Enduring Curiosity, Generous Service

PAPERS IN HONOR OF SHEILA K. BREWER

Edited by

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---Preface---

It is our pleasure to have nominated Sheila Brewer as the annual volume honoree. We met Sheila through her participation in numerous activities of the Archaeological Society of New Mexico. Over the years we learned just how modest she is even though she has spent innumerable hours on many projects and made many contributions to archaeology. She was a crew member, crew chief, and photographer during the excavations at the Vidal Site (LA 16254). She was a member of the ASNM Board of Trustees and participant in the Heaton Canyon Survey with Betty Kelley—all these activities while teaching in the Gallup-McKinley County school system. She is so quiet and self-effacing that many were not aware of the extent of her activities, but we already knew that she is always willing to help with any project. As we read over her autobiography, we learned that her family enjoyed the outdoors and that her mother was very interested in archaeology. Sheila continues that tradition, not only with her work on the Vidal Project and Heaton Canyon survey, but also with her nearly single-handed documentation of the rock art of El Malpais and assistance at the Bureau of Land Management Ranger Station there (see chapter by Brewer and Obenauf in this volume).

A volume honoring Sheila Brewer is long overdue. She has earned ASNM certifications in archaeology and rock art survey. She has been recognized by the Bureau of Land Management. Yet these accomplishments do not fully recognize all the energy and devotion that Sheila has donated so willingly to both the natural sciences and archaeology. We look forward to learning more about Sheila’s ongoing contributions as she continues her work with the Arizona Sonora Desert Museum in Tucson.

—Helen K. Crotty and F. Joan Mathien
Enduring Curiosity, Generous Service

SHEILA K. BREWER

I was born on April 10, 1940 in Arvada, Colorado, the youngest of Harold and Shirley Parker Brewer’s five children. Harold Wendell Brewer was born in Aztec, New Mexico Territory in 1906. His family, including my great-grandfather, Charles Greer Brewer, great-grandmother, Hannah, and teenaged future grandfather, Truman Prudy Brewer, came from Penn Yan, New York by train to Saint Louis and then by wagon train to New Mexico in 1882. My great-grandfather had been working at the Reno Gas Company where an industrial accident left him with damaged lungs. They were advised to go west so his lungs could heal in the dry, clean, warm, fresh air of New Mexico. They settled near Aztec on the San Juan River at the mouth of Blanco Canyon on a 160-acre homestead under the Homestead Act of 1862. They built a house and made the required improvements to the land to successfully prove up, and were granted title to their land. I have a picture of a field with a wooden fence around it and haystacks in the field. Eventually, though, they had too much trouble with the San Juan River flooding them out, so they moved into Aztec. In Aztec, my great-grandfather and grandfather went into construction, brick making, and blacksmith work. There are several buildings in Aztec that were built by my great-grandfather and grandfather from bricks that they manufactured themselves, including the old courthouse, the Methodist church, Odd Fellows Lodge, American Hotel (now Aztec Hotel), Brewer Mercantile, and several homes.

My mother, Shirley Parker Brewer was born in 1909 in Wellington, Colorado. Her grandfather, a Methodist minister, came over to the United States from England and settled in Malvern, Iowa. His son (my mother’s father) was a farmer who was elected to the Malvern school board. My grandmother was a teacher hired by the school board, so that’s how they met! They were parents to seven daughters, two born in Malvern, and five born in Wellington (near Fort Collins). My mother was the first one born in Colorado. They moved to Colorado in 1907 as part of a railroad program to bring farmers to settle the area. The railroad loaded all their possessions, even including wagons and farm equipment, onto a freight car to take them to their new farm. My mother was raised on that farm, and lived there until she went to college. She developed an interest in archaeology while walking over the plowed fields of the farm, finding and picking up arrowheads and other artifacts left by the Indians of that area and finding tepee rings near the farm. She went to college at Colorado A & M (now Colorado State University). She met Harold when they were both members of the college hiking club. She had a lifelong love and interest in archaeology which stimulated my own interest. Her favorite memory was going on a week-long trip in the 1930s, led by the archaeologist Dr. Etienne B. Renaud, to the shores of a glacial lake near Ft. Bridger, Wyoming. They picked up stone artifacts from around the ancient lakeshore, a few of which I still have. At the time, they thought the artifacts were from a very early human migration into the area but now archaeologists believe they are more recent seasonal vegetal procurement sites. My mother talked about that expedition the rest of her life and it was one reason she was a long-time member of the Colorado Archaeological Society.
As I said, Harold and Shirley were the parents of five children. There were two of us girls and three boys. My sister was the oldest, followed closely by two boys. Four years later came another boy and then, two years later, me. So the older three made up one set of kids that played together, and my youngest brother, Lynn, and I were like a second set of kids, and we did everything together. My sister was nine years older than I, and it wasn’t until we were adults and finally had interests in common that we became good friends. Of the boys, I have always been closest to the youngest, my playmate Lynn. We lived on the edge of town in Arvada and had dogs, cats, rabbits, and a huge garden (Figure 1). When I was five, my family moved to Fort Collins, Colorado. Grammy and Grandpa Parker lived five blocks away and I walked or rode my bicycle over there often. There were lots of kids in the neighborhood to play with, and we rode bicycles all over town. The Galloping Goose trolley went right in front of our house, and we could ride it to the city park lake to go swimming (except during polio scares!). I was already headed toward a career in biology—some of my favorite activities were chasing bugs and watching birds. Grammy and Mom often went to the sale barn to get chickens or rabbits to butcher for dinner. Even there right in the middle of town Mom always had a giant garden. I lived with my grandparents my senior year of high school when my mother took a teaching job over a hundred miles away in Sterling, Colorado. Later, while I was still in college, she taught elementary school in Red Feather Lakes, Colorado. There were grades one through eight in a one-room school, and she had to do everything—teach, make the fire, shovel the walks, and clean the school!

I graduated from Fort Collins High School in 1958 (Figure 2) and from Colorado State University in 1961 with a B.S. in biology and a minor in geology, along with a teaching degree in secondary science education. I received a Master of Arts for Teachers in 1963 from CSU before I began teaching. I always loved nature and the outdoors from my earliest childhood, and even through high school and college spent many hours watching and studying animals, plants, clouds, stars, and rocks.

I started my science teaching career in the Gallup-McKinley County Schools in 1963 (Figures 3 and 4) and retired from teaching in 1992 after 29 years of teaching biology, geology, and physical science to mid-school students and eventually high school students. I enjoyed teaching and especially interacting with my students. I started a science club. We took weekend trips around Gallup; many were overnight camping trips with parent chaperones. One night we were camped out at McGaffey Campground southeast of Gallup. The kids were eating popcorn in one of their tents when I heard a blood-curdling scream. Some skunks had smelled the treat and come to get their share! All of the kids ended up in one tent and left the other for the skunks. I took two different groups of kids

![Figure 1.](image-url)
to the Grand Canyon. Both times we hiked all the way to the bottom. One trip was over Spring Break, and we hiked down in mud, and up in snow.

As a member of the National Education Association (NEA) of New Mexico, I became involved in a class action lawsuit: Brewer, et al. v. Southern Union Gas Company, et al. This lawsuit went on from 1979 to 1986. I was the named plaintiff since alphabetically my name was the first of all the plaintiffs. NEA-NM was concerned that school districts were unable give teachers a raise in salary since the utilities costs kept going up so high. The NEA-NM lawyers who investigated found evidence of price-fixing. It was an interesting sight to see our three lawyers up against over 30 lawyers from the gas producers and supplier. The suit was settled, with 76 million dollars going to natural gas consumers in New Mexico for over-payments on their natural gas bills. Southern Union Gas had fixed the price to be paid to the San Juan area producers at the highest price paid for the natural gas, not the lowest. They got away with this until our suit since the higher price was passed through to the consumers to pay and nobody noticed. Eventually the school districts also sued Southern Union Gas Company and won another settlement to reimburse the school districts for the higher price they had paid for natural gas.
I became a member of the Plateau Sciences Society (PSS), an affiliate of the Archaeological Society of New Mexico (ASNM), in the 1970s. I have held all of the elected positions in PSS at one time or another, along with being on the board of directors. We had lectures on many subjects, including archaeology, and took many interesting field trips to places like Chaco Canyon, Hopi, Zuni, Sedona, and the Flagstaff volcanoes. PSS has hosted the ASNM Annual Meeting in Gallup several times. Probably the most memorable time was in the early 2000s when we took the participants to Zuni to visit the Village of the Great Kivas and the Seven Cities of Cibola.

PSS was the local sponsor of the ASNM Field School at the Vidal Great Kiva Site in Gallup. I first became involved in ASNM when I joined the Field School at the Vidal Site (LA 16254) from 1983 to 1993 (Figure 5). I started out as a crew member and as the years progressed I worked up to crew chief and finally photographer. I participated in the ASNM Certification program during the years at the field school. As of now, I have reached the Certified Archaeological Technician Level.

During the off-season I helped with the survey of Heaton Canyon with Betty Kelley (1983-1989). We found over 100 archaeological sites, of which five were rock art sites.

When I was the photographer for the field school, the city of Gallup sent a cherry picker so we could take a picture of the entire great kiva from above (Figure 6). It was fun to ride up in the bucket of the cherry picker and take a good picture of the entire kiva. Prior to this, we had tried a hot air balloon but it went up and away so fast that we didn’t get many good pictures of the kiva. Bill Sundt also tried a bipod to get pictures of the east half of the kiva. This method took a long time to set up and it was hard to use the camera. Bill had to raise the camera and take one picture and then lower it to reset the shutter between pictures.
During most of the years of the field school, I was the rattlesnake wrangler because of my background in biology. I would scoop the snake up with a shovel into a bucket and carry it away for relocation close by (but not too close). Besides snakes, I removed toads, “child-of-the-earth” crickets, scorpions, mice, centipedes, and black widow spiders when necessary.

Betty Kelley and I are the only people who ever obtained a Certified Field School Slave classification from ASNM. The overburden had been cleared from the eastern half of the kiva by backhoe. But the year the field director, Dick Bice, decided to open the west half of the Great Kiva after finishing the east side, it was our job to get the overburden off the west side. We really moved a lot of dirt that year to get the west side ready for the field school the following year!

After the field school was over in 1993, several qualified and interested people worked in Gallup on classifying and coding the artifacts excavated from the Vidal site. I took the coded information and entered it into the computer. Dick Bice in Albuquerque then used that information for the report. Whenever Dick needed pictures or information about the artifacts (which were stored at Red Rock State Park in Gallup), I took photos or sent him more complete information. I also wrote the chapter for the Vidal report on Natural Resources and Environment and helped with the photos for the chapters on lithics and special artifacts, such as turquoise, gaming pieces, copper bells, bear claws, pendants (including a calcite bear claw), and beads. Dick was unable to finish the report, and now Joan Mathien is leading the effort to complete it. She has asked for revisions to my chapter so now I’m working again on a project that I thought I had finished 20 years ago!

Betty Kelley and I watched over the Vidal specimens at Red Rock State Park until they were moved to the Hibben Center in Albuquerque a couple of years ago. Betty and I helped pack them for their move to Albuquerque, and then I helped Karen Armstrong’s curation crew at the Hibben Center to organize the specimens to get them ready for storage.

After retiring from teaching, I volunteered for the Bureau of Land Management (BLM) at El Malpais National Conservation Area and the National Park Service (NPS) at El Malpais National Monument near Grants, New Mexico. I ran the BLM Information Center for Visitors (Ranger Station) on NM 117 every Friday for 20 years. In addition to working on plant identification books, I conducted a Rock Art Survey and Recording Project in El Malpais from 1995 to 2007. I took a rock art seminar with Jay and Helen Crotty in 1989 and attended the Arizona Rock Art School during the summer of 1995. With information from old site forms, reports of people who had seen rock art sites, and from hiking the area, I located and recorded 87 Rock Art Sites and 17 Graffiti/Historic Sites on BLM land and seven Rock Art Sites and 11 Graffiti/Historic Sites on NPS land. I was helped by federal employees and various volunteers, especially Mary Raje and Marge Allen. I received the 2001 BLM National Volunteer Award–Making a Difference on the Public Lands at a ceremony in Washington, D.C. This award was in part for compiling the notebooks with photos and information about the plants in El Malpais, as well as for my long service at the Ranger Station and the rock art project.

Aside from these long-term volunteer projects, I also worked on several week-long Passport in Time archaeology projects over the years sponsored by the USDA Forest Service in California (site survey), Utah (museum curation), Arizona (site excavation), and New Mexico (data organization).

I was a member of the ASNM Board of Trustees for four terms (1989-1994 and 2000-2006) (Figure 7). During the early terms, I was the chairman of the committee for selecting the recipients for the Honoree Volume and the Archaeological Achievement Award and during the third term, I served as the Chairman of the Scholarship...
I am still on the Certification Council and the Scholarship Committee. Now I am an advisor to the Board of Trustees.

I joined the Northwest New Mexico Geology Club based in Grants in the 1990s after I learned about the group from Mary Raje. We took many field trips each year to various areas of geological interest. Some of the more interesting and unusual trips in New Mexico were the Aztec Arches, the active travertine springs in Ojito near San Ysidro and the Travertine Quarry near Belen, and the Kilbourne Hole near Las Cruces. Others included the Wheeler Geologic Area near Creede, Colorado, the volcanoes in Arizona and Hawaii, Comb Ridge near Bluff, Utah, Kartchner Caverns in Arizona, and the Alibates Flint Quarry near Amarillo, Texas.

I was an active member of New Mexico SiteWatch from 2008 until I moved to Arizona in 2013. Mary Raje and I watched over a historic lime kiln site and six prehistoric archaeological sites for the Forest Service and three rock art sites and five structural archaeological sites for El Malpais National Monument. I received the SiteWatch David Mathews Award in February 2009.

I would like to thank everyone who aided me in becoming an avocational archaeologist. My first contact at field school was my crew chief Betty Kelley. Dick Bice, Bill Sundt, Phyllis Davis, and Regge Wiseman were the people who gave me a good start with learning about all aspects of archaeology.

The ASNM Certification Program at the field school allowed me to learn and develop as a field archaeologist. The hands-on experiences during excavation in the field, in the lab, and during seminars helped to enrich my archaeological knowledge. The contacts with established archaeologists like Regge Wiseman, Doug Brethauer, and Gordon Page broadened my understanding of archaeology.
Working with Dick Bice, Bill Sundt, Betty Kelley (all of whom reached the ASNM Certified Field Archaeologist level) and Phyllis Davis (who, like me, reached the ASNM Certified Archaeological Technician level) helped reinforce archaeological concepts.

Learning from knowledgeable people in the field like Robert Weber (lithics), William Turney (survey), Stewart Peckham (ceramics), Jay and Helen Crotty (rock art), Joan Wilkes (archaemagnetism), and Sylvia Abeyta (pottery making) added to my knowledge. I learned from other participants in the field school about various aspects of archaeology and about their experiences at the archaeological and rock art sites in their home areas. All of these people and experiences molded me into an avocational field archaeologist.

I moved to Tucson, Arizona in August 2013. I started four months of training that month to become a docent at the Arizona-Sonora Desert Museum. The classes met two mornings a week, and then we had a lot of assigned reading at home. We observed experienced docents presenting some of the 50 different interpretive kits on the Sonoran desert, animals, plants, geology, minerals, fossils, and meteorites. We learned how to lead general grounds tours, butterfly walks, and bird tours. All of this was to get us ready to present all of these to the visitors at the museum.

I miss Gallup in the summer but am enjoying Tucson in the winter!  

—SKB
Ordo ab Chao:
Archiving Collections at the Maxwell Museum of Anthropology, University of New Mexico

KAREN ARMSTRONG

“Order from Chaos” has become the motto of the all-volunteer archiving crew of the Maxwell Museum of Anthropology at the University of New Mexico. As with many other museums, the Maxwell has archaeological collections from past excavations languishing in storage. Until the collections are fully organized, researchers avoid using them because too much time is needed to make sense of the collections before analysis can begin. The archiving crew organizes the collections, re-bags and re-boxes the artifacts according to current museum standards, and creates a computer-based catalogue of what was found. At this point, order has emerged from chaos and the collections are ready for study.

Many archaeological sites have been excavated and then the collections left in storage, uncatalogued, untouched, and rarely, if ever, published. With today’s emphasis on conservation archaeology, further large-scale digs are unlikely. It is time to excavate these stored projects, put them in order, and make them research-ready in order to mine the information they contain.

This ASNM Annual Volume honoring avocational archaeologist Sheila Brewer is an appropriate place to present not only her essential work with the Vidal Site (LA 16254), which was excavated by ASNM field schools between 1980 and 1992, but also to recognize the contributions of the members of the archiving crew and report on what they have accomplished over nearly a decade. The crew, I should point out, is just one of numerous groups and individuals dealing with collections at the Maxwell.

The volunteers of the archiving crew have varied backgrounds ranging from some who had no training in archaeology before beginning their archiving work to a retired professor of anthropology. Most of the volunteers are retirees, as the work necessarily takes place during the work week. Because the members of the crew have such different backgrounds, each new project is approached as a learning experience. Crew members are given handouts and reading lists, and attend lectures. There are field trips as well as discussions of findings as we progress.

How Did “Ordo ab Chao” Come About?

Having a Master’s in Cultural Anthropology and considerable field work in archaeology, I asked David Phillips, Curator of Archaeology at the Maxwell, about volunteer work in curating museum collections. This I did, in the fall of 2004, and I have been involved with the Maxwell’s collections ever since.

Working with Linda Cordell, who had directed the last of several UNM field schools at Tijeras Pueblo (LA 581) (Cordell 1980), Dave Phillips had begun assembling the collections from the various UNM field schools as well as from fieldwork conducted by the Albuquerque Archaeological Society (AAS), an ASNM affiliate, in Tijeras. He showed me what he had gathered, starting with Tijeras paperwork such as student notebooks, specimen cards, and computer printouts. Somewhat daunted, I nonetheless recruited volunteer help (mostly from the Friends of Tijeras Pueblo, another ASNM affiliate) and we tackled the collections. First we organized the documents that Dave Phillips had found and then we turned to the artifacts. In a near-miracle, Lou (Lucy C.) Schuyler appeared shortly after we began, also seeking
museum volunteer work. Lou had no prior experience in archaeology but she did have extensive computer skills, which the volunteer effort sorely needed. With the team completed, and after many volunteer hours, the archiving crew brought order to the massive Tijeras research collection. Little did we know than that it would be the first collection of many!

**Tijeras Pueblo (LA 581)**

Because most of the archiving crew were members of Friends of Tijeras Pueblo, it was possible to leap into the work without much prior orientation. Reorganizing the collections lasted from 2004 until 2007 and resulted in the following accomplishments. We prepared 830 plastic storage bins of artifacts: 806 from the UNM field schools, nine from the AAS work at AS-10A, and 15 from the AAS work at AS-10B.\(^1\) We also documented 943 Tijeras Pueblo artifacts (or bags of artifacts) stored for quick access in specimen drawers. The artifacts were assigned 17,089 unique accession numbers (16,388 from the UNM work, 236 from AS-10A, and 465 from AS-10B) that tie the artifacts to specific proveniences within the site. We catalogued 67 boxes of documents containing 568 primary documents on Tijeras Pueblo (for example, field forms, student notebooks, and specimen cards).

Ultimately, in part because the Tijeras Pueblo collections were properly organized, Judith Habicht-Mauche of the University of California, Santa Cruz was awarded a National Science Foundation grant to study the pottery from Tijeras Pueblo. Her study took place in the summer of 2011.

Reorganizing the Tijeras Pueblo collections was the cornerstone of Linda Cordell’s attempt to spark new research on an important but little-known site. While we mourn her passing, we know that the efforts to elicit more information from the Tijeras Pueblo collections will continue, and we take pride in our contribution to the realization of her vision.

**Pottery Mound (LA 416)**

The Pottery Mound collections were primarily the result of excavations directed by Frank Hibben at the site as UNM field schools in 1954, 1955, 1958, and 1959 (Hibben 1955, 1960, 1966, 1967, 1975; see also Ballagh 2011; Ballagh and Phillips, 2006, 2008; Schaafsma 2007). In later years, Hibben (1983, 1985a, 1985b) directed salvage work by volunteers as the site was being eroded by the Rio Puerco. The most carefully documented artifacts were excavated during a UNM field school directed by Linda Cordell in 1979 (Cordell 1980).

Because most members of the crew were not familiar with Pottery Mound, there were several orientation activities, among them lectures and training sessions from Hayward Franklin and a field trip to the Pottery Mound site. The following details will give the reader an idea of the extent of the collections and the work involved in archiving them. Between 2007 and 2013, the archiving crew organized the material into 629 plastic bins of artifacts, including 560 of Hibben’s collections, and 69 of Cordell’s artifacts, with 13,516 accession numbers for the Hibben collection and 1,524 accessions numbers for the Cordell collection, all entered into a database. Also archived were items stored in specimen drawers which were given 67 accession numbers. The crew catalogued 51 boxes of documents containing 422 primary documents. Having an organized and carefully documented collection has led to renewed archaeological research.

Since the reorganization began, Hayward Franklin has done extensive studies focusing on Pottery Mound ceramics (Franklin 2007, 2008, 2010). Suzanne Eckert has borrowed the 1979 surface collection from Pottery Mound, along with sherds from the site’s kivas, to follow up on her dissertation research (Eckert 2008). In the fall of 2012, the archiving crew assisted Patricia Crown, professor of anthropology at the University of New Mexico, in finding sherds of particular shapes for use in her research on trace foodstuffs.

**Vidal Site (LA 16254)**

The Vidal site (named for the landowner) is in Heaton Canyon near Gallup and includes a great kiva. It was excavated by ASNM field schools from 1979 to 1994 (Bice 1990b, Bice and Kelley 2000).
Sheila Brewer not only watched over the collection while it was still in Gallup (see her autobiography, this volume), but she was also essential to the effort to archive the Vidal artifacts, which may ultimately be housed at the state archaeological repository in Santa Fe. The Vidal collection remains temporarily at the Hibben Center while being studied for a final report being prepared under the direction of Joan Mathien.

**Albuquerque Archaeological Society Collections**

The following collections resulted from excavations undertaken by the Albuquerque Archaeological Society (AAS), and are now curated at the Maxwell Museum.

**Tongue Pueblo (LA 240).** Avocational excavations were carried out with the permission of the landowner at Tongue (also spelled Tunque) Pueblo (Barnett 1969; Bice 1990a). These resulted in collections categorized under the names of the Bice Collection (Maxwell Accession No. 2007.43), the Renwick Collection (2010.39), and the Vernon Collection (2010.40). In December 2009, Tom Morales contributed a Tongue collection which was added to the Bice material. There remains at least one Tongue collection in private hands (see Armstrong et al. 2011).

**AS-4, Lithic Sites at the Cochiti Housing Development.** The collection from fieldwork between 1970 and 1971 (Olsen and Bice 1995: C.1.2) was reorganized, i.e., “bagged and tagged” but not accessioned, as it remains the property of the Albuquerque Archaeological Society.

**AS-6 (LA 12133).** This Quemado area pithouse and pueblo was reported by Dick Bice (Bice 2004; Olsen and Bice 1995:C.1.3). The collection is repackaged as Accession No. 2010.58. Three complete pots from this site are in the pottery collection room in the basement of the Maxwell Museum’s Hibben Center.

**AS-7 (LA 67874).** Known as the Mandell site, this historic dump, used from ca. 1880 to 1910, was found in 1972 during groundbreaking for the Albuquerque Civic Center (Olsen and Bice 1995:C.1.3-1.4). Phyllis Davis was in charge of the salvage excavation and prepared detailed study sheets. The archiving crew repackaged artifacts by category, such as china, glass, leather, metal, and wood in boxes numbered 30,001 through 30,054. In the fall of 2013, at the request of Professor Emily Lena Jones, some 200 duplicate and representative artifacts selected by her were donated by AAS to UNM’s Department of Anthropology for teaching purposes.

**The Swinney collection.** In 2010, an unprovenienced collection of sherds was offered to the AAS through F. Joan Mathien by a Mr. Swinney. Some of the sherds in the collection may possibly have come from Tongue site. The archiving crew dry-brushed the sherd collection and sorted it into similar pieces. With Hayward Franklin’s help, the most diagnostic sherds will be added to the Maxwell Museum type collections. A small batch of the sherds was transferred to the University of Colorado’s Museum of Natural History for use in teaching kits. Type sherds will be available for educational purposes. Completely undiagnostic sherds will be offered to Pueblo potters who use ground sherds for temper.

**Gallinas Springs (LA 1178)**

Gallinas Springs is a large Pueblo III and possibly early Pueblo IV village in Gallinas Canyon near Magdalena. Three collections from this site are housed at the Maxwell Museum: one from a 1974 Western Michigan University field school, one from a 1977 University of New Mexico field school, and one from Forest Service-sponsored stabilization work along the arroyo that runs through the pueblo. In 2011 and 2012, the archiving crew reorganized the artifacts from the 1977 UNM field school, but much remains to be done. Research interest in Gallinas Springs is reviving, and the first step in that process was the crew’s work on the collections.

**Sapawe (LA 306)**

Sapawe Pueblo is an enormous Pueblo IV site located a few miles south of El Rito, New Mexico. The site was excavated under the direction of Florence Hawley Ellis during a series of UNM field schools
in the 1960s. For the next half century, the artifacts from Sapawe remained in field collection condition, and Ellis’s field notes and manuscripts remained in her home. In 2009, the Ellis house and its documents passed to Ellis’s granddaughter, Rieka Long, who donated the papers to the Maxwell Museum (Phillips 2010). Researchers have already made extensive use of the Ellis archives, including the student notebooks and other field notes from Sapawe.

As of November 2013, the archiving crew has processed about 250 of the nearly 500 oversized cardboard boxes of Sapawe artifacts, which were repacked into 16-quart Sterilite plastic bins (the Maxwell’s current standard curation box). The Sapawe project will continue through the academic year 2013-2014 and probably well beyond that. We expect that we will eventually have archived 1000 or more plastic bins of Sapawe artifacts. We will prepare progress notes and reports on what is being found.

Archaeologist Sunday Eiselt of Southern Methodist University is conducting advanced studies of pottery sherds from Sapawe, and a graduate student at Eastern New Mexico University is studying the faunal remains from the site.

San Gabriel del Yunque (LA 59)
San Gabriel del Yunque (also spelled “Yunge” and in other ways) is located across the river from Ohkay Owingeh, previously called San Juan Pueblo. It was there that Juan de Oñate established the first Spanish capital of New Mexico in 1598. Twelve years later the capital was shifted to Santa Fe, leaving behind a time capsule, as it were, of archaeological remains from the beginning of the new colony.

Florence Hawley Ellis of the University of New Mexico had remarkably positive relationships with a number of Pueblo people. In 1959 she received a letter from the Governor of San Juan Pueblo requesting that she arrange an excavation of the site believed to be the location of Oñate’s colony. The fieldwork took place in that year and again in 1960 and 1962 (Ellis 1975, 1989, 1992). A conference at San Juan Pueblo in October 1984 resulted in a collection of papers (Agoyo 1987). The only other publication is based on fieldwork mandated by highway improvements made long after Ellis’ research (Lent and Goodman 1992).

The most important San Gabriel artifacts were catalogued in 1968, and many of those objects are now on loan to museums where they can be viewed by the public. However, the majority of the San Gabriel del Yunque artifacts are housed at the Hibben Center as of 2011. The San Gabriel del Yunque collection fits in 182 plastic bins (not counting items catalogued in 1968). The collection consists mostly of ceramics, but also contains 18 bins of stone artifacts, nine of metal, four of adobe, and one each of wood, shell, glass, and vegetal/wood. There is even one bin of shoes—probably discarded sometime in the past century and a half.

Not long ago, a collection of San Gabriel metal artifacts turned up in a garage in southeastern Arizona during preparations for an estate sale. The metal items were turned over to the Arizona State Museum, which sent them to the Maxwell Museum to be curated with the other San Gabriel materials.

Other Collections
Along the way, the archiving crew took on collections recently arrived at the Maxwell Museum. Thus, these collections were properly organized and housed from the beginning.

Paul T. Kay Collection. Paul Kay was a student excavator at Pottery Mound. He went on to become a chemist but never lost his interest in archaeology. In 2009, after Kay’s death, his archaeological samples and notes came to the Maxwell Museum. The crew organized the samples so they could be added to the museum collections.

Jack H. Esslinger Collection. Upon Esslinger’s death, the museum received his collection of Latin American artifacts on loan; each year since then, part of the collection has been converted from a loan into a gift. The crew numbered, measured, and described 524 Mesoamerican artifacts, linking the items to Mr. Esslinger’s collections notebook where possible.
Peterson-Stuart Collection. Frederick “Pete” Peterson was an archaeologist and collector who left his collection to family members but also to David Stuart of the University of New Mexico. In December 2010 the crew set out hundreds of small items from this collection on folding tables so they could be organized and appraised. Like the Esslinger collection, the Peterson-Stuart collection was loaned to the Maxwell Museum and is slowly being converted into donations.

Glore Collection. Ila Glore gave her father’s collection of Southwestern projectile points and other artifacts to the Maxwell Museum. As is often the case, the points were in picture frames; the crew refers to the Glore collection as the “I’ve Been Framed” collection. The crew made notes on the number of frames, their contents, and the artifacts in the accompanying boxes.

Luther Rivera Collection. One of our many special volunteers was the late Luther Rivera. Son of a ranch manager in northeastern New Mexico, Luther began collecting projectile points at an early age (having learned that hobby from his father). Unlike most “point hunters,” Luther numbered each piece he found and maintained a log of where he found it—thus creating a private collection with actual research value. He also became a skilled flintknapper and taught many children (and adults) the art of flintknapping. Luther was very much interested in seeing that his lifelong collection of artifacts came to the Maxwell; with his family’s approval those pieces are now in the Hibben Center of the Maxwell Museum and are on display in the lower level hallway.

Closing Remarks
In the year 2011 the archiving crew contributed 1179 hours toward organizing, packaging, and categorizing items in the collections of the Maxwell Museum, and recording those items in a database at the museum. Had they been paid even the current minimum wage of $7.25 per hour, their contribution would have been valued at over $8500 for that year alone. But I think our work is worth much more. In scientific terms, the effort has been invaluable. One collection after another has gone from being unusable and unused to seeing repeated studies by archaeologists. In the next few years, it is hoped that the positive impact of the archiving crew’s efforts will grow as researchers begin to report on what they have learned from the collections. —KA

Acknowledgments
Who are the heroes behind this effort? In alphabetical order, my list includes Dallas Anderson, Bob Ayre, Margery Barol, Tim Baugh, Sheila Brewer, Nancy Brouillard, Tim Brown, Waynette Burnette, Kym Campbell, Ann Carson, Sonya Dobberfuhl, Danyelle Dosumu, Laurie Dudasik, Cliff Evans, Patricia Fordney, Hayward Franklin, Craig and Gina Fredrickson, John and Janet Geohagan, Shad Goldstein, Lionel Hutcoff, Roger Houghton, Andre Huffmire, Judith Isaacs, Jeanice Jansen, Jacqueline Johnson, Maggie Knight, Richard and Tessa Krause, Kathryn Linn, Candace Lord, Marty McMahon, Joanne Magalis, Lee Mann, Tom Morales, Rita Nagle, Melody Nowaczyk, Kriselda Nunez, Ann Pineda, Libby Radcliffe, Douglas Richardson, Eric Rinehart, Luther Rivera, Wanda Roach, Lawrence Sanchez, Rebecca Sagemiller, Lou Schuyler, Lee Shepperson, Jon Steen, Marc Thompson, Linda Vogel, Judy Vredenberg, Nelson Welch, Ann White, Nancy Woodworth, Connie Wulde, Ann Yeck, and Diann Zentner. I hope that no one from the crew has been missed. Two of the crew, Ann Pineda and Luther Rivera, are no longer with us. Many of the rest have now been working on collections for years, and don’t even flinch when a box is opened to reveal the latest chaos.

Thanks go to Lou Schuyler for providing data on the crew’s accomplishments, and to Dave Phillips for his help with drafts of this paper. Above all, thanks go to the archiving crew for the thousands of hours they have spent transforming archaeological collections into scientific gold.

Endnotes
1. AS-10A and AS-10B were two small pueblos that were located on private land adjacent to Tijeras Pueblo. At the request of the U.S. Forest Service, volunteers from the Albuquerque Archaeological Society carried out salvage excavations prior to development of the land for housing (Olsen and Bice 1995).
References Cited

Editors’ Note: Some of the Maxwell Technical Series entries below are available to download at no cost at http://www.unm.edu/~maxwell/technical_series.html.

Agoyo, Herman (Organizer)

Armstrong, Karen, Thomas M. Morales, and David H. Snow

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Ballagh, Jean H., and David A. Phillips, Jr.


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Bice, Richard A.


Bice, Richard A., and Elizabeth Kelley

Cordell, Linda S. (editor)

Eckert, Suzanne L.

Ellis, Florence Hawley

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Franklin, Hayward H.

Hibben, Frank C.


Lent, Stephen C., and Linda J. Goodman


Olsen, Nancy H., and Richard A. Bice


Phillips, David A., Jr.


Schaafsma, Polly (editor)

Turquoise at the White Shell Water Place

MATTHEW J. BARBOUR

Between July 2005 and August 2008, the Department of Cultural Affairs Office of Archaeological Studies conducted archaeological investigations at site number LA 1051. This work was conducted in preparation for the construction of the Santa Fe Convention Center at the northeast corner of Grant Avenue and West Marcy Street in the heart of downtown Santa Fe, New Mexico. Oral history among the Tewa of Tesuque Pueblo indicates that this location was the site of their ancestral village Ogapogeh, the White Shell Water Place.

Archaeological investigations of the site found evidence of human occupation dating to the Developmental (A.D. 500-1175), Coalition (A.D. 1175-1325), Classic (A.D. 1325-1600), Spanish Colonial (A.D. 1600-1821), Mexican (A.D. 1821-1846), American Territorial (A.D. 1846-1912), and New Mexico Statehood (A.D. 1912+) Periods (see Lentz 2011; Lentz and Barbour 2011). Between about A.D. 1150 and 1450, a time which roughly corresponds to the Coalition and first half of the Classic Period, the site appears to have been the location of a substantial pueblo, possibly the Ogapogeh of oral tradition. Evidence of this village included numerous pit structures, refuse pits, hearths, and human burials.

While a complete description of this pueblo is beyond the scope of the current presentation, it is the goal of this paper to provide a brief synopsis regarding turquoise artifacts recovered from the site. Turquoise is a semiprecious stone characterized as a hydrated basic phosphate of copper and aluminum, along with some iron, calcium, and silica. The mineral is generally massive, and crystals are exceedingly rare. It occurs as thin seams or veins, often as nodules and grains. The fracture is slightly conchoidal (shell-like) to uneven. Turquoise is very brittle, resembling ivory in consistency.

All 100 fragments of turquoise collected during archaeological investigations at LA 1051 were subjected to formal analysis. This analysis was conducted by Matthew Barbour and Kimberly Johnson in the fall of 2008. The methods and results of the analysis are reported in Ogapogeh, The White Shell Water Place (Barbour and Johnson in Lentz 2011). A summary of the findings presented in that report is provided below.

Background

The use of turquoise in the New World is not particularly old compared to evidence from the Middle East, which dates from at least the third millennium B.C., when the kingdom of Egypt first opened mines within the Sinai region. The earliest known use of the stone in the American Southwest was at Snaketown during the Vahki phase (A.D. 100–900). However, use of the stone up until the tenth century was very sporadic across the Southwestern landscape. The wider distribution of turquoise across the Southwest after A.D. 900, within archaeological contexts, appears to coincide with a contemporaneous rise in use within central Mexico. Large-scale caches have been documented at such sites as Pueblo Bonito in Chaco Canyon, the West Baker Site in Lordsburg, and Páquime in Chihuahua, Mexico (Snow 1973).

In the Northern Rio Grande, the most readily available location for the procurement of turquoise was the Cerrillos Mining District, located 30 miles south of Santa Fe. Archaeological evidence shows the use of the area going back as early as A.D. 900.
Ethnographic studies from the 1930s suggest direct access to turquoise from the Cerrillos mines was limited to the specific pueblos of Santa Ana, Santo Domingo, Cochiti, San Felipe, and San Ildefonso (Snow 1973). These pueblos represent Keres and Tewa linguistic groups, the same groups who occupied San Marcos Pueblo in the Classic and early historic periods (Snow 2008). Archaeological evidence based on ceramic assemblages found in association with the mines comes from San Marcos Pueblo. Snow hypothesizes that access to Cerrillos turquoise during the Classic and early historic periods was monopolized by the pueblo.

