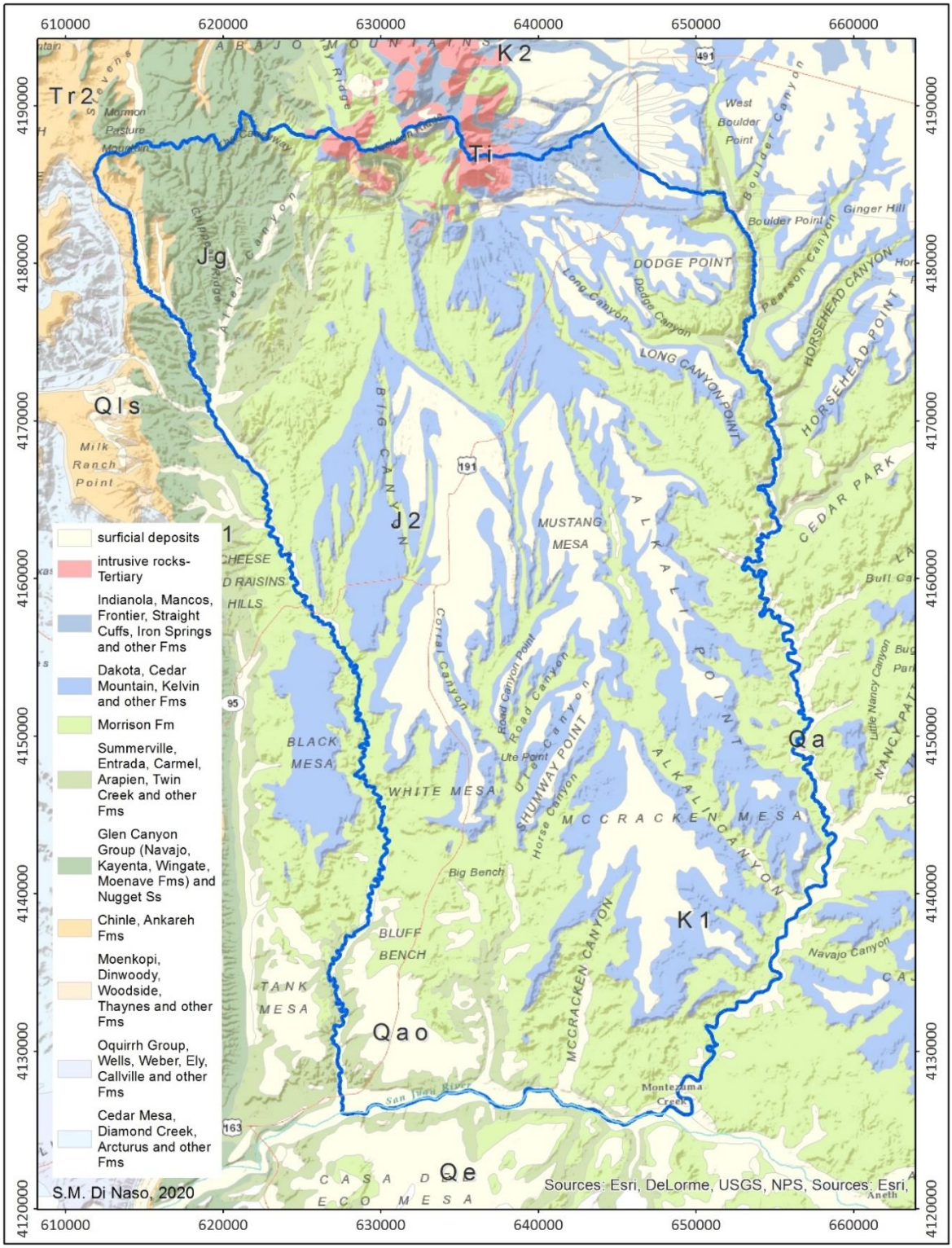


Figure 3. The Blanding Manufacturing Tract of the Mesa Verde Region.

Sherd and quartz sand tempers and sherd and crushed rock tempers are exotic and document the presence of Deadmans B/r types with the wrong temper type—Medicine B/r from the Kayenta Region and Wingate B/r from the Cibola Region, with occasional sherds of the slightly later Kayenta type Tusayan Polychrome. Tallahogan Red sherds from the Kayenta Region exhibit a distinctive quartz sand temper derived from white sandstone. Those extra-regional orange and red types, as well as the rare local types Abajo Polychrome and Dolores Red, have been filtered out of the database used for construction of all subsequent tables and graphs, which therefore reference only the major Mesa Verde Orange and Red Variety serving ware types.

The attribute of Vessel Form is not a type determinant (Hargrave 1974:82), but its inclusion in the analysis structure serves to summarize data categories in terms of generalized open (bowl) and closed (jar) vessel forms. Serving ware bowl sherds reveal polish on both the inside and exterior surfaces. Jar sherds are only polished on the outside surface. Table 2 summarizes the vessel forms recorded for the Pueblo I and Pueblo II Orange and Red Variety types in terms of percentages and ratios (where applicable) of bowl to jar forms. The bowl/jar ratios of the Pueblo I types are similar, but quite different for Early Pueblo Orange sherds, which suggests that the dichotomy is sensitive to how densely the vessel was painted. Bowls tend to be small and exclusively painted on the inside surface while jars, especially large water ollas, are sparsely painted and only on the outside surface. Unpainted jar body sherds necessarily end up in the Early Pueblo Orange category, which changes the ratio to near parity. The jar to bowl ratio for Deadmans B/r is more defensible given that there is no Late Pueblo Red category for unpainted body sherds.

Table 2. Vessel Form Percentages and Jar to Bowl Ratios by Weight.

Pottery Type	**Weight (gm)**	**% Weight**	**Jar to Bowl Ratio**
Abajo Polychrome	7.6	100.0	N/A
bowl	7.6	100.0	
Abajo R/o	259.7	100.0	2:9
bowl	213.8	82.3	
jar	45.9	17.7	
Bluff B/o	1096.0	100.0	1:5
bowl	924.6	84.4	
jar	171.4	15.6	
Deadmans B/r	1576.0	100.0	1:6
bowl	1354.9	86.0	
jar	221.1	14.0	
Early Pueblo Orange	701.9	100.0	5:8
bowl	432.2	61.6	
jar	269.7	38.4	
Grand Total	3643.3		

Table 3 provides a summary of the typological assignments of sherds recovered from sites targeted by the BRW research and Table 4 summarizes the data of Table 3 without reference to individual sites. Pueblo I habitation sites were the primary focus of the BRW Project research, and overwhelmingly returned Pueblo I orange types. The Smithsonian site identification numbers

Table 3. BRW Project Sites (n=24) by Pottery Type.

