From the Pueblos to the Southern Plains: Papers in Honor of Regge N. Wiseman

Edited by Emily J. Brown, Carol J. Condie, & Helen K. Crotty

2013 Contributors

Regge N. Wiseman
A Life of Serendipity

Anonymous
A Blast from the Past:
An Archaeologist in Catron County,
1971 and 1973

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Robert D. Dello-Russo
The Water Canyon Paleoindian Site: Preliminary Evidence of Site Formation Processes, Site Structure, and Late Paleoindian Lifeways

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Margaret Senter (Gretchen) Obenauf
Wiseman’s 1974 El Malpais Survey

Deen J. Seymour
Horse Herd Size and the Role of Horses among the Mescalero Apache: A Response to Osborn

John D. Speth and Laura Staro
Bison Hunting and the Emergence of Plains-Pueblo Interaction in Southeastern New Mexico: A Synopsis

H. Wolcott Toll
Venting: A Remarkable La Plata Deposit and the Importance of Pueblo Vent Styles

John P. Wilson
Excavations at Old Fort Sumner, 1968–1969
Today was begun by scaling the cliff to record the Cebolla Canyon Site, Barredo, I checked out the high country to the northwest where I found only a flake or two. The Cebolla Canyon Site is in the amazing situation at the end of a peninsula remnant of the mesa which lies to the west. I found the site to be in critical condition, the sole result of some long winded, reckless pothunter(s). Only ca. 8-10 rooms of the ca. 90-100 room site are not potted, a situation calling for immediate concern. Not only is the site in a natural position for destruction, but a system of walls and sumpsions have been built to block the easier approaches (mostly to the west). The site was fully recorded as #88.
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# Table of Contents

Preface ........................................................................................................... v

Regge N. Wiseman
   A Life of Serendipity ................................................................................ 1

Anonymous
   A Blast from the Past: An Archaeologist in Catron County 1971 and 1973 .... 7

Matthew J. Barbour
   A Brief Glimpse into Seventeenth Century Santa Fe: The 2011 Santa Fe Plaza
   Light Post Excavations ............................................................................. 11

Patrick H. Beckett
   Gran Quivira Treasure Hunters ................................................................ 21

Emily J. Brown
   Guano Happens, or, How Carlsbad Caverns Was Part of a Global Phenomenon
   that Influenced Organic Chemistry, Made Farmers a Voting Block, and Promoted
   U.S. Overseas Expansion ........................................................................ 27

Carol J. Condie
   They Gave It One Shot and Left, Never to Return: A Pueblo IV Attempt at Dry Farming
   on the Uplands West of the Ortiz Mountains, Sandoval County, New Mexico .......... 41

Robert D. Dello-Russo
   The Water Canyon Paleoindian Site: Preliminary Evidence of Site Formation Processes,
   Site Structure and Late Paleoindian Lifeways .................................................. 51

Theodore R. Frisbie
   An Old Bag of Sherds That Became a Kana’a Neckbanded Jar and Some Related Matters. . 65

David T. Kirkpatrick
   Trash Disposal Patterns at Lake Arthur, Chaves County, New Mexico .................. 75

Toni S. Laumbach and Karl W. Laumbach
   Clues to the Origin and Source of Seco Corrugated ....................................... 87

F. Joan Mathien and Joyce M. Raab
   Edgar Lee Hewett’s 1902 Expedition to Chaco Canyon .................................. 101

James L. Moore
   Developmental Period Trends in Projectile Point Styles ................................. 109
Margaret Senter (Gretchen) Obenauf
Wiseman’s 1974 El Malpais Survey .................................................. 123

Deni J. Seymour
Horse Herd Size and the Role of Horses among the Mescalero Apache:
A Response to Osborn ................................................................. 129

John D. Speth and Laura Staro
Bison Hunting and the Emergence of Plains-Pueblo Interaction in Southeastern
New Mexico: A Synopsis.............................................................. 141

H. Wolcott Toll
Venting: A Remarkable La Plata Deposit and the Importance of Pueblo Vent Styles ...... 147

John P. Wilson
Excavations at Old Fort Sumner, 1968-1969 ...................................... 161
Preface

I first became acquainted with Regge when Rory Gauthier suggested we invite him to participate in what is, lo these 12 years later, our by now infamous attempt to reprint H.P. Mera’s Laboratory of Anthropology bulletins on Southwestern ceramics and related topics. Regge’s knowledge of ceramic types and contacts with archaeologists who might be persuaded to write introductions to Mera’s bulletins proved a godsend to the project. It is certainly not because of any dearth of effort on his part that the volume remains in preparation—he has mustered a level of perseverance that ultimately overcomes obstacles that would cause lesser archaeologists to quail, and the volume is still on track for eventual publication. But this should not be surprising. Regge is one of those rare and enviable archaeologists who have no projects for which a report has not been prepared (he has written approximately 155 articles, contract reports, and artifact analyses), and I am quite certain that he will help see the Mera volume through to publication (even if it takes another 12 years).

Regge’s dedication to the Mera project is one small expression of a much greater dedication to the discipline and practice of archaeology. He has conducted or managed multiple survey and excavation projects in the Southwest and the Plains over the course of his career. Beyond his solid fieldwork and consistent publication, Regge should be recognized for his years of public service for archaeological organizations (including the Archaeological Society of New Mexico and the New Mexico Archaeological Council). With his emphasis on sharing research and a knowledge of people and publications in the field that borders on the encyclopedic, a volume of new papers is a particularly appropriate way to honor the contributions and talents of Regge Wiseman.

—Emily J. Brown
I was born on September 8, 1947 in Roswell, New Mexico, to Pauline Florence Pope Wiseman and Edwin Strauel “Jack” Wiseman. Both parents and my one sibling, Paula Ann Holmes, are native Kansans, Mom and Dad having been born and raised in post-frontier western Kansas shortly after the turn of the last century. Immediately following the end of World War II, Mom and Dad moved Paula to New Mexico to join his parents, Wellington Webster Wiseman and Henrietta “Etta” Strauel Wiseman, in Silver City, New Mexico. This partial “gathering of the clan” was immediately occasioned by the death of my dad’s younger brother, Reginald Neal “Reg” Wiseman. Uncle Reg had been one of 45 casualties of the last kamikaze attack on the Battleship New Mexico in action off Okinawa on May 12, 1945. Dad moved the family to Roswell in January of 1946 after discovering that working with his dad, also a veterinarian, was not going to work out (Granddad was “gearing down” and Dad needed to “gear up”).

My earliest recollection of babyhood was my mother placing me in my playpen in the shade of the huge bois d’arc tree (the “gourd tree”) in the back yard. Though scared to death (as Mom would say years later, “yowling my head off”), I was introduced to two of the greatest sensory pleasures of my future life—gentle, cool, soothing breezes on hot summer days and the opportunity to see long distances unhindered by enclosing house walls.

The one great life-changing event took place on a Tuesday evening in November of 1961. It was one of the first meetings of the Roswell post of the Explorer Scouts of America, a new program introduced by the Boy Scouts that fall. Our post specialty was geology. As with all young adolescent boys, this was a time of change... as we were poised to move into a new phase of life and had little clue as to what lay ahead. All I knew was that I had absolutely no interest in
cars, motorcycles, whether a passing car had a standard or automatic transmission (boys would sit around in small groups at school, guessing which one had which as each car pulled away from the stop sign; if this was a sign of life to come, count me out!). Late in life, my mother asked me whether I had had a happy childhood. I did not want to tell her the truth...no (well, it wasn’t a bad childhood, for she and Dad had provided well for us)... but I did tell her the other truth, which was that I felt that I was just hanging out, waiting for something to happen. What that happening was to be, I had no earthly idea!

That “happening” turned out to be Bob Cobean. Robert H. Cobean (now a noted Mesoamerican archaeologist) was a kid who had lived in the states of Washington, Ohio, and New Jersey by the time his parents had moved him and his brother to Roswell. He was interested in absolutely everything scientific—chemistry, biology, physics, astronomy, and now geology. Real gray matter between the ears! Speaking of a breath...or flood...of fresh air! But his real passion was something called “archaeology,” whatever that was. He said that it included things like looking for arrowheads, learning about prehistoric people, and such. The whole idea struck me as a bit absurd, but then I did like to look for minerals on our Explorer Scout outings. So, he and I hit it off big time, hanging out together as much as we could even though we lived across town from each other.

Then, one day, anticipating a particularly boring weekend, I decided that even looking for arrowheads would be more interesting than, well...doing nothing. I made the suggestion to Bob, we got on our bikes, and off we went to “Brown’s farm,” a large ranch that bordered the southwest edge of Roswell. On the way out, of course, Bob’s tire went flat (Bob frequently had bizarre things happen to him, most of them quite funny), so we alternately shared the pushing and riding duties. We did not find anything of note that day (or many days later on, for that fact), but somehow I was hooked.

Little did I know at the time, but this was the inaugural event of my Big Adventure, that brief period of a few years’ duration when a person transitions from childhood to young adulthood, with all the attendant excitement, wonderment, thrills, explorations, opening of the world, taking control of one’s life. To my experience, one can have many exciting and rewarding times after the Big Adventure, but they are never again quite the same in terms of feelings and fondness of memories.

Seeing that I was well within the grips of archaeology, Dad proposed that he and I get a travel trailer and take a trip through the Southwest in the late summer of 1963 to see various national parks and monuments. The trip was absolutely stupendous—Gran Quivira, El Morro, Walnut Canyon, Wupatki, Mesa Verde, Chaco, Bandelier! And that museum at Mesa Verde...what magic! It’s a good bet that I would have continued with archaeology without it, but that trip definitely sealed the desire. The following summer we did the same thing through southern New Mexico and southeastern Arizona, including stops to hunt minerals in various mining districts.

In the fall of 1963, I entered the New Mexico Military Institute (NMMI) in Roswell as Bob headed off to prep school at Culver Military Academy in Indiana. Following two years at NMMI, where they had no anthropology or archaeology courses, I enrolled at the University of New Mexico (UNM) in Albuquerque. What marvelous days, weeks, and months that followed(all of the boring non-anthro classes and anxiety over exams aside). That first fall I had run into Mike Marshall, a fellow who was on the verge of making quite a name for himself in Southwestern and especially New Mexican archaeology. One weekend, we took
a drive to southwestern New Mexico to visit a friend of his who was conducting a project there. The project? The “famous” Cliff Project being run by none other than Larry Hammack, assisted by John P. “Jack” Wilson, Stan Bussey, and Ron Ice for the Museum of New Mexico’s (MNM) Laboratory of Anthropology (Lab) and the New Mexico State Highway Department (NMSHD). They were busily engaged in the excavation of the Ormand Site (a large Salado village), Lee Village (a Mogollon pithouse site), and the Dinwiddie Mimbres site. Along the way we stopped at some other sites that Mike knew about, including the WS Ranch site at Alma. Since the Cliff Project ran for several months, Cobean and I were able to get over for a visit during the Christmas vacation.

At UNM I was especially lucky. I came in at the tail-end of an era in archaeology—on the cusp, as it were—of the shift from the culture-historical to the processual paradigm (because of inflation, I have long thought that we need to change that word to “para-quarters” or “para-half dollars”). I got a good dose of the old schooling, which prepared me extremely well for my future work. I attended the Sapawe field school in 1966 and the Taos field School in 1967. But the best luck of all was being a student of Florence H. Ellis. In the summer of 1968, after working for her as a teaching assistant on her Sapawe field school, I had the opportunity (and good fortune) of being hired by Jack Wilson as an assistant on his Fort Sumner project. As it turned out, that event gave me the proverbial “foot-in-the-door” and set my course to this day.

In the late summer of 1967, following J.J. Brody’s UNM field school at Taos, Cobean, a couple of his friends from back East, and I left El Paso, Texas, for a 15-day adventure into Mexico. We drove as far as the site of Chichen Itza in the Yucatan and back, visiting 15 sites and the pre columbian exhibits of the newly opened Museo Nacional in Mexico City. Except while in Mexico City, we camped out all the way, including feeding a bazillion mosquitos when we got stranded overnight on a chain of islands at the south end of the Gulf of Mexico. What a trip! What a whirlwind tour!! Three thousand miles in a long two weeks!

By the time we got back to El Paso, I was absolutely exhausted. I still wish I could thank that lady at the port of entry, who sat on the trunk of her car rather than let the authorities have a look. We were faced with having to unload the Wagoneer one more time for the U.S. Customs guy, but when that lady threw her fit, off he went for the show, and off we went to New Mexico!

In the late summer of 1969 I joined the New Mexico National Guard (the Vietnam War was hot and heavy at that time) and spent the winter and spring in boot camp (Fort Ord, California) and Advanced Individual Training (Fort Bliss, Texas) for training. I got back to Albuquerque just in time for the protests on the UNM campus that were spawned by the killings at Kent State University (Ohio). Fortunately for me, I was placed on kitchen duty for the duration, rather than having to go out in full riot gear, complete with fixed bayonets, and risk causing another Kent State. Hadn’t the command structure learned anything about what not to do? I guess not, for several Guardsmen and protestors were injured by bayonets, with one of the latter being consigned to a wheelchair for the rest of his life. But, membership in the Guard and Army Reserve served me well for nearly 22 years. What little money it paid was very useful in supplementing our other sources of income, plus I got an extra two-week “paid vacation” every summer. I never got rich, nor did I ever starve.

Pamela G. Conway and I married in Albuquerque on June 20, 1970. The fall of 1970 found me in graduate school at Arizona State University
ASU). There I continued my studies under Alfred E. “Ed” Dittert, enjoying archaeology like never before. But, the school situation was unsettling for me, and the call from Dave Kayser back at the Lab, asking me to work for him on the Whiskey Creek Project in the summer of 1971, was the final event that put me into life’s groove. Telling friends that I would return to grad school in a couple of years, I forged ahead, doing archaeology rather than sitting around and talking about it. Back in those days, a person with a Ph.D. in archaeology either taught in a university or did some form of administrative work. I already knew I was temperamentally unsuited for both vocations, to say nothing of a lack of interest. Although initially unanticipated, the Lab was “my home” from then on. Following a year at ASU (1970-1971), we moved back to Albuquerque where Pam could return to a job at Presbyterian Hospital and be near her family. In January of 1973 our daughter, Meredith, was born.

Then, in early February of 1974, I was offered what was informally called a “permanent staff position” with the Lab, meaning a state-funded position. Prior to that time, my work for the Lab had been on a project-by-project basis, with breaks between projects ranging from two weeks to four months. But, now I would have to do 40-hour weeks in the office and/or the field as the situation required. So, Pam, Meredith, and I moved to Santa Fe.

For a time, my job consisted mainly of small archaeological surveys for the NMSHD. At the end of the first year and a half, NMSHD hired its own archaeologist. I elected to stay with the Lab, rather than take the highway position. For the next several years, I did surveys contracted with various utility companies and the uranium industry. I also completed several projects (Blackrock, Naschitti, Carnue) that, for one reason or another, had run out of funds or leaders or both. I also got to do the occasional excavation project and survey. At one point, the then Lab director, Curt Schaafsma, asked me to be his unofficial assistant state archaeologist. Except for this brief “job,” my greatest accomplishment during a lot of those years (especially the first half of the 1980s) was avoiding getting “kicked upstairs” into some administrative position.

In the meantime, the life of an archaeological widow was not working out for Pam, and we decided to go our separate ways. Of course, those ways were not totally separate, for we still had our daughter and an amicable parting from which to begin anew. It was the right thing to do, and I believe all three of our lives have been much the better for it.

But divorce is never easy, and for a time, I needed assistance and understanding. Those lifesaving aspects came in the form of D.J. and Buddy Scraggs, who had retired from military service to Bent, New Mexico, at the time of one of my highway projects. For years I spent holidays and vacations at their home, enjoying great friendship, marvelous hospitality, badly needed R and R, and the opportunity to conduct archaeological survey in the vicinity of my former excavation project. Buddy is a natural storyteller who grew up in the coal country of southwestern West Virginia. It was 10 years before I heard the same story a second time, and what stories they are! D.J. is one heck of a cook, hostess, and friend, though she will never acknowledge these qualities. The beneficial effects of their friendship and hospitality simply cannot be overstated.

Another family to whom I owe a great debt is that of Pat and Becky Beckett of Las Cruces. They, too, opened their home and understanding to me, providing me with great friendship and hospitality. At that time, Pat was directing the Cultural Resource Management Division of the Department of Sociology and Anthropology.
at New Mexico State University. Two of the very useful activities he inaugurated were two regional conferences, the Jornada and the Mogollon, held in alternating years starting in 1979. Both conferences are still held, providing much needed interaction among archaeological practitioners when, even today, the conferences are the only truly focused meetings for their respective regions.

In 1979, I met my lifetime companion, Trudy Padilla. After 20 years of putting up with me, she finally agreed to marriage in January of 2000. The only thing I can think of as to why she has hung in there all this time is that she, though she disavows it, is going for sainthood. And deserve it she does! Her quiet, non-demanding way has been key to my survival in spite of my driven, virtually manic ways.

Early in 1986, the state was going through one of its periodic financial down-turns. The MNM, of which the Lab was a sub-unit, was literally faced with having to lay off at least one staff member. Then someone came up with the idea of asking me if I would be willing to leave my state-funded status and go back to work for what we now call the Office of Archaeological Studies (OAS). This group formerly composed the “soft-funded” or Research Section staff of the Lab and worked on various cultural resource management projects. But at that time, as it turns out, the unit was on its way to becoming independent of the Lab but still belonging to the MNM. After about two milli-seconds of thought, the answer was, Heck yeah! Although financially less secure, the shift meant that I would be doing archaeology fulltime, or at least as long as the jobs came in the door. In 1988, the funds were put back behind my old state-funded position, but I was not about to turn back.

In many ways the late 1980s to late 1990s was my decade. I had the opportunity to undertake several excavation projects in southeastern New Mexico and to try to make a difference in an area where too little was known. In all, I directed seven projects in and around Roswell and down U.S. 285 to Carlsbad.

Retirement from paid work came in January of 2000. For the first couple of years, I completed three projects that would have been left “hanging” by my retirement. After that, I worked on several projects of my choosing. All of these projects derived from my earlier education, experiences, and interests—the stone enclosures and early pottery of northeastern New Mexico, the Gallina culture of north-central New Mexico, a strong minor interest in the Galisteo Basin, and of course, my life-long interaction with the prehistory and early history of southeastern New Mexico and adjacent parts of Texas.

During this period I finally realized that the prehistory of southeastern New Mexico necessarily included the prehistory of west Texas and the Texas Panhandle (not too slow, huh?). To remedy my ignorance on the subject, I contacted a friend, Doug Boyd, seeking an opportunity to do some field work in the Southern Plains as a volunteer. As it so happened, he and Brett Cruse were looking for volunteers to help salvage a “pithouse” in the west pasture of the M Cross Ranch owned by John Erickson (of Hank the Cowdog authorship fame) and located in the Canadian River valley. That project led to periodic work over the next few years at other sites on the M Cross and the opportunities to meet archaeologists and important supporters of archaeology in the Texas and Oklahoma panhandles and in southwestern Kansas. At this time, a local self-made man by the name of Harold Courson hired Scott Brosowske, with his newly minted Ph.D. from the University of Oklahoma, to start Courson Archaeological Research (CAR) in Perryton, Texas. May providence continue to smile on Mr. Courson, Scott, and the CAR!
These experiences, plus participation on the 1996 Texas Archaeological Society field school at the Harrison-Greenbelt site southeast of Amarillo (thanks to Susana and Paul Katz) and a lot of reading and discussion, gave me a rudimentary but useful working knowledge of Southern Plains prehistory. It all constituted a crash course but was of immense value to me, to say nothing of a great experience!

For a brief period of 15 months, from late 2008 to early 2010, I went back on state payroll to help the OAS in conducting laboratory analysis and report writing for the NM-128 project east of Carlsbad. The sites investigated on the project had a lot of potential that might not be met if it became a “pickup” project (read “hot potato” job) for people needing work. Then, back to projects of my choosing. As of this writing (September 2012), draft manuscripts for all outstanding projects are either completed or are in progress. Once completed, I will no longer have a backlog of uncompleted work, whether old or comparatively new. But, as Florence Ellis said on many occasions, “Not to worry!” In this case, there’s no end of useful and interesting projects to undertake. As always, the only problem will be deciding which ones to do!

All of this work since my retirement in 2000 has been made possible through the courtesy, generosity, and interest of first Tim Maxwell and then Eric Blinman, successive directors of OAS. They have allowed me to keep my office and operating privileges at the OAS as an emeritus and a research associate. Their moral support in this gesture has led directly to my productivity through the years since retirement. I am forever beholden to both of these gentlemen.

Serendipity? Yes, by the boatloads! And because of it, my one main goal in life has been realized—to keep myself entertained. ☺️

[Invoking Honoree privilege, Regge chooses not to include a Selected Bibliography. Ed.]
In 1971 the Museum of New Mexico’s Laboratory of Anthropology conducted a series of archaeological excavations along New Mexico State Route 32 at Whiskey Creek (near Apache Creek, New Mexico), and the US Forest Road at Gallita Springs, Catron County, New Mexico. The following images show one Laboratory of Anthropology archaeologist.

Figure 1. Whiskey Creek, summer of 1971.

The crew is preparing for the day’s work. Check out the archaeologist in the white cowboy hat. Because of the remoteness of the area, the excavation crew lived in tents supplied by the museum.
The Laboratory of Anthropology field staff cataloging and housing excavated material for safe transport to Santa Fe. The lady cataloger also made great fry bread.
Figure 3. Gallita Springs, summer of 1973.

Excavation at one site began with stripping the surface. Horizontal control was in two meter units and vertical control in 10 cm levels. (Note: the white lines in the photo are strings the width of the control stripping unit. Cross strings were not used to allow ease of moving the overburden off site).
The road right-of-way was tested by exploratory trenches in areas without surface artifacts and features. These trenches exposed several surface rooms and a pithouse-kiva that were not visible from surface indications.
A Brief Glimpse into Seventeenth Century Santa Fe: The 2011 Santa Fe Plaza Light Post Excavations

MATTHEW J. BARBOUR

SANTA FE PLAZA, LA 80000, is a National Historic Landmark registered in the National Register of Historic Places (October 15, 1966, Item No. 66000491) and the State Register of Cultural Properties (No. 27). It has been the commercial, social, and political center of Santa Fe since at least 1610, if not earlier. However, debates continue to erupt regarding its initial location, size, layout, and use (most recently Hordes 2010; also see Hordes 1990; Noble 2008; Snow 1990; Wilson 1981).

In February of 2011, the Public Works Division of the City of Santa Fe planned to install four light posts along Palace Avenue across from the Palace of the Governors in the Santa Fe Plaza (Figure 1). Accomplishing this task required the excavation of four light post holes roughly .9 m to 1.2 m (3 to 4 ft) in diameter and 2.1 m (7 ft) deep below the current ground surface (bgs), thus necessitating archaeological monitoring and excavations to comply with state and municipal preservation laws.

Under the Museum of New Mexico Office of Archaeological Studies (OAS), the four light post holes were designated Test Units (TUs) 1–4. Archaeologists monitored hand excavation of each test unit by Gorman Electric, the contractor for the City of Santa Fe. When intact cultural deposits were encountered, the archaeologist shifted from monitoring the contractor’s work to performing systematic hand-excavation of the light post hole. Archaeological investigations resulted in the documentation of 17 stratigraphic units and the recovery of 1,430 artifacts (see Barbour 2011).

Archaeological Findings

The preservation and accumulation of archaeologically significant strata varied across the four test units (Figure 2). TU 1 contained mixed twentieth-century deposits associated with the installation of the storm drain, and in TU 4 archaeologists failed to recover any temporally diagnostic artifacts from in situ deposits. TUs 2 and 3 yielded substantial unmixed cultural deposits dating to the late eighteenth and nineteenth centuries. These included a clinker (burned coal) deposit believed to be the late nineteenth-century plaza surface (depicted in Figure 2 as Strata 2.2 and 3.2) documented previously by Cross Cultural Research Systems (1992) and the OAS (Barbour 2010; Lentz 2004).

However, only TU 3 (Figure 3) was found to contain lower cultural strata, designated Strata 3.5 and 3.6, dating to the early Spanish Colonial period. Stratum 3.5 appears to represent a late seventeenth- or early eighteenth-century surface on which some sort of military engagement may have taken place based upon the number of projectile points recovered from this stratum in 2004 (Figure 4) and a gunflint (Figure 5) found...
Figure 1. Aerial view of Santa Fe Plaza and location of light post Test Units.
Figure 2. Strata by period of deposition.

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<th>Level</th>
<th>Meters Below Ground Surface</th>
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<td>2.6</td>
<td></td>
</tr>
<tr>
<td>27*</td>
<td>2.7</td>
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Legend:
- = late twentieth century or mixed deposit.
- = early to mid-twentieth century century deposit.
- = nineteenth century deposit.
- = late eighteenth and nineteenth century deposit.
- = late seventeenth or early eighteenth century deposit.
- = early to mid-seventeenth century deposit.
- = unknown, no diagnostic artifacts.
- = culturally sterile.
- = unexcavated.

* = not systematically excavated, but investigated within a 20 by 20 cm window at the base of Test Unit 3.

Note: Top of Stratum 3.2 represents uppermost culturally significant deposit.

Note: Depth necessary for light pole installation.
Figure 3. Profile of Test Unit 3.
Figure 4. Projectile points and other flaked stone artifacts recovered from Stratum 3.5 in 2004. (Note: FS=Field Specimen.)
during current excavations. OAS archaeologist Stephen Lentz (2004:33) initially posited that this surface is associated with the Pueblo Revolt of 1680, but more recent Native American ceramic analysis suggests the deposit dates slightly later based upon the frequency of redwares and presence of Tewa Polychrome sherds (Wilson and Montoya 2011:56-57). If not connected to the Pueblo Revolt of 1680, it is quite possible that this stratum is archaeologically representative of the battle to recapture Santa Fe in 1693.

Artifacts recovered from Stratum 3.6 context appear to date to the early to mid-seventeenth century. Stratum 3.6 extended well below the depth necessary for light post installation (2.1 m or 7 ft bgs). To accurately ascertain deposit depth, a small window (20 by 20 cm or 8 by 8 in) was dug into the base of the light post hole and excavated for an additional 50 cm (1 ft 8 in). At 2.6 m bgs (8 ft 6 in), the sediment transitioned into a natural alluvial deposit of coarse sand and river cobbles. No floor was identified at the base of the deposit and appears to rule out the possibility that excavations were being conducted inside one of the two kivas created on Santa Fe Plaza during the 1680–1693 Native American occupation of the city. Large quantities of butchered fauna found in Stratum 3.6 could represent domestic and kitchen waste deposited within a large pit.

Examining the Seventeenth Century
Most of the Spanish documents in Santa Fe from the seventeenth century have been destroyed (Elliot 1988:27), and archaeology remains one of the few sources of information available regarding early Colonial life in Santa Fe. As a result, particular attention was given to this stratum and the cultural materials recovered therein.

Within the Native American ceramic assemblage, glaze wares outnumbered Tewa decorated wares four to one (Figure 6 and Wilson and Montoya 2011:57). This could indicate greater reliance on and contact between the settlers in Santa Fe and Native Americans living in the Galisteo Basin and regions along the Rio Grande south of La Bajada.
Hill during the seventeenth century. Conversely, in the eighteenth century, pottery from south of Santa Fe is rare. Instead, colonists are acquiring pottery from their Tewa neighbors to the north.

The vast majority of artifacts recovered from Stratum 3.6 were pieces of butchered animal bone. Fauna from the deposit was examined in relation to data from other seventeenth century contexts elsewhere in downtown Santa Fe (Palace of the Governors, La Fonda Parking Lot, and the Nusbaum House) and was found to be comparable (Akins 2011:77-78). Combined, this seventeenth century data set shows a diverse array of species presumably being consumed, including buffalo from the eastern plains. While seventeenth century settlers consumed sheep and goat, they appear to represent one of many protein types in the diet, including cattle and wild game. It is not until the 1700s that goat and sheep were overwhelmingly the primary protein source (Figure 7).

Stone artifacts were rare. Analysis of flaked stone indicates a preference for chert or quartz-like material (Moore 2011:89). It is probable that these materials were favored for their ability to maintain a sharp, resilient edge, ideal for use as a strike-a-light. Two strike-a-lights were encountered (based on the presence of metal adhesions along utilized edges). The few ground stone artifacts encountered were pieces of unprepared cobble with striations denoting only light or moderate use. This wear level combined with the use of cobble raw material suggests that many of these tools were used quickly and then discarded (Figure 8 and Wening 2011:98-100).

Lastly, the nine hand-wrought nails, metallurgical slag, and a piece of cut mica, presumably used for window glass or as a decorative embellishment on some furnishing, were of limited interpretational value but could represent metallurgy and construction/renovation activities occurring nearby at the time of deposition. Perhaps the pit was initially used as a borrow pit for mining sands and clays for construction of the Palace of the Governors prior to being filled in with kitchen waste.

Conclusions
Archaeological monitoring and excavations of the four test units needed to install light posts along the northern boundary of the Santa Fe Plaza provided the opportunity to increase our knowledge of this culturally important and enigmatic location. The majority of deposits encountered and characterized could not be associated with one another or with
archaeological findings elsewhere on the plaza. The preservation and accumulation of cultural strata varied significantly across the four test units and suggests at least some discontinuity or irregularities in the depositional sequence. However, small portions of the stratigraphic sequence, particularly the late nineteenth clinker-rich deposit and the possible Pueblo Revolt Plaza surface, coincided with previously published descriptions by Cross Cultural Research Systems and the OAS.

Certainly, many of the questions regarding the plaza cannot be addressed by the current archaeological data set and are outside the realm of this small study. However, the documentation of the strata, coupled with detailed analysis and interpretation of the artifacts and food bone from Strata 3.5 and 3.6, contributes in meaningful ways to our understanding of the past. It underscores the need to both conserve and protect Santa Fe Plaza as a valuable archaeological resource.

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**SALINAS PUEBLO MISSIONS NATIONAL MONUMENT** is composed of three units—Gran Quivira, Abó, and Quarai. All are early Tompiro pueblos at which the Spanish established mission churches in the 1600s. Gran Quivira lies approximately 25 mi south of Mountainair, New Mexico. It includes early pithouse villages dating from A.D. 700 to about A.D. 1300; its pueblo was occupied from ca. A.D. 1300 to A.D. 1672. It contains two Spanish mission churches. The earliest, San Isidro, was established between A.D. 1629 and 1631; San Buenaventura was begun in 1659. The inhabitants of Gran Quivira and the broader region were driven from the area by Apaches around 1672, eight years prior to the Pueblo Revolt of 1680. The Pueblo people took refuge with their Piro neighbors to the west, and some of them went south to El Paso del Norte. Subsequently, the revolt drove most of the original survivors of Gran Quivira and their Piro hosts, as well as the Spanish, south to the vicinity of El Paso del Norte. Shortly after abandonment, rumors of great wealth buried there by the friars and associated treasure maps abounded.

Most of the present-day treasure seeking activity can probably be traced to the legacy of these survivors. Gordon Vivian (1964:31) vividly describes the scene: “It’s a delightful picture—the descendants of the displaced Jumanas selling treasure charts of Gran Quivira to gullible Spaniards.” The tales of fabulous wealth buried beneath these ancient ruins undoubtedly hastened the demise of Gran Quivira's two churches, San Isidro and San Buenaventura, as most of the treasure tales involve the wealth of the friars or their hiding places.

In addition to those dug in the churches, there are several treasure seekers’ pits and shafts to the east and southeast of the main pueblo area. These have had major quantities of dirt and limestone removed and dumped nearby. All of these shafts go through the stratified limestone and into the underlying diorite. This is partly because many of the early accounts state that the treasure vaults were underground and their entrances were sealed. The nature of the outcropping bedding planes of the San Andres limestone almost looks like mortar and slab construction to the uninitiated, as Clara Corbyn (of whom more will be told below) describes:

Removing this rock he found a curious formation. When the rock was shoved to one side, beneath this was a huge boulder which rested upon another flat rock and so on, the two alternating, four or five deep and no telling how much farther down into the depth of the earth, for Laurence wearied of the search and abandoned his unfruitful work at the depth of about ten feet from the surface.
These rocks were, strange to say, laid with the regularity described, and in a bed of mortar which showed skillful handiwork (Corbyn 1904:368).

The first known treasure hunter at the site appears to be a Don Pablo Yrisarri “who began his probings at Gran Quivira in the 1780s after having come into the country by way of El Paso where he probably obtained his treasure chart” (Vivian 1964:31). Information on subsequent treasure hunts comes from an officer in the U.S. Army, James H. Carleton, who was in the region during the Indian Wars. In his journals from the period, Carlton (1855a, 1855b) makes many references to the treasure, its seekers, and their haphazard diggings:

Here (Torreon) we learned that a small party of Texans had recently been at the ruins of Gran Quivira in search of treasures (Carleton 1855a:304).

It seemed as if the genii who, in the Eastern tale at least, are said to guard the depositories of great treasures, were determined to make the existence of such a place as Gran Quivira as much of a problem to us as to the Mexicans themselves (Carleton 1855a:186).

The most rational accounts represent this to have been a wealthy Spanish city before the general massacre.
of 1680, in which calamity the inhabitants perished—all except one, as the story goes; and that their immense treasure was buried in the ruins. Some credulous adventurers have lately visited the spot in search of these long lost coffers, but as yet (1845) none have been found (Carleton 1855a:190).

We find in the cathedral, and in the chapel, in every room of the monastery, in every mound of stones in the neighborhood, and in every direction about the ruins, large holes dug, in many places to the depth of ten feet, by those who have come from time to time to seek for these hidden treasures. Some of these holes look as if they were made more than a century ago, while others appear to be quite recent. Even the ashes of the dead have not been left undisturbed during these explorations. Near the east end of the chapel we saw where the people who had been digging had thrown up a great many human bones, which now lie scattered about (Carleton 1855a:194).

In the late nineteenth century, another couple, Mr. and Mrs. Corbyn, left their imprints on the ruins of Gran Quivira. Having lost their fortune during a financial crash, they decided to return to New Mexico where they had first learned of the fabled treasure of Gran Quivira. They hoped that this vast treasure would return them to the affluence they had previously lost. The Corbyn’s filed for a 160-acre homestead on the site. After Mr. Corbyn died, his nearly blind widow, Clara Corbyn, continued her search for the treasure. She describes many instances of hearing treasure hunters at work in the church and of her many attempts to run them off in her book, *La Gran Quibira*. On one occasion she had a Mexican stranger take her to get supplies at a nearby store.

![Figure 2. Looking west to San Buenaventura from Mound 7.](image)
We purchased a few pounds of flour and returning past the old church we heard someone digging there. This I had forbidden and I hastened to see who the intruders were. I found two men, and was afterward assured that there was a third whacking away. I called out to them sharply and they answered me most impertinently. These persons refused to give me their name and declared their intention to do as they chose upon the ground, demanding that I show them my papers, improvements etc....We had a lively dispute but I came out ahead and they agreed to desist and to leave the ground (Corbyn 1904: 473).

Clara Corbyn’s title to the north part of the ruins was validated by the Secretary of the Interior and it was not until her death that the School of American Research bought it at a tax sale in 1914, thus ending active unauthorized treasure hunting on the monument. In the meantime, however, the treasure hunting continued.

About 1900, a band of Brazilian gypsies, under the leadership of La Cerda, came seeking a treasure worth $30 million which included a one hundred pound diamond. La Cerda claimed he had an aunt in Spain who had papers showing the treasure’s location. His dreams were short lived as “The count became embroiled in a fight over a lovely senorita in Tajique and landed in jail when it was thought that he had killed a Mexican boy. The boy recovered, however, and La Cerda’s brother bailed him out of his troubles and took him back to Brazil” (Anonymous 1970:1).

A descendent of Don Pablo, Jacobo Yrisarri, was looking for the treasure when he was arrested and taken to Santa Fe in 1907 for violation of the 1906 Antiquities Act. The area was by then a national monument and closed to treasure-seeking activities. The treasure tales lived on, however, as the following letter by a local man (translated from Spanish) illustrates:

It is with great pleasure that I take my pen in hand to send you greetings now to tell you news since you have probably heard mention of the old village of Gran Quivira the ruins of which exist at the present time. It has been said that there exists a great treasure buried by those who in former times lived in the above mentioned place. My friends and I, walking about this place found in a hidden spot a door that leads to an underground place made by human hands. This was covered with stone and earth which we removed and entered for as far as thirty feet but we were finally afraid it might sink and we left it. I, lacking the necessary elements for the enterprise, have been able to get my companions to agree to have join us an honest man so we may proceed with what we need. I have chosen you to carry out the enterprise. I am doing so because of memories of gratitude and favors. If you would like to come here we will take you to the place I have mentioned. We have chosen you to be our companion to see that our interests may be protected. Trusting in God we shall have the best results possible. I am hoping for your answer as soon as you can conveniently make it (Garcia 1916).

Despite national monument designation for the site, a permit to excavate for treasure at Gran Quivira was granted to J. B. Wofford and Alfred J. Otero in 1930, and to Otero again in 1932. The second time it was the persistent Jacobo Yrisarri working under Otero’s permit, and he began
to clean out his old shaft under the apse of San Isidro. The permit expired on December 31, 1933, and the attempts at an extension and a new permit were denied. The National Park Service backfilled Yrisarri’s shaft in 1940. This was not the last of the looting at Gran Quivira, however.

Eight Men Cited for Damage to Gran Quivira

After being alerted by a former National Park Service (NPS) employee, NPS Rangers cited eight California men for illegal damage to Gran Quivira, an historic pueblo that dates before the Spanish entrada and is the largest pueblo in the Salinas National Monument. The men were charged with violation of 36 CFR Part 5.14, which prohibits prospecting and mining within a national park. One man admitted to having used a device he called an “electroscope,” which was found in one of the men’s vehicles during a consent search to detect gold. The men said they had used it during the day with the intention of returning at night to dig into the site. They said they got the device from “a man called Bob,” who told them there was gold at Gran Quivira. They dug a hole 6 feet in diameter and 5 feet deep before becoming wary and leaving the site. Though no artifacts were taken, NPS Rangers found a shovel, posthole digger, trash, a shotgun, two rifles, a bow, camping gear, and a semi-automatic pistol with silencer on the site and in rented vans nearby.

Local sheriff’s deputies assisted in the investigation. In addition to the charges placed against them, the men were required to repair the damage to the site. The investigation continues, and information will be shared with other law enforcement agencies (Anonymous 1992).

Why have so many searched for the treasure and why has its allure proven so enduring? One journalist writing in the 1930s estimated the treasure at 1,600 burro loads of gold and silver, each burro load weighing 250 pounds, or 4,224,000 troy ounces (Cheney 1934:39). At today’s market price of $1,750 per troy ounce for gold and $34.00 for silver, that treasure would be worth in excess of $3 3/4 billion dollars ($3,767,808,000 dollars) if it was half gold and half silver.