However, this monopoly does not appear evident within earlier assemblages dating back to the Coalition period. Pindi Pueblo, another presumed Tewa site within the Santa Fe area contemporaneous with LA 1051, yielded a turquoise workshop specializing in beads and pendants (Stubbs and Stallings 1953:116–120).

The Assemblage

Table 1 shows the distribution of turquoise artifacts by depositional context at LA 1051. As depicted in the table, turquoise artifacts were widely distributed across feature types and temporal settings. It suggests that the use of turquoise did not change in any measurable fashion during the Coalition and Classic periods.

Raw Material

Raw material was the most common turquoise artifact recovered (n=43). Raw material reflects those pieces which were not culturally modified. Since turquoise does not naturally occur in the surrounding area, these objects must have been intentionally transported to the site by human hands. Raw material was distributed across a wide array of contexts, including prehistoric pit structures, burials, hearths, privies, and middens. The placement of this material within specific features such as burials, sipapus, and ash pits suggests ceremonial use.

Debris & Indeterminate Items

Only thirteen artifacts were characterized as manufacturing debris. Manufacturing debris constituted artifacts that resemble flaked stone and represent indicators of on-site manufacturing. Counts, however, were small, and no specific workshop areas could be identified due to the low quantities of this artifact type.

Indeterminate culturally modified turquoise included those pieces that had no identifiable shape or function but were modified by polishing, grinding, or other human alteration. These pieces could represent unfinished ornaments or pieces that were modified for some other purpose. The vast majority of these items are not refined and likely do not represent pieces once socketed into a larger piece of jewelry, but this interpretation cannot be ruled out entirely.

Indeterminate culturally modified turquoise were relatively common (n=24). Like raw material, they were distributed across a variety of spatial and temporal contexts, including burials, Classic- and Coalition-period pit structures, and refuse pits. The placement of indeterminate items within burial and pit structure contexts could be construed as ceremonial.

Ornaments

Twenty ornaments were encountered, including seven whole artifacts. Pendants and beads were the only specific types of turquoise ornaments identified through analysis. The dimensions of the intact ornaments are presented in Table 2.

Six of the 16 pendants were complete. All were determined to be roughly trapezoidal in shape, but varied substantially in size. Whole pendants (Figure 1) were found on the floors of Pit Structure 2 (Coalition), Pit Structure 4 (Classic), and Pit Structure 11 (Classic). These items could represent offerings left at the time of structure abandonment. Of the remaining three whole pendants, one was found in a Classic period refuse pit and the other
Table 1. Distribution of turquoise artifacts by depositional context.

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<th>Pendant</th>
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**Spanish Colonial Period (A.D. 1600-1821)**

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<th>Pendant</th>
<th>Bead</th>
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**American Territorial Period (A.D. 1846-1912)**

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**Total**

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<th>Bead</th>
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two were identified in nineteenth century contexts, specifically a construction debris pit and a privy associated with the Fort Marcy Military Reservation (Figure 2).

Four turquoise beads were also identified. Two were found within Feature 318, a Coalition period hearth or fire pit. The other two were located inside Classic period refuse pits, designated Features 251 and 310. Only the bead from Feature 251 was whole. However, given partial dimensions recorded from the remaining three artifacts, it appears that all four of the beads may have been relatively uniform in size measuring 8 mm in diameter and 5 mm in thickness.

The Munsell Color Chart and Turquoise Color Variability
The Munsell chart was used to identify the color of each turquoise artifact. Of 100 turquoise pieces analyzed, 44 different colors were assigned. The most common color (n=10) was 2.5B 9/2, followed by 2.5BG 9/2 (n=7). The remaining colors had five or fewer artifacts classified under each Munsell color, indicating substantial variety. In broader terms, 46 percent of the assemblage could be classified as blue green (n=46), followed by smaller counts of green (n=44) and blue (n=10).

<table>
<thead>
<tr>
<th>Feature No.</th>
<th>Feature Type</th>
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<td>11.8</td>
<td>9.2</td>
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<table>
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<th>Dimensions (mm)</th>
<th>Length</th>
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<td>Pendant</td>
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<td>Pendant</td>
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<td>11.8</td>
<td>9.2</td>
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Figure 1. Turquoise pendants from Pit Structures 2 (left) and 4 (right).

Figure 2. Turquoise pendant from Feature 79, the Fort Marcy NCO Privy.

Table 2. Measurements of whole turquoise ornaments.
Collectors of the material have in the past suggested that the color of turquoise could be used as a means to infer source, but this hypothesis has recently come under criticism. In this study, no attempt was made to source these materials because of the wide range of variability. It is presumed, given the proximity of LA 1051 to the Cerrillos Hills that the majority of turquoise is from this region. However, it is possible that sources in western New Mexico and Arizona are represented, given the appearance of western Pueblo manufactured ceramics from contexts such as Pit Structures 2, 4, and 8.

Conclusions

Turquoise was spread fairly evenly across LA 1051 and was found in similar contexts dating to the Coalition and Classic periods. Because of this, it seems likely that the use of turquoise was consistent throughout the different phases of site occupation.

While very few manufactured items were identified, the presence of the raw material within explicitly identified ceremonial features such as burials, sipapus, and ash pits suggests the material was of some intrinsic value and may have been associated with ritual behavior. This lies in opposition to what Snow (1973) suggests. He proposes that the use of turquoise is primarily secular in nature.

The definition of “secular” and “sacred” within Pueblo society is a matter of great debate. Some may argue that all prehistoric behavior contained some aspect of ritual and ceremony, while others infer simply quotidian activities. This argument will certainly not be resolved by the current sample.

This small sample precludes any but the broadest of conclusions. However, since turquoise is not a local material, the very presence of the substance links LA 1051 to areas south of Santa Fe and possibly to the west. Further, the wide-scale distribution of raw material and the nominal appearance of manufacturing debris suggest that the residents of LA 1051 were not simply trading for a finished product. As at Pindi, they may have enjoyed access to the Cerrillos turquoise mines. However, unlike Pindi, there is no evidence of formal workshops.

—MJB

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1953 The Excavation of Pindi Pueblo New Mexico. Monographs of the School of American Research and the Laboratory of Anthropology 18. Santa Fe.
Fire and Smoke: Ethnographic and Archaeological Evidence for Line-of-Sight Signaling in North America

WARD BEERS

The use of long distance communication through signaling by the native inhabitants of North America is documented both ethnographically and archaeologically. While the use of long-distance and line-of-sight signaling may be most applicable to sedentary societies under stress, its documented use by nomadic and semi-nomadic groups indicates that use of such signaling systems may well extend back to the first appearance of humans in the Americas. The information in this article is the product of thesis research regarding line-of-sight communication in the Jumanos pueblo cluster of central New Mexico. Early on in the research the apparent lack of ethnographic or archaeological evidence for communication by visual means such as fires, flashes, or smoke raised the question of whether such communication was simply the product of Hollywood westerns. Continued research, however, revealed the sources in this article. While this article contains no new information regarding long distance visual communication in North America, and particularly the Southwest, my hope is that the compilation of information in one source may be of use to researchers in the future.

Ethnographic Evidence

Smoke signaling by natives of what is now the area of Tampa Bay, Florida, was recorded as early as 1539 by the Gentleman of Elvas while chronicling the invasion of Hernando de Soto’s army into what is now the Southeastern United States (Smith 1968:23 [1866]). The continuation of such practices by Southeastern Indians was recorded by Swanton in the twentieth century, who commented that the Seminole of Oklahoma used smoke signals while hunting, dividing the smoke column into puffs by suppressing the smoke with a blanket, then releasing it in intervals (Swanton 1928:446).

Similar practices were recorded among the Chippewa in the Great Lakes region. The Chippewa would particularly signal with fire and smoke across water, increasing the volume of smoke by adding grass to the fire. The smoke signal was then broken into puffs with the use of a buckskin rather than a blanket (Densmore 1979:143; Hilger 1951:105).

Among Plains tribes the use of smoke signals and line-of-sight signaling using fire and other methods was recorded in the nineteenth and early twentieth centuries. Smoke signals virtually identical to those described above were used by the Comanche (Berlandier 1969:57n [1830]; Wallace and Hoebel 1952:264-265), and line-of-sight communication using mirrors, fires, blankets, and bison robes were in use among the Nakoda of Canada, Assiniboine (Denig and Hewitt 1930:408-409; Lowie 1909:33; MacLean 1896:26-27), and Pawnee (Blaine 1990:78-79). Use of line-of-sight and smoke signals among Plains tribes was prevalent enough that a section on the practices was included in William Philo Clark’s six-year study for the U.S. military on the Indian Sign Language, commissioned by General Philip Sheridan and completed in 1884 (Clark 1982:411, 415).

On the Pacific Coast, fire and smoke signaling are recorded among the Tlingit (Krause 1956; Swanton 1908:451) and Yokuts (Fremont 1846:272;
Among the Yokuts, messages regarding approaching parties were reportedly detailed enough to contain information about the size of the group, who they were, and direction of travel. The messages were reported to have been passed between lookout stations for over 400 km (250 mi) in less than four hours (Latta 1949:82-83).

Ethnographic documentation for signaling systems in the southwestern United States and adjacent areas of northern Mexico is extensive. Fray Marcos de Niza, in his 1539 reconnaissance of the Valley of Sonora reported “many smokes” which may have been signal fires (Hallenbeck 1949:35). In 1565, Obregón, chronicler of the Ibarra expedition, comments that in northern Mexico Indians would gather for war by use of smoke signals (Hammond and Rey 1928:155). Spanish conquistadores on the de Sosa expedition of 1590-1591 also mention native use of smoke signals on the Pecos River of Texas and New Mexico (Schroeder and Matson 1965:12, 67-68). During the attempted reconquest of New Mexico in 1681 communication by smoke was reported to stretch distances of over 203 km (126 mi) in the vicinity of modern Truth or Consequences, New Mexico (Hackett and Shelby 1942:202). Smoke signals were also mentioned in northern Mexico in the early eighteenth century (Griffen 1969:133) and on the coast of Texas in 1828 (Berlandier 1969:148 [1830]). In the pueblos of the northern Rio Grande, signaling systems were historically reported that stretched from the Bandelier area in the north to Chilili (LA 847) in the south, and from the Continental Divide to San Cristobal (LA 80) in the Galisteo Basin (Ellis 1991:57).

Signaling by use of mirrors, fire, and smoke, including the use of smoke rings, has been noted among the Navajo (Downs 1972:58; Newcomb 1964:17; Reagan 1930:300; Roberts 1951:27). Use of smoke signals in coordinating for war has also been recorded among the Western Apache (Bender 1974:98; Cremony 1981:179-180, 183; Goodwin 1971:261; Sweeney 1991:280). Apache signaling with smoke additionally was recorded in requesting parleys, coordinating hunts, and guiding parties (Griffen 1988:26-27; Matson and Schroeder 1957:344, 348).

The extent to which signaling may have been used prehistorically by North American Indians is hinted at in the accounts of Fort Phil Kearny, Wyoming. The Fort was essentially under siege by Cheyenne and Lakota warriors from the time construction began in 1866 until its abandonment two years later. Records indicate that prior to the Fetterman Fight of December 1866, Indian observers on hills surrounding the Fort were nearly constantly signaling with mirrors and, in at least one instance, fire. The signaling was used offensively, rather than defensively, and its frequency indicates that it may have been intended for harassment rather than communication (Brown 1962).

By far the most detailed historical account of the method of making smoke signals that I have encountered was reported by William H. Hardy in an 1888 article in the Mojave County Miner. The use of signals was reported in the area of Fort Whipple, Arizona in 1866, probably by Yavapai. The detail of the account warrants quoting the description in its entirety:

During the day I noticed signal smokes rise from hill and valley and mountain tops. I could read these signal smokes. They meant war. I could read in these pillars of smoke the number of teams I had and the number of men with the train.

The question is, how did the Indians make these smoke signals? In those days the Indian had no knowledge of matches. They had no guns. Each Indian when out on the warpath carried two sticks, one a dry stock of beargrass with notches cut in it, the other a hard stick like an old-fashioned fog-horn ramrod. They would place the sticks with notches on the ground, put their feet on it and set the other stick with the end in the notch, then roll fast between
the hands. Within half a minute they would start a blaze of fire, caused by friction. These sticks the Indians call ‘oca-cha’. They sometimes used flints. These the Indians called ‘otavia’. When the fire was started they would sprinkle a little pulverized pitch or resin on it. It started a black smoke quick. They would spread a handful of green weeds or grass on the fire and a white smoke or steam would follow. Again they would remove the grass and blow the fire a little and add pitch. Thus dots and dashes might be made, quite like the old-fashioned way of telegraphing on paper. Again at night I have see signal fires on the side or top of mountains and a blanket or robe passed in front of it conveyed information.

There was no patent covering this way of conveying news by the savages. I have seen on a calm day a column of smoke with black and white spots rise near one thousand feet high. I have known correct news concerning the movements of U.S. troops in war times to be smoked through at least three hundred miles in two or three hours, and news by courier five or six days later would prove the news by Indians to be correct. (Hardy 1888:1)

An account of how actual messages were sent among the Apache in 1796 is also worth quoting:

Smoke is the most efficient means by which they communicate. Understanding it is a science; but is so well known by all of them, that they are never mistaken in the meaning of its messages.

A small smoke made on the slope of a mountain, is a sign that they are hunting their own people whom they desire to meet. Another smoke in reply half way up the sides of an eminence, indicates that there is their habitation, and that they can freely come to it.

Two or three small smokes made successively in a plain or canyon pointing in one direction, are an indication of desire to parley with their enemies, and reply is made to this in the same fashion.

In this way they have many general signals used in common by all the Apache groups. In the same way there are also signals that have been specially agreed upon, which no one can understand without possessing the key. They make use of these frequently when they enter hostile country for the purpose of raiding. (Matson and Schroeder 1957:348)

Archaeological Evidence

Evidence for prehistoric signaling or line-of-sight communication is by nature speculative. However, the ethnographic evidence mentioned above, coupled with line-of-sight and viewshed analysis, and archaeological remains, strengthen the probability that such systems were in use prehistorically in North America.

Focusing on the American Southwest, the best known, most complex, and most probable line-of-sight communication system is within the San Juan Basin of the Four Corners area, with the center of the system being Chaco Canyon. An understanding of the Chacoan road system is integral to the understanding of this probable network. The Chacoan road system is an archaeological anomaly in the Southwest and whether a road system was its true purpose has been questioned (Durand and Durand 2000; Roney 1992). The “roads” were constructed along predominantly straight lines and portions of the system exhibit features that could
have functioned in line-of-sight communication (Stuart 2000:80-82).

There are two sizes of roads, one approximately 3.5 to 5 m (4 to 5.5 yd) wide and the other approximately 6 to 9 m (6.5 to 10 yd) wide. The roads all begin or end at or near a Chacoan great house, with a notable exception being the road that ends in Kutz Canyon, north of Chaco. However, some consider the road to change course and continue to Salmon Ruin (LA 8846) on the San Juan River (Gabriel 1991; Stuart 2000:82; Vivian and Hilpert 2002:114, 210).

Two Chacoan roads lend themselves particularly to examination for line-of-sight communication, those being the Great North Road, and the South Road. From the north, the Great North Road has, if not on the actual road then generally along its course (if a change in course and continuation to the northwest is assumed), three great houses before it reaches Pueblo Alto (LA 661) on the north rim of the canyon: Aztec (LA 45), Salmon, and the Pierre’s Ruins area (LA 16508). Also located along the road are Twin Angels (LA 5642), and Halfway House (LA 15191), two smaller ruins.

From Tsin Kletzin (LA 40385) on the south rim of the canyon, the South Road has on or near it four great houses before it disappears south of Kin Ya’a (LA 8987): Kin Klizhin (LA 34245), the Lake Valley Great House (Kin Lini) (LA 18755), Kin Bineola (LA 18705), and Kin Ya’a. Of these 11 sites along the entire north/south road, three have tower kivas, two are situated on high points overlooking the canyon itself, and one is situated on a series of pinnacles. The 130 km (81 mi) or so distance between Aztec Ruins and Kin Ya’a is punctuated by other structures common on Chacoan roads: herraduras and avanzadas (Gabriel 1991; Stuart 2000:82; Vivian and Hilpert 2002:121, 210).

Both herraduras and avanzadas are located at high points on the roads, often at slight changes in the direction of the road, and have been interpreted as shrines or signaling stations. Herraduras (Spanish for “horseshoe”) are generally in a “C” or “D” shape, constructed of a 1 m (1 yd) tall wall of masonry with any openings facing east, and tend to be 3 to 9 m (3 to 10 yd) in diameter. Avanzadas (Spanish for “outpost”) are similar, although squared and constructed of masonry or jacal. Dozens of these structures have been located on Chacoan roads (Gabriel 1991; Stuart 2000:82; Vivian and Hilpert 2002:121, 210).

Tower kivas, such as the three mentioned on the north/south road, have been considered at times to be potential high points for signaling (Vivian and Hilpert 2002:243). While this has been questioned on grounds of the danger involved in starting a fire on a roof constructed of pine logs and cedar bark, if the roof is covered by a few centimeters of dirt, it is not out of the question. In experiments at Paquimé it has been shown that at night a burning yucca can be seen up to 42 km (26 mi) in the distance, and a burning yucca should lack the heat necessary to burn beams below an earthen roof (Di Peso 1974:867; Swanson 2003:759-760; Vivian and Hilpert 2002:243).

Considering the locations of sites on the north/south road, it has been speculated that signals from fires or smoke could have been sent from the Chimney Rock outlier in Colorado, to Aztec, and down the north/south road beyond Kin Ya’a to sites in the Red Mesa area, using a combination of herraduras, avanzadas, and sites on high points. Experiments have been conducted regarding this theory by National Park Service employees using flares, with partially successful results (Vivian and Hilpert 2002:321).

El Faro (“the lighthouse”), a pinnacle in the Pierre’s Ruins Area that is capped with burned limestone (perhaps from signal fires), emphasizes the possibility of line-of-sight communication. From the pinnacle and nearby greathouse, at least five other Chacoan greathouses are within the viewshed of the site, as well as other Chacoan sites at distances of up to 72 km (45 mi). Within Chaco Canyon itself, Pueblo Alto, Tsin Kletzin, and Peñasco Blanco (LA 225) have been shown to be on lines-of-sight among themselves, and individually aligned with other great houses in the canyon. From three shrines on Chaera
Mesa, each great house in the canyon can be spotted (Vivian and Hilpert 2002:220).

To many researchers, the evidence suggests that the unifying principle of Chaco Canyon was not militaristic or possibly even economic, but religious (LeBlanc 1999:180; Stuart 2000:81; Vivian and Hilpert 2002:211-212). For this reason, it is suggested that the line-of-sight communication networks along Chacoan Roads were used for ceremonial purposes, calling people from throughout the San Juan Basin for ceremonials or to alert them for seasonal observations that may have been signaled from Chaco, such as times for planting crops (Gabriel 1991:202; Stuart 2000:166).

Although paths and semi-formalized trails were constructed in the post-Chacoan Southwest, there was no centralized region of authority, and therefore no roads leading to a central place. Warfare dramatically increased, and there is evidence that the knowledge of line-of-sight signaling that was in use ceremonially in Chaco Canyon was put to use between A.D. 1200 and 1400 as warning systems within semi-autonomous pueblos and villages within language groups (Stuart 2000:148-150).

The use of signaling was dramatically noted in Haas and Creamer’s landmark 1993 study in the Kayenta, Arizona area. This study details how villages were not only constructed with communication in mind, but in one case the landscape itself was altered between two sites to enhance the visual link. In Long House Valley, between Fireside House (LHV 14) and Tower House (LHV 137), a notch was prehistorically carved into a talus slope of Black Mesa which obstructed the view between the two sites. Both Tower House and Fireside House were built on elevated positions—Tower House on a hill surrounded in some places by masonry walls and Fireside House on a ridge. The locations of the sites, defensive walls, and artificially carved notch in the slope obstructing the view between the two sites indicate not only the prehistoric importance of defense, but also communication between sites (Haas and Creamer 1993).

The Largo-Gallina area on the west side of the Jemez Mountains is noted not only for five defensible cliff houses but also for fortified hilltops in a canyon that runs roughly north-south from El Vado to Regina, New Mexico (Hibben 1938:131, 1948). The ridgetop sites were characterized by pithouse villages and multiple towers that rose to up to 8 m (26 ft) in height. The towers were used for both storage and defense, as is interpreted from remains in the ruined towers. Towers that were not burned contain few artifacts and no corn, while towers that are burned often contain artifacts and burned supplies of corn, indicating attack and destruction before the corn could be used (Mackey and Green 1979:145-146).

The ridgetop sites in the Largo-Gallina area are considered fortified not only because of their location on steep ridges, but also because they were built compactly, are often surrounded by palisades, and contain towers. The fortified sites are located within a fairly narrow canyon and in a limited area of the mountains. The level of violence in the area is indicated by the burned canyon and in a limited area of the mountains. With these considerations, it seems reasonable to expect that some sort of lookout or signaling system was in place for use in warning of impending attack (Mackey and Green 1979:145-147; Stuart 2000:127; Swanson 2003:754). In 1987 Sleeter demonstrated in a study of 14 of the towers that 81 percent of the towers were either definitely linked or probably linked to the two closest towers to them in a chain-like communication system (Sleeter 1987:52, 77-78).

Near the Largo-Gallina area, on the southwestern slope of the Jemez Mountains, in the upper Jemez Canyon, agricultural field houses, all with potential Jemez Canyon, exhibit defensive characteristics (Fliedner 1975). The field houses are often located in small caves or against cliffs, average 400 m (437 yd) in distance from each other, and are connected by constructed trails that average 50 cm (20 in) wide and 20 cm (8 in) deep. Each dwelling is located within sight of another, and perhaps
they were used not only to keep scavengers from destroying crops, but also as a warning system for potential attack (Fliedner 1975).

Pueblo III defensive sites with line-of-sight connections have also been studied in the El Morro Valley of New Mexico, and at Perry Mesa near Prescott, Arizona. Some of the pueblos on Perry Mesa have been shown to have 7 to 13 lines of sight connecting them to other pueblos in the area (LeBlanc 2001; Wilcox et al. 2001). As the region moved into the Pueblo IV period, observation posts and guard settlements on cliff edges and knolls were established in the Grasshopper Region of Arizona (Tuggle and Reid 2001:96).

During the same period, sites built in defensible locations on mesas and escarpments began appearing in the Rio Abajo section of the Rio Grande between modern Albuquerque and Truth or Consequences. In this area are several sites with large viewsheds, including Hidden Mountain (LA 415) on the Rio Puerco near Los Lunas, and the Indian Hill Pueblo (LA 287) near San Acacia between Belen and Socorro. Notably, the San Pasqualito Village Site (LA 756) in the Bosque del Apache, is built with mesa-top views in all directions, and there is evidence of large fires on the edge of the site (Marshall and Walt 1984:186; Stuart 2000:149-150).

In the Sierra Blanca area of southeastern New Mexico at least two sites are known that were interpreted originally as “observatories” (Eidenbach 1979). Wally’s Dome (LA 20712) is located near Sierra Blanca at 1,981 m (6,500 ft), and consists of cairns and a stacked rock wall, possibly indicating defense, as its alternate name “The Fortification” suggests (Kelley 1984:297-298). Wizard’s Roost (LA 29588), at 3,158 m (10,360 ft) in elevation is also made up of masonry structures. While both sites are said to have astronomical alignments, they also have line-of-sight aspects to them, and may have been signaling stations rather than observatories, or both (Eidenbach 1979).

Elsewhere in the Southwest, lines of stone rings have been found in Seminole Canyon, Texas. While the rings lack artifacts or signs of fire, the locations of the sites suggest their use in a communication system (Turpin 1984). Similar sites, this time with evidence of burning within the stone enclosures, have been studied in Sonora, Mexico, in the vicinity of Paquimé (Doolittle 1988:32).

Like Chaco Canyon, Paquimé in northern Chihuahua, Mexico, was a large, centralized society. The city of Paquimé itself contained as many as 2,240 inhabitants, and the system covered an area of 87,000 km² (54,000 mi²) (Cordell 1997:410). Judging influence by the distribution of Ramos Polychrome pottery, Paquimé’s influence was felt in a 75 km (46 m) radius (Cordell 1997:410; Swanson 2003:765).

A survey conducted by Steve Swanson (2003) during the summers of 1995 and 1996 of 107 hilltops around Paquimé identified 23 stone platforms on hilltops and one “atalaya,” on Cerro de Moctezuma. Atalayas are circular stone walls up to 24 m in diameter and 2 to 3 m (6.5 to 10 ft) high. A GIS program was created to examine the lines of sight between high points with known features on them in the area. Through the use of GIS, alignments were demonstrated between the hills with platforms. Then the location of the atalaya on Cerro de Moctezuma was examined. Within the atalaya was a four-room structure, and on that structure 12 lines-of-sight from the hilltop platforms converged, indicating likely use for communication (Swanson 2003:754, 763).

Of the 23 platforms considered in the study, 15 were checked for fire-cracked rock. Of those 15, only five were found to contain fire-cracked rock. This could provide an argument that the platforms without fire-cracked rock were not being used for signaling. However, as mentioned above, it had been demonstrated in experiments at Paquimé that a burning yucca could be seen for up to 42 km (26 mi) at night (Di Peso 1974:867), which was later
extended to 60 km (37 mi) (Swanson 2003:760). If a burning yucca would lack the heat to burn through the roof of a Chacoan tower kiva, it also would probably also lack the necessary heat to crack rock, accounting for the lack of evidence of fire on the stone platforms (Swanson 2003:757).

Considering that half of Paquimé was devoted to public and ceremonial use, it was likely a regional power. Like Chaco Canyon, signaling stations on hilltop platforms surrounding the site, as well as the atalaya on Cerro de Moctezuma would have met the need of coordinating ceremonial activities. Considering the violent end of Paquimé (Rakita 2009:97), it can be reasoned that the line-of-sight communication system was also used for defense or warfare (Cordell 1997:409; Swanson 2003).

Although it may be impossible to prove that prehistoric line-of-sight communication systems were in use in the prehistoric Southwest, the archaeological evidence, supported by ethnographic reports, makes it likely. The uses of the systems vacillated through periods of drought, warfare, and centralized power, from the probable ceremonial and possible trade use by the Chacoans to the probable uses in warfare and trade during the Pueblo Coalition and Classic Periods to the probable ceremonial and military use at Paquimé. It is evident that these systems of communication were adapted by their inventors and users to suit their needs during periods of change in their dynamic societies. This evidence supports the probability of the prehistoric use of signaling in an area known for the meeting of different cultures, often for mutually beneficial trade, but also during conflict.

Conclusions
Historically and ethnographically documented, as well as archaeologically supported, the evidence is clear that the use of long distance communication by North American natives is not merely the product of Hollywood movies, or western novelists or artists. The use of such communication systems was integral to the conduct of trade, ceremonialism, and warfare among native groups. Its study will further enhance the understanding of these practices, as well as landscape use, in North America.

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Wilcox, David R., Gerald Robertson Jr., and J. Scott Wood  
Climate Change and Human Response: 
An Ecological Interpretation of the Settlement 
Pattern of Heaton Canyon

DOUGLAS PAUL BRETHAUER

Understanding how people utilize an environment in order to sustain a community is a subject of major interest in today’s world. The value of such information is obvious, as people become increasingly aware of the finite nature of the earth’s resource base. Archaeology’s role in this fundamental inquiry addresses such questions as the carrying capacity of specific ecological niches, but also lends itself to a consideration of the carrying capacity of the earth as a whole. Questions such as, “How can we build a sustainable society?” have become critical. The genesis for this interest lies in the recognition that no longer do we have the option of moving on to a new locality when we’ve exhausted the potential of a particular ecological niche. Living in a vast interconnected, technological civilization, populated with a myriad of interdependent sub-cultures, many people now intuitively understand that the earlier game we played no longer works. Archaeology can help in this task by reexamining our predecessors’ experiences with an eye toward understanding how each ecological niche exploited by humans supported the development of culture, to what extent it was “sustainable,” and how communities adapted to the exigencies of a specific environment.

Reconstructing the development and demise of a prehistoric occupation from an analysis of its material culture is difficult in the best of cases, especially when written records or other corroborating lines of evidence are limited. It is even more difficult when the artifactual analysis is not complete, as it is in the case of this project. Conclusions must be necessarily tentative—to be supported, revised, or rejected as additional information becomes available.

That point notwithstanding, the long-term excavations in Heaton Canyon, near Gallup, offer an opportunity to examine some of these questions. Given the longevity of the excavation, which began in the 1970s, the passing of time has afforded researchers an opportunity to propose ideas, modify some, reject others, and, finally, come to reasoned conclusions, not only about the specific site, but perhaps also about the larger cultural and environmental contexts.

Can the excavation and analysis of a prehistoric site be used to help the public become better decision-makers about the future direction of its own culture, and if so, on what basis? More specifically, can useful lessons be drawn from the events that occurred in Heaton Canyon, a small, remote area in northwest New Mexico inhabited by an indigenous population, ca. A.D. 950, for our benefit?

The answer is a qualified “yes.” Despite technological differences, modern-day people and prehistoric people share much due to a common sociobiology. We can assume that much of the prehistoric brain is knowable because we share much of the genetic content that shapes human behavior. It is a simple general assumption that most, if not all, cultures generally act to protect themselves, especially their youngest members, to assure long-term survival of the population.
Description of the Heaton Canyon sites

After many years of fieldwork, the long-running ASNM-sponsored excavation of the great kiva and other structures in Heaton Canyon has ended, and at this writing the analysis of the data collection is underway. Publication of the final report is still some years off, but some aspects of the prehistoric occupation of the area have already been delineated through survey, pottery analysis and radiocarbon dating.

The archaeology of Heaton Canyon seems relatively straightforward in some ways. A large number of Pueblo II roomblocks have been found throughout the canyon, both in the alluvial floodplain and along talus slopes to the east and west of the main drainage (Figure 1). The roomblocks range in size from as small as two to upwards of 20 or more rooms (Table 1). Most appear large enough to have been used for at least seasonal, and perhaps permanent, use by extended families. Many have been found to be roughly contemporaneous with the great kiva, which is the largest and most imposing architectural structure in the canyon.

The scattered placement of the site across the talus slopes seems significant. It is this pattern that suggested the possibility that the population was in some sense less organized than were populations found in the Pueblo III period which followed. Absent are the massive roomblocks seen at Chaco Canyon and elsewhere housing perhaps hundreds of people. There was not one clearly predominant building—in terms of size, architecture or site placement—among the residential structures that might offer a clue to the canyon’s social structure. On the face of it, the placements of individual sites seems to have been decisions left to the builders and occupants.

The dominant structure is the great kiva itself which, due to its size, has been assumed to have been constructed through a cooperative effort of canyon residents, perhaps those occupying the individual roomblock structures. Its size invites a comparison with great kivas found elsewhere, but the comparison is divergent in terms of its context.

Is there a relationship between this feature of archaeology and the area’s ecology? What is the economic and environmental significance of a great kiva without a large roomblock?

As one the project’s field directors (1978, 1985, and 1987), I took on the assignment of attempting to place the great kiva and the scattered site pattern into the context of the natural environment of Heaton Canyon. Some years ago I prepared an initial reconstruction of the canyon’s human ecology, which will be available when the final report is issued in the years to come. In order to help move the project forward, I am presenting here a shortened version of that paper (Brethauer 2000). It is based on evidence garnered during the excavation, on survey data collected and interpreted by Kelley (1992), and on other lines of evidence available at the time, including radiocarbon dates. Space limitations do not allow me to provide complete evidence for these conclusions here, but it will be contained in the final version of the site report.

Synopsis of the Reconstruction of the Settlement Pattern of Heaton Canyon

People began using Heaton Canyon for hunting and gathering at an unknown date prior to A.D. 850. A pottery-making people with knowledge of agriculture was attracted to Heaton Canyon and began to farm the floodplain in small numbers sometime in the ninth century. Population slowly expanded as people became more proficient farmers and as their knowledge of the canyon’s specific geography, topography, climate and other aspects of the resource base improved. After A.D. 990, a combination of improved climatic conditions (specifically, increased average summer rainfall) and technical know-how made an expansion of usable farmland (tributary arroyos) possible, and thereby created a new economic opportunity. Population then increased somewhat more rapidly over the next 120 years. One such family built its storage and living rooms just north of the great kiva around A.D. 992. Other families moved in and occupied many other plots of land suitable for building.
Figure 1. Heaton Canyon site locations
<table>
<thead>
<tr>
<th>Site Field No.</th>
<th>LA No.</th>
<th>Site Name</th>
<th>No. of Rooms</th>
<th>Predominant Pottery</th>
<th>Excluded from Population Study</th>
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<td>Gallup</td>
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<tr>
<td>594</td>
<td>88416</td>
<td>Serendipity Site</td>
<td>10-12</td>
<td>Puerco</td>
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<tr>
<td>595</td>
<td>14269</td>
<td>Sherd Scatter Southeast</td>
<td>1-2</td>
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<tr>
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<td>88419</td>
<td>Valley Jacal</td>
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<td>Red Mesa</td>
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<td>599</td>
<td>88421</td>
<td>Feather Head Site</td>
<td>5-6</td>
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<td>601A</td>
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<td>Bent Bolt Site</td>
<td>?</td>
<td>Puerco-Gallup</td>
<td>X</td>
</tr>
<tr>
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<td>2-3</td>
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<td>Hermana Site</td>
<td>9-10</td>
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Religious activities at first seemed to have been carried out in small family kivas. One such early kiva, adjacent to the site of the subsequently constructed great kiva, was built sometime around A.D. 980-992. An exception to the usual pattern was a larger than normal kiva constructed sometime after A.D. 975 on the same site as the great kiva. It may have been built to accommodate an unusually large family, but it could also indicate any early attempt by residents to form a larger consensual aggregation.

During the eleventh century, years of good rainfall and good harvests predominated, although they were interspersed with occasional periods of drought as well. Overall, the residents were able to increase their reliance on subsistence agriculture. The effective population continued to increase. By the middle of the eleventh century, about 33 families occupied Heaton Canyon, and by the end of the eleventh century, perhaps up to 60+ families did so. Climatic conditions continued to be generally favorable. During this period the population may have approached the canyon’s long-term carrying capacity. At the same time, the culture’s long-standing subsistence strategy, which emphasized continued hunting and gathering, may have changed, as agricultural crops gradually comprised a larger portion of the people’s diet. The Pueblo II residents had now become invested in agriculture both because favorable environmental conditions permitted it, and because a larger population depended on it for its subsistence. Episodic short-term droughts during this time may have caused concern, since people knew that they were now so numerous that reverting entirely to hunting and gathering would not have been economically feasible. When droughts did occur, they did not cause mass starvation, nor did they cause social breakdown. However, the
hardships fell unevenly on those families that were more dependent on runoff from tributary arroyos. Those whose fields lay in the canyon bottom where the water table was higher were able to harvest crops more reliably. These inequities lay the groundwork for more systematic changes in the social system when stress became more severe.

After enduring 10 or more years of drier-than-normal conditions (A.D. 1090-1099), and similarly dry conditions intermittently thereafter, a community meeting was called sometime around A.D. 1100 to consider ways in which people could join together to solve the problems presented by overpopulation of an unreliable resource base. The decision-making process emphasized the culture’s values of equity and consensus. The process was inclusive of all the resident families.

Construction on the great kiva then began between A.D. 1100 and 1110, and was completed in three to four years, based on dendrochronological evidence from the roof. The space provided the community with a forum for the adult males to meet, not only to carry out religious rites, but also to grapple with practical matters such as the equitable division of farmland and the provision of food to members of the community. It is assumed that the kiva played a critical role in these matters over the next half century by providing an appropriate forum for men to make formal decisions with religious sanction.

By virtue of the fact that the population was in decline by the first half of the twelfth century, it is inferred that the leadership council made difficult decisions about land use, and exercised a moderate level of social control during a time when short-term droughts made harvests unpredictable. The continued importance of the kiva is demonstrated by that fact that it was remodeled and repaired ca. A.D. 1137.

