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MISSION STATEMENT

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CORONA CORRUGATED, CAPITAN VARIETY – A NEW MANUFACTURE SOURCE FOR CORONA CORRUGATED

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One hundred forty four (144) sherds of an indented corrugated pottery were recovered from LA 5380, a late Glencoe phase (Kelley 1984:44-49) pithouse site located along the Rio Ruidoso near the village of Glencoe in south-central Lincoln County, New Mexico. From all criteria, the sherds can best be characterized as Corona Corrugated, the premier utility pottery of late prehistoric Gran Quivira or Pueblo de las Humanas in the Saline-Medano district of central New Mexico. Gran Quivira lies approximately 70 miles northwest of the Glencoe. Closer still, Corona Corrugated was also the primary utility pottery of Lincoln phase sites (Kelley 1984:51-56), the closest examples being along the middle reaches of the Rio Bonito a mere six miles north of Glencoe. It should be noted that Kelley calls her pottery "indented corrugated" rather than by a more specific name. Subsequent studies have shown it to be Corona Corrugated.

The name Corona Corrugated was first proposed by Alden Hayes (Hayes, et al. 1981) as a result of his mid-1960s excavation of Mound 7 at Gran Quivira. His rationale was that the two previously named types, Corona Rubbed-Ribbed and Corona Smeared Indented, were merely variations on a theme, and examples of both could be found together in excavated assemblages from any appropriate site in central New Mexico. In his 1981 publication, Hayes and Helene (A.H.) Warren provide detailed description and discussion of Corona Corrugated (1981:64-65), including the all-important tempering materials.

In all, 144 sherds readily identifiable as indented corrugated were recovered from various proveniences at LA 5380. A number of plain surfaced sherds representing smoothed lower parts of vessels of indented corrugated vessels are present among the undifferentiated brown ware sherd counts, and are therefore missing from the overall sherd tally for the indented corrugated category. These as yet uncounted plain examples might number as many as 30 to 50 sherds. The primary emphasis on the examination of 29 of these sherds focused on tempering materials and exterior surface treatments. In addition, several rim sherds are also present in the assemblage. Temper identifications were determined by David V. Hill through petrographic analysis.

Paste. Tends to be grainy and crumbly because it is low-fired or else was debilitated by repeated heating and cooling during use. Most sherds are dark gray to black on both surfaces, as well as in the pastes. Sherds that did not see use in cooking tend to be medium brown in color.

Temper. The variation in tempering materials is fairly restricted and consists mostly, if not entirely, of materials obtained in the Sierra Blanca, Capitan, and southern Jicarilla mountains of south-central Lincoln County. Although several potential categories were recognized during my examination under a 30 power binocular microscope, it is clear that virtually all of these

materials (n=22 variations) are from a related series of fine-grained leucocratic igneous rocks that might be characterized as monzonite and quartz monzonite. Dave Hill's (2016) petrographic analysis of a sample of these sherds indicates that this material is from the Capitan mountains and/or nearby peaks in the southern Jicarilla mountains. This material has been variously called Capitan granite, Capitan alaskite, and Capitan aplite. Helene Warren (personal communication, ca. 1975) was the first petrographer to bring this material to my attention.

Surface Treatment. The texturing treatments of the LA 5380 sherds are typical of Corona Corrugated as defined by Alden Hayes (et al. 1981). Overall, the final appearance of these sherds is generally one of haphazard (uneven) addition and manipulation of the coils and production of the textures (Figure 1a). Simply put, they are sloppy in appearance. They are not a work of art and only the rare, finest examples are reminiscent of the extraordinary products of the Reserve Mogollon peoples of prehistoric west-central New Mexico. Instead, they are more reminiscent of the utility tradition of contemporary Rio Grande Ancestral Puebloans.

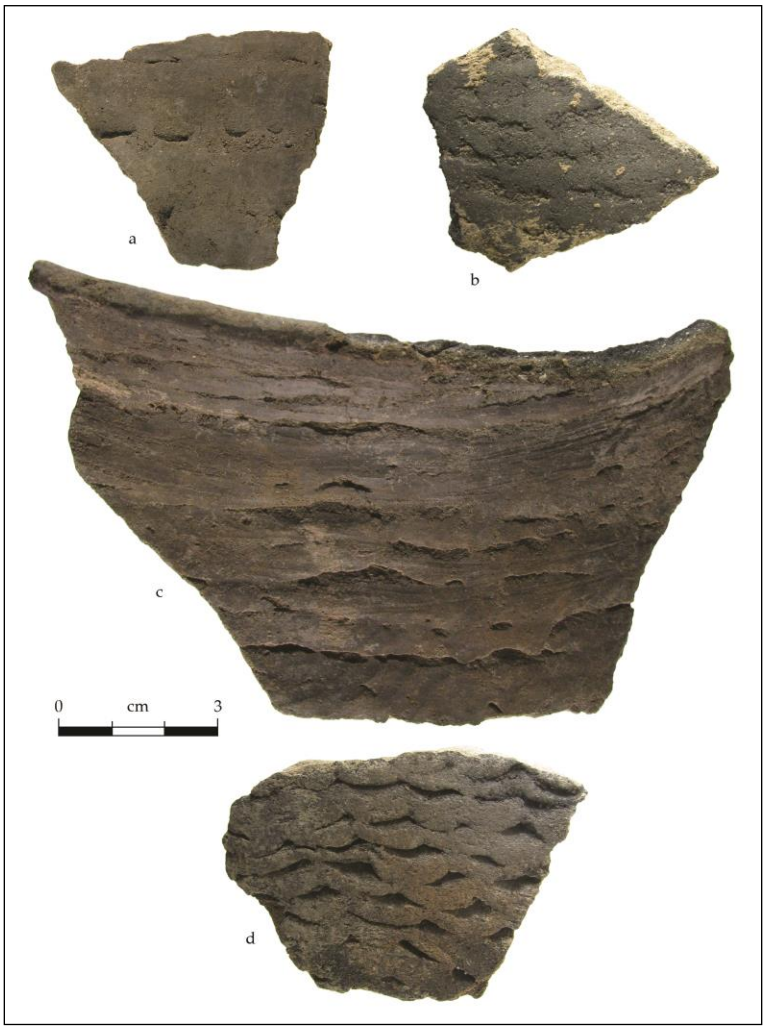

Figure 1a Examples of texturing on Corona Corrugated, Capitan variety exterior surfaces.

Interior surfaces: approximately half of the sherds appear to have been intentionally smudged.

Exterior surface: A decoration by surface manipulation of the clay during and immediately following the application of the coils is highly varied. The variations in the LA 5380 sherds are described in **Table 1**.

Vessel Shape: Four rim sherds were also recovered. They confirm that the vessels are generally wide-mouthed jars with moderately everted rims and expanding, probably globular bodies (Figure 1b). Coil treatment of the necks is usually sloppy, in part because of the curvature preceding the construction of the rims.

Figure 1b Jar rim profiles of Corona Corrugated, Capitan Variety

Figure 2 Jar rim-sherd of Corona Corrugated, Capitan Variety.

Comments:

There is an interesting note regarding the distribution of temper types of Corona Corrugated as found in the Roswell Oasis (Wiseman 2013). Using Gran Quivira as a baseline for comparison, Warren found that 57% of her study sample was tempered with quartz mica schist, 25% with angular quartz grains, and 10% with biotite felsite (Hayes 1981:64). Apparently the fine crystalline material found in the Sierra Blanca and Roswell areas is not present among the Gran Quivira assemblage. For the Henderson assemblage at Roswell, I found that 88% of the analyzed sample of 1699 Corona sherds was tempered with Capitan var. of Corona Corrugated, 10% with quartz mica schist, 1% with sand or sandstone, less than 1% with gray feldspar and crystalline rock, and 1% with miscellaneous materials (Wiseman 2004a:73). In contrast, for the Fox Place at Roswell, I found that 97.3% of the 365 analyzed sherds contain quartz mica schist and the remaining 2.7% is tempered with crystalline rock (D.V. Hill calls it Capitan monzonite and quartz monzonite) (Wiseman 2002:87). The very small analysis sample of Corona sherds analyzed for LA 5380 (n=28) shows 79% Capitan var. of Corona Corrugated.

Thus, the Henderson and LA 5380 samples are more similar to one another, while the Fox Place sample is more similar in the primary temper type (quartz mica schist) with that of Gran Quivira. The Fox Place, Henderson site, and LA 5380 are roughly contemporaneous with one another and either overlap with or are slightly earlier than the Gran Quivira sample analyzed by Warren.

Table 1. Variations in surface treatment of Corona Corrugated.

Unsmeared Indenting

Bold indented corrugated (indentations left unaltered after coils added to vessel during construction; result is a bold, well-defined series of indentations separated by narrow clay ridges).

Smeared Indenting

Lightly smeared indented corrugated (high points of clay in between the indentations show slight smoothing or rounding by hand);

Smeared indented corrugated (indentations clearly show as a pattern, but the high points of clay are smoothed by the hand to form wide separations between the depressions);

Heavily smeared indented corrugated (all but the deepest parts of the indentations obliterated; many of the shallower indentations are obliterated by filling in with clay).

