CLUES TO THE PAST

PAPERS IN HONOR OF WILLIAM M. SUNDT

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The Archaeological Society of New Mexico: 16

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Statements and interpretations presented in the articles are those of the authors and do not necessarily reflect the opinions of the Archaeological Society of New Mexico or its individual members.

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Printed in the United States of America

ISSN: 0587-1719

Cover: Pine tree site,
Photograph by Polly Schaafsma

Published by the Archaeological Society of New Mexico
P.O. Box 3485, Albuquerque, New Mexico 87110
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ERRATA, VOL. 15

Doyel, Simmons, and McAnany reported two errors in their article, "A Painted Kiva Near Chaco, New Mexico." Pg. 97: Figure 7 was inserted upside down by the printer. Pg. 98: The average size of Bis sa'ani kivas is 9 sq m, not 958 m. We apologize to the authors for any inconvenience these errors may have caused.
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William Martin Sundt

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No. 2 Collected Papers in Honor of Florence Hawley Ellis. 20 papers, 489 pages. 1975. (Out of Print)
No. 3 Collected Papers in Honor of Marjorie Ferguson Lambert. 15 papers, 264 pages. 1976. $14.00
No. 4 Collected Papers in Honor of Bertha Pauline Dutton. 11 papers, 206 pages. 1979. (Out of Print)
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No. 13 Secrets of a City: Papers on Albuquerque Area Archaeology in Honor of Richard A. Bice. 18 papers, 237 pages. 1987. $15.95
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Nos. 1-9, 15, & 16 available from COAS Publishing and Research, P.O. Box 3CP, Las Cruces, New Mexico 88003. Nos. 11-14 available from Ancient City Press, P.O. Box 501, Santa Fe, New Mexico 87502.

AWANYU: The quarterly journal was discontinued December 1977. For back issues inquire of COAS Publishing and Research (address above).

AWANYU NEWSLETTER: Distributed to members only. No back issues in print.
PREFACE

Clues to the Past honors William M. Sundt for his research and contributions to New Mexico prehistory and to the Archaeological Society of New Mexico.

Bill has made important contributions to the study of southwestern ceramics, especially in editing and publishing Pottery Southwest during its early years. His participation in the Albuquerque Archaeological Society and in the Archaeological Society of New Mexico have contributed to the continuing success of these organizations over the years. Participants from across the United States have learned a great deal about archaeology and the processes of excavation, analysis, and publication from Bill's seminars at the ASNM Field School.

The Archaeological Society of New Mexico thanks you, Bill, for your past and future contributions. We appreciate your dedication to the Society for we have all benefited.

The Editors wish to thank staff members of the Institute of Historical Survey for their assistance in the typing and layout of this volume.

April 1990
Meliha S. Duran
David T. Kirkpatrick
WILLIAM MARTIN SUNDT

Dolores Sundt

Bill was born in Las Vegas, New Mexico, on March 21, 1925, the oldest of four children. He began his career in archaeology in the usual way—collecting arrowheads from the time he was six or seven years old.

Both his environment and his parents nurtured his growing interest in Indian things. All around Las Vegas are prehistoric Indian pueblos and campsites where artifacts abound. His parents, who always enjoyed picnicking and spending time outdoors, would regularly take the family to the Tecolote Pueblo ruin a dozen miles southwest of Las Vegas, where everyone would spend the afternoon looking for specimens of the ancient craft.

Since he was so interested in Indians, one summer his parents made a large canvas tepee for him and his sister. It was about 12 ft in diameter at the bottom, and Bill decorated it with Indian designs. The children slept in it that summer. Their mother made them Indian-style clothes, and their father made Bill a war bonnet out of crow feathers. Bill was one proud and happy Indian.

His parents also took the family on trips to prehistoric sites. When Bill was 11, they went to the Puye ruins and across the Pajarito Plateau to Rito de los Frijoles and the ruins there. Bill got to visit the Indian ruins he had wanted to see for a long time and also found some relics there. The next year the family visited Mesa Verde National Park, where he saw the famous cliff dwellings, went through the museum, and listened to lectures.

He had several friends who also collected artifacts, and they would ride their bikes to sites a few miles away from Las Vegas. Of these boys, only Bill remained in the Southwest and kept up his interest in prehistoric Indians.

His interest went beyond collecting. Books also enriched his experience. His father read to the children from Ernest Thompson Seton's Two Little Savages, and Bill himself read extensively. Hewett's book in particular interested him. Ann Axtell Morris' book, Digging in the Southwest, and Deric Nussbaum's Deric in Mesa Verde remained favorites. He had to sneak back into the stacks to read the BAE bulletins in the public library, since the librarian did not trust young people with them. He wrote a paper on the Pajarito Plateau as a freshman at Highlands University.

Bill attended Highlands for one year. Before he entered the University of California at Berkeley for his sophomore year, he had to decide what to study. He could be an archaeologist and probably starve or be an engineer and make a good living and help the war effort. Material considerations won, and archaeology remained an avocation.

After graduating as an electrical engineer from Cal in 1947, he came to Albuquerque to work for the organization that eventually became Sandia Nation-
al Laboratories. He worked up through the ranks to become the lead engineer on a major project. In that capacity he got into an argument with the reliability analysis bunch. They got even: they invited him to join them. He did, and so began his career as a reliability engineer. Along the way he was coordinating editor and one of four authors of Reliability Technology: A Manual for Nuclear Ordnance Engineers, now an unclassified textbook. Bill was in the first group to be named a Distinguished Member of the Technical Staff at Sandia. His training and experience as an engineer have influenced the way he works as an archaeologist, from setting out hypotheses to handling data. His reliability work made him apt to question any assumption and insist on proofs.

To Bill's good fortune, Dr. Florence Ellis began to teach some of her courses in Southwestern anthropology in the evenings at the University of New Mexico, and Bill thus had the opportunity for formal study.

But, when looking into the literature for pottery type descriptions, he found them too general and subjective to suit an engineer. In order to find out what was really what, he decided he needed to make his own study collection of potsherds. In 1954 he made a trip through the Four Corners region to collect potsherds from all the "old" sites dug in the 1930s and earlier. This was the beginning of his informal education in ceramics. He had already started keeping records of where his arrowheads came from, and, after taking the courses with Dr. Ellis, he started recording all the potsherds he picked up, indicating the sites they came from on a map.

For a number of years he studied on his own. In 1966, one of his University acquaintances, Dr. Jerry Brody, told him about a local group that was forming an archaeology club. Jerry gave them about a year before they would be burned out and would quit. This was the Albuquerque Archaeological Society, of which Jerry himself has been a good and faithful member all these years.

Bill's archaeological career has been closely interwoven with that of the Albuquerque Archaeological Society (AAS). Although his real love is research, he supported the organization, first in the administrative line, serving as president and later as treasurer, as well as co-chairing the field and lab committee.

His and AAS's research effort started on a small site, AS-1, a Basketmaker campsite with an intrusive pottery cache, which Bill studied and wrote up for the report. By this time his private study had enabled him to be well-aquainted with Rio Grande wares. When AAS worked on part of Cynthia Irwin-Williams' Anasazi Origins Project at Prieta Vista, AS-3, Bill did the pottery analysis and report, his first major archaeological report.

At about the same time he helped Franklin Barnett with the ceramic section of his report on San Ysidro Pueblo and collaborated with Dick Bice on a booklet on pueblo pottery, which was an adjunct of an exhibit of the Albuquerque Museum. Informal consultations on pottery types started to become numerous, as people realized that he could give a reputable classification of pottery types or admit he did not know.

Pottery was not Bill's only
interest. His next involvement was with a prehistoric lead mine at Cerrillos. It was refreshing to work on something different, something in the open air rather than under a microscope.

Bill became involved in the activities of the Archaeological Society of New Mexico, writing an article on the mine site for Awanyu and giving reports at ASNM meetings. In 1972 he received ASNM's Amateur Award for his leadership in AAS, his research, and his work on pottery. Bill was president of ASNM from 1979 till 1987, and after that became executive secretary.

In 1972 Helene Warren, then of the Museum of New Mexico's Laboratory of Anthropology, approached AAS, asking for help in creating a periodical devoted to pottery studies. It was to be a volunteer effort, as the Museum had no funds for it, and Bill accepted the challenge of being co-editor in charge of publishing Pottery Southwest, with the Museum providing the other editor in charge of technical content, i.e. rounding up and editing articles for publication. Kathleen B. Angle was co-editor for the first seven years, and Regge Wiseman served another seven. The present co-editor, Wolcott Toll, has served two years. Bill did his share of rounding up articles and writing some, too. Now in the sixteenth year of publication, AAS can look back with pride at what it has produced, providing printing at cost with plenty of volunteers to get out the mailing.

Bill enrolled in ASNM's Incremental Certification Program in 1973 and attended his first field school at the Sterling site near Farmington. While pursuing the program, he also attended rock art field schools at La Cienaga and Chaco Canyon. At the latter, Jim Bain talked him into giving a lecture on pottery types for the benefit of the students so that they would know what to look for and what their pottery finds might mean.

Recognizing the work of AAS at Prieta Vista, BLM requested that they undertake the stabilization of a potted ruin that was crying for attention, and the Milpas project was born, for which a final report is now being prepared. The work at the Canada de las Milpas drainage area, AS-8, broadened from stabilizing one ruin to surveying the archaeological sites up and down the valley to determine the regional content. This resulted in moderately successful microseriation of the ceramics in the valley.

A few years after the Sterling Site Field School, ASNM moved its field school to Gallup, where it has been ever since. Bill was asked to help with ceramic analysis and with advanced studies for the field school and has worked for the school as photographer, crew chief, ceramics instructor, etc., nearly every summer. Over the years, work with the advanced ceramics lab has matured to its present rather sophisticated state, with the goal of microseriation yet to be realized. In 1988 and 1989, he undertook the introductory pottery seminar for the school. Bill retired from Sandia in 1984 and set up a consulting business in engineering studies and ceramic studies. The first year he worked almost entirely on engineering studies. Then his former mentor Dr. Florence Ellis called in desperation—would he possibly do a pottery study for Indian land claims cases she was working on? So began his second
career as a ceramic analyst. One of the highlights of the series of studies for Dr. Ellis was isolating and identifying several distinct varieties from the Jemez Mountain area, most notably a Jemez variety of Galisteo Black-on-white as distinct from the Jemez variety of Mesa Verde Black-on-white. Later the distinction was verified independently, when Bart Olinger of Los Alamos Scientific Laboratory, using X-ray fluorescence analysis, found the subtle distinction between these two varieties to be valid.

In the summer of 1985 Bill subbed at the last minute as a crew member at Ghost Ranch for Dr. Ellis. He used his report on this dig as part of the requirements for the culminating certification as Field Archaeologist in ASNM's certification program, which he received at the 1986 meeting.

At the same time AAS was approached to do an emergency salvage operation on private land west of Tijeras Pueblo. The two room blocks involved are part of the Tijeras Pueblo complex but date to earlier phases. Bill and Dick Bice, the co-chairmen of the AAS field committee, undertook supervision of the dig, which proved enjoyable though tiring, since part of the time they worked all daylight hours, seven days a week, racing bulldozers. Wet winter weather and bulldozers finally won. But they got good field notes, lots of photos, and a tremendous backlog of lab work, all waiting their turn for analysis and reporting.

At present, Bill's plans are to continue his active participation in the archaeological programs of ASNM and AAS and to still make time to clean up his backlog of unwritten reports.

Albuquerque

PUBLICATIONS

Sundt, W. M., Coordinating Editor, with contributions by A. M. Breipohl, R. O. Frantik, B. Slesinger, and W. M. Sundt


Sundt, William M.


Bice, Richard A., and William M. Sundt


Sundt, William M.


Bice, Richard A., Suzanne de Borhegyi, and William M. Sundt

Bice, Richard A., and William M. Sundt

Sundt, William M.


Bice, Richard A. and William M. Sundt

Sundt, William M., Bettie Terry, Beryl McWilliams, and R. A. Bice

Sundt, William M.
1984 TA84-1A, Typological Analysis of Potsherds in Collections from LA 85 (Old Santo Domingo Pueblo) and Other Sites Near Tent Rocks, New Mexico. Report submitted to Dr. Florence Hawley Ellis. Privately printed by the author. Albuquerque.


A historic photograph prompted an examination of historic Pueblo pottery canteen construction methods and the use of pukis. An apparently little-recognized technique, that of closing the domed body by coiling, appears to be the most commonly used and is best exemplified in historic discussions and actual examples of Hopi flat-backed canteens. Features are illustrated that may aid in identifying canteens from sherds in archaeological contexts. The unusual use of a broken, flat-backed canteen as a puki for building new canteens is examined in light of the various functions attributed to pukis.

INTRODUCTION: POTTERY CANTEENS

This paper specifically concerns two aspects of the method Pueblo potters in the American Southwest used for manufacturing ceramic canteens. First, several methods of forming canteens are described, as well as resulting features that may be diagnostic of the vessel form even when encountered on sherds. On a broader level we hope that this discussion will point out the potential usefulness of examining vessel construction method in the archaeological study of ceramics. Though archaeologists have long focused attention on and achieved considerable sophistication in analyzing certain aspects of ceramic technology, particularly tempering materials and firing, evidence of the methods used to build and form vessels has received little attention. Secondly, we discuss the role of pukis and raise questions about the function of such objects cross-culturally within the Southwest and about the use of the term puki in anthropological literature.

In the literature on Southwestern Native American pottery, the word "canteen" generally denotes a compact vessel with a short, slender neck and two handles. The term presumes the function of carrying or holding water. Prehistoric vessels called canteens usually have a round body which, as with most jars, is quadrilaterally symmetrical in shape when viewed from above. Some canteens of this configuration have been made into the present century (Peterson 1977:Figure 286).