“Does the treasure really exist? Quien Sabe! Men have schemed to get it and have died trying to reach it” (Hood 1951:54). The nearest silver and gold in quantity is found around White Oaks, New Mexico, closer to the pueblo of Tabira than Gran Quivira. Very little evidence was noticed on my survey of the Gran Quivira Monument 1980-1981 of firing activity needed for smelting or associated slag (Beckett 1981:64). The pueblo was also abandoned in the early 1670s, before the Pueblo Revolt of 1680, so it is doubtful that the friars left any church property or valuables behind. Any metal, even iron, was a scarce commodity in seventeenth century New Mexico. But, the legend is a very real thing for many of the old families of the region and they take delight in expounding on tingling tidbits of the treasure tales to visitors who lend them a willing ear.
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CARLSBAD CAVERNS was established as a national monument in 1923 and elevated to national park status in 1930 in recognition of the world-class cave system. It is the deepest limestone cave in the United States and the largest easily accessible cave room in the world. The caves are in the best exposed Permian age fossil reef and are home to a world-famous colony of migratory Mexican free-tail bats and one of the largest colonies of migratory cave swallows in the United States. The national park status came about as a result of persistent efforts by members of the local community who correctly realized that the otherworldly cave formations could be a significant tourist destination. Before the establishment of the park and the ever increasing numbers of tourists lent their earning power to the town of Carlsbad, however, a very different industry—one also reliant on the caves of Carlsbad Caverns—provided jobs and a source of income to some of the residents of Eddy County in southeastern New Mexico.

The “Great Guano Rush”
At the turn of the nineteenth century, farmers in the East had cultivated their lands long enough to have depleted the soil somewhat. At the same time, they were experiencing increased competition from farm products being shipped east by farmers homesteading in the West. The search for ways to improve the fertility of the soil in Eastern fields provided the incentive for researchers developing the new field of organic chemistry to explore plant growth and metabolism, giving rise in turn to study of various potential fertilizers, including guano (Skaggs 1994:2-3).

Guano, the droppings of birds and bats, had been used as a fertilizer by the Moche and Inca peoples in Peru for centuries, and the word “guano” derives from the Quechuan “huanu” or “wanu,” meaning “dung.” The fertilizing quality of guano was observed by the Spanish conquistadors in Peru in the 1530s but, more interested in precious metals than agriculture, they focused their efforts on mining minerals rather than bird excrement. It wasn’t until the early 1800s that guano garnered greater attention on the part of Europeans and Americans. One of the first mentions of guano as fertilizer in an agricultural publication was by John S. Skinner, editor of American Farmer, who extolled it as “a celebrated manure…possessing astonishing fertilizing properties” in 1824 (cited in Skaggs 1994:3). Guano quickly came to be prized as an agricultural fertilizer and as a source of saltpeter used in gunpowder.

Such was the demand for high quality fertilizer that in the 1840s, guano sold in the U.S. for $53 per ton, skyrocketing to a high of $73 per ton in the 1850s (Skaggs 1994:5). Hoping to profit from the valuable commodity, U.S. entrepreneurs (mostly whalers and merchants) raced to mine guano from
various Pacific islands in what Skaggs (1994) has dubbed the “Great Guano Rush.” Most guano imported into the U.S. came through Baltimore, which proudly proclaimed itself America’s Guano Capital (Skaggs 1994:148). The guano hit the fan, however, when, knowingly or not, U.S. entrepreneurs engaged in guano mining on islands claimed by other nations and pushed the U.S. government for backing and protection when the inevitable protests arose.

Pressured by constituent businessmen (but needing little encouragement), the expansionistic U.S. Congressman William Henry Seward put forth Senate Bill 339, which passed as the Guano Islands Act in 1856. The act enabled U.S. citizens to take possession of islands containing guano deposits anywhere in the world as long as they were not occupied and not within the jurisdiction of other governments. It was assumed that U.S. governance would end once an island’s deposits were exhausted and the island abandoned. This was a change from previous policy wherein it was expected that any territory acquired by the U.S. was an integral part of the country and would, in time, have an opportunity to become a state in the Union. These new so-called insular areas could also be held indefinitely by the federal government without any prospect of becoming a state. (Skaggs 1994:20-39, 56-66)

More than 100 islands have been claimed for the U.S. under the Guano Islands Act. Most are no longer U.S. territory, but some of those remaining under U.S. claim are the French Frigate Shoals and Swains Island (incorporated into Hawaii and American Samoa, respectively); Baker, Howland, and Jarvis Islands (now wildlife refuges); Kingman Reef (administered by the U.S. Navy), Palmyra Island (now part of the Pacific Remote Islands Marine National Monument), and Johnston Atoll (used by the U.S. government for disposal and destruction of chemical weapons) (Skaggs 1994:221).

Midway Atoll was also claimed under the Act and remains an insular area under U.S. administration; many islands that were retained under U.S. domain were those of particular strategic rather than economic significance. The Act did not prevent further conflict with other governments over guano; at various times since guano mining began, the U.S. has clashed with Peru, Mexico, Venezuela, The Netherlands, Colombia, Honduras, Nicaragua, Great Britain, Spain, the Dominican Republic, Haiti, Cuba, France, and Japan, among others, over guano mining activities on disputed islands.

In the end, however, it proved difficult to profit from bird guano mined from islands. Despite widespread use of slave labor (often kidnapped Chinese and Pacific Islanders), guano was prohibitively expensive to mine and transport. Few guano islands had hospitable harbors or easily available food and drinking water. The quality of guano on islands in wetter locations was greatly inferior to Peruvian guano because moist conditions leached the nitrogen out of it; such guano could not be sold for as high a price without being amended. Guano’s reputation and demand were further damaged by people selling ineffectual imitations. So rife and so foul were the fraudulent products that Maryland even instituted a state-level guano inspector position, charging importers forty cents per ton for inspection and a grade stamp. Guano was hard on vessels and crews; some insurance companies refused to insure guano ships after certain crafts spontaneously combusted and sank or ran aground under crews overcome by the fumes. In 1855, nearly 176,000 tons of guano entered the U.S., but by 1869, this was down to just over 13,000 tons. In the 1880s it was discovered that rock phosphate blended with animal byproducts or other organic matter had much the same results. Multiple discoveries of rock phosphate in the 1880s and 1890s further depressed demand for guano. In 1898, only 4500
tons entered the U.S., and import soon ceased altogether. (Skaggs 1994:10, 143-149, 155-157)

This was not the end of the guano story, however, as guano remained enough in demand that exploitation of non-marine sources of guano was ongoing. Guano occurs within the mainland U.S. primarily in central Texas and eastern Kansas, but in other locations as well. Small deposits were typically used locally, but larger ones could be mined commercially and shipped to agricultural regions. Small deposits in the caves of the porous Permian Uplift of the Carlsbad area were used by local farmers in the 1880s, but none were large enough to warrant development until the discovery of the deposits in Carlsbad Caverns.

Guano Mining at Carlsbad Caverns

In 1888, the town of Eddy was established as a cattle town and irrigation site by Charles Eddy in the southeast of what was then the New Mexico Territory. Charles Eddy pushed its development and even its culture, which was, at least initially, alcohol-free. Changes occurring in the Territory, severe weather incidents, and the failure of the various developmental schemes due to overgrazing and poor water management ultimately resulted in an economic crisis. Through the decades around the turn of the twentieth century, the residents of Eddy would actively seek various means of improving the economy of the area.

The first such plan was a change in the town’s name from Eddy to Carlsbad with the intention of luring visitors to a large natural spring with qualities similar to the European spa, Karlsbad. There was some success with this enterprise and wealthy investors arrived to “take the waters” and seek investment opportunities in irrigated land. This effort was assisted by the arrival of the railroad from Pecos, Texas in 1891, which provided a much improved connection to the outer world. Not until the 1920s, however, would the region’s economy become more secure with a base in potash mining and oil and natural gas production. Prior to this time, there was a constant search for others means of economic growth. In 1901, the discovery of large caves approximately 20 miles out of town began a path of development of the tourist industry that continues today.

As local lore has it, in 1901, or possibly as early as 1898, cowboy Jim White was riding well outside of town when he noticed a large opening in the ground from which hundreds of thousands of bats were emerging. Jim and others made some preliminary investigations of the caverns, but initially nothing came of the find. Another Carlsbad resident, Abijah Long, made the same discovery and exploration in 1903. In contrast to White, Long recognized the economic opportunity presented by the bat guano. In the early 1900s, guano was in demand for fertilizer for California’s growing citrus industry, and the first assessment of the guano deposits in the caverns suggested that they were over 100 feet deep in the largest rooms (Bailey 1925:324).

Long filed his claim in March, 1903 (MacVaugh 2000:23) and began making the first improvements to the site, including construction of a rough wagon road. Finding extraction of the guano through the cavern’s natural entrances difficult, Long’s workers sank a vertical shaft next to the natural entrance and installed a headframe, allowing the guano to be loaded into an ore bucket and hauled to the surface on a pulley system. According to Nymeyer and Halliday (1991:20), the bucket used to haul guano and people was of heavy iron riveted at the seams and manufactured by the Derbyshire-Harvie Iron and Machine Company of El Paso. The pulley was powered by a hoist which, though a great improvement over hauling guano to the surface by hand, was far from trouble-free. One operator recalls starting the single-cylinder engine “by blocking open one of the valves with a stick to relieve compres-
sion while I tugged at the big flywheel to git up a little speed. Then kick away at the clutch to see if she would start firing” (Nymeyer and Halliday 1991:95).

Realizing he needed more capital, Long partnered with the Ramsey Brady Company of Carlsbad. This allowed him to blast another shaft near the guano deposits, establish a more sophisticated bucket system for entry to the caverns and extraction of the guano, and build rough housing for the miners to replace the tents and wagons they had used thus far. Long also established a small railway within the cave that utilized an ore cart to carry ten sacks of guano at a time to the bucket for extraction to the surface (Nymeyer and Halliday 1991:20). This was a great improvement over hauling heavy bags of guano to the bucket by hand.

Guano mining was disagreeable and difficult work; Skaggs (1994:159) asserts that it was more difficult, dangerous, and demeaning than all of the early industrial jobs of the period, including coal mining, railroad construction, lumbering, butchery, and meatpacking. Workers had to dig trenches in the guano and chisel out chunks of aggregated feces. The resulting ammonia-laden dust was not only unpleasant but could lead to nosebleeds and even temporary blindness. Miners of guano worldwide (and even the sailors who hauled it and sometimes the farmers who used it) suffered from respiratory problems, gastrointestinal complaints (likely what would be diagnosed as histoplasmosis and shigellosis today), swollen limbs, and purpura (subcutaneous eruption of blood vessels) (Skaggs 1994:160). Though certainly not enslaved as were many of the workers on Pacific and Caribbean islands,
laborers in Carlsbad Caverns were working in
an enclosed environment that must have made
their exposure that much more unpleasant and
unhealthy. It was also hard physical labor;
standing up to their hips in guano, two men
could fill 400 50-pound sacks of guano per
day (Rothman 1998:143). Writing in 1928,
Bailey (1928:113-114) estimated that at its peak
production, Long’s guano mining operation
extracted 40 tons of guano per day in 50-pound
bags, or enough to fill between one and three
railroad cars (Rothman 1998:143). The guano
had to be hauled out to the railroad at Carlsbad,
and food and water had to be brought in to the
camp. Conditions were always difficult, but the
enterprise provided a few much-needed jobs.

Draft animals were important even after the
access road was put in, and it appears that the
guano was hauled out almost entirely in wagons.
Few automobiles were capable of navigating
the steep road where it climbed the ridge above
White’s City. One of the few vehicles that could
was a predecessor of the Jeep made by the Willys
Company called the Baby Overland. Some
Model T’s could make it, but most had gravity-
fed fuel pumps that required them to back up hills
as steep as those on the guano road and the road
was simply too rough for this to be possible (one
visitor compared it to driving up a set of stairs).
Willis Lee, an employee of the U.S. Geological
Survey and an early explorer and advocate
for national monument status for the caverns,
described the ascent of the guano road in one of
the two articles he wrote about the caverns for
National Geographic:

The cavern is reached over a road
sadly in need of improvement.... Two
hours of jolting into ruts and out of
them brings us to the foot of a steep,
rocky slope from which every vestige
of soil has been washed away...Here
the laboring machines come to a halt,
while their overheated engines cool.... Up this rocky slope we must make our laborious way to a bench on the mountainside about 1,000 feet above the valley. Some of the party remain in the jolting machines; others prefer to walk (Lee 1924:1-3).

Lee managed to drive a Model T to the mine by attaching a tire pump to the gas cap and using it to pump air into the tank, thereby forcing gas up to the carburetor (Nymeyer and Halliday 1991:96).

A significant hurdle for many extractive industries statewide was the cost of transportation to get the material to market. In the case of the guano, the market was the large fertilizer companies serving the citrus orchards in California, and the shipping cost even once the guano was hauled to Carlsbad ran at $9 a ton (Nymeyer and Halliday 1991:22).

When Long’s primary customer, the Hawaiian Fertilizer Company of San Francisco, announced it would purchase only dry fertilizer, Long then had two incentives to build drying beds outside of Carlsbad to reduce the weight of the guano (Rothman 1998:143). Long’s improvements to the mining operation and the drying facility were not enough to make the enterprise profitable, however, and he eventually sold the operation. Details of subsequent ownership are convoluted and contradictory. Some records suggest Long sold to H.F. Patterson, who in turn sold to T.W. Teague and Charles Doss in 1907, but Long also states that G.M. Cooke owned it in 1906, and that a J.D. Lanford sold it to the Carlsbad Guano Fertilizer Company in 1909 (cited in Nymeyer and Halliday 1991:22). The El Paso Fertilizer Company is also credited with ownership in 1906 (Rothman 1998:144). Regardless of the confusion concerning the early history of ownership, most sources agree
that the General Fertilizer Association of Los Angeles acquired it in 1911. An article in the Carlsbad Argus from April 14, 1911 reported that the mine employed 40 men in addition to the teams used to haul the guano to Carlsbad (quoted in Nymeyer and Halliday 1991:22). In sum, the guano in Carlsbad Caverns was mined by many various parties between 1903 and the late 1920s primarily, with sporadic efforts continuing through the 1950s.1

Where Long had seen a business opportunity in the presence of guano, the local cowboy Jim White was taken with the natural wonders of the caverns and undertook systematic exploration, finding an ally in local photographer Ray V. Davis. Davis’s photographs captured the beauty of the formations and were a key tool in overcoming the Carlsbad public’s perception that the caves were merely the source of the unpleasant guano (Rothman 1998:147). Through their efforts and the work of Government Land Office Examiner Robert Holley, U.S. Geological Survey field agent Willis Lee, and Senator Bursum of New Mexico, Carlsbad Caverns was granted national monument status by President Coolidge in 1923. The new monument was composed of 719 acres over the location of the caverns except for the 40 acres in the patent held by the General Fertilizer Company. In 1930, the monument lands were expanded and it was designated a national park.

During the period of initial exploration and assessment, and even in the early days of the National Park Service, one of the easiest ways for visitors to descend into the caverns and reach the most scenic areas was to ride down in the guano bucket at the mine. One notable personage who did so was the first Director of the National Park Service, Stephen T. Mather, in 1928. Lee’s National Geographic article also described the trip down into the caverns in the guano bucket:

This elevator consists of a steel bucket at the end of a wire rope which passes over a pulley at the top of a derrick and is lowered through an artificial opening or shaft, constructed for hoisting guano from the cave. The bucket holds two people if they are not too large, and if they stand very close together and hold very tightly to the wire rope.... Slowly we descend into the Stygian darkness, with only that threadlike rope between the world we know and love and that black, unknown inferno (Lee 1924:5).

The Carlsbad Caverns Guano Mine and Camp (LA 127550)

A recent update of the National Register of Historic Places nomination for the Caverns Historic District provided an opportunity for more detailed research and archaeological documentation into the above-ground remains of the guano mining operation at Carlsbad Caverns (LA 127550) and the associated Old Guano Road (LA 173395). The buildings originally present at the site had been demolished, and the two guano mine shafts were filled in and the area rehabilitated in 1981 in order to restore bat habitat and ensure visitor safety. Because of these changes, work at the site proceeded with a heavy reliance on historic photographs to establish the locations of structures and features.

The guano mine and camp site straddles Bat Cave Draw, extending up the slopes of the ridges on both sides of the drainage to the north and south. Many of the features are clustered on the north bank of the drainage around the second natural entrance to Carlsbad Caverns (the main entrance is the larger, more accessible cave opening that was developed for tourist access and is the setting of the twilight bat flights). Additional features are east down the canyon, and there are a few features on the south bank as well. The foundations or locations of seven structures were identified, as were seven stone walls (most
Figure 5. The overgrown foundation of the building sheltering the hoist. Photograph by R. Zac Selden, National Park Service. National Park Service photo, Carlsbad Caverns National Park.

Figure 6. The earliest photograph of the Carlsbad Caverns guano mine and camp, ca. 1903-1905. National Park Service photo, Carlsbad Caverns National Park.
creating level areas for buildings or the roadbed on the slopes of the draw), the modifications to the second natural entrance and the two shafts, the location of a set of narrow gauge rails, and a possible tent site.

The buildings formerly present at the site included a large storage building and a possible associated secondary shed or addition, two shelters for the hoist machinery that raised the guano buckets at the two shafts, and bunkhouses and other domestic buildings. Most of the buildings were wood-framed structures with pitched gable roofs. Walls were board and batten or rough wooden sheathing; roofs were covered with sheet metal. A series of corrals defined variously by stone walls or post fences are visible in the photographs, none remain intact. A broad scatter of artifacts covers the general area with a few denser areas near the locations of the buildings used for housing. Most are fragmentary; it is probable that much of the trash generated during the site’s occupation ended up in a dump along the Old Guano Road; other artifacts may have been removed during the “clean-up” of the site.

Figure 7. The guano mine and camp in 1924. National Park Service photo, Carlsbad Caverns National Park.

Figure 8. Visitors descend into the caverns in the guano bucket in 1924. National Park Service photo, Carlsbad Caverns National Park.
The earliest photograph, dating to sometime between 1903 and 1905 (Figure 6), shows two wood-framed buildings, a post and beam loading dock stacked with bags of guano, informal stone alignments and walls, and a person pushing a cart loaded with additional bags of guano, with a group of horses or mules nearby. It appears that there may have been a set of rails leading from the second natural entrance to the loading dock, though no historical account mentions this and the cart may have been a push cart rather than one on rails.

The next informational photographs of the site date to 1924 when the operations were nearing their end. In Figure 7, the large storage building, hoist house, headframe, and bunkhouse are evident. The housing visible in the previous photograph is gone, the post and beam loading dock was replaced by a dock formed by stone retaining walls, and a series of stone and post corrals are present where none were before. In Figure 8, tourists prepare to descend into the cave via the guano bucket. The details of the headframe can be clearly seen, with the storage building in the background and the building housing the hoist at the right. The cable from the hoist extends up to the pulley, then down to the ore bucket. Not visible in this image because of the exposure is another line that anchored the top of the headframe on the opposite side against the force needed to haul a loaded bucket to the surface. A set of narrow gauge rails extend from the two hatch doors used to cover the shaft when it wasn’t being accessed. The rails allowed easy disposal of the overburden while the shaft was

![Figure 9. The Old Guano Road. The road track is visible at the lower left of the photograph, extending toward the cluster of buildings at the park headquarters on the horizon. Photograph by Samuel Denman, National Park Service. National Park Service photo, Carlsbad Caverns National Park.](image-url)
constructed; the pile of dirt over to one side in this image shows they were not used subsequently. The second natural entrance would be behind the group of men observing the proceedings.

Cave formations were found mixed in the piles of overburden for both shafts and were a good means of pinpointing where the shafts were originally placed (the 1980s reclamation successfully obscured them). A segment of the pulley from the headframe of the second shaft was found during documentation, as was a 10-centavo coin from 1928. The small stone enclosure visible between the storage building and the hoist house in the first image is still present; so are the foundation and a brick feature from the hoist house itself. As stated above, artifacts were mainly fragmentary and domestic in nature, including pieces of ceramics (mainly dishes and tea cups), glass, food and beverage cans, architectural debris, the remains of a wood or kerosene cook stove, shell buttons, and other small items. Most were unremarkable, but the handle of a pre-1917 glass candy bottle shaped like a revolver was found, as was a glass bottle embossed with “Henry K Wampole & Company” on the side (likely for cod liver oil or another medicinal product), and a can embossed with “Richardson and Robbins/Dover DE/USA.” Richardson and Robbins was the first cannery in the state of Delaware; the company had a reputation for quality and specialized in canning delicacies such as boned hams and poultry, fancy fruits, and plum pudding (Smith 1976). The overall lack of industrial artifacts might be explained if the last corporate owner of the site removed any valuable machinery and tools when ownership passed to the National Park Service.

The Old Guano Road (LA 173395)
The Old Guano Road extends from the confluence of Bat Cave Draw and Walnut Canyon near White’s City up onto a long, east-trending ridge on the south side of Bat Cave Draw. It follows the ridge top, descending into Bat Cave Draw at the guano mine and camp (LA 127550) and continuing west a short distance to the main natural entrance to Carlsbad Caverns. At this west end, it is visible as a leveled linear area cut into the north bank of Bat Cave Draw. Once it crosses the draw and ascends the ridge to the south, it is most discernible as a swale with occasional linear alignments of earth and/or stones that were cleared to make it passable for vehicles. The two tracks that descended the lower part of the ridge into White’s City were covered with large cobbles and small boulders of local limestone by men working in the Civilian Conservation Corps to close the road and hide the scar from park visitors using the new NPS-built entrance road that follows Walnut Canyon. The road bed has therefore been obscured in this area, but the linear cuts in the hillside can still be discerned (especially with reference to historic aerial photographs). It is braided into multiple tracks where the slopes are most steep; apparently as one track eroded to impassability, another was attempted. David Kayser (personal

Figure 10. Artifacts in the dump along the Old Guano Road. Photograph by Samuel Denman, National Park Service. National Park Service photo, Carlsbad Caverns National Park.
communication June 15, 2012) suspects that
the road was built in an existing travel corridor
used by early ranchers and by Native Americans
before them. He also believes that it continued
to the west beyond the caverns entrance in the
vicinity of where the Desert Scenic Drive loop
road is today.

In comparison to the stretches of the Walnut
Canyon Entrance Road (built in 1927 to
circumvent the treacherous guano road), the
guano road has few built features along its 3.7-
mile length. Clearly the guano miners were
expedient in their construction, whereas the
State of New Mexico was more concerned with
road quality and safety when it built the road
for tourists to access the caverns. The guano
road has only one low retaining wall along the
entire road bed, and no culverts or other drainage
features. In addition, at the very eastern end
are three rectangular areas dug into the slope
of the ridge averaging 4 m on a side and with a
maximum depth of 75 cm; their age and function
are unknown.

Many of the artifacts along the course of the
road were the food and beverage cans and bottles
one would expect from use of the road and the
occasional episode of camping along its length.
Of note, however, is an area that appears to have
been used as a dump during the occupation of
the guano mine and camp (and, perhaps, the early
days of the National Park Service) that contains
many miscellaneous domestic artifacts as well
as a few related to the extractive activities at the
site, including a California Cap Company can
that once contained blasting caps.

**A Celebrated Manure**

Many of the natural resource extraction efforts
in New Mexico during turn of the twentieth
century would prosper for a short time but
ultimately peter out, and guano mining was no
exception. When the industry developed near
Carlsbad, it was already an anachronistic and
obsolete strategy typical of small communities
on the peripheries of industrial America. Potash,
an easily mined material found in many parts of
the country, was already proving to be a fertilizer
nearly as effective as guano when amended with
animal or petroleum byproducts such as those
generated in great quantities by Standard Oil and
the Armour Company. The once valuable guano
only remained viable as an extractive industry
in discrete niches that were too small to interest
large corporations (Rothman 1998:141).

The profits from the guano mining at Carlsbad
Caverns were never very high, but the guano
deposits in Carlsbad Caverns were one of the
very few in the region large enough to support
commercial-level extraction and transport even if,
in the end, proceeds were chronically low. Others
in the region (Ogle Cave—also within Carlsbad
Caverns National Park—or even Bat Cave in the
Grand Canyon) date to a slightly later period,
making the operation at Carlsbad Caverns one of
the earliest commercial guano mining operations
in the broader region. Although a rather limited
economic opportunity, at the local level the
guano mining at Carlsbad Caverns happened in
a place and time when any prospect for jobs was
very welcome. The guano extraction was also a
precursor to other extractive industries that are
mainstays of the Carlsbad regional economy
today, including potash, oil, and natural gas.

The mining of bat guano in Carlsbad Caverns
was an extension of the “Great Guano Rush” that
was, in its beginning, focused almost exclusively
on marine bird excrement. While the import of
island guano into the U.S. had largely dropped
off by the turn of the twentieth century, limited
mining of bat guano continues to the present day.
In the end, the legacy of the Great Guano Rush
has proven to be enduring. The possibilities
presented by guano helped spur fundamental
research in the field of organic chemistry. Guano
was one of the first fertilizers to be distributed commercially in the United States, and in the course of its promotion, farmers learned scientific agricultural techniques and ways to augment the productivity of their land. They also realized their potential power as a politicized agrarian sector group as they successfully pressured politicians to take action to make high quality, reasonably priced fertilizer widely available. Ultimately, this resulted not only in passage of the Guano Islands Act with its major impact on U.S. foreign policy and acquisition of U.S. territory, but also played a role in the creation of the U.S. Department of Agriculture with its regulatory oversight (Skaggs 1994:224). The “celebrated manure” has proven well worthy of the term.

Acknowledgments
The research presented here was completed as part of a contract to revise the National Register of Historic Places nomination for The Caverns Historic District at Carlsbad Caverns National Park (Brown et al. 2013). Thanks are due to the National Park Service for permission to publish the research and the accompanying photographs. Park curator David Kayser was of great assistance in innumerable ways; his knowledge of the park and its history proved invaluable. Thanks also to park staff members Samuel Denman, who assisted with fieldwork and locating research materials, and Dale Pate, who helped clarify the reclamation activities of the 1980s.

Endnotes
1. Other caves in the Carlsbad area were also mined for guano at various scales. An operation comparable to that at Carlsbad Caverns was the Ogle Cave Guano Mine in Slaughter Canyon, also now within the boundaries of Carlsbad Caverns National Park. This was a 60-acre claim filed by John D. Ogle in 1913. He filed additional claims in 1917 and 1918, mining what he claimed to be entirely high-grade guano until 1938.
2. The original entrance road was constructed by the State of New Mexico because the route was outside the boundaries of the federal land at the time. After the expansion and designation of the monument as a national park in 1930, the road was within the park boundaries. The upper end was rerouted in 1934 and the road paved in 1935, a period when many of the large stone masonry retaining walls and other roadside features were built. The segments of the original route that remain unpaved and unused are recorded as LA 173396.

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They Gave It One Shot and Left, Never to Return
A Pueblo IV Attempt at Dry Farming on the Uplands West of the Ortiz Mountains, Sandoval County, New Mexico

CAROL J. CONDIE

In August of 2000, Quivira Research Associates (QRA) surveyed 467 acres of Santo Domingo Pueblo land on the uplands trending west from the Ortíz Mountains toward the Santo Domingo Valley of the Rio Grande Basin. Eight sites and 24 isolated objects were identified. The survey was conducted for METRIC Corporation (for Vulcan Materials Company, who proposed to mine gravel from the area). However, when testing indicated that commercial quantities of gravel were not present, the project was abandoned. This paper is adapted from our report (Condie 2000).

The Sites and Isolated Objects
Figure 1 shows the project area and the locations of LA 130884-130891. Note that the sites are invariably set just above drainages.

Site Descriptions
LA 130884 (Figure 2), sited on the crest of a tongue above a gentle slope down to the east toward Arroyo Largo, measures 7 m east/west by 6.5 m north/south and contains the rock foundations of a field house and a sparse lithic/ceramic scatter. One room, fairly well defined, measures 2 m by 2 m. A second 2 m by 2 m room is probable, though vague in outline. The ceramics consist of four Rio Grande Glaze A (possibly Cieneguilla Glaze-on-yellow) sherds. The lithics consist of seven items of debitage, two cores, one possible chopper, and one scraper, all basalt. A small east/west arroyo debouches into the arroyo floodplain 15 m south of the site.

LA 130885 (Figure 3) is on a slight downslope 42 m east of and above an unnamed north/south arroyo that bisects the project area. Down-cutting is probably relatively recent, but what is now the arroyo would previously have been a low trough that would collect runoff from slopes to both the east and the west. The site measures 10.5 m east/west by 8.5 m north/south and contains the rock foundation of a small field house and a sparse sherd and lithic scatter. The foundation alignment is poor, but it appears that there is at least one 2 m by 3 m room and possibly more. The ceramics consist of four probable Pueblo IV (P IV) sherds. The lithics, all basalt, consist of five items of debitage and one possible core. None of the lithics looks convincingly cultural; had they not been in context with the sherds and the room foundation we would not have recorded them.

LA 130886 (Figure 4), on a level surface just above a 1 in 2 slope down to the south at the edge of the breaks above Arroyo Largo, measures 17 m east/west by 21 m north/south and is an undefined rock arrangement and a lithic scatter. The rock, which forms a rough circle approximately 2 m in diameter, is not convincing as a structure foundation and seems more closely related to Isolated Objects (IO) 6 and 15. We would have
Figure 1. Portion of USGS 7.5’ quad, showing locations of LA 130884-130891 in relation to project area. Scale: 1:24,000. Contour interval: 20 ft. The map makes it appear that LA 130891 is inside the project area, but it is actually outside according to the boundary that was staked on the ground.
recorded this as an IO had it not been accompanied by a scatter of 36 items of chipped stone debitage.

LA 130887 (Figure 5) is on a steep (approximately 1 in 3) east-facing slope above Arroyo Largo. A steep short drainage flanks the site immediately to the north. The site measures 8 m east/west by 9.75 m north/south and consists of a large scatter of rock plus a sparse lithic/ceramic scatter. Faint terracing is visible among the rocks. The steepness of the slope and the large amount of rock make a field house seem unlikely. More artifacts and a trash midden should be present to correlate with the large number of rooms the rock scatter would appear to represent. Instead, the rock scatter may represent granaries (see “Field Houses and Granaries,” below). The ceramics consist of eight Rio Grande Glaze sherds (Agua Fria Glaze-on-red [G/R] plus an unidentified glaze). The lithics, all basalt, consist of eight items of debitage, one chopper/scaper, and one possible chopper.
LA 130888 (Figures 6 and 7) is on a steep (1 in 3) slope above Arroyo Largo. The site area is 15 m southwest/northeast by 10 m northwest/southeast and contains a dense rock scatter along with a sparse lithic/ceramic scatter. It is difficult to see any room outlines among the rock, but the sizes of individual rocks and the confined limits of the cluster strongly suggest a human agency. Like LA 130887, the site seems too steep and the rock too abundant for this to be a simple field house. Again, the dense rock may represent granaries. Ceramics consist of six probable P IV sherds. Lithics consist of one ground stone object (a vesicular basalt mano fragment) and two items of chipped stone (one red chert turtle-back scraper and one blue limestone scraper).
LA 130889 (Figure 8) is situated on a northeast-facing slope above Arroyo Largo and a small east/west drainage to the north. The site area is fairly steep—on an approximately 1 in 2 slope—but the grade is even steeper below the site. The site consists of a cluster of rock and a lithic/ceramic scatter. Over much of the site, the rock is sparse, but forms a fairly dense blanket in an area of 3 m by 8 m inside the southeast edge of the site. Faint alignments are present, and some areas look vaguely terraced, but there are no clear-cut foundation lines. The variations in density of the rock scatter suggest that LA 130889 supported one or more field houses and, perhaps, a cluster of granaries. The large and varied ceramic inventory indicates habitation as well as storage and also suggests that LA 130889 may have enjoyed a longer occupation than the other sites. Presumably, the extensive terrace near the site made this area of Arroyo Largo a better agricultural spot than other areas. Ceramics total 75 sherds. Various types are represented, some of which we could not identify, but both Agua Fria G/R (53 sherds) and Espinosa Glaze Polychrome (G/P) (three sherds) are present. The lithics consist of 19 items, all but one being chipped stone (one gray limestone scraper and 17 pieces of basalt and chert debitage). The last item is ground stone, a possible camp metate that lies 7 m to the northwest, outside the site boundary.

LA 130890 (Figure 9) is located on the west- and northwest-facing toe of a northwest-trending ridge at the east edge of a shallow north northwest-trending drainage. The site measures 13 m east/west by 22 m north/south and consists of a probable house foundation and a sherd and lithic scatter. The stones of the “structure” are in unconvincing alignment—more compelling as a

Figure 8. Sketch map of LA 130889, showing rock scatter and limits of greatest sherd concentration. Note the 3 m by 8 m area of greater rock density near the southeast edge of the site.

Figure 9. Sketch map of LA 130890, showing probable field house foundation and lithic/ceramic scatter (artifacts marked by “x”).
random scatter than as a structure foundation. As Figure 9 shows, no artifacts occur near the rock scatter. However, arguments for a structure are that the rock scatter is just above and proximate to a drainage—an appropriate location for a field house, the rocks are roughly uniform in size, and they are in a group. The rock scatter measures 4 m by 5 m. On balance, a field house of two 2 m by 2.5 m rooms seems reasonable. The ceramics total 21 sherds, of which 17 are Agua Fria G/R and four are unidentified. The lithics total five items of basalt and chert debitage.

LA 130891 is outside the project area and, therefore, we did not conduct the usual recording. We felt it was important to note the site’s presence, however, so we paced the site limits, wrote a brief description, and obtained an LA number. The site, which measures 23 m north/south by 15 m east/west, is on a steep (1 in 3 to 1 in 3.5) southeast-facing slope adjacent to Arroyo Largo. Shallow east/west drainages run down both the north and south edges of the site toward the arroyo. A dense rock scatter covers the slope over the entire site area. We could see possible shallow terraces, but no convincing room outlines. LA 130891 may represent granaries. A few Agua Fria G/R sherds and basalt, limestone, and chert debitage and cores constitute the artifacts.

Isolated Objects

The 24 IOs are scattered fairly evenly over the northern two-thirds of the project area. Only four items (IOs 1-4) were found in the southern one-third. We do not know the significance of the IO patterning, but their presence indicates a certain amount of coming and going across the area during early P IV times.

IO-1. Seven Agua Fria G/R sherds in 2 m by 1 m area.

IO-2. One obsidian tool fragment.

IO-3. Two items basalt debitage 15 m apart.

IO-4. Nine Agua Fria G/R sherds in 1 m by 3 m area.

IO-5. One Agua Fria G/R sherd.

IO-6. An arrangement of rocks, one “course” high, in an amorphous circle 1 m to 1.25 m in diameter on narrow tongue above Arroyo Largo. No sherds or lithics. Lang (1995:57-58) reports finding piles of cobbles in the fields at San Marcos Pueblo in the Galisteo Basin approximately 10 mi east of the study area. The piles range from .9 m by 1 m to 4.6 m by 5 m. Lang thinks some of the piles may be stockpiles for making cobble borders around fields or terraces, but that the largest may be field shrines.

IO-7. Two Agua Fria G/R sherds.

IO-8. One Agua Fria G/R sherd.


IO-10. Five items basalt debitage.

IO-11. One Agua Fria G/R sherd.

IO-12. One Agua Fria G/R sherd.

IO-13. Possible hoe. Made of hoe- or axe-shaped sandstone. Slightly battered and chipped on bit end. Stone looks too unsubstantial for an axe. Use as hoe seems a better guess.

IO-14. One item basalt debitage.

IO-15. Arrangement of rocks forming solid circle approximately 1 m in diameter. One rock, approximately 15 cm long, juts out to south. No artifacts. Like IO-6, this is one course high.

IO-16. Two red sherds (probably Agua Fria G/R body sherds) 4 m apart.

IO-17. Two items obsidian debitage 3 m apart.

IO-18. One item obsidian debitage.
IO-19. Small bit of worked obsidian (approximately 15-mm sieve), probably a fragment of a shattered bird point.

IO-20. Three items fine-grained limestone debitage in 1.5 m area.


IO-22. Fragment of vesicular basalt slab metate of the style plastered into a metate bin. Its companion stone would have been a two-hand loaf-shaped mano. We also found one Agua Fria G/R sherd and one item of chert debitage within 15 m of the metate fragment. We failed to find the additional artifacts or structural stone required to classify this IO as a site.

IO-23. One item basalt debitage.

IO-24. Eleven basalt items (10 debitage, one core) in an area 2 m in diameter.

Site and IO Summary
The QRA survey identified eight structural sites and 24 isolated objects. Three (LA 130884, 130885, and 130890) are probably field houses of one or perhaps two rooms and a light artifact scatter. Three (LA 130887, 130888, and 130891) are dense blankets of rock, plus a few artifacts. These three sites are on steeper slopes than the field houses. We think the dense rock may represent granaries (the discussion below lays out our reasoning). One site, LA 130899, which contains more rock than the field house and less rock than the granaries, also contains a large number of artifacts (75 sherds, 19 lithics). On a steep slope, it may be a combined field house and granary. The final site, LA 130886, consists of a lithic scatter and a roughly circular rock pile one course high and 2 m in diameter. Two of the IOs, 6 and 15, are also small rock piles, but without artifacts. We do not know what the rock piles are.

The cultural and temporal designation for the seven sites that contain ceramics is definite or probable early P IV, since most of the ceramics are early Rio Grande Glaze types (A.D. 1315-1450). Nine of the 24 IOs consisted of or contained ceramics, eight of them definitely Agua Fria G/R and the ninth probably Agua Fria. Since none of the datable sites or IOs are earlier or later than P IV, we assume the rock piles (LA 103886 and IOs 6 and 15) are also P IV.

Field Houses and Granaries
Although there are no standing walls at any of the sites, we can make a few conjectures about the structures.

—The quantity of rock at the field house sites, LA 130884, 130885, and 130890, is barely enough for a couple of foundation courses, decidedly not enough for masonry walls. Thus, the walls were probably puddled adobe or jacal. The structural materials and the siting of the structures, on gentle slopes above arable land, suggest field houses where gardening tools and a pottery vessel or two for cooking and eating could be kept and where people could shelter from sudden storms, but they do not suggest rodent- and insect-proof storage structures.

—At LA 130887, 130888, and 130891, the rock is so dense it essentially forms a mantle over the slope. We had difficulty finding any wall alignments, though we felt we could detect occasional leveling or terracing in areas of perhaps .5 m or .75 m. These rock mantle sites are on much steeper slopes than the field houses. Like the field houses, however, their ceramics date them to early P IV and they appear to have been as short-lived as the field houses, to judge from the low artifact counts. We think these may have been granaries. It seems reasonable that, lacking clefts and overhangs in high rock canyon walls, the Arroyo Largo farmers instead selected narrow steep rocky slopes flanked on at least one side by east/west drainages that would channel most of the upslope water past the structures.
and out onto the floodplain. Any sheetwash from above or precipitation that fell directly on a granary would drain away rapidly because of the steepness of the slope. Interpreting these as clusters of adobe-mortared masonry granaries seems more logical than a single large structure at each of the three sites. The foundation course alignments—and perhaps even walls that collapsed as units—should have been visible if the structure was a single room. Clusters of small granaries, caving in a few rocks at a time as the mortar melted away, would seem to account for the jumbled rock arrangements we found. It also seems logical to assume the granary clusters were only a single story (perhaps 1 m or less) high, since the rock did not fall from a height great enough to allow it to tumble and roll any real distance.