Flattened Indenting

Slightly flattened indented corrugated (flattening accomplished by pressing a flat-surfaced object downward on the indented corrugations).

Banding (coils not indented)

Narrow banded (bands about 3 mm wide and do not overlap one another);

Medium banded (bands about 5-6 mm wide and do not overlap one another);

Wide banded (bands about 10 mm wide and do not overlap one another).

Clapboarded

Regular clapboarded (bands 5-10 mm wide, with the lower edge of each band slightly overlapping the band below it);

Flattened clapboarded (lower edge of each coil flattened by pressing with a flat-surfaced object; may have been accomplished by polishing while still somewhat moist and just prior to the leather-hard stage of drying).

Patterned Corrugated

Vertically alternating series of coils that display different texturing techniques. The single example has one section of coils of bold indented corrugated, while the next section above that is ribbed (very thin coils, the lower edges of which are left rounded and slightly protuberant, the resultant appearance being that of a horizontal series of closely-spaced wires).

Plain Surfaced

An unknown percentage of some of these vessels have plain-surfaced bottoms. Distinguishing sherds from this portion of vessels from Jornada Brown is sometimes relatively easy, sometimes less so. Thus, no serious attempt was made at this stage in the analysis to make the separation, and a few plain sherds belonging to indented corrugated vessels were ultimately found among the category of Undifferentiated Brownware.

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CHUPADERO BLACK-ON-WHITE: COMMUNITIES OF PRACTICE AND EXPRESSION AT THE HINER RUIN

Leon Natker, Blackwater Draw Museum

Abstract

The transmission of knowledge, and how it structures a society and the agency of the people, has been a focus of recent social science research. In archaeology, the use of practice theory to examine communities of practice has become a means of investigating social identity. These communities of practice, people sharing a history of the transmission of knowledge and the social relationships implied in that transmission, expand our understanding of prehistoric societies. The long term production and long distance exchange of Chupadero Black-on-white presents a unique circumstance for exploring the structure and agency of the people responsible for the manufacture of this type of pottery. New variations of this type, found at the Hiner site in central New Mexico, suggest the possibility of nested communities of identity within the larger Chupadero community of practice. This new data, which shows unique attributes located in a single provenience, may signal a different element of social identity. Understanding how the producers of this material culture shared knowledge can increase our insight into the long-term continuity of Chupadero Black-on-white and to the choices of the people who produced it. In this paper, I consider the implications of these unique variations within the context of the long-term stability of Chupadero production.

Introduction

Chupadero Black-on-white (AD 1050/1100-1545) pottery, produced in the Salinas and Sierra Blanca regions of central New Mexico, is perhaps the longest lived painted ceramic types in the American Southwest. This type was produced in central and southeast New Mexico and was distributed and exchanged over possibly the widest area of any style of Puebloan Black-on-white pottery (Creel et al. 2002a, 2002b) (Figure 1). The painted design style and form of Chupadero do not seem to change in any discernable way during the period of production (Hayes et al. 1981; Wiseman 2014). The widespread distribution and apparent lack of change in Chupadero Black-on-white make this pottery type a useful case study for understanding communities of practice and ceramic production (see Joyce 2012:150). Communities of practice can be defined as the network of relationships between people and objects, examined through the actions which produced the objects. The actions are learned, repeated, and reenacted by members of the community in a certain manner and persist over time (Lave and Wenger 1991:98; see also Bourdieu 1977). Eckert (2012) defines a community of identity as the conscious decisions that could identify group membership within larger social contexts. Style, as expressed in production techniques, such as coiling, shaping, polishing, design, and painting, are taught by participation in a learning community. This process of teaching and learning is the basis for understanding a community of practice (Cordell and Habicht-Mauche 2012:4; Minar and Crown 2001). How the techniques used in shaping and decorating a ceramic vessel persist in the production of Chupadero Black-on-white and the suite of variations found in Chupadero from the Hiner site, provide a laboratory for examining communities of identity within larger communities of

practice. I argue that Chupadero Black-on-white from the Hiner site show a difference in the use of style which may suggest a different community nested within a larger community of practice.

In this research I follow Carr (1995) in defining design as production attributes that include: vessel wall thickness, the shape of the rim, the painted design elements on the exterior surface of jars and the interior surface of bowls, as well as the scraping and smoothing of coils on unpainted surfaces (Carr 1995a:157). The totality of these attributes are what give the vessel "style". All of these attributes were choices which must be taught and learned by the potter. When the choices made in craft production are equivalent or produce equally viable options, the choices we see, the "style", is dictated by societal enculturation (Sackett 1985:157; Wiseman 1986; Hegmon 1992; Carr 1995). The visibility of these elements of style, convey information about production organization and the community of practice, both intra- and inter-village, which produced the pottery across the Sierra Blanca region (Wobst 1977; Plog 1980; Kintigh 1985; Carr 1995; Clark 2001; Cordell and Habicht-Mauche 2012; Schleher, Huntley, and Herhahn 2012:97).

Chupadero Communities of Practice

My research hypothesizes that the production of Chupadero Black-on-white represents a large community of practice which spanned several centuries, bound together by a "canon" of design traits (Phillips 2012). A canon can be defined as an expected list of attributes that must be present for the final product to be acceptable. The discovery of elements which exhibit traits outside that canon, presents a possibly unique circumstance. In this paper, I argue that unique traits or a group of traits outside the canon, which are found in only one room at the Hiner site, represent a community of practice nested within the larger Chupadero community of practice (Eckert 2012:55). The larger community of practice, represented in the standard production of Chupadero Black-on-white, can be seen as representing active decisions made during the production process to maintain social cooperation and/or membership (Wiessner 1983; Carr 1995a:160). The unique traits observed at Hiner 2, are production decisions that may have had specific social contexts (Carr 1995b:176; Eckert 2012:55). The function of style on visible media is a means of non-verbal communication which includes social messages regarding identity, both as an individual and within a larger group (Wobst 1977:330, 335; Carr 1995b:178)). The greater the visibility of these attributes, the greater the potential to communicate the message (Carr 1995a:154; Clark, J. 2001:12).

For all of its longevity and ubiquity in the Southwest, Chupadero Black-on-white does not seem to change or develop beyond its initial production style suggesting a single community of practice lasting for nearly 500 years and spanning more than 8200 square miles. The same two basic forms, bowl and jar, account for most of the known assemblages. The design, based on rim morphology, the undecorated surfaces, and painted decoration, appears to remain constant throughout the Sierra Blanca and Salinas regions (Hayes 1981:67; Kelley 1984:127; Clark, T. 2006). Hayes argues, after sorting over 15,000 sherds from Gran Quivira through all of its temporal horizons, there are no discernable differences in Chupadero, while Kelley muses that this apparent consistency argues against family production. Kelley's comments suggest that such consistent production over such a large area imply a community of practice larger than a family

or intra-village social group (see also Clark 2006). The sherds found at Hiner 2, all come from the same room, suggesting an isolated social group responsible for their manufacture and the variation in style.

Chupadero Black-on-white Typology

Chupadero Black-on-white (AD 1050/1100-1550), was first described by Mera (1931). The 1050 date for the beginning of production has never been definitively confirmed because of a lack of tree ring dates (Breternitz 1966:72). However, as Chupadero is known at sites dated to 1100 it is logical to think that production started sometime in the late 1000's (Regge Wiseman, Personal communication, 2016). Chupadero Black-on-white production occurs at sites scattered over a wide area of central and eastern New Mexico (Lehmer 1948; Kelley 1984; Mera 1931; Hayes et al. 1981; Vivian, Gordon 1961; Wiseman 1982; 1986). Chupadero appears to have developed from a combination of artistic traditions in west central New Mexico including Reserve, Tularosa, Red Mesa, Puerco, and Cebolleta (Wiseman 2014:25).

The production of Chupadero Black-on-white has several unique traits not observed among other Southwestern white wares, which make identification of sherds in an assemblage relatively straight forward. Both the bowl and jar form were started with a flat disc, sometimes referred to as a pancake (Clark, T. 2006). From the disc, coils were added and built up, then smoothed. Bowl exteriors and jar interiors are striated in the smoothing process, with an as yet unknown tool. This leaves distinct markings on the interior of jars and the exterior of bowls. The bowls are large and generally round, occasionally oddly warped examples are found. There is also a smaller bowl with an everted rim commonly found (Wiseman 2014). The jars, or ollas, are large, averaging 15 quarts (Beckett 1985:27). The handles are made of two or three ropes of clay and are punched through the surface of the jar and then smoothed on the inside. Although the Chupadero jar, which resembles an olla with only one handle, was exchanged over a wide area, the bowls are almost exclusively produced and used locally in the Salinas and Sierra Blanca regions (Creel et al. 2002a, 2002b; Clark, T. 2006). This assessment may not hold true. Wiseman (2014) is quick to remind us that the jars produce two to three times the sherds in an assemblage as the bowls. Therefore it may be necessary to reevaluate our concept of exchange in Chupadero Black-on-white.