A more orderly system of land and crop distribution could not compensate for environmental deterioration caused directly by overpopulation and indirectly by climatic change. The decades of the 1130s and 1140s saw a significant decrease in overall rainfall. Furthermore, the following decade (A.D. 1150) saw the end of the period of “increased effective moisture above modern averages [within the region]” (Euler et al. 1979:1096). Some families then began to abandon Heaton Canyon and move to less marginal areas to pursue hunting and gathering. While some families held on, a point finally came in the 1160s when the energy required to maintain the social system exceeded the potential benefits of remaining in place. A formal decision was taken by the remaining families in A.D. 1168 to abandon the canyon entirely and disperse. The kiva was burned to desanctify it and to symbolize the final abandonment of Heaton Canyon’s marginal lands. In the final analysis, the demise of the settlement seems to have been due to overpopulation relative to the resource base, against the background of generally drier conditions and short-term droughts.

Discussion

The community-wide culture that emerged in Heaton Canyon, beginning with the construction of the great kiva, was based on agriculture to a greater extent than previously. After abandonment there is no evidence of any subsequent occupation that reutilized the resources of the canyon as before. In terms of the people’s subsistence strategy, the resource base was exhausted. Pueblo III and Pueblo IV occupations are known from sites to the south at Zuni, Fort Wingate and elsewhere, and north in Chaco Canyon, but not in Heaton Canyon itself.

Based on the large differences in rooms associated with individual occupation sites the size of individual families is assumed to have varied. However, cooperation among all families was necessary in order to carry out tasks important to the entire community, both because of labor requirements as well as a (presumed) shared belief system. All families became stakeholders in the community’s most important decisions, such as to build the great kiva, or to abandon it and the canyon settlements later on. Since all families faced similar risks inherent in depending of marginal agricultural land, the only practical alternative was to extend their cooperation with each other, rather than face
alone the difficulties of survival through hunting, gathering, and farming.

The new social pattern, which integrated formerly loosely organized extended families into a cohesive tribal body, contained features that could not be easily dismantled. The construction of the great kiva was a catalyst that impelled the reorganization of the population into a more efficient decision-making body. Once the new social structure was created, it could not be undone without losing the gains it provided. The construction of the great kiva brought about a rationalization of the social structure. Once formed, it resisted dissolution, since people found a larger social grouping to be more economically efficient and resistant to the problems that people faced trying to live in an agriculturally marginal area. In short, a larger social aggregation reduced vulnerability to year-by-year fluctuations in the resource base by enlarging the base population practicing an enhanced subsistence strategy.

The Role of Religion

The social changes that occurred were aided by the community’s religious values. The environmental stressors leading up to the canyon’s abandonment may have worsened existing economic inequalities among families within the Heaton Canyon community, but religious practice and belief may have lessened conflict by subsidizing poorer families. Shared belief systems can help groups make and accept difficult decisions, by emphasizing the importance of group needs over those of the individual: The gods don’t take sides. The construction of the great kiva was a religious act that subsequently allowed the community to deal socially with the effects of environmental stressors. Even so, the environmental degradation of the Heaton Canyon environment did not allow the reorganized population to successfully overcome the lack of a permanent water source and limited quantities of arable land.

Final Thoughts

The excavations at Heaton Canyon indicate that the human experience there had much to do with social responses to environmental change. The record illustrates an instance in which a society used sociology and religion to wrestle with ongoing economic problems. The significance of religion in this situation cannot be overstated. (In contrast, it could be argued that our own society’s general abandonment of religious authority has made problem-solving more difficult, since there is no universally respected authority to reward people for making similarly difficult decisions.) In Heaton Canyon, the very marginality of the subsistence strategy would suggest that people would have understood their vulnerability and relied on religious authority as they faced frequently occurring vicissitudes. The Heaton Canyon occupation can be seen as a good example of the universal practice of interpreting, mitigating, and responding to physical experiences through a cultural lens.

A few final observations:

- Given the climatic conditions present in the prehistoric past, the Four Corners area was generally unsuited for sustainable human settlement based on an agricultural economy except where permanent water sources were available. Akchin agriculture supported only a limited population for a relatively short time span.
- The consensus model of decision-making seemed to work effectively by appealing to a neutral authority and by equalizing the harmful consequences suffered by any individual member of the group;
- Human populations are shaped by their experiences of a particular environment as much as people shape the environments in which they live.

—DPB
Endnotes
1. This section is replicated verbatim from portions of Brethauer (2000).

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Rock Art Recording in El Malpais National Conservation Area and El Malpais National Monument

SHEILA K. BREWER AND MARGARET SENTER (GRETCHEN) OBENAUF

Introduction by Gretchen Obenauf

This introduction summarizes a volunteer rock art recording project carried out by Sheila Brewer in El Malpais National Conservation Area (managed by the Bureau of Land Management [BLM]) and El Malpais National Monument (managed by the National Park Service [NPS]). Except in the northwest, the National Conservation Area (NCA) surrounds the National Monument. In general, the lava-covered “malpais” became part of the Monument and the non-lava areas became part of the NCA when the two special areas were designated by Congress on the last day of 1987. Because of this division, most of the sandstone suitable for rock art is in the BLM-managed NCA. Of the 94 rock art sites recorded, 87 are in the NCA and seven are in the Monument. In addition, there are 17 graffiti/historic inscription sites in the NCA and 11 in the Monument, for a total of 122 sites recorded by the project.

This report was originally intended to accompany the six large binders of site forms in the BLM archives and at the State of New Mexico Archaeological Records Management Section (Figure 1). However, when it was announced that Sheila would be the 2014 Archaeological Society of New Mexico (ASNM) volume honoree, it seemed appropriate to also publish the report in her volume.

Sheila carried out the El Malpais Rock Art Project between 1995 and 2007 as a volunteer for both the BLM and NPS. On May 23, 2001, she received the BLM National Volunteer Award—Making a Difference on the Public Lands, in Washington, D.C. She first became active in the ASNM while still a teacher in the Gallup-McKinley County schools. She participated in excavations at the Vidal Site (1983-1993) sponsored by ASNM. She attended ASNM rock art recording training seminars in 1987 and 1989, and attended a two-week long Arizona Rock Art Field School in 1995. She was first certified by ASNM as a Provisional Certified Rock Art Surveyor in 1987 based on a project in Red Rock State Park near Gallup, and was later certified in 2000 as a Certified Rock Art Surveyor based on the rock art recording project in El Malpais.

Figure 1. A happy day! Sheila submits the completed site forms in six large notebooks to the BLM in Albuquerque on July 13, 2007 (photo by Gretchen Obenauf).
Sheila began volunteering for BLM at El Malpais in 1986, and then started volunteering to staff the new BLM ranger station in 1992 after she retired from the Gallup-McKinley County Schools after 29 years of teaching (Figure 2). She soon realized that there was a tremendous amount of rock art just waiting for her to record it. She formally took on the project in 1995. Initially, Sheila identified sites with rock art in two ways. First, she went through the site forms for the previously recorded archaeological sites on file at the BLM office in Grants to identify sites with known rock art. She then relocated sites where rock art had been previously noted, completing a Laboratory of Anthropology site update form with rock art attachment for each of these sites. The locations of a number of unrecorded rock art sites were known to members of the staffs of the NCA and Monument; other locations were reported by members of the public. She located and recorded these sites early in the project.

A word about terminology used by this project: Although rock art sites are archaeological sites, and are recorded on the same Laboratory of Anthropology site form as other kinds of archaeological sites (with a rock art supplement), this project makes a distinction between rock art sites and other archaeological sites. Sheila recorded only rock art sites, although if the rock art was in close proximity to a known archaeological site, she recorded the rock art as an update to the existing site. She recorded two rock art panels in association with previously unrecorded archaeological sites. These are a storage room associated with RA-75 (LA 157949) and a rock shelter associated with ELMA-G28 (LA 157973), both in Bonine Canyon.

As the project progressed, members of the staff, other volunteers, and members of the public continued to report rock art sites, which Sheila located and recorded. In addition, she began a more systematic survey for rock art. In this and other facets of the project she was assisted by a number of volunteers and BLM and NPS employees. She and her assistants hiked many miles along both sides of the canyons of the NCA. They usually examined only the lower sandstone layers, checking especially in areas of high archaeological site density and at the mouths of canyons. Higher sandstone layers were checked only if rock art had been reported or a known archaeological site was nearby.

The NPS Sandstone Bluffs area on NM 117 has been examined intensively. Sheila and her assistants have also hiked extensively in the following BLM areas: the Narrows, Cebolla Canyon, Sand Canyon, Middle Canyon, Cedar Canyon, Bonine Canyon, and parts of Tank Canyon. The cliff areas facing NM 117 and County Road 41 were also checked.

The site files in the BLM Grants office first used to identify known sites with rock art are incomplete; the complete files are maintained by the BLM Rio Puerco Field Office in Albuquerque. Tony Lutonsky of the Albuquerque office supplied maps showing the locations of all known sites. Sheila used these maps to determine which recorded archaeological sites were near the rock art site being recorded. In some cases, she identified unrecorded archaeological sites near the rock art site. Distance and direction to previously recorded and unrecorded sites are noted in the narrative section of the Laboratory of Anthropology site form.
Each site was recorded on a Laboratory of Anthropology site form, with rock art attachment, according to the standards of the Archaeological Society of New Mexico Rock Art Recording Projects. Rock art was documented with three Pentax K1000 cameras (one for color prints, one for black-and-white prints, and one for color slides). All rock art was drawn to scale using a measuring tape and string grid.

Site locations were plotted in the traditional manner up through early 2000, and UTMs were derived manually from these plotted locations. In March 2000, BLM supplied Sheila with a Garmin GPS unit which she used until she purchased a similar unit.

During the early years of the project, graffiti and historic inscriptions were recorded on a shorter site form than rock art. It was later determined that they should be recorded on the long form. However, since the graffiti/historic inscription sites were not revisited when the information was transferred to the long form, there is not as much information about geology, plants, and other physical aspects of the surroundings for the graffiti/historic inscription sites.

And now a personal note. Sheila has been volunteering for the BLM since 1986, just before El Malpais National Conservation Area was established. Besides her heroic effort to record the rock art, she has also volunteered to staff the BLM Ranger Station on NM 117 near Grants one day a week. For many years she drove in from Gallup early one morning to staff the Ranger Station, stayed overnight in the sleeping quarters, and spent the next day recording rock art. After she finished the rock art project, she continued as volunteer staff at the Ranger Station one day a week. She has become a friend to all of us who have worked with her over the years, and we will miss her greatly now that she has moved to Tucson. Sheila, there’s always a bed waiting for you in Albuquerque!

—MSO

Results of the El Malpais Rock Art Project by Sheila Brewer

A total of 122 sites was recorded by the El Malpais Rock Art Project between 1995 and 2007. Of these, 104 were in the BLM-managed El Malpais National Conservation Area, and 18 were in the NPS-managed El Malpais National Monument. Of the 104 sites in the NCA, 87 were rock art sites and 17 were graffiti/historic inscription sites. Of the 18 sites in the Monument, only seven were rock art sites and 11 were graffiti/historic inscription sites.

Much of the rock art was found on Tres Hermanos sandstone in Cebolla Canyon, Sand Canyon, Middle Canyon, and Bonine Canyon in the NCA. Tres Hermanos sandstone is a reddish sandstone that makes an ideal “canvas” for rock art. However, one of the most unusual sites, a charcoal drawing of a possible kachina, was on the wall inside a lava tube located west of the Big Tubes area in the Monument. This site was a referral from David Bleakley, an Albuquerque botanist who did a plant survey of the Monument.

About 65 percent of the rock art sites face south: of the 94 prehistoric sites studied, 23.4 percent face southeast, 23.4 percent face south, and 18.2 percent
face southwest. The other orientations are 13.8 percent west, 11.7 percent east, 4.3 percent north (1.1 percent north, 1.1 percent northeast, 2.1 percent northwest), 2.1 percent face down, and 3.2 percent face up. It is interesting to note that 43.6 percent of all sites are multidirectional; that is, they have elements facing more than one direction.

It is clear that there is still unrecorded rock art in El Malpais NCA and El Malpais National Monument. Light conditions, boulders by the thousands, turning left instead of right, all mean that some rock art went unnoticed. In addition, there are many low probability areas that were not visited during the El Malpais Rock Art Project. Several rock art sites were reported that could not be located based on the descriptions of their locations.

**Design Elements**

The rock art design elements from each site were placed on the 2004 ASNM Design Element (Image) Condensed Inventory Key and coded on an Excel spreadsheet. Some of the elements were specific to the El Malpais Project. The coded information was then printed out showing the elements from each site and then a second printing arranged them by element type. The appendices to the report on file at the BLM and the Archaeological Records Management Section contain the code key and the data sheets. Some of the coding is not transferable to other project areas since I made up specific names for certain elements I found in El Malpais. It should also be noted that the ASNM Design Element Inventory Key has been updated since I used it.

The percentage of each type of the 1,341 prehistoric design elements is listed below:

- Linear Designs: 25.7%
- Geometric Designs: 22.7%
- Miscellaneous Elements: 14.3%
- Human Figures: 10.3%
- Animal Figures: 9.8%
- Prints and Tracks: 8.1%
- Multiple Elements: 3.5%
- Artifact Forms: 2.5%
- Dot Patterns: 1.9%
- Mythological Being: 0.7%
- Plant Forms: 0.5%

If the 82 historic elements are added, yielding a total element count of 1,423, there are 2.0 percent historic elements and 3.7 percent recent elements.

Comparing my data to the classifications by Polly Schafsma from her book *Indian Rock Art of the Southwest* (1980), I find that they best match the Anasazi Rock Art Tradition of the Colorado Plateau, although as noted below, at least one site is in Schaafsma’s Mogollon Red Tradition and another is in the Chinle Representational Style. In what follows, italics and underlined information below are statements that come from Schaafsma (1980). In addition, I have added other elements that I observed in El Malpais.

Life-form elements of Schaafsma’s Anasazi Rock Art Tradition include *solidly pecked life-forms, quadrupeds, including deer and mountain sheep,* and in the Malpais, pronghorn (Figure 4a-e). *Rectilinear stick figures, lizards, and flute players* are common. However, there are no flute players or Kokopellis in El Malpais, and in addition to lizards there were snakes (Figure 4f-g). Human figures have triangular- or square-shaped bodies or rectilinear stick shapes (Figure 5a). *Birds are common* and some that appear in El Malpais are thunderbirds, parrots, turkeys, shorebirds, ducks, swallows, and many unidentified birds (Figure 5b-g). *Tracks including animal, human and sandal prints* are common. El Malpais has bird, bear, and badger tracks (Figure 6a-e), and many human hand prints, some made by pressing hands in paint and then touching stone and some made by blowing paint around a hand (Figure 6f-g).

Abstract designs consisting of spirals, concentric circles, zigzag and wandering lines that act to unify or join the elements in the panels they occur are also found in Schaafsma’s Anasazi Rock Art Tradition. Design elements in El Malpais include many straight, wavy, curved, and zigzag lines, and abstract designs such as scrolls, spirals, and concentric circles...
Figure 4. Animal figures: (a) deer; (b) deer/elk; (c) bighorn sheep; (d) antelope; (e) mountain lion; (f) lizard; (g) snakes. Scale: One grid square is 20 cm by 20 cm.
Figure 5. Human figures and birds: (a) human figures; (b) unidentified bird; (c) swallow; (d) parrot; (e) unidentified bird; (f) turkey; (g) shorebird. Scale: One grid square is 20 cm by 20 cm.
Figure 6. Prints and tracks: (a) bird tracks; (b) bear tracks; (c) badger tracks; (d) human foot prints; (e) sandal track; (f) human hand prints; (g) human hand prints. Scale: (a) to (f)—one grid square is 20 cm by 20 cm; (g) is not to scale.
I put many elements in a complex linear abstract category if lines connected different elements (Figure 7e).

Textile and pottery motifs with frets are common in the Anasazi Rock Art tradition. There are 22 sites in El Malpais with actual textile elements or with sections showing pottery designs (Figure 7a).

Schaaafsma says that rectilinear stick figures, increased numbers of pottery and textile designs and abstract designs, along with the rectilinear shapes of men and lizards, could be diagnostic of the rock art of the Anasazi Rock Art Tradition.

Nine pictograph sites were found in El Malpais. LA 157894 (Cebolla Canyon) has small red painted human and animal figures. Some of the human figures seem to have birds or something else on their heads. LA 157897 (Bug in Cave in Cebolla Canyon) has a red-painted animal on the ceiling of a small cave with red, white, and black painted designs on the small back wall of the cave. LA 157898 (Sand Canyon) has a yellow-painted Lightning Man. This element is in danger of peeling off the sandstone cliff it is painted on. LA 157900 (Sand Canyon) shows a turkey with a few red painted lines (Figure 5f). Just to the south of the turkey are some wavy, red lines which appear to have been made at the same time as the turkey, not shown in Figure 5f. LA 157901 (Sand Canyon) is a stick figure made from faded red paint. Aldridge North (LA 157902 in the unnamed canyon north of Homestead Canyon) has hand prints on the ceiling of the rock shelter made from spraying white paint around a person’s hand (Figure 6f). The LA 157916 (Armijo Canyon) pictograph is formed from red paint handprints where they pressed their hand in the paint and then up on the cliff above the springs (Figure 6g). The second hand print is much lighter and probably made after they used most of the paint on the first print. This hand print has spatulate figure tips, perhaps showing that this person had congestive heart failure. LA 157917 (Armijo Canyon) has parts of 10 handprints which are very small and made by spraying reddish-brown paint around a hand. It also has a textile design made from red and white paint. LA 157954 (Tank Canyon) has five single zigzag lines, three wavy lines, parallel zigzag lines, and one with circles on a straight line which are made with red paint. These are in the Mogollon Red Style (Schaaafsma 1980:190), which makes some sense since this site is on the far south end of El Malpais.

Further findings about the rock art elements are described in the following paragraphs:

Two sites (LA 157890 in Cebolla Canyon and LA 157899 in Sand Canyon) have human figures or ceremonial figures with ear bobs (Figure 8a).

Two sites have figures that I called ghosts, Aldridge Panel (LA 10884 in the unnamed Canyon north of Homestead Canyon) and the Marge Site (LA 157938 in Cedar Canyon). The one in the Aldridge Panel is faint with lightly pecked lines which even show its ribs (Figure 8b). The faintness shows that it is older than some of the other elements on that panel. The ghost from the Marge Site reminds me of Jornada style elements from the Mogollon area because of its two large Tlaloc-like eyes (Figure 8c) (Schaaafsma 1980:199). Cedar Canyon is at the south end of El Malpais almost to the Catron County line, toward the Jornada area.

Another interesting element at the Marge Site (Cedar Canyon) is the presence of a pronghorn antelope petroglyph (Figure 4d). This panel is near grassy areas, which would be attractive to pronghorns. In the canyons farther north in El Malpais, bighorn sheep, shown by the type of their horns, are common (Figure 4c).

Another site (LA 157914) in Armijo Canyon has a pecked Lizard Man which has had a lightly scratched grid placed over it (Figure 8d). Alternatively, the grid may have been scratched on first and then the Lizard Man pecked. The grid is so faint that it is difficult to tell which one is on top.
Figure 7. Artifact forms, linear designs, and geometric forms: (a) textile or pottery designs; (b) spiral; (c) rectilinear scrolls; (d) concentric circles. Scale: (a), (b), (c), and (e) is one grid square is 20 cm by 20 cm; the grid square for (d) is 10 cm by 10 cm.
Figure 8. Human figures: (a) ceremonial figures with ear bobs; (b) ceremonial figure (ghost); (c) ceremonial figure; (d) “lizard men.” Scale: (a), (b), and left-most (d) is one grid square is 20 cm by 20 cm; (c) and right-most (d) not to scale.
Figure 9. Geometric forms, human figures, animal figures, and dot patterns: (a) terraced pyramids; (b) double “fish-hooks”; (c) “keyhole” design; (d) “flagmen”; (e) complex panel with life form; (f) single line of dots. Scale: (c) to (f) is one grid square is 20 cm by 20 cm; (a) and (b) not to scale.
Sites in Cedar Canyon have many stepped terraces (Figure 9a). They also have elements that I called fish-hooks, which are found only in this canyon (Figure 9b).

Keyhole designs (Figure 9c) show up in Aldridge North (LA 157902 in the unnamed canyon north of Homestead Canyon), Cliff (LA 18135 between Homestead Canyon and Armijo Canyon), and Keyhole (LA 157937 in Cedar Canyon).

Several sites in Cebolla Canyon and Sand Canyon have elements that I called Flagmen (Figure 9d). They usually have square bodies with a head and arms and a long line from the center bottom going down into the ground. These sites are Lobo Canyon Petroglyphs (LA 11709 in Cebolla Canyon near its junction with Lobo Canyon), Hump (LA 157895 in Cebolla Canyon), Junction (LA 157890), Upper Junction 1 (LA 157925), Upper Junction 2 (LA 157926), and Tall Blanket (LA 157927), all near the junction of Cebolla Canyon and Sand Canyon, and Monk Site (LA 157962 in Sand Canyon).

Five sites have associated grinding slicks. They are Cliff (LA 18135 between Homestead Canyon and Armijo Canyon) with six slicks, Dittert South (LA 11734 in Armijo Canyon) with one, Upper Junction 2 (LA 157926 near the junction of Cebolla Canyon and Sand Canyon) with two, Aldridge Grinding Slicks (LA 157931 in the unnamed canyon north of Homestead Canyon) with 10, and LA 74563 (between Cedar Canyon and Tank Canyon) with six.

Other interesting elements are the ceremonial figure (Figure 9e) at April (LA 157891 in Cebolla Canyon and one of the human figures in Mountain Lion (LA 157899 in Sand Canyon) with a baby inside (Figure 5a).

**Dating the Elements**

The rock art in El Malpais was dated by considering the ages of the archaeological sites associated with the rock art panels, as well as the age of the rest of the archaeological sites in El Malpais. The great majority of the sites in El Malpais date to Pueblo II (A.D. 950-1175 and Pueblo III (A.D. 1175-1325) (Marshall 1991). As noted above, most of the rock art in El Malpais seems to fit into Polly Schaafsma’s Anasazi Rock Art Tradition of the Colorado Plateau (1980) and likely also dates to the Pueblo II-Pueblo III time period.

I believe that at least three of the rock art sites may pertain to other rock art traditions. LA 157943 (unnamed canyon north of Homestead Canyon) consists of a curved line of 46 dots on a boulder (Figure 9f). It is unlike anything else I recorded in El Malpais and thus may be earlier. Another potentially earlier site, LA 157894 (in Cebolla Canyon) has small red paint human figures with birds on their heads along with a deer, similar to Modified Basketmaker-Developmental Pueblo Chinle Representational Style pictographs (Schaafsma 1980:125-126). LA 157954 (Tank Canyon) is a pictograph site with red wavy, straight, and zigzag lines, and one straight line with circles on it. This is a Mogollon Red Rock Art Tradition site which may date to approximately the same time period as the Anasazi Rock Art Tradition sites (Schaafsma 1980:187-191).

Several sites are probably more recent than the archaeological sites in El Malpais. LA 157961 in Sand Canyon has a face or mask that is made in a much different style than the other elements in El Malpais. I think it is probably Pueblo IV (A.D. 1325-1540) or historic. LA 140326 (El Malpais National Monument) is inside an ice cave and is drawn with charcoal. The drawings appear to be early Kachina figures or masks, perhaps Zuni or Acoma.

Characteristics of the Aldridge Panel (LA 10884) suggest it was used for many years. However, all elements are representational and probably date to Pueblo II-Pueblo III. Some petroglyphs are sparsely pecked and faint and may be earlier in the sequence. Some are darker and more deeply pecked with wider lines. Some show some incisions with less repatination and may be later. Several other panels likewise show that they were visited many times and more petroglyphs were placed on them.

—SKB
Acknowledgments

I want to thank all the volunteers who helped with this project. Below is a list of all the volunteers (unpaid and paid) who helped me over the years, in descending order of hours worked:

Mary Raje, Marge Allen, Terry Goodman, Dale Berry, Debbie Hannevig, Marie Oskey, Chanda Monk, Ken Jones, Amy Armaw, John Roney, April McDowell, Karen Davis, Peg Fleming, Rob Bastik, and Steve Fischer.

References

Marshall, Michael P.

Schaafsma, Polly
1980 Indian Rock Art of the Southwest. Santa Fe: School of American Research.
Musical instruments are relatively rare in the archaeological record, but the good preservation afforded by the arid Southwestern environment has left archaeologists with a wide variety of musical objects from the past including flutes and whistles of wood and bone; shell trumpets; copper and clay bells; rattles of gourd, turtle shell, or leather; wood and bone rasps; wooden bullroarers; tinklers of shell, petrified wood, nuts, and hoofs; and kiva bells—stones which produce a musical note when struck (E. Brown 2005). With rare exception, kiva bells are usually stones exhibiting only minimal modification, leading to some difficulty and confusion in identification. People unfamiliar with the instrument type might fail to recognize them, while others who know of them but have little knowledge of the acoustic properties of stone might misidentify stones with no musical qualities. This paper provides some guidance on identification of kiva bells from archaeological settings and a social and historical context for lithophones in the Southwest.  

**Lithophones**

Kiva bells (Figure 1) belong to a class of instruments known as lithophones—musical instruments made from a stone or pieces of stone—and as such are considered percussion instruments and idiophones. Because the sound is produced by

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Figure 1. Three kiva bells found in the historic plaza at San Lazaro Pueblo. Photograph by the author.
the vibration of the stone, lithophones are usually suspended or laid out on racks. Lithophones have been recovered from archaeological contexts worldwide including in Europe, the Far East, Africa, the South Seas, and North and South America. The oldest known set, discovered in 1949 at the site of Binh Da in the southern Dong Nai province of Vietnam, is 3000 years old (Condominas 1952 and Schaeffner 1951, cited in Falkenhausen 1993:201n4).

Caldwell (2013:521-522) distinguishes between various types of lithophones. Under stationary lithophones he includes natural stalagmitic drapery, adulterated ridges and stalactites, stationary rock faces, natural but positioned stationary lithophones, and manufactured stationary columnar lithophones. Under portable lithophones he lists suspended natural rocks, modified natural rocks, long bifaces and stone slabs, and stone cylinders. Most of the examples found in the Southwest fall into the suspended natural rock portable lithophone category, but one stone cylinder has also been found. The nearest stationary lithophone used prehistorically of which I am aware is the Lithophone Gallery in Las Ruinas Cave, Oaxaca, Mexico:

It is a group of stalagmites, stalactites, columns, and drapery of various colors and shapes, among which about ten have percussion wear on one or several sides. Other much smaller stalagmites are scattered broken on the ground. Using one of these to strike the speleothems of the lithophone produces particularly harmonious sounds, and their use as musical instruments is quite conceivable. It is interesting to point out that the acoustics in and between the lithophone room and the altar room are excellent. The resonance creates a phonic space among these different structures: it is thus perfectly imaginable that people near the altar would have received the full effect of beating on these “stone drums”, a term derived from a Maya glyph translation (Hapka and Rouvinez 1997:23).

Kiva Bells

In my research on musical instruments from the Southwest, I examined organological (morphological), ethnological, historical, iconographic, and archaeological lines of evidence to the degree possible for each instrument type. I have found no instances of Spanish or other historical documents that describe the use of kiva bells, nor have I come across any depictions of them identified as such. Organology and archaeology are discussed further below following the discussion of ethnographic accounts.

Ethnographic Accounts

The early ethnographic documentation consists of two observations, one provided by Edgar Lee Hewett and the other by Frances Densmore. According to Hewett (1909:655), kiva bells are stones “which, when tapped with stones of the same kind, give out a clear metallic sound that can be heard at a considerable distance. These stones, suspended from the roof by strings of deer-skin, were used by the priest to call men to the kiva.” Hewett claims to have seen such stones in use at Taos Pueblo in 1896, and Densmore observed one at Santo Domingo in the 1930s as part of ceremonies connected with the winter solstice as well as with sickness and death. In one instance, stones were used during a song which itself was regarded as protection against sickness (Densmore 1938:45-46, 172-173). Densmore describes the occasion of its use in the following way: “The larger stone is heavy, black in color, and shaped roughly like a crescent with notches cut in the concave edge. One man carries the stone, suspended by a heavy thong, and strikes it with a smaller stone, producing a sound like that of bells” (1938:45-46). Kidder also describes a similar method of playing a kiva bell (1932:94-95), but it is unclear whether he ever actually witnessed one in use.

An additional insight into the history of the use of kiva bells comes from a place name. There is a pueblo in the Jemez Mountains of New Mexico known as Patokwa. One of its other native names is Ka;atusekwa, a word that translates to “Place Where They Hit or Ring the Stones,” according to
Harrington (1916:397; see also Reiter 1938:Figure 2). Harrington goes on to add, “Such bell-stones used to be struck at Pátökwa in connection with certain dances: hence this name, we are told.” Harrington’s brief description of the method of playing the bells that precedes the statement about dances closely echoes language used by Hewett; it is my suspicion that while the linguistic information on the place name was probably obtained independently by Harrington, his information on the use of kiva bells came from Hewett rather than a Pueblo consultant.

One piece of more recent ethnographic information is also available. According to Brugge, who was researching a kiva bell found at Rainbow House in Bandelier National Monument, a Cochiti consultant stated that kiva bells stones were found in places where lightning had struck, and that the best tones were achieved by striking them with smaller pieces of the same type of stone (Brugge 1955:53-54). In addition to the significance inherent in the momentous event of a lightning strike upon the landscape, lightning is believed by many Pueblo groups to endow the land it strikes with additional fertility. Lightning is also closely associated with snakes and with warfare (Tyler 1964:236). This observation is consistent with, and may also explain, the zigzag lines and diamonds incised on a few kiva bells (see descriptions of individual objects in Table 1) which may represent lightning.

The available ethnographic data described above suggest that kiva bells were not suspended in racks as is frequently the case elsewhere in the world; instead, they were hung with leather straps and played by single individuals. As I have not discovered any depictions of kiva bells in my survey of iconography, the primary sources of information on the contexts of their use are the few ethnographic descriptions included above. The paucity of observations of kiva bells in use is perhaps not too surprising if Hewett is correct in his assertion that the main places they were played were the interiors of kivas, as these were places of limited access for many people, including ethnographers. Despite the small number of ethnographic observations, it is clear from the geographic locations involved that the use of kiva bells was fairly widespread within the Rio Grande Valley, ranging from as far north as Taos to at least as far south as Cochiti. As will be discussed further below, the archaeological evidence establishes the distribution of kiva bells as extending further south to Albuquerque as well as into the Galisteo Basin.

Organology

I know of 73 objects from Southwestern archaeological sites that have been labeled as kiva bells; only 50 have provenience information. Of the 73, I have examined all but 17 in person, and only 42 clearly possessed the physical characteristics of kiva bells. Some issues that have likely affected the sample must be mentioned. First, kiva bells are easy to overlook because many are simply pieces of unmodified stone that might be discarded by the uneducated excavator. It is, of course, impossible to know how many were inadvertently rejected during the course of past excavations. Second, some stones of the right size have been labeled as kiva bells when in fact they are of materials that, due to their physical properties, are not particularly resonant and would not be a good choice for sound production. Thus, the assemblage of known kiva bells has also been falsely inflated. While some experimentation is needed to decide more definitively what locally available material types would be appropriate for use as kiva bells some, such as sandstone, are clearly bad candidates due to their low density and highly friable nature. These have been eliminated from my sample in spite of their designation as kiva bells in the accompanying catalog information. Third, I was reliant on catalog information for identification of material types outside of my own expertise, and when that information was not provided, I assessed the general quality of the stone and included all but those with the coarsest grain such as those made from sandstone. Objects I examined in person that I have concluded did function as kiva bells are listed and described in detail in Table 1.