We had hoped to conduct pollen studies that might have told us whether these were indeed granaries, but the paucity of gravel precluded additional studies of any kind.

Who Built These Sites and Why in These Locations?
Charles Haecker (1987) inventoried 43 sq km (16.6 sq mi) immediately south of our project area in the 1980s as part of the Elena Gallegos land exchange. Site types Haecker reports (1987:103-104) consist of field houses, farmsteads (structures that contain three or more rooms), rock mulch garden plots, and rock alignment water catchment structures. In his discussion of this survey he remarks on the marginality, for human needs, of the western uplands of the Ortiz Mountains. The area’s severe unsuitability over thousands of years for either agriculture or for hunting and gathering is demonstrated by his site inventory: Of the 136 sites he identified, 114 are early Rio Grande Classic or P IV (A.D. 1350-1450), two are Middle Archaic (1800-1300 B.C.), and three are historic (mid-nineteenth to mid-twentieth century). To all intents and purposes, then, no one visited Haecker’s survey area until early P IV and no one ever set foot there again.

QRA’s survey revealed land use patterning almost identical to Haecker’s field houses and farmsteads—at the edges of ephemeral drainages where narrow ravines create alluvial fans or where stream terraces have formed. QRA’s sites also date to early P IV.

When an area that had been avoided for nearly all of the 10,000-12,000 years of human history in the Southwest suddenly sprouts dozens, if not hundreds, of little hunting/gathering camps, field houses, farmsteads, rock mulch garden plots, rock water catchment structures, and, if we are correct, granaries, something dramatic was occurring in life along the Rio Grande. The only mystery lies in what it was.

Linda Cordell (1979:151) believes that until the 1400s, Rio Grande villagers were able to reduce the pressure on cultivated fields from excess internal population growth because the nearby mountainous areas allowed some people to turn to hunting and gathering. After abandonment of the central San Juan Basin, the eastern Pueblo population became too high for hunting and gathering to serve as an alternative way of making a living. She remarks (1979:151):

Following the abandonment of the Chaco area, this outlet was not sufficient for the numbers of people in the eastern area. This added constraint is reflected by the large and unstable aggregated communities of Pueblo IV. The grid gardens along the Chama and in the Picuris area, the terraces and grids of the Pajarito Plateau, as well as the expansion of groups into the Plains margins in the Saline district indicate that intensive efforts were being made to support
a relatively tremendous population increase.

The mass invasion of this marginal landscape by people who left tiny agricultural and hunting and gathering sites provides a compelling illustration of Cordell’s analysis of the P IV situation.

If the sites speak of the desperation of nearby Pueblo communities, however, another question needs to be answered. It is clear that moisture was much higher for at least some years in the 1300s and 1400s than, for example, A.D. 2000. If the entire uplands area west of the Ortiz Mountains was wet enough to support floodwater farming and productive hunting and gathering, the more extensive traditional areas would also have been well watered. What factors could have forced at least some farmers from nearby villages to look away from more favored fields and toward areas like the Largo drainage? In 1941 the geologist Kirk Bryan studied the relationships between late prehistoric Southwestern cultures and climate, demonstrating that the dates of major population movements can be correlated with alternating cycles of erosion and alluviation. He discusses the downcutting cycle of A.D. 1300 to 1400 and explains (1941:240-241):

The effect of arroyo cutting is somewhat different from that of a mere drought. The growth of an arroyo takes place by the headward migration of falls. The steep new channel appears suddenly during a flood. It grows upstream in a chaos of fallen blocks, cliffs and minor channels. This falls section recedes a few feet or perhaps a mile each year, dependent on the number and size of the floods. As the falls move upstream, flood-water field after flood-water field becomes useless. There is, however, warning in advance and the cultivator knows that this year or at least within a few years calamity will overtake him.

Bryan (1941:241) believed that as Pueblo farmers saw their traditional fields facing destruction within a few years (or even months), their response would be to plant more fields in widely scattered locations in the hope that some of the fields would receive rain.

**Why Did They Never Return?**

Why they never returned is easier to answer than why they ventured there in the first place. No gardener in his/her right mind would voluntarily choose to risk labor and good seed in this area in any but exceptionally favorable years. —That the risk may have paid off briefly, however, is evidenced by the granaries. Presumably, one doesn’t bother to construct a granary unless one has before one’s eyes a maturing crop to store in it.

Unfortunately, good years cannot be anticipated in advance even today and it seems reasonable to expect that at least a few people would have returned to try their hands a few more times. Even if the crops failed we should find a smattering of later ceramics from these futile attempts. If early P IV farming in the uplands west of the Ortiz Mountains does indeed mean that traditional floodwater fields were being destroyed by arroyo cutting, some other powerful factor must have been operating to pull people away from these experimental dry farms.

The appropriately powerful factor may have been that people were gaining increased mastery of techniques that allowed taking water out of dangerous rivers like the Rio Grande and running it to fields via ditches. There is, in fact, overwhelming evidence from both restricted archaeological investigations and from Spanish documents that actual ditch irrigation was widespread throughout the Southwest by P IV
times (Greiser and Moore 1995; Moore 1995; and numerous other papers in Toll 1995).

**Where Did They Go?**

Genuine answers to exactly where they went might have been possible if studies of pottery temper could have determined which village(s) people belonged to. Once these identifications were made, similar studies might have made it possible to trace the movements of parent villages to locations on permanent streams where ditch irrigation could be added to or, in some cases, substituted for dry- or floodwater-farming techniques. Since the survey area did not contain adequate gravel to justify mining (and additional archaeological studies), the project was terminated.

**Notes**

1. Although I have attempted to obscure the exact location of the project area and the sites in order to comply with the requirement for confidentiality of site location information, I have retained the name and the label “Arroyo Largo” because it heads in the Ortiz Mountains and, true to its name, runs for a sufficiently long distance that pinpointing its location within the project area—thus, the site locations—would require a little more sleuthing than would appear to be worth it for sites that contain so few material items.

2. When we conducted our survey in August, many of even the toughest forbs and grasses were either dead or barely alive. A.D. 2000 was the year we did the survey. After this project was completed, Santo Domingo Governor Tony Tortalita asked if I would take him and the Tribal Council on a little tour of the sites. When I remarked on the dry conditions and lack of vegetation, Governor Tortalita said, “Yes, the cattle don’t even come up here on top. They know there’s nothing up here.”

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The Water Canyon Paleoindian Site
Preliminary Evidence of Site Formation Processes, Site Structure and Late Paleoindian Lifeways

ROBERT D. DELLO-RUSSO

Paleoindian remains in New Mexico are relatively rare with just over 1,200 Paleoindian sites and isolated projectile points documented in the New Mexico Archaeological Records Management System (ARMS) database. While the majority of Paleoindian manifestations may be points only, they constitute less than 1 percent of all documented “sites” in the state. More significantly, fewer than 20 Paleoindian sites have been professionally excavated to any degree in New Mexico and, of those, good bone preservation at open, excavated Paleoindian sites is rarer still. Such sites include the type site for the Clovis culture—Blackwater Draw, the type site for the Folsom culture—the Folsom site, and Milnesand, Ted Williams, Elida, and San Jon along the western edge of the high plains. Other open sites in other parts of the state, such as Ake, Boca Negra, and Mockingbird Gap, have produced some desiccated bone fragments and pieces of tooth enamel. Within that context, the discovery of the Water Canyon site (LA 134764) in Socorro County is significant in that it represents the first opportunity in west-central New Mexico to investigate an intact Paleoindian site with well-preserved faunal remains. It is also one of few such sites across the state directly associated with a robust record of paleoclimatic and paleoenvironmental change.

Research at the Water Canyon site is on-going and a broad range of analyses have been completed. The analytical results presented in this paper 1) reveal how paleohydrology and geomorphological processes have affected the site setting over time, 2) give us our first glimpse of intact site structure in Locus 1, 3) underscore how Late Paleoindian lifeways are reflected in the flaked stone, faunal and macrobotanical assemblages in Locus 1, and 4) support an expectation of multiple Paleoindian components at the site.

Site Description
The Water Canyon site is located in a structural basin between the Magdalena Mountains and the Socorro Mountains of west-central New Mexico. The actual Water Canyon drainage issues from the Magdalena Mountains, flows east across the basin to the Socorro Mountains, turns north and, after joining the Nogal Arroyo drainage, flows east to the Rio Grande. From a geomorphological perspective, the site rests at a point where a large bajada fan flanking the east side of the Magdalena Mountains is truncated by the erosional effects of the Water Canyon drainage and dissected by small tributary channels. One such incised channel, now associated with Locus 1 and known as “No Name Arroyo,” was found during the original site recording in 2001 just northwest of the original artifact scatter (now Locus 4). At 1 to 2 m below the surface, this arroyo exhibits a buried highly organic and extensive sediment lens that was subsequently determined to be the remains of a paleo-wetland (see Figure 1). At
the time of discovery, this deposit was estimated to date to the early Holocene geological epoch. Similar deposits in other areas of the American West have been referred to as “Black Mats,” a term coined by C. Vance Haynes (2008). While originally such deposits were thought to be associated only with Clovis period artifacts and faunal deposits, later use of the term has broadened to encompass most buried fossil wet meadows and similar paleo-wetlands that were formed not only during the Late Pleistocene but during the Holocene epoch as well. Accordingly, we now refer to the paleo-wetland at the Water Canyon site as a black mat.

The site comprises four surface artifact concentrations—Loci 1, 2, 3 and 4—and encompasses about 8.9 ha (22 ac) (Figure 2). This site size is based on the distribution of surface artifacts, not on the size of the black mat, which is considerably larger. Diagnostic surface artifacts (shown in Figure 3) include a Late Paleoindian point base, a Late Paleoindian point/knife mid-section, and a Clovis point base.

**History of Research at the Site**

The Water Canyon site was originally documented in 2001 by the author during an inventory in advance of a proposed construction project (Dello-Russo 2002). In the spring of 2008, I returned to the site with a small group of researchers and we collected hand-auger sediment samples for radiocarbon dating and documented a bone protruding from the buried wet meadow in the north cut-bank of the arroyo. Subsequent radiocarbon dates for three bulk sediment

![Figure 1. Black mat at base of cut-bank in No Name Arroyo, looking downstream.](image)
Figure 2. Contour map of Water Canyon site.
samples and one charcoal sample ranged from 7820 ± 220/215 radiocarbon years before present (\(^{14}\text{C} \text{ yr BP; A-15022; bulk sediment; } \delta^{13}\text{C} = -24.6\%\)) to 11,030 ± 60 \(^{14}\text{C} \text{ yr BP (AA83854; bulk sediment; } \delta^{13}\text{C} = -26.018\%\); Clovis/Late Pleistocene), with the newly discovered bone falling into the late Paleoindian era. These dates both supported and exceeded our previous age estimates for the wet meadow deposit and, together with the bone, gave us our first provocative glimpse of the site’s potential. Additional test excavations were conducted at the site during the spring and fall of 2009 and again during the spring of 2010. Individuals from the New Mexico Department of Cultural Affairs, Office of Archaeological Studies and the Museum of Natural History; University of Arizona; Escondida Research Group, LLC; University of Northern Arizona; and Red Rocks Geological Enterprises composed the field crews during these sessions.

**Field Methods**

A site datum and a back sight have been permanently established at the site and several temporary mapping sub-datums have been utilized. To date, we have developed a contour map (Figure 2) of the entire site and mapped and field-analyzed all surface artifacts. Fine-grained three-dimensional provenience data for all excavation units, artifacts, faunal remains, and samples were controlled by a total station. The

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**Figure 3.** Surface diagnostic artifacts: Locus 4 - upper left; Locus 1 - upper right; Locus 3 - lower.
three-dimensional orientation of larger artifacts (> 2 cm maximum dimension) was established by shooting both end points (referred to as provenience points or “pro-points”) along the long axis of a given artifact. These latter data are collected to inform on the potential re-orientation of artifacts from post-depositional processes, such as frost heaving, bioturbation, flooding, or colluvial slumping.

We have completed 21 hand-excavated 1-by-1-m test units (12 in Locus 1 and nine in Locus 3), six mechanically excavated backhoe trenches (in Locus 1, Locus 2 and Locus 3), and 49 mechanical soil cores utilizing a Giddings soil coring rig (Figure 2). These excavations have enabled us to collect assemblages of sub-surface lithics and faunal materials (bone, snails, tooth enamel), a suite of 26 pollen samples from hand excavations and soil cores, a suite of 19 bulk sediment samples for flotation processing and macrobotanical analysis, 41 radiocarbon samples (including bulk sediment, charcoal, and bison bone), two samples of red ochre that may have cultural associations, and two OSL (optically stimulated luminescence) pilot samples. Five stratigraphic profiles from trenches and five from hand-excavated units were produced.

The soil cores have provided not only dateable bulk sediment samples and pollen samples, but also stratigraphic data allowing us to map the subsurface location and horizontal extent of the buried black mat. These data, coupled with our large suite of radiocarbon assays, have been instrumental in helping us understand both the paleohydrology and the tempo of sediment erosion and deposition at the site over time.

**Paleohydrology at the Water Canyon Site**

As illustrated in Figure 4, the Water Canyon site rests in a relatively small wedge or pocket of fluvial sediments between the Magdalena Mountains (“South Baldy”) to the west and the Socorro Mountains (“Socorro Peak”) to the east. As noted previously, the site rests at the basal end of a long alluvial plain, or “bajada,” which contains the main Water Canyon drainage and which also channels run-off (precipitation and snowmelt) downslope toward the confluence of Water Canyon and Nogal Arroyo. The amount and pace of precipitation and snowmelt run-off control the degree to which the sediments at Water Canyon are saturated by the water table. Thus, the black mat and iron-stained sediments at the Water Canyon site testify to the past presence of a high, yet fluctuating, water table, reflecting changes in the regional precipitation regime. Through our analysis of the pollen record at the site (see Dello-Russo 2011, 2012; Smith 2012), the late Pleistocene–early Holocene epoch in the Water Canyon basin was characterized by a much wetter and cooler climate, owing, in large part, to the influx of Pacific moisture from the west. This Pacific moisture was responsible for the continued existence of inland lakes at the time (Allen and Anderson 1993, 2000; Anderson et al. 2002), such as nearby Lake San Agustin, and it most likely translated into a relatively high level of winter snowpack in the Magdalena Mountains and consistent year-round flows in Water Canyon deriving from snowmelt. As the climate over the succeeding 3,000 years became drier and hotter, it is likely that moisture from the Pacific decreased, while monsoon flows from the south and southwest (Gulf of Mexico and the Sea of Cortez) increased. Consequently, moisture arriving at the Water Canyon site then came more in the form of summer rains, rather than in the form of snowmelt, leading ultimately to a falling water table, increasing sheetwash run-off and paleo-channel formation.

**Landform Evolution in Locus 1**

Sediment and soil descriptions from 49 mechanical cores and six backhoe trenches, as well as stratigraphic profiles and radiocarbon dateable samples taken from the hand-excavated
test units and backhoe trenches, have helped us refine our model of site formation processes. For example, a large depression in the south-to-north profile of Backhoe Trench 5 suggests the presence of an ancient arroyo cut. This same possibility is echoed farther to the east where three mechanical cores exhibit bone fragments at levels around 3.7 m (12.1 ft) below the surface. Since these latter bone samples are substantially deeper than the remainder of bones excavated in Locus 1, and because their respective mean, calibrated ages [(9640 ± 40 14C yr BP; Beta 317339; sediment mixed with bone; δ13C = -23.30‰; 2-sigma calibration = 11,062–11,186 cal yr BP) and (9887 ± 59 14C yr BP; AA-95610; sediment; δ13C = -25.20‰; 2-sigma calibration = 11,198–11,412 cal yr BP)] are approximately 2062 years older than bones in Locus 1 (8200 ± 40 14C yr BP; Beta 292053; bone collagen; δ13C = -12.30‰; 2-sigma calibration = 9027-9278 cal yr BP), the two sets of bones most likely represent the remains of different individuals. It also seems likely that the deep bones sit at the base of an ancient arroyo or paleo-channel (Figure 5). Furthermore, it is perhaps possible that the bones compose part of a bone bed. Future mechanical excavations will be required to evaluate that possibility.

The south-to-north schematic of the Locus 1 stratigraphy (Figure 5) enables us to approximate the broader landscape evolution trends in Locus 1. Late Pleistocene sediments initially lay across Locus 1 as a massive sediment unit from at least as early as the end of the Clovis era at 11,030 ± 60 14C yr BP (AA-83854; 2-sigma calibration = 12,708 – 13,097 cal yr BP) until about 10,363 ± 85 14C yr BP (bulk sediment; AA-88079; δ13C = -25.00‰; 2-sigma calibration = 11,966 – 12,543 cal yr BP) during the Folsom era. Based on the paleobiotic and paleoclimatic reconstructions for that time at Water Canyon, the massive late Pleistocene soil unit was probably saturated by virtue of a high water table, and may have remained so through the first half of the Younger Dryas chronozone (approximately 11,300–12,500 cal yr BP). Following this time, the climate must have dried somewhat, or the seasonal precipitation regime may have shifted, causing the water table to drop.
High energy run-off events created deep paleo-channels until 9887 ± 59 14C yr BP (AA-95610; 2-sigma calibration = 11,198 – 11,412 cal yr BP) at the very beginning of the late Paleoindian era. From this point, faunal materials were apparently deposited—either naturally or culturally—in the base of a paleo-channel and sediments began to be laid down until at least 8050 ± 160 14C yr BP (bulk sediment; A-15622; δ13C = -20.70‰; 2 sigma calibration = 8547 – 9331 cal yr BP). That unit of sediment was then saturated by a rising water table that formed a relatively long-lived wet meadow during the remainder of the late Paleoindian period. However, upper portions of that deposit were later eroded away creating stratigraphic unconformities and shallow channeling across Locus 1 sometime after about 8200 ± 40 14C yr BP (Beta 292053; 2-sigma calibration = 9027 – 9278 cal yr BP). Following this, overburden sediments were laid down across Locus 1 during the Holocene and then, by recent times, additional arroyo down-cutting occurred (as exemplified by No Name Arroyo), exposing the buried black mat deposit.

**Archaeological Site Structure in Locus 1**

Our understanding of the site has improved tremendously in terms of site stratigraphy, site chronology, and the nature and orientation of the buried black mat. Analytical results are beginning to provide us with more details about the young (<5-year-old) bison that is represented by the numerous skeletal elements excavated thus far in Locus 1. Because the deposit where the majority of the bones are located is bisected by No Name Arroyo, the different average elevations for bone fragments on the north side of the arroyo as compared to those on the south side indicate that the black mat deposit slopes from northwest down to the southeast. Based on
the elevations of cultural materials in Locus 1 (Figure 6), as projected onto the 500 m East grid line, we believe that the faunal remains on both sides of the arroyo derive from the same late Paleoindian assemblage. The late Paleoindian temporal assignment is supported by dates from Hearth 1 and a parallel-sided point/knife mid-section with parallel oblique flake scars (indicative of a late Paleoindian occupation) in the surface scatter to the south.

The analysis of site structure is aimed at recognizing behaviorally significant patterning in the distribution of discarded elements and the possible effects of post-depositional disturbances to those patterns. For the Water Canyon site, site structure in Locus 1 is revealed by the spatial relationships among discarded flaked stone artifacts, discarded bone and tooth enamel fragments, and the ephemeral remains of a late Paleoindian hearth. The patterning seen in both the Figure 6 projection of artifact elevations and the Figure 7 plan view suggest the presence of two relatively distinct activity areas within the distribution of cultural materials in Locus 1. A hearth-centered bison butchering area is evident in the excavated units just south of No Name Arroyo. This interpretation is supported by the presence of bovine blood residue on an early stage biface, impact damage on the bison femur, burned and calcined bone fragments, thermally altered flaked stone artifacts, biface thinning and sharpening flakes (indicating tool manufacture and rejuvenation), and the cluster of small charcoal fragments designated as Hearth 1. A probable hide-processing-and-tool-sharpening area is suggested by the surface assemblage to the south of the butchering area. This interpretation is

![Figure 6. Elevations of surface and excavated cultural materials in Locus 1 projected against the 500 m East grid line.](Image)
based primarily on the presence of two scrapers, the late Paleoindian bifacial knife (which has evidence of use wear along one lateral edge), and numerous sharpening flakes.

**Paleoindian Lifeways as Seen from Water Canyon**

In a recent study of late Paleoindian patterns of land use and foraging strategies, Knell and Hill (2012) used Cody Complex site data from the northern Great Plains and the Rocky Mountains to infer subsistence and land-use patterns for late Paleoindians at the regional scale. The variables they utilized in their model included fauna-related data (diet breadth, kill size, and season of bison mortality), and lithic-related data (projectile point and tool discard) across three different environmental zones: Plains Grasslands, Plains Alluvial Valleys, and Foothill-Mountains. They predicted that the mobility of hunter-gatherers would have been regionally tethered in Foothill-Mountain areas due to the presence of seasonally predictable patches of biotic resources with high caloric returns. Within this landscape of relatively constrained mobility, hunter-gatherers would have regularly replenished their tool kits with locally available tool stones. It was argued, however, that their tool kits would have contained lithic materials from other regions as well, since late Paleoindians would not have remained in the Foothill-Mountain region year-round. In addition, due to the ecology of bison in Foothill-Mountain areas, late Paleoindians in such settings would also have hunted small dispersed herds of bison.

In terms of subsistence, we have noted previously that the late Paleoindian occupation at Water Canyon focused on the killing and processing of bison. Numerous bison bone and tooth enamel fragments have been recovered and the association between humans and the bison is supported by the presence of likely impact fractures on the distal femur fragment (FS 41) recovered from Unit 1-5.
and the presence of bovine blood on the rhyolite biface fragment (FS 1033) recovered from Unit 1-11 in Locus 1. This association between late Paleoindians and the bison at the Water Canyon site is further strengthened by comparing the radiocarbon date on bison bone with charcoal fragments from the Late Paleoindian hearth (Hearth 1). The bison bone returned a radiocarbon assay of 8200±40 (9027-9278 cal yr BP), and that is statistically the same (t = 2.203) as the radiocarbon dates of 8280±50 (wood charcoal; \( \delta^{13}C = -23.40\%o; 2\text{-sigma calibration} = 9122-9436 \text{ cal yr BP} \)) and 8186±47 (wood charcoal; \( \delta^{13}C = -23.90\%o; 2\text{-sigma calibration} = 9017-9277 \text{ cal yr BP} \)) on oak charcoal recovered from Hearth 1 in Unit 1-11. However, at this point in the research, these data reflect the utilization of only a single juvenile bison, not the utilization of many bison from a mass kill event, and this is consistent with a Foothill-Mountain adaptation. Further, the tethered nature of the late Paleoindian subsistence adaptation in the Foothill-Mountain region may also be reflected by the parching of seeds. At Water Canyon, this subsistence behavior is suggested by the recovery of carbonized goosefoot and amaranth seeds in and around Hearth 1 (McBride 2012). If this is an accurate interpretation of the evidence, then this represents the earliest demonstration of seed utilization by hunter-gatherers in the American Southwest!

From a technological perspective, the region surrounding the Water Canyon site provides additional indications that Foothill-Mountain adaptations were being pursued during the Late Paleoindian period. Two late Paleoindian projectile points—with parallel-sided blades and shallow concave bases typical of known Foothill-Mountain types (Pitblado 2003)—have recently been identified in the Magdalena Mountains (Dello-Russo and Walker 2008; Walker and Dello-Russo 2005). In addition, high-quality silicified rhyolites, both in the Water Canyon assemblage and at source areas in proximity to the site, provide further support for a relatively tethered, Foothill-Mountain adaptation. The Water Canyon site is very close to the regionally significant sources of tool stone known as the Black Canyon Quarry (LA 55991, ca. 11 km [6.8 mi] to the southeast of the Water Canyon site), Sedillo Hill (LA 39420, ca. 10 km [6.2 mi] to the southeast) and the Socorro Mountain Group (ca. five km [3.1 mi] to the southeast) (Walker and Dello-Russo 2006). These sources of tool stone contain fine-grained, homogenous silicified rhyolites that—particularly for Black Canyon—are known to have been utilized since Clovis times (Dello-Russo 2004). These rhyolites have been identified in the Water Canyon flaked stone assemblage, and the rhyolite from Black Canyon has been found, archaeologically, as far away as the Mockingbird Gap site ca. 50 km (31.1 mi) to the southeast (Huckell et al. 2008) and in the Valles Caldera National Monument in the Jemez Mts. (ca. 200 km [124.3 mi] to the north-northeast) (M. Steven Shackley, Letter Report to Dr. Robert Dello-Russo and Dr. Anastasia Steffen, X-Ray Fluorescence Analysis of Artifacts, 2009).

Yet, other lithic evidence at the Water Canyon site may reflect a wider range of mobility on the part of site inhabitants. Biface thinning flakes were found to have been made of Mule Creek and Polvadera obsidians and of Pedernal chert. These findings indicate that those who occupied Water Canyon during the late Paleoindian period either traveled to, or had trade relationships with groups from, areas over 200 km to the southwest, and to the north. If Knell and Hill’s argument is correct in this regard (2012:56), then the late Paleoindians in evidence at Water Canyon were in fact present in the other environmental zones during other times of the year.

The Case for Multiple Paleoindian Components at the Water Canyon Site

Holliday and Meltzer (2010), in a recent discussion of Paleoindian lifeways, made a few
salient points about the apparent low frequency of multi-component Paleoindian sites. Initially, Holliday and Meltzer underscored the fact that “a significant number of Paleoindian localities are kill sites, where circumstances permitting the kill (e.g., the temporary aggregation of prey) were contingent and rarely repeated” (Holliday and Meltzer 2010:579). Second, they noted that Paleoindians “rarely used the same spot twice, save in the case of fixed places on the landscape that provided important but rare resources, such as outcrops of high-quality stone for tool making or freshwater springs” (Holliday and Meltzer 2010:580). Both of these points are critical to an understanding of the Water Canyon site.

The one currently identified Paleoindian component at Water Canyon is characterized as a bison kill/processing area, consistent—as argued by Holliday and Meltzer—with many, if not most, documented Paleoindian sites. It seems likely, however, based on the character of the Water Canyon site and its environs, that evidence for additional Paleoindian components should also be expected. The most important reason for this claim is that the site setting—as an extant and long-lived wet meadow—provided a regionally predictable source of fresh water and a strongly diverse plant community that would have served as a source of food for both grazing herbivores and for foraging humans. A second reason might be the proximity of high quality, easily accessible lithic raw materials at nearby Black Canyon and other source areas.

Indeed, discoveries during the 2009 and 2010 field seasons do provide evidence to support that expectation. First, a Clovis point base was recovered from the surface of Locus 3 during the spring of 2009. While we do have a single Clovis-era date from the black mat in Locus 1, we currently have no in situ evidence for a Clovis age component. Second, deeply buried bone was recovered from three mechanical cores in Locus 1 during the spring of 2010. The bone from mechanical Core 10-01 was found at 45.20 m grid elevation, while bison bone from Locus 1 hand-excavated units was found at 48.31 m grid elevation. The sediments surrounding the deep bone dated to a range between 11,096 and 11,225 yr BP, while the bison bone dated to ca. 9153 yr BP. Thus, there are two occurrences of bone that are approximately 3.11 m (10.2 ft) apart stratigraphically and about 2,000 years apart in age. The more recent occurrence of bone is clearly present as a result of human agency. From the rationales provided by Holliday and Meltzer, it is likely that the deeper, older bone is there as a result of human agency as well and that the Water Canyon site should have at least two Paleoindian components.

**Summary**

While there are other known Paleoindian sites in the surrounding region (Amick et al. 1998; Beckett 1980; Dello-Russo 2002, 2001, 1997; Dello-Russo and Walker 2008; Dello-Russo et al. 2004; Hill et al. 2007; Huckell 2002; Huckell and Kilby 2000; Huckell and Ruth 2004; Hurt and McKnight 1949; Judge 1973; LeTourneau and Weber 2004; Weber and Agogino 1997), the co-occurrence of Paleoindian deposits, faunal remains, and a high-resolution paleoenvironmental record from the same era are uniquely represented at the Water Canyon site and provide a clear warrant for further research.

Today the Water Canyon site rests in a dry, juniper savannah setting. If, through our ongoing interdisciplinary investigations, the site continues to demonstrate its potential as a repository of multiple robust data sets, we may begin to glimpse the site as it was during the dynamic, late Pleistocene-early Holocene transition. There, in a setting very different from today, skilled Paleoindian foragers camped and adapted, over the course of several thousand years, to a rich but changing, biologically diverse, focal
wetland resource. By modeling and applying our findings, we can clarify our understanding of the paleoecology of west-central New Mexico and perhaps help shape our expectations for how living systems will respond to our current period of climatic change in the American Southwest.

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An Old Bag of Sherds That Became a Kana’a Neckbanded Jar and Some Related Matters

THEODORE R. FRISBIE

In 1968 Regge presented me with a bag of approximately 75 sherds he had excavated on December 2, 1967 from the floor of Pithouse 3, Site 3 from the Artificial Leg Basketmaker III-Pueblo I sites (LA 35493) near Corrales, New Mexico. Since they were found in close proximity to each other and included several rim sherds with neck banding, he believed they might well be restored to provide the only example of a Kana’a Neckbanded jar from the excavations. The work accomplished at the three sites had been the focus of my master’s thesis (Frisbie 1967). During the course of working on the ceramics, Tamaya Red, a variant of Lino Gray, was deemed to be an invalid type, which led to a publication (Frisbie 1975a). Further considerations of San Marcial Black-on-white (B/W) merited two papers (Frisbie 1975b, 1984), and in large measure inspired establishing, with considerable encouragement by Bill Sundt, editor, a Pottery Southwest open forum relating to ceramic typology (Frisbie 1976). Additionally, there was a joint publication pertaining to Maiz de Ocho—early eight-rowed maize (Galinat et al. 1970). The sites were also the subjects of the first paper I ever presented at a conference, which was strongly suggested by Florence Hawley Ellis following receipt of a second Archaeological Society of New Mexico scholarship (Frisbie 1966). A number of years later I received a contract to survey southeast of the site area prior to the construction of a floodwater drainage canal; however, no evidence of habitation sites was encountered (Frisbie 1978).

The reason Regge gave me the sack of sherds was simply because he viewed the sites as my domain, but there is more to the story than that… much more, in fact! As the deadline for my master’s degree in the spring of 1967 became ever closer, there was also the need to complete as much of the archaeological research in the Corrales area as possible. In my view, clearly establishing the progression of sites from pure Basketmaker III to a transitional phase, and thence to Pueblo I with some ceramic evidence for a transition into early Pueblo II was paramount. Surface materials dictated the research needed to accomplish my goal. All of the excavations at the three sites I selected were conducted without any financial support. The work was accomplished by University of New Mexico (UNM) Anthropology Club student volunteers during many weekends beginning in 1962. It was never possible to predict how many students would show up to assist. However, during the last season, there was one student who always showed up—Regge. He was an “eager beaver” dedicated to contributing and learning. During the last several months of excavation it was a two-person phenomenon—Regge and me. At the time I drove my 1955 Chevy Bel Air convertible to and from UNM to Corrales. The top was always down since...
we did not know what we now know about dermatological sun damage; in similar fashion we were equally vulnerable in the field. We weren’t “sun worshippers,” but we had no clue about protecting ourselves. Back then the sun was considered a “good thing”! One doesn’t discover that untruth until various “suspicious spots” begin to show with age. Sixty years of age seems a good guideline when “things” appear that we’re told need “freezing away, burning off, or biopsies.” Given my propensity to get to the bottom of things, I wanted some answers. According to my dermatologist, “Dr. Dan,” “…sunscreens were introduced to the public becoming ubiquitous about 1977; however, I would say that widespread usage started 15 years later, approximately 1992” (Daniel Goran personal communication 2012). No wonder Reg and I have both experienced the “ravages of the southwest sun”—the bottom line, here, for the younger generation: “PROTECT YOURSELF!”

A highly anticipated part of each of our excursions to excavate at Artificial Leg came on the return to Albuquerque. Sweaty and covered quite frequently with ashly dust—no matter! It involved a stop at the Dairy Queen in Alameda where we would each order a LARGE hot fudge sundae—whichever of us had the dollars paid—I think it worked out about equally. The regularity of our visits and consistent order, I am almost certain, resulted in our not needing to utter a word to the person behind the sliding glass window—just the sight of us invariably meant: “Two LARGE hot fudge sundaes—and go heavy on the hot fudge, please!” However, all good things must come to an end and in this instance it involved an early June 1967 deadline for my master’s thesis. There was no question about the fact if the thesis weren’t completed my acceptance into the Anthropology Ph.D. program at Southern Illinois University-Carbondale with a teaching assistantship would be null and void.

Although I had been frantically writing, doing ceramic restorations, and analyzing and tabulating artifacts there was much more work to be done. Among other things was processing data from a number of specialists from whom I had solicited and received freebie services. Their analyses of flora, faunal material, pollen, dog remains/burials, archaeomagnetic dating, and maize were incorporated as they became available. Perhaps foolishly, rather than simply reporting upon the six dog burials, I chose to incorporate a specialized study of dogs throughout the Southwest (see also Lawrence 1967). In essence, this could have been done at some later date as a separate publication, but I chose to invest a tremendous amount of time and energy that could have been better spent. What became more than apparent was that the June deadline was beyond my capability; this was further exacerbated by a required change relating to ALL measurements fairly late in the proceedings. Since I was following the established report format of the Museum of New Mexico, my chairperson, Dr. Florence Hawley Ellis (better known to all students as “Auntie Flo” when she wasn’t within earshot) informed me that there had been a shift from feet and inches to feet and TENTHS of inches. This involved thousands of artifact and architectural/structural measurements—it was time consuming, tedious, busy work, but it needed to be done! Fortunately, there were two people who came to my rescue on this and in numerous other ways: Regge N. Wiseman and my spouse, Charlotte J. Frisbie. Thanks to their untold hours assisting and keeping me on track, the thesis was completed prior to the deadline (and at times I came “close,” but didn’t end up in the loony-bin!).

The Sherds and the Restoration Process
As noted, Regge had returned to Site 3, Pithouse 3 to do further excavation. This was where we had last worked and hadn’t been able to finish for inclusion in my thesis. His work cleared more of
the floor level and found what appeared to be a restorable Kana’a Neckbanded vessel, although clearly a partial restoration since some pieces of the rim were not extant. Because he didn’t completely finish excavation of the pithouse, whether or not the remaining rim and other missing sherds necessary to complete it had scattered beyond where he worked remains an unknown. Additionally, it is not currently known if the two gray body sherds in floor contact (Frisbie 1967:108, Table 55), or any of the 63 gray body sherds recovered from the floor fill belong to the vessel or were part of one or more Lino Gray jars (since three rim sherds were recovered), or to a transitional vessel since one “ripple rim” sherd was also found. I suspect, however, the one neckbanded sherd quite likely could belong to the restored vessel (Frisbie 1967:167, Table 54). It is less likely that the numerous related sherds, exceeding 1,000 as noted in the previous table, from the stratigraphic trash fill level above the floor would relate to the restorable vessel—but given rodent activity and other factors, such is not possible to completely dismiss.

The restoration process began shortly after the bag of sherds was given to me by Regge. It became immediately apparent that the basal portion was non-existent as dry piecing began with but a few likely sherds. Based on my previous restoration work, which resulted in a three-part article requested by Bill Sundt for Pottery Southwest (Frisbie 1975c), I began from the base and worked upward toward the rim using masking tape to hold the in-progress work together until there was a section which could be added to without any problem of gluing upper pieces or sections. At the time I recalled the basal portion of a culinary vessel which accompanied a burial in the fill of Site 3, Pithouse 5 (Frisbie 1967:110, and Appendix D, Plate XII, Figure 22), which was accompanied by the base of a plainware vessel which had been smoothed for use as a bowl; thus, this base might have been utilized in similar fashion, but as a plate or lid for a pot, if when broken it remained intact. In this instance, however, given a few obvious basal sherds that could not be fitted onto the remaining lower portion this possibility seems highly unlikely.

What remained, therefore, was restoring the vessel by gluing it together in several sections that, hopefully, could then be fitted together for final gluing of the vessel. As always, each sherd surface needed to be as clean as possible in an effort to maintain complete accuracy of the vessel wall curvature. This process is especially crucial if one is working without the basal portion of the vessel. Since washing had already occurred, per usual back then—residual studies were unknown—my technique involved using a stiff toothbrush if the vessel was not friable (or on occasion a fine wire brush if the paste was extremely hard) in order to get the “best fit” possible. No piece could be glued with another IF it would interfere with gluing the various sections together. Given all else, the tediousness of “playing with a difficult restoration” resulted in leaving the three-part body sections and remaining sherds on a tray on the table in my library for well over 30 years.

Were it not for Regge’s being honored with an ASNM festschrift, I expect the tray and dust-laden contents would have remained on that library table until my demise, and following that—been relegated to the trash! Fortunately, the occasion has become a reality and with it, the impetus to retrieve and work on the vessel…something which I had for a number of years decided would be the subject of a paper in his honor—if and when the time came—and it has come to fruition!

In all honesty, when I retrieved the tray of sherds accompanied by the three restored sections I was completely unaware what the final outcome might be after a few hours of
working with the sherds. Amazingly, even to me, to each of the three sections (Figure 1) more sherds could be added so that it became possible to fit the sections together forming the major part of a Kana’a Neckbanded vessel!! I was also unsure if any of the sherds unearthed during the earlier excavation might be part of this vessel. However, since all of the Artificial Leg Site materials had been donated to, and archived by, UNM (Maxwell Museum), I knew that retrieving materials would almost certainly take longer than I had to prepare this paper. Consequently, I decided to restore the vessel from the three sections available (Figure 2).

My technique for restoration of the missing rim and body parts utilizes not a section of a rubber ball, but instead, modeling clay, which I form by taking impressions of existing comparable vessel surfaces. Once taken, the impression is moved to the area to be restored and with a palette knife Plaster of Paris is utilized to fill in and match the adjacent area thicknesses. I am opposed to any and all efforts to afford a non-detectable restoration, but I do “dampen” the plaster from stark white by adding a pigment that mirrors, but does not exactly match, the original surface color of the restored vessel—in this instance, lampblack. This is apparent in the final restoration photo (Figure 3). Based on the dark carbonaceous coloration of the lower half compared to the light gray of the upper section, the vessel was clearly placed over the fire/coals in the hearth and used in the preparation of food. The dimensions of the restored jar are: height 24.2 cm, greatest body diameter 29.3 cm, and a rim diameter of 9.0 cm. The exterior of the vessel is well smoothed and walls average 3.0 mm, but there is considerable variation in their thickness. Tempering material is light gray crushed rock.