Chupadero Black-on-white is made of a dense light gray to white paste. This low iron clay can fire to buff colors in a low-oxygen or neutral atmosphere. The majority of examples of Chupadero Black-on-white are tempered with crushed pot-sherd fragments, rock, or a yellowish caliche in a variety of mixtures (Wiseman 1986:9; Clark, T. 2006:76). Most surfaces are light gray in color with moderate polish. Although slips are not always present, when present, slips vary from chalky white to creams to gray; often the vessels have a self-slip (Kelley 1984:138). Potters used a high iron content black mineral paint to decorate the interior of bowls and the exterior of jars.

In the canon bowl designs are continuous from rim to base, usually with divisions into four sections. Designs with three, five, and six sections have been observed (Figure 1). The center of bowls is often empty, but geometric designs such as crosses and sun images, and

figurative decorations have been noted (Hayes 1981:71). One of the unique elements of the Chupadero painted design canon is the use of opposing saw-toothed patterns to create rhomboid shapes (Figure 1). These often become diamond lozenges, resembling what Europeans would call a harlequin pattern (Clark, T. 2006:229). The opposing areas are almost always alternately solid and hatched, with the empty or negative space in between, creating the rhombus. The hatching is a clear inheritance from Cibola White Wares (Wiseman 2014). The majority of Chupadero Black-on-white production was dominated by the previously mentioned, widely exchanged jar. The large serving size bowl is the other major part of Chupadero production (Wiseman 2014:26). Hiner 2 also contained sherds from the smaller bowl with an everted rim. This form has been noted at other Sierra Blanca sites (Clark, T. 2006:235). Chupadero Black-on-white was part of a standard ceramic assemblage found in both the Sierra Blanca and Salinas regions. Wiseman (1984:44-45) concludes this assemblage was a basic household tool kit for the region; wide-mouthed Jornada Brown ware (storage), Three Rivers Red-on-terracotta and Lincoln Black-on-red (food service), Corona Corrugated and El Paso Polychrome (cooking), Chupadero bowls (food service) and Chupadero jars (water storage).

Figure 1. Chupadero Bowl from LA 5380 courtesy of Museum of New Mexico.

While conducting research to examine questions surrounding the long-term stability of Chupadero production, I was cataloguing sherds from Hiner 2 (LA 176565) at the Maxwell Museum. During this process I encountered several sherds that displayed traits in addition to the expected traits of the normal canon (see Phillips 2012) of Chupadero Black-on-white. These additional traits included accentuated exposed coils on the outside rim of bowls and exterior painting on bowls. I argue that, even though these sherds from Hiner 2 display the many of the standard canon traits of Chupadero Black-on-white production, the additional traits represent attempts at unique expression, possibly the work of immigrants.

In the following sections, I briefly review the archaeology of the Sierra Blanca region, and the Hiner site in particular. With this as background, I then present my recent findings and discuss the implications they have for our understanding of Chupadero production and the communities of practice that produced Chupadero. Finally, I explore the implications for the interpretation of the production of this ware in the context of epistemologies used to construct our understanding of prehistoric Southwestern culture areas. I conclude, that at Hiner 2, there was a small nested community of identity, a group consciously making decisions to display traits that could emphasize or deemphasize membership in specific social contexts (Carr 1995b:178; Eckert 2012:55), engaged in the production of Chupadero Black-on-white that produced bowls with individual design traits.

Archaeology of the Sierra Blanca

Potters produced Chupadero Black-on-white over a large area of what is now central and southeast New Mexico. Archaeologists divide the area into two regions, the Sierra Blanca and Salinas. Hiner 2 (LA 176565) is found on the Gallo drainage in the Sierra Blanca region (Figure 2).

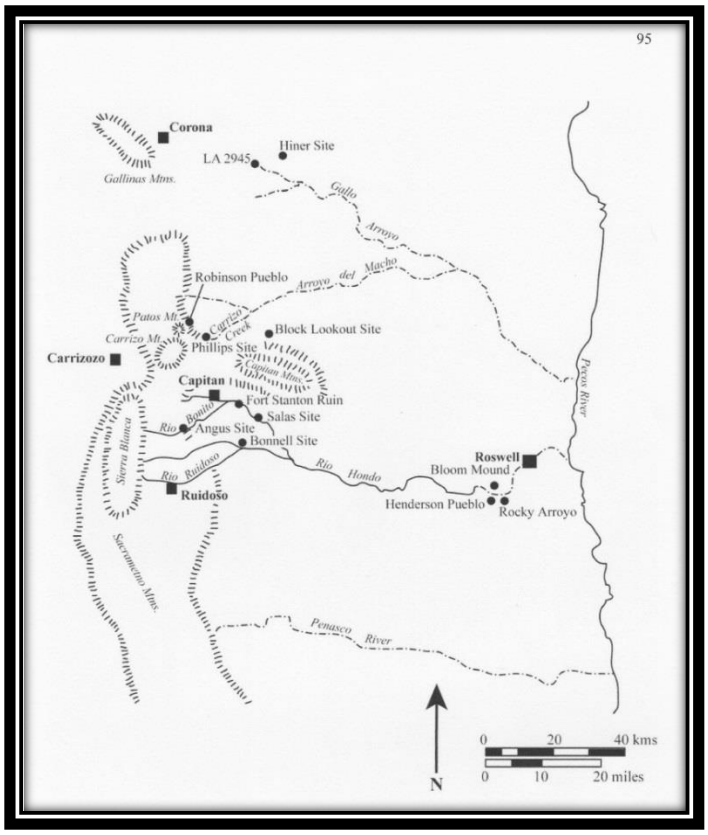

Figure 2. Sierra Blanca sites (Clark 2006:95).

Sierra Blanca Region

Archaeologists divide this area into various phases. These phases correspond to a combination of areal and temporal definitions. Kelley‘s (1984) designations are used for the Sacramento-Sierra Blanca-Capitan-Jicarilla Mountain chain (Figure 1). Recent researchers (Hayes, et al. 1981; Wiseman 1982, 1986) use Kelley’s designations, which I follow in this paper. The Hiner site consists of two structures, Hiner 1 and Hiner 2. Kelley (1984) excavated 5 rooms of Hiner 1 and surveyed Hiner 2. Hiner 2 was occupied during the Corona phase (AD 1100 to 1300) and possibly into the early Lincoln phase (AD 1300 to 1450) of Kelley’s designations.

Corona Phase. Corona phase villages are located in the northern portion of Kelley’s study area in the vicinity of present day Corona, NM. Villages consist of small pithouses with no plaza or other formal spatial designation. Some sites have early pueblo room blocks made of jacal. They range from a few houses to 50 or more, covering areas of up to 10 acres. Corona phase site ceramic assemblages are dominated by Jornada Brown wares and Chupadero Black-on-white, with fewer Three rivers Red-on-tan and St. John’s Polychrome. The late beginning date for this phase has been inferred from a lack of Red Mesa Black-on-white (AD 850-1050).

Lincoln Phase. Lincoln Phase sites (AD 1300-1450) are located in the piñon-juniper belt of the Upper Sonoran Zone (Kelley 1984:52). The sites consist of large masonry and coursed adobe pueblos, arranged in linear room blocks around plazas, ranging from 10 to 120 rooms. Ceramics suggest that during this period, exchange wares from the Little Colorado and Rio Grande regions increased. The dominant wares continue to be Jornada brown wares and Chupadero Black-on-white along with locally made Lincoln Black-on-red. Imported wares include St John’s Polychrome, Three Rivers Red–on-terracotta, El Paso Polychrome, various Chihuahua Polychromes, Gila Polychrome, and a wide assortment of Glaze A types from the Rio Grande valley (Kelley 1984:53).

The Hiner site. LA 176565 is on private land and sits on a tributary of the Gallo River, the Cola del Gallo Arroyo (Figure 2). Kelley surveyed Hiner 2 in 1954 (Kelley 1984:183). The ceramic assemblage found during Kelley’s survey indicated Hiner 2 dated to the later part of the Corona phase (AD 1150 to 1300). The assemblage is dominated by Jornada Brown ware and its Gallo Micaceous variant. Chupadero Black-on-white was the second most abundant type found on the surface. Three Rivers Red-on-tan and one sherd of what was categorized as Glaze I was also found during Kelley’s survey. Hiner 2 consists of an apparently rectangular structure abutting an open space with a round subterranean structure (Figure 3). The site came into the possession of Daniel Adams in the 1970’s. He excavated trenches through 10 rooms, a trash mound to the west of room 9, and a subterranean structure he referred to as a kiva between 1984 and 1989. Adam’s map indicates that the trenches were 4 feet wide. After trenching, he later excavated several of the rooms completely. The materials used in this study were taken from the floor context and the lower fill of the rooms Adam’s excavated (Clark, T. 2006:98). Clark also reports personal communication from Adams which indicated the rooms were not trash filled. The ceramic assemblage found during Adam’s excavation of Hiner 2 was also dominated by Jornada Brown ware and Chupadero Black-on-white. The most significant exchange ware is St.