However, sometime no later than the 1600s canteens of a different shape began to appear among the Pueblos, notably at Hopi and at Gran Quivira. These, quite unlike the prehistoric version, are not round but rather biconvex when viewed from the neck looking down, with the two convex surfaces often unequal in size and shape. Usually one side is bulbous while the other is somewhat flattened, resulting in their sometimes being referred to as "flat-backed canteens." Many Hopi examples are quite literally flat on one side and very bulbous on the other (Figure 1). The contours may be gently rounded or may form a sharp shoulder at or below the point of greatest diameter. During
the last century, bilaterally convex canteens, perhaps copies of commercially manufactured canteens, have also been made (Hardin 1983:Figure 93). Within these parameters, the shape of canteens may vary considerably (see Jacka and Gill 1976).

On decorated canteens it is virtually always the more bulbous surface that carries the design, while the flatter side receives the red slip, if present, separated from the design area with double framing lines around the lower body. Thus, judging from the orientation of the painted decoration, the flatter side is the base, and the apex of the more bulbous side is the top. As will be discussed below, this is also the orientation in which most canteens are constructed. The neck may extend horizontally from near the base, though on some it is placed higher and may be directed somewhat upward. When carried or hung, the orientation of the neck is upward, with the base side toward the body of the person or animal carrying it, or against a wall. Most canteens would not stand free in this position, so if they are set down while filled, they must be propped up with rocks or against another surface (Figure 2).

Large, flat-backed canteens in households and kivas appear in profusion in images recorded by photographers visiting the Hopi mesas at the end of the last century (Casagrande and Bourne 1983:Figure 35; Curtis 1922; Dorsey and Voth 1902). Emory Sekaquaptewa recalls seeing this large type of canteen in use in his childhood in the 1930s at Hotevilla. Women, often elderly, made three or

Figure 1. A typical Hopi plain ware, flat-backed canteen. This canteen (MNA OC1096) is identified as made by Hunimimka of Hotevilla, 1908-1910. (MNA photo no. 79.0139.)
Figure 2. "Evening in Hopi Land" by Edward S. Curtis, pre-1906 (ASM neg. no. 42861). Hopi women filling flat-backed canteens with water. Note the rock propping up the canteen in the foreground.

Figure 3. Hopi women carrying water home from the spring in flat-backed canteens supported on their backs in big pieces of cloth. Photo by Edward S. Curtis, date unknown (courtesy of the Southwest Museum).
four trips a day for water, carrying the heavy load up from the spring to the mesa top. At the side of the spring was "a concave hollow in the rock so the canteen can sit in it and its round bottom, with the neck opening straight up to prevent spilling—usually at the height so a person could lean back against it to lift [it] easily onto the back" (Sekaquaptewa, personal communication 1989). The canteens were not suspended by the handles for carrying, but rather were wrapped in doubled pieces of cloth with the ends tied around the carriers' foreheads or shoulders. "The flat side rests against the back so it won't roll around during [the] motion of walking." The handles were used to lift and move the canteens once they were in the household, where the water was poured into more open-mouthed jars for storage and use (Sekaquaptewa, personal communication 1989). Images by Curtis (Figures 2 and 3) recall this description.

Smaller canteens were also used at Hopi and were produced in the New Mexico Pueblos as well, particularly at Zuni and the Keres Pueblos. They were carried while traveling or working away from home, but they are also sometimes referred to as "ceremonial" (Peterson 1984: 88). Very small canteens, down to 3 in. in diameter, have also been made throughout the present century, and one miniature, possibly shaped into a bird effigy, was recovered from Mound 7 at Gran Quivira (Hayes 1981: Figure 110e). Canteens in a variety of shapes and sizes continue to be made by potters at many Pueblos today.

A PHOTOGRAPH BY FORMAN HANNA

A photograph taken by Forman Hanna at Walpi on July 10, 1922 (Figure 4) records some details of Hopi canteen manufacture that we believe may not be widely known. The photograph, otherwise undocumented, prompted further investigation. Additional information was obtained from three early written accounts of canteen construction, through examination of Hopi and other Pueblo canteens in several museum collections, and by inquiries made of contemporary Pueblo potters who make canteens.

In Hanna's photograph, a Hopi, or possibly Hopi-Tewa, potter with graying hair is working in a doorway, securing the end of a handle on a large canteen of the type usually having a flat or slightly convex base (Figure 4). The hemispherical top of this new canteen is still open; the coiling not yet completed. This opening is visible as what looks like a shadow immediately to the left of the potter's right forearm. The canteen sits within the lower portion of a similar canteen that has had its convex top broken away just above the neck and handles. Its flat base has been set on an inverted coiled basket, which is barely visible, possibly with a piece of cloth in between. The broken edge of the old canteen appears quite even and may have been purposefully shaped, perhaps by chipping or grinding along a bond between coils.

CANTEEN CONSTRUCTION TECHNIQUES

Canteen construction techniques were studied through published accounts of ceramic construction techniques and through analysis of museum specimen.
Published Accounts

In descriptions of Pueblo pottery making, it is generally assumed that the potter begins at the base of a vessel and progresses toward the mouth, ending construction with the rim. Through familiarity perhaps, this approach seems common-sensical, but in fact it is not an unvarying practice among hand-potters in other parts of the world. Potters in some villages of central Guatemala, for instance, begin a jar at the midpoint of the body, laying coils on a flat surface and raising the clay toward the neck, forming a cylinder. The jar is then inverted, and the potter adds coils from the body midpoint upward to form the base. The potter constricts the diameter until there is only a finger-sized hole remaining. This is then closed over by smoothing the clay toward the center with a corn cob, essentially enclosing the dome-shaped base from the exterior (Reina and Hill 1978:147-162). A nearly identical approach is used by the Ashanti in Ghana (Newman 1974:41-48). In the village of Pereruela in the León region of Spain, the domed tops of portable, hand-built ceramic bread ovens are also closed at the apex (Artigas and Corredor-Matheos 1970:84-85). A paddle is used to close the domed bases of inverted pottery bowls in Papua New Guinea (Blandino 1984:38-40).

This method of enclosing a rounded or domed surface from the outside initially struck us as a less-than-obvious approach to pottery construction, and we were surprised to see it appear in a traditional Southwestern context in Forman Hanna's photograph. The Hopi canteen in the photo (Figure 4) clearly had its neck put in place well before it was completed, precluding the usual base-to-rim construction sequence of other Pueblo jars. At the point the photo was taken, the potter appears to have had two options remaining: to continue coiling toward the apex and to close it from the outside center, as described above, or to form a dome-shaped bowl of matching dimensions and weld it to the lower body. The small dimension of the neck would appear to make the latter option difficult since the potter would not be able to put her hand inside to exert pressure to weld the two pieces together, nor does the angle of the join permit pinching the two pieces together from the outside.

Alexander Stephen's thorough description of the making of a Hopi canteen provides an excellent description of the process probably used by this potter to exactly the point Hanna's photo was taken:

The clay is rolled out as usual between the hands into a riband, and from the centre is paid out around in flat spiral, thus forming the flat base of the water bottle which rests upon the woman's back when carried.

The sides of the bottle having been builded up from the flat bottom or back a little higher than the position designed to be occupied by the neck and handles, these adjuncts are then made separately. The neck is a thick sided cylinder considerably longer than it will appear when projecting from the finished bottle; the handles also are considerably longer than required for the projecting curve they
Figure 4. A potter at Walpi, photographed by Forman Hanna in July 1922 (ASM neg. no. 33568). Note the open top of the canteen under construction, the old canteen being used as a puki, and the inverted basket underneath.
display when completed. The potter, from the inside pokes out with her finger a piece of clay, making the aperture in the place she designs for the neck; then, from the outside, she inserts the cylinder she has just made for the neck. Dipping the tips of the fingers of one hand in a basin of water, she moistens the surface where the projecting neck touches the bottle, then rolls out a little fillet of clay and lays it snugly around the junction, pressing it firmly into the clay of both neck and bottle, making the junction homogeneous. On the inside she then breaks off any unnecessary length of cylinder but leaves two inches or more which she then presses down upon the inside of the bottle all around the interior of the orifice, wetting the place with her fingers and smoothing it with her gourd fragment. From the inside she next punches out two little apertures at the place she designs for one of the handles. She then puts the ends of one of the curved handles in these holes from the outside, leaving projecting the amount of curve she desires. Then she lays a small fillet of clay around each of these inserted stems at the point of juncture with the outside of the bottle, and presses it firmly in with her wetted fingers. Then she presses back the inserted portion of the handles into the clay surrounding it on the inside, smoothing it with her gourd fragment, but leaving this portion of the bottle surrounding the handles a little thicker than elsewhere. She then in the same manner affixes the other handle and works upon its edges. [Parsons 1936:1188-1189] Inexplicably Stephen's diary, as published, ends discussion of construction at this point, shifting directly to firing in the next paragraph.

Fortunately Hough's description of Nampeyo making a canteen, though less detailed, continues through the completion of construction, confirming that the technique of closing over a dome from the outside was in fact practiced:

A toy canteen was begun by taking a lump of clay which, by modeling, soon assumed the shape of a low vase. With a small stick, a hole was punched through each side, a roll of clay was doubled for the handles, the ends thrust through the holes and smoothed down inside the vase, through the opening. The neck of the canteen was inserted in a similar way. Now the problem was to close the opening, pressing the layers together, gradually drawing in, making the orifices [sic, orifice] smaller until it presented a funnel shape. Then the funnel was pressed toward the body of the canteen, the edges closed together, soldered, smoothed, and presto! it was done and all traces of handling hidden. Anyone knowing the difficulties will appreciate this surprisingly dextrous piece of manipulation. [Hough 1915:79] Cushing (1886:512-513) cites a similar practice at Zuni,
though, surprisingly, he describes the neck being added after rather than before the convex dome of the canteen is closed.

Two other discussions of canteen construction posit a very different approach. Wade and McChesney (1981) state that "structurally, Polacca Polychrome canteens...are simply covered bowls with flat (basket-pressed) bottoms, gently swelling upward to rounded sides. The upperbody dome is an inverted, deep food basin" (p. 570). This seems to mean that they envision the vessels as made from two halves luted together, but they are not explicit as to what features led them to this conclusion.

Hayes (1981) describes the seventeenth-century canteens recovered from Gran Quivira as also being made of two parts: The bulging front was made by building the base of an olla shape up to the height of the shoulder and riveting handles in place near the top. A flat plaque of clay with a slightly raised edge was then inverted over the open top, and the still plastic edges were joined by working through a hole cut for the neck. The juncture of the two pieces is indicated on many canteens by an imperfectly smoothed area on the inside [p. 78].

Peterson (1984) describes contemporary Acoma potter Emma Lewis' method of making bilaterally symmetrical small canteens from luting together two "deep platters" (p. 128).

Museum Collections

We examined canteens in five museum collections to see whether features existed that would indicate how the vessels were made. Five manufacturing techniques were considered.

The expectation was that a canteen that had been coiled up to its dome and closed at the apex would reveal an "apex irregularity" on the interior, a major irregularity where the remaining opening in the top of the dome was covered over from the outside, no longer accessible for bonding or smoothing from the inside, since the neck is generally too small to admit the potter's hand. The area surrounding the apex on the interior would be less smoothed and the coils less well bonded together than on the lower sides of the canteen. Also, the orifice would have become smaller as coiling progressed toward the top, making smoothing of the interior increasingly more difficult toward the apex. One might also expect this to be an area of weakness, since the bonding of the coils would be incomplete.

The interior of a canteen made by luting two pieces together would be expected to have a single, unsmoothed, linear bond running horizontally where the two pieces were joined, again inaccessible to the potter for smoothing. If the two halves were equal in size and shape, the bond should be at the point of greatest diameter and should be easily visible directly opposite the mouth. In other cases the bond would be somewhere on the upper body and would probably be visible through the mouth. The interior of the upper dome piece would have been accessible for smoothing prior to luting and therefore should be free of any major irregularity. However, normal evidence of concentric coiling would not be inconsistent with this method of manufacture,
since the two sections could probably be made by coiling as easily as by the slab technique discussed by Hayes (Kit Schweitzer, personal communication 1989). These two variations of luting two pieces together are shown combined in Table 1.

At least since the turn of the century there has been considerable variability in canteen forms, some of which suggest the third and fourth construction techniques. Some shapes resemble a sphere flattened on one side, as though the piece were made as a jar and one side subsequently pressed against a flat surface to create the base. The base is off-center in relation to the neck, which is generally above the mid-point of the body. The shape of some canteens suggests a base-to-rim construction but with extra clay added to one side during coiling to make the neck off-center. Neither technique would seem to have a positive diagnostic feature, but they should definitely lack both the apex irregularity and the luting seam described above. It would seem that extreme asymmetry of the bottom and top parts of a canteen would be difficult to achieve through these two methods, so that shape alone might rule them out in some cases.

We examined 91 canteens in the collections of the Arizona State Museum (ASM), Western Archeological and Conservation Center (WACC), Museum of Northern Arizona (MNA), Museum of New Mexico (MNM), and the Amerind Foundation, but not the complete canteen holdings of any of the institutions. The interiors of the vessels were examined by looking through the neck of the vessel or through another break, if present. Two sizes of small flashlights and a microscope light were used for illumination; a raking light or reflected light seemed to show features most plainly. In whole, unbroken canteens, the apex of the domed surface was often wholly or partially out of the line of sight, but most of the wall below the apex area was usually visible on the side opposite the neck. The results of these examinations are given in Table 1.

Over one third of the canteens examined had definite evidence of the closing-of-the-apex method of construction, either a complete or partial view of a lumpy or puckered apex irregularity, a pronounced decrease in smoothing and bonding toward the apex, or, in two cases, the shape. The Hopi canteen in Figure 5 illustrates an easily visible example of the apex irregularity, seen through a large hole broken in its flat base. A miniature canteen from Gran Quivira (Figure 5), shown resting on its top surface, reveals an unequivocally irregular, puckered area in the center, seen through an elliptical opening where the neck is broken off. The majority of the apex irregularities we saw are very similar to these examples.