Figure 1. Completed restoration of the three sections.
Commentary and Discussion of Kana’a Neckbanded Ceramics

Based on protocol, one should use the officially designated name when discussing any of the well over 1,000 types of Southwestern ceramics. Therefore, rather than Kana’a Neckbanded, I should be using Kana’a Gray, which was assigned by Hargrave (1932:11). It is interesting to note Spier (1917:306) referred to the type as “Slab House Corrugated,” while Roberts (1931:121) came closer to the mark with “Banded Neck Culinary,” as did Colton (1932:10) via “Plain Gray-Coil Neck.” When I began working on the ceramics for my thesis I discussed with Dr. Ellis my preference: Kana’a Neckbanded. This did not comply with tradition. Given her propensity for making students explain their thoughts, she queried, “Why?” I noted that although both she (Hawley 1936:25, see also 1950 Revision) and Colton and Hargrave (1937:195) in their handbooks used Hargrave’s designation, “Kana’a Gray,” mirrored, again, by Colton (1965:19) in his ceramic checklist, my choice had already appeared in a number of reports. However, my rationale went considerably further—essentially, the numerous types of ceramics with any type of surface modification normally were incorporated in their name—for example, those featuring incision, tool punching, engraving, indented or exuberant corrugation, etc. Having worked as her head assistant at both Yunque-Yunque (San Gabriel) and Sapawe, I couldn’t help but blurt out Mera’s (1935) somewhat exuberantly named Tewa culinary types: Cundiyo Micaceous Smeared-indentented, Cordoba Micaceous-ribbed, Tesuque Smeared-indentented, and Sapawe Micaceous-washboard. Given the above, I suggested the official designation for Kana’a Gray should be changed to Kana’a Neckbanded. She wholeheartedly concurred! If time had permitted, I would have incorporated this exchange in the thesis; however, it is presented here, at long last.

During the intervening years, Oppelt (1976:142, see also second revised edition 1988) has provided an annotated bibliography and list of Southwestern pottery types. Herein, Kana’a Gray and Kana’a Neckbanded are SEPARATELY
listed with the notation that the latter is a synonym for the former. At present both names appear in the literature, and sometimes BOTH are used in the same report; for example, Hammack et al. (1983) in their report on three developmental period sites near Santa Ana and Zia pueblos consistently use Kana’a Gray in the text, but all illustrations featuring the type are captioned as Kana’a Neckbanded. Before finishing or ending this discussion it seems worth including a late (post-A.D. 900), officially unnamed, subtype or variety of Kana’a Neckbanded that is characterized by the neck coils having been grooved by tooling. It occurs at a number of sites in the general Albuquerque area, but none were found at the sites reported in my thesis. Ferg (1983:46) provides a concise discussion of this variant, Kana’a Grooved, and its distribution.

The introduction of neckbanding and its timed entrance into the Albuquerque area (Middle Rio Grande) has come under scrutiny by Pierce (1999) wherein he proposes a long and circuitous route which begins in the Mimbres region of the Mogollon via the always considered “mother brownware type,” Alma Neckbanded, dated at A.D. 650. He states that both the technology, as well as the vessels, gradually spread north and west to the Zuni region where Kana’a Neckbanded, the Pueblo grayware copy, begins manufacture at A.D. 730, reaching the Mesa Verde region from the west (resulting in Moccasin Gray [Neckbanded]) at A.D. 750, and within 50 to 100 years reaching the southern San Juan (general Chaco region). Pierce’s Map 1 uses the end of the spectrum date—A.D. 850. From here he proposes neckbanding moves along the Rio Puerco of the East and into the Albuquerque area at A.D. 900.

Although I have been highly impressed with his work relating to corrugated ceramics and their various properties (Pierce 2005a, 2005b), I take issue with two aspects of his 1999 paper—namely, the route and timing for the appearance of Kana’a Neckbanded vessels in the general Albuquerque region. In an earlier paper (Frisbie 1982), I dealt with the Rio Grande as a corridor for trade and interaction between the Mogollon to the south and the Basketmaker-Pueblos to the north. Generally speaking, Lang (1982:154-156) and Cordell (1979) concur; however, Marshall and Walt (1984) clarify this in far greater detail. Their Rio Abajo survey began at Abeytas in the north (in close proximity to Belen) and terminated at Fra Cristobal in the south (Elephant Butte Lake)—a distance of 115 km (72 mi). This survey added tremendously to Mera’s (1935, see also Wiseman’s update [in prep.]) earlier work. Herein, 137 sites were recorded (Marshall and Walt 1984:7-12, Table 1.3). Eight of them provided Basketmaker III material with a significant increase to 23 sites for the Basketmaker III-Pueblo I period. These sites practically spanned from one end of the survey area to the other (see also Marshall [1980] for the Lower Rio Puerco and Rio Salado). The latter sites are referred to as the Tajo Phase and is described as “…a north-central expression of the Mogollon subarea that was extant during the Pueblo I period, ca. A.D. 800-1000” (Marshall and Walt 1984:47). There is a preponderance of brownware (72.9 percent) featuring both Alma Plain and Alma Neckbanded; not unexpectedly, the grayware (22.6 percent) includes both Lino Gray and Kana’a Neckbanded. Suffice it to say, the northern region of Marshall and Walt’s survey is adjacent to the Albuquerque area (i.e., Middle Rio Grande) so that there is essentially an unbroken temporal and cultural continuum. In fact, there are a number of excavated pithouse sites within the Albuquerque region essentially beginning at the border with the Rio Abajo district. For example, four pithouses near Isleta were reported by Vivian and Clendenen (1965), and a number of others have been excavated and reported north of these both between and well beyond the Artificial Leg sites. We may deduce
from this the likelihood that Alma Neckbanded, which appears as a tradeware (as well as Alma Plain, and other Mogollon types), “mothered” Kana’á Neckbanded at any one or a number of sites along the Rio Grande without the necessity of the exceedingly long and circuitous route proposed by Pierce.

With respect to dating, the excavated Artificial Leg sites were chosen based on their ceramic complexes (Frisbie 1967:174-5, Table 72). Site I was “pure” Basketmaker III—exclusively Lino Gray chronologically placed at A.D. 580±40 via archaeomagnetic dating (Watanabe and DuBois 1965:395-97; Weaver 1967:699). Site 2, Basketmaker III-Pueblo I, featured a preponderance of Lino Gray with the appearance of the “ripple rim,” termed “transitional,” to Kana’á Neckbanded. The latter type makes its debut, sparsely, early during the occupation. I proposed that Site II was founded ca. A.D. 700. James Schoenwetter (personal communication 1967) provided a palynological date of approximately A.D. 750 for a lower trash level. Site 3 was considered multi-component, based on ceramics. The earlier component, dated at A.D. 850, featured all three previously discussed utility wares, but it was apparent that a shift from San Marcial B/W to a transitional type leading to Red Mesa B/W was occurring (for further discussion see Wiseman in prep.:16-19). This was followed by the last phase of occupation which featured Kana’á Neckbanded and Red Mesa B/W and suggested an occupational date of A.D. 870-930.

Schmader’s (1994; see also Garrett 1991) additional work at the Artificial Leg site area provided 20 radiocarbon dates wherein three-fourths of them fall between A.D. 650 and 950. He encountered no “pure” Basketmaker III or Pueblo II sites and suggests the inception of Pueblo I is A.D. 650; chronologically concurrent with this period is the hallmark ceramic type, Kana’á Neckbanded. Interestingly, from developmental sites near Zia and Santa Ana as reported by Hammack et al. (1983:16-17, 88) the archaeomagnetic dating provided the following: A.D. 925±15 and A.D. 910±12, as well as dendrochronological dates of 910±10, 925±15 and 950±17.

The obvious interpretation is that Kana’á Neckbanded vessels appeared within the Middle Rio Grande concurrently with its Mogollon counterpart, Alma Neckbanded, at ca. A.D. 650 and was not replaced by exuberant or indented corrugated until after A.D. 1000. Thus, one might query where neckbanding was first developed—a topic definitely beyond the scope of this paper! This does not explain the hiatus of the Rio Abajo Tajo Phase characterized by Kana’á Neckbanded dating between A.D. 800-900; however, Marshall and Walt (1984) were presenting their data via previously established ceramic complexes. Although there might well be the need for some adjustments to comprehend the exact dating, there can be no question Kana’á Neckbanded vessels were being produced in the Middle Rio Grande (Albuquerque region) prior to Pierce’s (1999) proposed A.D. 900. Essentially, there was no reason why the production of neckbanding needed to be introduced from the west simply because the Rio Grande provided the cultural corridor of interchange between the Mogollon and Basketmakers—soon-to-be Puebloans. Clearly, these folks were interacting on a regular basis, and I surmise even before the time being currently scrutinized.

Conclusions
Were it not for honoring Regge with this volume, there is no question the bag of sherds he presented me with 44 years ago would have remained unprocessed for my heirs to almost certainly simply discard at my demise. Their restoration has provided the only Kana’á Neckbanded vessel from the Artificial Leg Sites based on
the excavation of 10 pithouses and numerous associated surface bell-shaped storage cists under my direction (Frisbie 1967) and 30 pithouses and other features by Schmader (1994). The vessel has been donated to the Maxwell Museum, UNM, where it has been curated and joins the collection of all other cultural materials from these sites, including those of Schmader. Its catalog number is: 2012.156.1.

At the outset I had no idea this paper would lead me into a rather lengthy discourse on Kana’a Neckbanded ceramics. The process of delving more deeply into its naming, history from beginning to end, and the relationship to its Mogollon counterpart, Alma Neckbanded, has been personally rewarding, and definitely far more challenging than merely documenting the background and restoration of a pot. I hope the results of my suggestions might lead others to pursue further such matters as: WHICH neckbanded type REALLY came first? Or was it a simultaneous technological advance over a straight rim vessel to facilitate handling—especially a pot being placed over or removed from a burning hearth? Further, while I hadn’t thought of my discussion with Dr. Ellis relating to the nomenclature of “Kana’a Gray” vs. “Kana’a Neckbanded” until working on this paper, I do believe my rationale for officially changing the name, and those using similar vernacular where texturing of some form is in evidence, should be seriously considered. And lastly, I would have to admit my initial “love of working with ceramics” early in my career has been rekindled after a hiatus of 30 or more years!

Although the area of the sites has now been fully developed with houses and other types of structures, there remains an excellent possibility not all of the archaeological remains have been destroyed. For example, I well recall the typist of my thesis, Mrs. John Stapleton, whose home was located on a large lot on the first terrace of the Rio Grande west of Central Avenue in Albuquerque. On one of my visits to drop off the latest completed chapters, she noted her family had been finding artifacts in their back yard. Invited to “check it out” I realized the very strong likelihood that a site comparable to those she was typing up existed on the family property. I fully expect similar situations exist in the Artificial Leg Sites area (now collectively known as the “River’s Edge Sites” because the development is referred to as “The River’s Edge Subdivision”). Whether there is any further professionally oriented archaeological work remains moot. There is, however, the possibility that any such sites might involve kids “digging up stuff” which could lead to an interest in their becoming archaeologists. Finding artifacts as kids can have this effect—Regge and I come immediately to mind!!

As a final note, Regge never got to undertake the excavation of a Basketmaker III-Pueblo I site in the Middle Rio Grande. He did, however, provide a survey in San Ysidro of these archaeological manifestations (Wiseman 1976). It has made me wonder if his assisting me in the somewhat frantic efforts to complete the thesis forever banned a desire to undertake comparable excavations?!!

Acknowledgments

Suffice it to say, I owe a great debt of gratitude to Regge (a special friend since our early work together in 1966) not only for all of the assistance both in the field and lab during the preparation of my thesis, but in this instance, for providing me with “that old bag of sherds”—the focus of this paper! In my view, it is not just “another pot”—it is, as noted, the ONLY (restored) vessel of its type from a formidable amount of archaeological work conducted at the Artificial Leg Sites. In addition, Regge quickly responded to a series of queries during the preparation of this paper to clarify a number of points, especially relating to more recent work in the Middle Rio Grande for the Basketmaker and early Pueblo periods about which I had somewhat limited knowledge. I would like to thank Dave Phillips, Director, Maxwell Museum, UNM, for instantaneously agreeing to accept the restored vessel; it has taken its rightful place...
within the collection of artifacts from the Artificial Leg Sites. A thank you must also go to Ms. Allison Colborne, Librarian, Laboratory of Anthropology Library, Museum of Indian Arts and Culture, Santa Fe, for providing elusive reference data. Last, but not least, I greatly appreciate the reading and comments, as well as editing and computer assistance by both of my daughters, Elizabeth B. Frisbie and Jennifer A. Frisbie. Their contributions made the final editing of the manuscript by my wife, Charlotte J. Frisbie, considerably easier. I am indebted to all who assisted in the completion of this manuscript. Any omissions or errors are solely my responsibility.

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In the spring of 2008, archaeologists from Human Systems Research, Inc. (HSR) conducted an intensive survey of an 80-ac tract of land adjacent to the east side of the town of Lake Arthur, Chaves County, New Mexico (Laumbach et al. 2008). The archaeologically-surveyed parcel (Figure 1) was part of a larger project to improve the water and sewer system of the Lake Arthur community financed by an economic development grant administered by the Southeastern New Mexico Council of Governments. The survey was on lands administered by the State Land Office. Human Systems Research conducted the survey under New Mexico State Permit No. NM 08-005-S and New Mexico Cultural Resources Information System (NMCRIS) Activity No. 110984.

Figure 1. Location of the 80-ac block survey area (from Laumbach et al. 2008:Figure 2).
Five archaeological dumps were recorded in the 80-ac tract (Figure 2). The foundations of a cotton gin are visible outside the project area, while the remains of the railroad complex (LA 107974) had been razed and no longer visible. Three dumps less than 50 years old were identified but not recorded as sites. Portions of seven roads or trails were identified crisscrossing the survey area.

The historic archaeological sites LA 160169; LA 160170; LA 160171; LA 160172; and LA 160173 are artifact concentrations and associated scatters of artifacts that document the use of the 80-ac block as a location for trash dumps by Lake Arthur residents. These sites were determined to be potentially eligible to the National Register of Historic Places under Criterion D for the potential to contribute information on the history of the Lake Arthur area and this region of New Mexico.

The New Mexico State Land Office requested a discussion of the history of land use in the Lake Arthur area to mitigate the effects of construction activities on these archaeological sites. Dora Batista, Southeast New Mexico Council of Governments (SENMCOG), requested HSR to conduct the requested study.

**Methods**

The history of Lake Arthur and the land use patterns were researched using oral history interviews, census records, birth, death, and illness records, and other historic resources including town ordinances. Census data were obtained from Ancestry.com for the years 1910, 1920, and 1930 using copies of the data sheets. Data on deaths, illnesses, and the Lake Arthur cemetery were found at http://www.usgwarichives.org/nm/chaves/chaves.htm. Birth records were found at http://www.nmchaves.net/nmchaves/history.html.

*Figure 2.* Detailed map of 80-ac survey area showing location of archaeological sites, recent dump areas, roads, and isolated occurrences (from Laumbach et al. 2008:Figure 160).
Interviews were conducted with Ysidro Salazar (Mayor), Gerald Evans, Barbara (Funk) Shelton and her sisters Wanda (Funk) Whatley and Joan (Funk) Grossie, Jennifer Fields (Joan’s daughter), and Jeanette (Nelson) McNeil. Mayor Salazar provided copies of the early Lake Arthur ordinances from 1908 into the 1930s. Gerald Evans noted that the city hall burned in the 1930s so many of the records have been lost that would have been helpful for the years between 1908 and the mid-1930s.

The results of the land use study are presented in Lake Arthur, New Mexico: a Brief History of an Agricultural Community in Southeastern New Mexico (Kirkpatrick 2010).

**Lake Arthur**

Lake Arthur, incorporated in 1908, was an agricultural-based community on the Pecos Valley & Northeastern Railway. In the early 1910s the community had a wide variety of businesses and services, including physicians, and supported many farms and ranches in the surrounding area (Table 1). By the 1920s, the decline in water resources resulted in many businesses closing and farmers abandoning their properties. In the 1930s, the population increased slightly and a number of businesses, including a hotel, grocery stores, public schools, and several churches were in operation.

Between 1908 and 1910, the founders of Lake Arthur created seven ordinances that related to health and sanitation. These ordinances focused on loose livestock in town (Ordinances No. 2 and 11), dog licenses (Ordinance No. 3), disposal of trash (Ordinance 7), hog pens (Ordinance 10) and privy sanitation (Ordinance 28). The ordinances appear to be designed to control animal waste in the streets and on private property plus damage to buildings and other property. Dogs running loose tend to gather as a pack and would pose a danger to children and livestock. By keeping the hog pens clean, the odor would be minimized. The same probably applied to the privies.

On June 1, 1908, the Board of Trustees passed Ordinance No. 7, which prohibited the throwing of trash into the streets and alleys of Lake Arthur. Trash was identified as tin cans, garbage, and other rubbish. The town marshal was authorized to notify the offender “to remove at once any such rubbish.” If it was not done, then the costs for removal would be charged to the offender as the penalty. This ordinance went into effect on June 8, 1908.

The ordinance did not indicate where the trash was to be taken. It is very likely that each home had a burn pit and/or burn barrel where paper and similar trash could be burned. It is also likely that many of the homes may have had chickens that were given the fruit and vegetable scraps to eat. Gerald Evans (personal communication, April 2, 2010) and Barbara Shelton (personal communication, April 3, 2010) indicated many of the homes had burn barrels in the 1940s and 1950s and “some still do today.”

Evans and Shelton indicated that when they were growing up in Lake Arthur, the town dump was a surface dump located east of town in an area just east of the wastewater plant. This was outside the archaeological survey area. In the early 1950s, Chaves County officials cleaned the area by excavating a large pit and pushing this older trash into it. The county then dug a new pit where trash was to be dumped. This was periodically covered with dirt. When the pit was filled up, another

<table>
<thead>
<tr>
<th>Table 1. Precinct and Town Population for Lake Arthur 1910-1930.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precinct Name</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Lake Arthur</td>
</tr>
</tbody>
</table>
pit was excavated for the trash. The county eventually closed the pits and put in transfer bins (Ysidro Salazar, Leo Levario, and Gerald Evans, personal communication, April 2, 2010).

The residents of Lake Arthur used the open dump area east of the town limits until the 1950s, although none of the local residents who grew up in the community knew when the dump started. Access to the dump was by several two-track roads that are now grassy swales. Along these roads, the residents often dumped trash, predominantly food containers (cans and bottles) and household goods (e.g., ceramics and glass serving ware, enamelware cookware, and decorative ceramics and glass). The disposal of trash was continuous from the early 1900s to the early 1950s when the open dump was closed and covered with dirt, but individual trash dump areas within the sites were identified to periods of 1910s to mid-1920s, 1920s-1930s, 1930s-1940s and 1940s-1950s. The artifacts, especially those between 1910 and the 1930s, were probably purchased at one or more of the grocery and hardware stores in operation at the time.

**Development of Archaeological Sites**

The archaeological sites are the result of informal dumping of trash between the Lake Arthur town limits and the open dump area east of Lake Arthur (Figure 1). The designated dump area, as reported by local residents, was outside the southeastern boundary of the archaeological survey area. Five archaeological sites were found and recorded between Lake Arthur and the formal and established, open dump area. Three of the sites, LA 160170, LA 160172, and LA 160173, are spatially small, have few artifacts, and probably represent one or two dumping episodes or events. Sites LA 160169 and LA 160171 are the two largest and most complex sites found in the archaeological survey area. These sites are the result of multiple dumping events in a localized area. Detailed descriptions of the sites, including the description of the artifact concentrations and associated temporally diagnostic artifacts, is presented in Laumbach et al. (2008). Of the thousands of artifacts on Sites LA 160169 and LA 160171, the archaeologists recorded only those artifacts with the potential for providing chronological and functional data. The age of the archaeological sites was determined by identifying selected physical characteristics of cans and other metal artifacts, manufacturer methods and marks on bottles, and marks and design styles on ceramic artifacts. Similar information was used in assigning functional categories to the artifacts.

**LA 160169**

Site LA 160169 has 16 artifact concentrations (Table 2, Figure 3) and isolated occurrences or artifacts recorded as sheet trash between the concentrations. Road No. 4 (Feature 17) crosses the southern portion of the site, and Road No. 7 (Feature 18) is partially visible in the northern part of the site. The smaller artifact concentrations (e.g., Artifact Concentrations 2, 3, and 7) are thought to represent single dumping episodes, whereas the larger artifact concentrations were created by multiple dumping episodes (e.g., Artifact Concentration 1). It is very likely that Lake Arthur residents used the roads to bring their trash to this area.

**Dates of Artifact Concentrations**

The recorded sample artifact assemblage consisted of 434 artifacts of which 372 provided both chronological and functional data. The estimated maximum date range is very general. The presence of a late date can or bottle extends the time range but this artifact may actually be an isolated artifact that blew into the artifact concentration or was deposited several years after the initial dumping event.

The artifact concentrations of LA 160169 reflect the use of this locale for discarding primarily...
domestic trash from the late 1910s/early 1920s through the 1950s (Table 2). The dates reflect manufacturing dates, but the artifacts were discarded after this date. After manufacture, each artifact has a shelf life at the manufacturing plant, distribution plant, the store, and the use site. Bottles, especially condiment bottles, and tobacco tins were often discarded shortly after being emptied. However, soda bottles were refilled and could have had a useful life of 10 or more years.

The earliest artifact concentrations date from the late 1910s to the mid-1920s. These are Artifact Concentrations 3, 5, 6, 10, 12, and 13. The diagnostic artifacts are purple colored glass and hole-and-cap food and milk cans. Artifact Concentrations 1, 8, and 11 appear to date to the late 1920s/early 1930s to the 1940s. The artifact assemblages have more temporally diagnostic artifacts. Bottles for soda, cosmetics, and cleaning solvents are present. Artifact Concentration 14 appears to date to the 1940s based on the presence of soda and food bottles and hallmarks on ceramic artifacts. Artifact Concentrations 9 and 15 date to the 1940s and 1950s with the presence of soda and food bottles and diagnostic cans.

Several of the artifact concentrations have at least one artifact that dates either earlier or later than most of the artifacts. These artifacts can be interpreted two ways. First, the earlier artifact may have been an isolated artifact with the later dating artifacts dumped around it, or the later dated artifact was deposited as an isolated artifact or blew in from a nearby artifact concentration that has a later date.

Road 4 (Feature 17) and Road 7 (Feature 18) are shallow and grassy swales that cross the survey area. The roads are not datable by associated artifacts.

<table>
<thead>
<tr>
<th>Artifact Concentration/ Road No.</th>
<th>Field Feature/ Area No.</th>
<th>Dimensions (m)</th>
<th>Area (m²)</th>
<th>Date Range (Estimated Maximum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1</td>
<td>1 x 23</td>
<td>362</td>
<td>1920s–1950s</td>
<td></td>
</tr>
<tr>
<td>2 2</td>
<td>1.8 x 1.7</td>
<td>3</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>3 3</td>
<td>3.3 x 3.2</td>
<td>8</td>
<td>1919-1929</td>
<td></td>
</tr>
<tr>
<td>4 4</td>
<td>3.9 x3.8</td>
<td>11</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>5 5</td>
<td>8 dia. (approx.)</td>
<td>47</td>
<td>Pre-1925–?</td>
<td></td>
</tr>
<tr>
<td>6 6</td>
<td>9.5 x 6.5</td>
<td>52</td>
<td>Pre-1917–1930s</td>
<td></td>
</tr>
<tr>
<td>7 7</td>
<td>3 dia. (approx.)</td>
<td>6</td>
<td>1915–1940</td>
<td></td>
</tr>
<tr>
<td>8 8</td>
<td>9.5 x 9.8</td>
<td>26</td>
<td>1917–1948</td>
<td></td>
</tr>
<tr>
<td>9 9</td>
<td>5.0 x 5.5</td>
<td>26</td>
<td>1924–1925</td>
<td></td>
</tr>
<tr>
<td>10 10</td>
<td>3 dia. (approx.)</td>
<td>6</td>
<td>1907–1947</td>
<td></td>
</tr>
<tr>
<td>11 11</td>
<td>8.7 x 26.5</td>
<td>179</td>
<td>1907–1949</td>
<td></td>
</tr>
<tr>
<td>12 12</td>
<td>5.5 dia. (approx.)</td>
<td>24</td>
<td>1910–1924</td>
<td></td>
</tr>
<tr>
<td>13 13</td>
<td>10 dia. (approx.)</td>
<td>89</td>
<td>Pre-1917–1947</td>
<td></td>
</tr>
<tr>
<td>14 24</td>
<td>16.5 x 23.5</td>
<td>334</td>
<td>1923–1955+</td>
<td></td>
</tr>
<tr>
<td>15 25</td>
<td>4 dia. (approx.)</td>
<td>16</td>
<td>1923–1950</td>
<td></td>
</tr>
<tr>
<td>16 26</td>
<td>6 dia. (approx.)</td>
<td>24</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Road No. 4</td>
<td>17 x 136.2</td>
<td>408</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Road No. 7</td>
<td>3 x 45.55</td>
<td>136</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>
Artifact Concentration Composition

The artifacts from LA 160169 were sorted into functional categories (based on the author’s inferences of function) that indicate their general use (Figure 4). The largest group (109) is food-related, being primarily food cans, bottles, and jars of which the contents can be identified. This is followed by household items (95) that includes ceramic and glass dinnerware and food preparation artifacts. The third largest category is beverage (45) consisting of mostly of bottles with identifiable contents. The Unknown category, the fourth largest group (40), represents

Figure 3. Site map for Site LA 160169 (from Laumbach et al. 2008: Figure 14).

Figure 4. Artifact categories for Site LA 160169.
primarily glass bottles and jars with unknown contents as well as cans, caps from hole-and-cap cans, ceramic, and other artifacts the function of which cannot be determined. Tobacco tins (27) were found primarily in Artifact Concentrations 10 and 13. Construction materials (20) include nails, bolts, bricks, and concrete. The remaining categories of agriculture, automotive, beer, clothing, cosmetics, decorations, fuel, medicine, personal effects, tobacco, toy, wine, and wire have fewer than 10 artifacts each. Artifacts related to commerce, liquor, miscellaneous, mixed, and weapons were not present.

**LA 160171**

Sixteen definable artifact concentrations or dumps exist within LA 160171 (Figure 5). Artifact Concentration 2 has western and eastern sections with an area between them approximately 3 m wide with very few artifacts present. Artifact Concentration 10 has three concentrations about two to three meters apart. These are designated

![Site map for Site LA 160171](from Laumbach et al. 2008: Figure 45).
A, B, and C. Road 5 (Feature 17) of an old road that crosses through the site on the northern edge. To the west, it connects with the old road (Road 4) that goes through LA 160169. Road 6 (Feature 18) is a section of another old road that goes across the middle of this site. The concentrations contain a variety of artifacts that may represent either a single dumping episode (e.g., Artifact Concentration 23) or several dumping episodes (e.g., Artifact Concentration 2). The number in the box is the field Artifact Concentration number.

**Dates of the Artifact Concentrations**

The recorded sample artifact assemblage consisted of 527 artifacts of which 448 provided both chronological and functional data. Table 3 presents the physical characteristics of each artifact concentration and its date range. The date range is estimated based on the earliest and latest manufacturing date of the artifacts in the artifact concentration. The late date could actually be later if the artifact had a long lag time (shelf life) between the manufacture date and the discard date.

It appears many of the artifact concentrations were created between the early 1900s and early 1930s. Artifact Concentrations 6, 7, 8, 10, 12, 13, 14, 15, and 16 have hole-and-cap cans, early style sanitary seal cans, purple glass, and manufacturer marks on bottle bases. Artifact Concentrations 9 and 11 probably date to the 1920s. Artifact Concentration 1 probably dates to the 1940s. Artifact Concentration 5 is a recent dump based on the presence of an aluminum screw cap to beverage bottle and a Ronson lighter. Artifact Concentrations 3 and 4 did not have diagnostic artifacts.

Road 5 (Artifact Concentration 17) and Road 6 (Artifact Concentration 17) are grassy swales that are not datable but appear to be contemporaneous with dumping episodes.

<table>
<thead>
<tr>
<th>Artifact Concentration/ Road No.</th>
<th>Field Feature/ Area No.</th>
<th>Dimensions (m)</th>
<th>Area (m²)</th>
<th>Date Range (Estimated Maximum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15</td>
<td>3 dia. (approx.)</td>
<td>6</td>
<td>1944–1996</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
<td>55 x 17</td>
<td>781.2</td>
<td>1907–1971</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>8 dia. (approx.)</td>
<td>61</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>18</td>
<td>5 dia. (approx.)</td>
<td>26</td>
<td>—</td>
</tr>
<tr>
<td>5</td>
<td>19</td>
<td>11 dia. (approx.)</td>
<td>108</td>
<td>Recent</td>
</tr>
<tr>
<td>6</td>
<td>20</td>
<td>50 x 38</td>
<td>1,482</td>
<td>pre-1917–1947</td>
</tr>
<tr>
<td>7</td>
<td>21</td>
<td>12 dia. (approx.)</td>
<td>112</td>
<td>1903–1947</td>
</tr>
<tr>
<td>8</td>
<td>22</td>
<td>10 dia. (approx.)</td>
<td>72</td>
<td>1904–1928</td>
</tr>
<tr>
<td>9</td>
<td>23</td>
<td>8 dia. (approx.)</td>
<td>53</td>
<td>ca. 1920</td>
</tr>
<tr>
<td>10</td>
<td>27</td>
<td>24 x 27</td>
<td>455</td>
<td>pre-1917–pre-1925</td>
</tr>
<tr>
<td>11</td>
<td>28</td>
<td>10 dia. (approx.)</td>
<td>72</td>
<td>ca. 1924</td>
</tr>
<tr>
<td>12</td>
<td>29</td>
<td>20 dia. (approx.)</td>
<td>322</td>
<td>pre-1917–pre-1925</td>
</tr>
<tr>
<td>13</td>
<td>30</td>
<td>4 dia. (approx.)</td>
<td>14</td>
<td>pre-1917–?</td>
</tr>
<tr>
<td>14</td>
<td>31</td>
<td>4 dia. (approx.)</td>
<td>16</td>
<td>1917–1925</td>
</tr>
<tr>
<td>15</td>
<td>32</td>
<td>12 x 29</td>
<td>380.2</td>
<td>1904–pre-1917</td>
</tr>
<tr>
<td>16</td>
<td>33</td>
<td>7 dia. (approx.)</td>
<td>46</td>
<td>pre-1917–?</td>
</tr>
<tr>
<td>17 Road No. 5</td>
<td>3 x 36</td>
<td>108</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>18 Road No. 6</td>
<td>3 x 241</td>
<td>723</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>
Artifact Concentration Composition

The artifacts from Site LA 160171 have been sorted into functional categories that indicate their general use (Figure 6). The largest group (144) is the food-related artifacts, being primarily food cans, bottles, and jars of which the contents can be identified. This is followed by household items (108), including ceramic and glass dinnerware and food preparation artifacts. The third largest group (67) is the Unknown, which consists primarily of glass bottles and jars with unknown contents. Also included are cans, caps from hole-and-cap cans, and screw caps for bottles and jars. The fourth largest group (35) is construction-related artifacts such as window pane glass, nails, bolts, bricks, and sewer pipe. The fifth largest category (19) is beverage consisting of mostly bottles with identifiable contents. The remaining categories of agriculture, automotive, beer, clothing, cosmetics, decorations, fuel, medicine, personal effects, tobacco, toy, wine, and wire have fewer than 10 artifacts each. Artifacts related to miscellaneous and wine were not present.

Discussion

Lake Arthur was a dynamic frontier town in southeastern New Mexico in the early 1900s. A group of business men, farmers, and ranchers successfully incorporated Lake Arthur into a territorial community with a population of nearly 350 people with a surrounding population of 1,042 individuals. The Board of Trustees established a set of ordinances that addressed public health, safety, fiscal responsibility, and general conduct. The community had a variety of businesses, including a bank, newspaper, two hotels, grocery and hardware stores, a barbershop, jewelry store, land developers, lumber yard, livery stables, blacksmith, a drug store, and doctors’ offices. The public institutions and civic organization were a post office, public school, several churches, and a Masonic Lodge and Eastern Star club. There was never a public library, however.

The economy was primarily agricultural with crops of cotton and alfalfa and small truck farms. Water from artesian wells was critical to the success of these farms. The grasslands away from the Pecos River were used to raise cattle and sheep. The railroad was important for transporting the crops and livestock to markets outside of southeastern New Mexico. The decline of reliable water in the late 1910s and early 1920s (Nelson 1999) resulted in a decline in the population of Lake Arthur to 141 people, with only 208 people in the surrounding area. By the 1930s the population of Lake Arthur increased slightly to 215 people with 755 people in the surrounding precinct.

The businesses in 1949 were limited to a few small grocery stores and cafes, the public school, and city employees. Many of the residents worked as school teachers, ministers for the churches, laborers on nearby farms or for the railroad. Several people worked in nearby Artesia. The small grocery stores were more like today’s convenience stores. For serious grocery shopping, the residents went to Artesia where the stores had lower priced groceries. Similarly, for medical and dental needs, the residents went to Artesia or Roswell.

Throughout the history of Lake Arthur, the residents relied on using an area east of the
corporate town limits for the disposal of their trash. This area is outside of the area where the archaeological survey was conducted. Prior to 1950, there was an open dump where residents took their trash. In the 1950s, Chaves County officials closed down the surface dump by digging a deep pit, depositing the pre-1950 trash in the pit, and then covering it up. A second pit was dug and trash was deposited in it; it was periodically covered over with dirt.

Access to the surface dump area and later pit was by several dirt two-track roads that are now covered with vegetation (Figure 2). The creation of the five archaeological sites was made by individuals who probably did not want to go to the open surface pit.

Based on a few of the artifacts that could be assigned temporal context, it was possible to identify four periods of deposition. These were ca. 1908 to the mid-1920s, 1920s-1930s, 1930s-1940s, and 1940s-1950s. LA 160169 had the greatest variability in ages whereas LA 169171 seemed to have been created between the late 1910s and late 1920s. The deposition seemed to be continual over this 50 year period of time, and there did not seem to be a period, such as the Great Depression, where artifacts were not being deposited in this area.

For nearly 50 years, the artifact scatters were being created, a little at a time. The artifact assemblages at sites LA 170169 and 170171 are similar in content (Figure 7). The majority of discarded items relate to food and beverages and household items. The town’s people drove a short distance east of town and tossed out used food and condensed milk cans, whole and broken bottles and jars, broken ceramic plates, cups, saucers, decorative ceramic vases, chipped enamelware dish pans, cooking pots, and tea kettles. There was a noticeable absence of cooking and eating utensils.

There was also a lack of animal bones and canned meat tins. The meat was probably purchased from the local butcher shop, maybe run by Louis F. Rogers in 1912 or at Kintz Mercantile Company in the 1940s and 1950s. Many of the Lake Arthur residents had burn barrels and bones not given to the dogs were burned. There was a notable absence of burn barrel deposits in the sites. The contents were either dumped and buried on the property or deposited at the open dump area.

The artifacts at the archaeological sites were probably purchased locally at the Hearte Store in 1910 and operated by Jacob Hearte and his wife, Luhe; the 1912 stores run by Claude W. May and Louis A. Keller (May Mercantile Co, a general store); Daniel G. Jones and Clark J. Jones (Jones & Co General Store); and J. A. Edwards and J. D. Bratton (Lake Arthur Supply Co., a general store). The 1920 census lists people who worked at grocery stores, but the store names are not know. By 1949, the main store in Lake Arthur was Merritt Grocery, operated by the R. L. Merritt family, and Norris Grocery, run by Wayne Norris. Smaller stores included the Cox grocery store owned by Avery
Cox, the Kintz Mercantile owned by John Kintz, and Anita’s Store operated by Anita Farmworth.

The ordinances prohibiting the sale of alcoholic beverages may explain the general absence of beer cans and bottles containing wine and hard spirits. It is also common practice to deposit such containers in one’s privy.

The boundaries of the archaeological sites were arbitrarily defined based on the more concentrated distribution of artifacts. Figure 2 shows that there were many other artifacts dispersed across the landscape, either deliberately or moved by the eastward blowing winds.

Conclusions
The archaeological survey and historical study of Lake Arthur has provided new information about the material culture of an agricultural community in southeastern New Mexico. The historic records show that this community, like many others in this region and across New Mexico, began with the initial combination of good soil, water, and a railroad to transport the agricultural produce to markets outside the region. Census records and business directories provided insight into the types of stores and services that came to a booming community and those that remained when the population was not able to be supported by the agricultural crops they grew.

The people of Lake Arthur experienced good times and bad. Unfortunately, it is not known what the good times involved, other than dances and functions at the public school and fraternal organizations. In the early 1900s, health issues were a major concern for the mothers and fathers of children as diseases such as measles, diphtheria, and scarlet fever took their young children. Adults had a variety of diseases but the worst was tuberculosis, which caused nearly a third of all adult deaths.

The families did survive these tragedies. Some remarried so their children would have a mother or father. Elderly parents often participated in the family, probably helping to take care of children. Many of the Lake Arthur’s young adults were single men and women who grew up in Lake Arthur and then moved away. There are only a few families who can trace their origins back to Lake Arthur and the surrounding communities, such as Cottonwood.

Lake Arthur survives today with nearby farms and dairies for agricultural products. Many people commute to Artesia for other jobs but have chosen to live in Lake Arthur for its school and family roots. With the new water and sewer system, it will be possible for Lake Arthur to grow again as people will be able to build new houses and homes and enjoy the benefits of living in a small community.
Acknowledgments

I would like to thank Mayor Ysidro Salazar, Leo Levario, Gerald Evans, Barbara (Funk) Shelton, and her sisters Wanda (Funk) Whatley and Joan (Funk) Grossie, Jennifer Fields (Joan’s daughter), and Jeanette (Nelson) McNeil of Lake Arthur for taking the time to answer my questions about the history of Lake Arthur. Thank you to David Eck, Archaeologist, State Land Office, Santa Fe, New Mexico, who provided support and assistance during both the survey and land use study phases of this project. I would like to thank my colleagues at Human Systems Research for their assistance. Dr. Deborah Dennis provided administrative support. Karl W. Laumbach helped with suggestions for research directions. Nancy Komulainen-Dillenberg drafted the location and site maps. Leslie Kryder, Leslie Consulting, provided the pie graph chart figures.

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Clues to the Origin and Source of Seco Corrugated

TONI S. LAUMBACH AND KARL W. LAUMBACH

Introduction

Obliterated corrugated ceramics are widespread in the post-thirteenth century Pueblo world of southern New Mexico and southeastern Arizona. As with many types with broad distribution, the obliterated corrugated wares have multiple type names varying by drainage system or by region and by the interpreted cultural affiliation of the site or sites (Salado, El Paso Phase, etc.). To the west a variety of type names have been applied to local obliterated corrugated varieties but in many cases, and especially in the eastern area of its distribution, it was usually called Obliterated Corrugated or Smeared Corrugated. The type name Seco was applied as the result of a January 1972 visit by John P. Wilson and Pat Beckett to the Las Animas Creek located just a few miles south of Truth or Consequences in Sierra County, New Mexico (Figure 1). These two intrepid explorers recorded at least two sites on that trip, one was LA 3948 and the other, LA 3949. Both were composed of adobe room blocks with an enclosed plaza and both contained the range of paint-decorated ceramics expected on post-thirteenth century sites in that area, including El Paso Polychrome and Gila Polychrome.