John's Polychrome. The assemblage also included Three Rivers Red-on-tan and El Paso Polychrome in small quantities.

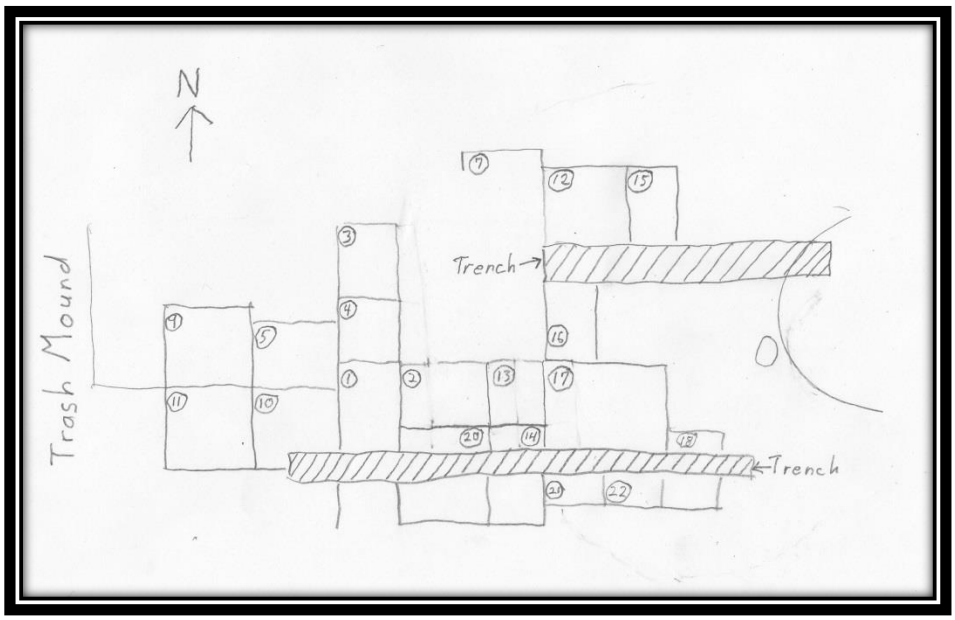

Figure 3. Map of Hiner 2, adapted from Adam's sketch map.

Methods

To examine whether or not Chupadero Black-on-white changes through time and across space I conducted an analysis on high visibility stylistic attributes (Carr 1995:154; Clark, T. 2006:226), Table 1. High visibility attributes are defined as those easily seen with the naked eye, i.e. vessel shape and painted design, and are either early or late in the steps of production (Carr 1995:174; Clark, J. 2001:12). The visibility of an attribute is linked to its ability to convey information (Wobst 1977:330). The greater the visibility of an artifact and its attributes, the greater is its potential to communicate with a larger audience. These attributes then can be used to explore whether the producers of Chupadero pottery attempted to mark social boundaries through design style, and if potters throughout central New Mexico drew from a collective pool of knowledge, a canon, which conveyed how to finish and decorate a Chupadero vessel. Clark (2006) and Creel et al. (2002) have demonstrated that Chupadero was made locally in the Sierra Blanca region and then exchanged widely in other parts of the southwest, not emulated. I argue that the uniformity seen in Chupadero decorative style over time is the visual declaration of communal concepts of social identity which linked the highly dispersed populations of central New Mexico, starting in the late Pueblo II period.

Table 1. Attributes for analysis of Chupadero Black-on-white

1. Vessel form and	2. Part of vessel	3. Rim Shape
4. Sherd Thickness	5. Scoring on unpainted side	6. Position of design
7. Slip	8. Hatched and solid points	9. Line thickness
10. Checker boards	11. Spirals and commas	12. Sun designs

My analysis of the Chupadero design canon used the attributes in Table 1, which include the morphology of the rim sherds, straight or everted, and the size of the vessel the rim sherds represented. Only sherds measuring 4 cm^2 or greater were used because smaller sherds would not allow for detailed analysis of painted designs. Each sherd was measured for thickness with a hand held digital caliper. Each sherd was measured at three random points; the resulting measurements were then averaged. For the design attributes, the presence or absence of these attributes was recorded and coded. I have chosen these specific attributes because they are easily observed and highly characteristic of Chupadero Black-on-white. Rim shape and striations may not seem to be "visible" traits in the conventional sense, but the constant handling of a vessel and in particular a striated Chupadero vessel, make the mass and texture visible even to someone who has impaired vision.

I catalogued a total of 751 sherds from the Hiner 2 (Table 2). Room 1 has a larger than average amount of small everted bowls. The size of these bowls implies personal usage rather than feasting or communal usage. In addition, the assemblage in Room 1 contained sherds of St. John's Polychrome and a partial vessel of Heshotauthla Polychrome.

Table 2. Percentages of Assemblages at Hiner 2 and Within Room 1.

Sherd Type	N	% of Total	Rim sherds	% of Total	Straight Rim	% of Total	Everted Rim	% of Total
Hiner 2 Jar	472	63%	42	8%	0	0%	42	8%
Hiner 2 Bowl	277	37%	112	40%	89	32%	23	8%
Room 1 Jar	37	44%	4	10%	0	0%	4	11%
Room 1 Bowl	47	56%	24	51%	9	19%	15	32%

Clark (2006:251) reported that the mean sherd thickness in Sierra Blanca Chupadero production, n=111, was 5.7mm for jars and 5.8mm for bowls. Of the sherds (n=751) I examined at Hiner 2 the mean sherd thickness for jars is 5.9mm and bowls are 6.0mm. A Chi-square test, $\alpha = .05$, returned the result $p = .998$, $X^2 = 0$, indicting no statistically significant difference in the assemblages. This adds to a growing body of data (Clark, T. 2006; Hayes, et al. 1981; Kelley 1984; Wiseman 1986, 2014) that argues that Chupadero Black-on-white production is uniform throughout its various production loci. Long-term continuity, as seen in Chupadero production, is not what researchers have come to expect (Lyons and Clark 2012:28). The journey from apprentice to master or peripheral participation to full participation (Lave and Wenger 1991) brings with it the dynamic that as the participants achieve mastery, they move from the learned, shared repertoire to becoming masters capable of innovations. The stability of Chupadero does not follow this pattern. It does support my argument for a large community of practice producing goods for exchange.

During the process of recording the design attributes in Table 1, I discovered several design variations: banded exterior on larger bowls and the exterior painting on the small bowls. During typical Chupadero production, the coils of the bowls are scraped until smooth, then on

the outer, unpainted side, they are striated giving them the characteristic Chupadero appearance (Figure 3). No slip or paint is applied to the outside.

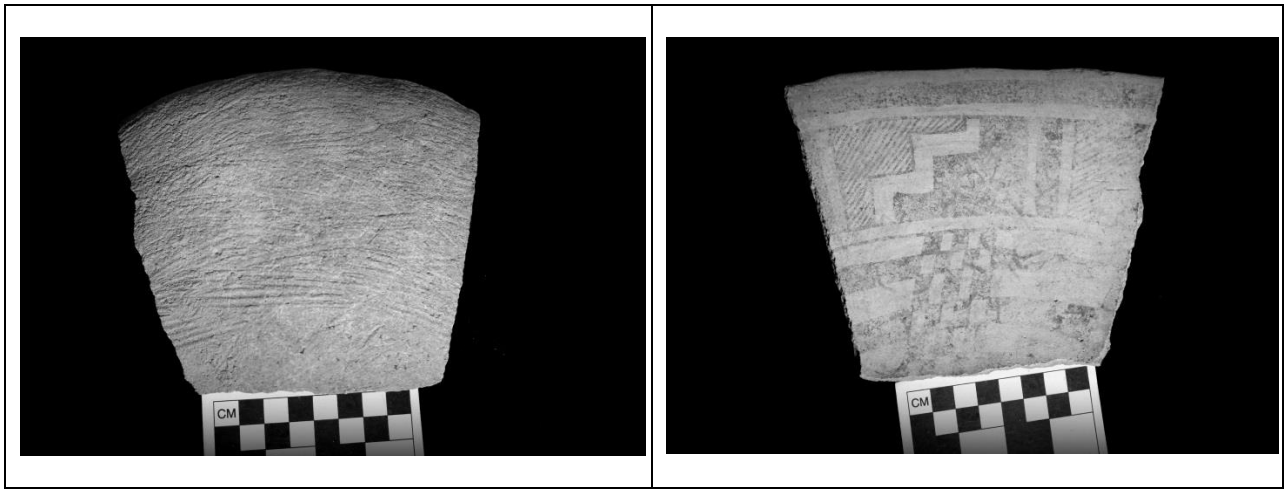

Figure 3. Typical Chupadero Bowl sherd from the Fort Stanton Ruin.