One Sikyatki Polychrome canteen fragment (Amerind No. 269) shows unobliterated, neatly executed spiral coiling on the interior of the dome apex rather than a marked irregularity; an area of coils about six in. in diameter around the center has received no smoothing. An area of three coils in the center has broken out as a unit and has been reglued into place, suggesting that the Sikyatki canteen illustrated by Wade and McChesney (1981:40), which appears to have a similar break, might also have been constructed by coiling to the apex rather
Table 1. Canteen construction techniques observed in museum specimens.

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*Several Zia and Acoma canteens may not be accurately distinguished but are definitely from one or the other of these two pueblos.

than by luting, as suggested by the authors.

Seven large Tabira Black-on-white canteens from Gran Quivira differ from any other canteens examined in having necks large enough to admit a person's hand. Most of these canteens showed only a trace of roughness at the apex rather than a pronounced irregularity. It appears that some interior smoothing was done through the neck, but not to the same degree as on the lower walls. We did not see the evidence of luting that Hayes (1981:78) cites for the Gran Quivira canteens. The specimen illustrated in Figure 7 has a minimum neck opening of approximately 6 by 8 cm, through which Jan could easily put her hand. Although a slight undulation on the interior reveals traces of concentric coils, all of the surface has received some smoothing, most of it also in a concentric pattern. One seam is particularly evident, lending support to Hayes' suggestion that the upper one-third of the vessel might have been added as one piece. However, the center of the dome has numerous deep striations, in an uneven but roughly parallel pattern. This condition seems consistent with the potter being able to partially smooth out the apex irregularity by reaching through the limited access of the neck.
Figure 5. Looking through a hole in the base of a Hopi flat-backed canteen at the interior of the upper body (WACC cat. no. N386; ASM neg. no. 83371). Note the puckered "apex irregularity" where the dome was closed from the outside.

Figure 6. Looking into the interior of a miniature Tabira Black-on-white canteen from Gran Quivira through a hole where the neck was broken away (WACC cat. no. Q5652; ASM neg. no. 83370). Canteen is sitting on its dome, flat base up, with the puckered "apex irregularity" clearly visible. (This vessel is illustrated in Hayes et al. 1981:Figure 110e.)
Figure 7. View of the interior of the upper body apex of a large Tabira Black-on-white canteen from Gran Quivira (WACC cat. no. Q3926; ASM neg. no. 83366). Neck at right. Note the incompletely smoothed area at the top of the dome. (The design on the front of this vessel is illustrated in Hayes et al. 1981:Figure 115e.)

It is difficult to explain these striations if the dome were luted on as one piece. Thus the preponderance of evidence suggests the coiling-to-the-apex method of construction.

The exterior shape of two recent Hopi canteens at MNA (Nos. E-614 and E-3433) strongly suggests that they also were finished at the apex, though the interior is not visible to confirm this. In both cases the upper walls taper to form a soft point, giving the upper vessel the contours of a Hershey's chocolate "Kiss," strongly suggesting that the apex was brought up into a point (perhaps like Hough's funnel) and not pressed down.

It is interesting to note that several canteens were almost quadrilaterally symmetric when viewed from the direction of the neck, and could presumably have been easily made from base to rim like an ordinary jar, yet the construction technique was the exterior closing-of-the-apex. Thus the technique of closing the apex
seems strongly associated with canteen making rather than solely with the practical considerations of developing a particular shape. A nearly spherical Acoma piece with an obvious pucker at its apex (MNM No. 7821/12) typifies this phenomenon. One Rio Grande glaze ware canteen (MNM No. 18621/11) appears to have an apex irregularity on its decidedly flatter side while the bulbous side is smooth; the orientation of construction apparently dictated the placement of decoration, which is on the closed side.

Several canteens made from two pieces luted together were found. An asymmetrical Hopi canteen (Amerind No. 1292) has a prominent seam that can easily be felt with the fingers on either side of the neck opening and seen on the wall opposite. It appears that the piece forming the dome was overlapped on the outside and all exterior sign of the seam obliterated. MNM No. 12364 from Acoma and one Zuni piece, MNM No. 19186, each have a prominent seam on the interior, but it is less clear whether these are luting or coil seams. Three modern, made-for-sale canteens from Zuni and Acoma are bilaterally symmetrical in cross-section, and at least two of these were probably made by luting together two identical dish-shaped halves.

Shape indicates that two examples from Cochiti and one from Santa Ana were made from base to rim by off-centering the neck (see illustration in Harlow 1977:66). Five from Cochiti also appear to have been made like a jar, then flattened on one side to sit at an angle. These cases are all problematical in that no certain diagnostic features are known, and examination was not sufficiently informative to rule out the closing-of-the-apex method.

In the case of 44 canteens, almost half the sample, no diagnostic feature was found that reflected with certainty the construction method. Luting could definitely be ruled out in some cases because the area in which a seam could be expected revealed none. Shape did not indicate that the neck was off-centering of the neck or that the jar was flattened. In most indeterminate cases the apex of the dome was not visible, thus leaving open the possibility that an apex irregularity was present but out of sight. In three cases enough of the dome seemed to be in view so that an apex irregularity should have been visible, if present, but was not, leaving only the options that the apex was very far forward or that some other type of construction had been employed. We suspect that, in most of the undetermined cases, the construction method was coiling to the top of the dome, but this can only be demonstrated with an improved examination method. It is of particular interest that this construction technique could not be detected in any of the eleven Zuni canteens examined, perhaps a result of inadequate visibility with the examination technique used.

Contemporary Practices

At the Santa Fe Indian Market in August, 1989, several potters were informally queried about their particular method for constructing canteens. One Hopi potter, Gloria Kahe (personal communication 1989), had made a small canteen by coiling up to the top of the dome. She likened the technique to that for making seed jars and said it is not particularly difficult.
Robert Tenorio (personal communication 1989) of Santo Domingo Pueblo had made one very large canteen, probably more than 30 cm in diameter but only a few centimeters high, in the same manner, supporting it from the inside with crumpled newspaper during construction. Arthur Coriz (personal communication 1989), also of Santo Domingo, also described coiling the dome. Nambe potter Lonnie Vigil (personal communication 1988) has made completely enclosed jar shapes in the same method, then has either cut a lid from the fully formed jar (ASM AT-89-15) or has placed a small air hole in the base to create an opening.

Stephanie Naranjo (personal communication 1989), who makes Santa Clara Polychrome pottery, explained making a canteen by forming a normal jar and then "squashing it over" to make it sit at an angle. Hopi potter Darlene Nampeyo (personal communication 1989), who lives at Jemez, described making a bilaterally symmetrical canteen by joining two dish-shaped pieces.

In summary, it appears that there are and have been several approaches to making historic Pueblo canteens: the coiling-to-the-apex method; luting of a partial dome onto a base piece; luting of two equal, dish-shaped pieces to make the bilaterally symmetrical type; flattening a jar asymmetrically to make a new base; and creating a jar with the neck off-center. We speculate that the first method characterizes most early historic canteens and most Hopi, Acoma, and Zia canteens, and that most Zuni canteens will also prove to be of this type. Luting of two unequal pieces appears to occur only sporadically, with bilaterally symmetrical luting becoming popular toward the end of the last century. On the basis of limited data, the last two methods, in which the vessel is made from base to rim, seem more characteristic of Cochiti and other more northerly pueblos where the making of canteens may have been more limited historically, judging by their relatively sparse representation in museum collections and publications. Firmer association of construction techniques with cultural origins awaits more study, with improved examination techniques.

An additional issue this study raises is the origin of the coiling-to-the-apex method of making canteens. While the method may not seem obvious to a nonpotter, it certainly would not have presented any technical difficulties to Pueblo potters. The distribution of the method in far-flung parts of the world indicates that independent invention has occurred at least several times. It appears to us that similar construction problems are probably presented by effigy vessels and other eccentric forms, and the technique may well have existed before the advent of the flat-backed canteen in the Southwest.

Hayes (1981:77-79) dates the Gran Quivira canteens to the 1600s. Dating of the New Mexico glaze ware and Sikyatki pieces is less precise. There seems to be no certainty that the flat-backed canteen was a Spanish introduction, but the time of its appearance and the widespread distribution of the form in the Old World may suggest that this is the case. If so, the coiling-to-the-apex technique might possibly have accompanied introduction of the form or might have been an indigenous, New World approach to producing a shape made by other means in the Old World.
We hope that the presentation of this material may be valuable in identifying canteen forms from sherds in archaeological assemblages. The "apex irregularity" and luting seams are quite distinctive, and while they are not certain indicators in themselves, may provide sufficient supplementary evidence to facilitate recognition of the canteen form.

CANTEENS AS PUKIS

The potter in Hanna's photo (Figure 4) seems to be using the lower part of the broken canteen as what most Southwestern anthropologists would probably recognize as a puki. The familiarity clearly comes from the context of its use rather than its form. The reuse of broken jars or bowls for pukis is well documented for other Pueblo potters (Barnett 1969:193-194; Guthe 1925:27; Kidder and Shepard 1936:383; Peterson 1984:125, Figure 166), however our examination of the literature and published photographs has not revealed any additional record of using broken canteens as pukis, for making either canteens or other forms of vessels. The only reference we have found describing any puki-like object in canteens is from Alexander Stephen's journal in 1893:

The water bottle is formed on a flat surface, a stone, a tray, or a basin filled level with sand, a smooth surface of clay being spread upon it and allowed to dry. [Parsons 1936: 1188]

Wade and McChesney (1981:570) describe Polacca Polychrome canteens as having flat, basket-impressed bottoms, implying that baskets may have served as the pukis.

It may be that Hanna recorded a purely idiosyncratic instance of using a canteen for a puki, or the lack of documentation may just reflect the paucity of information recorded on canteen construction. In any case, the unusual form of the canteen puki being used in the photo stimulated us to consider the purpose it is serving, which begins with consideration of how and why pukis are used generally.

We would guess that most anthropologists formulate their concept of a puki on the basis of repeated observation of it as part of the normal assemblage of artifacts used by Pueblo potters but without a precise understanding of the role it plays. The Tewa term, probably first popularized by Guthe's (1925) study of San Ildefonso pottery making has received widespread use by anthropologists to refer to any bowl-like object in which a potter of any Southwestern Indian group, prehistoric or historic, constructs a vessel (Crotty 1983; Farwell 1981; Lambert 1966; Peterson 1980:17, 27). The term has essentially been incorporated into English usage, albeit primarily in the specialized jargon of Southwestern anthropologists and pottery enthusiasts. This seems reasonably appropriate inasmuch as there is no real English equivalent. But the actual meaning of the term in Tewa is rarely mentioned, nor is any Tewa explanation of the function of the artifact. That pukis have more than one function or purpose is usually implicit, but rarely stated, in the writings of most authors. The English words mold, turntable, support, and others have been used in place of puki but each implies a specific function at the expense of the others. By contrast, to native English speakers, use of the term puki does not imply a
specific function. In the sense of being noncommittal, the choice of the term puki seems wise, but at the same time its use may inhibit recognition of cross-cultural differences in function.

Hardin (1983) has explicitly and succinctly described the multipurpose nature of pukis she has found among contemporary Zuni potters:

[They] have three main functions. They may be used to shape the vessel begun inside them; to support the lower part of a vessel while the upper body and neck are added; or to permit movement and rotation of vessels being worked on, which is important in maintaining symmetry in a hand-built vessel.

This statement provides a good starting point for considering the possible function of the canteen puki. The first function mentioned, that of shaping a vessel, may be closest to the original Tewa meaning. In writing about the Tewa article, Guthe (1925) translated the term "puki" as "mould." The Blairs (1986) cite a similar translation at Santa Clara: "the word 'puki' in Tewa is said to mean simply 'form'" (p. 93). Probably the most striking example of the mold function is the type of puki having an indented base, used for making water jars that in turn have indented bases. According to the Blairs (1986):

Vessels can be identified by the characteristics of the puki which have been imparted to it during formation. Taking into consideration shrinkage from drying, materials removed by the sanding and smoothing processes, and firing shrinkage, these characteristics still influence the outside form and may be transmitted through the plastic form to the interior of the pot where they may leave their distinctive signatures.

Maria Martinez of San Ildefonso claimed that she could identify her old unsigned polychrome water jars by the shape imparted to their bases by her puki. She said the base had a certain feel when placed on her head. [p. 96]

In photographs the bases of shaped, in-process Tewa vessels generally appear to fit snugly into their pukis, and the walls flare upward following the same angle and curvature as the puki (Blair and Blair 1986; Guthe 1925; Peterson 1977).

Superficially the canteen puki in Hanna's photo seems suited to provide the flat surfaced "mold" for the flat base of the new canteen. But in fact the position of the in-process canteen in its puki suggests that it is sitting on top of a layer of some material such as sand or ashes, which raises its base at least two or three inches above the base of the older canteen, much as Stephen describes the filling of a bowl to provide a flat surface. In fact, comparing the photo documentation for the construction of other vessel forms among the Hopi, the new vessels appear to sit loosely in a well hollowed in ash or sand, perhaps hardened, within a bowl, taking their form from this concave depression rather than from the shape of the bowl itself. Often the forms of the depression and the bowl are very different. Also, unlike the Tewa use of pukis, at Hopi the shoulders of new vessels are just above the top of the puki,
perhaps specifically reflecting the shallow shapes of Sikyatki Revival jars. While in this century many Pueblo potters have used pukis made specifically for the purpose, among the Hopi other existing bowls—including unbroken pottery stew bowls, baskets, and dish-pans—seem to have been most commonly used (Kunze 1988:180; Mauer 1977:204; O'Kane 1950:137; Stanislawski 1979:Figure 5; Way 1977:Figures 2-10). With the addition of sand or ash, these would seem to equal the usefulness of a canteen puki for constructing a new canteen.