On the basis of this examination, some conclusions regarding kiva bells can be advanced. Kiva bells from the American Southwest are
<table>
<thead>
<tr>
<th>Approx. Dates (A.D.)</th>
<th>Site Name</th>
<th>Site Number</th>
<th>Museum</th>
<th>Catalog Number</th>
<th>Reference</th>
<th>Length (cm)</th>
<th>Width (cm)</th>
<th>Thickness (cm)</th>
<th>Narrative Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown</td>
<td></td>
<td></td>
<td>Museum of Indian Arts and Culture</td>
<td>6376/11</td>
<td></td>
<td>19.9</td>
<td>5.1</td>
<td>2.08</td>
<td>A curved wedge of fine-grained basalt polished and scarred on the surface. No obvious notches for suspension. Tapping yields high, clinky sound.</td>
</tr>
<tr>
<td>1300-1600</td>
<td>Otowi</td>
<td>LA 169</td>
<td>Museum of Indian Arts and Culture</td>
<td>12780/11</td>
<td></td>
<td>11.18</td>
<td>4.15</td>
<td>2.42</td>
<td>A shaft of basalt with lots of polish and some scars. High, good resonance.</td>
</tr>
<tr>
<td>1300-1600</td>
<td>Otowi</td>
<td>LA 169</td>
<td>Museum of Indian Arts and Culture</td>
<td>16492/11</td>
<td>Lambert (1954: Plate XXVIII)</td>
<td>21.3</td>
<td>5.3</td>
<td>3.6</td>
<td>A wedge of unidentified gray stone with much scratching leaving polish only in some places. Some scars, mostly off tip. When tapped, sound is high, with overttones of the 5th prominent. The stone is very resonant when handled—perhaps it was ground as often as struck, causing the multiple, fine scratches.</td>
</tr>
<tr>
<td>1200-1575</td>
<td>Pa’ako</td>
<td>LA 162</td>
<td>Museum of Indian Arts and Culture</td>
<td>16491/11</td>
<td></td>
<td>8.2</td>
<td>3.2</td>
<td>2.2</td>
<td>An irregular piece of unidentified black stone with traces of red ochre. Several scars along edges. Much scarring, but also some areas of polish and abrasion. Stone gives a high tone when tapped in spite of the large size.</td>
</tr>
<tr>
<td>1300-1600</td>
<td></td>
<td></td>
<td>Museum of Indian Arts and Culture</td>
<td>16493/11</td>
<td></td>
<td>43.4</td>
<td>8.4</td>
<td>5.5</td>
<td>A wedge-shaped piece of slate with red ochre in the uneven surfaces and some cortex. Shaped by grinding; scratches are still evident. Design of incised diamonds scratched through the red ochre paint on all four surfaces. Lines sometimes meet at the corners; others do not or are obscured. Produces little sound when tapped, but very resonant under friction.</td>
</tr>
<tr>
<td>1300-1600</td>
<td></td>
<td></td>
<td>Museum of Indian Arts and Culture</td>
<td>16494/11</td>
<td></td>
<td>26.7</td>
<td>4.4</td>
<td>2.8</td>
<td>A long blade of basalt with light polishing on high spots. Lots of scars (especially on edges); no evidence of grinding. When tapped yields high, clinky sound.</td>
</tr>
<tr>
<td>1300-1600</td>
<td></td>
<td></td>
<td>Museum of Indian Arts and Culture</td>
<td>16497/11</td>
<td></td>
<td>28.5</td>
<td>6.6</td>
<td>3.2</td>
<td>A blade of unidentified stone (with some areas of gold speckles) with a light polish on the high spots and scars all around edges. When tapped yields a high and clinky sound.</td>
</tr>
<tr>
<td>1300-1600</td>
<td></td>
<td></td>
<td>Museum of Indian Arts and Culture</td>
<td>16498/11</td>
<td></td>
<td>23.1</td>
<td>7.3</td>
<td>2.4</td>
<td>An irregular slab of unidentified stone with no tapering edges or ends. Front and back faces ground flat, but edges left rough. When tapped yields a high, clinky ring. Long, vertical scratches down length; a few horizontal ones across the middle.</td>
</tr>
<tr>
<td>1300-1600</td>
<td></td>
<td></td>
<td>Museum of Indian Arts and Culture</td>
<td>16499/11</td>
<td></td>
<td>21</td>
<td>5.85</td>
<td>1.7</td>
<td>Unidentified stone very resonant under friction but irregular in shape rather than flat. Very polished and smooth—no scratches or scars.</td>
</tr>
<tr>
<td>1300-1600</td>
<td></td>
<td></td>
<td>Museum of Indian Arts and Culture</td>
<td>30198/11</td>
<td></td>
<td>44.5</td>
<td>3.8</td>
<td>3</td>
<td>A square blade of unidentified stone with incised diamond design on every face and remnants of red ochre in irregular areas. Edges pecked down in one area. Stone is square and thick; pitch is lower than most.</td>
</tr>
<tr>
<td>1300-1600</td>
<td></td>
<td></td>
<td>Museum of Indian Arts and Culture</td>
<td>31932/11</td>
<td></td>
<td>29.9</td>
<td>7.3</td>
<td>3.12</td>
<td>A spire of basalt polished only on ridges and other raised surfaces. Two notches possibly used for suspension at one end. Yields a high, clinky sound when tapped and is very resonant. Lots of scarring on sides.</td>
</tr>
<tr>
<td>Approx. Dates (A.D.)</td>
<td>Site Name</td>
<td>Site Number</td>
<td>Museum</td>
<td>Catalog Number</td>
<td>Reference</td>
<td>Length (cm)</td>
<td>Width (cm)</td>
<td>Thickness (cm)</td>
<td>Narrative Description</td>
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<tr>
<td>1300-1600</td>
<td>Museum of Indian Arts and Culture</td>
<td>31933/11</td>
<td>83.6</td>
<td>7.09</td>
<td>3.91</td>
<td>A long, blade-like, fine-grained, unidentified black stone with yellow ochre in some deep crevices. Polished in some areas; very scarred along edges. One end broken off. When tapped the sound is high and clinky.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1300-1600</td>
<td>Kuaua</td>
<td>LA 187</td>
<td>Museum of Indian Arts and Culture</td>
<td>43026/11</td>
<td>26.3</td>
<td>3.5</td>
<td>5.8</td>
<td>A triangular blade of unidentified stone with one face polished, one polished and pecked, one face unaltered. Two chipped notches midway down the shaft. When supported there by fingers the stone hung level, as if notches were located for balancing it. There are some scars but not many.</td>
<td></td>
</tr>
<tr>
<td>1300-1600</td>
<td>Museum of Indian Arts and Culture</td>
<td>45898/11b</td>
<td>11.65</td>
<td>3.16</td>
<td>2.21</td>
<td>A very small piece of basalt very resonant both when struck tapped and under friction. Very high pitch; less clinky than some. Very polished in some areas; scarring on one edge.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1050-1150</td>
<td>Pueblo del Encierro</td>
<td>LA 70</td>
<td>Museum of Indian Arts and Culture</td>
<td>51088/11</td>
<td>14.2</td>
<td>5</td>
<td>A long, narrow, tapering piece of unidentified stone. Incised lines form diamonds continuing around the different facets. Currently 105 cm long, though one end broken off. It is 14.2 cm wide at its widest point, and 8.4 cm at its narrowest. One side more beveled than the other. Broken into 3 pieces and mended; missing an upper corner as well.</td>
<td></td>
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</tr>
<tr>
<td>1299-1612</td>
<td>Pecos Pueblo</td>
<td>LA 625</td>
<td>Pecos National Historical Park</td>
<td>9648</td>
<td>12.51</td>
<td>3.54</td>
<td>0.7</td>
<td>A thin slab of phyllite with notches on sides of a tapered end. Slight resonance to the touch; produces a high clinky sound when tapped. Kidder writes that it is: “roughly notched on either side near one end as if for suspension on a string. So hung, and tapped with another stone, this specimen gives a clear, tinkling note, not unlike that of a small metal bell.”</td>
<td></td>
</tr>
<tr>
<td>1275-1692</td>
<td>San Lazaro</td>
<td>LA 91 and LA 92</td>
<td>Private Collection</td>
<td>A309051</td>
<td>5.8</td>
<td>5.64</td>
<td>A long, rounded shaft of unidentified stone with one pointed and one flat end. Evidence of pecking on rounded end and abrasion on pointed one. Very resonant; tapping yields tone with two notes about a major third apart. Depending where along the shaft one taps it, one note or the other is more prominent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1275-1692</td>
<td>San Lazaro</td>
<td>LA 91 and LA 92</td>
<td>Private Collection</td>
<td></td>
<td>31</td>
<td>5.41</td>
<td>2.75</td>
<td>An unidentified fine-grained stone with slight grinding on smaller end, some scars on larger end. Gives high, clinky sound when tapped and is generally resonant to the touch.</td>
<td></td>
</tr>
<tr>
<td>1275-1692</td>
<td>San Lazaro</td>
<td>LA 91 and LA 92</td>
<td>Private Collection</td>
<td></td>
<td>22.65</td>
<td>4.42</td>
<td>3.22</td>
<td>An unidentified stone with a smaller end ground to flattened point. Entire surface covered with pecked scars. Gives high, clinky sound when tapped and is resonant to the touch.</td>
<td></td>
</tr>
<tr>
<td>1275-1692</td>
<td>San Lazaro</td>
<td>LA 91 and LA 92</td>
<td>Private Collection</td>
<td></td>
<td>20.24</td>
<td>4.41</td>
<td>2.22</td>
<td>A slender piece of unidentified stone with scars along edges of facets. Red ochre still caught in rough, unscarred surfaces. Gives high, clinky sound when tapped and is resonant to the touch.</td>
<td></td>
</tr>
<tr>
<td>1250-1500</td>
<td>Tsama</td>
<td>LA 908</td>
<td>Maxwell Museum</td>
<td>B.13</td>
<td>23</td>
<td>8</td>
<td>3</td>
<td>A piece of feldspar much smaller on one side than on the other; possibly ground.</td>
<td></td>
</tr>
</tbody>
</table>
elongated stones of argillaceous limestone, basalt, phyllite, phonolite, feldspar and similar materials, usually 30 cm or more in length. Beyond this, analysis of their general physical characteristics reveals that there are few patterns governing their size and shape. Length, width, and thickness are not correlated to any statistically significant degree, consistent with what would be expected from a series of relatively unmodified stones. Basalt was the most common material type, but material type did not correlate either with size or with distribution among sites. Size did not correlate with distribution either, and in fact the site from which there was the largest sample, Sapawe, displayed the most variation in size and the most variety of material types. I did not pursue the question of whether all the material types represented are available locally, but one would expect that if kiva bells were made from stones from somewhere far from the Rio Grande Valley, examples of them would be found near the location from which those stones had come, and very few kiva bells have been found outside the Rio Grande Valley proper.

The great majority of those in my sample were unmodified stones. It is possible that a view similar to that of the Cochiti individual interviewed by Brugge prevailed in prehispanic times in that there may have been something significant enough about the natural state of the stones, whether an association with a lightning strike or something else, which meant that none of them were modified to fit a preexisting ideal of what a kiva bell should look or sound like. Of those kiva bells in my sample that had been culturally modified, the most common treatment was grinding or smoothing of some portion of the stone to flatten or otherwise shape it. A few had notches chipped in the side, presumably to facilitate suspension, but this number was surprisingly small considering that ethnographic evidence suggests they were suspended by cords to be played. A few retained remnants of red or yellow ochre in rough areas on the stone, and two were decorated with an incised, interlocking diamond design.

While I did not strike any with another stone, a rough idea of their musical qualities could be gained by gently tapping them with a fingernail. Many were resonant even under the friction of being moved during measuring and other documentation activities; some were more resonant with friction than with tapping. In general, the quiet tones emitted when the stones were gently tapped were high and “clinky” with the tonic, or root, note dominant. The notes decayed quickly because of the physical properties of the stone, the lack of force behind the stroke causing the sound, and because I did not attempt to suspend them but let them lie on a surface which would have muffled the sound-producing vibration of the stone somewhat. Some variation was present in the tone quality even at this simple level of analysis, however. In one case, two tones about a major third apart were clearly distinguishable, and one note or the other became more dominant depending on where along its length the stone was tapped. In another, a note at the interval of a fifth was especially prominent among the overtones in addition to the root note. Clearly, individual instruments would have varied greatly in tone color, quality, and available pitches.

Given the lack of patterning in the data on physical properties, it is difficult to provide guidance towards identification of kiva bells based on the aspects of size or shape. The main common quality is that of sound production, with a secondary measure being the presence of associated use wear. Most of the kiva bells I examined showed scarring from being struck with another stone (percussors of antler, bone, and wood may also have been used). Others exhibited striations and/or polished areas such as would develop when friction rather than percussion was used to cause the stone to vibrate and emit sound. Several had both scarring and polish.

Thus an assessment of the sound quality and carefully examination of subtle signs of use wear on stones found in archaeological contexts may be the only secure means by which kiva bells may be identified. Caldwell (2013) provides some useful guidance on how to accomplish this, drawing on the
work of Gonthier and Hai (Gonthier 2009; Gonthier and Hai 2011). The Saharan objects they examined were much more formally modified than those from the American Southwest, but because of this, some of the physical qualities of an “ideal” lithophone were more evident and provide a list of qualities that can be used to assess the sound potential of other examples. According to their experiments, the most successful lithophones are made from homogeneous rocks that are basically cylindrical in form because such stones allow sound waves to make sinusoidal curves forming three lobes uninterrupted by flaws or impurities. Denser materials were more sonorous. Those with conical or otherwise roundly tapered ends rather than flat or slightly bulbous ones sounded better, as did examples more circular than oval in cross-section. Differences in length did more to change the pitch among objects of like materials than did changes in width, and stones were not resonant generally unless length was at least 4.5 times the width.

The two locations along the length of the stone where the sound wave crosses itself to form the lobes is acoustically dead and are places where the stone can come in contact with another surface without the sound-producing vibration being muffled. These are where a cord may be tied for suspension or where the stone might be supported horizontally. Therefore, one can test possible kiva bells by laying them on two soft supports spaced approximately a quarter of the way from each end and gently striking them. Caldwell used a wooden mallet to test two possible New England examples in this fashion; obviously the choice of mallet material should reflect the goal of avoiding damage to the artifacts. For those interested in additional acoustical analysis, Caldwell (2013) recommends the iAnalyzer Lite software, which includes a version for iPhones, and the reader should refer to his article for additional information and recommendations.

In terms of use-wear, Caldwell (2013:531) refers to the work of Blake and Cross (2008) and Cross et al. (2002), who examined the results of repeated percussion of flint, antler, and bone on stone. Use of flint (and, presumably, other types of stone) resulted in dense clusters of conical fractures or polish. Antler and bone left calcium/phosphorus deposits that appeared as dark smears overlaying clusters of depressions in the surface of the stone. The effects of wooden percussors is identified as an area for future study (Caldwell 2013:531).

Archeology

According to D. Brown (1967:72), all the sites at which kiva bells have been found post-date 1300 A.D. and all are in the Rio Grande region. While he is generally correct, one isolated instance of a kiva bell in northeastern Arizona has come to my attention, and more may have gone unrecognized. Within the Rio Grande Valley, the use of kiva bells was fairly widespread, though they are most common in the area surrounding the Jemez Mountains and the Pajarito Plateau. Kiva bells have been found at the pueblos of Pecos (Kidder 1932:94), Pa’ako, Puye, Puaray, Kuaua, and Cuyamungue (Lambert 1954:132). Others have been found at Rainbow House (Brugge 1955), Otowi, Pueblo del Encierro, Gran Quivira (Hayes et al. 1981:131), the Chamisal site (Holkamp 2013), Tsama, and San Lazaro. This group of sites represents a span of time stretching from the Late Coalition period through the Classic and into the Spanish Colonial period.

Relatively little information is available on the provenience of the kiva bells at the sites named above. Hewett never published information about his excavations at Puye, for example, and Wilson’s report on Otowi has been lost (Mathien 2000). The objects from San Lazaro were not documented conventionally by the private landowner, but he informed me that they were found side by side in the historic plaza; all three were broken into three pieces each though he has since mended them. The catalog information on the two kiva bells from Rainbow House stated that they were found in the kiva and plaza area. Catalog notes on the kiva bell from Tsama state that it came from Room 2 of the East Plaza.

Lambert provides some description of the three kiva bells that were recovered from Pa’ako. Two
were found in Room 66 and another was from Room 76, but Lambert provides no information about the function of the rooms or any accompanying artifacts. Incidentally, her analysis notes that the kiva bells were all of a black, argillaceous limestone, a material which may be from the Sandia Mountains. This is in contrast to those found on the Pajarito Plateau, which were all of Jemez basalt, and those at Pecos, which were of phyllite (Lambert 1954).

Kidder does not use the term “kiva bell” to refer to the phyllite objects from Pecos, but he did recognize the musical characteristics of at least one. This object “is roughly notched on either side near one end as if for suspension on a string. So hung, and tapped with another stone, this specimen gives a clear, tinkling note, not unlike that of a small metal bell” (1932:94, and see object a in Figure 70). There are seven other objects of the same material in the figure in which he pictures the kiva bell, one of which was carved into a terraced shape and others of which display holes for suspension. It is unclear if any other these others were used musically; it is possible that the two smaller pendants were used as ringing stones. Kidder (1932:94) also notes the “lustrous, sparkling sheen” of phyllite, and feels such objects were attractive for use in ceremonial contexts for that reason.

Hayes et al. found a wider variety of materials used for kiva bells (which they refer to as ringing stones) at Gran Quivira than occurred at Pecos; gneiss, schist, limestone, and petrified wood were all used, though schist was most common. They were modified more extensively than those from other sites:

Most of the ringing tones have a thumb-sized, oval depression running lengthwise in the center of their faces, although two whole ringing stones lack these depressions, and on four they are extremely shallow. The depressions are pecked and then highly polished with a longitudinally [sic], reciprocal grinding motion. Four of the stones have a well-developed depression on the least convex of their two faces, along with an incipient depression on the more convex face, while two have a central depression that extends completely through the artifact. In both instances, the depressions were worn almost all the way through the flatter face, then chipped the last little way through from the reverse (Hayes et al. 1981:131).

The authors provide some provenience information. Most of the kiva bells were found on the floors of Late Phase rooms and in Kiva M; four were found in mixed trash. No information on the room function or associated artifacts is included. The observation is made, however, that “There is a tendency for ringing stones to be found together” (Hayes et al. 1981:132, Figure 175). This is consistent with the cache of ringing stones from San Lazaro described above. It is unclear whether this association also means that they were played in sets, but it certainly raises the possibility.

The most detailed information on the context of kiva bells I have been able to find is that of 35 kiva bells found during excavations at the pueblo of Sapawe in the Chama Valley of northern New Mexico. Of these, all but ten were found in rooms off Plaza D, and of the remaining ten, only two were not from Plaza D roomblocks, the latest occupied (Davis 1969). The first 25 occur in caches, though there is some disagreement among authors as to how many occurred in each. Those numbers given by Frisbie (1967) are presented here. The first cache in Room DE06 contained five kiva bells, five bone awls, three tchamahias, a pecking stone, an animal fetish, worked phonolite, a stone ball, two lighting stones, a small puki, a paint mortar, a bone beamer, a ceremonial blade, and other groundstone (Frisbie 1967:15). A second cache from Room DE06 contained a kiva bell, five eagle claws, a lightning stone, a whetstone, a pottery scraper, a bone beamer, a piece of antler, and a crystal concretion (Frisbie 1967:83, 85). A third cache, from Room DE11, contained eleven phonolite kiva bells, a ceremonial stone, a basin metate, a two-handed mano, a paint stone, two quartzite lightning
stones, a chalcedony blade, a curved piece of calcite, nine mineral specimens, three whetstones, a polishing stone, two pottery scrapers, a bone flute, and a bone whistle (Frisbie 1967:45). The Sapawe caches are described in detail because the objects accompanying the kiva bells are very clearly ceremonial in nature—particularly the concretions, lightning stones, and minerals.

The one exception to the rule of Rio Grande origin for kiva bells is an object from northeastern Arizona (Figure 2). While no contextual information is available (the Smithsonian acquired it from one W. N. “Navajo Bill” Wallace in 1919), it is the one example of a Southwestern kiva bell that has been extensively culturally modified compared to the others in my sample. It is 58 cm in length, and has been shaped into a smooth shaft with one flat and one pointed end. The stone is very resonant, and this is the specimen which yielded two different tones depending on where along its length it was tapped. Of all the objects in my sample it most resembles the lithophones identified in New England by Caldwell.

A Synthesis

While detailed provenience information on kiva bells is scanty, conclusions may still be drawn from the information available and the instruments themselves. D. Brown is correct that all known kiva bells date to after A.D. 1300, and while exceptions exist to his assertion that all kiva bells are from the Rio Grande Valley, certainly most of the known examples are from that region. Kiva bells do not appear to have been traded except perhaps locally; more research is needed to identify the sources of the stones used for music-making. In addition to being cached with other kinds of objects, kiva bells are often found in groups. On the basis of the information available to me, there is no evidence that there was a preconceived number of bells composing a “set”—they have been found individually and in groups of three (San Lazaro and Gran Quivira), five and 11 (Sapawe), and even 23 (Cuyamungue).

The available ethnographic evidence suggests kiva bells were used primarily ceremonially, both to announce the time for men to assemble in kivas and as part of ceremonies carried out in more public settings such as those associated with the winter solstice. The few examples of kiva bells decorated with ochre reinforce a ceremonial interpretation and add an element of visual communication as well as aural. Densmore’s observation that they were used during a song to protect against sickness and death is in line with the provenience information for the kiva bells from Sapawe found in caches with other ceremonial objects. While it is unknown whether the Sapawe kiva bells were used in public performances such as that Densmore witnessed, objects in caches such as those are often parts of “tool kits” used by shamanic individuals or members of a healing society that are frequently used in the course of divining and curing illnesses. It is possible they were used both to cure individuals in more private contexts and to protect the pueblos at large in more public ceremonies.

That none of the objects for which contextual information is known were found with burials suggests kiva bells were not individually owned. While one or more individuals might have assembled the contents of a ceremonial cache, the caches themselves have not been found in mortuary contexts. Caches are one way of discarding inalienable possessions (Weiner 1992)—objects that are members of a class of items that do not circulate, or do so only rarely and under special circumstances. Mills has found that in the prehispanic Southwest, inalienable possessions were often symbols of authority and were often the
kinds of things made by men (Mills 2000:337); this is consistent with the ethnographic accounts of male musicians and use in kivas.

It is unclear why the phenomenon of kiva bells did not spread outside the Rio Grande Valley except in isolated instances, for certainly the raw materials to make them are widespread. It may be they were used in secret—more in line with Hewett’s experience at Taos than Densmore’s at Santo Domingo—or they were part of an ideology that was not shared by people elsewhere in the Pueblo world at the time. Whether shared or not, it is probable that some of the ideology surrounding kiva bells contributing to their significance had to do with their material and a connection to that part of the landscape that is the earth itself. Whether they were associated with lightning in the manner suggested by the Cochiti person interviewed by Brugge and thus with fertility, or whether they were considered sacred because of an association with a mountain upon which they were found (see Ortiz [1969] for a discussion of sacred mountains), it is possible that their value was associated with a place in the local landscape.

Kiva bells were thus primarily a local phenomenon within the Rio Grande Valley. It is probably not coincidental that they appear at a time contemporaneous with the large, aggregated pueblos of the Classic period, for there is substantial evidence that the ceremonial lives of the Pueblo peoples were undergoing great change and elaboration during this time. The discovery or invention of new instruments was part of this development (E. Brown 2005:498-512), and in the Rio Grande, kiva bells appear to have been part of the process. Their local character might even have been important in incorporating groups of immigrants to the region if they were used in ceremonies symbolic of and unique to the communities the migrating people had come to. They may thus have been effective in establishing an ideological connection to the local landscape among newcomers even as the practice of incorporating literal pieces of the landscape into certain ceremonies might have reinforced any positions of power held by leaders native to the area.

No kiva bells have been identified at Patokwa because the site has not been excavated, but if the documentation and interpretation of the place name is correct, it casts a particular light on kiva bells. Patokwa was built in the location of an earlier pueblo by members of Jemez Pueblo in 1681. This is conclusive evidence that kiva bells were used immediately after the Pueblo revolt against the Spanish in 1680, a pattern reinforced by the discoveries of bells in historic parts of sites at which the Spanish had built missions prior to the revolt—Pa’ako, Pecos, Gran Quivira, and San Lazaro. Even more significantly, on the basis of his research at Patokwa and the nearby Boletsakwa, Leibmann has proposed that both villages manifest physical aspects of “the ideology of revitalization originally espoused by Po’pay in 1680, embodying the nativism and revitalism that reshaped the Pueblo world in the wake of the Pueblo Revolt” (Liebmann 2012:108). Much more information would be needed to ascertain what role, if any, kiva bells specifically played in Po’pay’s revitalizing vision. However, the fact that they were present in a purposefully “pure Pueblo” context in such numbers that they were incorporated into the name of the village suggests they were woven into Jemez ritual life during the Classic period to such a degree that they contributed to Pueblo peoples’ ethnic identity.4

In sum, although kiva bells may be challenging to recognize in archaeological contexts, research into the sound production of lithophones and the physical properties of known examples provide guidelines to assist in their identification that are not dependent on the researcher having a musical background. As with any object class, the interpretation of any given discovery of kiva bells should be made in the context of the specific provenience and history of the pueblo in which they are found. The results of research to date, however, show that kiva bells were used in ceremonial contexts throughout the northern Rio Grande Valley that appear to cross-cut community and linguistic affiliations as part of a broader, pan-Pueblo ritual expression.

—EJB
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Endnotes
1. Much of the background information on kiva bells is drawn from the chapter on them in my doctoral dissertation (E. Brown 2005:419-434).
2. There are much smaller lithophones that appear in archaeological contexts in the Southwest as well. These are only a few inches in length and are generally referred to as “ringing stones.” Often they occur in sets, and they appear more analogous to shell tinklers than kiva bells (E. Brown 2005:371-396). They are almost always made from petrified wood. Not surprisingly, they are most often found in northern Arizona where petrified wood from the Petrified Forest was readily available, but examples have been found in northern New Mexico as well. In light of the differences in size, material types and distributions, I treat ringing stones and kiva bells as two separate instrument types in spite of their common lithophone designation.
3. A beamer is a bone implement used in the hide tanning process.
4. This point should not be overstated—fractions at Patokwa split the village apart by 1683—so the politics of membership and identity in various social groups even within single pueblos were immensely complex in the difficult years of the revolt era.

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A Utopian Colony and A Boer Colony—Two Surprising Players in Early Irrigation Agriculture in the Mesilla Valley, Southern New Mexico¹

CAROL J. CONDIE

Agriculture in the Mesilla Valley

Although the fertile soils, climate, elevation, long frost-free growing season, year-around sun, and a river that seems to offer a constant and reliable water supply appear to make the Mesilla Valley the answer to an irrigation agriculturalist’s dream, the apparent promise contained hidden problems that defeated optimistic attempts again and again.

Stock raising and farming in the Mesilla Valley began in the late 1700s, but the first documented evidence of irrigation agriculture in the valley began in the 1820s during the Mexican period, when several notable attempts at farming were made.

Francisco Garcia had occupied and intermittently grazed stock between 1790 and 1824 in the area later known as the Santa Teresa Grant, and Toribio Benavides and others had apparently farmed at Ancon de Moleros about 1820 (Wozniak 1987:60). In 1805, Juan Antonio Garcia de Noriega settled at El Brazito and began farming, but did not succeed in acquiring a formal grant until 1823. Although he died four years later, his family remained on the grant, sporadically, until 1861 (p. 60). Baldwin (1938:316) reports that John Heath, from Missouri, had obtained the Brazito Grant in 1822 and had organized a colony of artisans and farmers to settle it, but was never allowed to occupy the grant.

Genuine settlement in the valley began in 1843, when the Doña Ana Bend Colony settled a huge grant, which had been issued by the governor of the State of Chihuahua in 1839 for 35,399 acres on the east side of the river (Baldwin 1938:316; Sayles and Williams 1986; Wozniak 1987:60). As the population grew, expansion took place to the south and Las Cruces and Tortugas were founded within the grant (Wozniak 1987:60). Las Cruces College was established in 1880 and became the New Mexico College of Agriculture and Mechanic Arts in 1889 (Williams 1986:247). (We know it today as New Mexico State University.)

New Mexico was annexed to the U.S. in 1848, but Chihuahua could still issue grants in the Mexican part of the Mesilla Valley (Wozniak 1987:60). After Texans claimed that the Doña Ana colonists’ title was invalid, 60 frightened Doña Ana citizens moved to La Mesilla on the Mexican side of the Rio Grande (p. 60). By 1852, 2000 people had moved across the river to Mexican land, and grants for the Mesilla Civil Colony, Refugio Civil Colony, and Santo Tomas y Iturbide, plus a grant to Jose Manuel Sanchez Baca, were subsequently issued by Chihuahua (pp. 60-61). As population increased, so did the irrigated acreage. Simmons remarks (1977:137) that when the Overland Mail first began operation in 1857, there were already more than 3000 people at Mesilla, and quotes newspaperman Waterman L. Ormsby, who traveled on the first westbound stage and reported “irrigated fields groaning with the weight of heavy crops.” From an estimated 3200 acres in 1850, irrigated acreage grew to 11,050 acres by 1890, aided by the Rio Grande Valley Irrigation Company’s construction of irrigation ditches in 1889 (Wozniak 1987:89, 102, 103).
Shalam

The first private attempt at large-scale irrigation was also one of the strangest. A unique colony—part multi-racial orphan asylum, part religious cult, part experimental agricultural project—was founded by Dr. John B. Newbrough and Andrew M. Howland on a horseshoe bend on the east bank of the Rio Grande in the northern part of the Doña Ana Bend Colony Grant in 1885 as the commune of Shalam (Keleher 1944; Priestley 1988; Stoes 1958a; 1958b).

Elegant and expensive facilities were constructed. Dormitories, houses, a library, a laundry, a gymnasium, a temple, a studio, a cooperative store, a dairy, chicken houses, barns, stables, and corrals were built (Priestley 1988:27-29). Flower gardens and vegetable gardens were planted (p. 27). The original 900 acres was soon expanded by an additional 500 acres. An immense irrigation system was installed—16 miles of pipe were laid, a well was dug, and steam-driven pumps were installed to lift water from the well to the 17,000-gallon irrigation reservoir when the river was dry (Stoes 1958b:113). Then began a series of experiments in farming and animal husbandry. Corn, wheat, barley, alfalfa, sugar cane, beans, peanuts, grapes, peaches, pears, apricots, plums, apples, figs, nectarines, asparagus, and artichokes were planted (Stoes 1958b:111). An apiary was established (Priestley 1988:28). The finest breeds of work horses, mules, chickens, and dairy cows were imported (Stoes 1958b:111-113). Agriculture at Shalam flourished when conditions were good, but ultimately a combination of repeated drought, flooding, crop failures, difficulties in finding markets, erratic train service in moving produce to markets, and that perpetual plague of experiments in communal living—slackers who provided none of the work but consumed most of the profits—finally defeated Shalam, and the colony was formally disbanded in 1901 (Stoes 1958b:117-119).

The Boer Colony

Soon after Shalam collapsed, a new group of strangers, led by Benjamin Viljeon, arrived in the Mesilla Valley. These people, refugees from the Boer War (1899-1902) in South Africa, were farmers and cattle raisers, long experienced in the vagaries of desert agriculture (Maluy 1977). Viljeon originally bought 750 acres of land in the old Refugio Colony Grant in 1905, but the Boers’ land eventually expanded to an area bounded by La Mesa and Vado on the north, Chamberino on the west, Berino on the east, and, roughly, present NM-186 and NM-404 on the south (pp. 96-100).

Perhaps most important among the Boers’ contributions to irrigation agriculture in the Mesilla Valley was their method of overcoming the river’s propensity to flood out vast acreages of farmland. Maluy (p. 101) outlines their solution:

Using common sense and ingenuity the Boers solved a problem that had been holding up development of the rich land to the west of the Rio Grande. The river channel was very shallow and was characterized by sharp horseshoe bends. When the water rose in the spring these features invariably caused destructive flooding. The Boers rectified the problem by digging small straight ditches across the necks of the bends with jetties extending out from the opposite bank to deflect the water into them. When the water rose the ditches soon enlarged and carried the entire volume with increased velocity which lowered the river. Viljeon said that three cutoffs made by the farmers saved a large and fertile section of land around Chamberino from high water. Thousands of acres were placed in alfalfa and crops which had been abandoned for years. Where the old crooked channels were only about a foot deep, the new ones were four to six feet deep.

The Boers planted alfalfa, potatoes, onions, beans, turnips, cabbage, and other garden vegetables (p. 101). Fresh vegetables were sold in El Paso, despite the problems caused by the “outrageous railroad service” (p. 102) and difficulties in keeping the public roads passable (p. 103). They soon realized that alfalfa growers were constantly at the mercy of middlemen and organized the Western Mesilla Valley Farmers
Association in 1906 to set prices and establish grade and weight standards for alfalfa, thus completely bypassing the El Paso hay brokers (p. 102). Maluy notes (p. 107): “Five years after their arrival the Boers were recognized as the most successful cultivators of irrigated land in the Southwest.”

But leadership in agriculture wasn’t the Boers’ only impact on the Mesilla Valley. They soon became an important part of the social and economic life of the valley. Maluy remarks (p. 100) “Hospitality and kindness were not only his [the Boer’s] habit but also his delight.” They were famous for feeding every tramp who knocked on the door; the women took refreshments to the men—both owners and hired hands—in the fields at mid-morning and mid-afternoon; people from all over the countryside were invited to periodic dances at Chris Viljoen’s huge ranch house; their proficiency in English, Dutch, and Spanish (several also spoke a Portuguese East African patois and Kaffir or Zulu dialects, less useful languages in southern New Mexico) eased communication with their neighbors and employees (p. 100). Maluy says (p. 100) “They... got along splendidly with their Mexican employees. The small village of Berino on the Santa Fe Railroad was practically supported by them.”

However, the Boer presence was not to last. The colony broke up and scattered, many back to South Africa, in 1917 when Benjamin Viljeon died (p. 107), but their impact on the Mesilla Valley was of major importance, as Maluy’s summary (pp. 107-108) illustrates:

In an area where the land was considered a poor risk at best because of the annual devastation by the Rio Grande they prospered. Due to their ingenuity in flood control and progressive ideas in irrigation, the Boers were direct agents in causing the value of cultivated land in the Mesilla Valley to double. Their lush farms were excellent advertisements for settlement and indicators of future economic growth. These two factors were both essential in New Mexico’s drive for statehood.

**The Santa Fe Railroad**

When the Santa Fe Railroad reached El Paso on June 11, 1881 to join the Southern Pacific track built from the west (Myrick 1990:239-240), growers in the Mesilla Valley must have felt that their difficulties in transporting fresh produce to market while it was still edible were over. Unfortunately, they were wrong. In her discussion of the problems that beset the colony of Shalam (1885-1901) in moving farm products to El Paso, Priestley remarks (1988:40) “Train service was completely unreliable.” Nor had service improved by the time of the Boer colony (1905-1917). Maluy (1977:102) reports Benjamin Viljeon’s chiding the El Paso business community for “tolerat[ing] the outrageous railroad services,” and goes on to say

The markets were ample and prices satisfactory, but instead of being only twenty miles away [from El Paso] they might as well have been two hundred. There were 16,000 acres of irrigable land available west of the river but less than one third was under cultivation. Men of enterprise were afraid to tackle farming where transportation was so undependable. Trains were normally a day late, and the probability of produce arriving at its proper destination was questionable. In many cases it was unloaded at an empty siding and stolen.

Nevertheless, a reference to Anthony and Berino as shipping points on the Santa Fe Railroad (McBride 1908:13) indicates that at least some growers patronized the railroad.

**Unabashed Boosterism**

Also influential in the “drive for statehood” and in efforts to increase population in New Mexico would have been brochures like that published by the New Mexico Bureau of Immigration in 1908 (McBride 1908). In true public relations fashion, this 56-page brochure points to the “wonderful Mesilla Valley, its phenomenally fertile soil, its magnificent climate, [and] its splendid and certain future,” noting that New Mexico’s population had increased more
than 100,000 in the two previous years, that “...such an era of development has set in as has never been dreamed of before” and urging “The time to come to New Mexico is now....” (McBride 1908:55).

In spite of the foregoing, the brochure provides a mostly restrained overview. The publication discusses Doña Ana County, the Elephant Butte project, field crops, horticulture, stock raising, mining, schools, churches, taxes, local government, wages, and cost of living (McBride 1908). The brochure also includes surprisingly candid reports by specialists from the New Mexico College of Agriculture detailing successful and unsuccessful field crops, fruits, vegetables, ornamentals, bee culture, poultry, and stock, and experimental plantings conducted by the Agricultural Experiment Station. By 1908 alfalfa was the major cash crop, with wheat and corn second, beans third, and sweet potatoes, onions, chile, tomatoes, cabbage, cauliflower, and celery following (pp. 33-36). Apples were the most important fruit crop, followed by grapes, peaches, cantaloupes, and watermelons (pp. 39-42).

**Elephant Butte Dam**

In the meantime, the dam that was to control the Rio Grande and permanently transform agriculture in the Mesilla Valley continued to evolve. In 1895 the Rio Grande Dam and Irrigation Company acquired rights-of-way from the U.S. Secretary of the Interior for construction of a dam and reservoir near Elephant Butte, but the company’s plans were contested by Mexico on behalf of irrigators at Juarez and below (Wozniak 1987:104). The period of 1846 to 1910 was a time of repeated attempts at construction of new irrigation systems and repeated floods, droughts, and shortages because of upstream irrigation (pp. 115-123). Irrigated acreage on the 11 ditches in the Mesilla Valley declined from 31,200 acres in 1880 to about 24,300 acres in 1903, and some ditches were abandoned (pp. 115-116). It was clear that if the promises of the fertile soil and the benign climate were to be realized, a dam and reservoir were critical. Further, subduing the river, reclaiming water-logged land, and assuring a constant flow to Mesilla Valley crops would require a massive and carefully integrated storage and delivery system from Elephant Butte to El Paso. Obviously, a federal project was required. Construction of the reservoir began in 1910 and construction of the dam began in 1911 (p. 143). At this point, agriculture in the Mesilla and Rincon valleys began a slow shift from mixed farming before 1910 to cotton, alfalfa, and other cash crops, partly because of the financial burden the Rio Grande Project imposed on the local water users’ associations (pp. 143-145). The dam was completed in 1916 and by 1917 irrigated acreage on Mesilla Valley’s nine working ditches had jumped to nearly 46,000 acres (pp. 145, 149).

Completion of the dam, reservoir, and delivery system came none too soon, for U.S. involvement in World War I was to force spectacular changes in New Mexico agriculture. Entry into the war coincided with shortfalls in crops all over the U.S. In New Mexico, drought, late frosts, and low reservoir levels raised serious concerns, especially since the war-burdened railroads could not be relied on to deliver the usual 60% of New Mexico’s food supply. (Smith 1943:349-350)

**A Standoff and a Turning Point**

To complicate problems, funding for the New Mexico College of Agriculture and Mechanic Arts in Las Cruces had been cut to the bone as the result of a tiff between the college and the 1916 State Legislature (Smith 1943:354). Fortunately, a new president had just been appointed to head the school, and the college’s Extension Service joined immediately with the U.S. Department of Agriculture to launch an intensive state-wide food production and conservation program (pp. 355, 358). Smith remarks (p. 359) “If anything, the statement: ‘The greatest agricultural awakening in the history of New Mexico’ was quite an understatement of the far-reaching activities that made up the great mobilization of New Mexico’s efforts.”

Despite continued drought and several crop failures in 1918, New Mexico agriculture underwent dramatic and permanent changes as improved farming techniques were implemented in such
areas as crop rotation, use of commercial fertilizers, plowing under soil-enriching legume cover crops, control of blowing soil, standardization of seed, etc. (Smith 1944:53). By the end of the 1920s, 90 percent of then-irrigable land was in crops and sodden lands were still being drained and reclaimed into the 1930s (Wozniak 1987:152).