Description of Seco Corrugated by John P. Wilson and Helene Warren

Seco Corrugated was described by John P. Wilson and Helene Warren in 1973. The geographic name “Seco” was taken from a Black Range drainage adjacent to the Las Animas Creek. Wilson and Warren’s observations were derived from ceramic sherds associated with LA 3949, the largest and westernmost of the two sites recorded by Wilson and Beckett. As described, basic attributes of Seco Corrugated are: 1) it is a brown ware; 2) it has detritus temper; 3) both bowl and jar forms have indented corrugations, typically over the entire vessel; 4) after the corrugations were indented they were smoothed to the point of smearing, but not completely obliterated. The smearing process seems to have been accomplished by scraping the clay while it was dry but not yet fired. It was observed that some polishing also occurred on the high points of the formed indentations. Wilson and Warren (1973) note that plain corrugations are apparently rare on Seco Corrugated and no patterned indenting or painting on vessel exteriors was observed.

Range and Temporality of Obliterated Corrugated Ware

Seco Corrugated from the type site LA 3949 was thought by Wilson and Warren (1973) to be identical with a pottery type identified by Wilson (1969:605-607) found in the region around Heber and East Clear Creek in east central Arizona where it was associated with Snowflake Black-on-white (B/W) dating to the thirteenth century. This type is referred to in Wilson’s dissertation as Type IV Corrugated. Wilson and Warren also felt Seco Corrugated was similar to wares found
in the Silver Creek and Vernon areas of east central Arizona. They also suggested that Seco Corrugated may have been included in Nesbitt’s (1938) Upper Gila Corrugated group that includes Reserve Plain, Indented, and Punched corrugated types and Tularosa Pattern Corrugated.

Other type names for similar obliterated corrugated ceramics come from work on post-A.D. 1300 Salado sites in the Gila, San Francisco, and Mimbres drainages. Several Salado sites on the Gila River were recorded and/or excavated during the 1960s and 1970s (Lekson 2002:5-9; Wallace 1998). The obliterated corrugated wares from the Gila River region were generally typed under the rubric “Smeared Corrugated.” Dean Wilson (1998:202) suggested that they are “variations of Salado utility ware” found in Arizona. The Salado utility ware referred to include Tonto Corrugated and a red-slipped version named Salado Red Corrugated.

Work by Nelson and LeBlanc (1986:133) on Salado sites in the Mimbres Valley recovered vessels of a similar type that they called Cliff Patterned Indented. They indicated that the Mimbres Valley version was in fact not an obliterated corrugated but a smeared indented created by tool marks placed in rows parallel to the rim while simultaneously creating a diagonal pattern, after which the marks were smeared or obliterated.

At Paquime, DiPeso et al. (1974:47-48,130-132) report on various styles of “rubbed” corrugated. One, Convento Rubbed Corrugated, is associated with the Viejo Period (pre-A.D. 1200). DiPeso states “This technique did not die out at the end of the Viejo Period but was carried along in the ceramic tradition throughout the life span of the ceramic art of Casas Grandes.” The second is Casas Grandes Rubbed Corrugated, which dates to the Medio Period (A.D. 1200-1450).

In the Rio Abajo province of the Rio Grande in the vicinity of Socorro, New Mexico, Marshall and Walt (1984:98) report that there is a decided increase of textured types, including smeared indented styles, during the Late Elmendorf Phase (ca. A.D. 1200-1300).

Farther to the north in New Mexico’s Cochiti Reservoir, Honea (1968:126) describes the following: 1) an obliterated corrugated type as “blind indented corrugated where individual coils were obliterated and the surface coarsely smeared”; 2) another as ribbed indented corrugated wherein the “individual coils are obliterated [and the] coil junctures marked by low to prominent, horizontal ribs” and the “indentations… smoothed”; and 3) a smoothed diagonal indented corrugated in which the “individual coils have been obliterated.” These types are associated with Santa Fe B/W, a thirteenth century type. Warren (1979:33) describes three types from the same area as Corrugated Indented Smeared, Prieta Smeared Indented, and Blind Indented Corrugated.

In the Zuni area, Mills (2007:229) states that after A.D. 1300 semi-obliterated and obliterated corrugated gray wares are common. She goes on to say “The temporal precedence of semi-obliterated coils on Tusayan Gray ware may be an indicator of migration out of the Four Corners area into the Mogollon Rim and even Zuni areas.”


While all of these types have their differences, they all present a similar appearance and seem to have composed the corrugated style of the fourteenth century.
Seco Corrugated and the Cañada Alamosa Project

The Cañada Alamosa Project has tested four sites located on the upper end of the Rio Alamosa north and west of Truth or Consequences. Seco Corrugated has been found in quantity at the Pinnacle Ruin (LA 2292) in the Cañada Alamosa (Figure 1). With 2,178 sherds of Seco Corrugated recovered, it is second only to plain brown ware (N = 2,701) after six seasons.

Figure 1. Map of primary study area showing general locations of Cañada Alamosa Project and LA 3948.
of field work. Coming in second is Reserve Indented Corrugated with 2,074 sherds. While Seco Corrugated is present in the carbon paint contexts (ca. A.D. 1250-1290) on Pinnacle Ruin, it dominates the corrugated ware category for the post-A.D. 1300 glaze period component.

In contrast, Seco Corrugated is rarely found in the Tularosa Phase component (ca. A.D. 1200-1290) on the Victorio Site (LA 88889), occurring only as scattered sherds (N = 30) prior to the 2009 season. Instead the dominant thirteenth century corrugated ware on the Victorio Site is Reserve Indented Corrugated (N = 3273) which is primarily associated with the Tularosa Phase component.

This situation changed in 2009 when restorable Seco Corrugated bowls were found in two late Tularosa Phase rooms. One bowl was found embedded in an adobe matrix in the uppermost of three floors in Room 18. Associated ceramics included St. Johns Polychrome, Tularosa B/W, Playas Red Incised and Techado Polychrome (a late variant of St. Johns Polychrome). Two sherds of carbon-painted Magdalena B/W, also a rarity on the Victorio Site, were found in the upper levels of Room 18. An archaeomagnetic sample from the hearth produced a date range of A.D. 1185-1280. Two additional Seco Corrugated bowls were found at Room 27. The bowls were found next to each other and both had been sealed onto the floor with adobe (Figures 2, 3 and 4). The positioning of the adobe suggests that the bowls were a late addition to the floor features as the adobe base was “on” and not “in” the floor. Associated ceramics include St. Johns Polychrome, Tularosa B/W, Chupadero B/W, Playas Red Incised, one

![Figure 2. Seco Corrugated bowls set in adobe at Room 27, LA 88889.](image-url)
sherd of Pinedale Polychrome and two sherds of Techado Polychrome. An archaeomagnetic sample from Hearth 1 in Room 27 yielded a date of A.D. 1210-1270 while a radiocarbon date (Beta 276918) from the same hearth provided a one-sigma range of cal A.D. 1260-1290.

Thus, chronometric data suggest that Seco Corrugated appears in the Cañada Alamosa during the late Tularosa Phase sometime after A.D. 1250 and possibly as late as A.D. 1280. The presence of a few sherds of Techado Polychrome supports that premise as Techado Polychrome, a late variant of St. Johns Polychrome (Smith et al. 2009:126-134), appears to have been produced primarily in the Quemado area and has been found in tree-ring dated contexts from Los Gigantes, a post-Chaco great house site near Zuni. In that case, the tree-ring dates ranged from A.D. 1253 into the 1270s (Matthew Peebles, personal communication 2009).

In summary, the discovery of three Seco Corrugated bowls in a late thirteenth century context provides us with a possible beginning date for obliterated corrugated ceramics in southern New Mexico.

Neutron Activation Analysis of the Cañada Alamosa Corrugated Assemblage

A sample of the late corrugated styles (post Pithouse Period) from the Cañada Alamosa has been analyzed by Dr. Jeff Ferguson at the University of Missouri research reactor. Dr. Virginia McLemore of New Mexico Tech has produced a detailed geologic map of the Montoya Butte quadrangle and sampled the clay deposits, providing the project with a robust baseline of local clays. Ferguson’s neutron activation analysis (NAA) of the Cañada Alamosa ceramics and the clay sources identified by McLemore has defined 16 clay groups. Separation of clay groups through NAA depends on the definition of a combination of elements unique to a particular group. Group 4 has three possible matches with clays local to the Cañada Alamosa. The analysis placed the majority (81 percent) of four temporally sequential corrugated types in the same clay group (Clay Group 4) suggesting that the Cañada Alamosa Project sample of these types reflects use of the same or similar clay sources from the eleventh century through the fourteenth. The types include the common post-tenth century types Mimbres Corrugated (N = 10), Reserve Plain Corrugated (N = 12), Reserve Indented Corrugated (N = 19), and Seco Corrugated (N = 36).

Seven sherds of Seco Corrugated were not assigned to a clay group, two were assigned to other clay groups, and the remaining six sherds of
Seco Corrugated were assigned to Clay Group 1. Intriguingly, the only other ceramic type assigned to Clay Group 1 is Mimbres Boldface B/W ($N = 4$). Jeff Speakman graciously reviewed the NAA data for the Mimbres white wares and those four sherds did not match any defined clay group in the Mimbres area. Speakman has speculated that the source for this clay group may be located in the area north and east of Reserve, New Mexico (Jeff Speakman, personal communication 2010). All that can be said at this time is that the clay source appears to be from a location where Mimbres Boldface B/W was produced.

**A Comparative Analysis of Reserve Indented Corrugated and Seco Corrugated from the Pinnacle Ruin**

Using a sample of utility sherds from the 2000 Cañada Alamosa Project field season at Pinnacle Ruin, Kari L. Schleher and Susan M. Ruth (2005:2-14) conducted a comparative analysis of Reserve Indented Corrugated and Seco Corrugated obtained during the 2000 field season. The goal of their research was to investigate the possibility of the presence of migrant populations at the Pinnacle Ruin. They postulated that if migrants were present, there might be differences in manufacture and technology of the ceramics.

Reserve Indented Corrugated (Figure 5) dominated the Pinnacle Ruin utility ware assemblage from the 2000 field season. It is characterized by indented corrugations laid obliquely across a bowl or jar exterior. The indentations vary from being wavy, shallow, and well defined, to finger- or tool-indented. In all cases, the high points on the indentations are somewhat flattened by polishing. The second most common corrugated ware in the assemblage was Seco Corrugated which has indentations that are blocky and stacked on top of one another. Unlike Reserve Indented Corrugated, the indentations are smoothed over and smeared or flattened by polishing.

Schleher and Ruth examined the technological style of the two types using 133 sherds of Reserve Indented Corrugated and 130 sherds of Seco Corrugated. They compared sherd thickness, breakage pattern, thickness of corrugation, surface finish, core color pattern, and firing temperature, all of which are common to body sherds of both types. The lack of rim sherds in both groups precluded the determination of vessel size.

Schleher and Ruth found statistically significant differences in sherd thickness, corrugation thickness, and breakage pattern. This was interpreted as indicating the presence of multiple pottery-making groups. However, Schleher and Ruth acknowledged that although Reserve Indented Corrugated was slightly thicker, this
may be indicative of vessel size, wherein the thicker walls are associated with larger vessels. Both Reserve Indented Corrugated and Seco Corrugated showed similar core color patterns and both are characterized by fully or partially oxidized vessels. The next most common trend of core color identified in both types was full reduction and reduced margins with fully oxidized cores. There was no statistical significance difference for core color pattern. They did find that the range of firing temperatures between the two types were similar. Bowl forms of both types have smudged interiors and it was found that this attribute had no significance between the two types.

Corrugation style is the primary attribute that differentiates Reserve Indented Corrugated from Seco Corrugated. In Schleher’s and Ruth’s technological analysis, it was found that some sherds are easy to separate based on corrugation style but others proved to be more difficult. They concluded that the technological styles of the two types overlap. It was suggested that this pattern of overlapping could represent an evolution of one ware into another while being manufactured by the same group. It may also represent a blending of technological styles between two groups.

In conclusion, the Schleher and Ruth study found that the technological styles of Seco Corrugated and Reserve Indented Corrugated are similar, but not identical, and that there were “some differences in the potting groups producing utilitarian wares at the site” (2005:12).

**LA 3948 on the Las Animas Creek**

LA 3948 was first recorded by John P. Wilson and Patrick Beckett in January 1972, during one of their site-recording junkets along the Río Grande and its tributaries. Also recorded was LA 3949 (Las Animas Village), a larger site located farther upstream on the Las Animas Creek and later tested by Margaret Nelson. While the LA 3949 is the type site for Seco Corrugated, it is also noted on the site form for LA 3948 as Animas Corrugated, a name later changed on the site form to Seco Corrugated by Helene Warren.

At the time of the Wilson-Beckett recording, numerous holes in the site indicated that it had previously been dug into, with some holes up to a meter in depth. An unnamed informant is quoted as saying that several human burials had been found. The land was and remains privately held.

The site map by Wilson and Beckett shows a block of about 10 rooms on the southern edge of the terrace and a heavily excavated area on the eastern edge and adjacent to the room blocks (Figure 6). A plaza area is immediately to the north and several small wall alignments are scattered to the west and north of the rooms.

A wide variety of ceramic types were recorded. They include Chupadero B/W, Casa Colorado B/W, Gila Polychrome, El Paso Polychrome, El Paso Brown, Heshotauthla Glaze Polychrome, a “local” variety of North Plains Black-on-red, San Francisco Red, Los Lunas Smudged, Animas Corrugated (changed to Seco Corrugated), Salado Red, and an obliterated corrugated with broad red lines in the technique of McDonald Corrugated. The surface collection was taken to the Museum of New Mexico where it was viewed by Helene Warren. In retrospect, it is quite possible that the Casa Colorado B/W was, in fact, the carbon-painted ware we now recognize as Magdalena B/W.

The site was again recorded in 1979, this time by Karl Laumbach. Laumbach saw the site layout a bit differently (Figure 7) as he describes the site as:

…three contiguous room blocks which join at right angles to form a three-walled plaza which is open to the north. The room blocks contain at
Figure 6. Map of LA 3948 by Wilson and Beckett, 1972.

Figure 7. Map of LA 3948 by Laumbach, 1979.
least one meter of fill. Construction is part cobble (masonry) and part adobe. The western room block has not been disturbed. The others have massive potholes in them. ... Several small cobble features to the west of the compound may represent an earlier Mimbres component. ... To the north of the compound low (50 cm or less) linear mounds exhibiting linear rock alignments appear. These features may indicate additional structures.

Laumbach identified the site as an Animas Phase occupation. In those days Animas Phase, defined by Kidder, Cosgrove and Cosgrove (1949) at Pendleton Ruin in New Mexico’s bootheel, was a catch-all for post Mimbres sites in southwestern New Mexico. Ceramics observed included Gila Polychrome, Seco Corrugated, Chupadero B/W, a textured red ware (Playas Red Incised?) and El Paso Bichrome.

At the time of Laumbach’s recording, the land was owned by a Mr. Owens. Local informants indicated that the holes in the site had been dug by members of the Beyer family from Las Cruces.

The Beyer Collection
In 2004 Karl Laumbach was contacted by Mrs. Susan Stolfus, a friend and neighbor, concerning a collection of prehistoric artifacts excavated by her parents on the Las Animas Creek in Sierra County during the late 1960s and early 1970s (Figure 8). Her parents, Lonnie and Gerry Beyer, were deceased and she wanted the artifacts to go to a place where they would be appreciated. In all 3,483 items were donated to Human Systems Research (3,481) and the New Mexico Farm and Ranch Heritage Museum (two).

Laboratory volunteers at Human Systems Research, Inc. cataloged and described the materials. The collection included numerous ground and flaked stone artifacts but the most intriguing artifacts were the ceramics. These included up to 11 restorable or complete jars and bowls of Seco Corrugated (Figures 9, 10, 11 and 12) in addition to partially restorable vessels of Ramos Polychrome (Figure 13) and Rio Grande Glaze Wares (Figures 14 and 15). Also included are sherds of Gila Polychrome, Chupadero B/W, Rio Grande Glaze A, Heshotauthla Glaze Polychrome, Tonto Polychrome, Magdalena B/W, Salado Red, Reserve Indented Corrugated, and late everted rims of El Paso Polychrome.

The most interesting ceramics in the collection were three pukis (Figures 16, 17, and 18). Puki is the Pueblo word for the shallow bowl-like base on which a clay vessel is started. It is used further for building and turning a pot as coils of clay are added to create the walls of the vessel. Wood ashes mixed with water are packed into the bottom of the puki to prevent the wet clay from sticking to it.

The largest of the three pukis is 28.6 cm in diameter and 3.0 to 3.25 cm in height with a wall thickness of 1.1 cm. The other two pukis
Figure 9. Seco Corrugated bowl from LA 3948 (Beyer collection).

Figure 10. Seco Corrugated jar from LA 3948 (Beyer collection).

Figure 11. Detail of smeared indentations/corrugations on Seco Corrugated jar, LA 3948 (Beyer collection).

Figure 12. Seco Corrugated jar from LA 3948 (Beyer collection).

Figure 13. Ramos Polychrome olla from LA 3948 (Beyer collection).

Figure 14. Agua Fria Glaze-on-red olla from LA 3948 (Beyer collection).
are smaller; one measures 18.73 cm in diameter and 3.56 cm in height with a wall thickness of .64 cm; the other is 22 cm in diameter and 4 cm in height with a wall thickness of 7 cm. Two of the pukis still have wood ash packed into their interior surface. The perimeter edges on all of the pukis have been purposefully shaped, possibly by grinding. All three are the bases of large Seco Corrugated jars (Figure 19).
The three pukis from LA 3948, coupled with the numerous vessels of Seco Corrugated found at the site, strongly suggest that the Seco Corrugated was produced at the site.

**Discussion**

To conclude, it is clear that varieties of obliterated corrugated wares were common across a broad region after A.D. 1300. Both John P. Wilson (1969) and Mills (2007) indicate that the first of these varieties (Moenkopi and Wilson’s Type IV Corrugated) were produced in northeastern and central Arizona by at least A.D. 1200. Mills (2007) also suggests that the southward spread of the style into the Mogollon Rim may be related to thirteenth century movements from the north. The type first appears at the Cañada Alamosa in the late 1200s where NAA data suggests it was both imported and locally produced. By the 1300s obliterated corrugated styles appear to have been produced at Salado sites on the Gila, San Francisco, and Mimbres drainages as well as on El Paso Phase and Magdalena Phase sites in the Black Range tributaries of the Rio Grande. It is our opinion that the Obliterated Corrugated found on El Paso Phase sites to the east of the Rio Grande was obtained through trade with the Black Range villages.

Based on the available data, it is clear that obliterated corrugated or obliterated indented styles became very popular across the traditional Mogollon area beginning about A.D. 1300. It was the corrugated style of the fourteenth century. As its popularity spread, apparently from west to east, potters who had been producing the corrugated styles of the Reserve-Tularosa series (Reserve Indented Corrugated, Tularosa Pattern Corrugated, etc.) began to emulate the style, resulting in slight differences from production area to production area. The spread of obliterated corrugated production stopped at the Rio Grande with the easternmost of the traditional Mogollon potters. From there it was extensively traded, particularly to the east into the El Paso Phase, Jornada Mogollon sites of south-central New Mexico. Thus, as a fourteenth century style, Seco Corrugated is the end game for almost 800 years of corrugated ceramic production in the Mogollon area.

**Acknowledgments**

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Edgar Lee Hewett’s 1902 Expedition to Chaco Canyon

F. Joan Mathien and Joyce M. Raab

During the twentieth century one of the major projects conducted in Chaco Canyon was the University of New Mexico/School of American Research/Museum of New Mexico (UNM/SAR/MNM) field school inaugurated in 1929 under the direction of Dr. Edgar L. Hewett. To better understand his research goals, methods, and the reasoning behind them, we wanted to know what Hewett knew about the archaeological sites in the canyon, when he learned it, and how he would later use this information. Here we focus on his initial 1902 expedition into the Chaco region which laid the foundation for later research that began in earnest in 1915 and culminated in the Chaco field schools.

The period in which Hewett’s visit occurred was one of change in anthropological viewpoints on research and education (Fowler 2000; Snead 2001). By the end of the nineteenth century, a number of explorers had made reconnaissance trips throughout the American Southwest, and the preservation of sites and retention of archaeological materials within this region were becoming major issues. A description of the large sites in Chaco Canyon was available (e.g., Gregg 1844; Jackson 1878; Simpson 1850), and several eastern institutions were seeking artifacts for exhibits in their museums as part of their educational programs (Snead 2001:40-64). Often the artifacts were acquired by local people, e.g., the Wetherills, who sold collections to various buyers. Considerable animosity resulted from the excavation of sites in Mesa Verde by Gustav Nordenskiold and Richard Wetherill and the shipment of this collection of artifacts to Sweden. As a result, when the Hyde Exploring Expedition (with Wetherill as its local manager) began excavations at Pueblo Bonito in Chaco Canyon in 1896, it generated concern among New Mexicans (Sellars 2007:277-278). The value of archaeological sites and artifacts to both local tourism and regional identity in the New Mexico Territory, which was applying for statehood, was not unrecognized.

In 1900 Hewett, as a member of the newly formed Santa Fe Archaeological Society, was responsible for requesting a General Land Office investigation of the Hyde Exploring Expedition (Sellars 2007:278-279). That year Max Pracht was assigned to evaluate the situation. His investigation was cursory. Although he did not visit the canyon, he reported that the excavations were scientifically conducted and no laws were broken. This event spurred Wetherill to file homestead claims on the land on which Pueblo Bonito was located. Hewett and the Santa Fe Archaeological Society were not quelled; renewed pressure brought another General Land Office investigator, S.J. Holsinger, to Chaco in 1901. Again no problems were detected with regard to the archaeological excavations (Snead 2001:53-56). His more thorough examination...
led to questions about the land on which the homestead claim was made and the trading business in which Wetherill was involved. Shortly thereafter excavations ceased, and the proposal by Holsinger (1901:2) that the federal government set aside a large section of the San Juan Basin to create a Chaco National Park needed evaluation.

Hewett was the logical choice to make this evaluation. Because of his interest in preservation of sites and his meeting in Washington, D.C., in 1900 with a number of leading figures in anthropology, Hewett was known as a regional expert (Sellars 2007:288). Among the people he had met was John F. Lacey, who had been sponsoring bills to preserve American antiquities. Thus, in 1902 Hewett ventured into the canyon to study its treasures firsthand.

The results of this visit, which probably was soon followed by at least one other, contributed to national policy. Hewett would work with Lacey and the committee established by the American Association for the Advancement of Science and the Archaeological Institute of America to pass the 1906 Antiquities Act (Sellars 2007:292-295). He would also have sufficient knowledge to formulate a broad research plan that would be carried out decades later by excavation at Chetro Ketl during 1920-21, in cooperation with the Royal Ontario Museum, and continued during the UNM/SAR/MNM Chaco field schools.

Hewett (1921:6-7) summarized the results of this expedition and how they were used. He later said:

I began my study of Chaco Canyon in the summer of 1902, under the auspices of the New Mexico Normal University [later New Mexico Highlands University]. Among the results were: (1) The first archaeological map of Chaco Canyon, prepared for the Bureau of American Ethnology in 1905, and made the basis of President Roosevelt’s proclamation by which the Chaco Canyon National Monument was established in 1907; (2) A short article on “Prehistoric Irrigation in Chaco Canyon,” published in Records of the Past, in 1905; (3) The articles on Chaco Canyon ruins in the Handbook of the American Indians North of Mexico, in 1905-06; (4) The description and discussion of the Chaco Canyon ruins in “Historic and Prehistoric Ruins of the Southwest and Their Preservation,” prepared for the Department of the Interior in 1904; (5) Articles on “A General View of the Archaeology of the Southwest,” prepared for the Smithsonian Institution in 1905; (6) Articles in Les Communautés Anciennes dans le Désert Américain, published in Geneva, Switzerland, in 1908; (7) Information furnished to Congress and the Department of the Interior from 1902 to 1906, in connection with the proposed laws for the preservation of American antiquities (Hewett 1936:167-169).

It is clear that he favored the establishment of Chaco Canyon National Monument (which occurred in 1907) that was later to become Chaco Culture National Historical Park in 1981.

Our first research goal was to better understand how much time Hewett spent in the canyon during this initial visit and what data he gathered. Based on a letter to Frank Springer dated June 26, 1920 (Fray Angelico Chavez History Library: Accession 105, E. L. Hewett Collection, Box 19, Folder 5) Hewett indicates that work from the 1900s included a survey, plans, and photographs,
Hewett’s records from this expedition, however, have not yet been found. Three of his colleagues, Kenneth Chapman, James G. McNary, and Margaretta McNary, kept informal narratives of their travels that summer or wrote about this adventure in their biographies. Chapman (in Munson 2007:36-41) stated that the goal of the trip was a reconnaissance of the major ruins in the Chaco region for a report to the U.S. Department of the Interior by Hewett in 1904. Chapman provided a glimpse into the field expedition operations and duties of personnel. James McNary (1956) supplemented his memory by discussions with Chapman but added very few additional details pertaining to the archaeological work. Margaretta McNary’s account (1902) is retained by her family, but a typed copy of it and some correspondence relevant to this trip were recently forwarded to the Chaco Culture NHP Museum Collection by Gwinn Vivian. An accompanying letter from her niece, Martha McNary Chilcote, dated May 20, 1974 to Dr. William J. Robinson, then editor of *The Kiva*, indicates that Hewett was commissioned by the Federal government to determine the worthiness of the ruins in Chaco as a National Monument.

Based on these accounts and the letter from Chilcote to Robinson, members of the 1902 expedition were Mrs. Hewett (Cora), Ruth Raynolds (daughter of Joshua S. Raynolds who donated the property on which the New Mexico Normal School, later New Mexico Highlands University, was built and who would become Mrs. James McNary), James Graham McNary (formerly at Tarkio College in Missouri when Hewett was there and later hired by him as a teacher of German and music at the Normal School), his sister Margaretta McNary (teacher of Latin), and Kenneth Chapman (art teacher/illustrator). Among their functions during the expedition, Ruth and Margaretta were the camp cooks who prepared and served meals. Ruth also served as a Spanish interpreter during their travels. Chapman and Jim McNary maintained the horses and packed the wagon. Chapman, and probably Jim McNary, also assisted Hewett in documenting various archaeological sites.

M. McNary (1902) provides dates for events during a seven week trip, beginning on July 1 and ending August 22. Chapman and J. McNary (1956) indicate that the party travelled at most about 20 miles per day and often less. M. McNary lists activities for each day; some of which were spent resting in camp and enjoying the local environs. Along the way, ruins at Pecos, Jemez, the Pajarito Plateau, and Puye were visited, as well as a few pueblo and Mexican villages where supplies could be restocked. Water was easily accessible except while crossing the desert from San Isidro to Torreon and on to Chaco Canyon. Years later Hewett commented on the route to the canyon and the difficulties it posed:

> It is fifty miles in any direction to a living stream. From any point of approach, the desert barrier must be crossed. This is not a formidable matter now, with automobiles to take the place of weary beasts. In the old days, one toiled across on horseback or by wagon, and it was a march for the seasoned veterans only. It was safe only when accompanied by a trusty Navaho (Hewett 1936:12).

Chapman indicated that Hewett planned a week to ten days for work in the canyon; M. McNary indicates they arrived in Chaco on August 2 and departed on August 7. Their first camp on their returning trip was four miles distant from the canyon near a water source that turned out to be dry. Their journey across the desert began in earnest on August 9. Thus, they would have had about a week in the Chaco Canyon region to carry out their studies.
During their stay in the canyon, M. McNary records visits to Pueblo Bonito and Pueblo Alto, plus interactions with Navajo during their meals and as providers of evening entertainment. Chapman (Munson 2007:40) indicates he and Jim McNary assisted Hewett with a survey of major ruins, which included preparation of ground plans. They used a tapeline or paced distances to make their measurements.

What maps were made during that summer is uncertain. An archaeological map of the canyon, dated 1905, is filed in the National Anthropological Archives (NAA manuscript file 4786). Three ground plans (for Pueblo Bonito, Peñasco Blanco, and Hungo Pavi—all drawn in the same style) appeared in Hewett’s 1908 dissertation. In the text Hewett (1908:62) attributes the plan of Pueblo Bonito to K. M. Chapman.

Were these the only plan views that might have been drawn by Chapman in 1902? In our attempt to answer this question, we discovered 12 maps attributed to Chapman (Table 1) in the Chaco Culture National Historical Park Museum Collection (CCNHP); these maps were later published by Hewett (1921, 1936). When the 12 were compared to maps in Holsinger (1901) and Jackson (1878), the outlines and numbers of rooms were very similar. It is suggested that Chapman used Holsinger’s or Jackson’s maps and modified them slightly because the configurations were almost identical, especially for Casa Rinconada where Holsinger shows a row of rooms along the south side and three rows along the east side of the great kiva. To have three investigators see exactly the same pattern amidst rubble that today does not suggest the presence of any rooms in these two areas is probably more than a coincidence. The practice of using earlier maps, with modifications, is ongoing; and by 1920 Hewett had permission to use earlier reports in his publications (Hewett to Springer, June 26, 1920, Fray Angelico Chavez History Library/Photo Archive, E. L. Hewett Collection, Accession 105, Box 19, Folder 5). We assume, therefore, that the three maps that appear in Hewett (1908) were drawn during the 1902 expedition as they differ sufficiently from those of Holsinger and Jackson in some details and much more so than the twelve in the CCNHP collection.

Formal photographs, on which Chapman spent considerable time, were poor or nonexistent because of a problem with Hewett’s 5x7 camera. A few photographs that Chapman took with his own camera, however, still were available in his personal collection when he wrote his autobiography (Munson 2007:40). Recent examination of the listing for the Chapman photograph collection (PAC 043) at the Palace of the Governors in Santa Fe did not reveal their presence.

Hewett was able to borrow and use photographs taken by others to illustrate articles written shortly after this trip, as well as later. Two photographs of the back walls of Pueblo Bonito

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<th>Table 1. List of maps possibly prepared by Chapman in 1902.</th>
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<tr>
<td>Tsin Kletzin</td>
</tr>
<tr>
<td>Una Vida</td>
</tr>
<tr>
<td>Wijiji</td>
</tr>
<tr>
<td>Yellow House/Kin Kletso</td>
</tr>
</tbody>
</table>
and Chetro Ketl referenced to 1902 appear in Hewett (1921:6, 8; 1936:31, 36). When they are compared to photographs in Holsinger (1901:14, No. 17 and 20, No. 24), they look identical. As noted above, Hewett had acquired the Holsinger report from the Department of the Interior on August 8, 1916 (letter from Arno B. Cammerer, Acting Director to E. L. Hewett, Fray Angelico Chavez History Library, E. L. Hewett Accession 105, Box 10, Folder 4, No. 2) and may have been confused over the origination of the photographs years later when he published his 1921 and 1936 reports. Two other photographs of the back walls of Kin Klizhin and Kin Kletso appear in Hewett’s 1904-05 overview of archaeology of the Pueblo region, but a third photograph in this publication, one of Hungo Pavi, must have been taken on a different trip because there is snow on the ground. Thus we might assume that Hewett returned to the canyon in winter sometime between 1902 and 1904 during which time he took additional photographs or that he obtained the one of Hungo Pavi from a different source. Or he may have obtained all photographs from other sources.

Hewett included two photographs of the entourage crossing the desert in his 1905 report on irrigation features. A similar photograph appears in James McNary’s biography (1956:28). Correspondence received by Robinson with the McNary diary indicates that M. McNary had several photographs that were kept in an album that was returned to the family. Hewett may have used some of the McNary photographs in this publication.

Only M. McNary mentions the collection of artifacts: one black pitcher with raised trim that Hewett found on August 8 near a ruin along the road to the camp located four miles distant from the canyon. If any others were collected, either they would have remained at the New Mexico Normal School (now Highlands University) or been moved to the Museum of New Mexico with Hewett in 1908 or later. In his memoirs Chapman mentions only that there was a collection of “Pajaritan” pottery that was moved from Las Vegas to the Museum in 1911. The 1928-29 MNM artifact list (CCNHP Museum Collection, Archive C85662, VA 1833) indicates one indented coiled bowl (#811), 4 ¼ inches in diameter x 4 inches high, was recovered by E. L. Hewett from Pueblo Bonito in 1902. These two descriptions do not match, so we assume that possibly two items were collected.

Although these are the only items that could be assigned to this expedition, there are three other items on the MNM list noted as coming from Pueblo Bonito that might have been recovered approximately at that time. They include 1) a black-on-white pitcher (#1680) with a broken but restored handle that is 7 x 6 inches; 2) a pot with handle (#1686); and 3) a bowl (#4521), 3 ½ inches high with a 6 ¼-inch diameter opening and a spiral decoration covering the interior. None of the items on the list match McNary’s description of the black pitcher, and we could not match these old catalog numbers with those currently used at the Museum of Indian Arts and Culture/Laboratory of Anthropology.

One other artifact possibly recovered from the work related to this expedition, or visits made to Chaco Canyon shortly thereafter, is at the San Diego Museum of Man (SDMM). This Gallup Black-on-white cylindrical jar with an unusual lip (SDMM3326) was donated to the museum by Hewett in 1915 (Green 2009). The accession record indicates it came from Pueblo Bonito and was obtained by Wetherill in 1903 from a collector named George Purd(e)y. This date could support a return to the canyon during the winter to finish data collection for Hewett’s 1904 report.

Additionally, during their sojourn in the canyon, Chapman learned about a Navajo artist, Apie Begay, who had drawn Navajo dance groups. Chapman provided Begay with good paper and
lent him his ten colored pencils so that he could produce three pictures, purchased for $1 each, that were later used in exhibits of the earliest examples of Navajo art made with white man’s materials.

In summary, data gathered during this expedition and possibly one additional visit shortly thereafter, combined with information from records available to him, would have provided Hewett with an overview of the Chaco area’s resources, as well as documentation of its major architectural structures.

Our second goal was to better understand what Hewett did with this knowledge. He included information from this expedition in several publications which were reviewed for additional glimpses into what he knew at the time. The first of these (Hewett 1904) addressed the need for preservation of archaeological sites throughout the semi-arid Southwest. Hewett followed then current practices of segregating groups of sites by geographical regions. He divided his very brief presentation of data into districts based on drainage basins (Rio Grande, San Juan, Little Colorado, and Gila). The San Juan district was further subdivided into Aztec, Mesa Verde, Chaco, Canyon de Chelly, and Bluff. He listed sites in the Chaco subdivision by their Navajo names, but provided little additional information.

In his overview of the archaeology of the Pueblo region, Hewett (1905a) defined the Southwest area which he considered united by physiography and climate, but not linguistically or ethnically. It encompassed Arizona and New Mexico, southwestern Colorado and southeastern Utah, and probably parts of Sonora and Chihuahua. Within this broad region, he considered sites in the Chaco drainage to be the finest and best preserved of the Pueblo ruins and lists 13 great houses located along the Chaco Wash and others in tributary drainages (e.g., Kin Klizhin, Kin Ya’a, Kin Bineola). He indicated which sites were on public lands and which ones were held in private ownership. Four sites were part of the Wetherill Homestead, including Pueblo Bonito and Chetro Ketl. For Una Vida and Peñasco Blanco, the private owners were not listed. Two sites were on land owned by the railroad. Thus at this early date, he was very much aware of the mixed land status of the major ruins in the Chaco drainages.

One report (Hewett 1905b) focused on irrigation features in an attempt to place the Chaco features into a broader anthropological focus. He discussed those found at Una Vida, Peñasco Blanco, Kin Klizhin, and Kin Bineola. He concluded that the Chaco system was not as extensive as that of the Hohokam but more sophisticated and larger than that documented for the Rio Grande Valley. Because he did not report on features at Kin Ya’a or the spring one mile west of Pueblo Alto that were described by Holsinger (1901), we assume that Hewett had not yet read a copy of Holsinger’s report. Both Hewett and Holsinger would have talked with Wetherill and his colleagues to learn about such features, but Holsinger would have had much more time to explore the area.

Hewett’s contributions to the *Handbook of American Indians North of Mexico* (Hewett 1907) are composed of archaeological definitions.

A few years later and similar to his earliest reports, Hewett’s 1908 dissertation again divided the greater Southwest into areas based on river drainages. He devoted four pages to Chaco Canyon in which he noted there are 18 ruined villages in an area 30 miles long and 10 miles wide, as well as a number of old irrigation ditches. His overall description of the canyon is basically confined to the description of the land set aside in 1907 as Chaco Canyon National Monument. Hewett recognized a number of architectural differences among the sites. He acknowledged
and appreciated the work of the Hyde Exploring Expedition from 1896 to 1900. He made no mention of Holsinger’s report.

Based on these various reports, we conclude that by 1908 Hewett had acquired a fairly good knowledge of the number of major ruins and irrigation systems in the Chaco region, as well as how the Chaco Canyon ruins fit within greater Southwestern architectural styles. He was also aware of the land status for each of the great houses in Chaco Canyon, an item of interest when he later returns to the canyon and attempts to preserve them (through purchase) for future investigations. Although Hewett would eventually excavate on what he considered to be non-government lands at the time, he also recognized that the surveys were not accurate.

In summary, although we do not know exactly how many times Hewett visited Chaco Canyon between 1902 and 1915, Hewett (1936:169) indicated that the staff and students from the School of American Research returned several times prior to 1921. The photograph of Hungo Pavi in the snow in his 1904 report suggests he may have returned either in the winter of 1902 or 1903. Hewett donated a “Cacao Cup” obtained from Richard Wetherill in 1903 to the San Diego Museum of Man after he became director of this institution in 1915 (Green 2009). It could have been acquired within the first two years of his original visit or even later. Based on the evidence we assume that he might have made at least two and possibly more trips to the canyon in these early years.

Hewett would have had sufficient information to formulate plans for a major research project, which he did carry out over a decade later. He also had learned several lessons. For example, although his excavations would be at sites located on what were then thought to be non-Federal lands, he would obtain permits from the Department of the Interior. He probably benefited from Putnam’s experiences at Pueblo Bonito (discussed in Holsinger 1901) and also he wanted to be sure he complied with the Antiquities Act of 1906 which he helped to draft (Sellars 2007:287-295). Although many of these non-federal lands were later purchased through one of the institutions with which he was affiliated in order to preserve them for research and posterity, he would also have recognized the benefits of private land ownership by the institutions who were conducting archaeological research on them.

Hewett was fortunate to be one of the upcoming leaders in archaeology at the beginning of the twentieth century. Because of his knowledge of Southwestern archaeological sites and acquaintance with key people both in New Mexico and Washington, D.C., he had an opportunity to take the lead in archaeological site preservation issues. Although he did not return to Chaco Canyon immediately, he was well versed in government rules and regulations and recognized the benefits of private land ownership. His knowledge of Southwestern archaeology provided him a framework for his broad research plan (Hewett 1936:49) that would be carried out both in 1920-1921 and during the Chaco field schools. 

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Projectile point styles vary through time, sometimes because of innovations in hunting technology and at other times because of cultural factors that are less easy to define. Two projects in the northern Rio Grande Valley provided an opportunity to examine temporal trends in projectile point styles during the Developmental period (A.D. 600-1200). The Peña Blanca Project along NM 22 examined sites below La Bajada Mesa, while the Pojoaque Corridor Project examined sites along U.S. 84/285 between Santa Fe and Pojoaque.

