POTTERY SOUTHWEST

Volume 26, Nos. 1 and 2 July, 2007
Spring/Summer 2007 ($3.00) ISSN 0738-8020

In This Issue: Editorial Board member Peter J. McKenna presents recent observations on Isleta Red on Tan and proposes answers to some interesting questions. In Max Sokol's article he provides a comparative study of labor expenditure on two phases of Mesa Verde Black-on-White. Thanks to Leslie Cohen for taking the lead editorial role for this issue. Ongoing features include "Recent Dissertations and Theses" with abstracts by permission from Proquest, "On the Shelf", and "On View". Finally, we provide some technical tips on submissions. An electronic publication creates formatting challenges beyond those of conventional printing or photocopying. These tips make publishing in *Pottery Southwest* easier for our contributors. We hope you will take advantage of them and send in your submissions (see Page 37 for how-to).

CONTENTS

Page

Observations on Isleta Red on Tan
by Peter J. McKenna 2-15

Human Resource Expenditure for Mesa Verde Black-on-White Pottery Production
by Maxwell Lee Sokol 16-28

Recent Dissertations and Theses Abstracts from ProQuest

El Paso Polychrome in the Casas Grandes Region, Chihuahua, Mexico: Ceramic exchange between Paquime and the Jornada Mogollon by: Jessica Prue Burgett, Ph.D. 29

Production, exchange, and social identity: A study of Chupadero black-on-white pottery (New Mexico) by Tiffany C. Clark, Ph.D. 30

The emergence of Jicarilla Apache enclave economy during the 19th century in northern New Mexico by: Tiffany C. Clark, Ph.D. 31

On the Shelf: Recent Publications of Interest 32-34

On View: Exhibits—In the Museums and on the World Wide Web 35-36

How to Submit Papers and Inquiries 37

Order Form for Archival CD of Pottery Southwest 38

Editorial Board:
David R. Abbott, Leslie Cohen, Patricia L. Crown,
Kelly Hays-Gilpin, Donna Glowacki, M. Patricia Lee,
Peter J. McKenna, David Phillips and Christine S. VanPool.

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

Observations on Isleta Red-on-tan

Peter J. McKenna
Bureau of Indian Affairs, Southwest Region

A recent review and description of Isleta Red-on-tan (R/t) suggests production ceased about 1900 but makes clear that additional work is needed to understand the type, its chronology, and place in Rio Abajo life (Franklin 1997). The following report addresses some of Franklin's questions by discussing the production span of Isleta R/t, further exploring its variability, its importance, and function in the Southern Tiwa area of New Mexico. The report uses this information about the type as a limited, but comprehensible representation of an era of culture change at the Old Chical site.

In the fall of 1996, proposed road alterations at the mouth of Hell's Canyon on the Pueblo of Isleta, New Mexico resulted in the location and recording of two sites; one (LA 112497 or "Old Chical") represents an earlier occupation of the community of Chical, New Mexico (McKenna 1996). Both sites are located on low terraces flanking the north and south sides of the mouth of Hell's Canyon Wash. "Old Chical" produced a mixed container assemblage which included the sherds of Isleta Red-on-tan that prompted this investigation of the type.

(**Figure 1** ***image of Isleta R/t)***.

Site LA112497 represents at least a portion of an early Isletan farming community, established, and still existing, at Chical, New Mexico. The principal portion of the site consists of four large, contemporaneous, rectangular adobe buildings and an adobe shack used most recently for

itinerant Mexican field hands employed around the Chical community. A limited prehistoric component is present but will not be discussed in this paper. The four adobe buildings are melted to grade or low wall stubs - other dwellings have undoubtedly been obliterated by floods, and ditch and field developments (**Figure 2**).

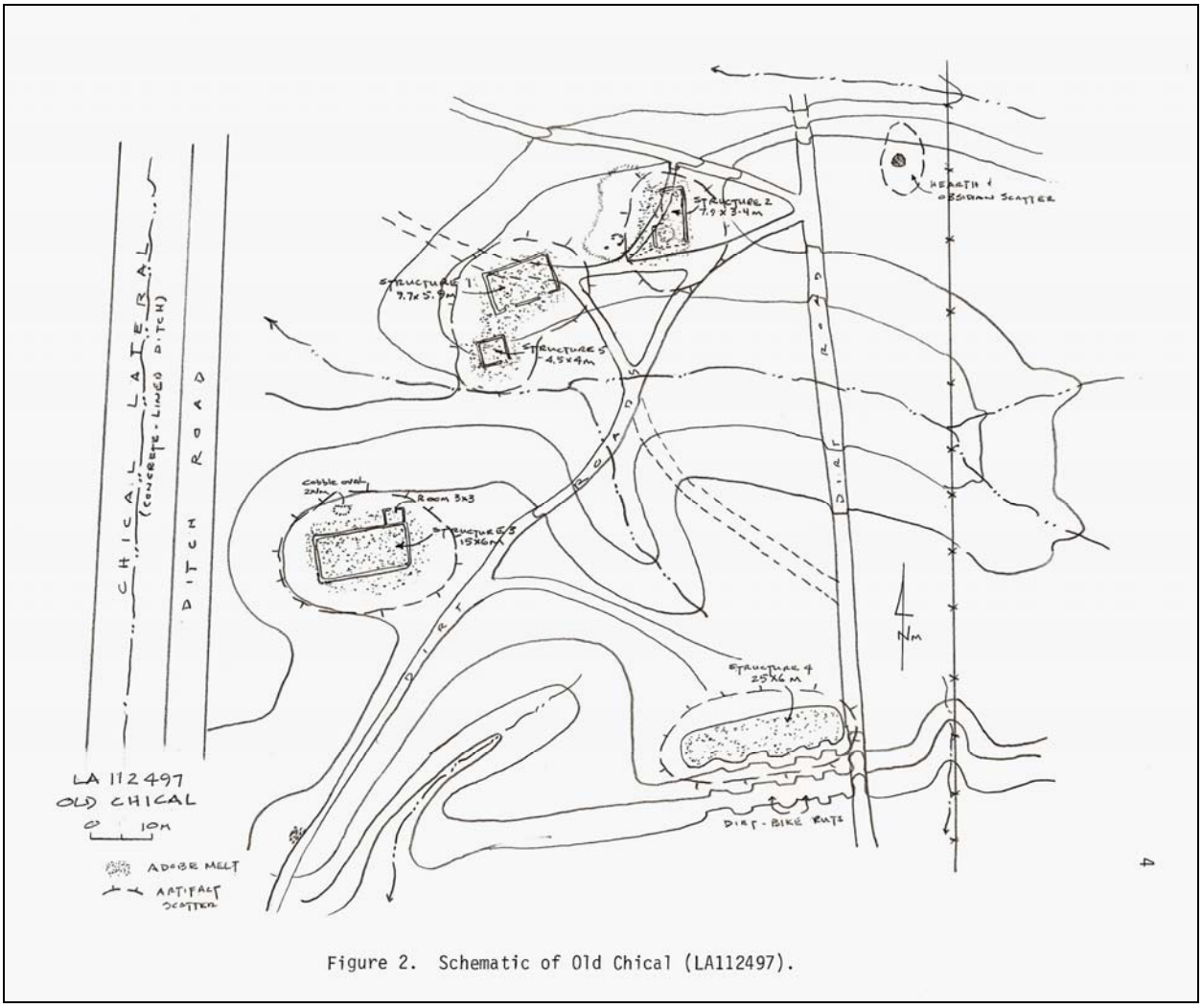


Figure 2. Schematic of Old Chical (LA112497).

(**Figure 2** ***Schematic of Old Chical (LA112497)).***

The buildings are of small to modest proportions; none exceeds 1,800 sq ft (**Table 1**). They were built of *terrones* adobes, cut from local sedge fields and coursed over *cemiento*-style cobble foundations. No evidence of roofing was present and closure material seems to have been salvaged for use elsewhere in the village. All but Building 3 appear to be single-room structures.

Building 3 is large enough to have been internally subdivided and has evidence of at least one separate room, a possible addition, on the northeast corner. All the structures except Building 4 were represented by assemblages of domestic trash spanning a period from about 1880 to 1940.

Table 1. Old Chical Building Sizes.

Building	Size (m)	Area m2 ft2
1	9.7x5.9	57 615
2	7.9x3.5	28 300
3	15.0x6.0+	
	3.0x3.5	100 1080
4	25.0x6.5	163 1750
5	4.0x4.5	18 195

Most of the material dated to the 1920s and 1930s but sufficient purple, aqua and older thick green glass was present to indicate an early 1900s occupation. The absence of hole-in-cap cans suggests very late, if any, 1800s use of the site (**Table 2**, **Figures 3, 4**). Building 4 lacked evidence of Puebloan ceramics and the general trash component did not contain the variety evident at the other buildings. In addition, the relatively high number of bottle glass scrapers suggests the function of Building 4 differed from the others. Perhaps it was a farm structure where tack, field equipment and stock were housed.

Table 2. Artifact Distribution by Structure at Old Chical.

	#1		#2		#3NW		#3NE		#3N		#4		#5		N
Pottery:	B	J	B	J	B	J	B	J	B	J	B	J	B	J	
Isleta Utility	86		8		6		5		1						106
Isleta Red-on-tan		2		1		4		2							9
Plain gray utility					1										1
Acoma Polychrome					4		1		1						6
sn	86		10		12		10		4						122
	#1		#2		#3NW		#3NE		#3N		#4		#5		N
Glass:															
clear, thin ≤ 2m															
bottle	2		1						1		2		4		10
pane/flat	20		2								2				24
other	1														1
clear, thick ≥ 2m															

	#1	#2	#3NW	#3NE	#3N	#4	#5	N
bottle	41	5	1	4	4	1		56
pane/flat	1	1		1		1		4
other	1			1				2
brown								
bottle, thick	39+	5		3	14	39	9	109
bottle, thin	5				2	16		23
cobalt blue								
bottle, thick				1	2			3
lavender, opaque								
cosmetics bottle					1			1
light green								
bottle			1	1				2
old green, thick								
bottle		2		2	4	1		9
other		1						1
natural, thick								
bottle			5		4	11		20
pane/flat			42		1	2		45
other						1		1
aqua, thick								
bottle	5	1			4	2		12
pane/flat	3							3
purple, thin								
bottle	1							1
purple, thick								
bottle	1		2	3	12	12		30
pane/flat		1						1
other		1	2					4
sn	119	21	53	16	49	90	14	362
Metal:								
sanitary food cans	22	2						
cartridges	1	1	2					
unknown scrap			X					
wire nails/staples	x		x					
hardware	x							
Ironstone/Porcelain:								
porcelains	x		x					
white glaze crockery	x	x	x			x		
decorated crockery	x							
blue-decal ware			x					
door knobs	x		x					
whiskey jug	x							
N	228	34	135			90	14	501+

Artifacts at the various buildings are eroding from the structural mounds themselves, no trash piles or middens were located at Old Chical. A number of commercially available products were present which help to date the site, including porcelains, blue-decal stoneware, whiskey jugs, cartridges in a variety of calibers, along with a great number of food, beverage, medicinal, and vanity glass containers (Figures 3 and 4). An extremely thick, clear glass soda bottle (embossed) from Cholson Bros. in Albuquerque, NM occurs in the 8 oz. size which became available after 1924, while applied color labels occurred after 1934. The embossed "28" on the base (Figure 3a)

probably represents the year of bottle manufacture (Riley 1958:264; Dart 1980:151-152). A crown-cap bottle with an embossed base from "3 Rivers" (Figure 3b) may be a product from Almagordo, New Mexico and probably is a condiment bottle (hot sauce?) produced before screw-cap closures became the standard for this type of product (see Dart 1980:145). Production of other items such as the .44 caliber cartridge (Figure 4m) started in the early 1900s (1908, Barnes 1965:194). In addition, the scattered trash contains abundant residue from recent partying and rural activities as illustrated by the .410 shotgun shell (Figure 4n); doves still quail on the autumnal benches of Hell's Canyon.