Site Number	Weight (gms)	% Weight by Site	Site Number	Weight (gms)	% Weight by Site
42SA13	203.4	100.0	42SA11885	37.9	100.0
Abajo R/o	109.7	53.9	Bluff B/o	35.7	94.2
Bluff B/o	16.0	7.9	Early Pueblo Orange	2.2	5.8
Early Pueblo Orange	77.7	38.2			
42SA712	114.0	100.0	42SA11937	57.9	100.0
Abajo R/o	2.8	2.5	Abajo R/o	8.6	14.9
Bluff B/o	88.2	65.6	Bluff B/o	27.0	46.6
Deadmans B/r	5.5	4.8	Early Pueblo Orange	22.3	38.5
Early Pueblo Orange	17.5	15.4			
42SA1964	148.1	100.0	42SA12002	77.7	100.0
Abajo R/o	4.9	3.3	Abajo R/o	6.2	8.0
Bluff B/o	65.6	44.3	Bluff B/o	8.6	11.1
Deadmans B/r	19.1	12.9	Early Pueblo Orange	62.9	81.0
Early Pueblo Orange	58.5	39.5			
42SA5170	14.3	100.0	42SA12196	81.1	100.0
Abajo R/o	3.2	22.4	Abajo R/o	2.0	2.5
Early Pueblo Orange	11.1	77.6	Bluff B/o	64.1	79.0
			Early Pueblo Orange	15.0	18.5
42SA7127	45.2	100.0	42SA12224	123.7	100.0
Abajo R/o	4.5	10.0	Bluff B/o	54.9	44.4
Bluff B/o	10.7	23.6	Deadmans B/r	5.0	4.0
Early Pueblo Orange	30.0	66.4	Early Pueblo Orange	63.8	51.6
42SA10374	68.7	100.0	12655	29.3	100.0
Bluff B/o	36.6	53.3	Bluff B/o	15.8	53.9
Early Pueblo Orange	32.1	46.7	Early Pueblo Orange	13.5	46.1
42SA11700	54.0	100.0	42SA13085	176.0	100.0
Abajo R/o	4.0	7.4	Bluff B/o	144.9	82.3
Bluff B/o	17.2	31.9	Early Pueblo Orange	31.1	17.7
Early Pueblo Orange	32.8	60.7			
42SA11757	16.8	100.0	42SA13144	1.8	100.0
Bluff B/o	3.2	19.0	Early Pueblo Orange	1.8	100.0
Early Pueblo Orange	13.6	81.0			
42SA11770	13.7	100.0	42SA14362	15.8	100.0
Bluff B/o	12.7	92.7	Bluff B/o	9.1	57.6
Early Pueblo Orange	1.0	7.3	Early Pueblo Orange	6.7	42.4
42SA11783	25.3	100.0	42SA16377	26.5	100.0
Bluff B/o	7.4	29.2	Bluff B/o	13.0	49.1
Early Pueblo Orange	17.9	70.8	Early Pueblo Orange	13.5	50.9
42SA11787	37.2	100.0	42SA24568	12.8	100.0
Bluff B/o	16.1	43.3	Deadmans B/o	3.2	25.0
Early Pueblo Orange	21.1	56.7	Early Pueblo Orange	9.6	75.0
42SA11801	36.6	100.0	42SA33968	37.1	100.0
Bluff B/o	19.2	52.5	Bluff B/o	26.6	71.7
Early Pueblo Orange	17.4	47.5	Deadmans B/r	8.8	23.7
			Early Pueblo Orange	1.7	4.6
Grand Total				1454.9	

Table 4. BRW Project Site Collections, Overall Type Percentages.

Pottery Type	Weight (gms)	% Weight
Abajo R/o	145.9	10.0
Bluff B/o	692.6	47.6
Deadmans B/r	41.6	2.9
Early Pueblo Orange	574.8	39.5
	1454.9	100.0

for these sites all begin with 42SA, which denotes their location in San Juan County, Utah, primarily within or immediately adjacent to the Blanding Manufacturing Tract. Pueblo II Deadmans B/r sherds, which were collected from five sites with significant Pueblo II occupations, represent only 2.5 percent of the total sherd assemblages. The data suggest that many Pueblo I sites were not reoccupied by the Pueblo II communities following an abandonment event that occurred at approximately A.D. 900 (Wilshusen and Ortman 1999:369-399).

The refired paste colors of Pueblo I orange types is best illustrated by a pie chart that summarizes refired clay color in terms of percentage by weight (Figure 4). The pie chart data does not include Dolores Red, vitrified sherds whose refired clay color cannot be determined, nor refired colors equaling less than an arbitrary cutoff of 1 percent of the total. It is apparent that potters focused on a limited range of clay types within their resource catchment, primarily those that refire to red hues 2.5YR5/8 and 2.5YR6/8, which account for 89.4 percent of the observed variation. Clay voucher sampling and refiring analysis sources those clays to the Upper Brushy Basin Member of the Morrison Formation, with outcrops primarily in the western uplands of the Blanding Tract. Clays that refire to reddish yellow hues 5YR6/6 and 5YR6/8 are associated with the Burro Canyon Formation as well as the Lower Brushy Basin Member, with major exposures along Montezuma Creek in the eastern portion of the Blanding Tract.

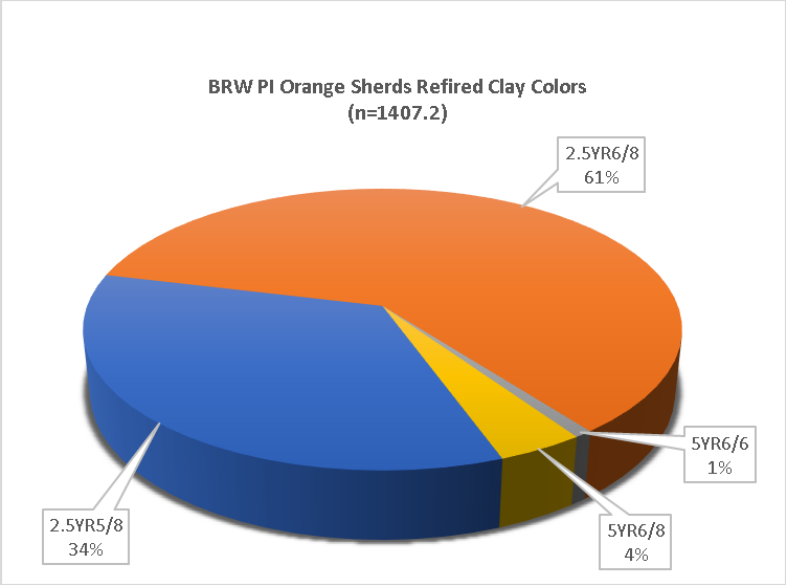


Figure 4. Refired clay color variation in Pueblo I orange types.

Table 5 provides a summary of the typological assignments of sherds recovered from sites targeted by the SJRWS&ERS project research and Table 6 summarizes the data of Table 5. The occurrence of site names instead of Smithsonian numbers indicates that at the time of this writing their final site numbers have not been received. Sites with Smithsonian site designations that begin with 5 indicates their location within the state of Colorado, with DL and MT documenting Dolores and Montezuma counties. With the exception of several sites, none of the Pueblo II sites listed in Table 3 were visited during the BRW Project research since the presence of those Pueblo I sherds was not recognized when site occupation periods were assigned. The data suggest that the residence patterns of Pueblo I and Pueblo II occupations were quite different but sometimes overlapping.

Table 5. SJRWS&ERS Project Sites (n=30) by Type.

Site Number	Weight (gms)	% Weight by Site	Site Number	Weight (gms)	% Weight by Site
42SA16	38.5	100.0	42SA12604	106.8	100.0
Deadmans B/r	38.5	100.0	Abajo R/o	8.4	7.9
			Bluff B/o	28.1	26.3
			Deadmans B/r	63.6	59.6
			Early Pueblo Orange	6.7	6.3
42SA00822	53.1	100.0	42SA14430	63.7	100.0
Bluff B/o	8.7	16.4	Bluff B/o	13.5	21.2
Deadmans B/r	39.4	74.2	Deadmans B/r	50.2	78.8
Early Pueblo Orange	5.0	9.4			
42SA00926	47.3	100.0	42SA17347	55.6	100.0
Bluff B/o	8.0	16.9	Bluff B/o	7.7	13.8
Deadmans B/r	39.3	83.1	Deadmans B/r	47.9	86.2
42SA971	71.8	100.0	42SA20711	89.4	100.0
Abajo R/o	15.1	21.0	Abajo R/o	2.8	3.1
Bluff B/o	19.6	27.3	Bluff B/o	10.4	11.6
Deadmans B/r	22.1	30.8	Deadmans B/r	66.4	74.3
Early Pueblo Orange	15.0	20.9	Early Pueblo Orange	9.8	11.0
42SA2096	168.9	100.0	42SA23760	37.0	100.0
Abajo R/o	7.1	4.2	Bluff B/o	3.0	8.1
Bluff B/o	48.0	28.4	Deadmans B/r	34.0	91.9
Deadmans B/r	89.2	52.8			
Early Pueblo Orange	24.6	14.6			
42SA2110	77.3	100.0	42SA24432	37.9	100.0
Bluff B/o	18.0	23.3	Bluff B/o	7.2	19.0
Deadmans B/r	53.2	68.8	Deadmans B/r	30.7	81.0
Early Pueblo Orange	6.1	7.9			
42SA2117	49.5	100.0	42SA33768	28.9	100.0
Abajo R/o	2.4	4.8	Abajo R/o	11.5	39.8
Deadmans B/r	47.1	95.2	Bluff B/o	2.4	8.3
			Deadmans B/r	15.0	51.9
42SA2907	110.0	100.0	42SA33968	38.9	100.0
Abajo R/o	24.2	22.2	Bluff B/o	11.1	28.5
Bluff B/o	28.4	25.8	Deadmans B/r	27.8	71.5
Deadmans B/r	43.4	39.5			
Early Pueblo Orange	14.0	12.7			

Table 5. Continued.