Even though the Mesilla Valley in 2013 is faced with the effects of global warming along with the rest of the world, many of the crops that looked promising to McBride in 1908 are burgeoning. According to the 2007 Census of Agriculture, Doña Ana County agricultural products by commodity group consisted of grains, oilseeds, dry beans, and dry peas; cotton and cottonseed; vegetables, melons, potatoes, and sweet potatoes; fruits, tree nuts, and berries; nursery, greenhouse, floriculture, and sod; other crops and hay; poultry and eggs; cattle and calves; milk and other dairy products from cows; hogs and pigs; sheep, goats, and their products; horses, ponies, mules, burros, and donkeys; and other animals and animal products. Rankings within New Mexico of acreage planted in the top crop items consisted of pecans (ranked first in the state and in the nation); forage—land used for all hay and haylage, grass silage, and greenchop (sixth in the state); cotton (first in the state); vegetables harvested for sale (first in the state); and corn for silage (fourth in the state). Rankings within New Mexico of top livestock inventory items consist of layers [hens] (first in the state); pullets for laying flock replacement (first in the state); cattle and calves (fifth in the state); colonies of bees (first in the state); and horses and ponies (sixth in the state).

McBride, now 105 years after his glowing review of Mesilla Valley agriculture, would not have been surprised. —CJC

Endnote
1. This paper is based on, though much altered from, a study (Condie 1997) Quivira Research Associates undertook at the behest of TransCore as part of an environmental analysis of the general area around the intersection of NM-478 and NM-226 in anticipation of proposed highway modifications.

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Birding In Dinétah

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Dinétah

For the Diné, Largo and Gobernador canyons and their myriad tributaries and mesas are known as Dinétah (among the people). Evidence of pre-Columbian Puebloan occupation between about A.D. 500-1050 is very prevalent. Subsequent to a general residential abandonment of the area by those people, there seems to be little evidence of occupation until the late A.D. 1400s-early 1500s when the remains of ancestral Diné or Navajo are found. The earliest Navajo site in Dinétah based on dendrochronology is A.D. 1541 (Dykeman and Roebuck 2012) and sites of that time and forward include forked-pole hogans, masonry pueblitos and defensive locations, scatters of stone and ceramic artifacts, trails, and petroglyphs and pictographs. Based on archaeological evidence, occupation of the area by the Diné seems to have ceased during the mid to late 1700s. This period of time is referred to as the Dinétah and Gobernador phases of Navajo history.

The Dinétah and post-Dinétah Navajo culture exhibits an easily recognizable continuity in many forms, most notably in ceremonial art. It is obvious to even the most casual observer that many of the images in sixteenth to eighteenth century Dinétah ceremonial art are similar if not identical to imagery first documented in the late 1800s (e.g., Matthews 1885, 1887). Some of those images are also very similar to documented kiva murals of the Pueblo IV-V periods (e.g., Copeland 2001; Copeland and Rogers 1996). These figures include a variety of supernatural beings, geometric forms of various sorts, and a multitude of game and nongame animals (Schaafsma 1963, 1992). One class of animal that is often portrayed is birds. Evidence for birds in Dinétah includes archaeological specimens recovered from excavations or items found in caches, and the depiction of birds or feather-embellished objects in rock art.

**Birds in Diné Culture**

Birds play a significant part in Navajo culture and the literature is replete with references to birds in one form or another. Only a brief summary, largely summarized from Reichard (1950), is presented here. Birds have important roles in many of the origin histories and many are named during the reciting of those stories during various chant ways. Some chant ways are named after birds, such as Ravenway and Eagleway (Wyman 1983:27), and the Great Star Chant was originally given for the benefit of Bird People who had fallen ill as a result of their conflict with other beings (Wheelwright 1956:84). In these histories the origins of various birds may be explained, supernatural beings (e.g., Navajo ye’i) may appear in bird form (e.g., Talking God as a bluebird), or a bird may be a companion to a supernatural being (e.g., meadowlark and Spider Woman). Birds are generally helpful beings, at least with regard to their relationships with humans, though some birds such as the crow have an evil propensity. Specific birds are associated with each of the sacred mountains/directions, the call of small birds represents happiness, peace, and prosperity, and each bird may have its own ritual song. All birds have pollen on their bills and feet (Wyman 1957:181).

Some birds, such as turkey, bluebird, yellow warbler, mourning dove, and some “snow birds” were occasionally eaten, as were eagles and hawks as part of eagle trapping ritual (Franciscan Fathers
Bird eggs, certain birds (e.g., crow), and most waterfowl and shore birds were not, or do not appear to have been, eaten.

Feathers and other bird-related objects are used extensively in ceremonial activity. Feathers may be “live” (taken from a bird ritually smothered with pollen or taken from a live bird in the field) or not live (e.g., found on the ground). Feathers from a dead bird not ritually killed may be used for non-ceremonial purposes. Feathers are used to make or decorate a multitude of ritual objects such as prayer sticks, ceremonial bows and arrows, brushes, rattles, aspergills, head feather bundles, masks, headdresses, and other costume parts. A difference in feathers on some ritual items indicates male or female forms or use of those items (e.g., bluebird/male; yellow warbler/female).

Feathers of various sorts were obviously needed for arrow fletching (eagle, red-tailed hawk, other hawks, crow, and owl) but were not used for decorating secular bows (Kluckhohn et al. 1971:34). Eagle feathers along with red-tailed hawk (a.k.a. “yellow-tailed eagle”), turkey, owl, and crow were also used in the past to decorate or ritually empower shields, lances, quivers, and war caps (Franciscan Fathers 1910; Kluckhohn et al. 1971; Reichard 1950). Shields with eagle feathers were said to make the shield bearer invisible to the enemy (Kluckhohn et al. 1971:369).

Ritual use of feathers reported in the ethnographic literature (e.g., Franciscan Fathers 1910; Haile 1943; Matthews 1902; Reichard 1950; Wyman 1957, 1975) include eagle, red-tailed hawk (yellow-tailed eagle and red-tailed buzzard), red-shouldered hawk, blue hawk (possibly American kestrel), turkey, owl (undifferentiated types), bluebird, yellow warbler (canary or wild canary), robin, magpie, crow, raven, crane (probably sandhill crane), hummingbird, roadrunner, red duck (possibly a cinnamon teal), green-winged finch and green-backed finch (probably the lesser goldfinch), goshawk, Bullock’s oriole, purple martin, Rocky Mountain sapsucker (probably the red-naped sapsucker), yellow-headed blackbird, red-shafted flicker (red-shafted woodpecker), cedar bird, and a bird referred to as “one which shakes the dew” (green-tailed towhee or possibly marsh wren). There certainly may be others.

Other bird parts cited in the ethnographic literature include the claws and foot pads of an eagle attached to bandoliers and a case made of a turkey leg bone to keep turkey beard hairs (Reichard 1950:630, 674). The claws of an eagle were attached to the “turkey foot” on the pole used in the hoop and pole game (Franciscan Fathers 1910:159, 482-483). Bird parts, particularly feathers, are a common component of chant bundles or jish (Frisbie 1987) and the skins of bluebird and Rocky Mountain sapsucker are reported to be part of Windway jish (Wyman 1962). Crane bills, and, in some cases, heron bills or even a woodpecker bill, may be used as medicine spoons in Flintway and Shootingway (Franciscan Fathers 1910:407-408; Haile 1943:22-23). Raven bills are used in Enemyway to kill the “ghost of the scalp,” and are referred to as “crow bills” (Haile 1938:41-42). The eye water of the turkey, magpie, roadrunner, and quail are used in star reading (Franciscan Fathers 1910:159).

In the Shooting Chant, carved models of small birds are suspended from the ceiling of the hogan and made to “fly” at a prescribed time (Reichard 1950:642). The bodies are made of yucca and the tails and wings of carved cottonwood. A flute is played during “flight” to signify their calls. Cottonwood carvings of a duck (or other animal) were used to relieve “animal infection” as part of a “remaking” rite when certain protocol was violated and the carving was deposited in habitat linked to the animal (Franciscan Fathers 1910:496; Lang and Walters 1972).

Birds are portrayed in numerous sandpaintings (e.g., Blessingway, Plumeway, Eagleway, Beadway, Shootingway, Hail Chant). Wyman (1957:112) cites a sketch of a Beautyway sandpainting of a 12-leaf corn plant with a different bird sitting on each leaf. Birds may occupy any number of positions in sandpaintings, and often only the variation of
coloring or the context within which similar looking birds are shown indicates the bird type. Normally, eagles, hawks, and some small birds in sandpaintings are shown in plan view (Wyman 1983:118). Birds in profile may be any number of kinds depending on form or color. Large birds may be turkeys, ducks, and in one Plumeway sandpainting, possibly crane, heron, grebe, or loon. Small birds may be bluebirds, yellow-headed blackbirds, goldfinches, yellow warbler, western tanager, blue swallow, and blue swift, to name a few. Other species that may be depicted include red-shafted flicker, black-tailed swallow, and nighthawk.

Portrayals of feathers are common in sandpaintings. Most often, they are white feathers with black tips representing eagle feathers, and are attached to heads, rattles, bows, and many other objects. Red feathers, often attributed to the red-shafted flicker, can be identified on the head gear of Gháá’ask’idii (Hump-backed God) and Zaha’doolzhaaí (a.k.a. Fringe Mouth) and on Gháá’ask’idii’s humped back in sandpaintings.

Dinétah Archaeological Evidence

In his 1915 excavations of eighteenth century Navajo defensive sites (pueblitos), Earl Morris located several bird-related items (Carlson 1965). From a burial at Frances Ruin (LA 2135) a necklace with a perforated bird bone that may be a turkey call or whistle, as well as three copper hawk bells, were recovered. At Three Corn Ruin (LA 1871) a collection of 11 copper hawk bells were recovered from an interment at the “northeast burial area.” Morris also recovered pottery that had bird feather motifs, including turkey feathers and possibly eagle feathers, on Gobernador Polychrome (Carlson 1965:Plate 23g, Plate 20e) and numerous specimens of historic Pueblo pottery with turkey and eagle feather motifs (e.g., Carlson 1965:Plate 34f).

Although slightly removed from Dinétah, during investigations at an eighteenth century Navajo defensive site known as Big Bead Mesa (LA 15231), Dorothy Keur (1941) located a single radius of a swan that had been modified for unknown purposes. During his travels and explorations of Navajo country, Richard Van Valkenburgh (1942) located contemporary Navajo prayer sticks at Cho’li’i (Gobernador Knob) adorned with bluebird and eagle feathers.

No bird materials were reported from excavated Navajo period sites during the Navajo Reservoir Project, which included hogans, pueblitos, and rock shelters (Hester and Shiner 1963). However, a robe made of yucca twine wrapped with unidentified down feathers was recovered with a Pueblo I burial from Todosio Rock Shelter, a site with a later Navajo component (LA 4298; Hester and Shiner 1963:Figure 59). Hester (1963:Figure 32) reports the recovery of hawk or owl claw beads and possibly bird bone beads from the Serrano Site (LA 4408), a late Pueblo I-early Pueblo II habitation. Bird bone awls and tubular beads are also reported from other Puebloan sites of the Navajo Reservoir Project by Eddy (1966:420-421). No fewer than 52 different birds were identified in the Navajo Reservoir Project area during associated environmental studies (Dittert et al. 1961:31-32).

At excavations of 81 Dinétah/Gobernador phase Navajo sites during the past 20 years in Dinétah, only about 10 percent yielded bird material (Brown et al. 2014). In these excavations, mostly consisting of hogan habitations and limited/specialized activity artifact scatters, three sites yielded single occurrences of hawk, turkey, and mourning dove remains. At five additional sites minor remains of unidentified small to large birds were found, including one occurrence of unidentified eggshells. Work at several pueblitos identified only single specimens of duck-sized bird bone at the Frances Canyon and Split Rock Pueblitos (Marshall 1991). It appears that faunal bird remains are rare at Dinétah Navajo archaeological sites.

Cache Evidence

Over the years several Navajo caches have been found in Dinétah that included bird specimens or bird-related items. From a site north of the San Juan River in Pump Canyon (Morris Site 17), Earl Morris secured through public auction in 1917 what
appears to be a piece of ceremonial equipment, perhaps a tablita of some type, with unidentified painted feathers on it (Carlson 1965:Figure 11, Plate 18). In Gobernador Canyon at Medicine Man Cave (LA103427), DeHoff (1977:Figure 5) recovered a small four-panel mobile made of two wooden hoops and animal skin upon which two Navajo ye’i with feathered headdresses are painted. A pair of protohistoric/early historic wooden figurines was found along Frances Creek, and Brugge (1996) suggested that a hole in one of the ears may have been used to attach a feather and also that feathers may have been attached to the top of the heads.

In a cache located east of the Santo Nino Tower (LA 2137) Keur (1940) reports that the “brother of Tony Fernandez” found two crows wrapped in cedar bark “under a rock.” From the Gobernador area a collection of four life-sized carved wooden birds (magpie, woodpecker, macaw/parrot, mourning dove), along with a pair of grass-stuffed raven skins tied together, were found in an unspecified ceramic vessel, along with prayer sticks, a female mask possibly associated with the Nightway chant, and Gobernador Polychrome and Puebloan pottery (Hester 1962:Figure 40a-e). A third raven skin stuffed with juniper bark is also illustrated by Hester (1962:Figure 38a). Its association with the others is uncertain, but it was apparently also found within a ceramic vessel.

From the most famous Navajo cache ever reported from Dinétah, a large assemblage of ceremonial equipment was found in Palluache Canyon (LA 6532; Brugge 1994; Roessel 1986). Part of this cache contained the remnants of ceremonial costuming associated with Gháá’ask’idi and possibly Zaha’doolzhaaí. These costume parts include Gháá’ask’idi humps complete with feather holders sans feathers, wicker-like feather headdresses sans feathers, and basketry “crowns” complete with red and black painted wooden feathers. Eagle bone whistles were also part of the cache.

**Rock Art**

The rock art of Dinétah is replete with the images of supernatural beings, geometric designs, and animal forms that are easily recognizable to any student of Navajo ceremonial art. Birds, their feathers, or their tracks are one of the more prolific animal forms depicted. They are most often presented as petroglyphs, and when the entire animal is shown, they are realistically portrayed in both profile and plan views. Although a small number of painted birds do exist, painted bird feathers are the more common pictograph expression (Figure 1). There is good evidence that Navajo petroglyphs in Dinétah were occasionally painted (Copeland and Rogers 1996) and bird petroglyphs may have been at one time more elaborately presented.

There are 11 recognizable birds depicted in rock art from either their body form or feather depiction: eagle, eagle-like or hawk-like, nighthawk, hummingbird, parrot/macaw, owl, crane, blue bird (?), turkey, red-shafted flicker (?), and swift or swallow. This is less than half of what have been identified from generally contemporaneous kiva murals among the Pueblos (e.g., Smith 1952:127) and is certainly less than what has been historically documented in Navajo ceremonial art and ritual usage.

**Eagles**

Eagles are most easily recognized and most commonly represented by depictions of their feathers, both in painted and carved forms. The designs are consistent with historically documented sandpainting styles and kiva murals. These feathers are found singularly carved among other images, attached to the heads of humanoid figures or masks (Schaafsma 1992:Figure 31), affixed to shields (Figure 2, LA 102398) or other circular designs that may or may not be shields, attached to the humped back of Gháá’ask’idi (Figure 3), and on arrows stuck in the backs of various animals (Schaafsma 1963:Figure 37, LA 3017). Most large feathers adorning headdresses, even when not in a clearly recognizable eagle style, are probably eagle feathers.
Figure 1. An example of common portrayal of feathered headdresses on Navajo ye’i figures (LA 114334). While the colors of the feathers do not distinguish the birds of origin, they most likely represent eagle and others. Gobernador Canyon drainage. Photograph by Dale Anderson.

Figure 2. Puebloan-looking individual from the Dinétah-Gobernador phase holding a shield adorned with eagle and parrot/macaw feathers (LA 102398). Gobernador Canyon drainage. Photograph by James Telford.
Eagle-Like or Hawk-Like

Plan view portraits of petroglyph or pictograph birds that are best identified as eagle-like or hawk-like are very common. They are characterized by broad tailed birds with outstretched wings and heads turned in profile to one side or the other, not unlike the eagle on a U.S. dollar bill (Figure 4a-d). Feet are not always indicated. Small versions may be painted a solid red but otherwise they are usually petroglyphs. Unfortunately, most tend not to be very distinguished in their markings and positive species identification is seldom possible. Future analysis of the context of the bird with associated images may yet aid in the identification of these birds. One occasional variation on the form that may be significant is when the tips of the wings or the tail feathers are specifically distinguished.

Nighthawk

One depiction of a nighthawk is found in petroglyph form (Figure 4e, LA57096). The patches on the wing seem to distinguish it from other eagle/hawk-looking bird forms.

Hummingbird

One presently unrecorded petroglyph site in Gobernador Canyon has the only known instance of this bird in Dinétah (Figure 4f). It may be either a male broad-tailed or black-chinned hummingbird.

Parrot/macaw

There are two known occurrences of this bird form. In one instance it is identified by long and narrow red and black tail feathers attached to a shield held in the hands of a human figure (Figure 2). The feathers are consistent with styles observed

Figure 4. Various petroglyph bird forms: (a-d) eagle/hawk; (e) nighthawk; (f) hummingbird; (g) parrot/macaw; (h) owl; (i-j) crane; (k) bluebird?; (l-m) turkey. Drawings by the author.

Figure 3. Circa early 1960s photograph of Gháá’ ask ‘idii illustrating rare pictograph example of apparent red-shafted flicker feathers (or American kestrel) on the headdress and on his hump between the eagle feathers (LA 15265). This figure no longer exists. Carrizo Canyon drainage. Photograph by Harry Hadlock. Photograph courtesy of San Juan County Museum.
on Pueblo IV and Pueblo V kiva mural decorations. In another instance, a full bodied parrot/macaw is painted at LA 56445 in profile using red paint (Figure 4g); unfortunately, erosion has badly weathered the form but it is clearly similar to forms seen in documented kiva murals.

Owl

There are two examples of owl petroglyphs, or at least owl-looking birds in Dinétah (Figure 4h, LA 56266; Schaafsma 1963:Figure 37, LA 3017). They may be either great horned owl or possibly western screech owl.

Cranes

These birds, or birds that appear as long-necked and long-legged forms, at times with knobby knees, are a common bird petroglyph (Figure 4i-j). There is a possibility that some may represent other water-related birds. These birds are sometimes quite large, approaching 2 m in height in one case. It is unlikely that birds such as herons are represented by any of the figures because herons have a body form and neck posture that seems sufficiently distinctive from cranes and could have been easily been represented in art if desired. They are often found in association with Anasazi petroglyphs when no other clearly Navajo figures are present. In some cases, they are superimposed by figures of Navajo origin, or have been repecked, presumably by Dinétah Navajos. Such superimposition and repecking of Anasazi images in association with clearly Navajo images is not uncommon in Dinétah. The cranes probably do not represent a Dinétah Navajo bird figure, but were rather created by the Anasazi and then used or otherwise incorporated by Dinétah Navajo into their own composition.

Bluebird

This bird is inferred from four petroglyphs at three sites (LA 51741, LA 56399, LA 57116) with the occurrence of a small bird perched on top of corn plants (Figure 4k, Figure 5). Small birds on top of corn plants in sandpaintings are commonly identified as bluebirds in the literature. It’s possible that these are not bluebirds, as a quartet of birds may occur perched on corn plants in sandpaintings, including the bluebird, yellow-headed blackbird, “yellow birds” (a.k.a. goldfinches or yellow warblers), and a fourth that varies between a western tanager, blue swallow, blue swift, or some others (Wyman 1983:133).

Turkey

Turkey petroglyphs are known from at least two sites where the form is unambiguous and in both cases, male beard hair is clearly illustrated (Figure 4m, Figure 6). Numerous other bird forms in Dinétah (Figure 4l), including large three-toed bird tracks, probably represent this bird.

Red-shafted flicker (?)

This bird appears to be represented by pictograph feathers on the crown and hump of Gháá’ ask’idii (Figure 3), and in one instance by feathers adorning a pictograph figure that may be a mask (Figure 7). These feathers are red with black tips, similar to the wooden specimens found with the Palluche Canyon cache. The identification of red-shafted flicker feathers on Gháá’ ask’idii costumes in various literature may be in error. Red feathers with a black tip more closely resemble the tail feathers of the American kestrel.
Swift/swallow

One example of birds with forked tails and wing curvature similar to swifts and swallows is known at LA 8946.

Summary

The evidence of Dinétah-Gobernador phase bird usage in Dinétah is considerable, particularly in ceremonial equipment and rock art. The diversity in forms seen in the art is not, or at least does not seem to be, present in contemporary and historically documented ritual art. However, there are indeed strong continuous ties between the homage paid to birds between the Navajo of Dinétah and their descendants.

—JMC

Figure 6. Male turkey with finely drawn beard hairs protruding from chest. Undocumented site in Largo Canyon drainage. Photograph by James Telford.

Figure 7. Probable mask pictograph with red-shafted flicker or American kestrel feathers interspersed between three large feathers (LA 56423). Carrizo Canyon drainage. Photograph by Dale Anderson.
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GIS analysis of the geospatial patterning of these sites indicates a significant preference for architectural site placement based on proximity to travel corridors down to the SCR that were utilized by animals and humans alike. Another key feature to the positioning of these architectural sites is the view of the surrounding terrain. The prehistoric inhabitants of the ARB and SCR were hunter gatherers; a commanding view of the surrounding terrain and control over the travel corridors down to the SCR would give them a tremendous advantage for hunting. No evidence was collected during the SCRP (Evans 2012) supporting the argument of the defensive nature of these sites (Campbell 1969; Lintz 1986), and arguments based on the line-of-site positioning of Apishapa phase architectural features on the landscape (Owens 2007) did not hold up in a recent GIS study (Evans and Alden 2013). All of the thermal features recorded during the study were external to architectural features, implying a seasonal use rather than a year round occupation. This in turn points toward mobility on the landscape that is also indicated by the presence of exotic materials such as Alibates flint from the Northern Panhandle of Texas; obsidian from Malad, Idaho; obsidian from the Valles Caldera located in northern New Mexico; as well as a Catlinite pipe fragment from Southwestern Minnesota.

In 1986, when writing about the general social organization of Apishapa phase, Lintz advanced the idea that “the scarcity of trade materials from either the Southwest or adjacent Plains manifestations suggest that they maintained few alliances outside of the region and were relatively isolated” (Lintz 1986:29). The sites recorded during the SCRP help to define the previously undefined Northwestern boundary of the Apishapa Phase occupation in the ARB (Zier and Kalasz 1999), and further helps to define the western boundary of trade and exchange throughout the Great Plains during the Late Prehistoric period from A.D. 100 to A.D. 1175 (Baugh and Nelson 1987; Evans 2012; Vehik and Baugh 1994). Contrary to Lintz’s argument, the Apishapa phase sites along the SCR
were not an isolated group. When taken as a whole, Apishapa architectural patterning on a regional scale within the ARB and beyond (Evans 2012:203), similarity in projectile point styles, similarity in general tool kits, and the presence exotic materials indicate that there was prolonged contact with outside groups and territories extending over significant geographic distances (Evans 2012) including the Northern and Southern Plains as well as the Southwest (Cassells 1997:223).

**Roper’s Walk and Surrounding Sites**

Roper’s Walk was named after the Roper family who homesteaded the ranch in the late 1800s. In order to put Roper’s Walk into a broader archaeological context it is important mention a few other sites within the Beulah locality as well as one site on the Alibates Quarry in the Northern Panhandle of Texas. All of the sites recorded during the SCRP are located within an area that is less than 6 km in diameter. It is important to note that although there is considerable variability in the style and construction of architectural features within a given site and that the variability between sites is also significant, there was one site recorded along the SCR (The Brown Palace Site), that shows a remarkable likeness to the architectural footprint of Alibates #28 (Figure 1). This is important because early researchers argued that the Apishapa were ancestral to the Antelope Creek Phase (Campbell 1969). This concept was later questioned and ultimately disproved by Lintz (1986) because he clearly demonstrated that the two groups were occupying different territories contemporaneously. A Seallorn style Alibates projectile point was recorded at Roper’s Walk, and Alibates debitage was recorded at two other Apishapa sites along the SCR. This coupled with the remarkable similarity in architecture between The Brown Place and Alibates #28 begs the question, were the two groups interacting more intensively than has been previously recognized?

Roper’s Walk contains nine prehistoric architectural features with over 15 rooms in total. These architectural features are constructed in the style of other Apishapa phase sites throughout the greater ARB between 1100 A.D. to 1450 A.D. These features are typically oval, round, C or D shaped and were built utilizing dry-laid masonry. Some rooms occur in clustered configurations with two to ten rooms common being common.

The fragment of a Catlinite pipe reported here (Figure 2) was found in the northern section of the site (Figure 3), and was surrounded by features that are indicative of Apishapa architecture throughout the greater ARB. It is by this association and context that I am arguing an Apishapa Phase date for the Catlinite pipe fragment.

**Figure 1.** Comparison of Alibates #28 (on the left) and Feature 9 at the Brown Palace site in Beulah, Co. Overlay of the two figures show the remarkable similarity in architectural patterning.
Figure 2. Close up of striations on pipe wall reveal two patterns of friction between the tool that was presumably used to bore out the pipe and the Catlinite. The striations run lengthwise as well as in a radial pattern.

Figure 3. Site map of Roper’s Walk showing position of Catlinite pipe fragment relative to architectural features. Circles represent architectural features, crosshatching represents artifact concentrations.
Catlinite Defined

George Catlin has been credited with being the first Anglo to be shown the Minnesota Pipestone Quarry by Native Americans in 1835, and the material quarried there now bears his name. Mineralogically, Catlinite is composed principally of pyrophyllite and muscovite, with lesser amounts of diaspore and kaolinite (Emerson et al. 2005:198; Gundersen 1991) and as a result, can be geochemically sourced. True Catlinite is usually red from the oxidization of the hematite and iron particulates contained within the material but can only be attributed to the pipestone quarry through geochemical analysis.

Although there are subtle differences in the lithologic attributes of red (hematite-bearing) Plains pipestones, it is difficult to distinguish—megascopically—among the wide variety of these fine-grained argillites. X-ray powder diffraction analyses of these red pipestones—which include catlinites—indicate that these argillites are mainly composed of differing amounts of five minerals: diaspore, kaolinite, muscovite, pyrophyllite, and quartz. The pipestones from any given Plains provenance essentially contain only four of these five common minerals at that given locality. Plains pipestones can be characterized mineralogically by quantifying the apparent relative abundance of the three dominant minerals they contain (Gundersen 1991).

A small fragment of the Catlinite sample found at Roper’s Walk was sent to Drs. Jeffrey R. Ferguson and Michael D. Glascock at the Archaeometry Laboratory Research Reactor Center in Columbia, Missouri. At that lab, the fragment of the pipe was crushed and divided into two samples for analysis by instrumental neutron activation analysis. This analysis showed that “the new pipe sample matches quite well with the Pipestone Compositional Group for all elements except for scandium and arsenic…” (Ferguson and Glascock 2009). The Catlinite fragment from Roper’s Walk is represented by the black triangle in Figures 4 and 5. The best fit in terms of geochemical composition can be seen in Figure 4. The worst fit in terms of geochemical elemental similarities can be seen in Figure 5, but it is still very close to the Minnesota pipestone group.

![Figure 4](image-url)

**Figure 4.** Best Fit. This bivariate plot of thorium and ytterbium base-10 logged concentrations show the two compositional groups, the unassigned samples analyzed by Mead (plotted with “+” symbols), and the new pipe sample (Solid triangle and labeled). Ellipses represent a 90% confidence level for membership in the group (Ferguson and Glascock 2009). The black triangle represents the sample from Roper’s Walk.
Dated Contexts for Catlinite

Catlinite from dated contexts (Scott et al. 2006; Sigstad 1973) indicate that the earliest time signature for the utilization of Catlinite is around 475 B.P. (Scott et al. 2006:57) which is followed by another pulse between A.D. 25 and A.D. 150 (Figure 6). The main fluorescence of use of this material begins around A.D. 1025 and the frequency increases significantly into historical times. Archaeological evidence shows that between 500 B.C. and A.D. 700, artifacts made from pipestone found in the quarries of southwestern Minnesota were traded as far east as modern Ohio, as far south as the Kansas River, and as far west as north central South Dakota (Figure 7). The SCRP adds southeastern Colorado to this geographic distribution. Studies in the Nebraska area suggest evidence of the greatest concentration of the stone (Scott et al. 2006).

Figure 5. Worst Fit. This bivariate plot of thorium and scandium base-10 logged concentrations shows the two compositional groups, the unassigned samples analyzed by Mead (plotted with “+” symbols), and the new pipe sample (Solid triangle and labeled). Ellipses represent a 90% confidence level for membership in the group, the black triangle represents the sample from Roper’s Walk (Ferguson and Glascock 2009).

Figure 6. Graphic display of temporal “pulses” for the use for Catlinite. Larger “bubbles” indicate overlapping dates.
Historical use of Tobacco and the Calumet Ceremony

The earliest European and historical observation of the Calumet Ceremony was recorded in 1634 by Padre Diego Romero during his encounters with the Plains Apache (Hall 1997:81). European accounts of the Calumet Ceremony suggest that its use spread from the tribes of the Great Plains toward the east, and not from those of the Eastern Woodlands in a westward direction. This important because the Catlinite pipe fragment found in Beulah indicates a southwestern to northeastern trade vector (Evans 2012). Blakeslee (1981:761-76) concludes that the type of pipe bowl used on calumet pipes appeared on the eastern Plains after A.D. 1270.

The calumet constrains and pledges those who have sung it to follow to war the man in whose honor it has been sung.… The calumet halts the warriors belonging to the tribe of those who have sung it, and arrests the vengeance which they could lawfully take for their tribesmen who have been slain. The calumet also compels the suspension of hostilities and secures the reception of deputies from hostile tribes who undertake to visit those whose people have been recently slain by theirs. It is, in one word the calumet which has authority to confirm everything, and which renders solemn oaths binding (Blair 1996:185-186).

The pipe fragment found at Roper’s Walk may represent the earliest Catlinite pipe found within the ARB, and possibly the earliest expression of the Calumet Ceremony on the western edge of the Great Plains.
Analysis and Attributes of the Catlinite Pipe Fragment

To the naked eye, the artifact found at Roper’s Walk has such uniformity in wall thickness, and smoothness of bore channel, that it appears to have been created or modified by modern tools. Caliper measurements of wall thickness revealed that there is significant variation in wall thickness from the proximal to the distal end of the pipe (Figure 8). The further one gets from the proximal end, the greater the variation in pipe-wall thickness. It may be that this wall thickness variability is a byproduct of the manufacturing technique and warrants further investigation to determine if the cause of the variation is due to the boring technique, drill tip morphology, or the shaping of the outside curvature of the pipe.

Variation in pipe-wall thickness and the variable directions of the striations along the pipe stem walls indicates a manufacture technique for boring that is inconsistent with modern tools, if a steel drill bit was used then the wall thickness would be expected to be more uniform. Another possible reason for the variation in wall thickness can be seen in Figure 9 where the shaping of the pipe (steps 3 and 4), is done by finely scraping the outside of the bowl or grinding it against a nether stone.

Conclusions and Connections to the “Outside” World

The presence of Catlinite pipe fragment at Roper’s Walk underscores the dynamics of far reaching trade networks practiced by the Apishapa inhabitants in the Beulah locality. Pipes found in archaeological contexts dated to the Apishapa Phase within the ARB are poorly described, or appear to be of a ceramic composition (Campbell 1969). Any other pipes that have been previously described as Catlinite without geochemical proof may not be true Catlinite. The importance of geochemical sourcing for the pipes already in collections cannot be understated. It is necessary, as there are quarry locations in Wisconsin, Kansas, and Ohio that have material that is similar in color, mineral characteristics, and other visual attributes to Catlinite (Boszhardt and Gundersen 2003), but differ significantly in chemical composition (Gundersen 1986, 1987, 1988, 1991). Just because it’s red, doesn’t mean it’s Catlinite.
The only absolute date associated with Roper’s walk come from the radiocarbon dating of a paired hearth feature. This feature is located 77 meters southwest of where the Catlinite fragment was found, and the pipe therefore cannot be directly associated with the either the feature or the date. As a point of reference, this paired hearth feature yielded a date of 14C-age BP: 1185 ± 15 (Pri -08-77-2), 68% range calBP: 1082 – 1151. This date is somewhat early for Apishapa structures in the ARB, but appropriate for the transition from being fully mobile on the landscape to limited sedentism seen through the construction of the circular architectural features found at Roper’s Walk. This date is also very early compared to the dates for the widespread distribution of Catlinite and the Calumet Ceremony throughout the Great Plains outlined above. However, the fact that the artifact was found within the “common area” between several Apishapa Phase features indicates by association that it could well be Apishapa in age.

The presence of Alibates as well as the results from the geochemical analysis of obsidian and Catlinite from the archaeological sites along the SCR has made a meaningful contribution to our understanding of the scope and magnitude of the connection that the Beulah District had with “outside” systems (Brosowske 2005). Based on key aspects of behavioral ecology and logistical organization for tool-stone procurement (Andrefsky 1994, 1999; Bamforth 1986, 1988; Bird and O’Connell 2006; Brantingham 2006; Kelly and Todd 1988; Krebs and Davis 1993), the direct procurement of obsidian, Alibates flint, and Catlinite by the Apishapa is highly unlikely due to the time and labor costs associated with that endeavor. This concept, when coupled with the construction of architectural features, implies a level of social organization within the SCR basin that requires us to look at different levels of sociocultural integration with outside systems (Vehik 2002).

From Malad, Idaho to the Beulah District is roughly 775 km (481 mi), from Pipestone National Monument it is 969 km (602 mi), from the Valles Caldera area in New Mexico is 280 km (174 mi), and from the Beulah District to the Alibates flint
Figure 10. Google Earth view of distant raw material source locations surrounding the Beulah locality.
quarry is almost 400 km (249 mi). These distances matter in terms of modeling the vectors of trade and exchange systems, and the social implications that allow for the movement of these exotic materials across the landscape.

The majority of the archaeology recorded within the Beulah District during the SCRP represents a pre-horse period, and thus directs our attention to pedestrian methods of transportation, trade, and transport of various lithic materials over great distances. The convergence of these materials in the Beulah district clearly demonstrate that there are connections with geographic areas well outside of the Beulah locality (Figure 10), and that there is significant evidence of trade, which is extremely rare during the end of the Diversification period circa A.D. 300 to 800 (Vehik and Baugh 1994:256).

Obsidian from Malad shows up in sites designated to be the Washita River phase (A.D. 1100 to 1450) in western Oklahoma (Baugh and Nelson 1987; Vehik and Baugh 1994:259) and may have made its way to these sites through southeastern Colorado. According to Vehik and Baugh (1994), during the Late Prehistoric (A.D. 100-1725), there is a marked increase in trade of material such as obsidian, Alibates flint, and Catlinite. These materials become more prevalent in sites throughout the Central Plains including Kansas, Nebraska, Iowa, South Dakota, and Oklahoma (Baugh and Ericson 1994; Vehik and Baugh 1994:253-265).

At over 978 km from its source, this piece of Catlinite has the distinction of being the furthest traveled exotic material observed and analyzed during the SCRP and has tremendous implications about potential trade networks that extend northward from Beulah onto the Great Plains. In light of the recent of the recent findings at Roper’s Walk and other sites along the SCR, Colorado can now be safely added to the list of states presented above by Vehik and Baugh (1994), which pushes the western boundary of the Great Plains exchange systems (Baugh and Ericson 1994; Brosowske 2005; Creel 1991; Vehik 1988, 2002; Vehik and Baugh 1994) right up to the foothills of the Rocky Mountains in southeastern Colorado.

There needs to be a greater effort made in terms of evaluating artifacts identified as Catlinite in existing collections through positive mineralogical identification. There should also be a concerted effort to establish the chronology and movement of Catlinite across the Great Plains to the west, as the spread of Catlinite to the east is relatively well documented (Scott et al. 2006). Catlinite was a sacred material to the Sioux and many other Native American groups and was a fundamental part of the growing and widespread practice of the Calumet Ceremony. Apishapa sites like Roper’s Walk hold an abundance of research potential and should be intensively studied to produce a more accurate picture of what the trade dynamics really looked like for the inhabitants of the first architectural sites constructed within the ARB. Based on the geographic distribution of the raw material sources outlined above and the similarities in architectural patterning on a regional scale, it’s safe to say that the Apishapa were not alone on the landscape, operating in isolation from other groups. —CE
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Chaco’s Disturbed Pueblo Bonito Burials:
The Case For Looting and the Most Likely Perpetrators

THEODORE R. FRISBIE

Although well over one hundred years have elapsed since the initial human remains were excavated at Pueblo Bonito and slightly over ninety years for the remainder, there has not been an overall evaluation to account for the great majority of these burials that exhibit signs of significant disturbance. Given the substantial amount of research and publication relating to Chaco Canyon, it seems probable that the quantity and quality of artifacts recovered from Pueblo Bonito’s burials have dampened thoughts of seriously analyzing how to account for the disturbances. Nonetheless, statistically, significant disturbances have been attributed to 83% of the recovered remains. Phrased slightly differently, in my opinion, what normally would be interpreted as resulting from looting does not fit well with the number of recovered artifacts. This paper presents an evaluation of the published reports, photographs, and field notes of the excavators—George Hamilton Pepper (1873-1924) and Neil Merton Judd (1887-1976), and a consideration of the identity of the perpetrators.