This study examines temporal trends in projectile point styles and assemblage composition, and was part of a wider examination of ethnic differences between the Northern Rio Grande and San Juan regions. Following Clark (2001), that study examined some of the more mundane characteristics of assemblages to establish ethnic markers suitable for distinguishing sites occupied by different cultural groups. Following a discussion of temporal trends in Northern Rio Grande projectile point styles and assemblage composition, that information is compared with assemblages from the San Juan region to illuminate potential ethnic differences.

Developmental Period Projectile Point Styles
The earliest and most comprehensive projectile point typology for the Northern Rio Grande was developed by Thoms (1977) as an MA thesis. A wider-ranging typology for the Southwest as a whole has more recently been developed by Justice (2002). Both typologies employ a strategy that the present discussion avoids: both assign location-specific names to types. The main problem with location-specific names is that they often carry connotations of place and ethnicity that can cause conceptual difficulties for other researchers. Thoms’ and Justice’s typologies assign different names to what are essentially the same types of projectile point, and use names that suggest a specific cultural association for those types. For example, Thoms (1977) defines a certain type as the Pojoaque Wide-based point, while Justice (2002) defines the same style as the Bonito Notched point. Depending on which name is used, this type can be associated with either the Chacoan cultural system or the northern Rio Grande cultural system—two very different ethnic divisions. This type of naming also tends to obscure similarities in projectile point styles between regions, since different names traditionally indicate different types. Thus, in this study typological designations are used that are descriptive in nature rather than location-specific to avoid these pitfalls. The only label with any cultural connotation is the term “Pueblo,” which is added to each descriptive designation in order to place individual specimens in a geographic and broadly cultural context.
Types were defined as the projectile point assemblage was undergoing analysis, with several major changes and alterations to the initial categorization requiring a re-examination of parts of the assemblage to ensure proper placement. The types defined by this analysis were based on visual inspection rather than metric analysis, since many specimens that could be typed were fragmentary. In addition, many stylistic nuances are dependent on a flintknapper’s skill and the applicability of a material to a certain style. Where a skilled knapper could produce very intricate and finely-made points that possess distinct stylistic nuances, the product of a less skilled knapper may possess more ambiguous stylistic nuances in a less appealing form. Material type variability can cause similar results. For example, the presence or absence of deep, narrow corner-notches might be used to distinguish between two projectile point types. However, given two flintknappers of varying skill that are using the same mental template to make corner-notched arrow points, the more skilled knapper would be better able to cut deep, narrow notches, while the best effort of a less skilled knapper would possess shallower and wider notches. Culturally, these points would represent the same type, but would be quite distinct in appearance owing to the technological expertise of the different knappers. Similarly, deep, narrow notches are more easily cut in points made from obsidian than when non-glassy materials are used. Again, the results can represent the same mental template, but the results would look very different. At this analytic level we were only interested in using gross morphological characteristics for classification. Distinguishing between characteristics that represent metric variation rather than the relative skill of knappers or suitability of materials for certain point styles was not a goal.

The Developmental period (A.D. 600-1200) projectile point series was divided into several types that usually included multiple varieties. The general types were mainly distinguished by notching system and included specimens that retained their bases as well as those that did not. In the latter case, specimens usually broke at the narrowest point and lacked most or all of their bases but retained one edge of the hafting element, allowing tentative assignment. Specimens with intact or mostly intact bases (with or without their associated blades) were usually assigned to specific varieties based on the shape of their bases or by the presence of uncommon edge treatments.

**Descriptions of Developmental Period Arrow Point Types**

**Pueblo Stemmed Points** (Fig. 1a-c): This type includes small stemmed arrow points, sometimes with slight barbs and usually with parallel tangs, though some specimens have slightly contracting or expanding bases that lack distinct tangs. The notches generally originate at the outer margins of the base near its intersections with the lateral edges. This results in a very wide blade in comparison with the stem, and the blades are usually distinctly barbed. No varieties were defined, because too few examples of this type were encountered during this analysis. Thoms (1977) defines this type as his Chimayo-Shouldered and Parallel Sided-Asymmetrical Tang types. Justice (2002) refers to this type as Dolores Straight Stem.

**Pueblo Corner-Notched Points** (Fig. 1d-f): These points are defined by the positioning and angle of their notches, which generally originate at the juncture between base and lateral edge, with both edges of the notch having acute angles in relation to the midline of the point. This positioning of the notches tends to create expanding bases with distinct tangs. Varieties defined by the shape of the base included: straight base, convex base, concave base, and irregular base. The specimens in this type are generally rather short and squat, with length-to-width ratios of less than 2:1.
Figure 1. Developmental period arrow points from the northern Rio Grande; a-c: Pueblo Stemmed Points (a and b adapted from Thoms [1977]); d-f: Pueblo Corner-Notched Points (broken barbs on e distort notching angle); g-i: Pueblo Corner-Notched, Long Blade Points; j-l: Pueblo Corner/Side-Notched points; m-o: Pueblo Side-Notched Points; p-q: Pueblo Shallow Side-Notched Points; s-u: Pueblo Unnotched points. All points to approximately the same scale.
One type defined by Thoms (1977)—Tesuque-Narrow Base—is included in this group, as are Justice’s (2002) Dolores Expanding Stem and Chaco Corner-Notched.

**Pueblo Corner-Notched, Long-Blade Points** (Fig. 1g-i): This type was originally included with the Pueblo Corner-Notched Point category, but was separated out because it may represent a distinct type rather than a variety. These points are notched in the same way as the Pueblo Corner-Notched type, but were distinguished by a length-to-width ratio of 2:1 or greater. Four varieties were defined including: straight base, convex base, concave base, and irregular base. One type defined by Thoms (1977)—Gallina-Narrow Base—is included in this category, but Justice (2002) did not distinguish this type.

**Pueblo Corner/Side-Notched** (Fig. 1j-l): This is an awkwardly-named type, and is distinguished from corner- and side-notched types by the placement of the notches. In this type, the notches originate just above the juncture of base and lateral edge. The angle of the barb edge in relation to the midline of the point is close to 90 degrees, while the angle of the tang edge is close to 45 degrees. This essentially combines characteristics of both corner and side notches, hence the name. Thoms (1977:156) refers to this type of notch placement as lateral-coincident. Several varieties were defined including straight base, convex base, concave base, and irregular base. Thoms (1977) defines this type as his Pojoaque-Wide Base Point and Justice (2002) as his Bonito Notched type.

**Pueblo Side-Notched** (Fig. 1m-o): The notches on these points originate from the lateral edges above their intersection with the base, have narrow openings, and the angle of both notch edges in relation to the midline of the point approaches 90 degrees. Several varieties were defined including straight base, convex base, concave base, irregular base, and basal-notched. The hafting element of the latter is essentially bifurcated by the addition of a notch originating in the center of the base and extending along the midline of the point, terminating before reaching the height of the side notches. In general, the points included in this category are rather short and squat, with length-to-width ratios of less than 2:1. Various of the types defined by Thoms (1977) are members of this type including the Pueblo-Aligned Edge, Pueblo-Convex Base, Pueblo-Concave Base, Pueblo-Straight Base, Pueblo-Parallel Edge, and Pueblo-Barbed varieties. Types defined by Justice (2002) that fit into this category include Temporal Side-Notched, Pueblo Alto Side-Notched, Kin Kletso Side-Notched, Pueblo del Arroyo Side-Notched, and the more general Pueblo Side-Notched.

**Pueblo Shallow Side-Notched Points** (Fig. 1p-q): This type was distinguished from the more general side-notched type based on notch shape and depth, but since these characteristics may be more dependent on the material used and skill of the knapper, this type may eventually be subsumed into the Pueblo Side-Notched category. However, in this study it was recognized as a distinct type and, for the time being, is treated as such. The notches used to define this type are wide and shallowly cut, with both notch edges having an obtuse angle in relation to the midline of the point. Several varieties were defined including straight base, convex base, concave base, and irregular base. Neither Thoms (1977) or Justice (2002) distinguished this type.

**Pueblo Unnotched Point** (Fig. 1s-u): This type is often difficult to distinguish from preforms, and is usually not recognized in the Pueblo area. However, several specimens were assigned to this type because they lacked notches but displayed use-related fractures, indicating that they were finished tools. Other specimens assigned to this category lacked use-related
breaks but appeared to represent finished tools; i.e., manufacture ended before notches were cut. Several varieties were defined including straight base, convex base, concave base, deep basal notch, and irregular base. Thoms (1977) did not distinguish this type of point, and Justice (2002) subsumes all triangular unnotched points into the Cottonwood Triangular type.

*Unknown Projectile Point.* This is a catch-all category that mostly includes specimens that are missing all evidence of their notches and hafting elements. One variety was defined for this type, and consists of Pueblo Long, Narrow Blade, Notch Indeterminate.

**Temporal Trends in Developmental Period Projectile Points**

While the late Developmental period (A.D. 900-1200) was well represented in the Pojoaque Corridor, that study encountered no components dating to the early Developmental period (A.D. 600-900). Fortunately, an assemblage of projectile points from early Developmental period contexts near Peña Blanca provides those needed data (Van Pool 2012). While Van Pool’s analysis was mainly technological in nature, raw data files and photographs of most of the specimens examined by his analysis were available for typing consistent with the methods used in the current analysis. These data can be compared and contrasted with earlier syntheses of projectile point styles for northern New Mexico produced by Thoms (1977) and R. Moore (1981). We begin with an examination of the temporal distribution of projectile point styles in the Pojoaque Corridor and Peña Blanca assemblages, and will then see how that distribution fits with the two earlier studies.

The Peña Blanca projectile points used in this analysis are specimens from unmixed early Developmental period contexts at LA 265, LA 6169, and LA 6170. Post (2012) dates these components to the mid-700s to early 800s at LA 6169, and to the early to mid-700s to the early to mid-800s at LA 265 and LA 6170. While more accurate temporal discrimination is possible, the sample of identifiable specimens is small, so further subdividing the assemblage would result in less reliability. Thus, these specimens are simply grouped as early Developmental period. The sample from the Pojoaque Corridor sites is more robust, and is divided into early (A.D. 900-1000), middle (A.D. 1000-1100), and late (A.D. 1100-1200) parts of the late Developmental period, based on ceramic assemblage dates.

Table 1 shows the temporal distribution of types for these assemblages. This sample includes 57 early Developmental period specimens and 187 from the late Developmental period. Several trends are visible in Table 1. Stemmed points were common in the early Developmental sample, but that assemblage was dominated by corner-notched points. Corner-notched points with long blades and corner/side-notched points both occurred in the early Developmental sample, but neither was common. There were no stemmed points in the late Developmental assemblage, indicating that this type may have fallen into disuse by the end of the early Developmental. After dominating the early Developmental assemblage, corner-notched points decreased considerably in popularity in the early part of the late Developmental period (ELD), and continued to decrease during the middle (MLD) and late parts of the period (LLD). Corner-notched points with long blades were most popular in the ELD, then followed the same trajectory as the corner-notched variety. Corner/side-notched points were also very common in the ELD, but unlike the corner-notched varieties seem to have maintained their popularity through the rest of the late Developmental period. Side-notched points may have been introduced during the ELD, and continually grew in popularity through the remainder of the late Developmental period. No obvious unnotched points were found...
in the Peña Blanca assemblage, so it appears that this type may also have been introduced during the ELD. Unnotched points remained moderately popular through the MLD, but began tailing off during the LLD.

Table 2 adds more questionable specimens to this analysis, including long, narrow points that lack direct evidence of their notches and possible unnotched points. This increases sample size to 62 for Peña Blanca and 265 for the Pojoaque Corridor. These data suggest that the unnotched point style may actually have originated during the early Developmental and gained moderate popularity throughout the late Developmental. Corner-Notched and Stemmed

<table>
<thead>
<tr>
<th>Category</th>
<th>Early Developmental</th>
<th>Late Developmental</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>%</td>
</tr>
<tr>
<td>Stemmed</td>
<td>11</td>
<td>19.3%</td>
</tr>
<tr>
<td>Corner-Notched</td>
<td>39</td>
<td>68.4%</td>
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<td>Corner-Notched, Long Blade</td>
<td>4</td>
<td>7.0%</td>
</tr>
<tr>
<td>Corner/Side-Notched</td>
<td>3</td>
<td>5.3%</td>
</tr>
<tr>
<td>Side-Notched</td>
<td>9</td>
<td>17.0%</td>
</tr>
<tr>
<td>Unnotched</td>
<td>8</td>
<td>15.1%</td>
</tr>
</tbody>
</table>

Table 2. Revised projectile point types and dates with specimens with less certain type assignments considered; counts and column percentages.

<table>
<thead>
<tr>
<th>Projectile Point Style</th>
<th>Early Developmental</th>
<th>ELD</th>
<th>MLD</th>
<th>LLD</th>
<th>Totals</th>
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</thead>
<tbody>
<tr>
<td>Stemmed</td>
<td>Count 11</td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>% 17.70%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.36%</td>
</tr>
<tr>
<td>Corner-Notched</td>
<td>Count 39</td>
<td>13</td>
<td>19</td>
<td>9</td>
<td>80</td>
</tr>
<tr>
<td>% 62.90%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24.46%</td>
</tr>
<tr>
<td>Corner/Side-Notched</td>
<td>Count 3</td>
<td>14</td>
<td>16</td>
<td>20</td>
<td>53</td>
</tr>
<tr>
<td>% 4.80%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16.21%</td>
</tr>
<tr>
<td>Side-Notched</td>
<td>Count 9</td>
<td>30</td>
<td>34</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>% 12.20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22.32%</td>
</tr>
<tr>
<td>Long Blade</td>
<td>Count 6</td>
<td>20</td>
<td>10</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>% 9.70%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13.76%</td>
</tr>
<tr>
<td>Unnotched</td>
<td>Count 3</td>
<td>18</td>
<td>26</td>
<td>18</td>
<td>65</td>
</tr>
<tr>
<td>% 4.80%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>19.88%</td>
</tr>
<tr>
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<td>Count 62</td>
<td>74</td>
<td>101</td>
<td>90</td>
<td>327</td>
</tr>
<tr>
<td>% 18.96%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100.00%</td>
</tr>
</tbody>
</table>
points were the most popular types in the early Developmental, with Stemmed points again apparently disappearing by the beginning of the late Developmental, and Corner-Notched points dropping off in popularity, though remaining a significant presence throughout the late Developmental. Corner/Side-Notched points were also first produced during the early Developmental and became common in the ELD, remaining at about the same level of popularity throughout the remainder of the period. Long, Narrow-Blade points appeared during the early Developmental, reached their height of popularity during the ELD, and dropped back to about the same levels as seen in the early Developmental after that. Thus, most of these types were made from at least the early Developmental through the end of the late Developmental. The two exceptions were stemmed points, which appear to have only been made during the early Developmental, and side-notched points, which first appeared during the ELD.

Some caveats are now in order. First, these trends can only be applied to the sample of sites examined by this study. While these trends might reflect the general trajectory of temporal trends in the Northern Rio Grande, we cannot assume that patterning in projectile point styles was so similar across the region that the patterns defined at a few sites can be applied across the board. Indeed, the variability in projectile point styles among the sample of sites excavated by the Pojoaque Corridor Project argues against any such blanket-like application. The trends defined here certainly apply to the sites in our sample, and they may apply more generally, but then again they may not. Only further studies of large populations of projectile points from numerous sites can tell us that. A second caveat is more specific. The trends identified for the unnotched projectile point variety may or may not be accurate. The only artifacts that could be confidently assigned to this category were those that exhibited use-related breaks or appeared to represent finished artifacts for which notching had never been planned. Most of our specimens fall into the former category, and only a few into the latter. A number of specimens that were originally classified as preforms were reassigned to a possible unnotched point category, but those assignments remain tenuous. If the reassignments are correct, then the unnotched form originated somewhat earlier than when our more dependable data suggest they did. If some or all of the reassignments are incorrect, then our original conclusions that unnotched points were first used during the ELD and remained a fairly unimportant type for the rest of the period must stand.

This analysis suggests that Northern Rio Grande projectile point assemblages contained mixtures of several distinct types throughout the Developmental period. With the possible exception of the stemmed variety, it appears that once a type was introduced it augmented rather than replaced those already being manufactured. Certain types grew in popularity through the Developmental period, while other types decreased correspondingly. Corner-notched points were clearly the most popular type in the early Developmental period, but with the increased popularity of the corner/side-notched type and the introduction of the side-notched type in the ELD, the popularity of corner-notched points dropped steadily. This trend was mirrored by an increase in the use of side-notched points until they came to dominate in the LLD. However, it is important to note that despite the growing popularity of the side-notched type, other types did not disappear. This is important, because it suggests that the assemblage of types in use at any one time was accumulative in nature rather than successional—once adopted for use, a particular point type continued to be made even as others were adopted and often became dominant.
Accumulative Versus Successional Assemblages and Ethnic Identity

Besides being inaccurate temporal indicators, most Southwestern projectile point types are equally inaccurate indicators of ethnicity. Please note that we feel this is true for most and not all types of projectile points. For example, many of the intricate styles produced by the Hohokam (Gladwin et al. 1938; Haury 1976) were more culturally restricted in use and manufacture than most other projectile point types. Justice (2002:274-275) discusses these Hohokam types, suggesting they were produced by craft specialists for use as mortuary offerings, though there is some evidence for their use in hunting and warfare as well. The situation was different in the San Juan and Northern Rio Grande regions. While some of the projectile points types made in the northern Southwest could have been culturally restricted in manufacture and use, this is uncertain and fairly doubtful. What is certain from the typologies presented by Thoms (1977) and R. Moore (1981), is that there was an almost complete overlap in the styles of projectile points used in the Northern Rio Grande and San Juan regions. A typology developed by the author for the Highland Mogollon area suggests that the types of points used in that region were very similar to those in the northern Southwest as well, though there were some differences (Moore 1999). Thus, the types of points identified in the Pojoaque Corridor and Peña Blanca assemblages represent styles that are widespread across areas inhabited by a variety of ethnic groups.

While projectile points are rarely indicative of ethnicity in the northern Southwest, assemblage characteristics can carry information related to cultural identity. This was true of ceramic assemblages from the Highland Mogollon and Northern Rio Grande regions (Boyer et al. 2010; Wilson 1999) that were accumulative in nature. When a new pottery style was introduced to these assemblages they joined the existing array of styles rather than replacing those that were already in use. Through time, ceramic assemblages came to contain large arrays of locally-manufactured types. This characteristic was also seen in ceramic period projectile point assemblages from the Highland Mogollon region (Moore 1999). As new point styles were added to the assemblage they joined rather than replaced those that were already in use.

Ceramic assemblages in the San Juan region were structured differently. Rather than representing accumulations of locally-manufactured styles, San Juan assemblages tended to be successional in nature. That is, new styles generally replaced rather than augmented older styles so that assemblages contained fewer individual local types than would be the case in similarly dated assemblages from the Northern Rio Grande or Highland Mogollon regions. These differences are believed to be indicative of ethnicity. This is not to say that the Highland Mogollon and Northern Rio Grande Pueblos necessarily represent the same ethnic group. Rather, these differences suggest that both the Highland Mogollon and the Northern Rio Grande Pueblos were ethnically different from the Pueblo occupants of the San Juan region.

Since differences that are potentially indicative of ethnicity occur in ceramic assemblages from the Northern Rio Grande and San Juan regions, it follows that there may be similar differences in the structure of their projectile point assemblages. While we can examine this question in detail for our study area, less detail is available for the San Juan region. If our assumption that the occupants of the Northern Rio Grande were ethnically different from those in the San Juan region is correct, we expect the projectile point assemblages from those areas to follow patterns similar to those in the corresponding ceramic assemblages. Thus, we expect to find an accumulative pattern in assemblages from
the Northern Rio Grande versus a successional pattern for those from the San Juan region.

As discussed earlier, the projectile point assemblages from the Pojoaque Corridor sites are, indeed, accumulative in nature. The only style that may have disappeared during the transition from the early to late Developmental period was the stemmed variety. Since this type was identified in at least two later assemblages from the Northern Rio Grande, Thoms (1977) may be correct in suggesting that this style was used until at least AD 1200. If so, then no types fell completely out of production during this period. The introduction of side-notched points during the ELD augmented, rather than replaced, the array of types that were already being made. While the use of side-notched points increased through the late Developmental period, none of the other types that were made at the onset of that period were abandoned, though they certainly decreased in proportion.

The structure of San Juan projectile point assemblages is examined using three detailed analyses augmented by site reports. The detailed analyses include Phagan (1988), R. Moore (1981), and Lekson (1997). Phagan (1988) examined about 1,700 points from sites excavated by Dolores Archaeological Project in southwest Colorado that mostly dated to between A.D. 600 and 1250. R. Moore (1981) looked at over 500 projectile points from Salmon Ruin, a Chacoan outlier along the San Juan River that was occupied between about A.D. 1088 and 1280. Lekson (1997) examined 1,774 projectile points, knives, and drills from sites in Chaco Canyon, representing a variety of occupational periods.

Despite the level of detail in Phagan’s (1988) analysis, his report is the most difficult of the three to use and apply to our model because styles were often characterized differently from the approach used in this discussion. For instance, Phagan’s Type 3 points have long, narrow blades, but hafting styles including stemmed, corner-notched, and corner/side-notched are mixed together. Since Phagan’s (1988) report summarizes data generated for the Dolores projectile point assemblage rather than providing detailed temporal information on all subtypes, we can only vaguely approximate trends for the styles used in this discussion. We will not consider his Type S-2, because this type represents unclassified cases rather than an actual type (Phagan 1988:40). The trends visible in the Dolores data suggest that a combination of stemmed and corner-notched points dominated between at least A.D. 600 and 920, with corner-notched points being the most popular style between ca. A.D. 600 and 840, and stemmed points replacing them as the most popular form between ca. A.D. 840 and 920 (Table 3). Small numbers of side-notched and corner/side-notched points were also used during these periods, but were comparatively rare. Stemmed points abruptly declined in popularity after A.D. 920, and seem to have disappeared by A.D. 1250. Side-notched points (and probably corner/side-notched points) were the second most common type between A.D. 920 and 980, and became the most common type after the latter date. Corner-notched points were again the most common type between A.D. 920 and 980, but declined considerably in use after the latter date. Of the four basic types defined for the Dolores assemblage in this analysis, two types were generally dominant at a time, with a third type representing a rather low proportion of the assemblage, and a fourth type occurring in almost negligible percentages.

Lekson’s (1997) analysis of the projectile point assemblage from Chaco Canyon suggests a steady progression from style to style, with types overlapping at least somewhat in their periods of most common use. Six basic styles were defined for arrow points from Chaco. Type A points were stemmed, Type B points were corner-notched
with straight bases and wide notches, Type C points were corner-notched with convex bases and narrower notches, Type D points were corner/side-notched, Type E points were side-notched with straight bases, and Type F points were side-notched with concave bases (Lekson 1997:663). Stemmed points were earliest in the sequence, occurring in Basketmaker III contexts, and continuing into Pueblo I and possibly (though this is considered doubtful by Lekson) into early Pueblo II (Lekson 1997:665). Corner-notched Type B points occurred in middle to late Basketmaker III contexts and, it is assumed, continued through at least Pueblo I, though this is not specified (Lekson 1997:665). Corner-notched points continued to dominate in early Pueblo II, with some modification of basal shape and notch dimensions resulting in the Type C style. Type D points were dominantly manufactured during late Pueblo II, with the side-notched form Type E dominating in early Pueblo III. By the latest Pueblo contexts in Chaco Canyon, Type E side-notched points were replaced by Type F side-notched points (Lekson 1997:665).

The typology developed for Chaco by Lekson (1997) suggests a strictly sequential progression of types from stemmed to side-notched, with some overlap between types implied. Since no counts are given in his report for the various types by time period, the amount of overlap and actual assemblage composition through time are impossible to determine. Lekson’s (1997) view of projectile point development is strictly successional in nature, though whether this reflects the nature of the data or a preconceived notion of how the sequence should develop is difficult to determine from the data provided in his synthesis. However, it should be noted that Lekson’s (1997) synthesis represents an abridgement of a much more detailed analysis that was never published. Thus, Lekson’s (1997) description of the development of the Chacoan projectile point sequence as successional was probably based on hard data rather than preconceived notions. We must assume overlap between types with eventual replacement (though perhaps not always total) of earlier forms by later forms.

Roger Moore’s (1981) analysis of the projectile point assemblage from Salmon Ruin covers a smaller time period—about 200 years—but is perhaps the most important of the three to this discussion, considering its detail and depth of analysis. Four basic types were defined: Class A points were corner/side-notched with short stems and convex bases, Class B points were side-notched with short stems and relatively straight bases, Class C points were side-notched with relatively long stems and straight to slightly convex bases, and Class D points were side-notched with medium to long stems and concave bases (R. Moore 1981:58-62). Class A and B points dominated during the Chacoan occupation between A.D. 1088 and 1130, and were still represented during the Mesa Verde occupation between A.D. 1185 and 1263-1280, though they were in the process of being replaced by Class C and D styles (R. Moore 1981:115).

Two aspects of R. Moore’s (1981) analysis are important to this discussion. First, the styles he defines can be broken into two basic types: corner/side-notched and side-notched, with the latter being modified through time by certain typological nuances. Fewer of these typological variations occurred during the primary occupation than during the secondary occupation, which R. Moore (1981:119) feels might reflect a cultural regulatory influence emanating from Chaco Canyon during the primary occupation. The second important aspect concerns the projectile point types that do not occur in this assemblage; no corner-notched or stemmed points were identified.

In essence, this report provides a window on the late Pueblo II and Pueblo III periods in the San Juan region, suggesting that the projectile point sequence was, indeed, successional, with some
overlap between major types occurring as new types began replacing old types. Similar to the scheme developed by Lekson (1997), R. Moore’s (1981) analysis suggests a successional rather than accumulative nature to San Juan projectile point assemblages.

Rohn (1977:217-219) summarized the projectile point sequence for Chapin Mesa in Mesa Verde National Park. The sequence from Chapin Mesa follows the developmental scheme suggested by Lekson (1997) for Chaco Canyon, though with some differences. Corner-notched points dominated in Basketmaker III assemblages, with stemmed points being the main type in Pueblo I and early Pueblo II times. Side-notched points with straight or nearly straight bases were consistently found in late Pueblo II and III contexts. A figure illustrating projectile points from these periods contains mainly side-notched points, with a few examples of corner/side-notched points and at least one corner-notched specimen (Rohn 1977:219). As a further illustration, 19 projectile points were recovered during excavations at Mug House on Wetherill Mesa (Rohn 1971:107-109). Of this small Pueblo III assemblage, 14 specimens were side-notched with straight or concave bases, 1 was a possible unnotched point, 2 were stemmed, and the last specimen was atypical and found in a ritual context.

San Juan projectile point assemblages appear to have been successional in nature rather than accumulative. While an array of styles may have occurred at any one time, assemblages were dominated by only one or two types at a given time, with other types generally occurring in much smaller numbers. This was especially true for the Salmon assemblage, where two types dominated during the Chaco occupation and continued into the Mesa Verde occupation, but were clearly in the process of being replaced by two other types (R. Moore 1981). Only two basic styles—corner-side- and side-notched—were represented among these four types. The impression gained from this discussion is that projectile point styles occurred sequentially in the San Juan region, with a progression from corner-notched and stemmed points through corner/side-notched points to side-notched points. Side-notched points began with relatively short bases, with the bases apparently growing longer through time. At the same time, basal edge shape transitioned from straight to concave.

Van Pool’s (2012) technological analysis of the projectile point assemblage from Peña Blanca provides some rationale for this progression. The flexible nature of the materials used for the manufacture of foreshafts and the sinew that was usually used to lash points to them tended to protect the hafted portion of the projectile point from the stresses that occurred during an arrow strike. However, this protection did not extend to the exposed blade of the point, and that section was more prone to breakage. When corner- and side-notched points were of equivalent lengths, side-notched points tended to be more durable because more of their total length was protected by the haft. However, this also meant that the section of blade protruding from the haft was shorter, resulting in less penetration. The process of lengthening the bases of side-notched points while at the same time transitioning from straight to concave bases would have effectively increased the section of point that was protected by the haft, while at the same time reducing penetration. This may have been countered by extending the length of the blade as well in an attempt to balance durability with penetration. Corner-notched points were less durable, but had greater penetration. Stemmed points had the same characteristics as corner-notched points, but the shortness of the stem and the lack of real tangs would have made this type more difficult to securely fasten to a haft. Thus, the stylistic
sequence in San Juan assemblages may be indicative of a technological process in which knappers were seeking to balance durability with penetrating power, with more efficient projectile point designs replacing less efficient types and styles through time. Certain types may have mostly disappeared because they were less durable despite having a better ability to penetrate. However, these types might have been retained in small numbers for special uses, such as in warfare.

While speculative, this developmental process could help account for the successional character of San Juan projectile point assemblages, while at the same time explaining why certain types that had mostly been replaced by more efficient designs still occurred long after one might assume that their manufacture had ceased. Fluctuations in the use of stemmed versus corner-notched points are visible in the late Basketmaker III and Pueblo I Dolores assemblages (Table 3), with the corner-notched style dominating through the middle of Pueblo I before being supplanted by the stemmed style. However, these were essentially stylistic variations on a single theme—points that lacked durability but had greater penetration. The developing prominence of the stemmed style over the corner-notched style may reflect a culturally-based preference rather than a technological development, since stemmed points were more difficult to securely haft than were corner-notched points. Several distinct styles were in evidence during the early years of the Pueblo period in the San Juan region, undoubtedly because people were searching for the best type of point to fit their needs, both aesthetically and for the joint purposes of hunting and warfare. Through time, the array of styles and types used became more constrained, with certain types dominating assemblages and other types occurring much less often and possibly in response to specialized needs. Even more speculative is the possibility that some of these changes in style were in response to changes in hunting techniques, requiring more durable points that perhaps did not have to penetrate as deeply.

While there were parallels with this process in the Northern Rio Grande, there were also important distinctions. An array of projectile point styles was used throughout the early and late Developmental periods, with no clear dominance of a single style until after about A.D. 1100, when side-notched forms became dominant in the sample of sites examined. Four distinct styles were in use throughout the late Developmental period (Table 4), and each style could easily be subdivided into several types that

<table>
<thead>
<tr>
<th>Date</th>
<th>Stemmed</th>
<th>Long, Narrow Blade</th>
<th>Corner-Notched</th>
<th>Corner/Side- and Side-Notched</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.D. 600–720</td>
<td>17.7%</td>
<td>17.7%</td>
<td>58.8%</td>
<td>5.9%</td>
</tr>
<tr>
<td>A.D. 720–800</td>
<td>35.5%</td>
<td>16.1%</td>
<td>48.4%</td>
<td>0.0%</td>
</tr>
<tr>
<td>A.D. 800–840</td>
<td>35.1%</td>
<td>8.1%</td>
<td>54.1%</td>
<td>2.7%</td>
</tr>
<tr>
<td>A.D. 840–880</td>
<td>46.0%</td>
<td>10.0%</td>
<td>40.0%</td>
<td>4.0%</td>
</tr>
<tr>
<td>A.D. 880–920</td>
<td>48.5%</td>
<td>21.8%</td>
<td>27.7%</td>
<td>2.0%</td>
</tr>
<tr>
<td>A.D. 920–980</td>
<td>15.0%</td>
<td>12.5%</td>
<td>45.0%</td>
<td>27.5%</td>
</tr>
<tr>
<td>A.D. 980–1250</td>
<td>15.4%</td>
<td>7.7%</td>
<td>15.4%</td>
<td>61.5%</td>
</tr>
<tr>
<td>post-A.D. 1250</td>
<td>0.0%</td>
<td>25.0%</td>
<td>25.0%</td>
<td>50.0%</td>
</tr>
</tbody>
</table>

Table 3. Distribution of projectile point styles for the Dolores area.
might or might not be real. Even though the side-notched style came to dominate by the LLD, the other styles continued to be made in significant percentages. Even the stemmed point style, which was completely absent from the Pojoaque Corridor assemblages, does not appear to have been abandoned since examples occur in very small numbers on some Coalition period sites.

Thus, there are both similarities and differences in projectile point assemblages from the San Juan and Northern Rio Grande regions though the end of the Developmental period and perhaps into the Coalition period. The styles and types of points used in these regions were very similar in appearance and design, and tended to appear at similar times. However, in the Northern Rio Grande the addition of a new style did not mean the replacement of older styles, it simply added to the array of point styles that were in common use at any one time. In contrast, the introduction of new points styles in the San Juan region tended to lead to the virtual replacement of older styles by the newer ones. The replacement is “virtual” because it appears that earlier styles did not always completely disappear; rather, they were perhaps used only for very specific purposes for which they may have been better suited than was the currently dominant style. Thus, in both regions, older projectile point styles did not completely disappear. The difference was in how commonly they occurred in later assemblages. With the possible exception of the stemmed style, all of the basic styles that were in use by the end of the early Developmental period were still in common use during the Coalition period and probably into the Classic period in the Northern Rio Grande. In the San Juan region, newer styles clearly became dominant through time, with older styles still occurring, but becoming quite uncommon.

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I’ve been following Regge Wiseman around the Bureau of Land Management (BLM) Rio Puerco Field Office for over 30 years, and he probably doesn’t even know it! In the mid-1970s, he carried out several surveys in the San Ysidro and Cuba areas. Periodically, as rights-of-way come up for renewal or new projects fall nearby, I’ll run across one of Regge’s surveys or sites, and even though they’re 35 years old, his recording is still first rate. After the mid-1970s he didn’t work much in the area (at least on BLM), until he wrote up the Lagunitas sites for the 2008, 2009, and 2010 ASNM annual volumes (Wiseman 2008, 2009, 2010). And right now he is writing up the late Steve Durand’s field school work on Mesa Portales near Cuba.

But in 1974, before I started at the BLM, Regge did an amazing survey for the BLM in what is now El Malpais National Conservation Area, near Grants (Wiseman 1974). At the time, the area was managed by the Socorro District’s San Augustine Resource Area. Management of the area was transferred to the Rio Puerco Resource Area (now the Rio Puerco Field Office) in 1983.

As part of the San Augustine Resource Area’s land use planning, they contracted with the Museum of New Mexico (MNM) for Regge to carry out a reconnaissance survey of BLM lands in the El Malpais Planning Unit. At that time, BLM did not yet have archaeologists in the districts and resource areas; the newly hired BLM New Mexico State Archaeologist, Leo Flynn, helped the Socorro District design and administer the contract.

The impetus for the reconnaissance was the planned designation of El Malpais Recreation Area, as well as recognition that sites were being vandalized and that a site monitoring program should be instituted. Since it was thought that visitors would be likely to concentrate in a corridor east of the lava flows (and mostly east of State Road [S.R.] 117), the reconnaissance focused on this area. Where S.R. 117 turns west towards Quemado, the survey was east of the Pietown Road (County Road 41).

Regge already had quite a bit of familiarity with the area. While in graduate school at Arizona State University (ASU) in 1970-1971, he was in classes taught by Ed Dittert, who had written his M.A. thesis (1949) and his Ph.D. dissertation (1959) on the Cebolleta Mesa area. Also at ASU was Dittert’s partner in the archaeology of the Cebolleta Mesa area, R.J. Ruppé (Dittert and Ruppé 1951, 1952; Ruppé 1953; Ruppé and Dittert 1952, 1953). Regge recalls that Dittert often talked about his Cebolleta Mesa area research in class, and Regge (personal communication 2012) had read all of the references cited above.
The BLM left it up to Regge to work out a strategy to maximize results with inadequate funding. In addition to starting off with limited Laboratory of Anthropology (LA) and BLM institutional knowledge about site locations, he consulted local ranchers, especially Bob Lee of the King Brothers’ York Ranch, about locations of major sites, site concentrations, and vandalized sites. The reconnaissance was then designed to record as many sites as possible.

Regge started the survey on March 28, 1974 and ended on May 9, having recorded 163 sites, only five of which had previously been assigned an LA number. These five sites, all in the Cebolla Canyon Community, were recorded on MNM site cards on August 24, 1933 by H.P. Mera (Mera Diagram No. 18). Because of the limits imposed by the BLM contract, Regge was able to fully record and map “only” 52 of the sites (including the five Mera sites). He recruited Jim and Nan Bain, who had founded the Archaeological Society of New Mexico Rock Art Field School in 1972, to record two rock art sites, for a total of 54 fully recorded sites. Regge provided site summaries and site locations for the other 109 sites, but no site forms. LA numbers were assigned to all 158 “new” sites. Regge says about the 109 sites with only site summaries: “Although they remain to be fully recorded, they were assigned LA numbers in anticipation that this will be done later on” (Wiseman 1974:2). At this point (in 2012), another 30 have been fully recorded, and most of the original 54 fully recorded sites have been re-recorded on newer LA long forms. As Regge said at the time: “This reconnaissance, then, can only be considered preliminary or initial to a larger, more thorough program” (Wiseman 1974:2).

Regge’s strategy was to follow up on leads provided by Dittert and Ruppe’s work, by BLM records and personnel, and by LA records. The New Mexico Cultural Resource Information System (NMCRIS) calculates that he surveyed 1,035 acres. Most of this is in single person pedestrian “wandering” transects, although perhaps 200 acres of block reconnaissance are mapped in the vicinity of the Cebolla Canyon Community, and a small amount of the reconnaissance was by vehicle. He mapped his reconnaissance transects, and those tracks are mapped on the NMCRIS Map Server. Regge’s field journal is appended to the BLM copy of the report. By my count, between March 28 and May 9, he spent about 17 days on the reconnaissance and another seven or eight days recording the 52 sites on the old one-page LA form, as well as mapping them.

One reason that he was able to accomplish so much in a short period of time is that he brought a trailer with him and wasn’t commuting from a motel room in Grants. His campsite was off S.R. 117 about a mile south of North Pasture Tank and about two-thirds of a mile west of The Citadel (LA 11651), part of the Cebolla Canyon Community.

His field journal provides a little perspective on the survey. First of all, he clearly was not putting in just eight-hour days. There are entries such as: “As the sun was getting low, I had to abandon the idea of getting to the mesa top and the large sites.” On that same day, he located and summarized three more sites on his way back to the vehicle. Another day: “As it was quite late (sundown) and I had ca. 1 ¾ mile walk back to camp, I had to stop noting sites and get home. As the light faded, I still saw several sites which must be taken care of tomorrow.”

He periodically noted the weather conditions. Remember, this is spring in New Mexico! My favorite is April 2: “Got up to the usual wind but also had heavy clouds which soon poured down (intermittently) snow and sleet. It was a miserable day, but I did manage to get quite a lot
accomplished.” He worked within the Cebolla Canyon Community that day and recorded several sites on LA forms, and made site summaries for several others. For an example of a site he briefly summarized the next day, see Figure 1. In only 12 lines he not only describes the site definitively but also reveals his dismay at what the site has undergone—emotions that an archaeologist almost never betrays on a formal site form.

He fully recorded the “larger and presumably more significant sites” (Wiseman 1974:1), although he did recognize that “with a few notable exceptions, none of the sites located by the survey has a specific intrinsic value which places it in an especially esteemed position relative to the others. Part of this fact lies in the realization that as time, research, and knowledge progress, changes take place in the kinds of questions asked and a concomitant change therefore takes place in the types of sites which are considered to be more important.”