The first anomaly observed was several bowl sherds whose coils were not smoothed, leaving the coils visible on the exterior of the bowl (Figure 4). The effect is similar to clapboarding and requires an extra step in the manufacturing process. It is likely that highlighting the coils on Chupadero bowls requires the potter to striate the exterior first and then re-emphasize the coil line. I next catalogued sherds with everted rims, which had been decorated on the outside with the white slip used for the interior of the bowl (Figure 5). It is difficult to see in Figure 5 but the painting is over the typical striations. This use of the white slip to create a design on the outside of the bowl is similar to exterior designs seen on St. John's Polychrome (AD 1150 to 1300) and Heshotauthla Polychrome (AD 1270 to 1400), both of which use white slip on the outside surface in geometric patterns. In addition, I found one bowl rim sherd with exterior painting using black mineral paint (Figure 6). In total there were 15 rim sherds, 13% of the total rim sherds found at Hiner 2, displaying one or more design traits which are not part of the Chupadero canon. These sherds represented 5 or 6 individual vessels. All of the sherds had the typical Chupadero scoring on the unpainted surface.

Figure 4. Front and back of Wide Banded Chupadero Bowl rim sherd.
Courtesy the Maxwell Museum of Anthropology.

The painted inside surface of the bowls, displayed the standard canon of painted designs, including opposing hatched and solid points, and sun designs. As has been noted, all of the sherds displaying the unusual traits were found in Room 1 of Adam's excavation. Determining if production took place at Hiner 2 is difficult. I infer production of pottery at Hiner 2 from the presence of polishing stones and prepared clay in the assemblage in Room 1. In addition, Adams reported finding a "large brick" of prepared clay in Hiner 2. Clark (2006) sampled this brick of clay in her INAA analysis (Clark, T. 2006:98). Her sourcing analyses for the Salinas and Sierra Blanca regions of Chupadero clays, produced a two tiered compositional hierarchy (Creel et al. 2002a, 2002b), which Clark called Chupadero 1 and Chupadero 2. The Hiner 2 clay is Chupadero 2 subgroup b (2b). Clark concludes that Sierra Blanca 2b was used locally in the Gallo drainage in the manufacture of Chupadero (Clark, T. 2006:161).

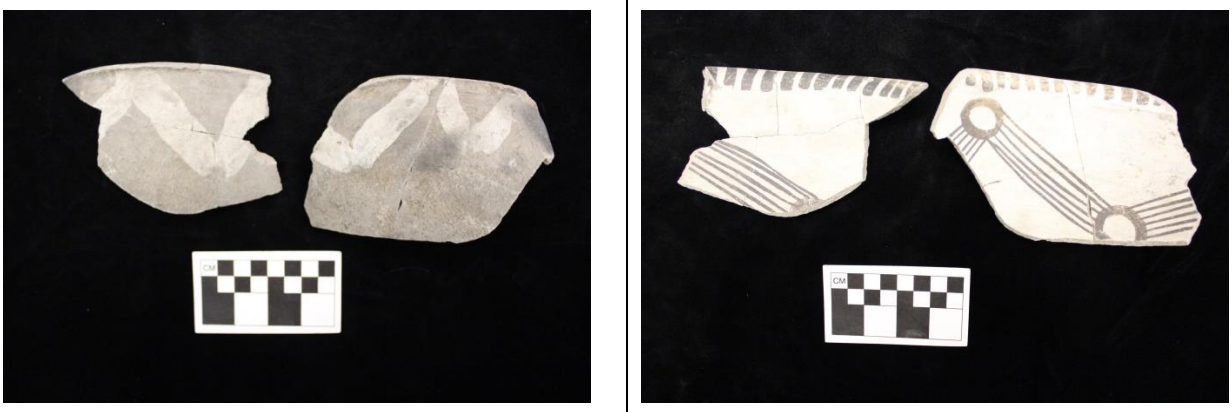

Figure 5. Exterior painted sherd. Courtesy of the Maxwell Museum of Anthropology.

Figure 6. Exterior painted sherd. Courstesy of the Maxwell Museum.

The finding of anomalous design attributes on bowl sherds, both on the large serving size bowl and the smaller everted bowl, raises additional questions. Are these additional traits meant to mark the individuality of this production group? Was this a signal meant for the larger community or only for those within the group? Situated learning theory, in which novices become journeymen and then masters, is based on the premise that the relationships which are the basis of this type of learning, are in constant renegotiation (Lave and Wenger 1991). Are these additional traits evidence of journeyman becoming the masters?

Discussion

The design of an artifact, its shape, size, morphology, and texture, its mass and engineering, and its decoration are the elements that give the artifact "style" (Carr 1995a:157-158). Style, then, can convey information about the community of practice from which the object was made. The more visible a stylistic attribute the easier it is for it to communicate. The

information on an artifact can be used to communicate membership in a social group both intra- and inter-community (Wobst 1977:328; Wiessner 1983:256-257; Carr 1995a:154).). Style is also a way of doing something; it is a choice (Hegmon 1992:517). Implicit in this choice is the agency of the actors making the choice. Following Conkey and Hastroff (1990), style in archaeology is unavoidable because without it there is nothing to discuss or interpret. The specific techniques and sequences needed to make a pot in a particular way have to be taught, practiced, and applied in ways that frequently conform to the standards of local producers (Minar and Crown 2001). For this discussion I concentrate on the high visibility attributes which distinguish those bowls found in Room 1 of Hiner 2 from other bowl sherds found at Hiner 2 and other assemblages containing Chupadero. The clapboard-like banding using accentuated coiling around the bowl rims observed on some of the bowls in Rm 1, and the exterior painting, over the striations, are high visibility traits which are not part of the standard Chupadero canon. How were these traits being used by the actors involves within the social fabric at Hiner 2?

Active, conscious choices in craft production can create an environment that regulates the social fabric (Conkey 1990:10; Carr 1995b:176). The material culture becomes iconic, and can function to promote the group's identity and cohesiveness, as well as maintaining boundaries both internal and external (Sackett 1990:36). A canon of traits and techniques develops which implies a system of beliefs (Phillips 2012:37). These beliefs can be spiritual, political or a combination of both. The primary function of these choices then, is the expression of social information and the enhancement of social interaction (Plog 1980:12; Kintigh (1985:36; Carr 1995a:158; Hegmon 1992:522). These interaction networks are part of the learning communities which produce the artifacts in question. Style then, in material culture, is that part of variability which connects artifacts in "…information exchange processes" (Wobst 1977:321). What then is the information that these particular producers of Chupadero are trying to convey? Conformity to stylistic traits indicates shared belief systems (Crown 1994; Curewitz and Goff 2012). This voluntary behavior reflects group solidarity and shared affiliations including a common cultural heritage (Clark, J. 2001:9) The design style similarity seen in the production of Chupadero Black-on-white suggests potters drew from a collective pool of knowledge, a canon, which told them how to finish and decorate a Chupadero vessel and showed they were members of the larger community. The arrival of differently decorated pots may signal the arrival of new people (Clark, J. 2001:7).

The information being conveyed on the sherds found in Room 1 of Hiner 2 suggest a limited variance, perhaps an individual potter or a group of related potters, doing something outside the expected canon. The information conveyed says that: …while we are a part of the larger community, we are also unique. Room 1, at the Hiner 2 site, contained a total of 47 bowl sherds all displaying traits consistent with standard Chupadero production, the painted sides of these sherds display the standard Chupadero lozenge and sun patterns. The limited number of sherds, 15, displaying extra traits and the location of all of them in the same room provide evidence for an individual or a small group creating the variation. The similarity of the externally painted sherds, to the external painting on St. John's and Heshotauthla Polychrome (Figure 7) and the presence of these types in the assemblage of Room 1, opens the possibility that emigres from the area of White Mountain Redware manufacture joined the local community of practice, perhaps through marriage. It is also possible that these traits were being emulated by people who

had exchanged for the White Mountain Redwares. Again, it is notable that the basic canon of Chupadero traits were followed on the unusual Chup sherds in Room 1. The accentuated coils and outside painting are all in addition to, not in place of, this canon. The additions are also on the outside, potentially the less noticeable side, of the bowl. All of the sherds with white slip painted on the exterior had a zig zag or saw tooth pattern, creating partial lozenges or triangles (Figure 8). The one sherd with exterior black paint (Figure 6) was painted in a geometric design reminiscent of St. John's Polychrome. It is possible that these extra elements were meant to mark an individual's bowl within a family group or community of practice.