Within the Chacoan literature that deals with the Pueblo Bonito disturbed human remains in question, seven reasons are variously noted for these disturbances:

1. “Swirling waters” entering a room via a doorway.
2. Secondary burial, i.e., moved from elsewhere.
3. Unavoidable disturbances via spatial limitations within rooms utilized for burials.
5. “Kids at play…in dark, spooky, forbidden corners.”
6. Desecration.
7. Looting/vandalism/plundering/pillaging.

Each of the seven reasons is discussed below but before doing so, it is necessary to review some facts about Chaco. It should be noted that there were two contemporaneous types of sites: 15 multi-storied Great Houses (hundreds of rooms) and several hundred small sites (5 to 30 rooms). In addition to numerous architectural differences, there were also major distinctions in other aspects of culture, including human burial practices. For the largest Great House (Pueblo Bonito), based on the undisturbed and partially disturbed burials the usual interment pattern was extended inhumation with head to the east. These interments were frequently accompanied by exotic funerary offerings, including massive amounts of turquoise. In contrast, small site burials were most frequently flexed with heads to the north, and characteristically accompanied by non-exotic items, primarily ceramics. There are a number of theoretical constructs to account for the disparity between these two distinctive populations involving social, political, economic, and religious organizational principles when viewed within the context of “The Chaco Phenomenon” or “The Chaco World”; Cordell and McBrinn (2012:198) prefer “…the more explicit term Chaco system” and provide the most recent synthesis; see also Saitta (1997:11-12) and Frisbie (1997:87-88; 2011a).

To date the most comprehensive analysis of all reported Chaco burials has been done by Akins
Her monograph represents the culmination of the Chaco Project and a synopsis of human remains data that utilizes a bio-cultural approach (see also Akins 2003). She, like numerous others, incorporates commentaries by Pepper and Judd, as well as offering her own interpretations. While 135 burials were recovered from Pueblo Bonito, 272 have been reported from small sites, but many more were looted (primarily for ceramic vessels) before 1930 (see Plog and Heitman [2010] for detailed discussion).

The Pueblo Bonito high status burials of concern occur in the northern section that represents the initial construction phase of the pueblo (Figure 1). This section consists of three blocks of approximately 30 ground floor rooms as well as their upper stories. The human remains were found in four contiguous rooms of the northernmost room block (Rooms 32, 33, 53, 56) reported by Pepper (1909, 1920), and four contiguous rooms in the western room block (Rooms 320, 326, 329, 330) excavated by Judd (1954). None of these rooms had access to the plaza and all had limited access from within the pueblo. Given the patterned locations, it should be noted a third set of rooms utilized for burials almost certainly existed in the eastern block of rooms; however, later construction, particularly Kiva 75, destroyed all vestiges of them (see Frisbie 1978:212).

Spatial limitations necessitate shifting to an examination of the seven explanations offered to account for the disturbed burials.

1. “Swirling Waters”

There can be little doubt that when Pepper excavated Room 33 in 1896 where he encountered the greatest concentration of grave goods and ritual deposits ever found in a Southwestern archaeological site, he had to explain the jumbled mass of human remains associated with the artifacts. The remains consisted of nine greatly disarticulated individuals and three burials which were mostly intact according to Pepper’s (1909) descriptions; Akins (1986:115) disagrees. Specifically, as encountered, the three most intact burials were Number 1, Number 5, and Number 12. His enumeration of the number of individuals was based on skull counts provided by Hrdlička (n.d.), but there were actually 14 above-floor individuals based on femur counts (Palkovich 1984). Pepper (1909:209-210) states: “In considering the contents of this room, it must be remembered that the greater part of the material had been affected from time to time by streams of water that no doubt poured through the eastern doorway after each heavy shower. The swirling water displaced the…skeletons…” Later archaeologists have suggested several other alternatives; however, because of the incredible amount of turquoise in various forms (beads being the most numerous, totaling 24,932 [Pepper 1909:242]), shell in various forms, and numerous other items, looting is usually not considered.

Before examining this matter further, it should be noted the human remains noted above were contained within a very small room which averages only roughly 2 m (6 sq ft) with the burials located just above the floor in a layer 0.5 m (20 in) in depth. The floor was composed of carefully hewn planks containing a 10 cm (4 in) circular hole (a probable sipapu) at the eastern end; sub-floor were two encrypted undisturbed burials (#13 entombed above #14). Each of these was lavishly furnished with burial goods with the latter exceeding the former in the number and types of artifacts including thousands of turquoise beads, hundreds of turquoise pendants, tesserae, mosaic work on baskets and other forms, as well as shell beads and pendants, large unmodified shells, stone beads, a shell trumpet, copper bells, and numerous other items. All total, the grave goods accompanying these two sub-floor burials surpassed those above the room’s plank floor (Akins 1986:115-117; Judd 1954:337-340; Pepper 1909, 1920:163-177).

The suggestion of “swirling waters” as the cause for the highly jumbled conditions of the majority of above-floor burials in Room 33 has been thoroughly dispelled by Plog and Heitman (2010) who clearly demonstrate that the stratigraphy, interior location of
Figure 1. Map of Pueblo Bonito (adapted from Akins 1986).
the room, and other factors preclude the possibility of water entering via the doorway.

2. Secondary Burials

To date no one has seriously presented a case for secondary burials in Pueblo Bonito; however, it is frequently noted since obviously, something needs to be said about the majority (83%) of human remains from Pueblo Bonito being disturbed. Plog and Heitman (2010:9) state: “An additional possibility may be that some of the interments were secondary burials that had first been placed elsewhere and later moved into Room 33 after the soft tissue had deteriorated.” This mirrors one of Akins’s (1986:116, 125) suggestions. As implied by the term, a secondary burial is the reburial of a primary (or other) burial wherein the remains, usually skeletons, are collected and moved to another location. Akins (1986:125) cites skull fragments and femur of an infant and perhaps a separate child found in Room 33 that were added from elsewhere to the mortuary remains. This is a possibility, although decomposition of infantile/child immature bones might also have occurred. However, it would seem highly unlikely that any skeletal material from non-residents of this high status lineage would have been added to the locations set aside for their own members.

While a number of cultures in Europe and elsewhere following the introduction of agriculture with concurrent ceramic production utilized urns for secondary burials, some others allowed the corpse to decompose in a designated location. Then the bones were collected and given a final resting place, frequently in an ossuary. The practice is often found when burial space is limited. Secondary burials are most commonly deposited as discrete entities, not randomly scattered about.

Throughout the Basketmaker-Pueblo continuum, inhumation was exclusively practiced.2 In all the Pueblo archaeological excavations of which I am aware there are no instances of secondary burials, although there are undoubtedly examples where ancestral remains were found exposed via erosion from wind or water, or during building renovations, leading to their potential reburial. Characteristically, secondary burials consist of skeletal remains being grouped together when reinterred—sometimes referred to as “bundle burials.” When these remains are excavated they are found as essentially discrete individual entities rather than partially intact or randomly scattered remains. Within the eight burial rooms under discussion in Pueblo Bonito the configurations encountered do not adhere to the normal secondary burial pattern; in fact, when excavated they showed no clear evidence of reburial and Pepper and Judd did not suggest the possibility. Finally, the undisturbed burials within the pueblo precisely fit the consistent Basketmaker-Pueblo pattern of inhumation. Therefore, to suggest the Bonitians utilized a different location for some burials and later brought the remains to the rooms designated for burials does not seem even remotely feasible. Well established cultural traditions are not easily changed; quite obviously, secondary burial was not part of the tradition.

3. Unavoidable Disturbances

Due to Spatial Limitations

Generally speaking, there can be little doubt the now recognized Room 33 remains of 14 individual human remains (rather than 12) buried in a 2 m (6 sq ft) room could well have led to some displacement of previous burials. This is especially true when they were all located within 0.5 m (ca. 20 in) deposit (i.e., layer) directly above the floor. However, there is also a good possibility that the fairly thorough disturbance (digging around, ransacking/pillaging noted below) within the room caused skeletal material and artifacts to settle resulting in a reduction of the original depth of the sand fill associated with the interments. Furthermore, careful placement of the most recent addition(s) would not result in the massive disarticulation of previous burials noted by both Pepper (1909, 1920) and Judd (1954). Also, as Akins (1986:116) points out, “…the fact that the mostly intact skeletons were neither the highest (n) or the lowest—a pattern not likely to result from one grave intruding on another,” tends to negate the spatial limitation possibility, even though unlike
Akins and me, Plog and Heitman (2010:9) still favor it. It seems that if the extended mat-or cloth-wrapped individual burials were originally carefully placed side-by-side in a two layer arrangement the total of 14 could be accommodated without difficulty. There is no evidence that these 14 elite individuals were buried in a haphazard fashion; definitely orderliness would have prevailed in this very special crypt.

To date, Plog and Heitman (2010) have presented the most comprehensive reanalysis of Room 33, incorporating their recent skeletal sample radiocarbon datings. These are congruent with two others published by Coltrain et al. (2007). The ranges are from A.D. 691-877 for Burial 13 and A.D. 690-873 for Burial 14, the two found sub-floor, and a matching date from an above-floor femur. This leads them to conclude these three individuals were interred within a few decades of each other prior to the beginning of the ninth century. Another femur provided a date suggesting burial late in the ninth century. Based on the accompanying ceramics, the others potentially could then have been interred at any time until the early twelfth century (i.e., Chacoan abandonment). These data dispel the previously commonly held notion that all of the Room 33 burials occurred post-A.D. 1020.

4. Animals (Carnivores and Rodents)

As noted above, all of the eight Pueblo Bonito burial rooms were located without access to the plaza, and given their interior location they would not be likely candidates for disturbance by larger sized carnivores or small animals. There is one minor exception noted by Judd (1954:326): in Room 320 there was found the “…headless skeleton of a second female”…“Pack rats had nested in baskets and pitchers and under the arched ribs of the torso, but by no stretch of the imagination can they be charged with the disorder so apparent here.” Given the interior location of these rooms, the only carnivores seemingly able to disturb them would have been domesticated omnivorous dogs. If they had gained access it would have had to have been while they could still gnaw segments of sustaining flesh from the skeletons. If that had been the case gnawing marks (larger than smaller rodent gnawing, also not noted) would be extant. Thus, the possibility of animals being responsible for massive disarticulation of human remains can be completely ruled out.

5. “Children at Play in Dark Forbidden Places”

This suggestion might be a fruitful consideration in some archaeological contexts. I am sure Akins’s (1986:116) inclusion, “…and perhaps children playing in dark forbidden places,” was just a thought in passing. Enculturated children do not violate sacred areas associated with “The Dead.” Such areas would have been more than well known to them and deemed “verboten!” In addition, children could not possibly have caused the havoc of disarticulation encountered in Pueblo Bonito burial sepulchers! From my knowledge of contemporary extant Pueblo practices, particularly at Zuni, no child would dare venture into a locale associated with human remains. This pattern is not only Puebloan, but widespread throughout Southwestern cultures and elsewhere in the world: Human bones are not to be messed with! Therefore, I find Akins’s suggestion not even remotely possible.

6. Desecration

Desecration of human remains implies an intentional despoiling/destroying of grave sites for any number of reasons. Examples might involve vengeance or hatred (often against enemies), a reaction to despotism, or establishing a new dynastic realm. A further extension found archaeologically may be cited wherein monuments, documents, et al., of leaders (of whatever variety) who have come before are destroyed or defaced to erase any memory of them.

Regarding the eight rooms under study, if desecration had been intended the disturbances would almost certainly have included the smashing of ceramics and other artifacts, as well as more than disturbing the bones. There is absolutely no evidence of this behavior. With regard to the disturbed remains within Pueblo Bonito I erred in
using “desecration” in the title of an earlier version of this paper (Frisbie 2013); there it was used as a synonym for looting simply because it seemed a bit more elegant. The two, however, have very different connotations and given the configurations Pepper and Judd encountered within the eight burial rooms being reanalyzed, desecration was definitely not the word I should have used!

7. Looting (Vandalism, Pillaging, Plundering)

My reanalysis of all of the evidence above leads me to conclude that the eight Pueblo Bonito burial rooms were looted since none of the other six criteria for disturbance offers a credible and verifiable explanation. There can be no doubt Neil Judd and I share a strong bond with regard to interpretation (Figures 2 and 3). Judd (1954:334-335) states that in his burial room complex—Numbers 320, 326, 329, and 330:

...of 68 interments 46, or 67.6 percent, had been violated...most had been dragged from their burial mats before decomposition was complete. Articulated limbs, a torso here and there, skulls with parts of the cervical vertebrae attached, all provide seemingly convincing evidence the general confusion in these four rooms was caused by irreverent hands. Lack of turquoise ornaments and, indeed, the paucity of ornaments of any kind, suggest the motivating reason for the vandalism.

He later comments: “From Pepper’s own description of conditions in the four rooms it seems clear that the disorder could have been caused by human agency only and not natural forces” (Judd 1954:339).

There are frequent recountings of the burials and artifacts, both disturbed and undisturbed, from the original reports of Pepper (1909:210-234, 1920:129-177, 210-213, and 216-218) and Judd (1954:325-342). Given what was found and the quantity and quality of these finds, essentially all who have published about Pueblo Bonito incorporate

Figure 2. Scattered skulls and torso in Room 320, northwest quadrant; Plate 91 [lower] from Judd (1954).
descriptive commentary from these reports. The most thorough reanalysis is to be found in Akins (1986:112-125, and the 2003 condensed version). Mathien (1997, 2003, and elsewhere) provides the most comprehensive studies of Chacoan turquoise and other materials relating to ornaments from burials and in other contexts. Plog and Heitman (2010:4-9), in a highly provocative paper, deal primarily with Pepper’s rooms, especially Room 33. Rather than more enumerating, I turn now to several examples which provide specific evidence of looting:

At the outset I must note that I firmly believe turquoise is the key to understanding the Chaco World/Phenomenon/System, and concomitantly, Chaco had strong ties to Mexico (Frisbie 2011a).

Given this, turquoise was the primary rationale for vandalizing the lavishly outfitted elite burials; almost certainly any exotic items found would have also become part of the booty. Since numerous ceramic vessels, baskets, wooden items (many exotic), and mundane objects were left in place, pushed or thrown aside, these items were of no interest to the looters.

What follows is fairly lengthy because it presents a clear case of looting which is documented, and therefore, worthy of explicating in detail and analyzing in depth. The scenario concerns someone who was keenly interested in Pepper’s 1896 spectacular finds in Room 33 and who decided to hightail it to Chaco apparently as soon as he became aware of them because he was there that following spring. This Phillips Academy curator/archaeologist was most noted for his midwestern Mound Builder work; however, his collecting interests were far broader and his methods, often deplorable, including selling artifacts. Warren K.
Moorehead was his name, known in the early days as “The Dean of American Archaeology,” a title long since debunked. It is well known he suffered from tuberculosis and an 1897 spring trip to New Mexico for health reasons was planned wherein he would also add to the Phillips Academy collections under the auspices of philanthropist Robert Singleton Peabody (who funded the academy’s Archaeology Department, including the building in 1901). Moorehead (1906:33) arrived in Farmington in April, hired “…nine men, a large wagon, and five horses [and departed for three weeks] at the Chaco Group ruins, seventy miles south.” Not only did the group spend time surface collecting within the Canyon; they also looted a small site cemetery (trash mound) across the canyon, acquiring 40-50 ceramic vessels (his estimate).

Moorehead (1906:34-38) then describes their experiences in Pueblo Bonito wherein they spent “two or three days in these [dark] underground [lower-floor] rooms climbing from one to another and collecting pottery and other objects.” “We opened one or two rooms…” “Beneath the floor [of one room]…was found a splendidly preserved skeleton…wrapped in a large feather robe…” Moorehead (1906:34) states: “some pottery [four mugs] accompanying this burial is shown in fig. 13.” Interestingly, in a letter to his sponsor Moorehead (1906:38) states, “Selecting at random a small room filled with rubbish, the workmen dug it out to a depth of three meters, down to a hard adobe floor.” Given his earlier burial statement, this would be one of the two rooms he looted of the four rooms burial room complex Pepper had not yet excavated (Rooms 53 and 56). Clearly the one burial Moorehead described was not prehistorically looted, nor were the others.

One might ask: How did Moorehead know the precise location of these two rooms that were part of the artifact-rich segregated burial room complex excavated by Pepper? I seriously question his “randomly selected” statement, and highly suspect that his close association with Frederick Ward Putnam provided him with the precise location. Putnam, associated with the American Museum of Natural History, directed (in absentia) the work at Chaco Canyon by Pepper. Putman also served from 1874 to 1909 as curator of the Peabody Museum of Archaeology and Ethnology at Harvard, and had previously worked with Moorehead on the Ohio exhibit for the 1893 World’s Columbian Exposition. I suspect they were in frequent contact when Putnam was in Cambridge. I also believe there may have been payback for the “where to dig” information.

It is interesting to note that Pepper chose to re-excavate Rooms 53 and 56 that had been dug (i.e., looted) by Moorehead. Pepper (1920:210) does not state that Room 53 clearly exhibited looting activity, but begins by noting that the eastern and northern walls had been torn down to gain easy access—typical of looters. He goes on to say as debris was being cleared in the southern section of the room, scattered remains of a skeleton, lacking a skull, were found and that the jaw was located in the center of the room. Pepper (1920:217) states regarding a sub-floor burial crypt in Room 56 that it was lined with sticks at the base and had walls composed of wooden boards: “This grave was probably covered with boards, but it may have been covered with matting for fragments of both were found in Room 53, where the greater part of the debris from this room was thrown” [along with the skeleton]. Interestingly, Moorehead and crew were not thorough enough in Room 53 to locate along the eastern wall a small bowl, two pitchers and most of a cylindrical jar, as well as a child’s skull; near it “…were over 4000 flat circular turquoise beads and about thirty shell beads or pendants…they had no doubt formed a necklace” (Pepper 1920:212-213). On the floor were additional whole vessels and within the debris at the southern end of the room were potsherds, end pieces of a cradleboard, and other wooden items; additionally there were turquoise beads, as well as pieces of feather cloth. While Pepper does not relate these finds to Moorehead’s looting, the connection is silently obvious.
Pepper (1920:216-218) wrote that Room 56 “…contained two graves that had been opened…and the bones were scattered…in the northeastern part of the room. There was also a mass of human bones in the northwestern corner, so it was impossible to determine how many bodies had been buried there.” In addition to the board-walled crypt noted above, two additional sub-floor burial crypts separated by an earlier constructed wall that was level with the floor are described; whether these had board walls remains moot. A few potsherds, a stone jar, and half of a jar cover were the only artifacts noted.

One is led to believe from Moorehead’s (1906:33-38) commentary on his three week “visit” to Chaco that nothing of major consequence was discovered beyond the feather robe and some pots with one burial. While Pepper does not press the issue, the fact he found turquoise beads mixed with debris thrown from Room 56 into Room 53 indicates Moorehead may well have chosen not to disclose what was actually found. There were at least three encrypted, below-floor burials, at least one of which was entombed in a specially prepared wooden board-sided (and topped?) crypt. Since the burials in Room 33 were lavishly outfitted with burial goods, particularly Burials 13 and 14 below the plank floor, one would expect turquoise and other items in another of this four-room burial complex.

There is a clue to this effect in Pepper’s noting of turquoise beads cited above.

There is no question that Moorehead sold artifacts to collectors and one might expect some unscrupulous, non-professional dealings, as well. With respect to the latter, remember this collecting trip to Chaco Canyon was funded by Mr. Peabody on behalf of the Phillips Academy. Therefore, any cultural materials collected should have been incorporated into their collections; however, given the somewhat nebulous report to his sponsor, it is easy to believe Moorehead falsified data on what was actually recovered.

A hunchback ceramic figurine reputedly from a burial in Chaco Canyon that became the major subject of a paper by Pepper (1906) remains an enigma. He said it was purchased by a Harvard graduate student while visiting Chaco from the trading post there, and presented as a gift to Professor Putnam. If one accepts such figures as representative of yet another Mesoamerican trait at Chaco and also understands the importance of human hunchbacks throughout Mexico and Central America and their characterization in ceramic form (Frisbie 2011b), it then appears unlikely that the artifact would have come from just any burial—it would have come from a high status one. Thus, I propose that this was very likely one of the artifacts Moorehead recovered from one of the entombed burials in Room 56 and failed to report to his sponsor. As payback for information about where to dig, he gave this “crème de la crème” artifact to his good friend and Chaco confidant, Fred Putnam for his personal collection; ultimately Putnam donated it to Harvard’s Peabody Museum (Figure 4).

Figure 4. The Putnam hunchback ceramic effigy. Collection of the Peabody Museum, Harvard University.

Moorehead and his crew missed a significant number of artifacts, including much highly valued turquoise. Interestingly, far more was missed in Room 33 than anywhere else. This is true even when disregarding the two lavishly outfitted completely undisturbed sub-floor burials that also included around 2,000 turquoise beads, pendants, and other
items located around the four corner posts that were ritually deposited. Given Pepper’s descriptions of the remains, a number showed signs of being torn apart while ligaments were still extant so that, as in Judd’s description, various body parts remained intact when tossed about during the vandalism.

I surmise there might well have been more grave goods in Judd’s burial rooms if the material covering the burials had been sand rather than varying mixtures of household trash, earthy debris, drift sand, and construction materials. Working in these materials would allow the perpetrators to be quite thorough during the process of unearthing items accompanying the burials even while utilizing poor lighting. Room 33 was characterized as having sand brought into the room to cover the burials. Sand would have hampered the recovery of burial goods using the typical Pueblo digging tool, a digging stick, simply because loose sand is notorious for allowing small objects to disappear, even more so when it is dry. Consequently, it would appear there was good reason the turquoise, etc. recovered by Pepper was primarily just above floor in a level measuring 20 cm. (slightly less than 8 in) in the burial level which was 0.5 m (ca. 20 in) in depth based on his numerous measurements. That does not mean I am suggesting more than some of his finds had disappeared from the plunderer’s view, but that there is a strong likelihood that some of his finds did. In addition, again, based on Pepper’s description, it would not appear that skeletal material was thrown into noticeable piles as described by Judd for his considerably larger rooms; rather it was indiscriminately scattered about the room as the looters worked. This indicates the room was more than just a burial room—quite likely it represented what might best be termed, “the Inner Sanctum” for the Chaco Phenomenon (see Plog and Heitman [2010:10-11] for a similar assessment).

As Pepper’s report makes clear, the looters were content with what they had found associated with the burials they vandalized in Room 33 by digging around, in, and under the remains while tossing them about. That a great number of grave goods were missed tells us nothing about what they found and hauled away. There can be little doubt it was a substantial amount, and would have been much greater if they had probed deeper and/or used a sifter basket; however, they never returned to plunder anew.

Thus far I have alluded to looting, clearly agreeing with Judd’s assessment; however nothing substantive has been presented to offer proof that this was, in fact, the case, aside from the description of Moorehead’s clearly established plundering activities wherein congruencies are found. Now I present what I believe to be salient explanatory features. They begin with the notion that lighting in these dark, interior, underground rooms was problematic, as it was for Pepper’s first glimpse into Room 33 via a candle through the partially sand-filled doorway leading from Room 32. The vandals utilized their own version of candles that Pepper (1920:138) described in close proximity to the remains of a mostly intact human torso in Room 32 as follows:

There were eight sticks in the sand at the right side of the body. From their appearance, it seems that they had been stuck into the soil of the sand at short intervals. One end of each is pointed and the opposite end is burned, as though they had been used as torches. The material is evidently cottonwood. They average 9.3 cm. in length and 1.3 cm. in diameter… Scattered about in the sand were six pieces of similar size, but with squared ends; these with two others with pointed ends, had the upper part charred…

Skeletal remains were located in the southwest corner and “wrapped about the bones and extending into the western doorway [leading into Room 33], there was a mass of burnt cloth” (Pepper 1920:138). Two types of textiles are noted, the majority being plainly woven while the second type was tie-dyed with banding.

Given the location of the cloth-wrapped skeletal material, my interpretation is that the
remains were dragged from Room 33 where the cloth had been accidentally ignited by a vandal “candle.” Extinguishing the fire in the doorway would have at least partially alleviated the problem of smoke while plundering Room 33. At some point thereafter, a careful examination of the wrapped torso for its accompanying turquoise, etc. now in Room 32, occurred. Pepper (1920:136) notes an additional “mass of cloth, matted and partially decayed” in the area, as well. As expected, under these circumstances no turquoise or other items were in direct association with the remains. From the description, it is also possible to conclude this was not a secondary burial—all evidence points to looting. Leaving the expended lighting devices in situ, given their number indicates a considerable period of time was spent, a clue pointing toward a lucrative amount of booty.

There can be little doubt the remaining portions of the skeleton remained in Room 33, and given the primarily well preserved cloth wrappings one might well expect the burial mat near the doorway in the southwest corner of the room was associated with these remains. Pepper (1909:197) notes it was protruding out of the sand and “…made of osiers sewed together side by side.” Although he does not specify that it was standing upright leaning against the wall, its location and his description tends to indicate this could well have been the case. If this burial mat was not associated with the burial being discussed, it could have been removed from one of the other interments. I strongly doubt it had been placed there awaiting to enwrap a new corpse to be interred within the burial chamber. Of particular importance is the banded, tie-dyed cotton fabric that, like the hunchback figure, and numerous other traits point to Mesoamerican connections (Figure 5). Such fabrics were reserved for the highest nobility (i.e., the “royal cloak”) and their wearing was sanctioned for use by the long distance traders (pocheta) during the Early Post Classic Toltec era (Frisbie 1997, 2011a).

Figure 5. The tie-dye and banded cotton textile found in the doorway between Rooms 32 and 33 associated with a partial torso. Photograph by Laurie Webster.
Given the above interpretation of Room 32, it was not sanctioned as a burial room. One individual’s skeletal material was dragged into the room and pilfered there. Hence, I suggest that this room, containing over 300 ritually important canes stacked in the northwest corner as well as numerous other non-funerary artifacts, was a repository for such items. In my estimation, it served in the same capacity as Room 28 to which it was connected by a (masonry sealed) doorway in its southern wall. Room 28 is most noted for the 114 stacked cylindrical jars, as well as numerous other items. The jars from which cacao was drunk provide another pairing of Mesoamerican traits.

Based on all of the above evidence, my interpretations, and Judd’s commentary, I believe the only conclusion to be reached is that the great majority of burials located within Pueblo Bonito were looted. Clearly the motivation was acquisition of turquoise in various forms, as well as shell and exotic type objects of interest to the perpetrators. I further believe it is almost certain the burials from Judd’s western set of burial rooms would not have had the voluminous quantity of turquoise, etc. reported by Pepper—56,000 pieces of turquoise from Room 33 alone—that remained for him to document even after having been looted. The reason for the disparity frequently given is a logical construct: the highest ranking lineage occupied the central section of Pueblo Bonito, flanked by lesser ones.

Who Were the Perpetrating Vandals?
When considering the possibilities of who the looters might have been the first consideration is: “When did the looting occur?” The excavation reports indicate it was not historic; therefore, it was perpetrated prehistorically. Logically, it would not have been the high status Chacoans plundering their own kin. If that were so, the materials recovered by Pepper and Judd would almost certainly have been significantly reduced simply because they would have had the greatest knowledge of precisely what was buried with their dead. That leaves the remnant population within the canyon after the collapse of the Chaco System ca. A.D. 1120 or later, resettling immigrants from the Mesa Verde region and, considerably later, the Navajos who also took up residence within the canyon.

Of these choices the most likely is the remnant population because they would have been the most apt to have an awareness of where the Pueblo Bonito burials were located.

Based on my reading of Pepper and Judd, there were no evidences of looting or disturbances in the rooms they excavated aside from the two dug by Moorehead and those looted during the years between their excavations which Judd identified by room number. This provides a strong indication the vandals were prehistoric and of Chacoan descent. If one considers that a high status, elite group occupied Pueblo Bonito, there is an excellent possibility they conscripted the services of a number of individuals from smaller sites across the canyon. This group could well have been in residence during their servitude, maintaining extended family and other ties to their home villages. Given this hypothetical, but highly feasible possibility for the pillagers, it could well have been these, or at least some of them, who remained within Chaco Canyon following the collapse of the system. Thus, I give the highest probability to looters derived from this group; they would have been in the best position to know where to find the richly outfitted burials.

Having established the most likely perpetrators for the looting of the high status burial rooms, one might query the rationale for this vandalism. Personal gain is a possibility; however, given the probability there was a vast quantity of turquoise and additional exotic material available, this might not be the case. In view of the fact turquoise had become the “God Stone” of Mesoamerica, it was in high demand by the elite for whom its acquisition was an essential part of their positions within society. Therefore, if a large quantity became available there is an excellent chance it was destined to be exported (or traded) far to the south.
Discussion and Conclusions

As noted above, there are numerous questions relating to the Chaco Phenomenon that remain enigmatic—including the major one: precisely what were the organizational principles that allowed the system to operate? Interpretation of archaeological sites/data has come to rest on what really happened in the past based on verifiable conclusions that are scientifically sound and, frequently, statistically derived. Computer-generated programs abound and the more “elegant” the better in solving archaeological enquiries. There remain, however, many issues for which investigators cannot rely on hard science to arrive at solutions simply because much data relating to human cultural behavior do not lend themselves to such explanatory procedures. Here, one might employ multiple working hypotheses selecting the one or two most likely to provide the answer to the problem. Of course, for Pueblo archaeology there is also ethnographic analogy with descendant tribal groups via extensive literature or living testimony. In the final analysis, much of what we think we know archaeologically is based on speculation wherein this seems to be “the best bet yet” to resolve posed queries. From my perspective, speculation represents a logico-deductive framework to arrive at plausible explanations.

In the process of reanalyzing the two Pueblo Bonito burial room complexes, this paper relies heavily upon speculation. Nevertheless, the evidence of looting for the great majority of burials far surpasses any of the other potential causes based on what is presented by Pepper and Judd from the archaeological record. Working from within the context of their reports, as well as from their specific commentaries, I have “read between the lines” to offer a number of additional insights. I have also built upon what others who have dealt with these same materials put into print. I believe my interpretations fall well within the realm of reality; they are logical constructs that may or may not be altered in the future.

There remains, however, one puzzling aspect worthy of consideration that no one, including Judd, has addressed. In his four burial room complex there is a doorway leading into an unnumbered room from Room 326 (Judd 1954:Figure 2; see also Figure 1 herein). Logically one would surmise an unnumbered room was not designated because it was left unexcavated by him, Pepper, or persons unknown, especially since he does number rooms that he notes were looted during the 20-year hiatus between Pepper’s and his excavations. Clearly, what I call “the Fifth Room” was part of Judd’s burial room complex because it is within the isolated, self-contained block connected by doorways. If my assumption is correct, this room almost certainly contains burials and grave goods that may or may not have been prehistorically looted. One might query if Judd purposefully neither excavated nor numbered “the Fifth Room” so that it could be excavated at some later date when more sophisticated analytic techniques and methods of interpretation were available. The notion of “leave something for the future” was not extant during the 1920s, but did Judd have this in mind? We will never know, but “the Fifth Room” could well provide valuable insights into burial practices that were not possible to ascertain when Judd excavated a major portion of Pueblo Bonito.

Although the potential excavation of an almost certain burial room currently raises numerous issues including all of those identified by NAGPRA, should the Native Americans who identify themselves as Chacoan descendants become interested, it seems that excavating this room could reveal important new information about Chacoan culture and lifeways for all those who continue to be fascinated by Chaco.

Endnotes

1. Additional unpublished notes are available in the National Park Service’s Chaco Archive; and other researchers have written on this topic as well.
2. Hodge’s (1921) discovery of some cremations at Hawikuh probably relates to Hohokam connections.
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Penitentes and Their Domestic-Looking Moradas

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La Hermandad de Nuestro Padre Jesus or Los Hermanos Penitentes is a lay-person religious organization with members that practice in New Mexico and Southern Colorado. This organization is currently a brotherhood of the Catholic Church, but members were secretive in their practices prior to their acceptance into the Church in 1947 (Weigle 1976). The brotherhood was not always viewed fondly by different groups, including the Spanish in the eighteenth century, the Catholic Church in the nineteenth century, and the Anglo colonizers in the nineteenth and twentieth centuries who settled in New Mexico (Weigle 1976).

As a frontier territory under Spain, there were only a few priests and friars available in New Mexico to complete marriages, death rites, or other sacraments, let alone religious services in the late 1700s. The Franciscans, who were typically the friars and priests tasked with the missionization of the indigenous people and served as the religious leadership in New Mexico, were expelled from the territory in the late 1700s (Ahlborn 1968). The scarcity of priests and friars in the past led to the development of the Penitentes. The Penitente religious ceremonies are similar to Catholicism practiced during medieval times, when iconography and pageants were common and self-flagellation occurred, which was brought to New Mexico during the Spanish colonization and is supported by archival evidence (Ahlborn 1968; Henderson 1937; Horka-Follick 1987; Weigle 1976; Wroth 1991). Many moradas were built away from the Catholic churches in communities, but occasionally they were built near the churches in isolated Hispanic villages. Although the location differed among communities, they usually were constructed of traditional materials and resembled domestic dwellings, unlike the Catholic churches. It is proposed that the traditional morada construction resulted from a need to blend in with the community and preserve the secretive aspects of the brotherhood. Several moradas were recorded that indicate the similarities in style and the materials used to construct the buildings.

Penitentes

It is unclear exactly when the Penitente Brotherhood started in New Mexico. It is known that aspects of Penitente practices were brought with Oñate’s group in 1598, who led the first Spanish settlers to northern New Mexico. According to Captain Gaspar de Villagra, during Holy Week, after stopping to camp near present day El Paso Texas, Oñate and his soldiers practiced self-flagellation as a form of penance, as part of the Easter ritual. This was a common practice in Spain and Mexico during this time (Weigle 1976). Also, according to archives, in 1627, Fray Alonso de Benavides who served as Custos and Commissary of the Inquisition in New Mexico was “upbraided by an Indian for Christians’ flagellation” (Weigle 1976:11-12).
It is not until the 1700s and possibly later, however, that the Penitente brotherhood was noted. The spread of the Penitente religious practices was likely due to the expulsion of the Franciscans in the late 1790s. By 1828 the Mexican government had outlawed the Franciscan Order from their duty as friars to the missions and the Hispanic communities in New Mexico. The missions and Hispanic communities were placed under government control and a secular branch of Catholicism. By 1850, there were only ten priests for the entire province (current day New Mexico, Arizona, and Southern Colorado), which included the various Hispanic communities and missions at the pueblos and Native American reservations (Horka-Follick 1987). With the Hispanic population growing and settling into new areas of New Mexico, the isolation of these frontier communities, and the lack of spiritual guidance, the Penitente Brotherhood developed. It has been hypothesized that the heyday of the Penitentes was from 1850 to 1899 (Horka-Follick 1987:4).

The head of the Penitente chapter is the Hermano Mayor. He is assisted by Acelador and Coadjutar. Other officers are a Secretario (reader), Sangredor (blood-letter) and Pitero (flutist) (Ahlborn 1968). Each Penitente chapter (called a morada) typically has 30-50 members that are associated with a specific community.

The Penitentes conducted processions during Holy Week between Wednesday and Friday, as the crucifixion of Christ and the sorrow of the Virgin Mary were the focuses of the Brotherhood (Wroth 1991). These processions were similar to the Spanish confraternities’ passion plays of the 1500s (Wroth 1991:17). These types of processions are still conducted today.