The canteen puki appears to have no mold function whatsoever in relation to the lower body of the canteen. And for supporting the lower walls from collapse as the pot grows, it also seems useless. The making of a canteen would seem to present one problem not encountered in the making of other vessel forms: the attachment of the protruding neck and handles to the lower body precludes the possibility of a mold for the lower walls. To have sufficient space to perform this operation may be the reason for raising the level of the working surface within the canteen puki in Hanna's photo. But the amount of support Hopi pukis provide for the walls of other vessels during construction may also be questioned, for the same reasons referenced above.

The turntable function is the third mentioned by Hardin. The large flat base of a Hopi canteen would seem to present a difficult surface to rotate compared with a smaller, round-based puki. It seems possible that the potter photographed by Hanna used the small base of the inverted basket to create a pivot upon which the canteen base would turn. The exterior of the old canteen is matted with dried clay, perhaps from being handled or turned by the potter while her hands were covered with moist clay. One published reference tends to affirm the importance of this function to Hopi potters: at Hano, Hough (1915) witnessed Nampeyo make use of a "concave dish called tabipi in which she began the coiled vessel and which turns easily on its curved bottom" (p. 78). It is difficult to know whether Hough chose to mention the turning function as a result of keen observation of its major use or chance choice of one of several possible functions. But the combined weight of the new and old canteens plus the sand or ash within seems very great for the basket to support. While the use of a basket may have made it possible for the potter to rotate the canteen puki, it seems unlikely to have any advantage for this purpose.

Thus, in terms of the three functions of pukis mentioned by Hardin, the canteen puki seems somewhat marginally qualified, suggesting that it may have some other function of importance to this potter. Colton (1951), who must also have witnessed Hopi pottery making first hand, refers to the ta-ve-pe as a "supporting vessel" and "a base on which to stand the jar" (p. 5-6). Emory Sekaquaptewa explains the Hopi word, correctly spelled taviipi, as coming from the root tavi, meaning "to place," plus the suffix pi, meaning implement or instrument. Thus the Hopi etymology would support the notion that a primary function of the Hopi equivalent of a puki is to provide a surface in or upon which to place an in-process vessel. It may well be analogous to a wheel potter's "bat," a flat, usually
circular, piece of plaster or other slightly porous material upon which a pot may be thrown, then used like a tray to move or handle the new pot in its plastic state to prevent distortion (Hamer and Hamer 1986:21; Nelson 1984:137). In writing on Santo Domingo pottery making, Chapman (1936) seems to be one of the few Southwestern anthropologists to explicitly reference this fairly obvious function: "...the new bowl or jar, still too pliable to be lifted, is set aside in its base dish to dry" (p. 10). For this purpose we would judge the canteen puki would serve admirably, and that, by process of elimination, it may be the only purpose it does serve. One unique advantage of this type of puki over a sand- or ash-filled bowl might be that the position of its handles and neck could provide a guide to their placement on a new canteen built within, and those in the photo do in fact match.

It seems probable that at least all three functions noted by Hardin are true of pukis to varying degrees wherever they are used, and we would expect the same of the bat or tray function. But the extreme example of the canteen puki usefully underscores the hazards of assuming that pukis function identically wherever they are found. Convenience of using the Tewa term must be accompanied by awareness of possible differences in the use of the actual implement among the cultural groups where it occurs. Sadly, Guthe's thorough study of San Ildefonso pottery making seems often to have led subsequent students of Pueblo pottery to dismiss the subject of technology, as though no differences existed in pottery techniques among the various Pueblos. Archaeological interest in ceramics has led to the recording of differences in temper, but little attention has been given to pottery construction techniques. Surprisingly few serious studies have been undertaken, and most of those focus on Tewa potters (Blair and Blair 1986; La Free 1975; Peterson 1980).

Returning to Hanna's photograph, whether this use of a canteen as a puki was an idiosyncratic, one-time, or one-potter practice remains unknown for the present. That Stephen's thorough description fails to mention their use suggests that it may not have been very widespread. This instance certainly presents a striking image, and it may have been some such impression that appealed to Hanna and prompted him to record the scene.

**SUMMARY**

An examination of Forman Hanna's photograph of a Hopi potter taken in 1922 led us to examine the construction techniques used in making flat-backed canteens and the manner in which pukis are used (and the term abused) in the Southwest.

An examination of 91 Pueblo canteens in museum collections revealed that the flattened body form can be achieved (1) by coiling the vessel up from an originally flat base and closing the apex of the dome by coiling, (2) by luting two dish-shaped pieces together at their edges, (3) by coiling a canteen up from an originally flat or convex base and welding on a cover, (4) by coiling a jar in the usual manner and then flattening one side, or (5) by creating a jar with an off-center neck. The first technique appears actually to be the most commonly used and may well have been that used in
making the earliest flat-backed canteens in the Southwest, dating at least as early as the 1600s. This closure technique is known from other parts of the world as well. Around the turn of the century, Cushing, Stephen, and Hough were all familiar with the technique, although it is now little mentioned in the literature on Pueblo pottery making. The relative popularity of each technique for various Pueblos at various times does appear to vary, although the pattern is still sketchy because of the difficulties involved in examining the interiors of intact canteens. However, we have described various physical remnants that can be used as criteria with which to identify each technique on a given canteen. The most diagnostic is the apex irregularity, a lumpy or puckered area visible on the interior top of a canteen's dome, which indicates the upper body was closed by coiling from the outside. Looking for this feature (as well as luting seams) on whole ethnographic canteens (using better examination methods) and on sherds from archaeological assemblages may enable us to fill out our understanding of the early historic origin and spread of the flat-backed canteen and to discuss trends and pottery technology among recent and modern Pueblo potters.

The unusual use of a broken, flat-backed canteen as a puki for constructing a new canteen made us question exactly why the potter had selected this item for use. Southwestern anthropologists have casually used the Tewa term "puki" to cover various items that may serve several subtly differing functions, including a mold for the new vessel, a support for the walls during construction, and the ability to turn or move the new vessel without touching it. In the case of Hanna's photo, the old canteen appears to both serve as a working platform, something implied by the use of the term taviipi, but not necessarily by the use of the term puki. In addition, we suggest that the old canteen may serve as a guide for placing the new canteen's handles and neck, something that would not have been indicated by the casual use of either term. The term puki is well embedded in Southwestern ethnographic and archaeological literature; however, seldom is there an explicit distinction made between whether the function cited is based upon the author's perception of its use or upon how the potters themselves perceive the function. When anthropologists and archaeologists use the term, they should be explicit in what they mean.

ACKNOWLEDGEMENTS

The authors wish to thank the following individuals for their assistance in this project: Allan McIntyre, Amerind Foundation; Christine Gross, Field Museum; Jonathan Batkin and Craig Clyver, Southwest Museum; Helene Warren; Emory Sekaquaptewa, University of Arizona; Kit Schweitzer; Louise Stiver and Charles Bennett, Museum of New Mexico; Elaine Hughes and Carol Burke, Museum of Northern Arizona; Stephen Keane, Western Archeological and Conservation Center; David H. Snow, Cross-Cultural Research Systems, Santa Fe; Peter Pilles, Jr., Coconino National Forest; Ken Hedges, San Diego Museum of Man; Helga Teiwes and Kathy Hubenschmidt, Arizona State Museum.

We would also like to thank Alden Hayes, Kelley Hayes, Emory
Sekaquaptewa, and Mike Jacobs for taking the time to read and comment on the manuscript in Arizona State Museum Tucson

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THE TUNQUE LEGACY—RESOURCES FOR STUDY

Richard A. Bice

Tunque Pueblo has a clouded history. Although it was one of the large prehistoric and trans-historic settlements in the middle Rio Grande valley, it has been the subject of only sporadic, systematic archaeological attention. Located beside a tributary arroyo of the Rio Grande, but away from the river itself, it did not receive the detailed attention of the early Spanish entradas that many of the other large pueblos of the time received. However, it seems to have been an important pueblo in its era, due, at least partially, to the fact that it is located immediately on top of an excellent source of pottery clay. Warren (1969) believes that it was a major manufacturing center for widely distributed glaze-decorated pottery during parts of the fifteenth and sixteenth centuries.

Although several papers have been written on certain aspects of Tunque (LA 240), the only broad report is that of Barnett (1969). However, much additional information remains to be gleaned from a number of diverse sources.

Drawing upon some of this source material, Bice (1982) presented an early reconstruction of the Tunque site plan. One of the purposes of this paper is to refine the 1982 plan into three stages of site evolution: the site as it was following its final abandonment, ca. A.D. 1600; the way it appeared following N.C. Nelson's exploratory investigations; and finally, the state of the ruin as it now exists.

Also presented are sources of information on Tunque and a discussion of the problem of treating heterogeneous data from a number of different archaeological investigations.

HISTORY OF THE SITE AND SUPPORTING DATA

Tunque (Tonque, Tungee) is located midway between Albuquerque and Santa Fe, a few miles east of the Rio Grande, on one of the natural routes between the river pueblos and the pueblos of the Galisteo Basin. Nelson (1914a:19) states that it probably was one of the pueblos visited by Coronado when he traveled from Tiguex near Bernallillo to Pecos (Cicuye). Later Spanish entradas, the Chamuscado expedition in 1581 and the Castano de Sosa expedition in 1590-91, may also have passed Tunque (Schroeder and Matson 1968:160-162). The Castano records note a pueblo, possibly Tunque, that had been deserted for a few days before the expedition passed that way and that presented the signs of many deaths as though it had been under attack.

Bandelier (Lange, Riley, and Lange 1975:58) and Dutton (1989:63-64) state that Tunque was a Tano pueblo. However, after an exhaustive study of available Spanish references possibly relating to Tunque, Schroeder (1990) concludes that an open question still remains as to whether it was "part of the Tiwa extension around the north end of the (Sandia) mountains to Paako or was a Keres
invasion up Tunque Arroyo as was San Marcos in the Galisteo Basin."

The Tunque ruin first received formal archaeological attention when Bandelier referred to it in his journal entry of December 16, 1882 (Lange and Riley 1970:379-380). In July 1885, he visited the pueblo, made notes, and mapped it (Lange, Riley, and Lange 1975:64-65).

To quote Bandelier's notes:

In many places there are only foundations left, which are of stone, that is rubble, but often the foundations are destroyed or scattered about. Long rows of debris, however, show the lines in the same manner as Puaray and at the Parida in the soil. The soil is light yellowish, and the adobe walls show darker brown. The walls appear to have been all of adobe and about a foot wide. Size of adobe undeterminable.

In several places the whole of the first story seems to be preserved, and the rooms are probably little disturbed, and perhaps empty; fragments of the roof are visible through cracks and openings, showing that it was made with splinters resting on beams, and covered with earth. Consequently, there must have been at least two stories in places. The rubbish hardly warrants more than two, although three stories in places are not impossible. The northern and principally the eastern parts are more destroyed. In regard to the eastern sections, it is evident that the drainage has had a good deal to do with it, as it is all in this direction, and the slope, though not steep, still very much abraded.

As for the northern rows, it is also possible that they were abandoned at an earlier time than the others and that consequently the pueblo was not simultaneously occupied in all its parts, and that thus its size and great extent do not give the measure of its former population. It is singular that no traces are found of any circular estufa.

[Lange, Riley, and Lange 1975:64]

The Museum of New Mexico, Laboratory of Anthropology, has a copy of Bandelier's map of Tunque, the original of which is in the Bandelier files at the Vatican. The map, painted in September 1885 (Lange, Riley, and Lange 1975:95), and shown in Figure 1, contains the earliest information available as to the full extent of the pueblo. It displays the three main east-west laterals, with a number of additional western house blocks. (North is to the left of the map. This convention was also followed by Nelson and, for the sake of consistency, has been adopted for use on all of the maps in this report.) The ruin's appearance is somewhat in the shape of a left hand, palm down, with a missing second finger.

It is significant that Bandelier's map shows tentative room outlines in the central east-west lateral and in some of the house blocks of the southwest quadrant, whereas, in other areas, rubble defines the house blocks. As Bandelier suggests, the pattern of deterioration in different parts of the site may be explained by variations in
Figure 1. Tunque map painted by Adolph Bandelier, 1885 (copy in Laboratory of Anthropology; original in Vatican).
erosional fill, early and late periods of occupancy, or selective areas of multistory construction. Some insight relating to these possibilities was found in the excavations conducted by the Bices, which showed that pottery found in the east part of the south lateral was earlier than that found in the central lateral and that at least one two-story structure was accounted for in the middle east-west lateral (Bice and Bice 1969:210-212).

Another feature of Bandelier's map is that at least one and possibly two house blocks are shown that do not appear on later maps of the site. The southwesternmost block, next to the arroyo, seems to have disappeared by the time Nelson arrived, perhaps due to erosion of the arroyo bank. The other house block, running east-west in the west-central part of the map, is more problematical since Bandelier's map has some anomalies in this area compared with later information. In any event, the position of this possible additional block is now obscured by the spoils of a brick plant.

In 1912, about three decades after Bandelier's visit to Tunque, the Tunque Pressed Brick, Tile, and Improvement Company was attracted to this location by the high quality of the local clay deposits (Barnett 1969:27). Two years later, in 1914, Nelson carried out some extensive but exploratory excavations on the site as a part of his survey in and around the Galisteo Basin. His work at Tunque is not covered in his Galisteo report (1914a), nor has it been reported on elsewhere, but a copy of his American Museum of Natural History notes (1914b) has been made available to the author through the kind offices of the Laboratory of Anthropology in Santa Fe. These notes cover the archaeological work done in individual rooms within numbered house blocks, identified in a field sketch map.