Site Number	Weight (gms)	% Weight by Site	Site Number	Weight (gms)	% Weight by Site
42SA3217	58.6	100.0	5DL02333	212.3	100.0
Abajo R/o	8.9	15.2	Abajo R/o	1.2	.6
Bluff B/o	6.8	11.6	Bluff B/o	8.1	3.8
Deadmans B/r	42.9	73.3	Deadmans B/r	203.0	95.6
42SA5265	68.7	100.0	5MT1905	149.6	100.0
Bluff B/o	15.7	22.9	Abajo Polychrome	7.6	5.1
Deadmans B/r	53.0	77.1	Abajo R/o	19.3	12.9
			Bluff B/o	35.1	23.5
			Deadmans B/r	87.6	58.6
42SA08135	32.1	100.0	5MT10991	285.1	100.0
Bluff B/o	11.0	34.3	Bluff B/o	42.6	14.9
Deadmans B/r	21.1	65.7	Deadmans B/r	239.2	83.9
			Early Pueblo Orange	3.3	1.2
42SA08455	26.7	100.0	5MT11555	55.8	100.0
Bluff B/o	9.2	34.5	Bluff B/o	3.3	5.9
Deadmans B/r	17.5	65.5	Deadmans B/r	52.5	94.1
42SA10340	127.7	100.0	CARVELL RUIN	47.9	100.0
Bluff B/o	42.7	33.4	Bluff B/o	15.6	32.6
Deadmans B/r	61.3	48.0	Deadmans B/r	32.3	67.4
Early Pueblo Orange	23.7	18.6			
42SA10805	50.7	100.0	LOST CANYON	34.4	100.0
Abajo R/o	8.8	17.4	Deadmans B/r	20.5	59.6
Bluff B/o	15.1	29.8	Early Pueblo Orange	13.9	40.4
Deadmans B/r	26.8	52.9			
42SA10811	90.7	100.0	WALLACE RUIN	32.6	100.0
Abajo R/o	4.4	4.9	Deadmans B/r	32.6	100.0
Bluff B/o	3.0	3.3			
Deadmans B/r	48.3	53.3			
Early Pueblo Orange	35.0	38.6			
Grand Total				2349.6	

Table 6. SJRWS&ERS Project Site Collections Overall Type Percentages.

Pottery Type	Weight (gms)	% by Weight
Abajo Polychrome	7.6	0.3%
Abajo R/o	114.1	4.9%
Bluff B/o	422.3	18.0%
Deadmans B/r	1646.4	70.1%
Early Pueblo Orange	157.1	6.7%
Grand Total	2347.5	100.0%

Table 7 summarizes the refired body clay colors of the Pueblo II Deadmans B/r sherds collected by the SJRWS&ERS fieldwork. Comparison with Figure 4 reveals that not only did Pueblo II potters use a wider range of clay types for red pottery production, but that they also shifted their emphasis to clay sources that refire to 5YR6/6.

Table 7. SJRWS&ERS Deadmans B/r Refired Paste Color Percentages.

Refired Munsell Color Names/Color Values	Weight (gms)	% Refired Colors by Weight
Red		
10R4/6	8.0	0.5
10R4/8	2.4	0.2
10R5/6	66.4	4.2
10R5/8	211.1	13.3
2.5YR5/6	1.9	0.1
2.5YR5/8	43.4	2.7
Light Red		
2.5YR6/6	5.7	0.4
2.5YR6/8	158.6	10.0
Reddish Gray		
2.5YR6/1	3.3	0.2
Yellowish Red		
5YR4/8	6.4	0.4
5YR5/5	4.1	0.3
5YR5/6	4.0	0.3
5YR5/8	30.9	2.0
Light Reddish Brown		
5YR6/4	10.4	0.7
Reddish Yellow		
5YR6/6	741.3	46.8
5YR6/8	63.6	4.0
5YR7/6	18.5	1.2
Pink		
5YR7/4	2.5	0.2
Brown		
7.5YR5/4	3.3	0.2
Light Brown		
7.5YR6/3	3.0	0.2
7.5YR6/4	21.8	1.4
Reddish Yellow		
7.5YR6/6	2.3	0.1
7.5YR7/6	2.5	0.2
Pink		
7.5YR7/4	6.8	0.4
Light Yellowish Brown		
10YR6/4	3.2	0.2
Very Pale Brown		
10YR7/3	2.0	0.1
Gray	155.9	9.8
Grand Total	1583.3	100%

The analysis procedure records surface color and paste color as independent attributes; because the red slip has no observable dimension in a sherd cross-section, attention to this color difference is often the only way to document the presence or absence of a red slip. Slip is defined as a clay slurry intentionally added by a potter to one or both surfaces of serving vessels prior to polishing, painting, and firing, which serves to change the surface color. A total of 17.9

percent of the entire Deadmans B/r assemblage represents unslipped sherds with congruent paste and surface refired colors that document production by potters with direct access to red clays in the 10R refired color group. As illustrated in Figure 5, Chart A, 96.4 percent of the unslipped sherds exhibit Munsell colors 10R5/6 and 10R5/8, which may represent natural variation in a favored clay source. Of the sherds with 10R red slips (Figure 5, Chart B), the same two refired colors (10R5/6 and 10R5/8) account for 77 percent of those sherds, which suggests that potters without direct access to those red clays imported them for use in Deadmans B/r production. Sherds slipped with Upper Brushy Basin Member red colors in the 2.5YR color range (Figure 5, Chart C) are relatively uncommon. Their refired clay colors match the two primary clays used for Pueblo I orange type production, which may suggest that their production was in the uplands of the western portion of the Blanding Tract.