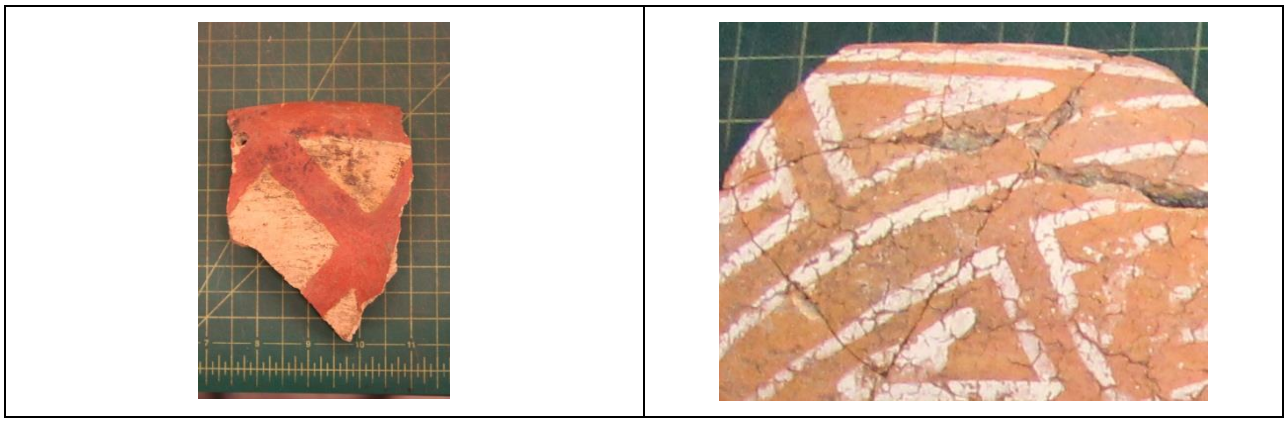

Figure 7. Exterior side of White Mountain Redware bowls. Courtesy of the Maxwell Museum

Figure 8. Sherd showing exterior painting. Courtesy of the Maxwell Museum.

Intra-societal distinctions are often difficult to see in the archaeological record because they may not have recognizable spatial divisions; however, distinctions should be visible in observable stylistic diversity (Hegmon 1992:527). I would argue that the anomalies on these Chupadero bowls are an observable case of stylistic diversity in the archaeological record and that they may represent intra-societal communication. The makers of the bowls, found in Room 1 of the Hiner Site, wanted to remain part of the "ultra-community" by adhering to the canon of

Chupadero traits; wall thickness, rim shapes, scoring on the exterior, and design elements on the inside, but they were trying to add something to that, to say something extra. This combination of traits argues for a community of identity nested within the larger Chupadero community of practice.

Conclusions and Future Research

How people learn and how they transmit that learned knowledge is the essence of a community of practice (Minar and Crown 2001; Cordell and Habicht-Mauche 2012). The consistency of style traits in Chupadero Black-on-white suggests a large community of practice in the Sierra Blanca. A canon of traits passed on through generations and across a large geographic region. Yet the presence of traits which vary from the canon, seen at Hiner 2, argue for the existence of a smaller community of identity nested within the larger community of practice (Eckert 2012:55). As intriguing and tempting as it is to say that this is evidence for individual artistic expression at Hiner 2, that it is evidence for emigrants from the Zuni area where White Mountain Red Ware was produced, or that these elements mark a personal possession, we must remain mindful of the fact that this is still an isolated occurrence. The variation in design elements also may represent a means of integrating disparate communities of identity, through the use of a canon of style, into one community of practice (Eckert 2012:56).

As yet, no complete vessels have been found with these distinct elements. More research needs to be done throughout the loci of Chupadero production to determine if this is an isolated occurrence or if there is a pattern of behavior to be found. Further research may include going back over previously documented collections with an eye to looking for similar anomalies. In addition, exploring known collections of other ceramic types might yield similar evidence for smaller communities of identity within larger communities of practice, or individual identification. This research can add significantly to our understanding of the production and use of ceramics, both intra and inter-community in the Southwest (see Joyce 2012:152). For my own part, I have access to materials from several other sites that I will investigate in the coming months as part of a larger study of Chupadero production. Using style to explore communities of practice gives us a richer understanding of the social life and social interactions of the prehistoric and protohistoric peoples of the southwest. Framing these questions through approaches that examine communities of practice can make our understanding of these peoples richer and more diverse and help us to see these individuals within the complicated human society they inhabited.

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SLIP EXPERIMENTING

Clint Swink, Artist

Introduction

"You can't tell by looking at a frog just how far it can jump" (Travis Brinkhoff personal communication 1971), nor can you always tell what color a raw clay will fire when it becomes slip. But color is just one of slip's roles as back-up player behind the visual star performer, painting. Like a good base man behind a flashy lead guitar, slip adds functional and tactile subtexts to pottery tunes.

Test bowls such as this one, #1804 (Figure 1), carry a great deal of information that can be utilized in a number of different ways. In fact, there are 494 bits of information, data, a potter can utilize on this single pot. And understanding these data can be technologically informative and archaeologically significant.

Figure 1 Bowl #1804, 21.4cm X 9.4cm

Authentic replicators such as myself limit ourselves to the materials, tools, and technology of our potting predecessors. It is my hope that I contribute to archaeology by offering a glimpse of these people one pot, one potter at a time. The authentic methodology used for selecting clays in some cases can yield the same clays that ancestral potters collected and used because our goals are the same. And, in the meantime, we make beautiful pottery the way it may have been made that honors our long silent teachers and offers an aesthetically pleasing alternative to artifact collecting.

Clay sources that produce seemingly identical pottery as the original, can often aid in identifying trade clays used in slips. The white montmorillonite slip I use for my Mesa Verde Black-on-white comes from near Cannonball Mesa, Colorado. In a non-published finding, it also was identified on a greenware (unfired) sherd from Long House in Mesa Verde National Park roughly 17 miles away as the raven flies. Likewise potters can be helpful to scholars researching clay body resources and such was the case in 1995 when I found alluvial clay in McElmo Creek

near Castle Rock site in Sand Canyon, Colorado for Donna Glowacki. This clay provided evidence of inter-site pottery production and resource movement in the Mesa Verde Region (Glowacki and Glascock 1995).

To the ancient potter, slip clays were important not only for color and luster, but for pottery paint function as well. Mineral paints such as combinations of lead, iron, copper and manganese were often used for black paints as were also contrasting colored clay paints. Mineral paint is fused **onto** the surface of the slip by firing and can be applied to any slip. Not so for organic paints, those made from certain reduced organic materials such as Rocky Mountain Bee Plant, *Cleome serrulata*. These paints require a special clay type, montmorillonite. The unique combination of a low-iron content montmorillonite, organic paint, and a limited oxidation firing regime creates black locally reduced iron and char **in** the slip which is like looking at a hand-rubbed oil finish in wood vs. an opaque stain on wood. This is the staple of classic Mesa Verde Black-on-white pottery.

Ancient potters often employed bright colors and finely polished finishes for their art work. In my opinion this often went above simply satisfying functional demands, and why not? They were artists striving to improve their ware and to maximize appeal within the constraints of culture and geography/geology. I try to think in a prehistoric market sense, just as potters always have when large quantities of ceramics are involved. Surplus inventory creates interdisciplinary competition. If you are trading (selling) pots, you strive to make yours more attractive in the market place. Superb art, quality craftsmanship (functionality), and stylistic flare are always successful market strategies.

Procedure

The primary goal of this slip experiment was to locate a bright red-firing montmorillonite clay that enables an organic paint to fire black, a characteristic of some White Mountain Redwares (WMRW) especially St. Johns Polychrome (Carlson 1970; Wilson 2012). The secondary search was also for a bright red that would replicate other WMRW painted with mineral paint. Although many types of clay tested here were not red, their colors were recorded as other potential slips or possible clay body candidates which could be later evaluated for building qualities.

Although red clay is common in the West, not all of it is red enough, and some red firing clay isn't red, but yellow. This is the difference between hematite red, and limonite (goethite) yellow bearing clays. In these tests, a yellow clay won for "best of show in red" at a whopping Munsell 10R5/8—this yellow frog jumped much further than all the red frogs!

The clay collecting for pot #1804 included locations on the Mogollon Rim west of Show Low, AZ, road cuts near Springerville, AZ and Quemado, NM; a few likely AZ candidates from a fellow potter Andy Ward, and a couple NM clays outed from the back of my dark, dusty clay closet.

The final count was 20 different clays, 19 of which were subjected to how well they could be applied with a finger, shrinkage, gritty inclusions, and wet and dry burnishing. Then 10 concentric circles of mineral and organic paint tests were applied inside and out. Pot #1804 was later dried and wood fired in a limited oxidation atmosphere on the inside, while the outside was exposed to oxidation. These data were recorded on a form for later reference (Figure 2).