Nelson's sketch map, reproduced here as Figure 2, shows the house block relationships and the general location of the sampling trenches that he dug across these units. Overall, he dug 240 rooms in a pattern representative of the entire site. Two refuse piles, A and B on his map, are not noted in the Bandelier painting. Both piles were in areas that have since been disturbed by the brick plant operations and cannot now be examined.

Although Nelson's map is not to scale, appearing to be somewhat compressed north-south, its pattern agrees with Bandelier's map except for the two house blocks previously noted.

Following Nelson, from the early 1930s through at least 1938, the Albuquerque High School Archaeological Society excavated the great kiva at Tunque. Despite Bandelier's statement that "no traces were found of any circular estufa," one great kiva did indeed exist. The kiva work was originally carried out under the direction of Sarah Goddard and later by Winifred Buskirk (Herbert Dick, personal communication 1989). Goddard (1933) reports on significant details of the excavation, and Dick, who participated in the AHS program, has kindly supplied further information concerning this project (Figure 3).

Starting in the early 1960s, other persons excavating at Tunque began to keep field records. Richard and Katherine Renwick (1961), who conducted extensive work largely in the northernmost east-west lateral, 3).
Figure 2. Tunque field sketch map by N.C. Nelson, 1914 (copy in Laboratory of Anthropology, original in American Museum of Natural History).
Moving Dirt from Tunque Kiva

Education and Pleasure Offered by Archaeology Society of A. H. S.

Many clubs have been organized for knowledge, but (with some exceptions) their purpose has been to provide a good time in a student's school years. Among the high school organizations with this object, we find one that provides for interesting knowledge and fun at the same time, namely, the Archaeology Society. This is a club where students may not only make startling discoveries for themselves, but for state museums as well.

Last year this group went on several field trips; on their last, they had the rare fortune of discovering a turkey flute and a ceremonial bowl in the kiva at Tunque Indian Pueblo, 35 miles north of Albuquerque. Their articles dated back several hundred years. Another important discovery found were pieces of old logs which held the kiva roof. These rare specimens were examined by the Laboratory of Anthropology in Santa Fe, and found to have been cut in 1430.

Meetings are held every Thursday in the museum, and club officers preside, with the assistance of Miss Goddard, sponsor. Any student interested in obtaining an historical education with genuine discoveries may join. Dues are 25 cents per year.

Artifacts from Kiva  AHS Newsletter ca. 1939

Photos by Herbert Dick ca. 1938

Figure 3. Information on the Albuquerque High School Archaeology Society excavations at Tunque.
have records on more than 40 rooms. Frank and Francis Vernon (1966) carried out work on 20 rooms in scattered places among the house blocks. Franklin and Joan Barnett (1969) dug more than 90 rooms in various parts of the pueblo. They were joined by Richard and Margaret Bice (1963, 1969), who excavated 50 additional rooms, mostly concentrated in the middle, east-west lateral.

Copies of the Renwicks', the Vernons', and the Bices' field notes have been deposited in the archives of the Albuquerque Archaeological Society. Maps from these investigators provide information on relative room positions, individual room sizes, architectural features, and, when appropriate, the location of artifacts.

RECONSTRUCTED PLAN-VIEW MAPS

Basic to the broad study of any site is a plan view of its arrangement and size. Thus, a principle objective of this report is the reconstruction of the Tunque site plan at significant intervals in its history.

Various aerial photographs of the site, ca. 1970-1989, are in the possession of the author. These were provided by Richard Loose, Roy P. Gauthier, Winnabelle R. Beasley, and Baker Aerial Photography. A copy of the Baker photograph, an oblique view, is reproduced as Figure 4. These photographs have been particularly valuable in establishing overall relationships between house blocks when compared with on-the-ground measurements of points identifiable in the photographs. After assembling data from all sources, judgement calls were made when apparent discrepancies occurred.

The site plan views do not portray the variations in room sizes in those areas where they are known, but rather show an average room module of 2.4 by 4.1 m (7.84 by 13.35 ft). This module was derived by adding a nominal wall thickness of .3 m (1 ft) to the average size of the 440 rooms reported by Nelson and the other investigators. The wall thickness, although a few cm thicker than that typically noted at the tops of excavated walls, was used as a conservative estimate of floor-level thicknesses where internal room dimensions were probably taken.

The first plan view, Figure 5, represents the site as it is thought to have appeared around A.D. 1600, after its presumed final abandonment. It shows the suggested additional Bandelier house blocks with the necessary land area to accommodate the one located in the southwest corner. It also shows two refuse piles that appear on Nelson's map. From this reconstruction, more than 1,980 ground-floor rooms can be counted.

The second plan view, Figure 6, ca. 1914, presents the site at the time of Nelson's work. This drawing incorporates the estimated locations of Nelson's transects across the house blocks, as well as current information on the locations and sizes of brick plant foundations.

The third plan view, Figure 7, dating ca. 1980, shows areas that were obliterated by the brick factory activities and the approximate locations of rooms and the kiva excavated by later investigators, including the Albuquerque High School, the Renwicks, the Vernons, the Barnettts, and the Bices.

As previously noted, all three maps contain repeated standard room modules. Detailed
Figure 4. Oblique aerial view of Tunque, ca. 1988 (Baker Aerial Photography).
Figure 5. Reconstructed map of Tunque, ca. 1600.
Figure 6. Reconstructed map of Tunque, ca. 1914.
TUNQUE PUEBLO
Reconstructed Planview — ca. AD 1980
Approx. Positions of Other Rooms Excavated

Figure 7. Reconstructed map of Tunque, ca. 1980.
Room size information is available in the field notes, and some detailed drawings have been prepared by the author for further studies.

RESOURCES ON MATERIAL CULTURE

One category of Nelson's notes on individual rooms, called "Items Found," lists material recovered, ranging through pottery, ornaments, lithics, animal bones, and burials. Although relevant pottery types had not been named at the time, the descriptive information allows some gross type identifications to be made.

In addition, a sampling of artifacts identified by field number was retained by Nelson and placed in the collections of the American Museum of Natural History in New York. Bertha Dutton (personal communication 1987) attested that these collections were extant when she was working with Nelson at that institution during her postgraduate years. A study of this material should be a rewarding endeavor for one with sufficient resources to allow spending the necessary time at that institution.

The next detailed source of information on material culture is the report by Barnett (1969). It presents room drawings and descriptions, including photographs of the cultural material recovered. In particular, it emphasizes data on the restorable pottery vessels. However, as Peckham (1969) pointed out in his review of the report, it did not provide an analytical sherd study from which a deeper understanding of the site's cultural history could have been developed.

To potentially fill this need, several other sources of information are now available. The collection of Tunque cultural items recovered by the Bices during their excavations has been deposited in the Albuquerque Museum of Art, Science, and History. Photographic records of these items, including 50 restored vessels, is in the possession of the author. Similarly, William M. Sundt (personal communication 1980) has a photographic record of the vessels recovered and restored by the Vernons and the Renwicks.

Finally, of overriding importance, the Renwicks have kindly donated their collection of provenienced sherds to the Albuquerque Archaeological Society. This collection is in the process of being curated by Tom Morales, a graduate student at the University of New Mexico, whose graduate research will cover studies on the theme of Helene Warren's manufacturing centers.

Thus, the available sources of data have the potential of answering many important questions ranging from additional insights on the proposed pottery manufacturing center, through information concerning migrants to and from the site. Warren, in her contributions to the Encierro (LA 70) report, suggests not only commerce between the pueblos of Tunque and Encierro, but also the possible late migration of Tunque peoples to Encierro. These questions and others concerning Spanish interactions at Tunque--suggested by pottery styles, a goat head burial (Bice and Bice 1969:219), and a bronze pestle (Barnett 1969:34)--suggest many intriguing problems to be solved.

INTERPRETING DIVERSE RECORDS

In approaching such studies, the diverse nature of the exca-
vation and recording techniques employed by all of the different investigators pose a challenge to the student.

From observations at the Tunque Site, it appears that the method of excavation employed by Nelson was to cut room-width trenches across the house blocks in such a pattern as to provide representative samples from all house blocks. Architectural information on each room was then recorded in the field notes entitled "Dimensions etc.", which included plan dimensions, depth of excavation (usually to the floor), notes on walls, and occasional notes on other features, such as fireplaces or pits in the floor. Excavations by later investigators were carried out one room at a time, and the methods of note taking as well as other recording techniques varied markedly among groups.

Thus, the diverse nature of the data requires that methods be developed to normalize the heterogeneous data so that the information can be rationally handled. A Tunque study now underway relating to the nature of apartments and room uses, in which the occurrence of fire centers is an important element, illustrates one such method. The results of this trial analysis are presented in Table 1.

The first column names the investigators, the second column shows the number of rooms dug, while the third column presents the number of rooms with reported fire centers. The important column is the fourth, which shows the percentage of rooms containing fire centers. Because of the low percentages for both Nelson and Barnett, it seems clear that their field procedures did not provide for full recording of these features. Thus, clues were sought to detect the rooms in which other fire centers probably existed. A good indicator was thought to be the presence of darkly sooted walls in combination with any one or more of the following items: firedog, imbedded draft deflector, or fire reflector.

To test this theory, the field notes of all of the investigators were examined to list the occurrence of such indicators.

The results of this test are contained in row five of Table 1, which shows that unreported fire centers probably did indeed exist in some of the Nelson and Barnett rooms. The fact that the process produced such features for only these two investigators, where the statistical discrepancies had been noted, instills some confidence in the process.

Row six presents the total number of rooms containing probable plus reported fire centers, while row seven converts these numbers into the important percentage totals. These new Nelson and Barnett percentages now correlate much more closely with those shown by the other investigators. Differences that still exist, particularly in the Renwicks' data, may be at least partially explained by the fact that the Renwicks reported a proportionately higher number of rooms in the outer tiers, where active fire centers are more likely to occur, than in room tiers of the deep interior of the pueblo.

This example indicates that it may be possible to make nonrigorous but meaningful use of heterogeneous data, thus providing a larger data base for some types of studies.

SUMMARY AND CONCLUSIONS

In this paper, I presented
Table 1. Reported and probable fire centers.

<table>
<thead>
<tr>
<th>Investigators</th>
<th>Nelson</th>
<th>Barnett</th>
<th>Rice</th>
<th>Vernon</th>
<th>Renwick</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Rooms</td>
<td>240</td>
<td>92</td>
<td>50</td>
<td>20</td>
<td>42</td>
<td>444</td>
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<tr>
<td>No. Rooms w/ Reported Fire Centers</td>
<td>33</td>
<td>14</td>
<td>13</td>
<td>6</td>
<td>16</td>
<td>82</td>
</tr>
<tr>
<td>Percent Rooms w/ Reported Fire Centers</td>
<td>14</td>
<td>15</td>
<td>26</td>
<td>30</td>
<td>38</td>
<td>18</td>
</tr>
<tr>
<td>No. Rooms w/ Probable Fire Centers</td>
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<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>No. Rooms w/ Reports &amp; Probable Fire Centers</td>
<td>55</td>
<td>22</td>
<td>13</td>
<td>6</td>
<td>16</td>
<td>112</td>
</tr>
<tr>
<td>Percent Rooms w/ Reported &amp; Probable Fire Centers</td>
<td>23</td>
<td>24</td>
<td>26</td>
<td>30</td>
<td>38</td>
<td>25</td>
</tr>
</tbody>
</table>

the architectural layout of the Tunque Pueblo ruin as it is thought to have existed in ca. A.D. 1600, ca. A.D. 1914, and ca. A.D. 1980. I also presented the location of currently available Tunque resources, including provenienced sherd and other artifact collections, field notes, and photographic records.

Finally, the paper addresses the problem of making use of data from a variety of sources and demonstrates the possibility that it can be normalized for certain uses.

Making use of this material, I have embarked on a number of studies such as defining apartments, room usage, occupation phases, and the traits of the occupants. It is believed that the Tunque resources may also be of value to other interested archaeologists.

ACKNOWLEDGEMENTS

I wish to express my appreciation to the many persons who have aided me in identifying and gathering Tunque resource material. Stewart Peckham guided the search at the Laboratory of Anthropology for sources of Tunque information, including...
Bandelier's map and Nelson's field notes. Marsha Jackson provided support in obtaining copies.

Charles Lange acted as a consultant on some Bandelier details; Bertha Dutton gave encouragement and guidance; and Albert Schroeder arranged for copublication of his paper on Tunque language identity.

To Richard and Kitty Renwick and to Francis (Vernon) Bradley go much thanks for making their field notes available, thus allowing for current and future use. An additional debt is owed to the Renwicks for donating their provenienced Tunque sherds and associated artifacts to the Albuquerque Archaeological Society. Also, the work invested by Tom Morales in curating the Renwick collection is appreciated, as are the additions to the pool of knowledge through his thesis studies.

The many hours that William Sundt has devoted to making photographic records of Tunque pottery vessels is acknowledged. These add much to the accumulated data of the site.

Herbert Dick graciously volunteered information on the work that was done by the Albuquerque High School on the Tunque great kiva. In addition, he supplied photographs that he had taken in about 1938 as a member of the school's Archaeology Society. These add historical variety to our knowledge.

Thanks go to Richard Loose, Roy Gauthier, Winnabelle Beasley, and Baker Aerial Photography for providing aerial photographs of the site. The photographs were invaluable in allowing the site maps to be constructed to scale and in making it possible to position excavated rooms.

Albuquerque

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THE RED HILL SITES, RIO ARRIBA COUNTY, NEW MEXICO

Carol J. Condie and Landon D. Smith

Data recovery at four of six lithic sites on and near Red Hill, Rio Arriba County, New Mexico, resulted in retrieval of obsidian artifacts that date between ca. 1123 B.C. and ca. 3616 B.C. and ceramics that date to A.D. 900-1250. The Red Hill sites help to elucidate the possible extent of seasonal rounds during the Desert Archaic period, probable tenures at campsites, and possible artifact caching. In conjunction with the San Antonio Peak and Guadalupe Mountain sites, they cast light on the problems of multiple occupancy of high altitude campsites and the length and constancy of use of Jemez Mountain obsidians by prehistoric people who circulated through the Taos District.