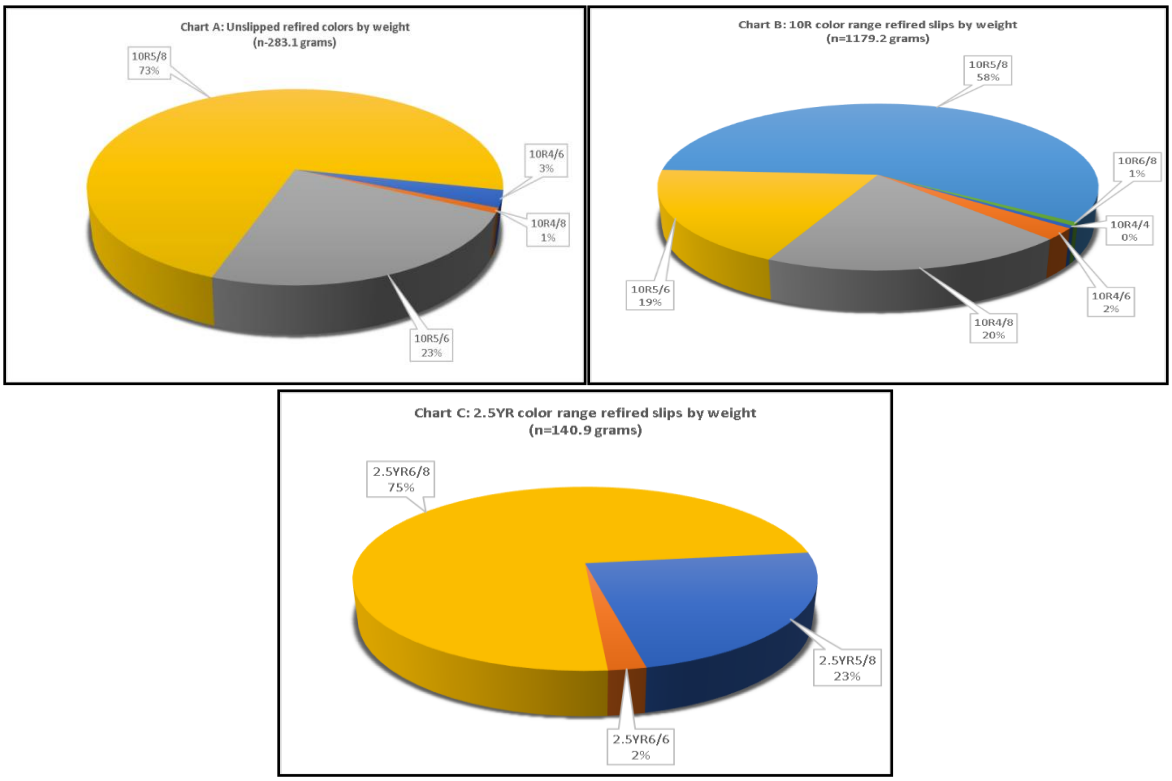


Figure 5. Deadmans B/r refired surface colors.

In terms of ceramic technology, the combination of an iron-rich red clay body or slip and a manganese black paint that also contains iron and other metallic fluxes creates a eutectic reaction (Encyclopaedia Britannica 2019) that serves to lower the melting point of manganese, and when fired in an oxidizing atmosphere produces a glaze paint black-on-red pot (Habicht-Mauche 2006:5; Van Keuren et al. 2013:679-680). Although no supporting data were generated, over the duration of the analysis it was noted that successful glaze paint generation was also correlated with 10R5/6 and 10R5/8 clay colors, regardless if they represented a body clay or an applied slip.

Sherds without paint vitrification may represent copies made by potters without access to the proper ingredients and/or firing techniques.

Interpretations and Summary

The placement of types into a temporal series has an unstated assumption of continuity between the Pueblo I and Pueblo II oxidized pottery, but the continuity hypothesis has never been tested, only assumed. The types appear to be similar, but are quite different in terms of how production was organized. Pueblo I orange pottery production was restricted, in the sense that pots were only made by production communities living in residential association with viable pottery clays that returned orange surface colors within the Blanding Tract. Pueblo II red pottery production was distributed across the cultural landscape of the Blanding Tract and beyond. Production communities utilized viable clay sources in their immediate resource catchment to make pots, and when necessary added a red clay slip before polishing and painting. In contrast with the Pueblo I production of orange pottery, Pueblo II potters followed a cultural convention that required red surface colors. The refired colors of those body clays documents the use of a wide range of clay types, suggestive of production at multiple aggregated villages constructed in coordinated building programs by immigrant groups moving into a landscape depopulated by wholesale abandonment at the end of the Pueblo I period.

Dispensing with the term "San Juan Red Ware" is at best a risky proposition, and unlikely to be embraced by an older generation of archaeologists who will undoubtedly continue using the descriptor despite the arguments as to why it should be discontinued. Indeed, the wholesale reorganization of the typological systematics outlined above should be taken as a call to convene a ceramic conference to resolve the criticisms of both the author and reviewers of this paper. The ceramic analysis reported above retains traditional ceramic types with contemporaneous generation of compositional data necessary for sourcing analysis. The compositional data derived from refiring analysis are informative of ceramic production in general but also serve to group sherds with identical temper and clay combinations suggestive of discrete production zones within the Blanding Manufacturing Tract. It is important to note that research goals necessarily dictate the structure of the ceramic analysis to ensure that pertinent data are generated.

Acknowledgements. The collection and documentation of sherds and clay voucher samples and field laboratory processing of those samples for the BRW research enlisted National Forest Service Passport in Time (PIT) volunteers who donated their time and energy to support the fieldwork portion of the research. Dr. Steven Di Naso joined the project at a critical juncture and revived the faltering project with his enthusiasm for fieldwork and expertise in GIS, geophysics, and archaeometry. My wife, Irene Lopez Wessell, served as field assistant throughout the research and her expertise in volunteer management was indispensable, as is her continued editorial assistance. Dave Dove and Winston Hurst of the SJRWS&ERS Project revisited numerous previously recorded Pueblo I and Pueblo II sites and recorded new ones to satisfy their goal of representative pottery collections. They also generated numerous clay voucher samples across and exterior to the Blanding Tract. Those individuals named above also provided editorial advice and corrections, but I am responsible for any deficiencies of the report, the approach for ceramic analysis, and interpretations of the resulting database.

References Cited

Abel, Leland J.
1955 *Pottery Types of the Southwest: Wares 5A, 10A, 10B, 12A—San Juan Redware, Mesa Verde Gray and White Ware, San Juan White Ware*. Series Editor Harold S. Colton. Museum of Northern Arizona Ceramic Series No. 3, Flagstaff.

Arnold, Dean E.
1975 Ceramic Ecology of the Ayacucho Basin, Peru: Implications for Prehistory. *Current Anthropology* 16:183-205.

Binford, Lewis R.
1972 Archaeological Perspectives. In *An Archaeological Perspective*, pp.78-104. Seminar Press, New York.

Breternitz, David A.
1966 *An Appraisal of Tree-Ring Dated Pottery in the Southwest*. University of Arizona Anthropological Papers No. 10, Tucson.
1993 The Dolores Archaeological Program: In Memoriam. *American Antiquity* 58(1):118-125.

Breternitz, David A., Arthur H. Rohn, Jr., and Elizabeth A. Morris
1974 Prehistoric Ceramics of the Mesa Verde Region. *Museum of Northern Arizona Ceramic Series* 5.

Chase, Phillip G.
l985 Whole Vessels and Sherds: An Experimental Investigation of their Quantitative Relationships. *Journal of Field Archaeology* 12:213-218.

Colton, Harold S.
1953 *Potsherds: An Introduction to the Study of Prehistoric Southwestern Ceramics and Their Use in Historic Reconstruction*. Museum of Northern Arizona Bulletin No. 25, Flagstaff.

Colton, Harold S., and Lyndon L. Hargrave
1937 *Handbook of Northern Arizona Wares*. Museum of Northern Arizona Bulletin No. 11, Flagstaff.

Daifuku, Hiroshi
1961 *Jeddito 264.* Papers of the Peabody Museum of Archaeology and Ethnology No. 33(1). Harvard University, Cambridge.

Di Naso, S.M., D.M. Dove, W. Hurst, and W.A. Lucius
2019 *Identifying San Juan Redware Production Locales and Trading Partners: Research Update 2019*. Paper and Poster presented at the 92nd Annual Pecos Conference, Cloudcroft, New Mexico.

Earle, Timothy K.
1982 Prehistoric Economics and the Archaeology of Exchange. In *Contexts for Prehistoric Exchange,* edited by Jonathon E. Ericson and Timothy K. Earle, pp. 1-12. Academic Press, New York.

Encyclopaedia Britannica
2019 Eutectic. Electronic document, https://www.britannica.com/science/eutectic, accessed September 2019.

Habicht-Mauche, Judith A.
2006 The Social History of the Southwestern Glaze Wares. In *The Social Life of Pots: Glaze Wares and Cultural Dynamics in the Southwest, AD 1250-1680*:1-16. The University of Arizona Press, Tucson.

Habicht-Mauche, Judith A., and Hunter D. Jones Burgess
2016 The Life and Times of Tijeras Utility Ware. In *History and Archaeology—Connecting the Dots: Papers in Honor of David H. Snow*, edited by Emily J. Brown, Carol J. Condie, and Helen K. Crotty, pp. 129-145. Papers of the Archaeological Society of New Mexico 42. Archaeological Society of New Mexico, Albuquerque.

Hargrave, Lyndon L.
1936 Notes on a Red Ware from Bluff, Utah. *Southwestern Lore* 2(2):29-34.
1974 Type Determinants in Southwestern Ceramics and Some of their Implications. *Plateau* 46(3):76-95.