On the Friday of Holy Week is the last procession, which is the most important of the processions. The Hermano Mayor leads the procession along the Calvario. Cross bearers drag wooden crosses that often weigh 200 pounds, and other brothers may have cacti bound to parts of their bodies. Flagellants are part of the procession, as are singers, and flute players. A carreta de la muerte (death cart) is pulled by brothers. This cart’s wheels do not turn, making it difficult to pull. In the cart is a skeletal statue that is usually Doña Sebastiana or the Angel of Death. At the end of the Calvario, the chosen male is tied to a large cross and “crucified.” Members are chosen to aid the sufferers (Horka-Follick 1987:100). After the various processions are completed during Holy Week, the rest of the day is spent confessing sins, visiting other moradas in the vicinity, praying, and private penance (whipping) in the morada. In the evenings, food is provided in the morada, as well as first aid and sleeping (Horka-Follick 1987:102). Historically, morning processions focused on singing, while the evening processions focused on whipping (Horka-Follick 1987). Other Penitente processions may include May 1st and 2nd, November 2nd (All Souls Day), August 15th (Assumption Day), December 8th (Immaculate Conception), the feast day of the village saint, the feast of Saint Francis of Assisi, and the death of a brother (Horka-Follick 1987:94).

In addition to the religious function of the Penitente Brotherhood, members also served the community in other aspects. The group served as a “welfare bureau, a court of justice, an undertaking agency, a comforter of the sick and as a fellow helper in any community endeavor” (Horka-Follick 1987:14). Therefore, the Penitente Brotherhood served the community by overseeing several social functions in addition to the religion that the territorial governments failed to accomplish.

Moradas

Most of the Penitente rituals performed occurred outside of the morada. The morada was used for prayer, meetings, storage of Penitente equipment and first aid after flagellation (Van Citters 1985). Moradas are a simple design and resemble domestic buildings rather than Spanish missions and later parish churches. Moradas are usually linear or L-shaped, and are typically Northern New Mexico Vernacular style (Sze 1995).

According to Sze (1995), moradas have been constructed of a variety of traditional materials
and include locally occurring stone, adobe brick, and jacal. Adobe bricks are laid onto stone foundations in a Spanish building technique that was influenced by the Moors (Ahlborn 1968:130). Adobe mortar is used between the bricks and typically mud plaster is used on the interior walls (Ahlborn 1968:130). Other building materials were available in the 1800s with the opening of the Santa Fe Trail, and later in the 1880s with the railroad. The railroad not only brought different building materials, but also different styles which flourished in New Mexico but were not adopted for construction of moradas.

Moradas have few windows and the windows are small, with none in the chapel room (oratorio). The few windows the building does have are usually heavily shuttered. The early moradas had flat roofs with parapets and canales, but the later buildings have gabled and hipped roofs typically covered with corrugated metal; and more recently remodeled ones have composition shingles which replaced the corrugated metal (Sze 1995). Bell towers are sometimes associated with the buildings, which distinguish them from the surrounding domestic houses.

**Interior of Moradas**

Moradas can have two to three rooms: a sanctuary space that is an oratory (chapel or oratorio), a sacristy in the center (meeting room or el sepulcro), and a room for storage (Ahlborn 1968; Sze 1995). Some moradas have additional rooms including a bathroom, and records room (el escritorio) (Sze 1995).

The morada interiors in the Abiquiu, New Mexico, were recorded by Ahlborn (1968). These rooms had whitewashed walls plastered with adobe, hard-packed dirt floors, and small windows. There were a corner fireplace, ceremonial equipment, and a tub in the storage rooms. The tub was used to wash off the blood after penance. The sacristy had benches, storage chests, fireplaces, and religious objects. In the oratory, there were altars with crucifixes, santos (saint statues), retablos (flat panel paintings), and bultos (sculptures) (Ahlborn 1968:136-138).

**Associated Exterior Features**

In addition to the bell towers, campo santos (cemeteries) and maderos (large wooden crosses) can be used to distinguish moradas from domestic dwellings. Also, a path that leads to the “Calvary” (calvario) is part of the exterior.

**Abiquiu Moradas**

The two moradas at Abiquiu are the best known Penitente moradas in New Mexico. One of the moradas (east) is listed on the National Register of Historic Places (Kemnitz 1970). Information indicates that both are relatively old; and although there has been some remodeling, they appear to be similar to their original look.

Abiquiu is located in northern New Mexico in the Rio Chama Valley. The community is small and was initially settled in the 1740s (Pearce 1965). This village was a buffer community specifically established in an attempt to protect the larger settlements along the Rio Grande from the nomadic Native tribes (Ahlborn 1968). In 1747, the villagers of Abiquiu petitioned to abandon the community due to Native American raids, but the community was resettled in 1754. After this resettlement, Abiquiu became a major trade center with the Native groups (Julyan 1998).

**East Morada**

The east morada is the older of the two and may have been built as early at the mid-1700s (Van Citters 1985). Currently, the morada is a narrow, one-story, rectangular-shaped building that is made of adobe brick and covered with mud plaster (Figure 1). The building measures approximately 102 ft by 26 ft (31 m by 8 m) and has wooden vigas, wooden canales, and a flat roof with a parapet. An interior pipe chimney is located on the east side of the roof. A contracted chancel, which rises to a bell tower, is located on the west elevation. Buttresses were noted on both the north and south elevations, which appear to be newer modifications. Three shuttered windows and two doors are located on the south elevation. Each window has a small wooden pediment over it. No entrances or windows are on the north elevation.
The west elevation was not recorded as it could not be seen from the public road. This morada is a Northern New Mexico Vernacular style without the typical gabled roof. Three large wooden crosses (maderos) were noted to the east of the building (Goar 2012).

South Morada

The south morada is a narrow rectangular-shaped, one-story, adobe brick building that is also of the Northern New Mexico Vernacular style. Currently, this is a one-story, stucco-covered, adobe brick building likely built in the 1800s (Figure 3).

The morada is 66 ft by 33 ft (20 m by 10 m) (Figure 4). The medium-pitched gabled roof is covered with corrugated metal and has eaves and wooden vigas with exposed wooden rafters. Two interior metal pipe chimneys were noted on the center north side and southwest corner of the roof. Two shuttered windows and two small doors are located on the south elevation and a small shuttered window is located on the east elevation. Three wooden crosses (maderos) are located to the south of the building. Previous recordings indicate that there was a contracted chancel with a bell tower on the west elevation (Ahlborn 1968). During the current recording, this side of the building was not visible from the road;
and it is unclear whether the contracted chancel and bell tower still exist (Goar 2012).

Las Trampas Morada

Las Trampas was settled by Juan Arguello and twelve families who received a land grant from Governor Cachupin in 1751 (Pearce 1965). The morada in Las Trampas appears to have been greatly modified from the original building, which has made it difficult to determine its age. It is likely that it was built after the Catholic Church, located to the west, and could date to the early 1800s.

This morada is adjacent to the Catholic Church (San Jose de Garcia). The morada appears to be currently used by the church, possibly as a domestic dwelling (Figure 5). The building is 39 ft by 26 ft (12 m by 8 m) (Figure 6). The original (older) portion of the morada is the typical one-story, Northern New Mexico Vernacular style narrow building, with a rectangular-shaped plan. The building is made of adobe brick that has recently been covered with stucco. The roof is a hipped type and is covered with new corrugated metal with open eaves and exposed, wooden rafters. Windows are wood-framed, single-hung types without shutters, which is uncommon for moradas. The windows are located on the north, south,
and west elevations, but the east elevation could not be seen from the road or parking lot and was not recorded. As there are windows on most elevations, it is likely that several have been added to the original building as moradas usually have fewer windows.

An addition has been constructed on the east elevation that makes the building into an L-shaped plan. Wood-panel doors, noted on the original and the addition, appear to be relatively new. Entry porches are on both the north and south elevations of the original and are covered by extensions of the hipped roof. Wood posts support these extensions. These entry porches appear to have been added to the original structure. Wooden crosses (maderos) are located to the north and south of the morada (Goar 2012).

**Vadito Morada**

Vadito is located near Peñasco, New Mexico. Peñasco was established in 1796 and encompassed several small communities (Julyan 1998). No date has been found for the establishment of Vadito and it is probable that this community began around the same time as Peñasco. It is likely that this morada built sometime in the 1800s.

The Vadito morada is also located near a Catholic Church. This morada is a stucco-covered,
one-story, rectangular-shaped building that is likely constructed of adobe brick. The Northern New Mexico Vernacular style building has a new, red v-crimped metal covered gabled roof with open eaves and exposed wooden rafters (Figure 7). Also, a small cross is in the south center of the roof. An interior pipe chimney was observed on the northwest corner of the roof. The building measures 40 ft by 26 ft (12 m by 8 m) (Figure 8). There is a buttress on the east elevation. Windows, which are wood sash, single-hung types with stucco-covered sills, have a 2/2 glazing. No shutters were noted. Doors appear to be new, metal replacements. A shed-roofed covered entrance is on the east elevation that is supported by wooden posts. There is a wooden cross and a sculpture of Jesus east of the morada. This building appears to be well maintained, with twentieth century modifications that include the new doors, the new roofing material, and new stucco (Goar 2012).

San Luis Morada

San Luis is in the Rio Puerco area, and settled in the 1760s (Harris 2003). Until the 1860s, when the Navajo Reservation was established, this area was abandoned and resettled due to periodic raiding by the Navajos (Harris 2003).
This morada is across the road from the Catholic Church. The Northern New Mexico Vernacular style morada is a stucco-covered, one-story, narrow building with a rectangular-shaped plan likely constructed of adobe brick (Figure 9). The roof is a corrugated-metal medium-pitched gable type with eaves. An interior pipe chimney is in the center of the roof. The morada measures 49 ft by 23 ft (15 m by 7 m) (Figure 10). Two small wood-sash windows were observed: one on the southwest elevation and the other on the northeast elevation. Based on Google Earth, the northwest portion of this building has a contracted chancel, which was not observed from the road. A wood-panel double-leaf door is on the south elevation and is accessed by concrete steps. There is a large cross (madero) south of the door and a campo santo to the southeast of the entrance doors. The double-leaf door appears new and may not be the original entrance to the morada.

Truchas Morada

According to Spanish archives, the village of Nuestra Señora de Rosario de las Truchas was referenced in 1752 (Julyan 1998). By 1770, the village had 26 families that comprised 122 residents (Julyan 1998).

Figure 9. Photograph of the San Luis morada, southwest elevation.

Figure 10. Foot print sketch of the San Luis morada.
This morada is located approximately 0.1 miles away from the Catholic Church. The morada in Truchas is another Northern New Mexico Vernacular style, one-story building with a narrow, rectangular-shaped plan that is constructed of adobe brick and covered with stucco (Figure 11). This morada measures 102 ft by 26 ft (31 m by 8 m) (Figure 12). The roof is a medium-pitched shed type that is covered with corrugated metal. In the center of the roof is a small bell tower with a metal bell. Windows are small, wood-sash, single-hung types, and have wooden shutters. Three wooden doors are on the south elevation. On the north elevation are two adobe buttresses. A campo santo is located to the northwest of the morada.

**Synthesis**

By the late 1700s, moradas were being constructed in New Mexico. The architecture of the moradas was chosen to blend in with the other buildings in their communities as a way to remain secret from the infrequent visits by the priests. The moradas recorded indicate this “blending-in” construction (Goar 2012). Three domestic buildings are described below as comparisons to the moradas. As indicated by the photographs and the descriptions,
these domestic houses are similar in style and materials as the moradas.

**Building 1**

The first structure (Building 1) is a Northern New Mexico Vernacular style, one-story, stucco-covered residence with a square-shaped plan in Albuquerque (Figure 13). The foundation is raised and made of concrete. The roof is a medium-pitched gable with closed eaves and wood corbels and is covered with composition shingles. One interior pipe chimney was noted. There are at least six windows, located on the north, west, and east elevations. The windows are screened with wooden frames and appear to be metal casement types with 2/2 glazing. One metal security door was noted and concrete steps lead up to the entrance. One interior pipe chimney was noted (Goar and Lawrence 2012).

**Building 2**

Building 2 is a one-story, Northern New Mexico style, stucco-covered Albuquerque residence with a rectangular plan that is likely to have been constructed with adobe brick (Figure 14). The building foundation is raised and is made from concrete. The roof, a medium-pitched gable with open eaves and exposed wooden rafters, is covered with corrugated metal. There are at least seven windows, located on the west and east elevations. The windows have wooden frames and are either single-hung or double-hung types. An evaporative cooler is in one of the back windows. There are several doors, which include a wood panel, a wood single-leaf, and a screen type. The building has no porch, but there is a concrete slab on the east side of the structure, with children’s toys and a swing set situated on the slab. An attic vent was noted on the gabled-peak. Two interior pipe chimneys were recorded (Goar and Lawrence 2012).

**Building 3**

Building 3 is a one-story stucco-covered adobe brick residence-turned-restaurant, with a raised foundation and square plan located in Peralta (Figure 15). The roof, which is gabled with a medium pitch, is covered in new corrugated metal. Batten-and-board pediments are present in the gabled peaks. There are...
Figure 14. Building 2, west elevation.

Figure 15. Building 3, north and east elevations.
five windows on the east, north, and south elevations. All visible windows are metal casement types except one, which is a fixed metal type surmounted by two casement windows. The only visible entry is a wooden door covered by a screen door. A small shed is attached at the south elevation, which has particle-board walls and a low-pitched gabled roof covered in V-crimp metal. The architectural style of this building is Northern New Mexico Vernacular, and the building was likely constructed in the 1940s (Goar and Hroncich-Conner 2012).

When comparing the six moradas recorded to the domestic buildings presented above, they appear similar in style, shape, and building materials. The moradas have a narrow, rectangular shape; are made of traditional materials found in New Mexico; and are built of a simple Northern New Mexico Vernacular style. The architecture of moradas has a domestic aspect as opposed to the early mission churches or later parish churches. The moradas have a linear or, at times, an L-shaped plan similar to Hispanic domestic buildings (Sze 1995:75).

Due to the Spanish Crown, the Catholic Church (1700s, 1800s, and the Anglo-Protestant settlers) and their eventual suppression of the Penitente Brotherhood, disguising the moradas was a way to practice the medieval ceremonies and remain secret. As Figures 16 and 17 demonstrate, Catholic churches built in the same time period as the moradas are large, impressive buildings that are easily found. Although they used traditional materials, they were built to impress and be noticed, not to blend into the surrounding environment. The churches are in communities where moradas were recorded; Abiquiu and Las Trampas.

In addition to the moradas sharing the same Northern New Mexico Vernacular style, several had similar building features, including small, shuttered windows, few windows, and contracted chancels. These building features are likely to have evolved as aspects of hybridity and were influenced by the progression in seclusion of the Brotherhood.

Both moradas in Abiquiu (East and South) and Truchas have wooden shutters over the small windows to protect the secret religious ceremonies from being viewed by the public. In contrast, most domestic dwellings do not have shutters as the inhabitants have no need to hide from public view. Also, there are few windows on the moradas, and many have them on only one or two elevations. This is the case for the two Abiquiu moradas, as well as those in Truchas, Vadito, and San Luis. The only morada to have multiple windows on all elevations was the Las Trampas morada, which has been remodeled and may now be used as a domestic dwelling by the Catholic Church. In contrast, the domestic dwellings included above have several windows located on several elevations. The lack of windows helps to keep the penance activities performed in the morada secret.

Several of the moradas have contracted chancels, including the two in Abiquiu, and the San Luis morada. It is unclear why this architectural feature is associated with the moradas but may be related to an altar in the interior of the building. According to Ahlborn (1968), the contracted chancel is where the altar is located in both moradas in Abiquiu.

Based on fieldwork and archival information, moradas were typically made of adobe brick, jacal, or locally available stones. The decision to use traditional materials rather than materials introduced by trade in the 1800s also helps to support the idea that moradas were built for secrecy. The moradas recorded were all adobe brick, and the surrounding community buildings were also adobe brick.

**Conclusions**

Medieval Catholic practices came to New Mexico with the early Spanish settlers including public penance and processions, particularly during Holy Week. As policy changed in Spain and the Catholic Church, the public penance and processions were no longer practiced. Due to New Mexico’s isolation as a frontier and its lack of priests and friars, however, this practice continued and became
Figure 16. The *Santo Tomas el Apostol* Catholic Church in Abiquiu.

Figure 17. The Catholic Church *San Jose de García* in Las Trampas.
the Penitentes organization. When more settlers, who had not seen or practiced public penance or processions, came to New Mexico, the Penitentes became secretive, built their moradas away from the center of the communities, or built them in a domestic style to blend in with the surrounding community. The Brotherhood maintained their culture and resisted the changes brought in by new settlers, as indicated by the construction and placement of the moradas. —TRG

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Jenkins, Myra Ellen, and Albert H. Schroeder
1974  *A Brief History of New Mexico.* University of New Mexico Press, Albuquerque.
The significance of a set of older photographs often is not easily recognized especially if they are not properly identified and kept together within a single collection. Those taken during the 1920 and 1921 excavations at Chetro Ketl in Chaco Canyon by Wesley Bradfield, a School of American Research (SAR) archaeologist during the early twentieth century, fall into this category. Yet his contribution has not been fully acknowledged, in part because the photographs are now intermingled among collections in two separate archives and most are not credited to him. Here we provide a brief outline of the history of the 1920 and 1921 excavations and a few of Bradfield’s photographs to illustrate various features and artifacts that were uncovered at that time.

The 1920 and 1921 Excavations

Initial plans to conduct a major research project at a number of sites in Chaco Canyon were made in 1916 when Edgar L. Hewett, then Director of the School and the Museum of New Mexico (MNM) entered into partnership with the Royal Ontario Museum (ROM) and the Smithsonian Institution. With the eruption of World War I, all activity was postponed. By the time the project was resumed in 1919, the Smithsonian withdrew its participation (Hewett 1921a:7-8). In 1919 when Hewett applied to renew his excavation permit, he was advised to limit his excavations to one area (correspondence with the Department of Interior in Hewett files: MIACLAB 89ELH.025). He chose Chetro Ketl as the focus of studies by SAR and ROM in 1920 and 1921.

Documentation of this research is limited. An overview of the results was presented in articles that appeared in Art and Archaeology (Hewett 1921a, 1921b, 1922). Hewett relied on colleagues to report on specific topics (Bloom 1921; Bradfield 1921; Chapman 1921). These results provided Hewett with basic information on topics he would pursue during later field schools in Chaco Canyon that began in 1929 as a cooperative project with the University of New Mexico.

Although Hewett’s original field notes from 1920 and 1921 have not been found, he indicated that they were extant when he prepared the 1936 summary of his accomplishments (Hewett 1936:73). Ten years later Paul Reiter (1946), who had been hired by SAR in 1925, could not find the field notes from the 1920 and 1921 seasons. Because Reiter was originally a driver for Hewett and a student who participated in the Chaco field schools that began in 1929 and later curator of archaeology at MNM from 1933 to 1938, he would have known all of the participants in the 1920 and 1921 expedition. Reiter (1946:118, 128) indicates that Bradfield took several hundred photographs during the 1920 and 1921 field seasons that were the best documentation and the only remaining records he could find. Bradfield’s photographic collection, therefore, is a most valuable record of the initial excavations at Chetro Ketl. Although a few authors have utilized some of his photographs as illustrations in recent research on Chetro Ketl (e.g., Lekson 1983), this
collection has not been fully identified, probably because it had not been retained as a unified contribution by one investigator.

**Bradfield’s 1920 and 1921 Chaco Photographic Collection**

During our research in the Museum of Indian Arts and Culture/Laboratory of Anthropology (MIACLAB) archive and the Photo Archives at the Palace of the Governors in Santa Fe, we reviewed numerous photographs of excavations at Chetro Ketl and other sites investigated under Hewett’s direction between 1920 and 1938. We identified slightly less than 300 photographs that probably were taken by Bradfield during the 1920 and 1921 field seasons. They are not catalogued as part of the formal Bradfield photo collection but are scattered among other photographs of Chaco Canyon at these two institutions that today are subdivisions of the Museum of New Mexico.

Notations on a few of the prints indicate that Bradfield was the photographer. Several were also stamped as property of SAR. Using this information and by comparing the content with Hewett’s (1921b, 1922) reports of the work carried out at Chetro Ketl during these two years, we were able to group the photographs by subject matter and conclude that we had found the majority of the photographs that Reiter saw in the 1940s and attributed to Bradfield.

Why was the collection separated? It was divided when it was integrated with other Chaco Canyon photographs at the time a new MNM catalog system went into effect during the 1960s after SAR and MNM became separate entities. At that time, photographs were grouped by site or topics within regions rather than by expedition. The photographs of Hewett’s forays into the canyon (1920 through 1921) were mixed with those from the UNM/SAR/MNM Chaco field schools (1929 to 1938). Some photographs were placed in the collections at the Laboratory of Anthropology and others at the Palace of the Governors Photo Archives where they are retained today.

By examining these two collections and using Hewett’s 1920 map and a more recent one by Lekson (1983:Figure 1.2; partially presented here in our Figure 1b), we were able to sort the photographs and assign them to specific features (e.g., room or kiva). Of particular interest are two rooms that had intact roofs: Room 1-4 (Hewett’s Long Room) and Room 9 (Hewett’s Triangular Room). Also presented are photographs of the “Moat” (designation given to a feature constructed along the exterior of the south wall of the plaza at Chetro Ketl; its function is unknown), small kivas with their features, the great kiva and its southeast post, other later architectural features, and artifacts. The photo essay that follows highlights a sample of the photographs. A list of Bradfield’s photographs is retained by the curators at the two institutions.

**The Photo Essay**

Prior to 1920, no excavations had been conducted at Chetro Ketl (Figure 2, a and b) and no artifacts collected by various museums or institutions. The goal of the initial investigations was to discover the general outline and content of the site. The depth of the site was unknown prior to 1930 when earlier masonry walls beneath the great kiva were uncovered and a trench revealed a height of five stories along the back wall. Hewett began by excavating trenches in the “dump” (trash mound) located to the southeast of the structure. If done stratigraphically, it could provide information relative to the chronological development of a site. The placement of trenches and the demarcation of different strata are illustrated in Figure 3. According to Hawley (1934:31) the material recovered from this excavation was never studied in detail.

Because one condition for obtaining an excavation permit was the preservation of the ruin once it was exposed, the masonry blocks recovered in fill may have been saved for use in repairing the walls. Figure 4 includes a long rectangular feature composed of masonry blocks that were stacked between the southeast corner of the room block and the trash
Figure 1. Plan views of the 1920 and 1921 excavations in the southeast corner of Chetro Ketl. Kiva numbers assigned by Hewett were converted to alphabetical designations in later years. (a) Hewett (1921:46). (b) Lekson (1983:Figure I.1).
Figure 2. Two photographs of Chetro Ketl prior to excavation. (a) View looking west at the southeast corner of Chetro Ketl. The second story of the exterior east wing wall is visible in the center of the photograph (Palace of the Governors Photo Archives Negative Number 80799). (b) View taken from the north mesa looking southeast. The back wall is in the foreground; the east wall shows in the left center of the photograph (Palace of the Governors Photo Archives Negative Number 80437).
mound. The amount of fallen masonry is extensive; some of it was probably used to level the walls of the great kiva during preservation (see below). Where else the masonry was used remains undocumented.

Along the exterior tier of rooms of the East Wing, Room 1-4, then known as “Long Room,” was two stories high. The lower room retained much of its roofing material (Figure 5). The upper room had been subdivided into two sections connected by a doorway in the dividing wall (Figure 6). The upper story northern room (Room 4) had two doorways in the west wall.

Room 9, the “Triangular Room,” located at the junction of the southern row of rooms that enclosed the plaza and the southeast corner of the East Wing, also revealed an intact roof covering a lower story room that had been added to the East Wing in an earlier construction phase before the “Moat” was constructed and the rooms attached to the wall enclosing the plaza were built. Figure 7 illustrates the ceiling entrance into the earlier first story room.

Figure 8, a and b, illustrates the “Moat” and the southeast curvature of the wall that forms the outside of Room 8. Excavations uncovered five of the later rooms that formed the south plaza enclosure.

Hewett’s map (Figure 1a) is a fairly accurate representation of the kivas and the location of their interior features. Figure 9 documents details of the remodeling of the firepit in Kiva A (formerly Kiva 12); it clarifies the presence of the ventilator shaft(s).

In 1921 the great kiva was excavated only to the first floor level (Figure 10). A trench around its circumference and two setbacks in the southeast outer wall are visible. The bench and stairway of the antechamber were uncovered (Figure 11a). Part of a disintegrating roof support pole was removed from the southeast posthole (Figure 12, a and b). During preservation activities, the great kiva wall was brought to level with the plaza floor.

Additional features that were uncovered in the plaza probably date to late period use of Chetro Ketl. Called “fire pits,” several are rectangular in shape and often part of a set (Figure 13, a and b).

**Artifacts and Other Collected Items**

Although Hewett indicates that photographs were taken of all major artifacts, the only ones documented in the Bradfield collection included a burned squash seed (Figure 14a), some unidentified seeds (Figure 14b), metates (one of which appears on the south wall of the room beneath Room 8, Figure 7), wooden posts (Figure 12, a and b), vigas, and latillas (Figures 5-7).

The exact number of artifacts recovered during the 1920 and 1921 expedition is unknown. Correspondence in March 1921 between Lansing Bloom and Edgar L. Hewett (FACHL, Edgar L. Hewett Collection, Acc. No. 105, Box 17, Folder 8) indicates that approximately 300 artifacts were collected in 1920. They included: eight arrow points, one spear head, 11 bone beads, two small bone scrapers selected for exhibit in Santa Fe, 16 additional bone scrapers more or less broken, 26 bone awls selected for Santa Fe exhibit, 229 bone awls of all kinds additional to above, ten fragmentary bowls of which six or seven when set up may show three-quarters each of original bowl, 3 to 4 lbs of red paint from the trash mound, and miscellaneous corn cobs, squash stems, piñon nuts, etc. No stone implements were brought into the museum from Chaco Canyon, and neither was any skeletal material recovered.

Bradfield (1921:37) indicates that among the animal bones recovered during excavation were buffalo, elk, deer, mountain sheep, bear, dog or wolf, squirrel, rabbits and quail. These plus small-eared corn, squash seeds, piñon nuts, and beans suggested the types of foods eaten. Bundles of unidentified plants and roots were also recovered. Ashes in the trash midden and rooms indicated wood was the principal fuel, and traces of coal ash were present.
Figure 3. Stratigraphy visible during the 1920 excavations in the Chetro Ketl trash mound. (a) East-west trench (MIACLAB Negative Number 81326). (b) View of the west side of the mound (MIACLAB Negative Number 81328).
Figure 4. Overview of the trash mound and southeast section of Chetro Ketl after some of the rooms had been exposed. Note block of masonry stacked in a line between the pueblo and trash mound (Palace of the Governors Photo Archives Negative Number 80795).
Figure 5. Room 1-4 or “Long Room.” (a) North wall showing collapsing first story roof/second story floor (Palace of the Governors Photo Archives Negative Number 59597). (b) Remains of roof/floor separating the two stories in the southern half of the room just north of the partition wall (Palace of the Governors Photo Archives Negative Number 80399).
Figure 6. Overview of excavations in Room 1-4. Visible are doorways into Rooms 5 and 7, crossbeams that seem to be supported by smaller upright posts that were placed along the east and west walls, and other roofing material (MIACLAB Negative Number 81333).
Figure 7. Ceiling entryway into lower level in Room 9. A metate sits on south wall of lower room. (Palace of the Governors Photo Archives Negative Number 80482).
Figure 8. Southern tier of rooms and “moat.” (a) Looking to the east (Palace of the Governors Photo Archive Negative Number 80572). (b) Looking to the west (Palace of the Governors Photo Archive Negative Number 80573).
Figure 9. Southern half of upper floor in Kiva A (formerly Kiva 12). Both a subfloor and above-floor ventilator systems are visible. The round lower fire pit later was remodeled into a rectangular shape. Plaster remains on the wall in front of the section in the upper quarter of the photograph. A trench or earlier wall is seen between the above-ground ventilator and the niche in the east wall. Another niche is visible to the west of the ventilator system in the lower right hand side of the photograph. (Palace of the Governors Photo Archive Negative Number 80377).
Figure 10. Overview of the great kiva after excavation uncovered the first floor and preservation had been completed in the fall of 1921. Visible are two rectangular indentations near the upper level of the southeast wall as well as a raised rectangular level in the southwest. (Palace of the Governors Photo Archive Negative Number 80820).
Figure 11. The bench, stairway, and antechamber of the great kiva. (a) Bench and stairway prior to stabilization. (Palace of the Governors Photo Archives Negative Number 80552). (b) Antechamber after preservation. In the photo are E. L. Hewett and Nelson Etcitty. (Palace of the Governors Photo Archives Negative Number 80817).
A disintegrating “pine” log was recovered from the southeast seating pit of the great kiva. (a) Palace of the Governors Photo Archives Negative Number 81722. (b) Palace of the Governors Photo Archives Negative Number 80830/MACLAB Negative Number 70.4.9.59.
Figure 13. “Firepits” in southeastern section of plaza. Both are constructed of masonry and are rectangular in shape. (a) Southeast corner (Palace of the Governors Photo Archives Negative Number 80511). (b) South side (Palace of the Governors Photo Archives Negative Number 80518).
Figure 14. Seeds recovered from Chetro Kettl. (a) Squash seed (Palace of the Governors Photo Archives Negative Number 80441). (b) Other seeds recovered beside hearth outside and near Kiva C (Palace of the Governors Photo Archives Negative Number 90484).
Coal is found in the canyon; a modern tunnel had already been dug into the south side about a mile below Chetro Ketl. Twisted yucca strands, rabbit fur entwined with fibers, and one finely woven sandal were among the fabrics recovered to suggest clothing. Some red pigments, as well as a few obsidian and flint flakes, were found.

Chapman (1921) indicates that pottery sherds were abundant; thousands were recovered from refuse in abandoned kivas in the plaza. His initial study of sherds recovered from Kiva F (formerly Kiva 11) was focused on design styles which he illustrated in ten figures. A number of variations in hachure, dots, and black and white space were recorded. Based on his analysis, a few of the sherds must have been imported from other areas, which suggested interrelationships with the outside world.

Two partially restored bowls were recently identified among the MIACLAB collections. The first is a Mesa Verde Black-on-white (Mancos Black-on-white) bowl (MNM 19752/11 formerly cataloged as Bc 10/36) that was recovered from Kiva 11 (Kiva F) in 1920. The interior is light gray with a black paint design that might represent sunflowers. The exterior is plain. The second is a Puerco Black-on-red bowl (MNM 46346/11 a-d). The interior has a polished red slip decorated with a black zoomorphic figure in the bottom and an elaborate rim, as well as a band. The exterior is plain polished red slip with fire clouds.

With the exception of the partially restorable bowls, what museum quality artifacts that were recovered were probably sent to the Royal Ontario Museum. In his correspondence with Bloom, Hewett suggested that the museum would receive the 1920 collections as their share of the material recovered at Chetro Ketl (Fray Angelico Chavez History Library, Accession 105, E. L. Hewett Collection, Box 7, Folder 9). Chapman (in Munson 2007:87) indicates that Currelly later was able to select specimens for the Royal Ontario Museum collection.

Conclusions

Our search for both records and artifacts at the various repositories led us to the conclusion that very little data were intentionally destroyed by Hewett. We found lists of expenses, names of Native American workmen, and correspondence on numerous topics. Yet we did not find field notes, a catalog of artifacts for 1920 and 1921, or most of the items. Because Hewett (1936:73) indicates he took much of his text on the 1921 excavation of the great kiva from the original field notes, they were still intact at that time. What happened to them later is unknown. They were not among the materials at SAR or the various MNM divisions. Other than notes by Chapman for his work in Kiva F (SAR Acc. 02, Box 12), we have not found papers retained by his associates. The Bradfield photographs, therefore, provide the best extant documentation of the 1920 and 1921 excavations at Chetro Ketl.

—FJM, JMR

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Archaeological Serendipity and Historical Narrative: N. C. Nelson and Hernán Gallegos at Malagón Pueblo, 1912 and 1581

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The Galisteo Basin (Figure 1), of course, is so-called from one of the pueblos named there by the Chamuscado-Rodriguez expedition of 1581-1582. The party consisted of three Franciscans under the leadership of Fray Agustín Rodriguez, and nine “soldiers” under the command of Francisco Sanchez Chamuscado. According to the narrator of the expedition, Hernán Gallegos, “nearly all” of the soldiers were miners, and they “knew about mines, veins, and minerals…” (Hammond and Rey 1966:110). Several investigators have correlated the names assigned by members of the expedition with the historic Galisteo Basin mission pueblos, but they have been misled, I suggest, by failure to consider an alternative route into the Basin (Hammond and Rey 1966; Reed 1943, 1954; Riley 1951; Schroeder & Matson 1965). Details in the written accounts of the expedition, together with chance finds in the archaeological record, suggest re-interpretation of the names of the pueblos visited and named by expedition members.

No journal or daily log of the expedition’s travels survives, but it is unlikely that the named pueblos encountered and other descriptive information were made up following the party’s return to Mexico in 1582 when Gallegos wrote his account (Hammond and Rey 1966:15). Nevertheless, the itinerary of the expedition’s travels and experiences often is unclear, and is broken by reference to, or descriptions of, out of sequence events. The estimates of leagues traveled are questionable, slips of memory are apparent, and the numbers of houses given for the various pueblos clearly are exaggerated. Places visited apparently follow with little concern for continuity in the sequence of travel—with the exception, I suggest, of the following reconstruction.

Summing up his account of the expedition, Hernán Gallegos listed the pueblos visited, presumably in order up the Rio Grande (“Guadalquivir”), including a side-trip that led them into the “Valley of San Mateo.” Gallegos wrote (Hammond and Rey 1966:106) that some five leagues from the Guadalquivir they discovered a valley they named San Mateo where they found four pueblos they named Piedra Hita, Galisteo, Malpartida, and Malagón—perhaps, but not necessarily, in that order. These names, interestingly, are those of small villages in Spain’s western Provinces of Ávila (Piedrahita), Cáceres (Galisteo, Malpartida), and Ciudad Real (Malagón). Gallegos noted (p. 106) that Malpartida was “a league from the [pueblo] already discovered and which we called San Mateo,” one that has gone unnoticed by previous investigators. I will return to San Mateo presently. In addition, Gallegos said (p. 106), Malpartida was about a league from some mineral deposits which the party went to investigate, returning with samples of a “coppery steel-like ore.”

Previous efforts to identify Malpartida have focused exclusively on the proximity of San Marcos Pueblo to the well-known turquoise and lead deposits of the Cerrillos Hills. As a result, correlating Malpartida with San Marcos is perpetuated in the literature (Hammond and Rey 1966; Reed 1943, 1954; Riley 1951; Schroeder 1979:245, 248; Schroeder and Matson 1965:144). These same authors agree on the following identifications of the pueblo names assigned by the Chamuscado party: San...
Lázaro/Malagón, San Cristóbal/Piedrahita (although Reed 1943 also suggested the possibility that Pecos might have been Piedrahita), and “Galisteo” with the historic mission pueblo of the same name. Curiously, none have attempted to identify the party’s “San Mateo” pueblo. To anticipate, a curious oversight in equating Malpartida with San Marcos Pueblo is the close proximity of San Lázaro Pueblo to the well-known ore deposits at both the Old and New Placers.

We also discovered a stream carrying a large volume of water which flows into the Guadalquivir from the south. This stream forms a valley which we named Valle Vicioso because it was so fertile and luxuriant. In the valley there were three pueblos. The first was close to the river, opposite the pueblo of Castildabid.

![The Galisteo Basin map](image-url)
We named it Castilblanco. (Hammond and Rey 1966:106, emphasis added)

Upstream in this valley, at the Pueblo they called “La Barranca,” they were informed that “three days’ journey up this river,” behind the “Sierra Morena” (Sandia Mountain), were 13 more pueblos, which they did not attempt to visit.

There are but three tributaries to the Rio Grande that flow for a significant part of their course from south to north: Tijeras, Las Huertas, and the San Pedro Creek-Uña de Gato-Arroyo Tunque/Tuerto system. Tijeras Creek, clearly, can be eliminated from consideration. The Galisteo River (a natural route to San Marcos and the Cerrillos mineral deposits) and its feeder tributaries, all run east to west. Moreover, there is no reason to believe that the Galisteo should have been any more verdant some 400 years ago than it is today, and we have no way of knowing how luxuriant the course of San Pedro/Arroyo Tunque/Arroyo Tuerto might have been in the summer or fall of 1581. Blinman (2011:71) notes a severe drought in the Galisteo Basin beginning about 1575, and Gallegos’ use of the word vicioso may well have been a relative one. The abundant vegetation and vigor of plant life supported by numerous active springs in the Las Huertas Valley, however, makes it a prime candidate for the valley they called “Vicioso.”