Bowl #1805; 10.30.16: Fire #405
Slipped on dry ware

Anasazi Claybody/Slip-at-a-glance

*Possible St. Johns

Clay ID.	Color Raw	L/O	Ox	Workability Wet with finger Low	Med.	High	Drying Properties Cracking Low	Med	High	Grit Yes	No	Firing Properties Luster (+ or-) Matte	Satin	Gloss	Cracking No	Low	Med	High	Warpage Yes	No	Shrink %	Wet Smooth GumOK 1-10		Organic Paintable Beeplant No	faint	med	dark	Other paints		
1.FLR	BR	FG	MR		X						X			X	X										X				
2.QY	MY	RB	MR			X					X			X	X										X				
3.QO16	RO	DO	MO		X						X		X		X										X				
4.LLLG	LG	WW	LY	X							X			X	X										X				
5.LLG	MG	LG	MG			X					X			X	X										X				
6.LLY	BY	BRN	BR		X						X			X	X									X					
7.LLM	MR	DG	M		X						X			X	X										X				
8.BP	P	RO	LR			X					X			X	X										X				
9.ZG	LT	YT	LT			X					X			X	X											X			
10 CM1Y	LY	LT	LT			X					X			X	X											X	*		
11CM1P	L	LL	LT		X						X			X	X											X	*		
12CM1R	MR	BRN	LR		X						X		X		X											X	*		
13CM1PP	LP	MG	LR			X					X			X	X										X				
14CMGIP.	LG	LG	LG			X					X			X	X										X				
15CM2Y.	DY	MR	BR			X					X			X	X									X					
16CM2W	W	W	W		X						X			X	X									X					
17CM2G.	LG	DG	MG		X						X		X				X								X				
18.QRG	DG	DG	DG			X		X			X			X				X							X				
19.BGS	LG	LT	LT			X					X			X	X											X			
20AWG.	LG	W	W	N	O		T	E	S	T	S																		

DR--dark red; MR—med. red; BR—bright red; RB—red brown; LR—light red; MG—med. Gray; LG—light gray; DG—dark gray
MY—med. yellow: BY—bright yellow; LY—light yellow; DY—deep yellow; RO—red orange; DO—dark orange; LT—light tan
YT—yellow tan; MT—medium tan; WW—warm white; W—white; BRN—brown; M—maroon; P—pink; LP—light pink; L—Lavender

Figure 2 data form

As a primitive potter I also have sensory tests for my clays. For example, I always smell the clay I use. This is not quite like tasting wine and I have not come up with many qualitative categories for clay smell. However, as a general rule the carbonaceous and alluvial clays have a "rich and earthy" smell and montmorillonites are "Sweet, chemically smelling with a slight earthy after-smell" (Swink 2004). I have a good memory for smell and in this batch of tests I noticed the familiar smell of Cannonball White coming from a pink clay, Benson Pink, from AZ. The smell alone told me it was montmorillonite and should accept organic paint if fired correctly.

Some potters taste their clay for "saltiness," an indicator for fluorescence which can create cloudy, sticky finish problems. I use vinegar because most troublesome "salts" are basic and the acid "fizzy test" identifies these. Or better yet, a Ph test strip does the same thing only much better. One never knows what is in wild clay so I avoid ingestion, but do not rule it out as a possibility for early potters.

My experience has been that slip can be successfully applied thinly to bone-dry ware or to wet pots but not between these two conditions which all potters call "leather-hard." The drying stresses from the latter will immediately create destructive cracking. The same will

happen on bone-dry slipped pots if they are not allowed to thoroughly dry between subsequent coats.

I have found the best way to apply slip is by finger application so I recorded this finger painting first on the dry greenware pot. I like a finger because it is handy and I can feel the process, thus judging thickness, texture, and adhesion during application as I go. I am comfortable thinking that this was a common practice prehistorically as well. Some slips apply silky smooth and some will not finger apply easily including montmorillonites; those derived from weathered indurated volcanic ash. These common clays are very expansive and sticky to finger apply, but they make gorgeous slips that will take organic paint. So, before I fired this pot, I knew from the smell, color *and feel* of Benson Pink that it was a candidate for St. Johns Polychrome if I could coax a decent red out of it in the firing.

Let me say at this point that an experienced potter can manage recalcitrant materials if the fired results warrant. So no matter the results of the testing, bad grades sometimes graduate if you know what you are doing. Becoming adept at the craft takes practice and perseverance as well as observation and good record keeping which, if nothing else, makes one pause to think during the process.

As the test clays were applied they were also tested for burnishing with a smooth stone. Burnishing compacts the surface clay and at the right dryness point—almost dry-- yields a glossy finish most of the time. Still, there are some gummy slips that will not polish; they just won't; while others become so glossy the pot appears to be glazed. As with most potters, I judge slip finish as dull, matte, satin and glossy. My rule of thumb is that at high heat, say above 800° C, the potter will lose one half to one of these finishes, i.e. a gloss will produce a satin or a satin-gloss.

Typically, slip is the "priming of the clay canvas" for subsequent painting. Slipping can be an all-at-once operation or done sequentially depending on the slip, clay body and often the form size. Some very large forms must be slipped and burnished as the pot is built to avoid slipping pitfalls. Slipping requires expertise.

Smoothing with a burnisher takes place after a brief drying period. Some slips can be beautifully smoothed wet while some, like montmorillonites, gum up the burnisher and peel off from the pot wall. So testing and recording is important to know before slipping begins.

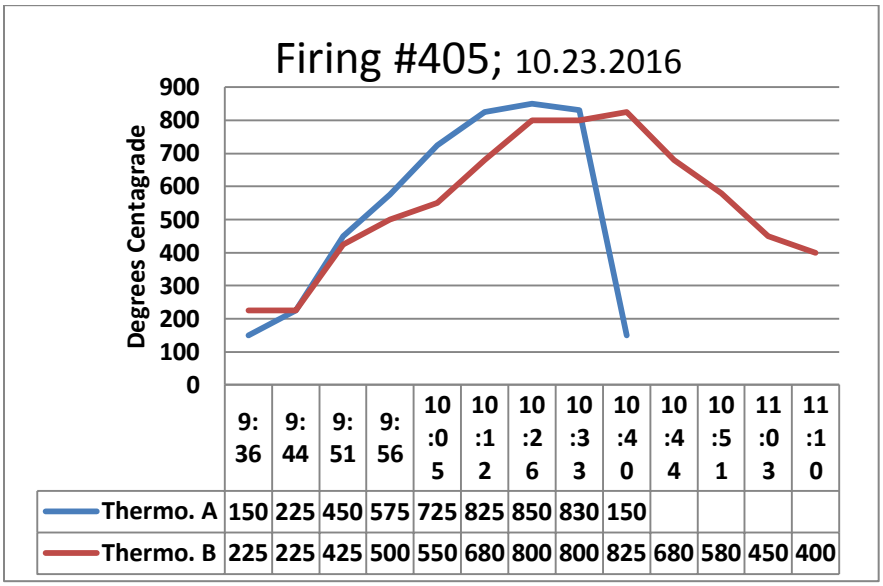
Drying properties are important to "the fit" as potters call it, meaning the drying difference between the clay body and slip. Because slips are usually manipulated, levigated in water, for fineness of particle size, they are essentially temper-free and can crack upon drying depending on application—thin, not so much, thick, risky. If thick slip doesn't crack then there is temper present--period. It may not be visible or tactile like organic temper, but it is there. You don't fool clay. I have intentionally added fine tempering material such as talc to thick slips as the Maya potters did to offset unwanted cracking. I record simple "cracking" which is subjectively measured by judging the dried puddles of sample slips. Subjective empirical data is valuable if the observer is consistent.

Those pesky montmorillonites offer the worst fit problems because their expansive nature holds more water and upon drying, that translates into more shrinkage. If the shrinkage is severe, the slip can just peel off, virtually a "slipping slip." Less radical fit problems translate into crazing (little cracks) whereas low shrinkage means a perfectly smooth painting surface. These conditions can be managed with appropriate timing techniques during building and/or drying. Slipping during construction is a perfect way to manage high shrinkage slips because both the claybody and slip are shrinking simultaneously. When the lower section of a large pot is firm enough to invert, it can be slipped and smoothed. Timing is crucial. If the pot is too wet, the additional moisture from the slipping can collapse the form, when the form is again firm, it can be flipped over and building resumed. Often the bottoms of large prehistoric jars offer a slipping record which ironically sometimes includes no slip at all.

When I encounter a gritty slip, I record it as a note to process it further. Some clays are naturally more apt to stay in suspension longer than others simply by particle size alone and even hold minute temper particles longer.

Flocculation is the state of colloidal clay when it settles and doesn't stay in suspension, but cakes on the bottom. Deflocculation, the exact opposite, is the suspension of colloids and important to potters for this creates the finest of all slips, *terra sigillata* (Nelson 1960). Natural or intentional chemical additions of certain "salts" can create this effect and were critical to the more adept potters of the ancient world such as the Greeks, Romans, and Maya. The finer the particles the better is the polish and the sooner the melt in reduction firing. Although not proven at this point, I suggest that particle size was important to some Southwest potters' mineral paints.

Firing



	9:36	9:44	9:51	9:56	10:05	10:12	10:26	10:33	10:40	10:44	10:51	11:03	11:10
Thermo. A	150	225	450	575	725	825	850	830	150				
Thermo. B	225	225	425	500	550	680	800	800	825	680	580	450	400

Figure 3 firing temperatures

After #1804 was thoroughly dried, it was fired in a shallow basin ±80 cm in diameter and ±10 cm deep, using piñon pine and juniper fuel with three polychrome pots I wanted to oxidize.

Firing #405 had to be a combination of atmospheres. I drew on my 4-step limited oxidation model (Swink 1993, 2004) for the bowl face which would bring out the best organic paint results and I wanted full oxidation on the exterior to illustrate the range of slip colors which could be expected. Additionally, the paint tests would reflect their qualities in each atmosphere. Simply put, this was to be an above ground smother with later oxidation, which was designed to create and preserve organic blacks at high temperatures and allow the reds to oxidize at lower temperatures.