Kaiser, Timothy, and William Lucius
1989 Thermal Expansion Measurement and the Estimation of Prehistoric Pottery Firing Temperatures. In *Pottery Technology: Ideas and Approaches*, edited by Gordon Bronitsky, pp. 83-100. Westview Press, Boulder.

Kidder, A.V.
1942 Forward. In *Rio Grande Glaze Paint Ware*, by Anna O. Shepard. Contributions to American Anthropology and History Vol. VII, No. 39, pp. i-iv. Carnegie Institute of Washington, Washington, D.C.

Kroulek, Orion
2011 *A Temporal Component Analysis of Kipp Ruin (LA 153645)*. M.A. thesis, Department of Anthropology, New Mexico State University, Las Cruces.

Lucius, William A.
1988 *Village Formation and Social Interaction: A Test of the Interaction Hypothesis*. Ph.D. 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.

Lucius, William A., and David A. Breternitz
1992 *Northern Anasazi Ceramic Styles: A Field Guide for Identification*. Center for Indigenous Studies in the Americas Publications in Anthropology No. 1, Phoenix.

Lucius, William A., and Dean Wilson
1981 Formal Descriptions of Mesa Verde Region Ceramic Types: Three New, One Old. *Pottery Southwest* 8(3):4-7; 8(4):2-5.

Matson, Frederick R.
1965 Ceramic Ecology: An Approach to the Study of the Early Cultures of the Near East. In *Ceramics and Man*, edited by Frederick R. Matson, pp. 202-217. Viking Fund Publications in Anthropology No. 41. Wenner-Gren Foundation for Anthropological Research, New York.

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

Munsell Color
1976 *Munsell Book of Color*. Kollmorgen Corporation, Baltimore.

Mutschler, Felix E., Edwin E. Larson, and Michael L. Ross
1998 Potential for Alkaline Igneous Rock-Related Gold Deposits in the Colorado Plateau Laccolithic Centers. In *Laccolith Complexes of Southeastern Utah: Time of Emplacement and Tectonic Setting—Workshop Proceedings*, pp. 233-252. U.S. Geological Survey Bulletin 2158.

Plog, Stephen
1995 Paradigms and Pottery: The Analysis of Production and Exchange in the American Southwest. In *Ceramic Production in the American Southwest*, edited by Barbara J. Mills and Patricia L. Crown, pp. 269-280. University of Arizona Press, Tucson.

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.

Renfrew, Colin
1977 Alternative Models for Exchange and Spatial Distribution. In *Exchange Systems in Prehistory*, edited by Timothy K. Earle and Jonathon E. Ericson, pp. 71-90. Academic Press, New York.

Roberts, Frank H.H., Jr.
1929 *Shabik'eschee Village: A Late Basket Maker Site in the Chaco Canyon, New Mexico*. Smithsonian Institution, Bureau of American Ethnology Bulletin 92.

Roper, Donna C.
1979 The Method and Theory of Site Catchment Analysis: A Review. In *Advances in Archaeological Method and Theory* 2:119-140.

Rouse, Irving
1953 The Strategy of Culture History. In *Anthropology Today*, edited by A.L. Kroeber, pp. 57-75. University of Chicago Press, Chicago.

Shepard, Anna O.
1936 The Technology of Pecos Pottery. Part Two of *The Pottery of Pecos*, Volume II, by A.V. Kidder and Anna O. Shepard, pp. 389-636. Papers of the Southwestern Expedition No. 7, Department of Archaeology, Phillips Academy, Andover, Massachusetts. Yale University Press, New Haven.

1939 Technology of La Plata Pottery. Appendix to *Archaeological Studies in the La Plata District, Southwestern Colorado and Northwestern New Mexico*, by Earl H. Morris, pp. 249-287. Carnegie Institution of Washington Publication 519, Washington, D.C.

Skipp, Gary, and W.M. Aubry
1992 *X-Ray Diffraction Studies of the <2-μm Fraction from the Upper Part of the Brushy Basin Member of the Upper Jurassic Morrison Formation and the Lower Cretaceous Burro Canyon Formation in the Four Corners Area, Colorado*. U.S. Geological Survey Bulletin 1808-K.

Spencer, Robert F., and Jesse D. Jennings
1965 *The Native Americans: Prehistory and Ethnology of the North American Indians*. Harper and Row, New York.

Van Keuren, Scott, Hector Neff, and Mark R. Agostini
2013 Glaze-Paints, Technological Knowledge, and Ceramic Specialization in the Fourteenth-Century Pueblo Southwest. *Journal of Anthropological Archaeology* 32:675–690.

Wilshusen, Richard H., and Scott G. Ortman
1999 Rethinking the Pueblo I Period in the San Juan Drainage: Aggregation, Migration, and Cultural Diversity. *Kiva* 64(3):369-399.

Windes, Thomas C.
1977 Typology and Technology of Anasazi Ceramics. In *Settlement and Subsistence along the Lower Chaco River: The CGP Survey*, edited by Charles A. Reher, pp. 279-370. University of New Mexico Press, Albuquerque.

THE DIGITAL MICROSCOPE: A USEFUL TOOL IN CERAMIC IDENTIFICATION

Hayward H. Franklin
Research Associate, Maxwell Museum, University of New Mexico

For many years, taking close-up photos of pottery cross-sections or surfaces was a difficult task for ceramic analysis using common binocular microscopes. In another realm, thin section petrography with prepared slides employed specialized and expensive polarizing microscopes, sometimes fitted with cameras. This high-end petrographic option remains the ideal route, although hampered by high costs of slide preparation and then analysis, which tend to restrict its use to small, selected samples.

However, for ordinary low-power optical identification, capturing images was difficult prior to the advent of inexpensive digital microscopes. Some expensive binocular microscopes could be fitted with a third photo tube to accommodate attachment to a 35mm camera. These were awkward contrivances to work with, and in any case, depth of field with optical cameras was very narrow. Later, at less expense, small digital cameras could be held through one binocular tube, while focusing on the backscreen, or with the other ocular. While digital cameras improved acuity and depth of field, some could be adapted to eyepieces, but others could not. Here again, high-end equipment permitted attachment of specialized digital cameras through a special tube, and more advanced ones later connected directly into a computer. For most of us, confined to standard 10-30x binocular microscopes, taking good quality shots of sherd surfaces or cross-sections was not an easy operation within any reasonable budget.

Fortunately, the appearance several years ago of inexpensive digital microscopes has provided an alternative. As many of you have already discovered, these stand-alone and portable pieces of equipment can bypass the optical microscope and connect directly to a standard computer. As such, they are small, lightweight, and readily taken into the field, or wherever a laptop computer might go. Fixed with their own light source, they can illuminate and snap a picture of any small object from about 40x to 1000x. Prices are as low as $35, but may range as high as $500 for high-end equipment.