Regge’s most intensive work, but still at the reconnaissance level, was within the Pueblo II-Pueblo III Cebolla Canyon Community. Here he concentrated within an area of about 200 acres, locating 34 sites. He fully recorded and mapped 28 sites with an average of about 25 rooms per site, and made site summaries for another six smaller sites. Within the “intensive reconnaissance” area are four sites with over 50 rooms, six sites with over 25 rooms, six sites with over 15 rooms, as well as 16 smaller structural sites, and one sherd area. The largest site associated with the community, The Citadel, is outside the intensive reconnaissance area, with perhaps 75 rooms. We relied on Regge’s reconnaissance of the Cebolla Canyon Community until 1991 when, as he suggested, a Class III inventory (i.e., thorough surveys that employ formal parallel transects no wider than 15 m and seek to record all the sites and all isolates identified) of 320 acres encompassing the 200-acre reconnaissance area recorded 51 sites (Wozniak and Marshall 1991).

![Figure 1.](image)

Figure 1. A portion of Regge’s field journal for April 3, 1974. The site known then as the Cebolla Canyon Site and now as the Penole Site was split between BLM and private surface ownership at the time of Regge’s reconnaissance. BLM has since acquired the adjoining private section.
We still use Regge’s site forms to complement the newer long forms.

Other areas with significant site clusters were in North Pasture, Armijo Canyon (Dittert Site Community), and Tank Canyon/Goat Tank Canyon, but none of these can compare with the density of large sites in the Cebolla Canyon Community. Other areas examined were Sand Canyon, an unnamed canyon west of Sand Canyon, Homestead Canyon, Middle Canyon, and Cedar Canyon. Regge really got around in a little over a month!

I should also mention Regge’s helpful maps. In many cases, he mapped the shape of the pueblo, but didn’t try to map individual rooms. Where he spent more time than was common in those days, was on the topography and geographic features. This means that when you’re standing on a site, you can almost always tell if it is the site Regge recorded, because of the detail in the map (see Figure 2).

Over the years, BLM has followed up on many of Regge’s recommendations. Several sites were stabilized for protection or interpretation. Sites have been placed on the National Register of Historic Places. Follow-up Class III surveys have been undertaken in areas he suggested. Land use planning has opened several of the areas that he recommended for interpretation. BLM archaeologists and rangers have patrolled many of the sites and areas he pointed out as vulnerable to illicit excavation, and now SiteWatch volunteers are helping with site monitoring.

Especially after the 1987 designation of BLM-managed El Malpais National Conservation Area (NCA)—not to be confused with National Park Service-managed El Malpais National Monument—much of the BLM Rio Puerco Field Office’s attention has been focused on the rich cultural resources of the NCA. And it often seems that, no matter where we go, Regge was there first. ☞
Figure 2. Regge’s map of LA 11723, the Dittert Site.
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Wozniak, Frank E., and Michael P. Marshall
Horse Herd Size and the Role of Horses among the Mescalero Apache: A Response to Osborn

DENI J. SEYMOUR

Horses figure prominently in the historic record and horse bones are a key diagnostic element of some Apache sites. Painted or pecked depictions of the horse are found in rock shelters and on rock faces and include the horse alone or with a rider wearing a hat or perhaps with a lance or bow and arrow (Figure 1). Many believe that the distinctive so-called “puking horse” at Hueco Tanks near El Paso is a depiction of an Apache or other historic horseman having ridden a horse so hard that it is vomiting blood from its overstressed lungs (Figure 2). Many groups, not just the Apache, portray horses as key elements of rock art because such animals were initially unusual, perhaps because of the power they held, or because of their importance in societies after their introduction in the 1500s. There is no doubt that the horse contributed to changes in the Apache way of life, but the horse did not assume the same role among the mountain groups, such as the ancestral Mescalero and Chiricahua, that it did for many Plains tribes.

Osborn’s Model: The Problem
The horse was important to the Apache in historic times; in fact, many would argue that Apache identity was formed only after the introduction of the horse. Yet, a study that addresses Mescalero horse use indicates that horse herd size was much lower than expected, at least in the early 1800s. In an American Anthropologist article Osborn (1983) describes the Mescalero (as well as some other groups) as anomalous with respect to his explanatory model of equestrian adaptations during the Historic period. (I focus on the Mescalero rather than others owing to my familiarity with this group.) His model posits that there is a relationship between winter severity and the number of horses. The number of horses decreases in areas where winter severity is highest, that is, in the northern latitudes of the Northern Plains. According to his analysis, this model accounts for 65 percent of the variability in horse herd size on the Plains, but, interestingly, it does not account for the unexpectedly small size of Mescalero horse herds given the mildness of the climate.

An anomalous cluster of ethnographic cases including the Mandan, Arikara, Hidatsa, Oto, Ponca, Omaha, Fox, Sac, Pawnee, Kansa, Mescalero, and Jicarilla Apache … fail to conform to our expectations concerning horse numbers and winter severity. While these cases cluster in moderately favorable environmental situations (relatively low winter severity indices), they remained “horse poor” throughout the historic period (Osborn 1983:580; emphasis added).

Citing Murdock (1967), Osborn (1983:575-587) posits that this divergence from expectations
Figure 1. Painted or pecked depictions of horses are widespread throughout this region, and include the horse alone or with a rider wearing a hat or perhaps with a lance or bow and arrow. This image is from Otero Mesa. Photograph by Deni Seymour.

Figure 2. Many believe that the so-called “puking horse” at Hueco Tanks near El Paso is a depiction of someone riding a horse so hard that it is vomiting blood from its overstressed lungs. Photograph by Deni Seymour.
relates to dependence on horticulture. But contrary to Osborn’s thesis, the Mescalero were not initially reliant on horticulture. There is little evidence to indicate that the southernmost Apache (Mescalero and Chiricahua) cultivated to any extent or at all prior to the imposition of this system on them in the mid 1800s. With regard to the Chiricahua Apache, whose adaptation was quite similar to the Mescalero, Opler (1941:372) states “No attempt was made to cultivate crops until very recent times” and his oldest Southern Chiricahua informant stated categorically:

My people did not practice farming. The Indians had many plants which were given to them [by nature] and did not have to farm. They moved around too much also (Opler 1941:372).

Similarly, ethnographic and ethnohistoric data regarding the Mescalero indicate that they were a hunting-gathering-raiding people who did not farm prior to the nineteenth century (Schroeder 1974; Sonnichsen 1986:17, 89, 91, 115). For example, one source states: “under the instruction of Army officers we planted crops” (Betzinez and Nye 1959:140), implying a lack of knowledge prior to this time. Archaeological data pertaining to campment locations support the notion that these Apache were not farmers, even on an intermittent basis.¹

Given these data, practice of horticulture for the Mescalero is not a viable explanation for the relative smallness of horse herd size historically. Explanations for Mescalero herd size are far more complex than Osborn’s model allows. Clearly, the remaining 35 percent (or more) of the variability of horse herd size, at least with regard to the Mescalero and Chiricahua, is accounted for by other factors. This problem remains of interest from the standpoint of making generalizations about human behavior, a pursuit which I applaud, and for attempting to correlate these generalizations to environmental parameters. No doubt many aspects of human behavior are generalizable within certain boundary conditions, but also some percentage of human behavior is attributable to culture- or historic-specific practices or factors other than environment (or a single environmental parameter).

**Factors Keeping Horse Herds Small**

Numerous factors seem to have worked together to limit horse herd size among the Mescalero and Chiricahua Apache. These relate to social and economic factors, such as: (1) distance to supply, (2) ease of replacement through raiding, (3) the different social value of the horse among these Apache as compared to many Plains tribes, (4) the role of horses as technology and food, (5) the overuse of horses, (6) the need to remain concealed, and (7) the broad distribution of small groups across the landscape. The factors just cited are integrally related to the fact that long before the late eighteenth century at least some of the Mescalero had a mountain-oriented adaptation (basin-and-range) rather than a Plains way of life. This mountain-based adaptation limited horse use. Equally relevant is that from an early time they were under military pressure as a consequence of their raiding lifestyle and proximity to European settlements, missions, and presidios. These intervening factors indicate that environmental explanations, such a winter severity that affects in-region variability of grass growth, have less to do with herd size in the southernmost Southwest. The viability of the model in this region is also questioned given the widespread availability of suitable forage types other than grass. Each of these factors is discussed below, providing a more in-depth understanding of horse use among the basin-and-range Mescalero and their western neighbors, the Chiricahua.²

**Mountain versus Plains**

One primary consideration regarding Mescalero horse herd size is that the Mescalero residing
west of the Pecos River practiced what may be viewed as a Plains margin adaptation where they used both Plains and mountain zones. They were not Plains-oriented in the way many groups were who relied solely on the Plains, but rather they often lived in the mountains and valleys of the Southwest, moving onto the Plains for specific purposes, such as for bison hunts.

Ancestral Apache groups resided within the historically documented mountain-based Mescalero territory long before the Comanche push south resulted in Plains Apaches moving to the west. Both Chiricahua and Mescalero groups likely migrated south from the Subarctic via the western slopes of the Rockies or by way of an intermountain route rather than down the Plains (Seymour 2012a). These ancestral Apachean groups who inhabited the mountains and valleys west of the Southern Plains or Llano Estacado were variously named by Europeans. The Mescalero exhibit behavioral patterns more similar in many ways to the mountain-based Chiricahua than the many Plains Apache groups (Schroeder 1974; Seymour 2002, 2004). Importantly, both Plains and mountain zones could be used to their advantage, and temperature variations and resource availability could be ameliorated though elevational shifts in the mountains.

This geographic distribution affected horse herd size and the way horses were viewed. This distinction is also important for assessing Osborn’s model because this means that when the Mescalero are removed from his Plains sample an even higher percentage of variability in herd size on the Plains is accounted for by severity of winters.

Ease of Replacement/Distance to Supply
With regard to the Great Plains, Wallace and Hoebel (1986:40) indicate that “The greater distance from Texas and Mexico, the fewer the horses found.” In contrast, in the Southwest smaller herd sizes among the Mescalero and Chiricahua relate in part to the short distance from the source. A ready supply of horses was available from their earliest introduction in northern New Spain. Even some of the earliest Spanish accounts document the theft and gift of horses. For example, an account of the 1583 Espejo expedition mentions a sorrel horse that had been given to natives by previous Spanish visitors (Hammond and Rey 1929:67). Horses could be obtained from the settlements in New Mexico, Sonora, and Chihuahua. Chiricahua Land Claims accounts from the 1950s that convey information relative to the late 1800s reinforce earlier information of horse raids into Sonora (Mary Botella, Henderson 1957:851) and throughout what is now southern New Mexico and Arizona (Sam Kenoi, Henderson 1957:556-558).

Feral horses were also available for capture. These same accounts and others mention the prevalence of wild horse populations. Apparently the San Simon Valley of southeastern Arizona and the Animas Valley of southwestern New Mexico were popular locations for the Apache to obtain feral horses, and numerous wild herds roamed the Plains (Mee 1993:56; Wallace and Hoebel 1986:41).

Later in time, a relatively endless supply of horses could be procured by raiding, which, while a dangerous activity, was ultimately adapted to become an important part of Apachean social and subsistence systems. Thus, there was little need to maintain large herds when replacements could be easily obtained as other supplies were being acquired. Still, this does not entirely account for this difference because the central and northern Plains groups raided to obtain horses as well, and in late historic times they herded thousands of horses up from Mexico along the Comanche Trail.
Horse Trade and Raiding
Given the increasing constriction of Apache territory and over-hunting as a result of the intrusion of enemy settlements and forces, it was necessary, or at least desirable, to trade or raid to obtain valued resources of many different types. Yet, both of these means of obtaining resources are also noted in the earliest documentary sources (1500s) for this region. Horses were packages that were easily procured when out to pasture and could be effortlessly transported. This made raiding for them a practical endeavor. Horses also moved faster than cattle and sheep, making them a more attractive raiding target that allowed furtive escape.

By virtue of their grazing habits, horses were easily obtained, and, as the following passage indicates, there was a steady supply:

If cattle and horses were conveniently left in corrals some distance from the houses, the inhabitants were left undisturbed. And never did we take all the herds. We did not care much for cattle, and we took care to leave enough horses so that the Mexicans could raise more for us (Ball 1970:12).

The Mescalero and Chiricahua Apache were not stockbreeders, but obtained horses selectively and in a way that would ensure the herds they culled remained viable. By the mid 1800s horses could be obtained from ranches on both sides of the international border. Horses were routinely cycled through Apache camps, but the Apache tended not to accumulate horses any more than they did any other possessions or wealth.

Many Plains groups, including the pastoralist Comanche, were horse breeders and obtained them as gifts, in trade, and in raids. The Comanche were the richest in horses of all Plains tribes, they introduced the horse to the Plains, and they were the source of horses for most other tribes. Killing a favored horse was akin to killing a brother. Furthermore, as part of a war complex a man’s horse herd was a source of pride and wealth. “The accumulation of war honors, horses, and captives marked a man as a leader” (Schilz and Schilz 1989:2). Among these groups wealth and prestige centered largely in horses which were individually owned, and most warriors owned hundreds while a few owned over a thousand (Hämäläinen 2008:243; Wallace and Hoebel 1986:34, 36, 39, 40, 44, 68, 233, 241). These differences affected Apache horse herds and the way they viewed horses.

Horses as Technology and Food
The Apache of the southernmost Southwest used horses as a means of transport, as beasts of burden, and also for food. This key element of their technology (horses as tools) became essential for maintaining their highly mobile fast-moving lifestyle that depended upon their ability to cover 70 to 90—perhaps even 120—miles before stopping in order to avoid pursuers after a raid (see Ball 1970; Betzinez and Nye 1959:6, 60, 131). Horses were loaded with supplies and equipment but were not used to pull travois. The mountain Apaches built brush structures anew at each location rather than pulling prefabricated tipis along behind as many Plains tribes did (Seymour 2009a, 2010). Loaded with goods or people, horses were taken into rough and brushy country.

Horses provided a mobile and ready form of food that could be accessed when other reserves and sources failed. They were food preserved on the hoof, carrying themselves forward as needed. So while horses were highly valued, the Mescalero and Chiricahua often ate their horses, thereby contributing substantially to the attrition rate. It may be that the difference in behavior between the Mescalero and Chiricahua on the one hand, and many of the other horse-using groups, on the
other, results from the fact that the Plains groups had ready access to buffalo and did not need to eat their horses as often as the mountain-based Apaches. The latter had bison but were not in the midst of the richest bison territory, and herds substantially diminished through time much earlier than on the Plains.

Clearly, however, this practice of consuming horses does not explain all of the difference because while some Plains groups, such as the Blackfoot, only rarely ate horsemeat (Ewers 1955:222), other groups, such as the Comanche, ate horsemeat when on raids or during food shortages. Yet it was still a relatively rare practice among the Comanche to use horses for food and they never killed mares (Wallace and Hoebel 1986:35, 68). The Apache sometimes killed all horses in their possession and commonly lost them to a retaliatory attack.

Attrition Through Overuse
To some degree horses were disposable for the Apache. They were frequently worn out as a consequence of overuse. The Apache did not practice the same restraint with regard to limiting the amount of miles ridden each day as did the presidial solders and American cavalry. This accounts, in part, for why the Apache were able to outdistance their pursuers and it also is responsible for the high attrition rate of horses. This overuse by Sonoran groups, not just the Apache, was noted as early as the mid 1700s by Father Och: “the Indians annually kill many thousands of horses through excessive riding” (Treutlein 1949:143).

Practices regarding the preservation of the health of horses are a fundamental difference in strategy that affected the way they were used and the effectiveness of pursuit and avoidance tactics on each side. Comanches had long strings of horses that could be traded out as each tired (Wallace and Hoebel 1986:43), unlike the Apache who had many fewer. Moreover, it is probable that the rigorousness of the Apache lifeway reduced the fertility rate of horses, much as among humans who are subjected to excessive exercise and privation.

Maintaining Stealth
Another factor that likely affected herd size was the need to remain hidden and undetected by military pursuers, bounty hunters, and vigilantes. Large herds, where each animal was not specifically in use, would attract unwanted attention. The mountain Apache were aware of the liability of large numbers of horses:

When we camped that night we drove our horses and mules two miles further down the river and tethered them there. The reason for this was that if an enemy would be following he would spot the trail of the animals and would not notice our camp. Then we packed everything on our backs, climbed up the mountainside to the summit, and made camp there. By such measures we usually escaped surprise in our camps (Betzinez and Nye 1959:84-85).

Unneeded livestock would thwart stealthy movements and provide a target for enemy aggression. These were not compromises the Apache could accept. An Apache would abandon his horse to effect escape. Moreover, they often escaped by traveling through areas that were unsuitable for horses, or in areas that the cavalry, who were more compassionate toward their mounts, would not take their horses. During the late 1800s the Apache avoided encounter with the military numerous times by disappearing into the boulders and through craggy passes. They would then regroup hundreds of miles away, having left all their belongings, including livestock, in the previous camp or at the point.
of encounter with the enemy. The following quotation conveys the lengths to which band members would go to avoid capture:

Scaling walls was taken for granted. When closely pursued we killed our horses and scaled cliffs no enemy could climb. Men tied ropes to women and children and lifted them from ledge to ledge until they could take cover or escape (Ball 1970:75-76).

Horses were important in raiding and warfare for the Apache but limited herd sizes were part of their strategy for success. Fewer animals emphasized a focus on defense rather than horse breeding and wealth accumulation in circumstances where possessions were routinely lost in retaliatory campaigns by the enemy. Few belongings, including horses, allowed for a stealthier presence and more fleet movements.

**Group Size and Landscape Use**

Apache social group size was much smaller than among many groups on the Plains. Smaller social group sizes meant fewer animals. In turn, these animals were less detectable from a distance as were their trails that led into hiding places and encampments. The total number of people was smaller, and the way they distributed themselves on the landscape resulted in smaller groupings for much of the year. A single subdivision of Comanche, the Penatekas, had 8,000 people in the early 1800s, while the Apaches of various groups residing on the Mescalero Reservation in the 1870s numbered under 3,000 (Schilz and Schilz 1989:3; Sonnichsen 1986:162). As Osborn (1983:584) points out for Plains groups, “Residential groups size, particularly during the winter months, and number of residential moves per year were closely tied to horse herd size and horse-to-person ratios.”

Smaller group sizes among the southernmost Apache resulted from the need to remain undetected. As one ethnographic source notes: “We seldom assemble the forces because small bands could be more easily moved and concealed than large ones” (Ball 1970:146).

Smaller group sizes also related to the low density of clustered resources across the landscape. One important resource was grazing areas, which were more restricted in distribution and areal extent than on the Plains. Pasture availability therefore affected group sizes for humans and horses alike and was an important factor in encampment location selection: “She selected a camping place some distance from the water, and not visible from it…We carried our water to a camp where there was grass, wood, and concealment”(Ball 1970:17). Thus, the location of grama (a high-nutrient-value grass) was important in encampment location selection. Yet, the Apache probably did not focus on optimal foraging habitat for their horses, but instead considered a number of factors in encampment selection.

The Apache occupied relatively large base camps that multiple family groups called home. Ethnographic and archaeological evidence indicate that these varied widely in size but might contain 10 or 40 families, and known examples, such as two in the Franklin Mountains (41EP396, 41EP401), are 30 or 40 acres. These spatial parameters can be misleading, however, because houses were often scattered across the terrain and each encampment varied considerably in how widely huts and other features and artifacts were dispersed. Their distribution was dependant on the natural characteristics of the local terrain and also varied temporally (Seymour 2009b, 2009c, 2012b). According to Land Claims documents, each territory had at least two of these base camps, one for summer and another for winter, positioned to accommodate seasonal
climate changes (Henderson 1957). Later in time, additional locations were used in case one location was too close to—or discovered by—enemies.

These base camps were considered home bases; from these locations smaller groups, family or task-based, went out regularly to procure food, to raid, and so on. When smaller groups left the base camp they might be gone a week, a month, or longer. During this time they often traveled to a predetermined destination for a specific purpose. They might visit a caching location, such as the 30-acre Hormiguero site in the Peloncillo Mountains (AZ CC:12:58; Seymour 2013), or a favored piñon collecting or mescal processing location. Visiting other local groups or families was common as well. At their destination they established an encampment either at an existing and known place where they had stayed previously or at a new unfamiliar location. Sometimes temporary encampments were established along the way; these might consist of a shelter in inclement weather or something much less archaeologically recognizable. Many hut rings in the Whitlock Mountains (AZ CC:7:11, BLM) as well as isolated ones in other areas may represent locations where a single family or task group camped briefly on their way to somewhere else.

When there was a need for a large defensive force or an organized raid, larger residential groupings were formed. These supersized residential sites were where multiple groups came together. The 130-acre, 200-plus-structure Cerro Rojo site (LA 37188) is an example of this type of residential site (Seymour 2002, 2004, 2009d). Here multiple family groups and probably several bands came together at various times. Ethnohistoric sources indicate that these were gathering places for ceremonies, to prepare for war or raids, or to cooperate in a hunt (Ball 1970:22; Basehart 1960:60-61, 110; Betzinez and Nye 1959:85; Cole 1988; Cortés y de Olarte 1989:65; Matson and Schroeder 1957:342; Seymour 2004, 2009d; Sweeney 1991, 1992; Robert Geronimo, Henderson 1957:414). They were also social occasions for finding suitable mates. Yet when the occasion concluded, encampment residents dispersed to reform their day-to-day groupings.

Alternate Sources of Forage
Studies of forage for feral horses on White Sands Missile Range in southern New Mexico indicate that mesquite, grasses, and Russian thistle are the major foods of wild horses (Hansen 1976:347). Russian thistle, being a recent introduction as its name implies, would not have been available in early historic times although this species may have supplanted another. Historically horses on the Plains were known to eat bark, leaves, and twigs when grass was low in the middle of winter (Osborn 1983:566-567; Wallace and Hoebel 1986:35, 31). The dietary variation seen in modern times and these Plains historic practices have documented parallels in the early historic period Southwest. For example, in Luxan’s account of the Espejo expedition of 1583 a horse that had been given to natives was fed on mesquite (Hammond and Rey 1929:68).

What is of interest is the relatively low importance of grasses in the diet of free-roaming horses in southern New Mexico. Grasses played much less of a role in feral horse diets in this region than many other places in the West (Hansen 1976:347). This relates in part to the patchiness and unpredictability of grass distributions, especially as compared to the Plains. The harshness of summers and limited water sources may be the Southwestern equivalent to the severity of winters when considering limiting environmental factors on horse herd size. All of these factors have implications for modeling locations of suitable forage. They also explain why Osborn’s model does not effectively account for Mescalero (and Chiricahua) Apache horse herd sizes.
Conclusions

Many factors likely account for the smaller horse herd sizes historically among the Mescalero than among many other groups further east on the Plains. Perhaps the most relevant factor is that substantial segments of the Mescalero and their ancestral predecessors were not Plains oriented. Another important part of the equation is that relations between Apaches and other enemy groups influenced much of their behavior, including horse herd size, especially later in time. Moreover, Osborn’s model regarding herd size on the Plains relative to winter severity cannot be applied in an area where horses were a disposable and renewable resource. The Apache used the horse but did not value it in the same way as did many of the Plains tribes. Horses were a form of technology (for transportation and bearing burdens) and a source of food. The horse was as easily replaced through trade and raids as other key resources. Accumulation of large herds would be detrimental for a group whose main defense was their ability to vanish and then regroup hundreds of miles away. It is not the seasonal availability of grass that limits horse herd size in the southernmost Southwest, although this is the operative factor on the Plains, where grass is the dominant species. Alternative food sources were available in the mountainous Southwest, as attested to by modern wild horse populations in the region and historic accounts. Explanations generalizable to the Plains are not applicable to the southern Southwest, where severity of summer and limited water supplies are probably more relevant. Consequently, it is necessary to question the viability of Osborn’s model to explain any aspect of horse herd size in the southern deserts of the American Southwest. Yet, the inconsistencies or anomalies found in the Mescalero example are interesting in their own right and may be the exception that proves the rule for the Plains.

Notes

1. Basehart (1960:58-59) states that there is evidence that one or two groups of Mescalero cultivated the soil to some extent. At best, he says, these efforts at farming were of limited nature and exerted little influence on other subsistence activities. Differences between his findings and those of Opler may be attributable to local variability in farming practices or to telescoping events over time in the minds of informants. The important point, he says, is that agriculture was not a major form of subsistence.
2. Inclusion of both Mescalero and Chiricahua facilitates discussion because it expands the ethnographic and ethnohistoric data available for use. Their adaptations and lifeways were very similar in some ways, especially with regard to horse use and landscape use. Moreover, during the time of Murdock’s studies many of the Chiricahua were living at Mescalero; therefore their practices had been conceptually collapsed.
3. Attrition of Apache population played a role in group size as well because these groups were so close to Spaniards and then to Mexicans and Americans that campaigns against them were more likely than against Plains tribes. On the Llano Estacado Europeans were not consistently present until the mid nineteenth century (Schilz and Schilz 1989:3).

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Bison Hunting and the Emergence of Plains-Pueblo Interaction in Southeastern New Mexico: A Synopsis

JOHN D. SPETH AND LAURA STARO

(A note of explanation: This is a brief synopsis of a longer paper that originally was prepared for inclusion in this celebratory volume. Unfortunately, our completed manuscript ended up being much too long to be included. Rather than eliminating it altogether, the editors offered us a marvelous alternative—publish the full-length version in *The Artifact*, the scholarly journal of the El Paso Archaeological Society, but still include a brief synopsis of the major findings here. We are grateful to them for making such an ideal solution possible.)

It is a pleasure for us to be part of this celebration. Regge Wiseman is a remarkable archaeologist who over the years has added immeasurably to our understanding of Southwestern prehistory. Not only are Regge’s contributions many and substantial, he has also worked in just about every corner of the Southwest and on just about every time period and type of site. But among the many areas where he has worked, one is especially meaningful to us. Regge shares with us the same passion for the archaeology of southeastern New Mexico, a huge and very neglected chunk of the American Southwest. Over the years, Regge has come back to this part of the state over and over again and, with each return, his work has added a valuable new chapter to our understanding of what happened in the past in this vast region, and how developments there dovetailed with happenings in the “heartland” of the Southwest and in the Southern Plains.

In what follows, we briefly summarize unpublished information on bison hunting in southeastern New Mexico, using faunal remains salvaged by Regge from Rocky Arroyo. This small pithouse village, probably dating to the late thirteenth century, is located a few kilometers southwest of Roswell. Local amateurs destroyed much of the site in the 1970s, abandoning most if not all of the fauna on the surface, along with a number of piles of lithics and sherds. Regge salvaged these materials and mapped the site, identifying the remains of at least three roughly square pit rooms irregularly placed around an open midden-filled area (Emslie et al. 1992). The amateurs had completely emptied two of the structures and partially dug the third. They also excavated most of the midden. In 1980 Regge excavated the remaining undisturbed fill in the third pit room, recovering an in situ sample of artifacts and animal bones.

There are at least two late prehistoric pithouse villages in the Roswell environs (Fox Place [LA 68188] and Rocky Arroyo [LA 25277]) and two pueblo villages (Henderson [LA 1549] and Bloom Mound [LA 2528]). While the focus here is on Rocky Arroyo, we make frequent comparisons to materials from the other three sites, since all four of these communities, based
on their ceramic assemblages, are broadly contemporary (thirteenth to fifteenth century), and all are located within a few kilometers of each other. However, despite the overall similarity of their ceramic assemblages, there are differences sufficient to suggest that the pithouse communities are slightly earlier than the pueblos. The architectural differences between them also point to the same conclusion.

Seriation of the El Paso Polychrome jar rims adds further credence to this chronological ordering (Speth and LeDuc 2007). It also allows us to subdivide Henderson’s occupation into two phases (“Early” and “Late”), and it puts Bloom Mound after Henderson. Seriation also puts Fox Place earlier than Rocky Arroyo, and it suggests that Rocky Arroyo is closer in time to Henderson’s Early Phase than to Fox Place. Thus, seriation arranges the sites into an intriguing “pithouse-to-pueblo transition,” with Fox Place earliest (small oval to round pithouses), followed by Rocky Arroyo (large square pithouses), followed by Henderson’s Early Phase (roomblocks of abutting, square to rectangular semi-subterranean “bathtub” rooms), followed by Henderson’s Late Phase (aboveground roomblocks), and closing with Bloom Mound (also aboveground roomblocks).

All four sites produced bison remains, though in vastly different quantities: Fox Place (239), Rocky Arroyo (2,618), Henderson Early Phase (1,398), Henderson Late Phase (2,672), Bloom Mound (72). Bulls dominate the Rocky Arroyo and Henderson assemblages, suggesting that most hunting took place in the spring when males are in better physical condition than pregnant or nursing cows (Speth and Rautman 2004).

We calculated a “bison index” (BI) that looks at the proportion of bison out of the combined total of bison and medium ungulates (predominantly antelope). Ordered chronologically, the results are: Fox Place 16.7, Rocky Arroyo 51.0, Henderson Early Phase 33.3, Henderson Late Phase 46.2, Bloom Mound 5.3. The BI provides a measure of the changing importance of bison hunting that is less sensitive than raw counts to differences in the volume of deposit excavated at each of the sites. Again, it is clear that the importance of bison in the local economy changed over the two centuries represented by the occupations of the four Roswell communities: bison hunting was conducted on a limited scale at Fox Place (mid-1200s?), peaked at Rocky Arroyo and Henderson (late 1200s-1300s), and declined precipitously at Bloom Mound (late 1300s to mid-1400s).

Given the scarcity of cows at Rocky Arroyo and Henderson, there may have been no major fall hunt. Perhaps during the fall the Southern Plains herds moved to grazing areas that lay beyond the reach of Roswell’s hunters. Or perhaps competition among groups for access to the herds was more intense during the fall than during the spring, making long-distance forays into the Southern Plains too risky at that time of year (Wade 2002:174).

Interestingly, evidence for bison hunting is almost nonexistent at Bloom Mound, while evidence for lethal violence becomes very apparent for the first time (Wiseman 1997). Local amateurs who dug much of the site in the late 1930s found many skeletons of burned and unburied victims, suggesting that the near-total collapse of bison hunting (but not long-distance exchange—see below) by these Roswell-area inhabitants during the fifteenth century may be the end result of an extended period of intensifying competition among Southwestern and Southern Plains groups for access to the herds, and perhaps to trading partners, that in its early stages made the fall hunt too precarious for hunters from Roswell to venture out into the grasslands, and in its later stages drove them off the Southern Plains altogether (Baugh 2008; Speth and Newlander 2012).
Not only are there a lot of bison bones at Rocky Arroyo and Henderson, there are also a lot of non-local ceramics that came from as far afield as the Rio Grande, northern Mexico, western New Mexico, and eastern Arizona. Numerous other types of items from distant sources have also been found, including marine shells, obsidian, turquoise, a scarlet macaw, and copper bells. These visible markers of once extensive trade networks are clear testimony to Roswell’s far-flung networks of interaction and exchange (Emslie et al. 1992; Kelley 1984; Rocek and Speth 1986; Wiseman 2002, 2004).

While the Roswell inhabitants clearly engaged in a lot of bison hunting, it is much harder to show that any of the meat was actually exchanged with distant communities. However, there is one carcass part that might provide the window we need—the ribs. When broken off as a unit from the vertebral column, the rib cage is easy to dry and transport as is (Friesen 2001). Interestingly, at both Rocky Arroyo and Henderson ribs are conspicuously underrepresented, despite the overall abundance of bison bones. It is unlikely that these spongy bones were destroyed by village dogs, since much more delicate antelope ribs are well represented. Thus, if the villagers transported dried rib slabs away from their kills, which given their food value is very likely, they were not consuming the rib meat at home, suggesting that the ribs went elsewhere, presumably as items of exchange (see Driver 1990).

If we accept that the Roswell communities were active participants in Plains-Pueblo exchange, can we see anything in the data that might inform us about changes in this exchange system over time? One way to go about this is to compare the proportion of ribs in the bison assemblages from Rocky Arroyo and Henderson. The results are interesting—arranged from earliest to latest, the proportion of ribs declines steadily from 26.0 percent at Rocky Arroyo to 17.7 percent in Henderson’s Early Phase to only 10.4 percent in Henderson’s Late Phase. The bison samples from Fox Place and Bloom Mound are too small to be included in this comparison, although the fact that there are very few bison remains from these sites is informative in and of itself. Thus, to the extent that the proportion of bison ribs serves as a proxy for the intensity of meat exchange, these data suggest that the importance of interregional interaction involving products of the bison hunt intensified sharply over the century or so between the mid-to-late 1200s and the mid-to-late 1300s and then declined precipitously starting sometime in the late 1300s or early 1400s.

We can also monitor change in the intensity of long-distance interaction using the non-local ceramics. We distinguish local from non-local solely on the basis of whether they are common in the assemblage or rare, a distinction that was pretty obvious in the Roswell sites. Looking first at Henderson, the total number of rim sherds for all seasons and all ceramic types is 2,678. Of these, 5.1 percent are from non-local vessels. When looked at by phase, non-local rims constitute only 1.4 percent of the total rims in the Early Phase, rising to 6.1 percent in the Late Phase. This upward trend continues at Bloom Mound, where 11.0 percent of the rims are “non-local.” In other words, long-distance ties to the Pueblo world, at least insofar as they are reflected in ceramics, increase sharply during the latter part of the occupation at Henderson and continue to increase at Bloom Mound.

Unfortunately, we don’t have the rim sherd counts from Fox Place and Rocky Arroyo, so we can’t directly compare their data with the values from Henderson and Bloom Mound. For Fox Place, the lack of rim data is actually not a problem. Although the excavation at this site was much larger than at the other villages, it produced only 289 non-local sherds. By comparison, we recovered 1,560 non-local sherds from Henderson (only
95 or 6.1 percent from Early Phase contexts and 1,465 or 93.9 percent from Late Phase contexts). Bloom Mound produced 1,051 non-local sherds. It seems reasonably clear, therefore, that Fox Place’s involvement in interregional exchange, at least as seen through the ceramics, was fairly minimal—and the same would appear to be true of Henderson’s Early Phase.

The sherd collection from Rocky Arroyo consists of only 1,497 sherds. Judging by the apparent scale of the amateur excavations, this must be only a fraction of the ceramics they actually found. Regrettably, the fate of the bulk of the collection is unknown. If we can assume that these 1,497 sherds are a reasonably representative subsample of the original collection, admittedly a very big “if,” the small number of non-local sherds (29) most closely parallels the values seen in the other Roswell sites to which it is closest in age—Fox Place (289) and Early Phase Henderson (95). Henderson’s Late Phase and Bloom Mound are very different, the former yielding 1,465 non-local sherds, the latter 1,051. These results suggest that interregional interaction on an intensive scale, or at least Roswell’s involvement in it, did not really “kick in” until Late Phase Henderson, presumably sometime during the mid- to late 1300s.

To bring this overview to closure, let us summarize a few of the more interesting findings. Our discussion has focused on four late prehistoric villages—Fox Place, Rocky Arroyo, Henderson, and Bloom Mound. Based on their ceramics all four are broadly contemporary, dating between A.D. 1250 and 1450. The El Paso Polychrome seriation places them in a chronological sequence, revealing a local “pithouse-to-pueblo transition” that begins with small round pithouses (Fox Place), followed by square pit rooms (Rocky Arroyo), and finally by aboveground roomblocks (Henderson and Bloom Mound). While we have no simple explanation as to why this transformation in village organization occurred, what we can do is point out a few correlations that emerge from the data, emphasizing that these are offered, not as necessarily causal, but as targets for further research.

1) The shift from pithouses to aboveground structures happens hand-in-hand with a dramatic upswing in the importance of bison hunting. The architectural changes are also accompanied by a change in mortuary practices—burials are very rare at Fox Place (Wiseman 2002), but are fairly common at Henderson and Bloom Mound, and included many adults in flexed positions beneath house floors (Rocek and Speth 1986; Speth 2008). This shift in mortuary practices very likely denotes a decline in residential mobility, one that probably already began at Rocky Arroyo.

2) The upsurge in bison hunting seen at Rocky Arroyo and Early Phase Henderson occurred before, not hand-in-hand with, the sharp Late Phase increase in non-local ceramics. In other words, the expansion of the bison hunting economy seems to precede the expansion of the exchange network and may have been a precondition for its development.

3) Bison remains in Early Phase Henderson are more or less equally divided in their occurrence between domestic (room trash) and public (plaza roasting features) contexts (Speth 2004). In the Late Phase more than 80 percent of the bison remains are concentrated in public contexts. Moreover, the abundance of bison ribs declines at this time, implying a significant increase in the export of dried bison meat, presumably for exchange. It is also at this time that the frequency of non-local ceramics jumps significantly. In other words, it appears that during Henderson’s Late Phase, the networks of interaction expand, bison meat and presumably other products of the hunt become important items of exchange in these networks, and bison becomes a more “public” resource.
4) During Bloom Mound’s occupation, which probably falls largely within the first half of the fifteenth century, the intensity of exchange continues to increase, while at the same time bison all but disappear from the local economy. The Bloom Mound villagers no longer hunt bison, nor, judging by the scarcity of ribs, are they receiving dried bison meat in any significant quantity from elsewhere. Nevertheless, the fact that the abundance of non-local ceramics is substantially greater at Bloom Mound than at Henderson implies that this community is still enmeshed in widespread networks of exchange. What their role becomes in these networks, however, is not clear. Very likely they take on the role of “middlemen,” but exactly what they contribute to the system remains a mystery. In any case, their involvement in the larger system seems to bring them into intense competition with other Southern Plains groups, competition that leads to the eruption of deadly violence and ultimately the complete abandonment of the Roswell area by sedentary or semi-sedentary communities pursuing this sort of economic strategy.

The Roswell villages have fascinating archaeological stories to tell, stories that we have only begun to appreciate and tease apart. Southeastern New Mexico is not the archaeological wasteland that many in today’s archaeological establishment seem to think it is. Regge Wiseman knew that a long time ago, and has been one of the major forces documenting and interpreting the area’s precious but rapidly vanishing record.

Acknowledgments
The senior author (JDS) is responsible for these acknowledgments. In 1996 my junior author, then a University of Michigan undergraduate, analyzed the Rocky Arroyo bison as part of an Honors thesis in Anthropology. Given her monumental efforts, it seemed only fitting that she should be a coauthor on this paper. I owe Regge far more than I can express here. He has been a friend for some four decades, and over those many years his passion for the archaeology of southeastern New Mexico has been contagious, and the published record to which he has contributed so much has been an inspiration. I am deeply grateful. Although Regge was always uncomfortable with the intense heat for which Roswell is famous (or infamous), he nonetheless always braved the searing temperatures to visit my mid-summer excavations in Roswell, helping me and my students learn about the prehistory of the area and the subtle “ins” and “outs” of the local ceramic sequence. Those visits were worth their weight in gold to me. Not only did I always learn a lot, but I thoroughly enjoyed talking with him about the archaeology of a part of the Southwest that was special to us both. Now that I have retired, I will truly miss those visits and those conversations. Thank you, Regge, for your friendship and for your wonderful and lasting contributions to a very special part of the Southwest.

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Venting: A Remarkable La Plata Deposit and the Importance of Pueblo Vent Styles

H. Wolcott Toll

The La Plata Valley in northwestern New Mexico was the site of intensive Pueblo occupation from Basketmaker II through Pueblo III times. While it is at the diagonal extreme of New Mexico from the area determined to be truly important by Regge N. Wiseman, it is a place in and around which he has worked (e.g., Wiseman 1982, 2008). In fact, he even worked on the project of which this site is a part. It was there in 1988 that the immortal quote from Mr. Wiseman was uttered, “This is the hardest dirt since Dent.”