INTRODUCTION

In September 1988 Quivira Research Center (QRC) was given an opportunity to undertake data recovery for Colorado Aggregate Company of Alamosa, Colorado, at six lithic sites on and near Red Hill west of the Rio Grande in the upper Taos Valley (see Condie and Smith 1989), an area that is "perhaps one of the most poorly known regions, archaeologically, in New Mexico" (Boyer 1988:8).

Apparenty transfixed by the massive structural sites in other areas of New Mexico, archaeologists ignored the high ranges on either side of the Rio Grande until Renaud's (1942a, 1942b, 1944, 1946) extensive investigations in the 1940s led him to delineate a nonceramic tradition he termed the Upper Rio Grande culture. The area's moment in even this pallid sun was brief, however, for neglect again set in, and it was not until the 1970s and 1980s that the area again received attention. (See Boyer [1988]) for a history of work in the area.)

Like its much grander neighbor, San Antonio Peak, located 2.5 mi to the north, Red Hill is an extinct volcano, two of a line of volcanoes that fringe the Rio Grande Rift from southern Colorado to Albuquerque. Volcanics, particularly basalt (olivine andesite), are, of course, abundant in the area. Elevations of greater than 2,438 m (8,000 ft) in this part of the Taos Plateau result in a short, 100-day growing season (Cordell 1979:Map 3) that would have precluded prehistoric agriculture, but the 40-50 cm (16-20 in.) of annual precipitation (Cordell 1979:Map 4), and the thin but nutrient-rich soils (Maker and Daugherty 1986) support conifers and other plants inviting to humans and grasses and browse plants on which deer, antelope, and elk—equally inviting to humans—thrive.

THE RED HILL SITES

Site density in the San Antonio Peak-Red Hill-Tres Piedras area can only be described as fierce. For example, Boyer (1984, 1988) recorded densities of 44 and 142 sites per section in the Red Hill and
San Antonio Peak areas, and Gomolak (1989a, 1989b) recorded densities of 198 and 512 sites per section south of Tres Piedras on Carson National Forest lands.

This paper reports on 6 of the 13 sites Boyer identified in 1988. Five of the sites are scattered over Red Hill itself. The sixth lies .75 mi to the east on the edge of Arroyo Aguaje de la Petaca.

Site LA 67166

At 2,554 m (8,380 ft), Site LA 67166 lies at the lowest elevation of the six—in a protected flat adjacent to Arroyo Petaca. Although it was the largest of the group (500 m east-west by 300 m north-south), we collected artifacts only from the 300-by-10-m access right-of-way. The 25 artifacts consisted of 1 obsidian backed end scraper (Figure 1c-d), 1 worked obsidian flake (Figure 1a), 3 basalt bifaces, a reworked obsidian Folsom point previously collected by Boyer (Figure 1b), and 19 pieces of basalt debitage.

The three obsidian samples were submitted to Archaeological and Historical Consultants (AHC) for dating. The flake and the Folsom point proved to be undatable since they were made of an unsourced obsidian, which Stevenson designated Type A. The backed end scraper is of Polvadera obsidian and bears an initial manufacture date of 3616 B.C. ± 146 and a reworking date of 1989 B.C. ± 124. Even though the reworked Folsom point is undatable, the point yielded the greatest rim widths, 6.65 μ and 6.75 μ, from this collection (or from any of the other sites in this project), which presumably nudges it into the Folsom period at 9000/8800 to 8000 B.C. Also, the worked flake of Type A obsidian shows a rim width of only 4.91 μ, which would seem to argue either that the reworked Folsom was collected elsewhere and brought to the site by the real inhabitants or that the site is multicomponent, with both the 4.91 μ and the 6.65/6.75 μ rims representing separate occupancies.

Although we collected only a small portion of this site (3,000 sq m or 2% of the 150,000 sq m area) and the 25 artifacts retrieved constituted the smallest collection from any of the sites in the project, a relatively large number of artifacts, 6 out of 25, are formal tools. If proportions hold roughly true, the entire site may contain 1,200 artifacts. We collected only basalt and obsidian, but Boyer (1988:13-14) noted chert artifacts, as well. All materials appear to be exotic to the immediate area, though not all are exotic to the general Red Hill area. On the basis of the assemblage we collected, and taking into account the site's relatively low, protected location and its proximity to water, we feel that Site LA 67166 seems a likely candidate for a campsite.

The dates for the one dated artifact present may indicate that the end scraper was initially worked elsewhere at ca. 3616 B.C., then was collected and carried to the site, where it was reworked at ca. 1989 B.C.—or it may never have left the site after 3616 B.C. The same possibilities apply to the reworked Folsom, except that the smaller difference in rim widths indicates a shorter span between manufacture and reworking. Recent observations made by Flenniken and Wilke (1989) may be pertinent to both artifacts. They argue that Great Basin dart point types assumed to represent
Figure 1. Chipped stone from the Red Hill Sites. Site LA67166: (a) worked obsidian flake; (b) reworked obsidian Folsom point; (c) obsidian backed end scraper, and (d) possible manner of hafting c; Site LA67170: (e) obsidian flake scraper; (f) chert projectile point base; (g) obsidian projectile point base; (h) obsidian backed and scraper; Site LA67169: (i) basalt biface; and Site LA67171: (j) obsidian projectile point fragment. All actual size.
chronologically diagnostic types may instead represent sequential cycles of use, breakage, and rejuvenation, which can change. In other words, an Elko Corner-notched could be changed into an Elko Eared and thence into a Gypsum Cave type, all within a short period of time. Gomolak (1981) considered similar problems associated with scavenging and recycling of debitage. These are intriguing, though at this point unprovable, thoughts.

Site LA 67168

From the top of Red Hill, which rises only 91 m (300 ft) out of a wide, grassy plain, an unimpeded 360-degree view is possible. Site LA 67168 covers the 2,682-m-high (8,800-ft-high) top of the hill (40 m southwest-northeast by 160 m northwest-southeast) but is spatially separated into three distinct artifact concentrations. Concentration 1, in the center, yielded 40 items--6 sherds, 1 basalt projectile point fragment, 1 worked obsidian flake fragment, 1 worked obsidian flake fragment, and 32 pieces of basalt, obsidian, and rhyolite debitage. From Concentration 2, at the southeast end of the hilltop, 1 rhyolite and 25 basalt items, all debitage, were recovered. Concentration 3 yielded 1 basalt projectile point fragment and 48 pieces of basalt, obsidian, chert, and rhyolite debitage.

Six obsidian samples were submitted to AHC for dating. A worked flake and two unworked flakes were submitted from Concentration 1. Two are of the unsourced obsidian Stevenson labeled Type B, but the third matched Obsidian Ridge chemical characteristics, and Stevenson dated it to 1401 B.C. ± 121. Three unworked flakes were submitted from Concentration 3. Two matched Stevenson's unsourced Type B and were undatable. The third, however, matched Polvadera characteristics and dated to 2302 B.C. ± 96. The final datable prehistoric occupation at the site is evidenced by the six sherds recovered from Concentration 1. Bill Sundt analyzed them as Taos Incised, which has been dated at A.D. 900 to 1250.

The patterning of the artifacts in three discrete scatters and the lithic types present within each scatter indicate at least three components at Site LA 67168. Concentration 2, which consists solely of basalt debitage plus one piece of rhyolite, looks like a visit by a hunter watching for game. Concentration 3 contains one basalt projectile point fragment and a mix of rock types among the debitage, some local, some exotic. Only the Polvadera flake was datable (ca. 2302 B.C.), but rim thicknesses of the two unsourced Type B items suggest two and perhaps three additional components for Concentration 2. For Concentration 1, the presence of two components is unequivocal, demonstrated by the Obsidian Ridge flake dated at ca. 1401 B.C. and the six sherds of Taos Incised dated at A.D. 900-1250. The rinds of the two unsourced Type B items suggest two more visits. Although both Concentrations 1 and 3 bear enough artifacts for campsites, their obvious multi-ecomponency, their paucity of formal tools, the lack of hearths or burns, and their location on a windswept hill make interpretation as hunters' lookouts more likely.

Site LA 67169

Perched at approximately 2,658 m (8,720 ft), on the steep, southwest face of Red
Hill, Site LA 67169 overlooks a wooded draw eroded into the arc of the volcanic cone. Site area is 25 m southwest-northeast by 30 m northwest-southeast. That this site is a single-component hunter's lookout seems almost certain. Although 49 artifacts were recovered, all items are basalt, which is available anywhere in the surrounding area, and only one tool, a biface (Figure 11), is present. The steep slope would probably hold no more appeal as a campsite prehistorically than it does today, but would provide an ideal spot to wait for animals moving up the draw below.

**Site LA 67170**

Below and northwest of both Sites LA 67168 and 67169, Site LA 67170 begins in a saddle at the 2,618 m (8,590 ft) elevation and continues down the south-trending draw. The site measures 47 m east-west by 70 m north-south. We recovered 78 items from the site: 1 obsidian flake scraper (Figure 1e), 1 obsidian backed end scraper (Figure 1h), 2 point fragments of chert and obsidian (Figure 1f-g), 1 chert biface fragment, 1 basalt tool fragment, 2 worked basalt flakes, and 71 pieces of basalt, rhyolite, obsidian, and chert debitage.

Five artifacts were submitted to AHC for dating: the point fragment, the flake scraper, and three flakes. The point fragment and the scraper were found to be of the unsourced obsidian Stevenson labeled Type A. One flake was of unsourced Type B obsidian. However, the other two flakes proved to be of Polvadera obsidian, one dating to 3170 B.C. ± 123, and the other to 1123 B.C. ± 137.

Seven of the 78 artifacts recovered from Site LA 67170 are formal tools or worked flakes. Like Concentration 3 at Site LA 67168, not far above it on the crest of Red Hill, Site LA 67170 artifacts exhibit the greatest diversity in raw materials recovered from any of our sites—basalt, obsidian, chert, and rhyolite, some local, some exotic.

In character, however, Site LA 67170 artifacts show more similarity to those at Site LA 67166 in representing some activities that might be carried out at a campsite. The location of the site, which offers greater protection from the wind than the top of the hill, would also seem to hint at a campsite. At the same time, though the view would be more restricted than the 360-degree view from the top of Red Hill, a hunter could sweep perhaps 190 to 200 degrees from the northeast to the southwest. If the present vegetation in the southeast-trending draw were present, the view directly to the south or southeast would have been obscured.

The site may have been a campsite occupied for several days or weeks, or it may represent multiple occupations. In this case, we prefer to think of multiple occupations—occupations that consisted of both camping and looking. Multiple occupations, to our mind always a strong possibility for a site located as this one is, are also attested to by the two Polvadera obsidian dates (ca. 1123 B.C. and 3170 B.C.) and by the rind width differences in the unsourced Type A obsidian flake scraper and point fragment.

**Site LA 67171**

Close to the southeast base of Red Hill, Site LA 67171 sits at 2,597 m (8,520 ft) elevation and measures 25 m southwest-
northeast by 35 m northwest-southeast. We recovered 61 items, all of them basalt debitage, except for one obsidian projectile point fragment (Figure 1j). The point fragment, which was submitted to AHC for dating, was analyzed as Polvadera and dated to 1500 B.C. ± 101.

The 61 items of basalt debitage at Site LA 67171 suggest that some mildly serious flaking occurred here, but the scarcity of cortex (only four items retained more than 10%) obviates interpretation that it was a quarry site. Site LA 67171 seems more likely to have been a hunter's lookout where basalt that had been picked up and roughed out nearby was worked on for a time.

**Site LA 67172**

Just 40 m below Site LA 67171, Site LA 67172 lies at the 2,585 m (8,480 ft) elevation and measures nearly the same—20 m north-south by 38 m east-west. We recovered 35 artifacts, all of them basalt except for one item of chert. One basalt biface fragment is present, but no other stone shows modification.

Our interpretation of the activities that occurred at Site LA 67172 is essentially the same as that for Site LA 67171—a hunter was taking advantage of down time spent waiting for animals by working up local basalt. Since seven of the 35 artifacts exhibit more than 10% cortex, this hunter's basalt cobbles may have been picked up a little closer to the site.

**LITHIC ANALYSIS**

The main focus of the analysis was to examine the relative percentages and frequencies by site of the categories established by Sullivan and Rozen (1985; also see Rozen and Sullivan [1989a, 1989b]). The results of the analysis for the six sites are presented in Table 1.

Although quantities are low, the analysis of the assemblages initially indicated that the sites fell into three groups (Table 2). Group I (LA 67166, LA 67168 [Concentrations 1 and 2], and LA 67169) is characterized by moderate percentages of complete flakes, few or no broken flakes or flake fragments, and high percentages of debris. Group II (LA 67168 [Concentration 3] and LA 76170) shows moderate percentages of complete flakes, low percentages of broken flakes and flake fragments, and high percentages of debris. Finally, Group III (LA 67171 and LA 67172) contains moderate percentages of complete flakes and broken flakes, low percentages of flake fragments, and high percentages of debris.

In spite of the apparent distinctions among these three groups, however, one critical similarity stands out: all three groups show high percentages of debris. Sullivan and Rozen (1985:763) note that, as core reduction is intensified to remove more flakes per core, the potential for shattered striking platforms and bulbs of percussion is increased, and higher percentages of debris are thus produced. In addition, the occurrence of moderately high percentages of complete flakes for all groups suggests by itself that tool production took place at all locations to some degree (Sullivan and Rozen 1985:762).

Given this overall technological similarity for all three groups, it seemed that the general pattern of differences
Table 1. Class counts, percentages, and obsidian dates of Red Hill lithics by site.