From my limited experience, the pros and cons of these new tools would include the following observations. Most obviously, the overall advantage of having an inexpensive and portable tool for close-up photography of any small object makes them a desirable companion to the standard optical microscope. Independent of a delicate and bulky optical device, this lightweight and relatively durable device can be put to many uses. Even inexpensive ones take remarkably good images with better depth of field than a standard optical scope. And, of course they can be utilized for close-ups of lithic tools, wood, bone, and other archaeological objects. A standard set-up with a desktop computer is shown in Figures 1 and 2. Figure 3 is the surface of a sherd of Pottery Mound Polychrome, while Figure 4 shows a glazed and non-glaze line at 40x taken with a simple digital microscope. Example results of paste-temper cross sections taken with relatively

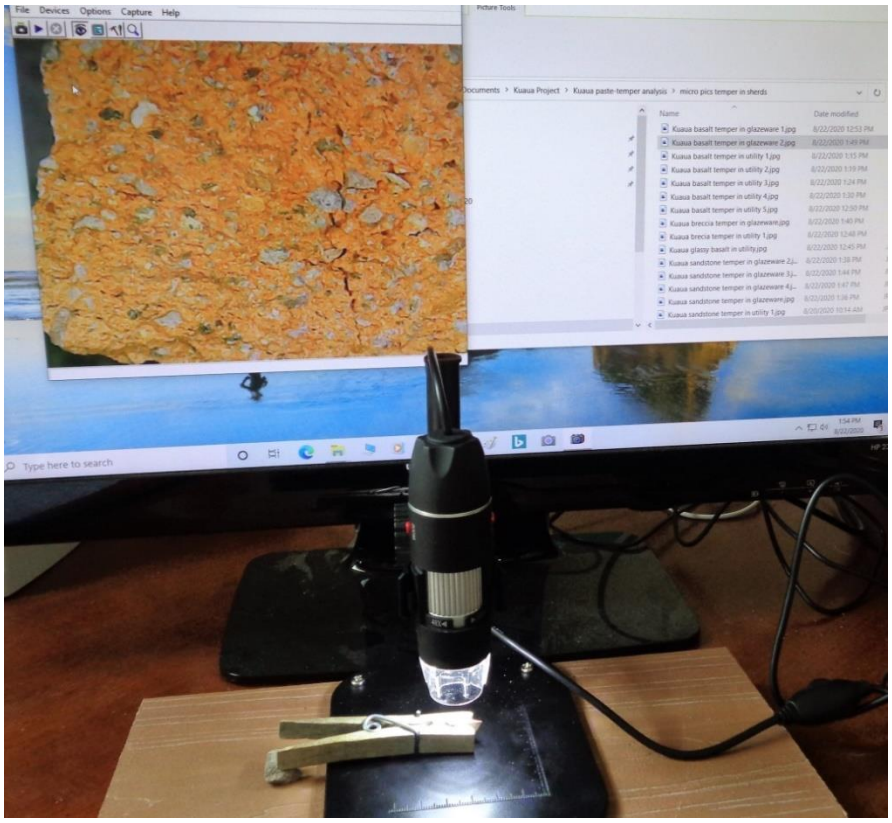


Figure 1: Digital microscope in operation, with image view on PC screen.

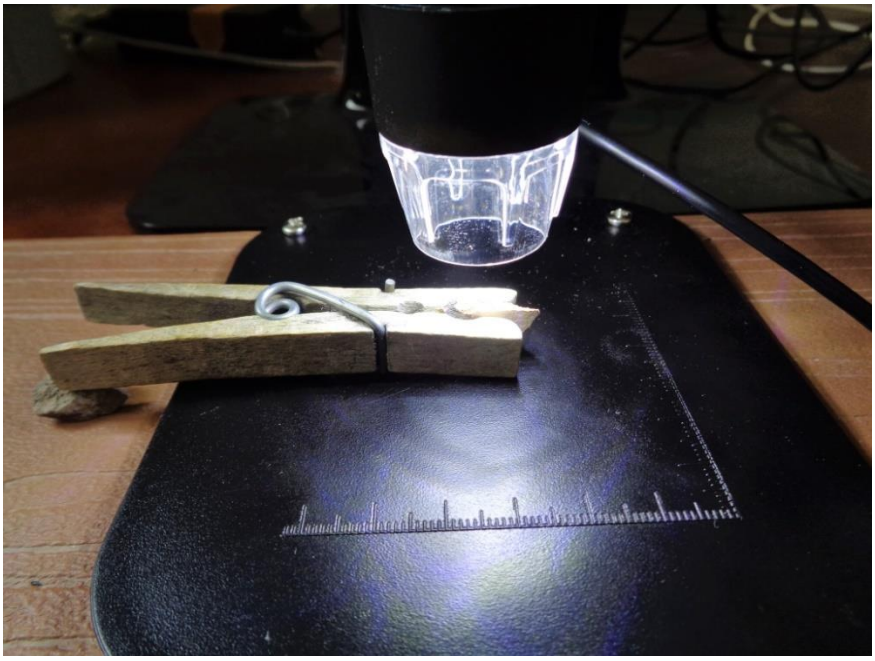


Figure 2: Holding sherd for cross-section imagery.

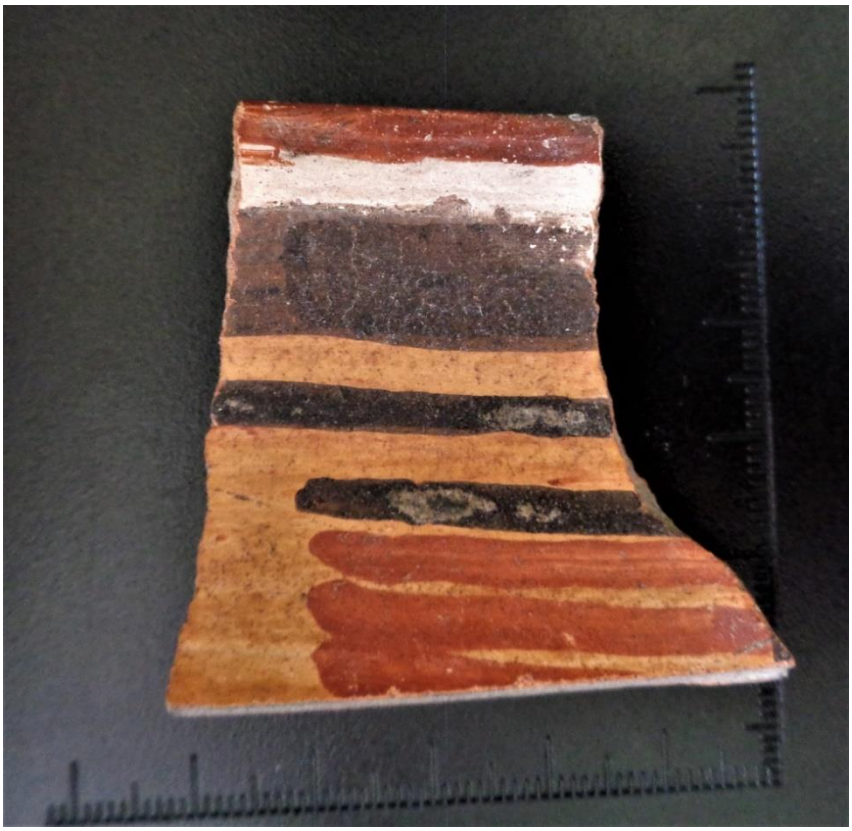


Figure 3: Pottery Mound Polychrome sherd, bowl rim interior.

Figure 4: Digital microscope photo of black glazed and red painted lines on same Pottery Mound Polychrome sherd.

low-end equipment are shown in Figures 5 through 8. Once the image is transferred to a computer, a standard photo editor can be used to crop and enhance the photo. Figures 5 thru 8 were cropped and sharpened with the standard Windows 10 photo editor, and more sophisticated programs such as Photoshop or Photoshop Elements can add further editing capabilities. Storage, transport, and printing of these microscopic pictures share the same advantages with any other digital image.

Are there any drawbacks? My limited experience with a relatively inexpensive digital microscope suggests a few cautions. First, you need a good solid stand, and the cheaper models either do not have a stand, or include one with insufficient vertical span. Separate stands are available having more range, but even these may not have smooth adjustment; mine also needed to be firmly attached to a heavier base (Figures 1 and 2).

Secondly, the range of magnification varies somewhat. Unfortunately, the lowest magnification of all those I previewed online was 40x. While this works well for many objects and seems appropriate for sherd cross-sections, it is rather high for other shots. Standard binocular microscopes are typically used for potsherds at between 10x and 30x. Personally, 10x to 15x gives adequate magnification and superior depth of field with optical equipment. Thus, it is puzzling why digital scopes start at a relatively high 40x; and in some cases go as high as 1000x. A more useful range for this application would probably be 10x to 100x, but my reviews to date have not found this to be available.