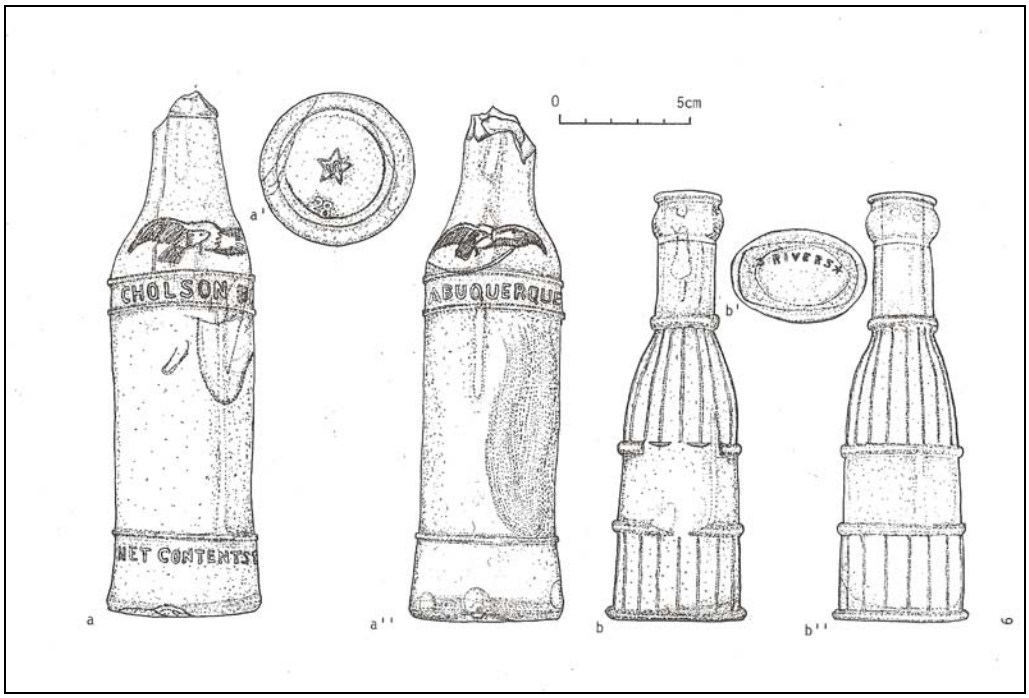


Figure 3. Glass Bottles from Old Chical, Structure 1.
a-a") crown cap clear glass soda pop bottle from Cholson Bros. Albuquerque, NM., also embossed Net Contents 8 oz. b-b") crown cap clear glass (condiment?) bottle from 3 Rivers in Alamagordo, NM

This description of early 1900s industrial products at Old Chical is presented to strengthen the assemblage context and temporal placement of the native Isletan pottery evident at most of the buildings (Table 2). The continued use, and production for use, of local and nonlocal Puebloan pottery is certainly indicated by the amount and variety of material at Old Chical and by technical changes from earlier versions of the pottery (**Table 3**). Quality polychrome vessels from Acoma (Figure 4a, b [same pot]) are present but locally produced vessels make up the majority of the Puebloan pottery. Isletan products occur as utility vessels (Figure 4c), a number of which exhibit the exterior sooting indicative of cooking vessels, and as a red-slipped ware most easily envisioned as the famous giant Isleta dough-bowls (Figure 4d-f). The sherds of these red-slipped vessels also show use-wear, particularly Figure 4d, which has an abraded bowl-interior oriented "notch" similar to the attritional patch formed when stirring and serving implements are routinely left in place inside a vessel (Skibo 1992:132-139). The evidence from Old Chical indicates the production and use of traditional Isletan pottery for Isleta households

continued, at least until World War II, albeit with technical changes perhaps distinctive to the latest production period.

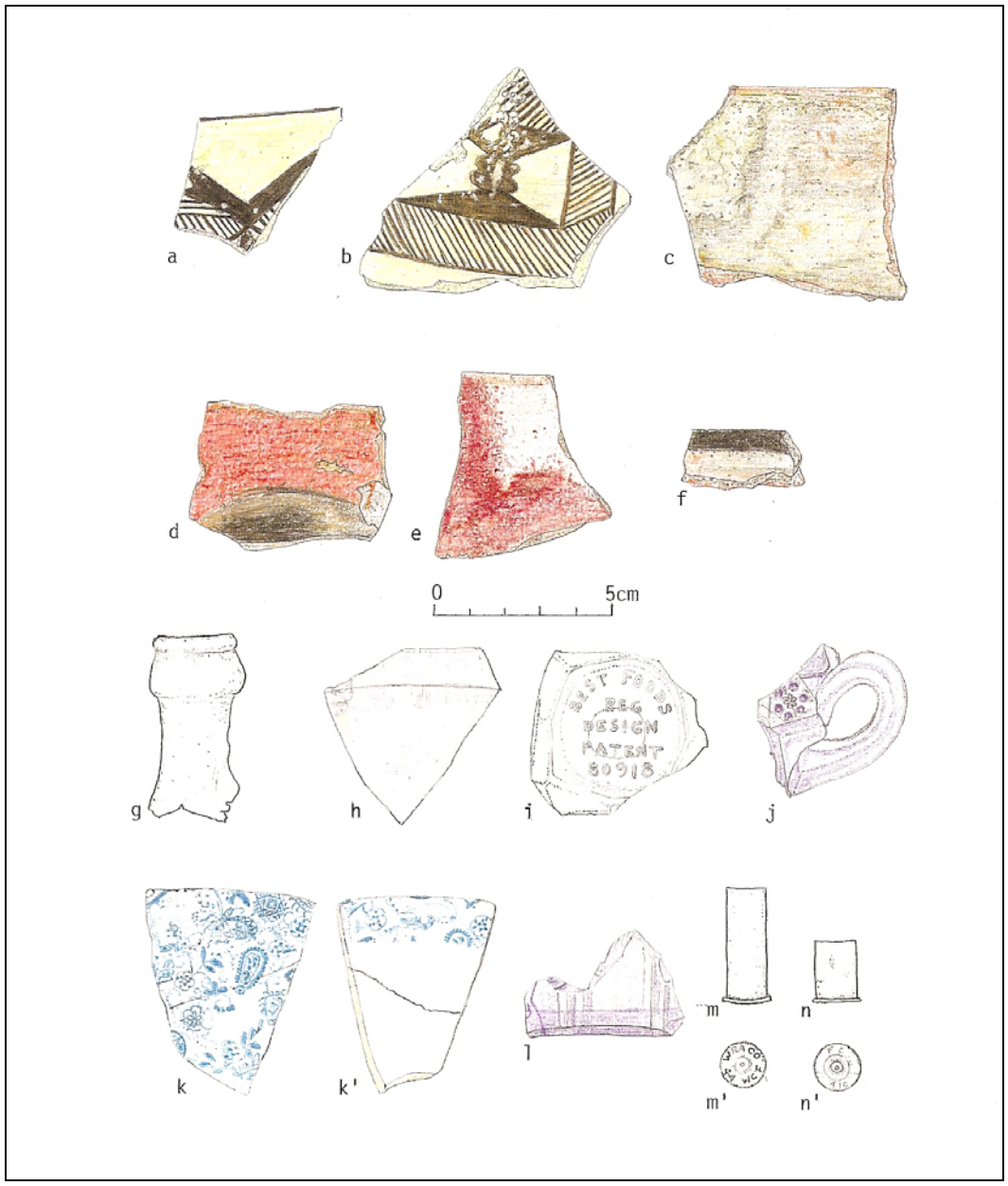


Figure 4. Selected Artifacts from Old Chical (LA112497).

a&b) Acoma Polychrome jar rim (a) and shoulder (b) sherds, c) Isleta Utility rim from crushed pot in NW corner of Structure 1, d, e, f) Isleta Red-on-tan hemispherical bowl (slightly inverted rims) with f showing rim-interior black paint, g) clear glass soda bottle with crown cap, h) purple glass storage jar rim, i) clear glass condiment jar base, j) molded purple glass sugar jar, k-k') exterior and interior views of small blue-on-white floral decal ironstone bowl, l) purple glass whiskey tumbler base, m-m') .44 cal. center-fire rifle cartridge from Winchester Repeating Arms, n-n') .410 shotgun shell with interior plastic sabot and paper basal wad.

There is a family of red-slipped, quartz-sand tempered, orange/tan paste wares in the historic greater Rio Grande basin of New Mexico. The Tewas made Posuge Red. The Saline Tompiros produced Salinas Red. The southern Tiwas developed Isleta R/t, nee "Tortugas Red-on-orange", while the Hispanics produced Casitas Red-on-tan/brown and the Keres copied it ("plain red"). There is no compendium, much less consensus, on variation among these red-slipped ceramic types (Carrillo 1997; Dick 1968; Frank and Harlow 1974:117; Franklin 1997; Harlow 1970:24; Snow 1982:266-267; Toulouse 1949:19-20; Warren 1979:243-244) and Isleta R/t is hardly a household name among Southwestern ceramicists.

Table 3. Comparative Isleta Red-on-tan Descriptions.

A.D. 1700-1900	>1900
Synonyms: Plain Red "Brick" Ware (Toulouse 1949), cf. Tortugas R/o (Harlow 1970)	
Technology:	
Construction: coil & scrape	-
Firing: oxidized	-
Paste: fine-grained, not gritty or coarse; color is tan, beige or an olive gray oxidizes to light yellow or buff (7.5YR7/6-8/4 [13], 10YR8/4 [1], 5yr6/8 [1])	medium-coarse texture; color is gray to red-yellow with carbon-cores, common, oxidizes to Lt. Red (2.5YR6/8 [3])
Temper: very fine quartz sand, some untempered, fine white specks of unknown character may be present	medium to coarse grained mixed quartz dominate) and granitic sands (0.75-1.00mm); temper density 40%+ of paste
Walls: average 5mm, ranges up to 7mm, thick 8.1mm average (6.4, 8.6, 9.2mm)	
Firing Clouds: present, common on bowl exteriors	-
Surface Treatment:	
Slip: thick red slip applied in band on bowl exteriors (2-5cm) and overlaps rim to upper interior with jars slipped on exterior to shoulder; slip varies from medium dark red (common) to orange and magenta	deep red slip evident on exterior of bowls, 1 of 3 has interior slip overlap
Polish; slipped areas are highly polished occasionally to luster, non slipped areas are moderately to well polished on bowls; polishing streaks may be visible on slipped areas	-
Paint: none	mineral paint interior rim
Vessel Forms: hemispherical bowls, shouldered bowls w/inverted rims, cylindrical necked jars, soup plates ranging from flat-rimmed deep hemi-spherical bowl to almost flat-bowl bodies.	(1), unpainted (2) deep hemispherical bowls only
Rims: rounded, direct (52%), beveled round lip (30%), flat (2%), flared (4%), beveled other (5%)	rounded, direct
-from Franklin 1997 (n=250)	-Old Chical specimens (n=9)
Other Notes:	
paste - often quite mottled to orange but overall light brown; temper - sand; slip - red 10R4/4 to red-brown (2.5YR4/4) often crazed whereas Tewa slips are smooth; wall thickness up to 1cm	
-from Batkin 1987:192	

Isleta Pueblo, as a pottery producer, is conspicuous by its absence from the ceramic treatises of the main students of the period (Harlow 1973; Snow 1973, 1982, 1989). Its principle historic pottery is largely dismissed as a “plain red ‘service’ ware” which was sporadically made and then discontinued some time ago (Ellis 1979:352; Frank and Harlow 1974:117; Harlow 1973:11). Recognition of Isleta R/t has largely been at the level of ceramicists’ jargon. Except for Franklin's effort (1997), the type has never been described and the name only recently appeared in print as a descriptive label below an image of a 1890s firing event at Isleta Pueblo (Batkin 1987:190).