<table>
<thead>
<tr>
<th>Site Number/Conc</th>
<th>Complete Flakes</th>
<th>Flake Fragment</th>
<th>Broken Flakes</th>
<th>Debris</th>
<th>Retouched Piece</th>
<th>Core</th>
<th>Artifact Count</th>
<th>Obsidian Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA 67166</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>16</td>
<td>3</td>
<td>3</td>
<td>25</td>
<td>3616 B.C.</td>
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<tr>
<td>Percentage</td>
<td>12.00</td>
<td>0.00</td>
<td>0.00</td>
<td>64.00</td>
<td>12.00</td>
<td>12.00</td>
<td>1989 B.C.</td>
<td></td>
</tr>
<tr>
<td>LA 67168</td>
<td>14</td>
<td>1</td>
<td>0</td>
<td>17</td>
<td>2</td>
<td>0</td>
<td>34</td>
<td>1401 B.C.</td>
</tr>
<tr>
<td>Percentage</td>
<td>41.18</td>
<td>2.94</td>
<td>0.00</td>
<td>50.00</td>
<td>5.88</td>
<td>0.00</td>
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</tr>
<tr>
<td>LA 67168</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>0</td>
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<td>Percentage</td>
<td>46.15</td>
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<td>0.00</td>
<td>53.85</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
<td></td>
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<tr>
<td>LA 67168</td>
<td>13</td>
<td>1</td>
<td>3</td>
<td>31</td>
<td>1</td>
<td>0</td>
<td>49</td>
<td>2302 B.C.</td>
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<tr>
<td>Percentage</td>
<td>26.53</td>
<td>2.04</td>
<td>6.12</td>
<td>63.27</td>
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<td>0.00</td>
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<td>Percentage</td>
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<td>5</td>
<td>2</td>
<td>42</td>
<td>7</td>
<td>1</td>
<td>78</td>
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<td>26.92</td>
<td>6.41</td>
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<td>53.85</td>
<td>8.97</td>
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<td>LA 67171</td>
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<td>6</td>
<td>18</td>
<td>25</td>
<td>1</td>
<td>0</td>
<td>62</td>
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<tr>
<td>Percentage</td>
<td>19.35</td>
<td>9.68</td>
<td>29.03</td>
<td>40.32</td>
<td>1.61</td>
<td>0.00</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Percentage</td>
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<td>20.00</td>
<td>54.29</td>
<td>2.86</td>
<td>0.00</td>
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<td></td>
</tr>
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<td>Total</td>
<td>97</td>
<td>14</td>
<td>30</td>
<td>197</td>
<td>16</td>
<td>4</td>
<td>358</td>
<td></td>
</tr>
</tbody>
</table>
might actually have resulted from the low counts of artifacts from the sites. To check this, we then examined the patterning by technological group of five variables (median flake thickness, mean relative flake thickness, cortex, and two platform characteristics) also used by Sullivan and Rozen (1985:764) in their analysis of the TEP St. Johns material. It is clear from the results (Table 3), that, based on these variables, there is no true technological difference among the three groups, and, consequently, no genuine technological distinction among any of the six sites. Thus, we conclude that all six sites represent the same set of lithic technology behavior--core reduction, tool manufacture, and tool maintenance.

### OBSIDIAN HYDRATION ANALYSIS

Christopher M. Stevenson of Archaeological and Historical Consultants performed obsidian hydration analyses for obsidian from the Red Hill sites. Only 7 of the 16 samples submitted matched trace element analyses.
Table 3. Debitage form variables for each technological group.

<table>
<thead>
<tr>
<th>Variable</th>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Flake Thickness in µ</td>
<td>6.77</td>
<td>5.73</td>
<td>6.95</td>
</tr>
<tr>
<td>Mean Relative Flake Thickness</td>
<td>9.17</td>
<td>11.18</td>
<td>10.39</td>
</tr>
<tr>
<td>Cortical Flakes (Cortex 10% Surface)</td>
<td>7.1%</td>
<td>12.6%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Faceted Platforms</td>
<td>1.4%</td>
<td>1.6%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Lipped Platforms</td>
<td>5.7%</td>
<td>3.1%</td>
<td>11.0%</td>
</tr>
</tbody>
</table>

for previously sourced obsidians (from Polvadera Peak and Obsidian Ridge). The remaining nine artifacts fell into two types, which Stevenson labeled A and B. QRC provided Stevenson with raw material samples from the No Agua Mine, generously supplied to us by Jack M. Carraher of Manville Sales Corporation, for analysis. We had assumed, on the basis of visual inspection and Red Hill's proximity to No Agua Peaks, that some of our artifacts, both flakes and debris, might be No Agua, but Stevenson's analyses demonstrated that the trace element profiles of Type B artifacts did not match the profiles of the samples from the mine. Unfortunately, we were unable to locate possible raw material sources in the southern Colorado area. Although the possibility exists that the Type B artifacts derived from a different No Agua flow than the one from which the samples were taken, Types A and B remain unidentified.

Even so, a stab at relative dating is possible through rim thicknesses (Table 4). Not only do different rind widths occur among artifacts of a single obsidian type at Sites LA 67166, 67168, and 67170, but it also appears that there may be temporal differences between the A and B types. Type A rims range from 4.26 µ to 6.75 µ. Type B rims range from 1.37 µ to 3.18 µ or (leaving out FS No. 28 at Concentration 3, Site LA 67168, which Stevenson shows as a questionable Type B) to 2.58 µ. If the reworked Folsom point from Site LA 67166 is used as an anchor for Type A obsidian; it appears that the sites containing Type A (LA 67166 and LA 67170) may consist of generally older components than those containing only Type B. That the two oldest Polvadera dates occur at these sites (ca. 3616
Table 4. Results of obsidian hydration dating by site.

<table>
<thead>
<tr>
<th>Site/Sample</th>
<th>Type</th>
<th>Rim Width (μ)</th>
<th>Date</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA 67166</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS #14</td>
<td>A</td>
<td>4.91</td>
<td>--</td>
<td>worked flake</td>
</tr>
<tr>
<td>FS #17</td>
<td>Polvadera</td>
<td>6.16</td>
<td>3616 B.C.±146</td>
<td>backed end</td>
</tr>
<tr>
<td>FS #25, C1</td>
<td>A</td>
<td>6.65</td>
<td>--</td>
<td>reworked</td>
</tr>
<tr>
<td>FS #25, C2</td>
<td>A</td>
<td>6.75</td>
<td>--</td>
<td>Folsom</td>
</tr>
</tbody>
</table>
| LA 67168, Concentration 1
| FS #12      | B             | 2.58          | --              | flake                       |
| FS #13      | B             | 1.48          | --              | worked flake                |
| FS #37      | Obsid. Ridge  | 4.51          | 1401 B.C.±121   | flake                       |
| LA 67168, Concentration 3
| FS #21      | Polvadera     | 5.39          | 2302 B.C.±96    | flake                       |
| FS #28      | B (?)         | 3.18          | --              | flake                       |
| FS #31      | B             | 2.02          | --              | flake                       |
| LA 67170    |               |               |                 |                             |
| FS #24      | B             | 2.03          | --              | flake                       |
| FS #30      | A             | 4.26          | --              | proj.pt. frag.              |
| FS #34      | A             | 4.83          | --              | flake scraper               |
| FS #36      | Polvadera     | 5.91          | 3170 B.C.±123   | flake                       |
| FS #44      | Polvadera     | 4.59          | 1123 B.C.±137   | flake                       |
| LA 67171    |               |               |                 |                             |
| FS #20      | Polvadera     | 4.86          | 1500 B.C.±101   | proj.pt. frag.              |

56
B.C. at LA 67166 and ca. 3170
B.C. at LA 67170) bolsters this
notion. Except for one Type B
flake at LA 67170, Type B items
are associated only with Concen-
trations 1 and 3 at Site LA
67168, which contain pieces
dated to ca. 2302 B.C. and ca.
1401 B.C.

In summary, the Jemez obsid-
ian sources were certainly known
and used by the tool manufactur-
ers frequenting the Red Hill
area for a presumably continuous
span stretching for 2,500 years,
from ca. 3616 B.C. to ca. 1123
B.C. More speculatively, the
Type A source, known as early as
Folsom times, was exploited for
a time during the Archaic and
then exhausted or its location
forgotten.

SUMMARY AND DISCUSSION

The results of this analysis
can be discussed within the
context of these six sites on
Red Hill as well as in a local
and regional context.

The Red Hill Sites

The six Red Hill sites appear
to represent a range from brief-
ly used, one-time hunting stands
(Concentration 2 at Site LA
67168, Site LA 67171 and Site LA
67172) to repeatedly used hunt-
ing stands (Concentrations 1 and
3 at Site LA 67168, Site LA
67170 and possibly Site LA
67166) to repeatedly visited
campsites (Site LA 67166 and
possibly Site LA 67170). Char-
acteristics of the debitage at
all of the sites indicate core
reduction and tool manufacture
and maintenance, rather than
quarrying. The widespread
abundance of basalt in the area
further negates the idea that
these precise spots would have
been visited solely for the
purpose of quarrying. The
topographic situations of the
sites and the surrounding area
suggest that hunting was the
primary aim and that a lone
hunter or a small party took
advantage of dead time to knock
out a few new blanks or tools or
to repair old tools. It also
seems possible that some butch-
ering and skinning tools were
flaked out after a successful
kill had been made. Sites LA
67166 and LA 67170 may have been
used both as hunting stands and
as campsites, since both are in
situations that might have drawn
game. Tool counts at both sites
suggest more than visits of a
few hours. Tool types--scrapers
occurred only at these sites--
suggest the same.

These site functions seem to
be reasonable in light of the
model we feel is most appropri-
ate for Archaic hunting-gather-
ing bands. Although alternative
models have burgeoned in recent
years (see Bettinger [1987] and
Myers [1988] for recent review
articles of hunter-gatherer
models), we find ourselves in
accord with Jennings (1957) and
Hunter-Anderson (1986) in be-
lieving that Steward's (1938)
analysis of historic Great Basin
Shoshonean groups provides an
adequate model: Family-based,
egalitarian bands, of constantly
fluctuating size and membership,
hunting and gathering now as
single families, now aggregating
briefly for major harvests or
game drives or for longer peri-
ods in winter villages, but
above all remaining fast on
their feet and flexible enough
to switch food-gathering strate-
gies at a moment's notice.

Further, the Red Hill sites
seem to elucidate three small
segments of the Archaic lifeway:

- The seasonal rounds repre-
sented at the sites con-
taining Jemez obsidians
probably extended at least 75 mi to the southwest and an unknown distance in other directions (but presumably north into Colorado) to the sources of Types A and B obsidian. There may have been informal exchange with groups circuiting nearer these sources, but we see exchange as less likely as the sole source of supply—particularly since the occurrence of Jemez obsidians apparently remained constant over several thousand years (too long a life to expect of even the most carefully structured networks!).

Whatever they were doing the rest of the year, Archaic people were not staying at these sites for more than a few days at a time. (Our prejudice, of course, is that "home" for Archaic people was wherever they happened to be, and that, except possibly for winter camps, they never stayed anywhere for more than a few days.)

They seem to have relied on being able to manufacture needed butchering, skinning, and other tools from the local rock at places like Red Hill, bringing with them only special tools that required nonlocal materials (or the wherewithal for making them). It seems likely that excess tools and raw materials were cached at locations all along the seasonal round, to be picked up when needed. Catching artifacts and food is a practice attested to both ethnographically (e.g., Dyk 1967:81) and archaeologically (e.g., Nordenskiöld 1979:38, 42).

The Local Context

Boyer's (1985) data recovery project at the San Antonio Mountain Scoria Mine consisted of testing on four lithic sites, LA 48364, 48365, 48367, and 48368. Sample collections were taken at three of the sites, but the fourth, LA 48365, was completely collected. Basalt was by far the predominant rock type at all sites (ranging from 84% to 97% of the lithic assemblage), but Jemez, Polvadera, and No Agua obsidian, chert, chalcedony, quartzite, and welded tuff also occurred (Boyer 1985:Table 1). A few projectile points were collected, but by far the greatest number of tools at all sites were utilized flakes. Ground stone (basalt metate fragments and one-hand sandstone manos) was present at Sites LA 48364 and 48368. A micaceous sherd, possibly Apache, was recovered from Site LA 48368. Three of the San Antonio Peak sites are demonstrably multicomponent, ranging from ca. 618 B.C. at Site LA 48367 to perhaps as late as the A.D. 1700s (if the micaceous sherd at Site LA 48368 is Apache). Some plant food collecting and processing is apparent at Boyer's sites, but hunting activities also occurred at all of them.

The Regional Context

Placing the Red Hill sites in regional context is hampered by the same general archaeological neglect of the larger area that is true for the local area. A project undertaken in 1988 in conjunction with the Moly Corp Mine on Guadalupe Mountain about
20 mi north of Taos near Questa constitutes the sole major data recovery project in the Taos Valley outside the immediate vicinity of Taos (Seaman 1989, and personal communication 1989). Ten sites, incorporating 87 separate study units and nearly 800,000 sq m of site area in the saddle between the two peaks, were investigated. Artifacts recovered range from Paleo-indian (a basalt Belen base) through Archaic (Jay, Bajada, etc.) to Pueblo points, Taos Gray sherds, and historic Tewa Red sherds. Although the site was only sampled over 16,000 chipped stone artifacts were collected, including 209 projectile points and 532 other tools. Financial constraints prohibited extensive analysis of thedebitage, but Seaman believes that as much as 30% of the debitage was utilized. Many of the formal tools show remodeling. X-ray fluorescence analysis indicates that all obsidian recovered is Jemez. A large assemblage of ground stone (682 items) was present. Although no hearths were identified, root burns and stains, burned bone, and overheated lithic artifacts attest to fires at the site.