Light may be as important as magnification; an adequate and adjustable light source is essential. Smaller units have built-in LED light sources, which should have adjustable power. More expensive models come with sturdy stands with separate adjustable lamps providing illumination from the sides. Plenty of light is required, as with optical equipment. Annoyingly, there is typically no way to hold an object on the stand; I use a clothespin to position a sherd cross section vertically. A fine metric scale placed next to the object for reference would also be useful, as suggested by Peter McKenna. However, physically adjusting ceramic fragments next to a metal or plastic rule in focus might require an adjustable stage.

The necessity to have at least a portable laptop computer available for the connection would not seem to be a drawback these days. However, some microscopes are equipped with SD data card capability, so they can store digital data independently from a computer. Thus, images might be captured and stored in situations where a computer might not be present.

Lastly, try to get the desired view using the power and focus controls of the microscope itself; magnifying by later enlargement on the computer may compromise image quality. Once in the computer, fine-tuning the image size and quality with a photo editor is probably an essential final step. Obviously, the size and quality (acuity and brightness) of the original image would determine how much additional manipulation would be needed, once it is transferred into computer storage. As such, this might be a matter of "pay me now or pay me later" in attaining the best possible results in the end.

Figure 5. Volcanic tuff and basalt temper in utility ware from Kuaua Pueblo.

Figure 6. Volcanic breccia temper in glazeware from Kuaua Pueblo.

Figure 7. Black basalt temper in glazeware from Kuaua Pueblo.

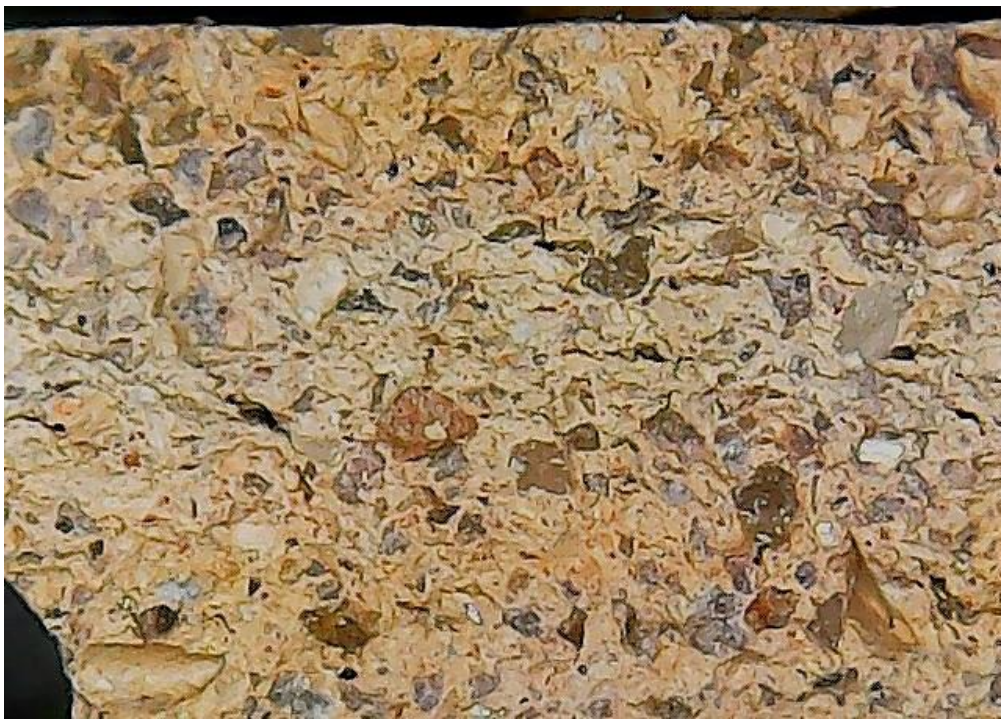


Figure 8. Sandstone temper in glazeware from Kuaua Pueblo.

In sum, the technical breakthrough of inexpensive digital microscopes marks a milestone in analytical technology. Even inexpensive equipment yields impressive results. At this point in time, my comments may be just "preaching to the choir," as such equipment has been available for some time, and readers may be familiar with it. A quick search on Amazon.com reveals the popularity of digital microscopes of all sizes and prices for sale these days. As one who struggled for years to obtain adequate photo results with reasonably priced optical equipment, the advent of the independent digital microscope seems absolutely revolutionary.

REVIEWS

Analysis of Ceramic Compositional Data from Late Developmental Period Sites in the Tewa Basin, New Mexico. Michael A. Schillaci, Steven A. Lakatos, Jeffery R. Ferguson, and C. Dean Wilson. 2020. *Kiva* 86(1):70-107.

Reviewed by Peter J. McKenna

The authors report the results of ceramic fabric chemical composition based on neutron activation analysis (NAA). Focusing on late Developmental assemblages, the authors limn prior compositional studies which have focused on Coalition and Classic assemblages (>A.D. 1200), but which have shown that pots produced in different communities can be linked to local clay sources. In this study, NAA revealed three compositional groups, one local and two nonlocal. The first compositional group was 'local' with two sub-groups, white wares and utility wares, each tempered with different aplastics; second was a nonlocal group produced in the San Juan (Chaco) Basin; last was a third suite of pottery of unknown but nonlocal origin posited to be from the San José or Rio Puerco (of the East) areas pending further study. Anomalies in these patterns are recognized and are used as a springboard for discussing the flexibility of transitional behaviors in the development of communities of practice and identity frameworks. This paper is not without its technical wrinkles, though the data and its presentation are truly impressive. As comparative nomenclature the authors use the term "Cibola white ware" when discussing ceramics which technically belong to the Chaco Series of Cibola Whiteware; there are other series within Cibola Whiteware, including the "Taos Series" (see Colton 1953), which might confuse the present discussion. Also, the excellent detailed descriptions of the non-local Cibola Whiteware types do not address the continuing dilemma of distinguishing them from the contemporary local whiteware type Kwahe'e B/w. Finally, some of the results of this technical study with NAA were anticipated in earlier research in the Tewa basin, such as at the Tsogue site (Condie et. al. 1999, 2011).

References

Colton, Harold S.
1953 Pottery Types of the Southwest, Part 12A: Cibola White Wares. Ms on file at the Musuem of Northern Arizona, Flagstaff.

Condie, Carol J., Hayward H. Franklin, and Peter J. McKenna
1999 Results of Testing at Three Sites (LA 746, LA 102070, LA 121621) on Tesuque Pueblo Land, Santa Fe County, New Mexico for the Pueblo of Tesuque (NMCRIS 60479/65092). Quivira Research Center Publications 398, Albuquerque.
2011 The Depositional Sequence and Ceramic Change at the Tsogue Site, LA 746, on Tesuque Pueblo Land, Santa Fe County, New Mexico. In *Words and Sherds: Papers in Honor of Meliha S. Duran and David T. Kirkpatrick*, edited by Emily J. Brown, Carol J. Condie, and Helen K. Crotty, pp. 93-104. Papers of the Archaeological Society of New Mexico 37, Albuquerque.

Interpreting Ancient Food Practices: Stable Isotope and Molecular Analyses of Visible and Absorbed Residues from a Year-long Cooking Experiment. Melanie J. Miller, Helen L. Whelton, Jillian A Swift, Sophia Maline, Simon Hammann, Lucy J. E. Cramp, Alexandra McCleary, Geoffrey Taylor, Kirsten Vacca, Fanya Becks, Richard P. Evershed, and Christine A. Hastorf. 2020. *Scientific Reports* 10:13704 at https://doi.org/10.1038/s41598-020-70109-8.