From the very limited perspective of the Old Chical sample, the nature of Isleta R/t appears to have become simplified over the span of its production. The key changes highlighted in Table 3 include the late-production of thicker-walled, more coarsely textured large "dough-bowl" forms. Jars, soup plates, and other forms appear to have been discontinued. The use of high-iron clays (alluvial sources) and arkosic sands, as might be expected in piedmont outwash areas of the Manzanos Mountains like the mouth of Hell's Canyon arroyo, suggest the Old Chical vessels are the products of the Chical community rather than imports. In an oxidizing experiment, a single sample of Isleta Utility and the Isleta R/t samples from the site were refired at 910˚C. The Isleta Utility ware oxidized to a light red (10R 2.5YR6/6) which was very similar to the color of the Isleta R/t samples, suggesting limited clay-source variety in the Chical area. In addition, the Isleta Utility sherd was tempered with aplastics which are similar to, although slightly coarser-grained, than those of the Isleta R/t vessels.

The rim paint on one of the Isleta R/t specimens suggests several things. First, production of these items is Isletan but probably reflects knowledge of Laguna Pueblo paint technology. Second, the rigid production norms of the nineteenth century were relaxing. The differences in temper type, density (as reflected in a coarser texture) and clay selection are significant changes from the Isleta R/t specimens from Valencia Pueblo, just 4 miles south on NM-47 (Franklin 1997). The variation noted here may be related to both time and the potting habits of a small, localized group of producers. However, fabric differences in texture and clay source do seem to be real for the entire production span of the type. This is illustrated by the coarse paste varieties noted here, at Abó as actual items, in the personal observations of Mera and Stallings on Isleta area material (Toulouse 1949:19), and by the consistent references to "orange" or reddish pastes in contrast to Franklin's (1997) well documented fine-paste, lower iron (clay) fabrics which span a 200 year period at Valencia Pueblo. Untested assumptions about sources, producers and the extent and character of Hispanic-Isletan trade may be at the root of much of this apparent variability.

There seems to be some archaeological-historiographic bias at work for Isleta from scholars who use the ceramic window to view the past. The pueblo was essentially abandoned at the time of the Pueblo Revolt; many people went south to El Paso with the Spanish, many decamped to the Hopi area, and others probably fled into the population cracks of the Rio Grande. Otermín's post-Revolt sortie stripped, eviscerated, and torched the reoccupied pueblo in 1681. Isletans began returning as early as 1715 or 1718 (Schroeder 1979:244). It appears Isleta was not fully reoccupied until the mid-1700s, when other Tiwas returned from Hopi (1742, Schroeder 1979:244, Ellis 1979:353-354). Snow (1973) has convincingly argued that Pueblos of the historic era, and earlier, were engaged in a form of market economy that was stimulated, but not

fundamentally changed, by Spanish demands for commodities, particularly pottery. Ceramic market share was, in part, established and maintained by village or polity craft specialization (Snow 1973; Walt 1990). When Isleta was abandoned, its potential market share was probably lost to other pueblos. However, due to the continuing local need for low-cost, functional pottery, there apparently emerged a "quiet" tradition of potting at Isleta which contrasts with the attention-grabbing matte-polychromes and high-polish black and red wares of other pueblos. Given the occupational hiatus and instability of Isleta's reoccupation, pottery production as a distinct Isleta craft, may not have become reestablished until 1730-1740. At the same time, the production of Casitas Red-on-tan, an essentially identical Hispanic ware, was initiated (Carrillo 1997:205). This synchronous development cannot be a coincidence. The apparently late adoption of a low-profile pottery style in the Isleta area seems to have led to an academic glossing over of both the abundance and the importance of the local red-on-tan ware to the local economy and society.

The development of identical red-on-tan pottery by differing, but extremely close, cultural/ethnic entities at the southern edge of the mainstream pueblo pottery manufacturing and market area strongly suggests a mutual need for pots which would perform well and mediate the higher costs of acquisition through trade. Furthermore, the similarity of the wares testifies to the mutualism of pottery learning and producing systems within the Isletan and Hispanic communities. Stylistic blending is a common feature of frontier or resettlement zones where disparate, dislocated or resettled peoples practice a high degree of cooperation which may be manifest through shared symbols, like basic pottery finishing styles, of group identification (McGuire 1982; Post 1994:84). The early 1700s social situation around Isleta was one of a resettled frontier with the newly returned Tiwa population intermixed with numerous Hispanic families moving from Bernalillo to thwart a perceived Southern Tiwa threat to the reestablishment of the Spanish colony (Ellis 1979:353).

Illustrations of stylistic trends and decorative elements indicate Casitas R/t from Hispanic villages of the Rio Abajo tends to be even more like Isleta R/t than its northern counterpart. A simple rim oriented red slip-band is favored over the independently placed designs of crude whorls, lines, splatters, and daubs characteristic of the northern villages (illustrations in Dick 1968; Carrillo 1997). Separating varieties of Casitas and Isleta R/t and establishing viable, distinguishable differences, other than contextual assertion, between the two types, will require more rigorous pursuits of provenience controlled type-variety descriptions and fabric characterization studies than have heretofore been attempted. But for this discussion, what is important is the communality between groups creating a similar product which crosscuts any differentiation by neo-ethnocentrist typological constructs. Because of its similarity, it may have been widely, and seamlessly, traded among the Rio Abajo communities, with differences in form being the strongest indicator of ethnic affiliation. European forms such as soup plates, candle sticks, *bacins*, and cups can be expected to cluster in Hispanic towns and Christianized portions of puebloan communities.

Perhaps the most poignant illustration of the place of Isleta R/t in Isletan society is a series of native drawings produced in the late 1930s and early 1940s (Goldfrank 1962) and in the decline of the type some 200 years after its beginnings. Batkin (1987:191) knew of 10 potters making Isleta R/t in 1920 and asserts production had ceased by 1950. The drawings cover uses near the

end of the red-on-tan production span. Goldfrank's presentation of 140 illustrations contains at least 30 identifiable depictions of pottery use, 11 of which show Isleta R/t being used in a variety of contexts. Though most of the depictions are in black and white (the originals are in color), Isleta R/t is consistently represented by a plain vessel with a darker band below the rim. The single color plate (#46) confirms and reinforces the pottery represented in the duotone images. The illustrations exclusively depict the bowl form, both small bowls and the large hemispherical dough bowls, for payment of services and use in personal, perhaps second order, ceremonies involving death, ritual food-redistribution events, cleansing, and Catholic-oriented rites. The yeoman-like role of Isleta R/t extends to the single depiction of its use in a higher order ceremonial context. In Drawing #128, an Isleta R/t bowl sits in a moiety house *nicho* as a permanent, stationary, passive watering bowl for thirsty ritual paraphernalia. The drawings also show that Isleta R/t was used to cross contextual boundaries of private ceremony, public native ceremony, and Catholic-inspired rituals which often ended in the loss of vessels as gifts (to "Mexicans") or ritual breakage. In contrast, nonlocal matte-paint pottery jars (primarily Acoma-Laguna) and ceremonial bowls more commonly appear in public ceremonies of traditional Isletan affiliation (*katchina* dances, moiety rituals, medicine society rituals, public races, and the publicly visible transport of fluids, foods, fetishes, and prayer sticks). Because the illustrations were offered expressly to provide depictions of traditional and ritual events to augment Else Clews Parson's 1932 picture-bare *Isleta, New Mexico* ethnography (as well as cash for a dispossessed Isletan [Parsons 1962:1]), the drawings are biased against functional portrayals where everyday use as dough bowls, serving bowls, laundry hampers and wash pots, water jars and parching vessels might have been depicted. The illustrations do establish that Isleta R/t was firmly embedded in the social matrix and that its multiple roles had evolved to include regular, ritual destruction as well as routine attrition through use and loss. Continued production, at least through the 1930s, was necessary to replace the vessel inventory, if for no other reason than to maintain its traditional ceremonial functions.

In conclusion, what questions of Franklin's have been furthered in the above discussion and how does all this relate to Old Chical, occupied and abandoned after 1900? First, historical events and the circumstances of ceramic product development suggest 1700 is too early a date for the start of Isleta R/t. The relatively strong statistical associations with Glaze F (A.D. 1650-1700) at Valencia Pueblo may be a function of occupational and post-occupational processes resulting in deposit mixing. Likewise, ethnohistorical documentation and the evidence from Old Chical itself indicate the type was produced up to at least World War II and probably ended in 1950. Isleta R/t would appear to date from A.D. 1730/40 to 1950. Next, the type was locally abundant and was an important portion of the pottery assemblage. Its uses were socially diversified, ranging from household functions to varying orders of ritual behaviors. The vessel form inventory for Isletan households seems to have been relatively constant and relatively simple, consisting of bowls and jars of various sizes. Lastly, untested assumptions about pottery production and ethnic roles in the Rio Abajo area seem to have side-tracked controlled characterization and stylistic studies. Such studies could reveal not only real differences (i.e. variation) in the Isleta/Casitas R/t mélange but actually enable studies of exchange, function and social roles from a ceramic perspective. Until these issues are addressed, argument will continue at the weakest level of inference – contextual assertion.

At Old Chical, Isleta R/t may have functioned as a native product with links to the old ways of doing things in a rapidly commercializing world. Its presence marks the occupation as Isletan, the Hispanic equivalent having been discontinued. Its occurrence in a mixed-ware assemblage indicates that native potteries still functioned within the level of the domestic household, rather than simply as nostalgic shelf-relics. Its presence represents the intimate exchange of skills between potting groups, a level of exchanging news and views on Isletan life and centuries' old rhythms of treating pottery required for domestic chores and Isletan breadstuffs. The use of metal containers, store-bought products, and motorized transport and tractors were rapidly being turned to and signaled a change in the life-ways represented by native pottery; a way of life so recent, yet not even dimly echoed in the click of crock-pots in new Chical.

This paper was extracted from the referenced 1996 manuscript by the author. PJM

REFERENCES

Barnes, Frank C.
1965 *Cartridges of the World*. Follet Publishing, Chicago.

Batkin, Jonathan
1987 *Pottery of the Pueblos of New Mexico 1700-1940*. The Taylor Museum of the Colorado Springs Fine Arts, Colorado Springs.

Carrillo, Charles M.
1997 *Hispanic New Mexican Pottery: Evidence of Craft Specialization 1790-1890*. LPD Press, Albuquerque.

Dart, Alan
1980 Glass Artifacts. In *A Cultural Resource Management Plan for Timber Sale and Forest Development on the Mescalero Apache Indian Reservation* Vol. 1., edited by Bruce G. Harrill, pp. 143-160. Bureau of Indian Affairs, Forest Archeology Program, Albuquerque Area Office, Albuquerque.