Temperatures were recorded using 2 Inconel over-braided ceramic fiber insulated type K thermocouples and an analog pyrometer read by an assistant, Chuck Glass (Figure 3). Thermocouple "A" rested on the exterior of the pot and "B" was inside the pot directly below "A" which failed after about an hour, but the most important, "B" did not.

A primary fire (Swink 1993) was built and allowed to burn down to a one coal thickness layer before adding the setting (Swink 1993) which included shelving, pottery, and firing sherds. #1804 was inverted over a ±3 cm flue, and leaving 2-6 cm air spaces between pots. Four firing sherds (Swink 2004) were placed over the inter-pot setting voids, leaving plenty of the pot walls showing and good venting down low. A secondary fire (Swink 1993) support was built on the hot coals with a tripod of 5 cm diameter piñon branches. Smaller fuel supported by the tripod was loosely added because I did not want the fast temperature ramp of tightly packed fuel. Kindling was placed on the hot coals and some was placed against the pyre to spread the ignition to the larger fuel. This was allowed to slowly engage the large, leaning pieces. Then more of the same was added until full fuel engagement. After this, as fuel voids opened, larger 5 cm-sized fuel was added. Fueling consisted of maintaining reduction for 70 minutes when the majority of the fuel was consumed.

The smothering layer (Swink 1993) began as the fire opened after a 30 minute ±800° C soak. Flaming fuel was flicked off by my assistant as I spread soil around the base of the exposed areas starting upwind with the bowl. We worked clockwise from the SE flicking and perimeter smothering. After 5 minutes when this was finished I smothered the entire setting with soil. Temperatures were monitored during cooling until 450° C when I began removing soil and firing sherds for oxidation purposes. I started with the bowl and after 15 minutes I uncovered the rest.

Results

After firing (Figure 4) slips were examined and recorded for color, luster and cracking. Paints were also recorded for color, density and viability. Although the outside of the bowl was uncovered a bit late and was partially fire-clouded, it still showed patches of color potential and was useful. Prior to firing I had oxidized slip samples in an electric kiln fired to 775° C which correlated well with the "patchy" wood fired oxidation samples (Figure 5).

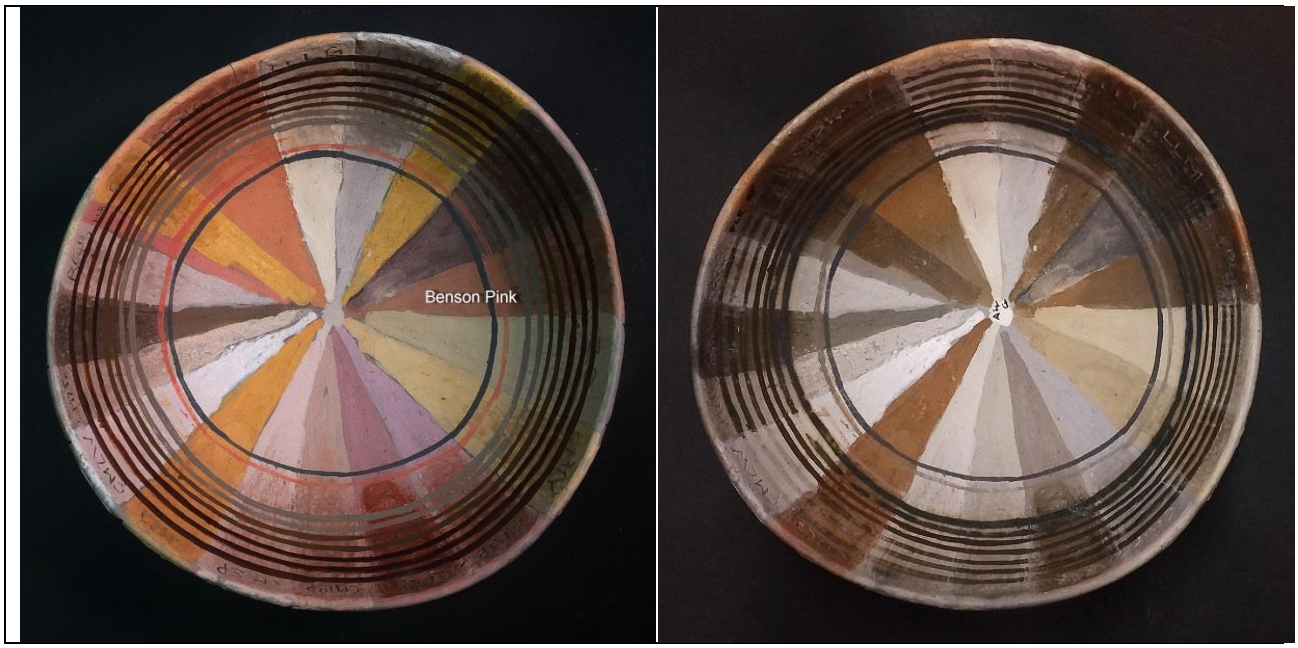


Figure 4 Bowl #1804 before and after limited oxidation firing #405

The organic paint tested was purple Rocky Mountain bee plant. Of the 19 clays painted all but two showed above average blacks in limited oxidation. Those two slips were the best white and red—alas! The two most valuable prehistoric slip colors failed for organic paint. So my search still continues for St. Johns Polychrome red, but I did gain two beautiful slips for mineral painted replicas.

Oh, and Benson Pink? The black was acceptable and the red was the second best red candidate. It may still in the race if the red can be enhanced with limonite, a practice I do not rule out prehistorically. Another round of tests is already prepared for the next trial.

Figure 5 Electric kiln oxidized samples

Conclusion

This is my simplified approach to garnering useful clay information from all those bags of clay that pile up from the fun part of this business, prospecting. And it stands to reason that the information, the test data, should be recorded so I have illustrated my solution. Data is not for everyone and only because I have "one foot in science and the other is art" (Bruce Bradley personal communication 1998) does it appeal to me as I continue to explore experimental archaeology.

The information I have provided represents 30 years of experimentation and production in this field. Oddly, I was compelled to cite myself when mentioning the 4 step firing process terminology because it has never been cited before. The terms I first published in *Pottery Southwest* in 1993 met with resistance, initially being dubbed jargon. Now, all the terms are used pan-southwest among potters and archaeologists, "primary fire" especially, to describe the unique trench kiln approach of prehistoric potters who sandwiched pottery between two active fires. And, the 4 step firing model remains robust. After 23 years it has survived to produce thousands of pots in hundreds of firings producing tons of data and gorgeous, archaeologically correct pottery.

In detailed firing discussions presented by Shepard (1956) which were pre-trench kiln discovery and my subsequent firing renaissance; the emphasis was on the difficulty and complexity of "controlling" atmospheres. Controlling firing atmospheres is what modern pottery is all about and this bias made it difficult to imagine how ancient potters could achieve such "complex," consistent results. In the end, they knew from simplistic experience what their pottery condition was and simply threw dirt on the fire, quenching it at the precise time--or not! Their firings weren't always perfect or even successful. And neither was anything else they did including slipping, but most were and I am convinced that what I have discussed is valid because the ancient potters did the same thing I have done only *much, much* differently, and better!

Notes

If you have found my discussion too vague I suggest you read Shepard 1954 for more depth. If this paper leaves you wanting more about authentic replication based on actual production, then Swink 2004 will fix that. You are also encouraged to look at the Facebook page *Traditional Southwest Pottery* for pottery replication dialogues and *Ancient Sherds* for glimpses of pottery types and distribution through sherds.

Pot #1804 will be curated at Arizona State Museum for educational purposes. There it will rest comfortably, patiently awaiting eager young hands and minds.

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The Albuquerque Archaeological Society
Celebrates It's 50 Years!

by Marc Thompson
photos courtesy of Hayward Franklin

On Saturday, October 22nd, the Albuquerque Archaeological Society celebrated its 50th anniversary with an open house at the Open Space Center. The event was free, open to the public, and attended by 165 visitors. There were tables with information about the Maxwell Museum of Anthropology, rock art recording in New Mexico, all about potsherds, Society publications, field trips, and membership information. Additionally, there was an exhibit of archaeological art by fourth graders, live music, light refreshments, and a birthday cake. Field trips to Piedras Marcadas and Tijeras Pueblos were offered Sunday morning and afternoon.

AAS birthday cake with polychrome bowl logo

Jazz trio in the patio of the Open Space Center

	
Lou Schuyler serves J.J. Brody cake cut with a Marshalltown trowel, Jean Brody in background.	Gretchen Obenauf, 1st Vice President, speaks with author Paul Secord.
	
Marc Thompson, Ask an Archaeologist, fabricates answers for Sally McLaughlin and Paul Secord.	Helen Crotty, Marc Thompson, Jerry Widderson, and Joan Mathien enjoy the weather and company.

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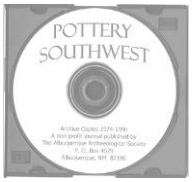

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