Reviewed by Peter J. McKenna

Going beyond the straightforward identification of macro-remains and absorbed organic residues, the authors address how the use-history of cooking pots shapes their residues and the resulting chemical fidelity of those residues in comparison to the original ingredients. Unglazed "La Chamba" pots were used for the experiments, La Chamba pots being a traditional black cooking ware made in Colombia, S.A. Four questions are framed to inform on the question of cooking use-history: do surface residues reflect a single cooking event (last use) or are they a mixture of prior uses; do stable isotopic values of macroscopic carbonized residues relate to the biogenetic isotopic values of the original or final ingredients; are absorbed lipid residues accumulated over the use life of the vessel; and, finally, are absorbed lipid residues reflecting the original or final pot ingredients. The experiments involved the cooking of corn (a C_4 plant) and wheat (a C_3 plant) and some mixtures with deer meat in 50 replicates of cooking the same primary recipe, with the final one to four cooking events seeing changes in recipe content; periodic charring was also done. The article is detailed in methods, comparisons, and the results of the charred macro-remains; the isotopic results of the carbonized thin-layer organic patina; and analysis of absorbed liquids. Detailed data tables and graphics support the presentation. Charred macro-remains generally reflect the final foodstuffs cooked in a vessel rather than an accumulation of events. Organic patina residues tend to represent a longer cooking history and would provide information on multi-purpose vessels or where a wide range of ingredients is used in a variety of combinations over the use life of a pot. Lipid biomarker analysis demonstrated that absorbed lipids correspond to a gradual overprinting of prior cooking events. This article will be of particular interest to researchers considering questions of subsistence, cooking vessel use-specialization, or the mobility or role of vessels in relation to different ecological niches.

The Vidal Site: An Isolated Great Kiva in Heaton Canyon near Gallup, New Mexico. Richard A. Bice and Phyllis S. Davis. 2020. The Archaeological Society of New Mexico Special Publication No. 7. Archaeological Society of New Mexico, Albuquerque.

Reviewed by Peter J. McKenna

Excavation of the Vidal Site great kiva and associated nearby unit houses was undertaken by the Archaeological Society of New Mexico Field School between 1979 and 1993. This report covers the usual dimensions of archaeological interest: history of work, architectures, material culture, and local settlement. This is a legacy project of the Archaeological Society of New Mexico and has been years in the realization. It has come to fruition thanks in large part to the editorship of F. Joan Mathien. Our review here focuses only on the ceramic contribution to the

report. This site and community are of particular interest because Heaton Canyon is a rare Chaco-era settlement lacking a great house as part of the community. Analysis of the pottery is treated in a largely type-oriented descriptive manner, though utility ware is discussed in classes of surface treatment not types (e.g., plain ware, indented corrugations, etc.). The assessment that about 94 percent of the painted types are local relies entirely on typological foundations. The late Richard (Dick) Bice and William (Bill) Sundt along with Elizabeth (Betty) Kelly present the bulk of the pottery discussion in Chapter 19, focusing on relative frequency of wares and typological time relating to the excavations. Two periods are represented in the assemblages, A.D. 935-995 and A.D 1035-1106. Ceramic dating, related to available dendrochronology, is detailed in Chapter 16. The analysis concentrates on the utility ware in an attempt to estimate production and the number of vessels by focusing on the weight of sherds per square centimeter for the average jar and projecting assemblage strength to assess the level of living activity in the various temporal components. Types are described in a separate chapter, as is the discussion of worked sherds. There are about 54,000 sherds in the Heaton Canyon excavation collections (stored at the Laboratory of Anthropology) and the ceramic analysis provides an important baseline of data necessary to additional work needed with this collection.

EXHIBITS AND EVENTS

Fall 2020 continues to be the Age of Coronavirus. We have no events to report. We can say that museums are trying to make the best of a bad situation, and many have special online exhibits.

Albuquerque Archaeological Society
Publications: 1968-2003 in PDF Format
Available as a 2 CD Pack for $15.00
(See order form on the last page of this volume)

CONTENTS

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.

SUBMISSIONS TO *POTTERY SOUTHWEST*

The availability of Pottery Southwest in electronic format creates opportunities for communicating with a wide audience in a sophisticated manner. It is currently published two or three times a year on a flexible schedule. Included are sections for Major Papers, Comments & Responses, Book Reviews, and Current Exhibits & Events. Following is a brief list of guidelines to follow in preparing submissions:

Style: Please adhere to the Society for American Archaeology's *American Antiquity* Style Guide for submissions. Refer to the *Chicago Manual of Style* for any questions regarding punctuation, i.e., single versus double quotation marks.

Author Information: Major papers should be approximately 15-20 pages including bibliographies and endnotes, but may be shorter or longer. Comments & Responses, Book Reviews, and Current Exhibits & Events should be short, in the 500- to 1,500-word range. Authors are responsible for the accuracy of their work.

Page Set-up: All submissions must be in Microsoft Word format. Top, bottom, left, and right margins must be 1 inch. Do not use any headers and footers in your submission. Text font should be Times New Roman, 12 point. Figure and table labels and tables should be Times New Roman, 10 point. Paragraphs should be single spaced. Do not use the tab key, enter key, or the space bar to line up text, especially in tables. Bibliographies must follow the *American Antiquity* style guide.

Spelling, Grammar, and Punctuation: Please spell check and grammar check your work before submission.

Images: Images must be in .jpg format. Images should be submitted as a separate file as well as inserted into the document.

Inserts: Please do not import spreadsheets, pie charts, etc. from Excel into the Word document. They must be converted to Word format for submission, or converted to .jpg format. Do not use text boxes.

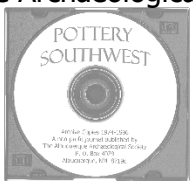
Deadlines: The deadlines for the 2021 issues are April 15, 2021 and August 15, 2021. Papers submitted after these dates will be considered for future issues. Depending on the number of submissions, papers submitted by these dates may be held for future issues.

Returns or Rejections: *Pottery Southwest* reserves the right to reject or return for revision, any material submitted on the grounds of inappropriate subject matter or material of poor quality or of excessive length, or if the material contains defamatory or illegal references. Manuscripts may also be returned for reformatting when they do not comply with the style provisions. Papers under consideration for publication elsewhere will not be accepted.

Questions, comments or inquiries should be sent to the editors at *psw@unm.edu*.

***Pottery Southwest* Copyright:** The Albuquerque Archaeological Society has held the copyright for *Pottery Southwest* since 1974. Standard copyright procedures apply; i.e., an author who contributes a paper to *Pottery Southwest* may distribute the paper in its entirety as long as they reference *Pottery Southwest* as the source, i.e., *https://potterywouthwest.unm.edu* and the volume reference. The same hold true for citations in bibliographies. The author may not offer the same article in its entirety to any other publication. Downloads of *Pottery Southwest* are offered free of charge. Thus, it is unrealistic for an author to assume to hold an individual copyright on a specific paper. Copyrights for individual photographs that are used to illustrate a point in the text and referenced therein as "figures" are part of the submission and are treated as such. Authors are responsible for ensuring that material presented for publication does not infringe upon any copyright held by a third party.

ORDER FORM
for Pottery Southwest Vols. 1-23, 1974-1996 Archive CD,
Pottery Southwest Five Years in Cyberspace Archive CD Vols. 24-28,
Prehistoric Southwestern Pottery Types and Wares by Norman Oppelt,
and/or Albuquerque Archaeological Society 2-CD Sets



TO: Albuquerque Archaeological Society
P. O. Box 4029
Albuquerque, NM 87196

Number & Choice	**POTTERY SOUTHWEST CDs**	**Price per CD**	**Total**
[____] Vol. 1-23 [____] Vol. 24-28	**PLEASE PRINT CLEARLY** Name: _____ Address: _____ City: _____ State: _____ Zip Code: _____ E-Mail: _____	$5.00 for AAS members & students $7.50 for non-members	
No. of Oppelt CDs	**PREHISTORIC SOUTHWESTERN POTTERY TYPES AND WARES by Norman Oppelt**	**Price per CD**	
[____]	**PLEASE PRINT CLEARLY** Name: _____ Address: _____ City: _____ State: _____ Zip Code: _____ E-Mail: _____	$6.00 for AAS members & students, $7.50 for non-members	
Number of AAS CD Sets	**ALBUQUERQUE ARCHAEOLOGICAL SOCIETY 2-CD SETS**	**Price per CD Set of 2**	
[____]	**PLEASE PRINT CLEARLY** Name: _____ Address: _____ City: _____ State: _____ Zip Code: _____ E-Mail: _____	$15.00	

	Shipping		**$4.00**
	AMOUNT ENCLOSED:		**$_____**