Dick, Herbert W.
1968 Six Historic Pottery Types from Spanish Sites in New Mexico. In *Collected Papers in Honor of Lyndon Lane Hargrave*, edited by Albert H. Schroeder, pp. 77-94. Papers of the Archeological Society of New Mexico Vol. V, Museum of New Mexico Press, Santa Fe.

Ellis, Florence H.
1979 Isleta Pueblo. In, *Handbook of North American Indians: Southwest* Vol. 9, edited by Alfonso Ortiz, pp. 351-365, Smithsonian Institution, Washington D.C.

Frank, Larry, and Francis H. Harlow
1974 *Historic Pottery of the Pueblo Indians 1600-1880*. New York Graphic Society, Boston.

Franklin, Hayward H.
1997 Valencia Pueblo Ceramics. In *Excavations at Valencia Pueblo (LA953) and a nearby Hispanic Settlement (LA67321), Valencia County, New Mexico*, edited by Kenneth L. Brown and Bradley J. Vierra, pp. 125-248. Office of Contract Archeology, University of New Mexico.

Goldfrank, Ester (editor)
1962 Isleta Paintings. *Bureau of American Ethnology Bulletin* 81. Smithsonian Institution, Washington D.C.

Harlow, Francis H.
1970 *Historic Pueblo Indian Pottery*. Museum of New Mexico Press, Santa Fe.
1973 *Matte-Paint Pottery of the Tewa, Keres, and Zuni Pueblos.* Museum of New Mexico Press, Santa Fe.

McGuire, Randall H.
1982 The Study of Ethnicity in Historical Archaeology. *Journal of Anthropological Archaeology* 1:159-178

McKenna, Peter J.
1996 Cultural Resource Survey: Proposed Improvements along the Chical Road, Isleta Pueblo Lands, New Mexico. Report IS96-079 on file Bureau of Indian Affairs Southwest Region, Albuquerque.

Parsons, Elsie Clews
1932 Isleta, New Mexico. *47th Annual Report of the Bureau of American Ethnology for the Years 1929-1930*, pp. 193-466. Washington D.C.
1962 Introduction in Isleta Paintings. Ester Goldfrank editor, *Bureau of American Ethnology Bulletin* 81. Smithsonian Institution, Washington D.C.

Post, Steven S.
1994 Ceramics. In Archaeological Excavations of LA 15260, the Coors Road Site, Bernalillo County, New Mexico, by Richard B. Sullivan and Nancy J. Akins, pp. 65-84. Museum of New Mexico, Office of Contract Archaeology. Archaeological Notes 147, Museum of New Mexico.

Riley, John L.
1958 *A history of the American soft drink industry, 1807-1957.* American Bottlers of Carbonated Beverages, Washington.

Schroeder, Albert H.
1979 Pueblos Abandoned in Historic Times. In, *Handbook of North American Indians: Southwest* Vol. 9, edited by Alfonso Ortiz, pp. 236-254. Smithsonian Institution, Washington D.C.

Skibo, James M.
1992 *Pottery Function: A Use-Alteration Perspective*. Plenum Press, New York.

Snow, David H.
1973 Some Economic Considerations of Historic Rio Grande Pueblo Pottery. In *The Changing Ways of Southwestern Indians: A Historic Perspective*, edited by Albert H. Schroeder, pp. 55-72. Rio Grande Press, Albuquerque.
1982 The Rio Grande Glaze, Matte Paint, and Plainware Tradition. In, *Southwestern Ceramics: A Comparative Review*, edited by Albert H. Schroeder, pp. 235-278. The Arizona Archaeologist 15. Phoenix.
1989 A Very Brief Overview of Rio Grande Glaze and Matte-Paint Ceramics. Ms on file for New Mexico Archaeological Council, Rio Grande Ceramics Workshop, Santa Fe.

Toulouse, Joseph H. Jr.
1949 *The Mission of San Gregorio de Abó*. Monographs of the School of American Research 13, School of American Research, Santa Fe.

Walt, Henry J.
1990 Style as Communication: Early Historic Pueblo Pottery of New Mexico. Unpublished Ph.D. Dissertation, Department of Art History, University of New Mexico. Albuquerque.

Warren, Helene
1979 Historic Pottery of the Cochiti Reservoir Area. In, *Archeological Investigations in Cochiti Reservoir, New Mexico Vol. 4: Adaptive Change in the Northern Rio Grande Valley*, edited by Jan V. Biella and Richard Chapman, pp. 235-246. Office of Contract Archeology, University of New Mexico. Albuquerque.

Human Resource Expenditure for Mesa Verde Black-on-White Pottery Production

Maxwell Lee Sokol

This study compares the labor requirements of two phases of Mesa Verde Black-on-White pottery production: greenware (unfired pottery) manufacture and trench kiln firing. The experiment contributes to the data on labor costs for trench kiln firing, establishing the value of 11.26 labor hours per 15 vessels, which corresponds to 1 meter^2 of kiln space. The purpose of this study was to determine the human resource expenditure for Anasazi greenware manufacture during the late Pueblo III era (A.D. 1200 to 1300). The results reveal that the production of 15 pieces of greenware required an average of 59.46 hours. These findings corroborate the hypothesis of the experiment: greenware manufacture entailed significantly greater labor than did the trench kiln firing. In utilizing the findings of previous research, in which the firing phase is defined as more crucial than the greenware manufacturing phase, the study demonstrates that there is an inverse relationship between the labor required to perform each phase of production and the relative importance of that phase to the Anasazi. The human resource expenditure needed for each stage of Mesa Verde Black-on-White pottery production does not dictate the importance of that phase to the Anasazi.

According to the Pecos Classification system, the Pueblo III period ranged from A.D. 1100 to 1300. The Anasazi occupied what is now known as the Four Corners region of the American Southwest, located at the convergence of what are now Arizona, Utah, Colorado, and New Mexico. Anasazi history has been traced back over two millennia, and the culture went through numerous periods of development over the years. In the early centuries A.D., many Anasazi abandoned their traditional, nomadic hunter-gatherer lifestyles in favor of a sedentary agricultural existence. Anasazi pottery production continues to provide new insight on this prehistoric civilization. It is hypothesized that manufacture of Mesa Verde Black-on-white greenware (unfired pottery) during the late Pueblo III era (A.D. 1200 to 1300) required substantially greater labor than did the trench kiln firing. This study intends to demonstrate that although the kiln firings were considered more valuable, efficient greenware manufacture required a greater amount of labor. These findings can be used to corroborate the hypothesis that the human resource expenditure, necessitated by each phase of Mesa Verde Black-on-White pottery production, did not dictate the significance of that phase to the Anasazi.

The importance of the archaeological study of pottery manufacture is clearly identified in *Ceramic Production in the American Southwest* (Crown and Mills 1995). Ceramic production is just beginning to receive its deserved attention as a scientific tool; knowledge of the production process is vital, for it must be understood when examining the distribution and consumption patterns of ancient civilizations. Crown and Mills identify production, distribution, and consumption as the three primary stages of economic transaction. They argue that ceramics are excellent agents for the study of archaeology because the condition of pottery is maintained over time, despite minor alterations. An additional benefit of utilizing ceramics to acquire archaeological data is that the use of pottery by most food-producing civilizations provides archaeologists with an understanding of prehistoric technology.

Steven L. Fuller's 1984 study, "Late Anasazi Pottery Kilns in the Yellowjacket District: Southwest Colorado," provided the first comprehensive study of Pueblo III trench kilns. Fuller develops an ethnographic comparison of the firing technology of such groups as the Hopi, Eastern Pueblos, Navajo, Southern Diegueno, Fulani, and Gwari, which provides a rudimentary look at Anasazi pottery firing. Clint Swink, in his 1997 report entitled "Firing Anasazi Trench Kilns," advanced Fuller's research on the firing process by describing the in-depth sequence for a perfected firing model. Swink's research defined the phases of Anasazi trench kiln firing: the primary fire, setting, secondary fire, smothering phase, and finally the pottery recovery. He also discusses the first experimental firing of an actual Anasazi trench kiln in 1997, which represented a turning point in the scientific research of Anasazi pottery.

In their 1997 collaborative research paper, "Technology and Organization of Anasazi Trench Kilns," Eric Blinman and Clint Swink discuss how, over time, the trench kilns moved farther away from residential sites because domestic consumption of fuel resulted in fuel scarcity. In the Pueblo III era, the kilns were located in areas of more abundant fuel because it was practical to move the kilns and greenware to the fuel source. Blinman and Swink also present the possibility that larger kilns, having a capacity of about 120 vessels, implies communal efforts of numerous Anasazi potters. They suggest that the existence of large kilns indicates complex social organization for the firing procedure.

Wesley Bernardini's 2000 study, "Kiln Firing Groups: Inter-Household Economic Collaboration and Social Organization in the Northern American Southwest," offers a mathematical process to estimate the size of kiln firing groups, measured in number of households. Bernardini also relates the importance of archaeological studies focused on areas away from residential regions because the firing stage of production was not conducted near Anasazi roomblocks or adjacent kivas.

In his 2000 study, "Rocks, Pots and Fire: A Report on the Study of Kiln Furniture, Ceramics, and Firing of an Anasazi Trench Kiln, 5MT 7525, Feature 11 (Camp Kiln), Woods Mesa, Montezuma County, Colorado," Swink provides a thorough analysis of the excavation and subsequent firing of Camp Kiln. A principal goal of the experimental firing was to establish a labor cost for the firing process. In his conclusions, Swink pointed out the incomplete nature of his findings, identifying certain aspects of the firing preparation that were not measured. The purpose of the present study is to advance the data regarding labor costs for firing, and to study the human resource requirements for greenware manufacture.

The first phase of this experiment focused on adding to the data about the labor requirements of a Mesa Verde Black-on-White trench kiln firing. In the post-firing procedure, the replicated trench kiln was backfilled with soil to ground level to preserve the structure for the following year (Swink 2001). It is speculated that trench kilns were utilized only once a year (Blinman and Swink 1997), so the potters had to be diligent in their efforts to ensure that the quality of the kiln was preserved until the next firing. The existence of "fairly clean redeposited sterile soil" (Brisbin, Ives, et al. 1999:295) in the top layer of the kiln fill lends credence to the theory that the backfilling of the soil also represented a means to conserve the unused smothering soil for the next firing. The following year, this soil and the post-firing residue had to be removed.

In order to accurately measure kiln cleanout labor, I used only replicas of digging tools that were available to the Anasazi in the late Pueblo III era, including pottery sherds and sticks (Swink 2000).

Kiln cleaning tools (photo credit: Max Sokol)

A juniper digging stick (46.4 cm long x 4.0 cm wide x 3.6 cm high) and a piñon digging stick (86.1 cm long x 5.8 cm wide x 5.0 cm high) were used to loosen the soil at ground level prior to digging. The two pottery sherds used to remove the soil from the kiln measured 25.5 cm long x 17.6 cm wide x 7.2 cm high and 26.9 cm long x 18.6 cm wide x 5.0 cm high. Two burden cloths were used to carry the soil from the kiln to the midden (trash pile); one measured 64.1 cm x 63.8 cm and the other 73.9 cm x 70.5 cm. I timed the kiln cleanout process, which I performed with my mentor, Clint Swink. This quantity, representing the work of two people, was then doubled to arrive at the number of man-hours required for one laborer to complete the cleanout task.

After the kiln was completely dug out to its base/floor, I measured the length and width of the replica kiln at its surface, setting level, and floor, and the height/depth of the kiln from ground level.