In that “luxuriant” valley the expedition recorded three pueblos. Castilblanco, as noted, was close to and on the opposite side of the Rio Grande from Castildavid. It should, then, have been located on the east side of the river near the mouth of Las Huertas Creek. Tamaya Kuwasaya, LA 109126, at Angostura on the banks of Las Huertas Creek, is an ancestral site claimed by Santa Ana people and is a good possibility for the party’s Castilblanco. Although the dominant ceramic types reported there are clearly historic (including Glaze F and later types), a number of “unknown glazes” also are reported. The predilection of Spanish colonists to settle atop pueblo ruins is well-known (e.g., Armstrong et al. 2011; Snow 1976). A documented westward shift of the Rio Grande in the vicinity of Algodones at some time in the eighteenth century likely has obliterated any evidence of Castildavid opposite.5 Farther up they encountered two more pueblos: “Buena Vista,” as it was situated on a hilltop, and the other, “La Barranca,” as noted above.6 Marshall and Walt (1985:93) remarked that there are no “large prehistoric pueblos” in the Las Huertas/Placitas district. Nevertheless, they cited LA 150239, atop a hill and, again with historic pottery, as a masonry room-block some 29 by 8 m on the hillside above Las Placitas. Scurlock(1998:193) reported a 15-20 room pueblo at San José de las Huertas, and the site of Tecolote is said to be the location of a former pueblo (Julyan 1998:349).

Immediately following travel up the Valle Vicioso, is the account of the valley and pueblo they called San Mateo, a league from Malpartida. Malpartida then, was the second of five pueblos in the “valley” of San Mateo. At either San Mateo or Malpartida they were informed of two large pueblos on the slopes of the Sierra Morena—probably Paako and San Antonio—but did not visit them. At this point I suggest that the party continued due east past the site of Tecolote to the junction of San Pedro Creek with Uña de Gato, some distance north of Paako, in the vicinity of Hagan, New Mexico.

Where Las Huertas Creek alters its course from north to westerly toward the Rio Grande, the expedition had a choice of travel (Figure 2): northerly to Arroyo Tunque (called “Tuerto Creek” on an 1847 map by Lt. Abert (1962)),and the pueblo of that name, thence east up Arroyo Tuerto. Alternatively, they continued east past Tecolote, Hagan, and Golden, to the same Arroyo Tuerto farther up. Both routes provide access to the low divide between the Ortiz and San Pedro mountains, past the headwaters of Arroyo Chorro, along which is situated San Lázaro Pueblo. A short distance southeasterly from San Lázaro, in the extreme southwestern corner of the Basin, is Pueblo Blanco. Important to my reconstruction, this route took them past the well-known ore deposits of both the Ortiz and San Pedro districts. I suggest, therefore, that San Lázaro Pueblo was the expedition’s San Mateo
On their return from the “buffalo plains” to the pueblo they called Piedrahita, they learned of the death of the friar, and it was clear at this point that the natives of the province were hostile toward the Spaniards. They began a withdrawal, stopping at Malpartida, where they were informed that the Indians of Malagón Pueblo had stolen three of the Spaniards’ horses. Learning of this, five members of the party were dispatched to apprehend the culprits “either peaceably or by force…” (Hammond and Rey 1966:96). Upon reaching Malagón Pueblo, the five men went up to the houses to see if they could find any trace of horseflesh. Hernán Gallegos and Pedro de Bustamante soon found pieces of horseflesh in two houses of the pueblo….We then fired our harquebuses…and the Indians,
observing our conduct, were more frightened than defiant...all five of us, holding horseflesh in our hands, again asked the Indians...to tell us which men were guilty of killing the horses....” (Hammond and Rey 1966:96-97)

Eight Indians were apprehended after some skirmishing and were returned to camp at Malpartida where the decision was made to behead the culprits. Realizing the consequences of such a dire act, it was decided, instead, that the friars would rush to the block in the middle of the plaza upon which the Indians’ necks were placed, and intercede, tussle with the axe-men, and snatch the victims from their intended fate. Thus, wrote Gallegos, the Indians might “love their rescuers, who were to remain in the land” (Hammond and Rey 1966:98). Might not the “tussle” at the beheading scene account for the Franciscan rosary bead found by Bandelier?

San Cristóbal Pueblo, apparently, rather than San Lázaro, as previous speculation has it, was the expedition’s Malagón, and this is strongly suggested by the recovery there, by Nels Nelson, of two horses’ heads in Room 25 of Building 10 (Figures 3 and 4). Nelson’s descriptions from Room 25 of Building X at San Cristóbal are telling: “Among the animal bones were a number of horse heads, young animals, that bore marks of having been killed by a blow between the eyes” (Nelson 1916:61). Further, his typewritten inventory of items recovered from Room 25 (Figure 5) noted that none of the domestic animal bones (including, presumably, the horse heads) “show cuttings by modern tools.” (Nelson’s original room inventories were sent to the Laboratory of Anthropology in 1933 and can be consulted at the Archaeological Records Management Section).

Figure 3. Building X, San Cristóbal Pueblo (N. C. Nelson, 1916).
That the animals were killed in or very close to San Cristóbal, and their heads tossed into abandoned rooms is the most likely explanation, and no other large mammal heads were recovered by Nelson during his extensive excavations throughout the Basin’s large pueblos. Edible parts of the head include brains (fat), nose, tongue, and maybe the mandible for grease and marrow, but such delicacies characteristically were removed in the field at the site of the kill, leaving the skull where it lay (Speth and Staro 2013:16).

In October of 1598, Juan de Oñate (Hammond and Rey 1953:393) undertook an exploratory trip to the salt lakes of the Estancia Basin and beyond. Reaching San Marcos Pueblo, he traveled the next day to the pueblo they called “El Tuerto,” and from there “to the first pueblo behind the sierra.” Tuerto is a former name for today’s Ortiz Mountains, the “Old Placers,” and the former mining camp there of Real de Dolores, in the “Sierra de San Lázaro,” renamed Tuerto and, later, Ortiz Mountains (Figure 6). Tuerto, as noted, also is recalled by the name of the arroyo system that separates the Ortiz from the San Pedro Mountains.

I believe that San Lázaro Pueblo was Oñate’s “El Tuerto” pueblo for the following reasons. Testimony before the viceroy in Mexico in 1602, from several of Oñate’s colonists, revealed that his nephew, Vicente de Zaldívar, had spent time at the pueblo of “El Tuerto,” at the “mines of San Mateo,” crushing and smelting ores and “building machinery for this purpose” (Hammond and Rey 1953:642-643, emphasis added). “Tuerto” not only means “one-eyed,” but also “twisted” and, more to the point, “harmful,” “wrongly,” “in error,” and so on—recalling, perhaps, the ill-fated leave-taking (“malpartida”) of Friar Santa María from Pueblo Malpartida. If the “mines of San Mateo” were adjacent to Pueblo Tuerto, as the testimony implies, I believe that San Lázaro was Oñate’s Tuerto Pueblo as well as Pueblo San Mateo of 1581-1582.

The only reference to any place in New Mexico called “San Mateo” in the Oñate documents (Hammond and Rey 1953:393) comes from the testimony cited above, but the source of that name and its location can have been passed on only by Felipe de Escalante who returned to New Mexico following his initial trip in 1581-82 as a member of the Chamuscado party. Escalante was a miner by trade and undoubtedly informed Zaldívar of the ore deposits about a league from San Mateo (see End Note 3).

Identified in the vassalage and obedience of the pueblos at San Juan in September 1598, Tuerto apparently was mistakenly transcribed as “el Puerto, el pueblo quemado”—literally, “burned” but implying deserted (perhaps “destroyed”)—and was assigned, along with San Marcos, San Cristóbal,
Building X.  Room 25.

A. Dimensions, etc.
1. 13' E. and S. x 7' 3" N. and W.
2. Dog to stone flag floor, 9' 6" below surface.
3. No ceiling seen but 4 spaced posts stood against E. and S. walls to height of 4' 6".
4. Walls fairly well done; some plaster remains on.
Dirt
5. Under the floor contains ashes and charcoal.

B. Items Found.
1. Mullers, 6 incomplete.
2. Rectangular slab, 3/4 x 10 x 14".
3. Fragment of cooking slab, one side smooth and blackened.
4. Pebble of iron ore.
5. Four smooth pebbles, apparently slightly worn.
6. Small square pottery vessel, incomplete in 3 fragments, base
   3" sq. top 5" sq. ca. 2-1/2" high.
7. Miscellaneous potsherds, ca. 6 qts.: representing: black,
   blackened, reddish and grayish ware, glazed and
   painted designs.
8. Miscellaneous animal bones, ca. 1 bu., plus 2 entire horse heads.
   The bones are mostly those of domestic animals, but
   none show cuttings by modern tools.
9. Deer horn 6-7/8" long, probably used. Field No. 339
10. Section of tubular bone, 1-3/4" long. Field No. 340
12. Fragment of pointed bone implement, ca. 4" long. Field No. 342.

Figure 5. Nelson’s undated (but ca. 1915?) typewritten inventory of materials recovered from Room 25, Bldg. X, San Cristobal Pueblo. Note his comment regarding the lack of metal tools on the bones (courtesy of Archaeological Records Management Section, Museum of New Mexico).
Galisteo, and several as yet unidentified pueblos in the Galisteo Basin, to one of Oñate’s Franciscans. San Lázaro is missing from the 1602 Martinez map of the Rio Grande pueblos, I suggest, because it might have been deserted in 1601, perhaps the result of earlier raids behind Sandia Mountain reported by Castaño de Sosa in 1590-91 (Hammond and Rey 1966:292-293).

In the mid-to-late sixteenth century San Lázaro is believed to have been occupied by a very small population (Schroeder and Matson 1965:140), an opinion also held by Eric Blinman (personal communication 10/28/2008). Glaze E found there is a minority type, and appears primarily (but not exclusively) at the mission community at the site (Blinman, personal communication 10/28/2008). The name San Lázaro is significant, I believe, as it recalls Lazarus raised from the dead by Jesus, and I suggest that it was a “reconstituted” mission pueblo resulting from the reducción program sometime between about 1601 and 1613. It was a visita of San Marcos in 1613, implying that it contained a small population augmented, perhaps, as a result of the congregación program from among the pueblos we call Blanco, Colorado, Largo, and Shé. Those pueblos also yield sixteenth century Glaze E ceramics (e.g., Mera 1940), but did not become missions. The brief, single mention of Pueblo San Mateo in 1582 suggests an unimportant, perhaps very nearly abandoned, pueblo of little or no account to the Spaniards.

The correlation of Malagón Pueblo with historic San Cristóbal, I believe, cannot be doubted on the basis of Nelson’s chance recovery of the horse heads there. Malpartida, identified here with Pueblo Blanco, and San Mateo with San Lázaro, I suggest, correspond far better with the narrative than do previous identifications. Piedrahita (Spanish for “a pile of rocks,” as well, of course, as the name of a village in Spain’s Ávila Province), then, remains unidentified. The party set out from Piedrahita for the buffalo plains and returned to Piedrahita afterwards. This suggests that Piedrahita was on the farthest edge of the region. A pile of rocks, perhaps, is an
apt description for any of the pueblos today called Largo, Colorado, or Shé. It was believed previously that San Cristóbal (no less a “pile of rocks”) was the village called Piedrahita because that pueblo also is situated “on the edge of the buffalo country” (e.g., Hammond 1927; Mecham 1920:283).

Leaving Piedrahita on September 28, 1581, the party traveled some 19 leagues before encountering “a large pool of brackish water in a plain below a canyon” (Hammond and Rey 1966:89). Continuing, they encountered more pools of briny water, noting that the area was “suitable for sheep” and after five more leagues they came to “a very large pool of water” (p. 89). I cannot help but believe their route took them through the vicinity of today’s White Lakes, continuing southeasterly until after some 24 leagues they encountered a river “with a large volume of water and many trees” (p. 89). Clearly, this was the Pecos River. Four leagues beyond they found a village of people living in hide tents (p. 89), possibly the same people who, according to information obtained at Malpartida, followed the bison herds (see End Note 4).

Assuming that San Cristóbal Pueblo is identified with the party’s Piedrahita, as previous investigators have argued, it is only some 14 miles between San Cristóbal and the Pecos River (rather than 24 leagues, some 50 or 60 miles!), and I believe seriously weakens this traditional identification. Traveling lost in circles for very nearly a month over a distance of only some 14 or so miles, paints a picture of a party of hapless neophytes (Hammond and Rey 1966:88, note 2)—which those men most certainly were not!

San Mateo, Malpartida, Malagón, and Piedrahita—names that failed to survive the 1581-82 expedition, leaves only Galisteo Pueblo as a reminder of the party’s sojourn in the Basin. Why that is so warrants a brief departure from this tale of the horseless heads of San Cristóbal. Late in July of 1590 a large party under the leadership of Gaspar Castaño de Sosa left the future site of Monterey, Mexico, ostensibly to found a colony. Traveling north by way of the Pecos River into New Mexico’s Pueblo world of the upper Rio Grande, the party reached Pecos Pueblo; thence, skirted the southern end of the Sangre de Cristo Mountains, and moved north, perhaps as far as Picuris, before moving south along the Rio Grande to the “Queres” pueblos below La Bajada (Hammond and Rey 1966; Schroeder and Matson 1965).

From one of those villages, Cochiti, or a nearby pueblo, Schroeder suggested (Schroeder and Matson 1965:142-143), de Sosa traveled east into the Galisteo Basin to a pueblo they named San Marcos, “another pueblo of their [Queres] language” (see Snow 2008). There they discovered some minerals which “showed no silver.” Subsequently, while in the region between the Pecos and Rio Grande, de Sosa entered and named pueblos San Cristóbal and San Lucas. Evidently, no one from the Chamuscado party returned with de Sosa, as none of the earlier names are mentioned in the account of Castaño de Sosa’s expedition.

Eight years later, when Juan de Oñate’s Franciscans were assigned their respective pueblos for mission work, the name Galisteo Pueblo stands out along with San Marcos and San Cristóbal, the latter two names provided by members of de Sosa’s party who returned with Oñate (e.g., Snow 1998). As noted, Felipe de Escalante, from Chamuscado’s expedition, also returned with Oñate, and undoubtedly it was he who provided Oñate with the name Galisteo, bestowed in 1591.” This suggests that the de Sosa party did not see Galisteo Pueblo, since they characteristically took an “oath of obedience” at each pueblo, and assigned it a saint’s name. Galisteo Pueblo was identified by Oñate, presumably in 1601, as Santa Ana de Galisteo (Hammond and Rey 1953:321). “San Lucas” Pueblo of the de Sosa expedition remains unidentified among the seventeenth century pueblos of the Galisteo Basin. San Lucas, perhaps San Lázaro, might have been a name erroneously recalled by returning members of the de Sosa party—or, perhaps, it was Pueblo Blanco, no longer extant by 1598?

—DHS
End Notes

1. Revised and expanded version of a paper presented at the annual conference of the Archaeological Society of New Mexico, May 5, 2013. My thanks to Sheila Brewer for the invitation to contribute to this volume; and to Hayward Franklin for editing and arranging the illustrations.

2. The expedition, while still moving up the Rio Grande, and at no great distance below Puaray Pueblo (see Snow 1975), gave the name “San Mateo” to a pueblo on the east side of the river (Hammond and Rey 1966:104). The duplication of names is not accounted for in the narrative, but there can be little doubt that the San Mateo on the “Guadalquivir” was not the same pueblo as that in the “Valley” of San Mateo. This particular pueblo of San Mateo in the valley of that name is not mentioned subsequently in the narrative, perhaps because the inhabitants were too few to warrant further attention?

3. What mineral this phrase might represent is not clear. A number of minerals with a dark gray or metallic color, such as tetrahedrite, argentite, and bornite, found principally in the Ortiz and San Pedro districts, occur with copper (Northrop 1959). “Wire silver” is reported from the Cerrillos Hills (Milford and Swick 1995; Northrop 1959), but the de Sosa party failed to note its presence from the Cerrillos mineral zone—“no silver,” it was reported by de Sosa—and various assays indicate only some 2.4 to 4 oz/ton during the hey-day of Cerrillos mining (Milford and Swick 1995:144-146; USGS 1965; also see End Note 7 below).

4. At Malpartida they learned that the buffalo were but two days’ travel, “a mere eight leagues” away, and the natives—some of whom were “striped”—said that they lived “so far away” from the buffalo “on account of their cornfields and cultivated lands, so the buffalo would not eat the crops.” The Indians who followed the buffalo were enemies. It is unclear whether Gallegos’ information (Hammond and Rey 1966:87-88) in these paragraphs referred specifically to Malpartida, or to the people of the Galisteo Basin, generally. The presence of people who were “striped,” refers either to Southern Plains people later called “Jumanes rayados” (e.g., Scholes 1940:276), or to people of the “Jumanos” pueblos of Chupadera Mesa. The suggestion of population heterogeneity is of considerable interest.

5. An 1813 dispute over boundaries between Santa Ana, San Felipe, and various residents of Algodones in 1813 resulted from the river’s shift to the west at some time during the previous century (Spanish Archives of New Mexico 1:1356). It should also be noted that Bandelier was informed, while at Bernalillo in 1882, that “there was another ruined pueblo on the east bank, but that it had been washed away by the river” (Lange and Riley 1966:316).

6. The site of Tunque Pueblo lies above a portion of Tunque Arroyo that has been down-cut, possibly suggesting use of the term “La Barranca” here for Tunque Pueblo. But whether the down-cutting is a phenomenon of the past several hundred years, or was present in 1581, I cannot say.

7. When he and Father Mailluchet were visiting Pueblo Blanco, Bandelier wrote in his journal, December 20, 1882, “Here it was that an ivory part of the Franciscan rosary was found, which Father Mailluchet secured. The skull on one side has the legend: Ecce finem [Behold the end!], the legend on the other side we could not decipher. But it is characteristic of a Franciscan rosary.” (Lange and Riley 1966:378)

8. Felipe de Escalante itemized the equipment he was taking to New Mexico (Hammond and Rey 1953:242-243), including “A set of bellows for use in smelting silver; three pick-axes, and one iron machine (ingenio) for extracting silver.” Furthermore, Escalante stated that he had been a “first discoverer of that land, which I was. I spent large sums of money exploring it by order of the Count of Coruña, and I say further that none of the other discoverers of that land are going to serve his majesty on this expedition” (Hammond and Rey 1953:242-243). Silver, along with gold, were early prospects in the Ortiz Mountains (e.g., Milford 1995:65-70). Escalante died during the siege at Acoma in 1599.

9. From San Cristóbal Pueblo, Castaño de Sosa took a young girl back to Mexico where she was instructed in Catholicism and the Spanish language. “Doña Ines,” as she was called, returned with Oñate who believed her native language might serve the expedition as a second “Malinche,” only to learn that she had forgotten her native tongue in the intervening years (Snow 1998:2010:52). In an otherwise enigmatic statement, Oñate referred to Galisteo, in 1601, as one of our “first settlements” (Hammond and Rey 1953:747)—unless by this he meant “mission” settlements? Hodge, Hammond and Rey (1945:268) note only that “A convent was established at Galisteo prior to 1612.”
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United States Geological Survey [USGS]

A Little-Known Prehistoric House Type in Southeastern New Mexico

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Recent finds of stone enclosure type structures in southeastern New Mexico have expanded the known distribution of this form of prehistoric and early historic house form. This structure type is currently best known for southeastern Colorado where it is called an Apishapa structure and is attributed to the Apishapa phase, A.D. 1050 to 1450. Stone enclosures are built with field stones that are either piled up haphazardly, coursed and dry-laid, or set on edge or on end, depending on the natural form of the available rocks. The associated material culture varies from region to region and often includes pottery made by farmers local to each particular region. Regarding subsistence, the general consensus suggests that Apishapa people were hunter-gatherers, some of whom had access to corn. However, whether or not corn was grown by Apishapa people has not been settled. So few sites outside of southeastern Colorado and northeastern New Mexico have been tested or excavated that this question remains unanswered for those sites as well. Another major question that also remains is whether the occupants of stone enclosure sites were related to one another biologically or in any way other than a general structure style and a hunter-gatherer lifestyle.1

The archaeological sites of southeastern New Mexico, meaning that part of the state lying east of the Guadalupe and Sacramento mountains, are most widely known as burned rock/caliche and artifact scatters among sand dunes. West of the Pecos River Valley in the foothills of the Guadalupe Mountains, the most readily recognized features that occur are referred to variously as ring middens, midden circles, agave roasters and, most recently, annular burned rock features. Local lore has reported for decades the presence of “Puebloan” sites bearing, either explicitly or implicitly, pueblo and pithouse style structures in the Southwestern archaeological sense. None of these rumors have been verified even though this writer has made several attempts to do so.

Then, in the early 1980s, a new feature type was encountered during late-stage archaeological surveys for the Brantley dam and reservoir (Katz and Katz 1985, 2002). Originally referred to as pithouses (presumably in the Southwestern archaeological sense), it was soon discovered that the structures are basically identical with structures long known in northeastern New Mexico (Parker 2003, Wiseman 1975) and especially in southeastern Colorado as stone enclosures (Campbell 1969, 1976; Glassow 1984 [who calls them “built up rock circles”]; Renaud 1942) and now, as Apishapa phase houses (Zier and Kalasz 1999:198-221) (Figure 1). More recently, three more sites bearing one or more examples of this structure type have been found in southeastern New Mexico and recorded through activities related to the Carlsbad Field Office of the Bureau of Land Management.

While this paper focuses on the stone enclosures recently found in the Carlsbad region of southeastern New Mexico—and to a lesser degree on similar sites found in the area between southeastern Colorado and west Texas—it should be mentioned that a non-systematic perusal of literature has shown that stone enclosure structures have been recorded at least as far west as southeastern California and as far east as the Lower Pecos region (at the confluence of the Pecos river and the Rio Grande) of west Texas.
Figure 1. Map of regions of recorded stone enclosure structures in southeastern Colorado, New Mexico, and west Texas.
A cultural or ethnic affiliation of the inhabitants among these widely distributed structures and sites seems unlikely but requires consideration in any thorough study of the phenomenon.

**What is a Stone Enclosure Structure?**
**A General Definition and Description**

The characterization of the structure type is drawn mostly from the archaeological literature for southeastern Colorado and northeastern New Mexico (see especially Campbell 1969; Gunnerson 1989; and Kalasz et al. 1999). While some archaeologists may disagree, this writer believes that the following definition fits all such stone structures in a generic way, even though the phenomenon encompasses a certain amount of variation in details. Prominent among these details are 1) shapes and orientations of stones used in construction, 2) presence/absence and placement of interior features, 3) presence/absence and details of construction of doorways, and 4) whether the structures occur as single rooms, as units composed of two or more contiguous rooms, or as combinations of single and multi-room units at a given site. The reader should keep in mind that the examples of stone enclosures recorded thus far in the Carlsbad region consist mostly of single rooms and the occasional double room or figure 8-shaped units.

**Structure Shape**

Most stone enclosures are individual rooms that are circular to oval, donut-shaped constructions of rocks (Figures 2-4). The rocks are laid either on the original surface or surrounding shallowly excavated depressions. Some enclosures are roughly square or rectangular; others are C-shaped. In some sites in some areas, clusters of two or more contiguous enclosures have been recorded, but these “buildings” lack standardized layouts and numbers of rooms.

**Construction and Materials**

In some stone enclosures, the rocks are neatly stacked dry-laid masonry (i.e., they lack mud mortar), but most appear to be haphazardly piled rocks. Evidently in all cases, the rocks are unmodified field stones and therefore reflect the sizes and shapes of stones available in the vicinities of the sites. Thus, some enclosure stones are tabular, others blocky; some are very elongate (a meter or more in length), and others are short in all dimensions. However, virtually all are larger than those commonly found in tipi rings, and none are as small as the fire-cracked, burned rocks common to the midden rings of southeastern New Mexico and west Texas. Outcroppings of bedrock are often incorporated into the walls of stone enclosures. The number of rocks in each structure can vary from barely enough to define the full outline to accumulations that are a meter or more in height. In enclosures constructed with elongate or columnar stones, the rocks may be laid horizontally or propped at vertical or near vertical angles.

**Size**

Inside diameters of stone enclosures vary from as small as 2 m to as large as 8 m, with 3 to 4 m being common. Outside diameters range from 3 to 14 m.

**Doorways**

Enclosures may or may not have 1-m-wide breaks that probably served as doorways. In some areas, the doorways were further demarcated by columnar rocks set vertically on either side as jambs. When doorways occur, they are often (but not invariably) open to the east or southeast. Examples on the western and southwestern sides of structures are also known.

**Floors**

To date, none of the excavated floors have been found to have been prepared with a surfacing material such as mud or intentionally placed rocks (flagstones, for instance). Some are bedrock, and others have use-worn, trampled-earth floors.

**Hearth**

Interior fireplaces such as ash-filled pits and ash concentrations on the floors are occasionally present. Many excavated stone enclosures appear to have lacked such facilities, suggesting warm weather occupations.
Figure 2. Examples of stone enclosure structures at Sitio Creston near Las Vegas, New Mexico. Adapted from Katz and Katz 1985.
Figure 3. Examples of stone enclosure structures and site map at the Brantley Stone Enclosure Site near Carlsbad, New Mexico. Adapted from Mallouf 1999.
Postholes

One or a few small cylindrical pits are occasionally found either towards the center of the structure or near the periphery of the floor. These pits probably secured the bottom ends of roof and/or wall posts of the superstructure. However, in most cases, postholes are entirely lacking, indicating that superstructural elements were probably anchored among the rocks of the enclosure rings.

Superstructures

The composition of the walls and roof above the foundation stones is almost totally conjectural. Holes for roof support and wall anchor elements are rarely found. Thus, it seems likely that most stone enclosures, especially the smaller ones, probably had either dome-shaped or possibly conical- (tipi-) shaped superstructures composed of the appropriate flexible or rigid, light-weight wooden elements covered with brush, grass, mats, hides, or some combination of these materials.

Site Locations

Most recorded stone enclosure sites are situated on high points in the landscape. These range from terrace edges to hilltops, to isolated points around the edges of mesas, to ridge tops. While these locations
are generally interpreted as being defensive in nature, archaeologists should not automatically assume this to be the case. In those cases that are convincingly defensive, their locations are augmented by blocked passages and walls at points of easy access to the site. In some instances, two or more apparently fortified stone enclosure sites are located within visual distance of one another, strengthening the idea that they constitute a network for mutual defense.

Regarding the need for defense, Robert Campbell (1969, 1976) suggests that defensive measures in southeastern Colorado were necessitated by internecine warfare because of competition for farmland. Or, possibly, Puebloan peoples from the west or Athabascan raiders from the north were the cause.

**Material Culture**

At the archaeological survey stage, two manifestations of stone enclosure sites are encountered. The more common site has few artifacts on the surface; diligent searches often yield only a handful of items scattered about the site. Excavation often recovers more items than expected from surface indications, but overall, the usual stone enclosure site does not yield hundreds or thousands of artifacts. Culturally stained soils are also commensurately scarce to nonexistent on these sites. On the other hand, the second and much less common manifestation of stone enclosure site produces thousands of artifacts upon excavation. Artifact-bearing deposits in these instances are decidedly blackened and attain depths of 50 centimeters or more.

In the aggregate, stone enclosure sites reveal a diverse artifact assemblage. This diversity is most often expressed at the occasionally rich site, but is rarely suspected from the remains seen at the “average” stone enclosure site. In addition to lithic debitage (flakes, cores, etc.), the aggregate assemblage includes projectile points, scrapers, knives, drills, flake tools, manos, metates, and pottery.

A variety of projectile point styles or types has been recovered from stone enclosure sites. The earlier sites (Graneros or Woodland in Colorado; culturally unassigned in northeastern New Mexico) produce both dart points and arrow points, the latter most often being corner-notched or Scallorn-like. The later sites (Apishapa in Colorado) may produce a dart point or a corner-notched arrow point, but the primary style is the side-notched Harrell-like or Washita-like arrow point. The Brantley site near Carlsbad, New Mexico, produced both Late/Terminal Archaic style points and a Neff style Livermore arrow point. Judging by the radiocarbon dates for Brantley, the Archaic points may also represent what appears to be an underlying Archaic component. The dominant projectile point style at Cielo Complex sites of west Texas are of the Perdiz arrow style.

Artifacts called “scrapers” and “knives,” including flake tool forms, are relatively common on stone enclosure sites. However, the formalized, tear-drop-shaped end scrapers and four-bevel (Harahey) knives characteristic of Late Prehistoric bison-hunting Plains cultures normally occur only on stone enclosure sites situated in the Plains country of far southeastern Colorado and, interestingly, certain of the Cielo Complex sites in the Texas Big Bend area.

Manos and metates are usually the small oval cobbles and small oval basins on rock slabs so typical of the Archaic and Late Prehistoric Plains cultures.

Pottery is enigmatic with regard to stone enclosure sites. It is often absent in the sites even though, as far as is presently known, all stone enclosure occupations date to periods during which pottery was being made elsewhere in the Plains and the Southwest. In many cases, a few sherds of pottery may be present. A few sites, however, have produced hundreds or even thousands of potsherds upon excavation.
These inconsistencies raise the question as to whether the inhabitants of stone enclosure sites were making pottery, or whether they were trading for it, or both. It is probably noteworthy in this regard that where pottery is found on stone enclosure sites, the types or styles usually reflect the pottery styles being made by the farming village groups nearest to the stone enclosure sites in question. For example, in southeastern Colorado, Woodland period stone enclosure sites yield Woodland style cordmarked pottery, and later-dating Apishapa phase sites yield Borger- and/or Stamper-like cordmarked pottery from the nearest Southern Plains villages. The pottery from Sitio Creston near Las Vegas, New Mexico (Wiseman 1975), has been characterized as being Taos Utility-like. The pottery from the Brantley Stone Enclosure site near Carlsbad reflects Jornada Mogollon assemblages, including mostly El Paso Brown and South Pecos Brown, with small amounts of Chupadero Black-on-white, Three Rivers Red-on-terracotta, Lincoln Black-on-red, and El Paso Polychrome. Inexplicably, Cielo Complex sites in the Big Bend district of far west Texas appear to lack pottery altogether. This is in spite of the fact that radiocarbon dates demonstrate contemporaneity between Cielo sites and nearby pottery-making La Junta villages.

Subsistence

Virtually every archaeologist who investigates stone enclosure sites concludes that the economy focused on generalized hunting and gathering. The presence of specialized end scrapers and beveled knives suggests that some of the easternmost stone enclosure groups in far southeastern Colorado engaged in bison hunting.

The role of horticulture (gardening of corn) or even farming (more intensive gardening) at Apishapa stone enclosure sites in southeastern Colorado and those of the southern Park Plateau in northeastern New Mexico is unclear. Opinions on the matter tend to closely follow the cultural paradigm in vogue at the time that particular investigations were under way. Thus, early on (1960s and 1970s), farming was essentially assumed to have been a major part of the economy and that it was important (even a prime mover) in the diet of the inhabitants of the sites in southeastern Colorado (Campbell 1969, 1976). This interpretation was based on the recovery of small amounts of corn (including some stalks and husks as well as cobs) and some beans at eight sites, a perceived settlement shift towards arable lands, and the then current idea that once introduced to growing cultigens, any and all peoples would immediately embrace the practice and endeavor to make it the centerpiece of their subsistence regime.

Later on (1980s and 1990s), a new paradigm required more proof of farming as demonstrated through use of flotation recovery from site sediments and assessments of ubiquity of remains across the site. It became important to discover and then demonstrate the degree to which growing cultigens was important to the diet. The most recent summation (Zier and Kalasz 1999) favors the interpretation of Apishapa diet as incorporating relatively small but consistent amounts of corn in the dietary regime. The same appears to be true for the southern Park Plateau (Campbell 1984; Biella and Dorshow 1997; Dorshow et al. 2000; Dorshow et al. 2002). The presence or absence of corn has not been demonstrated at either Sitio Creston (near Las Vegas, New Mexico) or the Brantley Stone Enclosure site at Carlsbad even though the presence of imported pottery at Brantley suggests that the occupants were in touch with farmers.

Dating

Zier and Kalasz (1999) date most of the stone enclosure structures in southeastern Colorado to the Diversification period (A.D. 1050 to 1450) with a few of them being somewhat earlier and belonging to the late Coalition period (pre A.D. 1050). Glassow (1980) assigns stone enclosure structures on his sites at the southern margin of the Park Plateau near Cimarron, New Mexico to his Vermejo phase, A.D. 400 to 700. Farther south, the Sitio Creston site at Las Vegas, New Mexico, has now been radiocarbon dated to the period A.D. 600 to 1000+. Excavations at the Brantley Stone Enclosure site yielded three
radiocarbon dates (Katz and Katz 2002:87), two of which (240 B.C. to A.D. 30 and A.D. 380-690 at 2σ) this writer believes are too early for the stone enclosure occupation and probably represent an underlying Late/Terminal Archaic occupation of the site. The third radiocarbon date, A.D. 1030-1310 (at 2σ), agrees well with the pottery and the Neff style Livermore arrow point, all of which are believed to represent the occupation of the stone enclosures. Excavations and other information pertaining to Cielo Complex sites indicate that they date to the Late Prehistoric and early Historic periods, in this case, between A.D. 1335 and 1690 (Mallouf 1999).

In summary, the use of stone enclosure structures in Colorado, New Mexico, and west Texas appears to have occurred between about A.D. 400 and 1700. Interestingly, the earliest examples may be those on and immediately south of the southern portion of the Park Plateau in northeastern New Mexico. There is no doubt that the entirety of the Park Plateau, including that portion in southeastern Colorado, witnessed the greatest concentration of stone enclosure occupation up until at least A.D. 1450. Just how, if at all, the stone enclosures of Colorado and northeastern New Mexico relate to those of southeastern New Mexico and west Texas is a subject of great interest.

Movement/Migration of Stone Enclosure Dwellers

At the time I wrote a previous version of this paper (Wiseman 2002), I was intrigued with the possibility that the stone enclosures of southeastern Colorado, especially those of the Apishapa phase, signified the earliest and most important manifestation of the “stone enclosure culture” and that the stone enclosure sites in northeastern New Mexico, southeastern New Mexico, and western Texas might represent a portion of the Apishapa peoples who had migrated southward. A major peg in this proposition rested on the then presumed dating of Sitio Creston (about A.D. 1150), which has subsequently been established through radiocarbon dating as the second half of the first millennium A.D. (site file for LA 4939 at the Archaeological Records Management Section, Laboratory of Anthropology, Santa Fe). These revised dates mean that the occupation of Sitio Creston was among the earliest of this structure type in the northeastern New Mexico/southeastern Colorado super-region and could not have been a part of a southward migration to west Texas.

Campbell (1969, 1976) had already postulated that Apishapa peoples had migrated down the Canadian river to found the Antelope Creek phase sites of the Texas Panhandle. Christopher Lintz (1989) subsequently expressed his objections to Campbell’s ideas in this regard based on similar reasons—basic contemporaneity of the Apishapa and Antelope Creek phases. Of all four regions discussed here—Apishapa phase (southeast Colorado), Las Vegas, New Mexico (Sitio Creston), Carlsbad (southeast New Mexico), and Cielo Complex of the Big Bend country (west Texas)—only the Cielo Complex manifestation is fairly clearly among the latest, if not the latest in date. A group of stone enclosure sites in the vicinity of McCamey in west Texas has not been dated.

If cultural and physical linkages between the northern and southern manifestations are to be demonstrated, then two major hurdles need to be overcome. The first is to demonstrate a physical linkage by finding stone enclosure sites in the 250 km (150 mi) gap between the northern and southern clusters of sites. The second and more difficult task will be to develop the theoretical underpinnings that explain how the transformations in artifact assemblages and the concomitant implications about subsistence and other cultural aspects can be accounted for from region to region as the people moved about the landscape.

—RNW
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Endnote
1. This paper is a slightly revised version of one published over a decade ago in another venue (Wiseman 2002).

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