LA 37600 is in the Barker Arroyo Community of the La Plata Valley, which is situated in the Totah region of northwestern New Mexico (Figure 1; Toll 2008). The famous Chaco outlier Morris Site 39 (LA 1897, Morris 1939:50-55) and the confluence of Barker Arroyo with the Rio La Plata are visible from the site. LA 37600 was a component of a major settlement at the mouth of a large unnamed arroyo. As a part of the Office of Archaeological Studies (OAS) La Plata Highway project in 1989 and 1990, sections of this settlement were partially excavated as two sites because of the presence of the highway between them. Outside the right-of-way on either side of the highway there are substantial roomblock mounds. At LA 37599 east of the highway we worked in seven pit structures and several surface rooms. At LA 37600 west of the highway we excavated all or part of seven pit structures and around 40 surface pits. Among the 14 pit structures, three on each side of the road were semi-subterranean mealing rooms and the other eight were full-sized circular subterranean structures; five of those were fully excavated and the portions of the other three that were in the right-of-way were excavated.

Pit Structure 1, LA 37600

My discussion here centers on just one of those pit structures at LA 37600, prosaically called Pit Structure 1. More narrowly, I will discuss just one of the feature complexes in the structure, chosen both for its remarkable contents and because it is a springboard to discussion of pit structure ventilation features, which were quite clearly important to their Puebloan builders.

This complex pit structure fits well into the 4 m-diameter, 2 m-deep size range common in structures excavated by the project (Figure 2). Remodeling of several aspects of the structure means that it exhibited more than one variety of several important features. In its final configuration it had four masonry pilasters, although it was apparently also in use for some time without pilasters. When abandoned, it had an above-floor vent and deflector (Figure 3). Other features distinguishing this structure include eight subfloor storage vessels—more than any other structure excavated by the project—and three very large cists. Pit Structure 1 made extensive use of masonry, mostly using
Figure 1. Location of the Barker Arroyo community within the La Plata Valley, showing LA 37600; the confluence of the Rios La Plata and Animas with the Rio San Juan—the Totah—formed an important focus of population from Basketmaker through Pueblo III.
Figure 2. Bipod view of Floor 1 of Pit Structure 1, above-floor ventilator deflector in place; Floor 2 was removed at the time of placement of Floor 1. The subfloor vent tunnel beneath the visible floor is apparent between the above-floor ventilation system deflector and the bench (1 m scale).

Figure 3. View along the north-south axis of the final floor of Pit Structure 1, LA 37600 from the south. Note that the extensive masonry is completely plastered. The stone slab holding the above-floor vent deflector above the closed subfloor vent tunnel is visible in the foreground.
cobbles, in contrast to all of the other structures on the site, which were earthen walled as were the majority of structures in the project.

Ventilation features are the focus of this paper. Tenth through thirteenth century Colorado Plateau pit structures (also known as kivas or round rooms) have elaborate approaches to ventilation systems. While they seem to have been frequently fine-tuned, the two basic styles discussed here are subfloor and above-floor types. Both include a usually vertical shaft that intersected the ground surface and drew fresh air down to a horizontal tunnel connected to the structure chamber. In the above-floor type, the shaft was fitted with an opening at the base of the wall. The deflector—a rock slab, or a masonry or adobe construction—diverted the air flow from the central hearth (see Kiva 2 in Figure 4; Figures 2 and 3). In the subfloor variation, the shaft connected to a tunnel beneath the floor. The air entered the chamber through an opening adjacent to the central hearth (Kiva 1 in Figure 4). Deflectors varied in this design from a rise in the floor to a more constructed unit, but the deflector was not as tall as those in chambers with above-floor vents. As seen in Figure 4, both styles could exist on the same site, and, as discussed here, structures were sometimes converted from one style to the other.

Any full-sized, completed pit structure contains an abundance of information, but some contain more than others. Pit Structure 1 at LA 37600 is a “data rich” structure: we were able to excavate the entire structure; preservation was good; extensive remodeling at two temporally discrete events left numerous and varied features; the fill contained a substantial trash component; and a number of artifacts were left on the floor and sealed-in features. Although 18 specimens were submitted to the Laboratory of Tree-Ring Research, only two tree-ring dates were returned for this structure. Most of the undated samples are juniper, but one piñon and 3 Populus specimens were also identified. Both successfully dated specimens came from masonry pilasters that incorporated vertical juniper posts dating to 1064 VV and 1065 RB. While there are only two dates, they constitute a good argument for a construction episode at 1065 because of their context and consistency, and the association of more Pueblo II sherds with the construction materials as compared to the floor and fill assemblages.

This date is 18 years later than the latest date returned from Pit Structures 2 and 3, suggesting a clear sequence of structure construction and probably of use. Pit Structure 2 was the other full-sized structure fully excavated at LA 37600. While similar in size to Pit Structure 1, it was completely lacking in masonry. It had burned, providing the rare La Plata luxury of an extensive tree-ring sample, which placed its construction

![Figure 4. Adjacent pit structures at the Three-C Site in Chaco Canyon (modified from Vivian 1965:12-13; see also Lekson 2007:19). Kiva 1 on the left has a subfloor vent and tunnel, while Kiva 2 on the right has an above-floor vent and a taller deflector. Fresh air from the ventilator shaft enters the structure chamber from a horizontal opening in the floor in the subfloor design and through a vertical opening in the bench face in the above floor version. The vent shafts were not shown in the original figure and have been approximated.](image)
clearly in the early 1040s. Pit Structure 3 was one of the mealing rooms between the two larger structures; it also dated to the early 1040s. The substantial trash deposit in the upper fill of Pit Structure 1 contains abundant ceramics dating to the late 1100s to earliest 1200s.

In Pit Structure 1 only suggestions of a floor earlier than that first encountered and recorded were present, but these suggestions are strong enough to venture that an earlier floor did exist. Clear instances of remodeling include: replacement of the subfloor vent with an above-floor vent, conversion of a large storage feature into a subfloor vessel feature, closure of another large cist, remodeling of the hearth, and placement of a large floor patch in the center of the structure. The features have been divided by floor, based on remodeling evidence. Ceramics in the subfloor vent and larger, earlier features suggest that there was considerable temporal separation between the two floors. The structure stood unused for a number of years and was then remodeled, which included lowering the floor level slightly. The two floors are numbered 1 for the intact, later floor, and Floor 2 for the removed floor for which subfloor features (including the subfloor vent tunnel) remained.

Above-Floor Ventilation System
The vent to Pit Structure 1 underwent at least one major remodeling when it was changed from a
subfloor to an above-floor system (see Figure 4, which shows both types). Our reconstruction is that there was an earlier vent shaft that was connected to the subfloor system. When the system was changed, a second shaft was built, adjacent to the first one, but away from the pit structure chamber; this is the vent shaft that was in use when the structure was finally abandoned (Figure 5). There is evidence for yet a third configuration in that fill disturbance, and remnants of masonry were noted to the south of the last shaft. This extensive remodeling and the collapse of part of the later vent tunnel makes sorting out the two systems complicated. The later vent shaft was a cobble column placed inside the earlier vent shaft and connecting to the above-floor vent tunnel (Figure 5). The exterior of the shaft is round, but the interior, which was only superficially excavated, was square.

The above-floor deflector was built on a shaped slab placed over the subfloor vent (Figure 3). The slab is trapezoidal, 44.5 and 50.0 cm on the bases, 49 cm in height and 4.8 cm thick, with the sides ground and the bases chipped. This large slab has a ground area on one face measuring 29 by 40 cm and 1.2 cm deep. This area is roughly elliptical with the long axis at an angle to the axes of the slab. The deflector was constructed primarily of more or less flat cobbles 10 to 15 cm in length, and contained seven pieces of ground stone. In addition to the 20 kg (44-pound) shaped basal slab there were five partial manos and a piece of a slab metate. The masonry was plastered over on all faces.

Under this reconstruction, Floor 2 no longer existed at the time of excavation, having been removed with the reoccupation and remodeling of the pit structure that created Floor 1. Contrary to the “law of superposition,” then, Floor 2 was earlier than Floor 1. Floors 1 and 2 were very close to the same level. Judging from the condition of the subfloor vessels that went with Floor 2, the depth of plaster removed appears to have been about the thickness of a culinary jar rim fillet, or between 1 and 2 cm.

**Subfloor Ventilation System**

The subfloor vent tunnel was not completely filled; when the structure floor was cleared, gaps were visible below the slabs covering the feature (Figures 3 and 5).

The vent tunnel was crossed by a number of small lintels consisting of juniper poles 2 to 3 cm in diameter, and one larger piece of wood was placed at an angle to the smaller lintels. The lintels probably crossed the tunnel under the bench as well as within the chamber (Figure 6). The bench collapsed above the above-floor vent, so it is not clear whether the bench had a southern recess notch above the subfloor vent, but there was no indication of such a notch. Since the lintels supporting the slabs were rotten and since the floor was exposed for a while as Floor 1 was recorded, the slabs eventually slumped into the feature. The lintels were also unburned, and unfortunately no tree-ring dates were recovered. The lack of fill makes it seem very likely that the vent shaft connected to the subfloor vent was closed prehistorically, presumably soon after the vent went out of use. The east side of the tunnel was lined with upright cobbles, three of which are metate fragments (one of these is the only basin metate from the site). This row of uprights is more or less aligned with the edge of the vent shaft, but was placed on top of the subfloor vessel (Figure 6). The lining could have had any of a number of functions: a retaining wall for the original vent tunnel, a support for the lintels roofing the tunnel, a modification of the size of the tunnel, or a means of filling the feature and holding up the remodeled floor.

There is some indication that the upright slabs are up to 20 cm from the edge of the trench, and their placement over the subfloor vessel suggests
either remodeling or placement of the vessel as a consecration during construction. The large slab on which the deflector for the later ventilation system was placed may have been a closing slab for the subfloor vent or may have been specially placed during the remodel. In either case, the slab is about where the subfloor vent opening would have been. The subfloor tunnel articulated with a vertical shaft at the edge of the structure. The edges of the tunnel were carefully lined with cobble masonry in addition to the upright slabs.

Marking the Change: The Subfloor Assemblage

The contents of the subfloor vent tunnel were almost certainly ritual deposits, dating to the closure of the feature upon conversion to the above-floor system. These materials include an incised corrugated vessel partially sunk into the floor of the vent tunnel and containing two whole tchamahias (with a third tchamahia outside the vessel), a jet pendant blank, a ceramic pipe, two unworked pieces of jet, a bone awl, and a bone bead tube. The incised vessel was covered with a sandstone pot lid. In addition to the remarkable artifact assemblage there was a relatively large amount of faunal material (Table 1). The faunal material falls into three primary groups: small mammal (37 percent), lagomorphs (31 percent), and turkey/bird (29 percent). The majority of the turkey remains are fragmentary, although about a quarter of them are more than 75 percent present. The age and element distribution within the bird bone implies that a couple of individual birds (one mature and one young mature) could account for the bone in the vent. Placement of “deconsecration” animals (Hill 2000) is not suggested. The mixture of small mammal, turkey, and rabbit elements is more like food waste than a ceremonial deposit. The combination of special

Figure 6. Profile of the east wall of the subfloor vent tunnel showing placement of the cache vessel within the vent below the metate built into the wall of the tunnel.
artifacts and apparently normal refuse suggests a ritual closure of the feature accompanied (or followed) by an attempt to fill it.

The vent tunnel also contained a notable ground stone assemblage: 17 items out of a site total of 102, including grinding tools, two axes (one chipped and one ground), polishing and abrading stones, and shaped slabs (Table 1). Most of the ground stone items are partial, and may have been part of the construction or fill. Grinding implements, while in some ways mundane, also have ritual importance and inclusion especially of whole tools could have had significance.

The vessel containing tchamahias leaves no doubt that the subfloor vent and its closure were a significant place and event and draw attention to the rest of the deposit. Tchamahias are of unclear, and indeed, probably multiple, function (Cattanach 1980:284-285; Ellis 1967; Hayes 1976; Judd 1954:243-245; Larralde 1991; Rohn 1971:247-248; Wenker 1999), but whether weapons or gardening tools, they clearly have special connotation, as evidenced by the great effort expended in their manufacture and in their context here. Given the combination of fine workmanship on special non-local material, special contexts, and yet clear signs of use on some bit ends, I feel it is quite likely that these artifacts were used in special work contexts, such as beginning of the season ritual planting. There is a chip out of the bit of one of the tchamahias, which may be post depositional; otherwise, these three examples are pristine (Figure 7). The axes, complete two-hand trough mano and other mano, and the basin metate could be ritual closure items, more mundane fill, or construction pieces. The nearly complete basin metate was placed in the wall of the vent tunnel adjacent to the cache pot.

In addition to its placement in the vent and its contents, the subfloor vessel is unusual in its own right. The rim has very little eversion, suggesting that it may be a Mancos Corrugated (Pueblo II) vessel, though Dean Wilson (personal communication, 2012) points out that the shape is unusual, and analysts identified the vessel as Dolores Corrugated. Dolores Corrugated is a

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gray ware type with rim eversion intermediate to Mancos and Mesa Verde Corrugated, which is likely to also be intermediate in time of production, that is, intermediate to Pueblo II and Pueblo III, late 1000s to early 1100s (Lucius and Wilson 1981).

The coils at the base of the pot are smoothed. The vessel is sooted, so it is likely that it was used over a fire before being placed in the vent tunnel. It has repair holes, and there are areas where the soot and corrugation are worn, showing its use after cooking. Pendant from and just below the rim fillet, the outside of the vessel has a series of six similar figures from 6 to 12 cm long and some vertical lines incised through the coils before the vessel’s clay was dry (Figure 8). The incised shapes are reminiscent of sandal lasts with the little toe notches to the right. The vessel’s orifice diameter is 11.5 cm, its maximum diameter 21.0 cm, and its height 26.5 cm.

The corrugations on this vessel are very fine (around 11 coils in 5 cm), but the incised figures are crude and haphazard in appearance, and some of the corrugation has been obliterated. The obliterated areas are next to some of the “sandals,” and could have been sandals as well. The difference between the workmanship of the corrugation and the incision suggests that they were done by two different people. The excavator noted that the vessel also contained decayed vegetal material, perhaps corn meal. The vessel was placed so that it was underneath the vent wall,

Figure 7. Tchamahias. a were found within the sandal-incised vessel, b within the subfloor vent. Whole tchamahias are very rare in the project assemblage: there are only six whole specimens of this type in the entire collection.

Figure 8. “Sandal Last” figures incised in subfloor gray ware vessel within the subfloor vent tunnel. There are six of these figures deployed around the vessel below the rim. The height of the figure at the upper left is 82 mm.
and so that it was located beneath the concavity in the metate (Figure 6). Ellis (1967) noted that at Acoma tchamahias were stored in ceremonial jars. Wilson (personal communication 2012) also notes that while the gray clay and the igneous temper are local, the fineness of the corrugation, the smoothed base, the vessel shape and the incising are all reminiscent of Mogollon vessels—yet another aspect of this vessel which would have set it apart.

The association of sandal last forms and whole tchamahias occurs in another provenience on the project. At LA 37598, a site with an early Pueblo III component in the Jackson Lake community to the south (Figure 1), a sandstone sandal last-shaped slab with ground pigment on both faces was found. In the same surface room two whole tchamahias were also found. The rarity of sandal last forms and tchamahias, especially whole ones, make these two co-occurrences remarkable. In the entire project assemblage there is one “sandal last” and there are eight whole tchamahias, only six of which are the “classic” silicified siltstone variety shown in Figure 7. Five of the tchamahias have the sandal association.

A total of four pieces of worked jet were found at LA 37600 (Figure 9). The location of two of these is extremely suggestive: they came from ceremonially closed ventilator tunnels, one from Pit Structure 1 (with two unworked pieces from the vessel containing tchamahias) and one from Pit Structure 7. The fourth piece of jet is a very gracile disk bead from the floor of mealing room Pit Structure 3 (Figure 9e). In Pit Structure 1 of the LA 37599 portion of the settlement, it appears that when a subfloor vent was converted to an above-floor vent, the subfloor tunnel next to the hearth became an ash receptacle. This ash pit is one of two proveniences in the project that contain multiple pieces of jet—two ornaments and one piece of debris were present there. Because of this occurrence and the jet found in the LA 37600 Pit Structures 1 and 7 closed vents, there seems to be an association of jet with closed vents. As in the case of tchamahias and sandals, this association is, of course, not massively supported, but once again very rare items are associated, and the occurrence is suggestive.

Completing the remarkable assemblage, the intact white ware pipe or cloud blower found in the vent tunnel (Figure 10a) is also a rare form with ritual implications. The fact that it was complete once again suggests intentional placement of a highly significant artifact as part of the transition in ventilator design. A very similar second pipe (Figure 10b) was present in the roof fall fill of the structure. Other uncommon items in the vent tunnel include a bone tube bead and a small awl on which the open olecranon fossa forms a threading eye (Figure 11).

**Venting: An Important Cultural Symbol**

Part of Pit Structure 1’s complex history is a change from a subfloor ventilation system to
an above-floor one with ceremonial closure of the subfloor vent. It is clear that there is a sequence in pit structure construction in the two structures at LA 37600. First was Pit Structure 2 in the 1030s, built with an above-floor vent. Pit Structure 2 was used, perhaps through the 1040s, abandoned apparently without closure ritual, but burned, an unusual practice for pit structures of this era in this area. The depression appears to have filled mostly naturally, with little activity in the vicinity for some years. Next, probably in the 1060s, Pit Structure 1 was built with a subfloor vent and elaborate masonry vent shaft; it is large and complex enough that any traces of a simpler precursor were removed (Figure 5).

After some hard-to-specify time—perhaps 10 to 15 years—Pit Structure 1 was remodeled with pilasters and an above-floor vent tunnel. The somewhat unusual roof support system put in place in Pit Structure 1 was very much the same as that in Pit Structure 2, consisting of four posts placed butt end up cut into the face of the bench with the upper part of the tree pointing down and projecting below the level of the floor. The similarity of this roofing system in the two structures is strongly suggestive that the builders were the same or the same family, even though there is likely to have been a break in time between the these features in the two structures. Masonry use was very extensive in Pit Structure 1 in complete contrast to Pit Structure 2, which had virtually no masonry. Differing masonry types suggest multiple workers in Pit Structure 1, probably over a span of years.

Existing pit structure typologies (Lekson 2007:18-25; Lipe 1989:58; Vivian 1965:12-13, 21-23 and 1990:162, 230) define “Chaco kivas” as having horizontal log pilasters, a notched bench recess, and a subfloor ventilator. Mesa Verde or San Juan kivas are defined as having a larger, more formal recess, taller, usually masonry, pilasters, and an above-floor ventilation system. Clear examples of the “Chaco kiva” features are shown in the Kin Kletso Report (Vivian and Mathews 1965:46-47). While “kivas” of both types (but see Lekson 2007:18-22 on the use of this term) occur in both areas, and the differing styles are surely to some extent temporal rather than an areal, this redefinition from one style to another in Pit Structure 1 implies a change of some magnitude. I can imagine scenarios of symbols evolving and fading, being replaced, and then being reestablished concurrently.
with sociopolitical religious groups. Vivian (1965:23) notes a similar mixture of kiva styles in Chaco at the Three-C Site. In reviewing the same phenomenon, Toll, Newren, and McKenna (2005) argued that this variety of architectural styles in Chaco sites is further evidence that the users of Chaco were diverse and variable, as well as temporary in their presence in the canyon.

In spite of the great attention to the ventilator, LA 37600 Pit Structure 1 did not replicate a “Chaco Round room” in all aspects. At 1.1 to 1.2 m high, the bench is higher (Lekson gives .5 to .8 m for heights); there is no indication that horizontal log pilasters were ever present; and the structure diameter is smaller (4.1 m versus a minimum of 6 m). Ventilator style and placement were clearly important social markers throughout the Pueblo world to their builders, and hence to archaeologists. Thus, the long-standing tradition of pit structures with east-oriented vent complexes and no recess in the northern Rio Grande contrasts with the equally well established traditions of south-oriented pit structures on the Colorado Plateau (Boyer et al. 2010:297-301; Lakatos 2007). Wiseman (2008:234-236) notes how ventilator and wing wall style are markers of Gallina traditions.

The way in which the ventilator transition in LA 37600 Pit Structure 1 is marked shows that the change was a significant one for the users of the structure, whether they were the same people—and the time span suggests they could have been—or a change of people remodeling and using the structure. We know that change and movement were constants throughout Pueblo life. Do these vent styles represent political and religious shifts within this one community, as the archaeological labels “San Juan Kiva” and “Chaco Kiva” suggest? Of course, I don’t know the answer to that question, but I like the dynamism within cultural tradition that it represents. In describing a single provenience and process I’ve noted some co-occurrences of rare items: tchamahias and sandal forms, jet and redesigned ventilators. To quote Reg Wiseman (2008:249), while “the limitation imposed by our sample cannot be overstated, it is nonetheless interesting.”

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Acknowledgments
I would like to remember Alphonso Benally, William Sarracino, and David Bunker, all of whom worked at this site and have since passed away. In addition to thanking them for their work, I thank the rest of the crew at LA 37600, Nancy Warren for her artifact photographs and for developing all those site photos, and Scott Jaquith and Rob Turner of the OAS for their help with the figures. Excavation of LA 37600 was done under contract with the New Mexico Department of Transportation.

Notes
1. Totah is a Navajo word that means “where the rivers come together,” clearly a place of significance in an arid land. This five-letter word with deep roots in the area refers to the area of the confluence of the Rios Animas and La Plata with the Rio San Juan. It thus includes the Salmon Ruin, the Aztec complex, the La Plata Valley up to Morris Site 41 and into Colorado, and down the San Juan to the Hogback (McKenna and Toll 1992). Consulting with Vernon Foster of Tohatchi confirms that this understanding of the term is in concordance with Navajo usage (personal communication, 2012).
2. The dates 1064vv and 1065rB are given in the Laboratory of Tree-Ring Research notation. On the Christian calendar they translate to A.D. 1064 very variable, meaning that the outermost ring of the specimen is variable and the date could be later; 1065rB is A.D. 1065 with complete outer ring and beetle galleries, which is a very secure date.

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Excavations at Old Fort Sumner, 1968-1969

JOHN P. WILSON

Introduction
★ BETWEEN OCTOBER 31, 1862 and the end of August 1869, old Fort Sumner on the Pecos River was one of New Mexico’s largest military posts. The adobe buildings there, about seven miles south of modern Fort Sumner, served as the administrative center for a Mescalero Apache (until late 1865) and Navajo Indian reservation (Figure 1). The troops guarded an average of about 7,000 Navajos until the summer of 1868. Two months after signing a peace treaty on June 1, 1868, the Navajos returned to their old homeland and the military post lost its reason for existence. The site continued as a ranch until the depression of 1893-1894, after which the buildings were salvaged and the adobe walls demolished or allowed to sink into ruins.

When the Belen cutoff of the Santa Fe Railroad came through in 1906, people had already begun to move up to Sunnyside, today’s Fort Sumner. Farmers plowed the valley while the Pecos River cut to the east, destroying nearly everything west of the old parade ground. In 1965, the De Baca County Development Council, Inc. was formed with attorney John Humphrey Jr. as its chairman, and efforts to acquire the fort location and present it to the State of New Mexico began.

In 1967, the Fort Sumner Village Council bought 50 acres of land here and donated the acreage to the State, with the object of developing the site as a state monument. Only a few acres next to the river had been left unplowed and traces of adobe walls could be seen there. The original proposal involved excavation of the last remaining structure with outlines completely intact—a U-shaped barracks at the south end of the buildings along the east side of the parade ground (Figure 2). At the time, it was thought that this might be reconstructed as a visitor center. Archaeological excavations at the old fort site began July 12, 1968, and field work concluded on November 4 for that year. The present writer directed these efforts with Regge Wiseman as his most capable assistant from August 13 until September, when Regge left to return to college. In 1969 the field season started on June 23, again with Regge as assistant, and concluded at the end of August (Figure 3). In both years, Neighborhood Youth Corps boys provided the labor force until their school started in the fall. Local men were hired to complete the season in 1968.

Many people in Fort Sumner and Santa Fe aided during the field work and later. At Fort Sumner, Mr. John Humphrey Jr., Lee Rosenberger, Mary Moore, and others all gave valued assistance. Ms. Anne Fox brought her sons Chris and Robbie from Texas and joined for a week in August 1968. During the 1968 season, a series of 14 weekly progress reports appeared in the De Baca County News (Wilson 1968). Some 43
Figure 1. Location of Fort Sumner.

Figure 2. General Getty’s map of Fort Sumner, 1868.
years later, Cordelia Snow, Lou Haecker, Julia Clifton, and Allison Colborne of the Laboratory of Anthropology helped make the old records available.

**The Excavations**

There had been three barracks buildings at the post, and the main effort both seasons was in excavating the one with its outlines intact. This structure, except for one of the front or “squad” rooms, was excavated in 1968, together with the latrine trench directly behind it. In 1969 the remaining squad room was cleared and the portico or porch area adjoining on the west side of the building was outlined carefully, while a second latrine trench and a post-1870 storage cellar near the river bank were similarly uncovered. With the archaeological work completed, all of the rooms and trenches were backfilled (Figure 4).

**Uncovering the Barracks**

Army specifications for the period depicted a U-shaped barracks building as having two large “squad” rooms along the front and two wings leading off at right angles, housing a company of 100 men. The two main rooms at Fort Sumner each measured 14.54 by 5.64 m (49 by 19 ft) with an entrance hallway some 5.79 by 3.26 m (19.5 by 11 ft) situated between them. The four rooms in the north wing, as identified from a contemporary plan, provided the First Sergeant with a relatively commodious space of 5.93 by 5.93 m (20 by 20 ft) and the company laundresses with three smaller rooms, 4.45 by 5.43 m and 3.86 by 5.93 m (15 by 20 and 13 by 20 ft). The south wing included the company mess room, 8.90 by 5.64 m (30 by 19 ft), a kitchen 5.93 by 5.93 m (20 by 20 ft), and a store room 5.93 by 4.45 m (20 by 15 ft). The overall length and depth of the structure...
came to 34.72 m by 27.30 m (117 by 92 ft), which was considerably smaller than the scaled plans suggested. The eastern end of the south wing is shown in an 1864 photograph, behind the two guards (Figure 5; also Wilson 1974:8).

The barracks excavation turned out to be the most challenging project this writer ever experienced. Defining its walls, floors, and fireplaces were beyond the abilities of our labor force, and much of the close work had to be done by the archaeologists. There were no foundations, and rarely any remnants of white plaster on the walls. The journal entry for one room, on August 1, 1968, read “There is no difference in color, hardness, or anything else that one can see or feel between fill and wall.” This applied to all of the barracks rooms, and some wall fireplaces could only be approximated. The upper room walls had been pushed over during demolition and adobe bricks in profile constituted much of the upper fill. Defining where these stopped and the remnants of walls in place began required great care. Exterior walls were generally two adobes in width, with some interior walls only one adobe wide. Doorways from rooms in the two wings opened into the enclosed patio. The two squad rooms were entered only through the central entrance area.

Remnants of poorly defined fireplaces partially set into the interior walls of the front squad rooms and adjoining rooms could be traced in part. Side-wall fireplaces in adjacent rooms had been set back-to-back with a single flue. A hard clay substratum formed the floors and at places it was seen that the base of the walls actually lay in a shallow trench, cut 15 to 20 cm (6 to 8 in) deep. Postholes in some rooms, including one squad room, suggested the use of large props to support a sagging roof. Numerous small sheets of white plaster found beneath the fallen wall
adobes showed that the interior wall surfaces had been finished with lime plaster. Only a few small patches of plaster remained in place. No remains of the original roofing beams or vigas, or of door and window frames were found; any usable wood had probably been carted off in the 1890s.

Nothing about the building or its contents indicated any structural modifications or even use by the ranchers who followed the military occupants. Very little cultural refuse was found in the room fills or on the floors, and all of this could belong to the military occupation. Most objects were small and broken; anything usable seems to have been removed prior to final abandonment.

Animal bones were the most abundant cultural debris, and a final report on these may be read in Olsen and Wilson (1976). Next in frequency came iron nails and heavily corroded iron artifacts such as horse and mule shoes, chains, and fragments of bars and straps. Other items included bottle and window glass, occasional white earthenware sherds, and bullets for military weapons of the middle 1860s.

In 1969 a considerable effort was made to define what was called a portal area adjacent to the front side of the excavated barracks. Here, a line of squared beams lay parallel with the front wall and about 2.37 m (8 ft) from it; these appeared to mark the limit of the portal or porch-like feature. They had been placed in the hard clay substratum at about the level of the room floors. Vertical posts once rested on these beams and supported a porch roof. Stratigraphy adjacent to these beams showed two

Figure 5. Building under construction, ca. 1864. View looking west, south wing of the excavated barracks on the right. National Archives image, used by permission of the Palace of the Governors Photo Archives, negative number 01816.
intervals of deposition due to flooding: one flood had left a deposit of sand; the layer above consisted of several inches of river gravel. Contemporary photographs of Fort Sumner included views of such portals (Thompson 1976: 113, lower; 114, lower; 117, upper).

The Latrine Excavations
Two latrine trenches, Latrine 1 (Feature 10) and Latrine 2 (Feature 16), lay behind the barracks row. One of the National Archives photos of Fort Sumner ca. 1864 featured the same two privies or “sinks” when they were first built—small adobe buildings about 2.97 m (10 ft) square and 2.67 m (9 ft) in height, with flat roofs, a door on the west side and a window in the north wall (Figure 6). The small pens that adjoined them in the photograph were not explained.

These privies lay in what later became a plowed field east of the old barracks; cultivation has destroyed every trace of the superstructures. The vaults were excavated in hopes of recovering complete artifacts for eventual display. Both trenches proved to be rectangular with sloping sides. Latrine 1 measured 3.35 m (11 ft) by 1.83 m (6 ft) at the top and the four sides sloped down to a flat bottom 2.28 m (7.67 ft) long by .69 m (2.33 ft) wide, at a depth of 1.28 m (4.33 ft) below the base of the plow zone. Latrine 2 was somewhat longer, wider, and had steeper sides. Both vaults were unlined.

The decomposed material in the latrines was concentrated in the depths of the fill but also adhered to the sides, showing that the slope was present originally and not the result of erosion. All of the complete and reconstructable artifacts recovered came from the greenish-yellow deposits and belonged to the fort period. This level had been covered over by a reddish clay in the fill, evidently by intention, and at some later time water-deposited river gravels filled the balance of the depression.

Figure 6. View looking southeast at two latrines in rear of barracks, Quartermaster corrals and wood yard beyond, ca. 1864. National Archives image, used by permission of the Palace of the Governors Photo Archives, negative number 001815.
Both latrines contained many complete and restorable artifacts plus objects that had partially disintegrated. Among the latter were wadded newspapers (i.e., toilet paper), a few tin cans and smoking pipes, and some remnants of boots. Animal bones, small pieces of window and bottle glass, and dozens of small (ca. 1 cm diameter or less) shell and porcelain buttons were also recovered. Some of the porcelain buttons exhibited calico designs printed on one surface (Figure 7). Unfortunately, an unknown number of such buttons had been washed and the designs removed before it was realized that these were patterns, not simply stains or discolorations. Military historian Gordon Chappell (personal communication, July 2012) concurred that these buttons had probably popped off the soldiers’ long johns while the latrines were in use, or perhaps came from the soldiers’ gray undershirts. Apparently, no published references to these are known. Much rarer were brass military buttons, cartridges, and bullets datable to the Civil War era.

**Artifacts from the Fort**

In each latrine the most prominent finds were glass bottles, nearly all of them complete, a few restorable. Latrine 1 yielded 32 glass containers, Latrine 2 a total of 24. Of the Latrine 1 specimens, half were what bottle catalogs term Prescription Ware—druggists’ packing bottles (Figure 8b), round prescriptions, Philadelphia ovals, ginger ovals, etc., but no panel bottles. Most were aqua; two light green examples bore the initials J.N. on the base. One oval prescription had “Peter T. Wright & Co. Philada” embossed on it, another “Heintzelman’s Ess. of Jamaica Ginger Philada.” A light green whittle-marked bottle displayed “E.R. Squibb.” There were 10 wine and liquor (brandy, bourbon) bottles of various styles (Figure 8d) but none of the quart export beer bottles so ubiquitous at later forts (Wilson and Caperton 1994:56-76). A ginger beer bottle found near the bottom would have come from England, and a thin amber glass liquor type
marked “W. McCully & Co. Pitts. Pa.” on the bottom may have been a very early beer bottle.

Of particular interest was a light green cylindrical wine bottle with cork in place, neck downwards, about two-thirds filled with what smelled like kerosene. In 1969, a sample submitted to the Houston Research Laboratory of the Shell Oil Company led them to conclude that this sample of kerosene was distilled using a rather crude pot still from a Pennsylvania crude oil (Wm. A. Bailey, Jr., Research Director, to John P. Wilson, personal communication, July 18, 1969).

Three three-sided clear glass cathedral style bottles may have held pickles, pepper sauce, tamarinds, honey or other condiments, to judge by the labeled containers recovered from the steamboat Bertrand, sunk in 1865 (Switzer 1974:50-60). A fluted prescription and an oval cologne perhaps contained cologne or toilet water. An octagonal ink bottle of aqua glass bore a pontil scar, otherwise rare (only four from Latrine 1) on bottles from Fort Sumner. Figure 8(c) is a clear pressed glass drinking or bar glass with nine flutes.

The Latrine 2 glass containers appeared to be contemporary with those from the other latrine, but were more varied in form. Nine Prescription Ware examples included two square-shouldered wide-mouth round prescriptions and two plain ovals, one marked “F. Brown’s Ess. of Jamaica Ginger Phila.” Others were round prescriptions, and a single Madison panel with three sides recessed had raised vertical lettering on the sides that read “…LL” “Extract of Sarsaparilla” and “Louisville Ky.”

Nine Perfumers’ Ware and Toilet Water forms from the second latrine included four oval colognes, all plain, and three oblong toilet water containers, square with chamfered edges and lettered “Barnes Magnolia Water P.H. Drake Y Cia. Nueva York” within a flattened oval on one side. The oval colognes were cylindrical and, like the others, of clear glass. A desk ink well had two concentric round sections, one with a horizontal vine motif cut into the glass. The cylindrical champagne catsup example bore a graphite pontil mark and raised lettering: “Shriver’s Oyster Ketchup Baltimore.” A Worcester or club sauce form had “Cumberland Sauce” lettered around the shoulder and “Fithian & Pogue” and “Bridgeton N.J.” down the sides.

The four wine and liquor bottles were most interesting. One was a light green cylindrical wine bottle 12 in high, with a kickup, identical to the one with the kerosene in Latrine 1 only empty. Another was a brown glass standard brandy form, perhaps another early beer bottle (see Figure 8d). A brown glass liquor bottle of unknown type had oval front and back sides with a raised strip on both edges. Raised lettering along these edges read “J.H. GARNHART” and “ST. LOUIS. Mo 1864.” The 1864 is hopefully the year date when the bottle was blown. Finally, a plain schnapps specimen, light green and square with chamfered edges, exhibited raised lettering on three sides: “UDOLPHO WOLFE’S” “SCHIEDAM” and “AROMATIC SCHNAPP’S.” The original contents are obvious.

Unfortunately, when records were reviewed in early July 2012, only two bottles could be located in the Archaeological Research Collections. The other 54 may be among the historical materials curated at the Palace of the Governors. Time was lacking to determine their whereabouts and the information given here is drawn from an inventory and analysis done around 1970.

Overall, all but a few of the pharmaceutical containers were probably purchased from the post sutler and disposed of when emptied of their contents. The bottle with the kerosene had obviously seen reuse. By way of comparisons,
the contemporary collection from the steamboat *Bertrand* was mostly limited to ales, wine, whiskey, bitters and other intoxicants, sauces, and condiments (Switzer 1974). The first years of Fort Selden, New Mexico overlapped the timespan of Fort Sumner, and Prescription Ware forms from the hospital latrine at Fort Selden matched their counterparts from Fort Sumner quite closely (Wilson and Caperton 1994:78-83). This is unsurprising because most of these would have come from U.S. Army medical stores.

Restorable ceramics from the latrine vaults amounted to a single refined white earthenware bowl, undecorated, from Latrine 2 (Figure 8a) and two similar bowls with two blue bands around each, found in Latrine 1. Besides fragments of ginger beer bottles in the north squad room, the only other interesting ceramics appear to be fragments of a blue transfer-printed bowl in the fireplace of the kitchen and numerous pieces of refined white earthenware with hand-painted floral motifs in the fill of the same room. All of these ceramics probably originated in England; the heavy white ironstone so common on later nineteenth century sites was completely absent in contexts dating to the Fort Sumner period.

**A Stone Foundation and a Storage Cellar**

On the opposite (west) side of the parade ground, part of three sides of a crudely-laid stone foundation lay exposed on the surface (Figure 4). By the dimensions it is unlikely that this structure related to the fort; perhaps it dated to the ranching period or even more recently. The foundation was not explored.

Just north of this foundation, testing uncovered a subterranean room of some kind. A considerable portion of the 1969 season was devoted to excavating this and even screening the fill, which proved to be a miscellany of bottles, old boards, metal trash, and debris of every kind, with no stratigraphy. The sides of the room were lined with adobe brick walls and the east side had a doorsill and partial door jambs at the bottom of what had been a board stairway that led up to the ground surface. It was eventually decided that this had been a post-1870 storage cellar, later filled with debris dating from the 1880-1900 period, with some admixture in the upper 2 ft of fill from as recently as the 1930s.

After 1969, the New Mexico State Legislature appropriated $40,000 for the construction of a visitor center building at the fort site. This was located north of the excavated barracks and designed by Mr. William Lumpkins, a prominent Santa Fe architect. The objective was to create a center with quarters for a monument staff person and a larger room for exhibits. The design, contract letting, and construction were all accomplished in a very short period, and the dedication was held in August 1970. A layer or two of new adobes on top of the old barracks walls served as a stabilization measure, and Fort Sumner State Monument opened to visitors that year.
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<td>Forward Into the Past: Papers in Honor of Teddy Lou and</td>
<td>2002</td>
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<td>2003</td>
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<td>Ever Westward: Papers in Honor of Elizabeth Kelly</td>
<td>2004</td>
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<td>Southwestern Interludes: Papers in Honor of Charlotte J. and</td>
<td>2006</td>
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<td>2007</td>
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<td>Chasing Chaco and the Southwest: Papers in Honor of Frances Joan</td>
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<td>2011</td>
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</tr>
<tr>
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<td>2012</td>
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<tr>
<td></td>
<td>Papers in Honor of Carol J. Condie</td>
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</tbody>
</table>

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<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1993</td>
</tr>
<tr>
<td>2</td>
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</tr>
<tr>
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<td>2003</td>
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<td>S. R. Durand, editors.</td>
<td></td>
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<tr>
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<td>2010</td>
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<tr>
<td></td>
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<td>jointly with the Bureau of Land Management as New Mexico BLM</td>
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