The kiln after cleaning (photo credit: Max Sokol)

Since this experiment centered on the concept of kiln capacity, only the values for the kiln length and width at the setting level were used in mathematical equations. The setting is comprised of tabular sandstone slabs, firing sherds, and pottery. The slabs provide a base above the primary fuel upon which the greenware is placed. The product of the length and width at the kiln setting represents the area of the setting in square meters, which is the kiln capacity. I then used a mathematical proportion to determine the man-hours needed to dig out one square meter of kiln space.

The second phase of this study was the measurement of the labor requirements for manufacturing greenware. Two potters participated in each aspect of the experiment: my mentor, representing the expert, and I, representing the novice. In order to provide viable conclusions, we performed this experiment by emulating the ancient Anasazi method and by using only the tools and resources available during the late Pueblo III period.

The first component of the vessel preparation was to grind carbonaceous clay for one hour, using only a *mano* and a *metate* with a trough-like indentation. The mass of the crushed clay was then measured in kilograms using a triple beam balance and a time/kg numerical value was calculated for the novice and the expert potter. Similarly, temper was ground for one hour using the *mano* and *metate* and the mass of the ground temper was then appraised. Temper, consisting of 100% crushed pottery sherds, is significant in that it creates a homogeneous drying rate for the claybody by establishing a conduit for moisture removal. A time/kg assessment of the labor required for preparing the temper was computed for each potter.

The dry claybody was then produced by the dry, ground carbonaceous clay with temper. The claybody was comprised of 85% dry clay and 15% temper by volume, with masses of 1.24 kg and 0.17 kg, respectively. This is the ideal for drying rates, plasticity and optimum firing success (Swink 2001). The amount of time required for grinding that quantity of clay and temper was calculated for each potter.

Grinding the dry clay (photo credit: Max Sokol)

The dry claybody was then mixed with water, creating the wet claybody prepared for greenware production. This production of wet claybody was a comparatively easy procedure, so it was a constant in this experiment and the time value for each potter was identical. The mass of the wet claybody was then determined, having a value of 1.69 kg. For each potter, the sum of the time required for grinding 1.24 kg of clay and 0.17 kg of temper and for making the wet claybody represented the particular potter's labor requirements for preparing 1.69 kg of claybody.

I then wedged the wet claybody for 120 strokes, a procedure which further prepares the claybody for utilization in greenware manufacture. One hundred and twenty strokes have been cited as the standard (Swink 2001). This value was a constant in the experiment, for it would take any potter, regardless of skill level, the same amount of time to carry out this simple task.

The final element of the vessel preparation was the production of a batch of slip. The slip utilized in this experiment was composed of dry, montmorillonite clay and water. Slip is crucial for pottery production, for it produces a surface for painting. The production of slip is a constant in this experiment because it is a relatively simple procedure and the skill level of the potters, the mass of the manufactured vessel, and the resulting amount of slip used per vessel would not change the time required for slip production. The amount of time needed to manufacture the batch of slip was divided by the number of vessels constructed in this experiment (ten) to arrive at a time quantity for the production of slip per vessel (the same batch of slip was used in the production of all ten vessels).

The first phase of the actual greenware manufacture was the construction of the vessel, using such authentic tools as a deer bone awl for cutting and a gourd scraper for smoothing. The vessel's mass was measured just prior to slipping to ensure the moisture content was uniform for each of the two potter's vessels. Using the recorded masses, the human resource expenditure for vessel preparation was calculated.

Each potter then slipped their vessel, a procedure that involves applying two thin coats of slip using the leaves of a broad-leafed yucca plant (*Yucca baccata*). Slipping was followed by water polishing, which entails finger-smoothing the brush strokes created from slipping the vessel. Each potter then used a burnishing stone to polish their vessel for smoothness and luster. Finally, the vessel was painted with a brush made from the narrow-leafed yucca plant (*Yucca harrimaniea*), using organic paint derived from Rocky Mountain Beeplant (*Cleome serrulata*). The complexity of the painted design on each vessel was a variable in this experiment, as I (the novice) painted relatively simple designs, whereas my mentor (the expert) painted comparatively complex designs.

The sum of the numerical time values of all of these processes (claybody preparation, slip manufacture, wedging, building, slipping, water polishing, burnishing, and painting) represents the labor for the manufacture of a single piece of greenware. The expert potter produced and painted two mugs, one bowl, one canteen, and one dipper.

Expert Vessels (on right) and Novice Vessels (on left) (photo credit: Max Sokol)

The novice's production was identical, except that one of the novice's mugs was unpainted. Since a full kiln has yet to be discovered, it is unknown what combination of vessel types was put into each firing. In this study, I established a hypothetical sample of vessels, with each potter manufacturing two mugs, one bowl, one canteen, and one dipper.

The approximate value of 15 vessels/meter^2 of kiln space was utilized to compute the labor requirements needed to manufacture 15 pieces of greenware (Swink 2001). The total labor requirement for the novice's 5 vessels was averaged with the expert's time to produce his 5 vessels. This average equals the human resource expenditure for an average potter's production of 5 pieces of greenware. The total labor requirements for each potter (the novice, average, and expert potter) to manufacture 15 vessels, representing the capacity of one square meter of kiln space, was calculated by tripling the recorded time involved in that particular potter's production of 5 vessels.

The pre-firing cleanout of an Anasazi trench kiln required 42 minutes of labor for two people. This value doubled, 84 minutes (1.40 hours), represents the labor required for one person to complete the task. The capacity of this particular kiln was determined by calculating the area of the kiln at the setting level (Table 1). The product of the setting length (1.16 meters) and setting width (1.04 meters) yields a value of 1.21 meters^2. If the pre-firing cleanout entailed 1.40 hours for 1.21 meters^2 of kiln space, 1 meter^2 of kiln space would require 1.16 hours of labor ($\frac{1.4 hours}{1.21 meters2} = \frac{X hours}{1 meter2}$). This value was added to the other data for labor activities involved in a trench kiln firing to arrive at 11.26 hours for the entire firing (Table 2).

The objective in this study was to quantify the labor required for manufacturing 15 pieces of greenware. Prior to evaluating the labor involved in the physical manufacturing, the preparatory measures were assessed for each of the two potters (Tables 3 & 4). In one hour, the novice ground 3.02 kg of clay, so it took 0.41 hours to grind the 1.24 kg of clay used to produce the claybody ($\frac{1 hour}{3.02 kg} = \frac{X hours}{1.24 kg}$). The novice then ground 0.42 kg of temper in one hour, so 0.40 hours would be required to grind the 0.17 kg which represent 15% of the claybody ($\frac{1 hour}{0.42 kg} = \frac{X hours}{0.17 kg}$). The time to make claybody, a constant in this experiment regardless of the skill level of the potter and the mass of materials, was measured at 0.03 hours. The sum of the time required for clay grinding (0.41 hours), temper grinding (0.40 hours) and claybody manufacture (0.03 hours) was 0.84 hours to prepare the 1.69 kg of claybody.

The same process was carried out by the expert potter (Tables 3 and 4). He ground 9.44 kg of clay in one hour, so it took him 0.13 hours to grind the 1.24 kg of clay which represented 85% of the claybody ($\frac{1 hour}{9.44 kg} = \frac{X hours}{1.24 kg}$). He then ground 1.10 kg of temper in one hour, so 0.15 hours would be required to grind the 0.17 kg that were actually utilized in producing the claybody ($\frac{1 hour}{1.10 kg} = \frac{X hours}{0.17 kg}$). The sum of the time required for clay grinding (0.13 hours), temper grinding (0.15 hours), and claybody production (0.03 hours) was 0.31 hours to prepare the 1.69 kg of claybody.

For each vessel manufactured, I used the mass prior to slipping to ascertain the amount of time required for the claybody preparation (clay grinding, temper grinding, and claybody production) of the individual vessel. For vessels 1-5, representing the novice's vessels, the claybody preparation time of 0.84 hours/1.69 kg of claybody was used to determine the labor requirements for preparing the particular mass of claybody of each vessel. The proportion $\frac{0.84 hours}{1.69 kg} = \frac{X hours}{mass before slipping}$ was used to calculate the time required for the claybody preparation of vessels 1-5 (Table 5). For vessels 6-10, the expert's vessels, the claybody preparation time of 0.31 hours/1.69 kg of claybody was utilized to assess the human resource expenditure for

preparing the mass of claybody for each individual vessel. The proportion $\frac{0.31 hours}{1.69 kg} = \frac{X hours}{mass before slipping}$ was used to calculate the time required for the claybody preparation of vessels 6-10 (Table 6). Tables 7 and 8 show the time needed by each potter to accomplish the actual fabrication of the vessels (the wedging, building, slipping, water polishing, burnishing, and painting).

For each vessel, the recorded times for claybody preparation, slip manufacture, wedging, building, slipping, water polishing, burnishing, and painting, were added together to arrive at the total labor required for the manufacture of that vessel. This result was calculated for each of the ten vessels (Tables 9 and 10). The one exception was Vessel 2, which remained unpainted. Of the 294 Black-on-White vessels in the Mug House Assemblage of Anasazi pottery, 18 vessels (6.12%) and 156 sherds were undecorated whiteware (Rohn 1970). Thus, one of the 15 vessels (6.67%) produced in this experiment was left unpainted.

Tables 9 and 10 show the time involved in the production of each vessel, which represents the labor investment per pot for the novice and expert potter. The total labor cost required for producing vessels 11-15, corresponding to 5 pieces of greenware made by an "average potter," was calculated by averaging the total time needed to build vessels 1-5 with that for vessels 6-10. The data in this experiment includes the human resource expenditure of a novice potter, 23.28 hours (4.48 hours + 2.63 hours + 5.27 hours + 8.12 hours + 2.78 hours), that for an expert potter, 16.36 hours (3.13 hours + 2.84 hours + 4.41 hours + 4.54 hours + 1.44 hours), and that for an average potter, 19.82 hours ($\frac{23.28 hours + 16.36 hours}{2}$).

The final component of this experiment was the determination of the labor requirements for manufacturing 15 pieces of greenware, which would occupy one square meter of trench kiln space, by multiplying the value of producing 5 vessels by three. The total labor involved in the production of 15 vessels by a novice was 69.84 hours (23.28 hours x 3), by an average potter was 59.46 hours (19.82 hours x 3), and by an expert was 49.08 hours (16.36 x 3) (Table 11).

In order to determine the validity of this study's hypothesis, it is important to indicate that, as Wesley Bernardini contends, "Firing, the climax of the potter's labor…is arguably the most important stage of pottery production given the potential for vessel loss" (Bernardini 2000 369). It was not uncommon for the Anasazi to break their pottery. Each year, the household had to compensate for these losses by manufacturing new vessels. Thus, the number of vessels broken yearly nearly equaled the annual number of vessels produced. The annual household vessel breakage/replacement rate was approximately 17 domestic vessels during the Pueblo III period (Judge 1984). A failed firing prevented the Anasazi from obtaining their pottery. Firing failure was catastrophic because the Anasazi depended heavily on the success of the firing to meet their annual pottery needs.

The short time frame during which the kiln firings could successfully take place contributes to the reason why the firing was considered more important than greenware manufacture. Swink (2001) speculates that, whereas greenware manufacture could take place throughout the year, the optimal time for firing was the summer solstice because of ideal weather conditions. The

exposure of greenware to rain and freezing during storage and transport could be devastating. Consequently, the Anasazi relied on the success of a single, annual firing to obtain their finished pottery.

In the 1999 Mesa Verde Waterline Replacement Project, the closest habitation site was located 1.2 km from a contemporaneous kiln site (Brisbin, Ives, et al. 1999). The data refer to the Pueblo II period (A.D. 900 to 1100). Over time, the distance between the habitations and kilns increased as a result of fuel depletion, and by late Pueblo III, kilns were as much as 25 kilometers from residences. A major cost of a failed firing was that the scarce fuel supply had been squandered. Furthermore, the Anasazi had to travel great distances, often over harsh terrain, to bring their greenware to the firing. It was vital that this pre-firing labor, including transportation of greenware, not be wasted by a failed firing.

In conclusion, this study reveals that making 15 pieces of greenware requires, on average, more than 5 times the labor cost of firing the same vessels, with 59.46 hours of greenware manufacture compared to 11.26 hours of kiln firing (See Tables 2 and 11). Relatively large man-hour requirements for the greenware manufacturing stage of production, when compared with the labor cost of kiln firing, contrasts with the kiln firing's greater importance to the Anasazi, which supports the initial hypothesis of this study. Although greenware manufacture was substantially more labor-demanding than the firing, as it required a significantly greater cost in human resources, the firing was considered more vital and valuable. The firing literally and ceremoniously concluded the process of pottery production for the Anasazi, representing the culmination of vast amounts of labor in greenware manufacture. This evidence supports the notion that the kiln firing was the most important phase of pottery production, and this theory, when examined in conjunction with the data collected in this experiment, confirms the original hypothesis of this study. There is an inverse relationship between the labor needed to complete each phase of pottery production and the relative importance of that phase to the Anasazi.

By investigating the labor involved in pottery production, this study augments the archaeological record on the Anasazi. The research adds to the data on the labor requirements for firing an Anasazi trench kiln by calculating the labor cost of performing the pre-firing cleanout of the kiln. To complete the figures for trench kiln firing labor, future research should focus on the human resource expenditure required to build the kiln. The study has also examined the labor requisites of Mesa Verde Black-on-White pottery production. The data gathered in this experiment supports the hypothesis that greenware manufacture required considerably more labor hours than did the more important process of trench kiln firing. Moreover, this study suggests that the human resource expenditure of an Anasazi pottery-making procedure does not indicate the significance of that process to the Anasazi. The relatively small amount of time involved in trench kiln firing was indeed more crucial to the Anasazi than the protracted procedure of greenware manufacture. This study provides scientific data on the labor component of Anasazi greenware manufacture. Future studies should reveal that even more time was required for pre-firing activities, including the gathering and fabrication of pottery-making materials, actual greenware manufacture, and transportation of greenware. I believe that future research will support the theory, demonstrated in this study, that although the firing stage of production was of critical importance to the Anasazi, the labor involved in the greenware manufacturing stage of production required a significantly greater investment of labor.

Tables

Table 1. Experimental Kiln dimensions.

Kiln measurements	Length	Width	Height/Depth
Measured at Surface	1.29 meters	1.17 meters	N/A
Measured at Setting	1.16 meters	1.04 meters	N/A
Measured at Floor	1.10 meters	0.95 meters	N/A
Measured from Floor to Surface	N/A	N/A	0.33 meters

Table 2. Labor Requirements: Firing 15 vessels in a replicated Late Pueblo III Trench Kiln (adapted from Swink 2001).

Activity	Man Hours/Meter of Kiln Space
Pre-Firing Cleanout	1.16 hours
Fuel Procurement and Processing	2.35 hours
Replacement Shelving Procurement	0.25 hours
Actual Firing	3.00 hours
Smothering	3.00 hours
Pottery Recovery	1.00 hours
Backfill Kiln	0.50 hours
Total	**11.26 hours**

Table 3. Preparatory Grinding of Materials for Claybody Manufacture

Potters	Clay Ground/hour	Temper Ground/hour
Potter 1	3.02 kg	0.42 kg
Potter 2	9.44 kg	1.10 kg

Table 4. Preparation Prior to Greenware Manufacture 1.

Potters	Grind 1.24 kg Clay	Grind 0.17 kg Temper	Produce 1.69 kg Wet Claybody	Total Preparation
Potter 1	0.41 hours	0.40 hours	0.03 hours	0.84 hours
Potter 2	0.13 hours	0.15 hours	0.03 hours	0.31 hours

Table 5. Novice Potter: Preparation Prior to Greenware Manufacture 2.

Vessel	Mass Prior to Slipping	Claybody Preparation	Slip Manufacture
Vessel 1	0.52 kg	0.26 hours	0.01 hours
Vessel 2	0.47 kg	0.23 hours	0.01 hours
Vessel 3	0.72 kg	0.36 hours	0.01 hours
Vessel 4	1.23 kg	0.61 hours	0.01 hours
Vessel 5	0.31 kg	0.15 hours	0.01 hours

Table 6. Expert Potter: Preparation Prior to Greenware Manufacture 2.

Vessel	Mass Prior to Slipping	Claybody Preparation	Slip Manufacture
Vessel 6	0.82 kg	0.15 hours	0.01 hours
Vessel 7	0.21 kg	0.04 hours	0.01 hours
Vessel 8	0.92 kg	0.17 hours	0.01 hours
Vessel 9	1.13 kg	0.21 hours	0.01 hours
Vessel 10	0.23 kg	0.04 hours	0.01 hours

Table 7. Novice Potter: Greenware Manufacture Time Expenditures.

Vessel	Wedging	Building	Slipping	Water Polishing	Burnishing	Painting
Vessel 1	0.04 hours	1.86 hours	0.12 hours	0.14 hours	0.77 hours	1.28 hours
Vessel 2	0.04 hours	1.36 hours	0.12 hours	0.13 hours	0.74 hours	0 hours
Vessel 3	0.04 hours	1.78 hours	0.17 hours	0.26 hours	0.90 hours	1.75 hours
Vessel 4	0.04 hours	3.30 hours	0.27 hours	0.31 hours	1.00 hours	2.58 hours
Vessel 5	0.04 hours	0.61 hours	0.10 hours	0.15 hours	0.62 hours	1.10 hours

Table 8. Expert Potter: Greenware Manufacture Time Expenditures.

	Wedging	Building	Slipping	Water Polishing	Burnishing	Painting
Vessel 6	0.04 hours	0.64 hours	0.13 hours	0.20 hours	0.59 hours	1.37 hours
Vessel 7	0.04 hours	1.66 hours	0.11 hours	0.05 hours	0.40 hours	0.53 hours
Vessel 8	0.04 hours	0.97 hours	0.20 hours	0.26 hours	0.77 hours	1.99 hours
Vessel 9	0.04 hours	1.59 hours	0.33 hours	0.18 hours	0.64 hours	1.54 hours
Vessel 10	0.04 hours	0.48 hours	0.13 hours	0.14 hours	0.43 hours	0.17 hours

Table 9. Novice Potter: Total Man-Hours per Vessel.

	Total Man-hours
Vessel 1	4.48 hours
Vessel 2	2.63 hours
Vessel 3	5.27 hours
Vessel 4	8.12 hours
Vessel 5	2.78 hours
Total	**23.28 hours**

Table 10. Expert Potter: Total Man-Hours per Vessel.

	Total Man-hours
Vessel 6	3.13 hours
Vessel 7	2.84 hours
Vessel 8	4.41 hours
Vessel 9	4.54 hours
Vessel 10	1.44 hours
Total	**16.36 hours**

Table 11. Labor Requirements by Skill Level.

Potter Skill Level	Manufacture 5 Vessels	Manufacture 15 Vessels
Novice	23.28 hours	69.84 hours
Average	19.82 hours	59.46 hours
Expert	16.36 hours	49.08 hours

References Cited

Bernardini, Wesley
2000 Kiln Firing Groups: Inter-Household Economic Collaboration and Social Organization in the Northern American Southwest. *American Antiquity* 65(2):365-377.

Blinman, Eric and Clint Swink
1997 Technology and Organization of Anasazi Trench Kilns. *Prehistory and History of Ceramic Kilns*, pp. 85-102. American Ceramics Society, Westerville, OH.

Brisbin, Joel M. and Gay A. Ives
1999 Mesa Verde Segment Trench kiln firing Kilns. *Mesa Verde Waterline Replacement Project Phase III: Archaeological and Historical Studies*, pp.281-310. Manuscript on file, Division of Research and Resource Management, Mesa Verde National Park, CO.

Chapman, Kenneth M.
1970 *The Pottery of San Ildefonso Pueblo*. University of New Mexico Press, Albuquerque.

Crown, Patricia L. and Barbara J. Mills
1995 Ceramic Production in the American Southwest: An Introduction. In *Ceramic Production in the American Southwest*, edited by Barbara J. Mills and Patricia L. Crown, pp. 1-29. University of Arizona Press, Tucson.

Fuller, Steven L.
1984 *Late Anasazi Pottery Kilns in the Yellowjacket District, Southwestern Colorado.* CASA Papers 4. Complete Archaeological Service Associates, Cortez, CO.

Greenlee, Robert
1995 *Life among the Ancient Ones: Two Accounts of an Anasazi Archaeological Research Project*. Hardscrabble Press, Boulder.

Guthe, Carl E.
1925 *Pueblo Pottery Making: A Study at the Village of San Ildefonso*. Yale University Press, New Haven.

Heacock, Laura A.
1995 Archaeological Investigations of Three Mesa Verde Anasazi Pit Kilns. *Kiva* 60(3):391-410.

Hibbets, Barry N,
1984 *Excavation and Evaluation of Archaeological Site 5MT8451, and a Report of Archaeological Monitoring of Celsius Energy's Cutthroat No. 1 Well Site and Access Road, Montezuma County, Colorado*. La Plata Archaeological Consultants Report 8428. Dolores, CO.

Judge, W. James
1984 New Light on Chaco Canyon. In *New Light on Chaco Canyon,* edited by David Grant Noble, p.8. School of American Research Press, Santa Fe, NM.

Lacey, Patricia R., Leigh Ann Hunt, and L.B. Lacey
1997 Test Excavations at Two Prehistoric Pottery Kiln Sites (42SA12729 and 42SA22558) in Southeast Utah. Paper presented at Crow Canyon Archaeological Center, Cortez, CO.

Leach, B.
1976. *A Potter's Book*. Faber and Faber, London.

Marriott, Alice
1948. *Maria: The Potter of San Ildefonso*. University of Oklahoma Press, Norman.

Swink, Clint
1996 Firing Freckles and Hot Spots as Evidence of Late Pueblo III Cover Sherd Use. Paper presented at the Sixth Kiln Conference, Crow Canyon Archaeological Center, Cortez, CO. Ms. on file Anasazi Heritage Center, Dolores, CO.

1997 Firing Anasazi Trench Kilns: The Rebirth of Mesa Verde Black-on-White Pottery as a Result of Interdisciplinary Collaboration. Paper presented at the Ceramic Technology and Production Conference, the British Museum, London.

2000 Rocks, Pots and Fire: A Report on the Study of Kiln Furniture, Ceramics, and Firing of an Anasazi Trench Kiln, 5MT 7525, Feature 11 (Camp Kiln), Woods Mesa, Montezuma County, Colorado. Paper presented at the Mesa Verde Black-on-White Symposium, Anasazi Heritage Center, Dolores, CO.

2001 *Messages from the High Desert — the Art, Archaeology and Renaissance of Mesa Verde Pottery*. Swink Art, Bayfield, CO.

Wilson, C. Dean and Eric Blinman
1995 Changing Specialization of White Ware Manufacture in the Northern San Juan Region. In *Ceramic Production in the American Southwest,* edited by Barbara J. Mills and Patricia L. Crown, pp. 63-87. University of Arizona Press, Tucson.

Recent Dissertations and Theses Available From ProQuest

Note: The dissertation citations and abstracts contained here are published with permission of ProQuest. Further reproduction is prohibited without permission. Copies of dissertations may be obtained by addressing your request to ProQuest Information and Learning, 789 E. Eisenhower Parkway, P.O. Box 1346, Ann Arbor, MI 48106-1346. Telephone 1-800-521-3042; Web page: *http://www.proquest.com/products_umi/dissertations/individuals.shtml*

Title: *El Paso Polychrome in the Casas Grandes Region, Chihuahua, Mexico: Ceramic exchange between Paquime and the Jornada Mogollon*
Author: Jessica Prue Burgett, Ph.D. The Pennsylvania State University, 2006.
Document: AAT 3229384, ISBN: 978-0-542-80953-8, 283 pp.
ABSTRACT: El Paso Polychrome was the second most common non-local ceramic type at Paquimé, a 13th 15th century pueblo in northwestern Chihuahua, Mexico. Paquimé was one of the largest sites in the prehistoric Southwest. Most models of this center's development and regional role focus on trade, and El Paso Polychrome is one of the most common non-local ceramic types at Paquimé. Researchers have generally assumed that El Paso Polychrome originates in the Jornada Mogollon culture area, centered in west Texas and southern New Mexico. This ceramic type's status as a trade ware in northern Mexico has never before been tested, though the exchange of ceramic vessels is not the only possible explanation for El Paso Polychrome's presence. The focus of this dissertation is testing this assumption that El Paso Polychrome is a trade ware at Paquimé and other sites in northwest Chihuahua. For this purpose a large sample of late El Paso Polychrome from Paquimé was systematically compared to samples from Villa Ahumada, Chihuahua, at the very southern extent of the Jornada Mogollon culture area, and to samples from several sites at Fort Bliss Army Air Artillery Range in the Jornada Mogollon heartland. Technological and design attributes were recorded for over 1600 El Paso Polychrome sherds from these three locations, and 300 of these samples were also thin-sectioned for petrographic analysis. This petrographic analysis provided information on mineral components, ceramic body recipe and grain-size distribution. When compared statistically, El Paso Polychrome from the Chihuahuan sites is not significantly different from samples from west Texas and south-central New Mexico. In addition, all El Paso Polychrome samples subjected to petrographic analysis were tempered with crushed granite, and there are no sources of granite within 30 kilometers of Paquimé or Villa Ahumada. This is well beyond the distance potters are willing to travel for raw materials in ethnographic studies. The frequency of El Paso Polychrome at Paquimé and its associated communities can be entirely accounted for by the movement of ceramic vessels rather than other causes, such as migration of potters or stylistic emulation.

Title: *Production, exchange, and social identity: A study of Chupadero black-on-white pottery (New Mexico)*
Author: Tiffany C. Clark, Ph.D. Arizona State University, 2006.
Document: AAT 3210115 ISBN: 978-0-542-58977-5, 446 pp.
ABSTRACT: Regional production and exchange of ceramic goods are integral to economic systems and political and social processes. Archaeological study in the American Southwest has traditionally focused on understanding the organization of a single component (production *or* distribution) within a regional ceramic economy. In recent years, however, researchers have suggested that a more integrated approach to the study of production and exchange is needed to elucidate the broader social contexts in which these economic activities took place. This dissertation explores the connections and interrelationships between production and distribution systems in the Salinas and Sierra Blanca regions of central New Mexico during the early Pueblo IV period (A.D. 1250/1270--1450). Focusing on Chupadero Black-on-white pottery, this comparative study evaluates organizational variability in regional economic systems in order to understand how social relations structure, and are structured by, different production and exchange practices. Three dimensions of regional ceramic economies are considered---production, exchange, and social identity. Although these dimensions involve intertwined social and economic processes, aspects of each may be delineated through the consideration of a few key parameters. Incorporating data from complementary chemical and mineralogical compositional sourcing studies, organizational aspects of Chupadero production and distribution systems are assessed for the Salinas and Sierra Blanca regions. Technological and design style information obtained from a ceramic attribute analysis are then used to examine the social contexts of production. The inclusion of this additional analytical component brings a more socially oriented perspective to the study of regional ceramic economies and allows for the investigation of the structure of social networks that is independent from, and complementary to, the social inferences that derive from ceramic production and exchange data. Results of the compositional and stylistic analyses suggest that a complex interplay of social and economic factors were responsible for shaping the regional ceramic economies that developed in central New Mexico in the early Pueblo IV period. These factors include regional differences in population size and distribution, involvement in pan-regional interaction spheres, and use value of Chupadero vessels. Though Chupadero production and exchange systems in both study regions appear to have been influenced by the same constellation of factors, the particular effects of each vary according to the specific, historically contingent conditions that were present in the Salinas and Sierra Blanca regions in the late thirteenth and early fourteenth centuries.

Title: *The emergence of Jicarilla Apache enclave economy during the 19th century in northern New Mexico*
Author: Tiffany C. Clark, Ph.D. University of Michigan, 2006.
Document: AAT 3208450 ISBN 978-0-542-56896-1, 641 pp.
ABSTRACT: Previous characterizations of Plains-Pueblo interaction highlight the important role that Apaches played in the regional socioeconomic system of the precontact American Southwest. However, Jicarilla Apache responses to state expansion after A.D. 1550 and the evolution of forager-farmer interactions during the historic period remain unstudied. Enclavement, the encapsulation of an ethnic community within a larger society, is characteristic of many nomadic groups existing as coherent sociocultural entities within polyethnic state systems. This dissertation examines the nature of nomadic enclaves and the process of enclavement using Jicarilla Apache historic and archaeological materials. I argue that enclave formation during the pre-reservation period incorporates many elements of preexisting Plains-Pueblo relationships and that enclavement enabled the Jicarilla to preserve traditional aspects of society well into the 19th -century. Jicarilla enclavement involved the expansion of exchange networks with settled agriculturalists, the occupation of secondary niches within a settled zone, and the reorganization of labor practices. The evolution of the Jicarilla enclave is traced from the precontact era to the 19th -century using ethnohistoric references. Enclave ideology, social organization, and economy are reviewed based on ethnographic documents. A specific case study using archaeological materials from the Chama Valley of New Mexico reveal the ways in which the Jicarilla Ollero enclave occupied the northern Rio Grande by establishing mutualistic ties with rural Hispanic and Pueblo Indian villages. Specific insights into the productive economy of Jicarilla women are reconstructed from ethnographies, oral interviews, apprenticeship with traditional potters, and detailed studies of whole ceramic vessels and fragmentary ceramics found in museum collections. A major contribution of the study is the generation of a raw micaceous clay database developed through survey of clay sources from 1998 to 2001. Over 150 clay samples were submitted for Instrumental Neutron Activation Analysis (INAA) at the Ford Nuclear Reactor, University of Michigan, Ann Arbor. Clay samples were matched to 500 micaceous sherds recovered from Apache, Pueblo, and Hispanic archaeological sites. Source matches help to identify patterns of land use, the organization of pottery production and technology, and aspects of ceramic exchange that are characteristic of enclaved Apaches as well as their sedentary Pueblo and Hispanic neighbors.

On the Shelf

Signs of the Casas Grandes Shamans
ISBN 978-0-87480-874-2
Christine S. VanPool is visiting assistant professor, department of anthropology, University of Missouri, Columbia.
Todd L. VanPool is assistant professor, department of anthropology, University of Missouri, Columbia.
Casas Grandes, or Paquimé, in northern Chihuahua, Mexico, was home to a religious system that swept across northern Mexico and what is now the southern United States between AD 1200 and 1450. To commemorate this religion the people of Casas Grandes created striking polychrome pots with black and red geometric and naturalistic designs on a cream base. Their pottery provides a window to Casas Grandes cosmology.

Looking through this window, authors Christine and Todd VanPool find a world centered on shamans who took spiritual journeys to consort with supernatural creatures. The shamans called upon horned serpents to bring rain, the lifeblood for farmers living in the Chihuahuan desert; dealt with snakes that held powers more potent than their bites; and raised, sacrificed, and buried macaws as ritual offerings to ensure water and fertility.

These findings challenge long-held beliefs about Southwestern religion and force a reconsideration of the importance of shamanism in the development of social differentiation in societies around the world.

"It is increasingly clear that Paquimé and its associated sites represent the only clear intrusion of Mesoamerican high culture into the Greater Southwest. The implications for understanding just about every aspect of protohistoric Southwestern culture are enormous." —Carroll Riley, emeritus professor of anthropology, Southern Illinois University

Available from The University of Utah Press *http://www.uofupress.com/store/product325.html*

Ceramic Ethnoarchaeology
William Longacre
ISBN: 978-0-8165-1735-0
Ethnoarchaeology—the study of material culture in a living society by archaeologists—facilitates the extraction of information from prehistoric materials as well. Studies of contemporary pottery-making were initiated in the southwestern United States toward the end of the nineteenth century, then abandoned as a result of changes in archaeological theory. Now a resurgence in ethnoarchaeology over the past twenty-five years offers a new set of directions for the discipline. This volume presents the results of such work with pottery, a class of materials that occurs abundantly in many archaeological sites. Drawing on projects undertaken around the world—the Phillipines, East Africa, Mesoamerica, India—in both traditional and complex societies, the contributors focus on identifying social and behavioral sources of ceramic variation to show how analogical reasoning is fundamental to archaeological interpretation. As the number of pottery-making societies declines, opportunities for such research must be seized. By bringing together a variety of ceramic ethnoarchaeological analyses, this volume offers the profession a

much-needed touchstone on method and theory for the study of pottery-making among living peoples.

Available from University of Arizona: Books on Request. http

New Perspectives on Pottery Mound Pueblo
ISBN: 978-0-8263-3906-5
Polly Schaafsma , Editor
Preface by Linda S. Cordell
Ancestral Puebloan peoples inhabited the Pottery Mound site on New Mexico's Rio Puerco River from the late fourteenth to the late fifteenth centuries. Archaeologist Frank C. Hibben began excavating Pottery Mound fifty years ago, when archaeologists were paying relatively little attention to Ancestral Pueblo sites. Pottery Mound remains poorly studied, under published, and largely neglected.

Hibben found that Pottery Mound was home to diverse Puebloan characteristics evident in both Rio Grande Pueblos and the Western Pueblos. Hibben also discovered an abundance of pottery styles and layers of murals in eleven kivas that are a magnificent archive of religious iconography of the period.

In *New Perspectives on the Pottery Mound Pueblo,* renowned Southwestern archaeologist Polly Schaafsma presents essays by contemporary scholars on the site's murals, rock art, pottery, textiles, and archaeofaunal remains. Contributors revisit Pottery Mound for new insights into inhabitants' regional interactions, migrations, and trade during the Pueblo IV period--a time of dynamic change in Puebloan culture.

Contributors:
Michael Adler--associate professor of anthropology, Southern Methodist University
Tiffany Clark--zooarchaeologist, Arizona State University, Tempe
Helen K. Crotty--research associate, Museum of Indian Arts and Culture Laboratory of Anthropology, Santa Fe, New Mexico
Suzanne Eckert--assistant professor of anthropology, Texas A&M University
Kelley Hays-Gilpin--associate professor of anthropology, Northern Arizona University
Steven LeBlanc--director of collections, Peabody Museum, Harvard University
Patricia Vivian--anthropologist, Witch Well, Arizona
R. Gwinn Vivian--professor emeritus of anthropology, University of Arizona, Tucson
Laurie Webster--visiting scholar in anthropology, University of Arizona, Tucson
David R. Wilcox--curator of anthropology, Museum of Northern Arizona, Flagstaff

Polly Schaafsma is a research associate with the Museum of Indian Art and Culture in the Museum of New Mexico, Santa Fe.

8.5 x 11 318 pages 112 color photos, 50 halftones, 38 line drawings, 13 maps

Available from The University of New Mexico Press
http://www.unmpress.com/Book.php?id=11044038561064

Publications available from the Albuquerque Archaeological Society

Bice, Richard A., Phyllis S. Davis, and William M. Sundt

2003 AS-5 Indian of Mining of Lead for use in Rio Grande Glaze Paint. Albuquerque Archaeological Society. Albuquerque

From the Foreword

"Although three decades have passed between the beginning of the Albuquerque Archaeological Society's field work and the completion of this report, this report is still an historic first not just for New Mexico but for the entire country. This is a major milestone in archaeology, the first recorded excavation of a prehistoric lead and early historic lead/silver mine in the United States of America.

"Lead isotope studies have demonstrated that Rio Grande Pueblo potters almost exclusively used galena (lead) from the veins within 800 meters of the Bethsheba mine in the early 14th century (Habicht-Mauche, et al., 200, 2002). This report and the work conducted by Warren (1974) confirm that the Bethsheba and/or other veins within one/half mile were mined by AD 1300. . . . "

"This report is also the first published report on the excavation of a Spanish or Mexican silver/lead or lead mine in the country." Homer E. Milford, Abandoned Mine Lands Bureau, New Mexico Mining and Minerals Division.

Paperback: $22.00 plus $3.50 shipping and handling, CD in pdf format: $12. Please make checks payable to: The Albuquerque Archaeological Society, P. O. Box 4029, Albuquerque, NM 87196

Bice, Richard A., Phyllis S. Davis, and William M. Sundt

1998 The AS-8 Pueblo and The Canada de las Milpas: A Pueblo III Complex in North-Central New Mexico. Albuquerque Archaeological Society. Albuquerque

From the Foreword

"This volume is the latest in a long series of important contributions made by the Albuquerque Archaeological Society over the past 30 years. The project which is reported here involved excavations at a 13th century Anasazi pueblo and investigation of the larger community of which it was a part. Excavations focused on AS-8, a 46 room pueblo located near San Ysidro, New Mexico. As-8 is the largest site in a cluster of mostly contemporaneous farmsteads which includes at least 48 other architectural sites located along a two mile long portion of Cañada de las Milpas. This cluster appears to represent a distinct community, and AS-8 is the preeminent site within the cluster. Several lines of evidence suggest that initial settlement in this area occurred around AD 1160, and that occupation continued until around 1305, with the period of most intensive occupation about AD 1245. . . . .

"The cornerstone of the analytical and interpretive sections of the report is an innovative ceramic seriation. . . . . The ceramic seriation is combined with other lines of evidence to infer the construction sequence at AS-8 and the settlement history of the community as a whole." John R. Roney, Albuquerque.

Paperback: $22.00 plus $3.50 shipping and handling, CD in pdf format: $12. Please make checks payable to: The Albuquerque Archaeological Society, P. O. Box 4029, Albuquerque, NM 87196

On View
In the Museums

The Secrets of Casas Grandes
November 5, 2006 – October 2007
Museum of Indian Arts & Culture /Laboratory of Anthropology, Santa Fe

Ramos Polychrome jar with horned serpent iconography, Casas Grandes, AD 1200-1450. 16.2 cm. x 19.0 cm. Edward Ledwedge collection, Museum of Indian Arts & Culture / Laboratory of Anthropology, 8313/11

This exhibit is unique in its focus on the archaeology and ceramics of Casas Grandes, Northern Mexico, a little-known prehispanic culture of the Greater Southwest. Concentrated around the prehistoric site of Paquimé in northwestern Chihuahua, Casas Grandes was the most complex society of its time, blending elements of ancestral Puebloan and Mesoamerican culture. During the Medio period of A.D. 1200-1425, Casas Grandes was a major regional center of interaction and trade, with evidence of ball courts and exotic artifacts such as copper, shell, turquoise, and macaws.

Specialist potters made striking, intricately-painted effigy vessels and geometric polychrome ollas. The vibrant pottery features elaborate symbolic imagery and depicts humans, supernatural beings, and animals, including macaws, owls, fish, turtles, lizards, feathered and horned serpents, and other fantastic creatures. Some scenes portray dancing figures with animal headdresses, and appear to tell stories of transformation from the human to spiritual realm. Along with other archaeological evidence, the variety of ceramic forms and intriguing iconography offer a window to the ancient Casas Grandes world.

Today these ceramics are considered remarkable works of art, and several recent museum exhibits have displayed them from the perspective of art history. The current exhibit differs by exploring what the ceramics tell us about the people who made and used them—beyond their beauty as art objects—and by considering the larger society in which they functioned in utilitarian and ritual contexts. The exhibit presents current archaeological findings and highlights future research problems that concern the remaining secrets of Casas Grandes.

On the World Wide Web

There are many valuable resources now available on the World Wide Web. Here are just a very few relating to Southwestern pottery. Please feel free to send your suggestions and/or comments for inclusion in future issues of *Pottery Southwest*.

Arizona State Museum online
Some 20,000 Southwest Indian whole-vessel ceramics combine to form the focus of ASM's POTTERY PROJECT. Spanning 2000 years of life in the unique environments of the American desert Southwest and northern Mexico, the collection reflects almost every cultural group in the region. This collection - the largest and most comprehensive of its kind - is one of the nation's most significant cultural resources. It has been designated an Official Project of the *Save America's Treasures* program, a public private partnership between the White House Millennium Council and the National Trust for Historic Preservation to celebrate and preserve our nation's cultural legacy. (http://www.statemuseum.arizona.edu/exhibits/pproj/index.asp)

Logan Museum of Anthropology
The Logan Museum of Anthropology at Beloit College in Beloit, Wisconsin, possesses a superb collection of artifacts from the ancient Southwest. The vast majority were collected during excavations undertaken by the Museum in the 1930s under the direction of Paul Nesbitt. From 1929 to 1931, field work was done at the Mattocks Ruin in the Mimbres Valley of New Mexico resulting in an extensive collection of pottery and other artifacts from the Mimbres people. From 1931 to 1939 focus shifted to another group of Mogollon sites in the Reserve area of New Mexico. Work at the main site, the Starkweather Ruin, was supplemented by exploratory digs at the Hudson and Wheatley Ridge Ruins. These sites yielded a large number of Mogollon artifacts of all types. To these were added extensive surface sherd collections from important sites all over the Southwest. (http://www.beloit.edu/~museum/logan/)

Lowell D. Holmes Museum of Anthropology
"Through the Eyes of the Pot: A Study of Southwest Pueblo Pottery and Culture,
The Morgan Collection of Southwest Pottery" Wichita State University, Wichita, Kansas
In 2002, the Lowell D. Holmes Museum of Anthropology at WSU received more than 100 Southwest Pueblo pots and a large library of related books from WSU alumnus Jack Morgan. On the Web site, the photographs of 109 pots, most of which are from the Morgan collection, can be rotated 360 degrees. The site also contains biographies of 54 potters represented in the collection, and the history of the pueblos where the pots were made. Many of the pots were made by well-known Pueblo artists. (http://www.holmes.anthropology.museum)

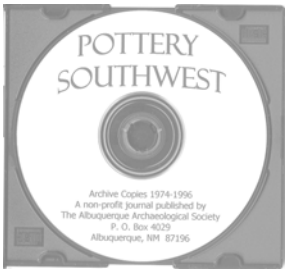
SUBMISSIONS TO *POTTERY SOUTHWEST*

The availability of *Pottery Southwest* in electronic format creates opportunities for communicating with a wide audience in a sophisticated manner. It also creates formatting challenges far beyond those of printing and/or photocopying. Some of our contributors have requested that we provide guidelines for submissions. Readers with dial-up connections have requested that we keep the size of the publication under 1,000 KB. Following are some tips on how to make this electronic transition as painless as possible:

Author Information	Please include all the information you want in the publication including your contact information so that readers may contact you directly.
Length of Paper (word count)	Major papers should try to be in the range of 3,000 to 5,000 words or a maximum of 30,000 characters counting spaces. (To find out the length of your paper in MS Word go to Tools and click on Word Count.) Inquiries and Updates as well as dissertation abstracts and notices should be in the 500 to 1,500 word range.
Page Margins	Top, bottom, left and right margins should all be 1 inch.
Headers and Footers	Please note that any headers and footers will be removed before inclusion in the complete issue. It is best not to include them in your submission.
Font Type and Size	Our preferred font and size is Times New Roman, 12 point.
Spelling and Grammar	Please be certain to use the spell check and grammar check features of your word processor before submission. Authors are responsible for the accuracy of their work.
Paragraph Format	Paragraphs should be single space, flush left, double space or 12 points between each paragraph.
Images (number & pixels)	Please limit all images to 640 x 480 pixels maximum in jpg. Whenever possible please try to limit the number of images to no more than six. Images should be submitted as a separate file as well as within the document. When lining up images the easiest way is to create a table and insert the image into a cell. The row below the image can be used for its label. This is much easier than trying to line up text under an image. To learn more about size see http://www.microscope-microscope.org/imaging/image-resolution.htm.
Text Boxes	We recommend avoiding text boxes; use a table format instead.
Format Of Spreadsheets, Tables, etc.	Importing spreadsheets, pie charts, etc. from Excel into a Word document should not present a problem. However, if you do this, please send us a separate copy of what you use so that we may assure that the transition works smoothly.
Bibliographies	In order to make formatting go smoothly, we are requesting that bibliographies not include any tabs or spaces to make text line up. This causes havoc for conversions. Thus, please follow this format: **Author (last name, first name) year title, etc.** We will insert hanging indents so that the text lines up properly.
Tips On Using Ms Word	If you are in doubt as to where paragraph returns, tabs and/or spaces have been used to line up text in your document, click on the paragraph symbol in your tool bar at the top of your screen. This will reveal where these formats have been used.

Over the summer we may change our internet service provider. In the interim "Camera ready" submissions should be sent to *psw@unm.edu* with a copy to *pottery_southwest@hotmail.com.* Finally, please don't be shy about contacting us if you have questions about submissions; we'll be happy to help. Your contributions are needed to keep *Pottery Southwest* viable. Additional formatting tips are at SAA's site at http://www.saa.org/publications/Styleguide/styframe.html.

ORDER FORM
for POTTERY SOUTHWEST
1974-1996 Archive CD



TO: *Pottery Southwest*
c/o Albuquerque Archaeological Society
P. O. Box 4029
Albuquerque, NM 87196

Number of CDs	**Send to PLEASE PRINT CLEARLY**	**Price per CD**	**Total**
	Name: _____ Address: _____ City: _____ State: _____ Zip Code: _____ E-Mail (optional): _____	$5.00 for AAS members and students	
	Name: _____ Address: _____ City: _____ State: _____ Zip Code: _____ E-Mail (optional): _____	$7.50 for non-members	
	AMOUNT ENCLOSED:	$ _____	

YOUR NAME & ADDRESS (if different from above):

Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

E-Mail (optional): _____