The San Antonio Peak, Guadalupe Mountain, and Red Hill sites together paint a regional picture that begins with visits during the Paleolithic period (Folsom at Site LA 67166, Belen at Guadalupe Mountain), revisits throughout the entire Archaic (Jay Bajada, etc., at Guadalupe Mountain and various of Renaud’s sites, obsidian dates from 3616 B.C. to 1123 B.C. at the Red Hill sites and obsidian dates from 618 B.C. to A.D. 96 at the San Antonio sites) and through the Anasazi period (obsidian dates of A.D. 765, 810, and 819 at San Antonio Peak, Taos Incised sherds at Red Hill, Pueblo points and Taos Gray sherds at Guadalupe Mountain) into the historic period (Tewa Red sherds at Guadalupe Mountain and the possible Apache sherd at San Antonio Peak).

Two regional patterns of importance stand out: First, all of the apparent campsites have undergone multiple occupancies from an early period forward. In the Guadalupe Mountain case, enormous numbers of visits must have occurred. Second, the obsidian flows around the Valles Caldera in the Jemez Mountains were discovered by Desert Archaic people by at least 3600 B.C. (though probably earlier) and continued in almost constant use among people who frequented the Taos District.


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Renaud, E.B.

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1938 Basin-Plateau Aboriginal Sociopolitical Groups. Bureau of American Ethnology, Bulletins No. 120.

Sullivan, Alan P., III, and Kenneth C. Rozen
Recent research in the Taos area raises questions concerning the accuracy of the traditional sequence used for this area. For the past three decades, the lack of chronometric information has made assessment of this sequence difficult and refinement impossible. Recently dated tree-ring, archaeomagnetic, and radiocarbon samples permit a reevaluation of the dating of processes occurring during the Anasazi occupation of the Taos area.

INTRODUCTION

Archaeologists have conducted surveys and excavations in the Taos area for nearly a century (Bandelier 1892; Blumenschein 1956, 1958, Ellis and Brody 1964; Wetherington 1968; Woosley 1980, 1986). Despite the quantity of information generated by this research, our understanding of the prehistory of the Taos area has not altered substantially in the 30 years since the first synthesis was published (Wendorf 1954; Wendorf and Reed 1955). A major factor responsible for limiting our current interpretations of Taos area prehistory is the lack of finely tuned chronological control. Over the past 5 years, substantial headway has been made in acquiring chronometric dates for the Taos area, and it is possible to reevaluate the sequence.

THE TAOS AREA SEQUENCE

The sequence used in the Taos area was developed by Wendorf (1954, altered slightly in Wendorf and Reed 1955). Wetherington (1968) revised this sequence, with the addition of phases within the periods (Gladwin and Gladwin 1934), but the virtual absence of absolute dates from the Taos area forced Wetherington to depend largely on ceramic associations dated in other portions of the Southwest for tying down his scheme. Wetherington (1968:73) was quite clear in admonishing archaeologists to use his chronological sequence as a heuristic device that could be altered and refined as work in the area dictated. Over time the sequence has in fact been altered slightly (Table 1). However, the sequence has gained widespread usage and has proven remarkably serviceable in describing the general prehistory of the area.

On the basis of excavations at over 33 sites, we can state that the general culture history for the Taos area follows a typical Anasazi sequence from pithouses to aggregated pueblos, although relatively late in time. This sequence traditionally comprises three phases prior to A.D. 1350, each characterized by architectural and ceramic traits. The earliest sites with pottery and pithouse architecture occur in the Valdez phase, dated by Wetherington at A.D. 1000-1200. Pithouses are found isolated or in groups of up to four structures (Green 1976). Associated decorated pottery is the mineral-painted Taos Black-on-white. Both plain and incised gray wares occur as
Figure 1. Taos area and location of Pot Creek Pueblo.
Table 1. Comparison of sequences for the Taos area
(all dates are A.D.)

<table>
<thead>
<tr>
<th>Phase</th>
<th>Woosley 1986*</th>
<th>Herold &amp; Luebben 1968</th>
<th>Wetherington 1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valdez</td>
<td>900-1100</td>
<td>1000-1200</td>
<td>1000-1200</td>
</tr>
<tr>
<td>Pot Creek</td>
<td>1100-1175/1200</td>
<td>1200-1250</td>
<td>1200-1250</td>
</tr>
<tr>
<td>Talpa</td>
<td>1175/1200-1350</td>
<td>1250-1275</td>
<td>1250-1350</td>
</tr>
</tbody>
</table>

*Woosley (1986) does not use the phase names, but argues that small pueblos appeared in a "Transitional" phase at 1100-1175/1200 and that the aggregation at Pot Creek Pueblo and Picuris Pueblo occurred ca. 1175/1200.

culinary and storage vessels. Late in the phase, small jacal surface structures appear at several sites, with no room larger than 8 sq m in area (Green 1976; Peckham and Reed 1963; Vickery 1969; Woosley 1980, 1986). The small size and the general lack of heating features suggest that these jacal structures were used primarily for storage (Glassow 1984:206-207). At least three subterranean structures associated with the jacal rooms have been identified as kivas (Green 1976; Vickery 1969), although Wetherington (1968:79-80) questions this identification, arguing that kivas were not present in the Valdez phase.

The advent of the Pot Creek phase, dated from A.D. 1200-1250, is traditionally marked by the appearance of contiguos-walled, adobe surface structures; organic-paint and corrugated ceramics, and definite kivas. Single-story roomblocks of 4-18 coursed-adobe rooms surround or abut a courtyard area, which often contains a kiva. Both Taos Black-on-white and an organic-paint pottery, Santa Fe Black-on-white, occur. Corrugated utility vessels replace the incised pottery.

Excavators have interpreted components at six excavated sites as dating to this time period (Blumenschein 1956; Green 1976; Holschlag 1975; Jeancon 1929; Vickery 1969; Wetherington 1968; Woosley 1980). At the end of the Pot Creek phase the small pueblos are abandoned, and larger roomblocks are constructed at a few sites.

The succeeding Talpa phase is characterized by aggregated pueblos with associated plazas and big kivas and the addition of a later style of organic-paint black-on-white ceramics, Talpa Black-on-white, to the existing repertoire. The population was largely aggregated at Pot Creek Pueblo, Picuris Pueblo, and perhaps one or two additional large sites in the area (Woosley 1986:155). Pot Creek Pueblo was abandoned at the end of this phase, which Wetherington (1968) dated between A.D. 1250-1350.

Implicit in this sequence is the assumption that changes occurred contemporaneously in several spheres of life in the Taos area. Thus, changes in architecture, the ceramic assemblage, and village size and layout are seen as changing rapidly and synchronously at the
phase boundaries. This assumption of contemporaneity can be challenged on the basis of recent work in the area. For instance, Woosley (1986:148) argues that pithouses continued to be occupied throughout the prehistoric sequence.

**DATING REEVALUATION**

To evaluate the reliability of the existing sequence, it is necessary to review the available dates. As noted, the sequence was constructed on the basis of ceramics dated in other regions. Even where chronometric dates have been available for Taos area sites, they have not always been incorporated into published interpretations (Green 1976; Wetherington 1968). The use of ceramics in dating structures is problematic, since the majority of sherds in Taos area structures either derive from filler in melted adobe walls, thus predating use of the structure, or from posthabitation trash dumped in the rooms, thus postdating use of the structure (Crown n.d.). In either event, ceramics may give a gross range for site occupation, but are poor indicators for dating individual structures within sites. And, if ceramics are unreliable indicators for structure dating, independent dates from structures are not useful in dating associated ceramics, either.

Ignoring the ceramic evidence leaves us largely concerned with dating a sequence of shifts in architecture and village layout, including the earliest pithouse occupation, the introduction of the kiva, the move to aboveground structures, the aggregation of population at Pot Creek Pueblo and Picuris Pueblo, and the abandonment of Pot Creek Pueblo. Two factors complicate interpretations of dating for these changes. First, although most excavated sites in the Taos area are multicomponent, dates are generally available for only one structure or one component, but not for others. Sorting out the relationship between, for instance, a dated kiva and an undated roomblock is then difficult. Second, many of the available dates come from radiocarbon or archaeomagnetic samples with large ranges. Deciphering the sequence becomes a guessing game of selecting the most reasonable range from a series of dates. Nevertheless, with the dates available now, some preliminary evaluation of the architectural sequence is in order.

Beginning with dating of the use of pithouses, a total of 12 dates exist for 5 subterranean structures at 5 sites. These include five tree-ring, five radiocarbon, and two archaeomagnetic dates (Table 2). The dates range from A.D. 900-1320, but all of the tree-ring dates fall between A.D. 1077 and 1154. Only a single cutting date of A.D. 1147 exists. Eight of the 12 dates overlap, largely between A.D. 1050 and 1210. Of the three remaining dates, all are radiocarbon dates with large ranges that fall outside of the range of the other dates. Two of these samples come from structures with one other radiocarbon and one archaeomagnetic date within the A.D. 1050-1210 range, and they thus seem anomalous. Based on the otherwise tight clustering of dates, I would argue that pit structures were used for habitation between A.D. 1050 and 1210.

Three of these dated pit structures were interpreted as kivas. Two, one at Sagebrush Pueblo and one at TA 47, are thus interpreted solely on the
### Table 2. Dates from subterranean structures in the Taos Area

<table>
<thead>
<tr>
<th>A.D.</th>
<th>Method</th>
<th>Provenience</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>906 - 1018</td>
<td>C-14</td>
<td>pithouse</td>
<td>TA 34(^1)</td>
</tr>
<tr>
<td>906 - 1020</td>
<td>C-14</td>
<td>&quot;kiva&quot;</td>
<td>Sagebrugh Pueblo(^1)</td>
</tr>
<tr>
<td>1050 - 1150</td>
<td>archmag</td>
<td>pithouse</td>
<td>Cerrita(^2)</td>
</tr>
<tr>
<td>1077 vv</td>
<td>tree-ring</td>
<td>&quot;kiva&quot;</td>
<td>TA 47(^3)</td>
</tr>
<tr>
<td>1105 - 1215</td>
<td>C-14</td>
<td>pithouse</td>
<td>TA 34(^1)</td>
</tr>
<tr>
<td>1110 - 1270</td>
<td>C-14</td>
<td>pithouse</td>
<td>Cerrita(^2)</td>
</tr>
<tr>
<td>1121 vv</td>
<td>tree-ring</td>
<td>&quot;kiva 2&quot;</td>
<td>Pot Creek Pueblo(^3)</td>
</tr>
<tr>
<td>1142 vv</td>
<td>tree-ring</td>
<td>pithouse</td>
<td>TA 18(^4)</td>
</tr>
<tr>
<td>1147 r</td>
<td>tree-ring</td>
<td>&quot;kiva&quot;</td>
<td>TA 47(^3)</td>
</tr>
<tr>
<td>1154 vv</td>
<td>tree-ring</td>
<td>&quot;kiva 2&quot;</td>
<td>Pot Creek Pueblo(^3)</td>
</tr>
<tr>
<td>1170 - 1210</td>
<td>archmag</td>
<td>pithouse</td>
<td>TA 341(^2)</td>
</tr>
<tr>
<td>220 - 1320</td>
<td>C-14</td>
<td>pithouse</td>
<td>Cerrita</td>
</tr>
</tbody>
</table>

Symbols provided by the Laboratory of Tree-ring Research:
- r - the outermost ring is continuous around available circumference
- + - one or a few rings may be missing near the outside whose present or absence cannot be determined
- vv - there is no way of estimating how far the last ring is from the true outside

\(^1\) Southern Methodist University Radiocarbon Laboratory Reports for dates: 790 \(\pm\) 55 B. P. (SMU 867), 988 \(\pm\) 56 B. P. (SMN 868), 987 \(\pm\) 57 B. P. (SMN 892), (\(^t\) 1/2 = 5568).

\(^2\) 186:153

\(^3\) Robinson and Warren 1971:51

\(^4\) 1988 Letter Report, Laboratory of Tree-ring Research

\(^5\) 1978 Records for TA 34, on file, Fort Burgwin Research Center

The presence of associated surface rooms, although they lack any of the distinct architectural features considered characteristic of kivas. These are probably best interpreted as pithouses. Only the pit structure at Pot Creek Pueblo has kiva features, including a foot drum (Wetherington 1968:44). Wetherington (1968:48-49) argued that this structure dated to the later Pot Creek phase, because 28 organic painted and corrugated sherds were recovered in the level directly above the floor. The ceramics do in fact indicate filling of this structure during the Pot Creek phase, but this alone cannot be taken as evidence that the feature was constructed during that phase. Tree-ring dates of A.D. 1121 vv and 1154 vv come from this kiva (Letter Reports of the Laboratory of Tree-ring Research). The evidence suggests, then, that kivas appeared during the time when pithouses were occupied and that this predated the move to
A.D.

118

119 2

120 7 9 9

121 6 8 9 9

122 2 8 9

123 0 3 3 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 6 9 9

124

Figure 2. Stem-and-leaf diagram of tree-ring dates for small pueblos in the Taos area.

Note: The numbers in the left-hand column of stem-and-leaf diagrams represent decades. The numbers to the right each represent a single tree-ring sample dating to the year specified. Cutting dates and probable cutting dates are underlined. For example, the third line in this figure indicates that there were three dates in the A.D. 1200-1210 decade, two noncutting dates of 1207 and 1209, and one cutting date of 1209.

habitation in above-ground structures.

Turning to surface architecture, no jacal structures have been dated. Dates are available from only three of the six excavated sites with small adobe pueblos, and all are tree-ring dates. These dates are listed in Figure 2, in a stem-and-leaf diagram. (In the stem-and-leaf technique favored by Ahlstrom [1987], dates are graphically displayed with decades to the left and individual tree-ring dates to the right. Cutting dates are underlined.) These dates, from two small pueblos, PC 58 and the Llano Site, and from Room C in Mound 2 at Pot Creek Pueblo, indicate construction primarily between A.D. 1234 and 1239 (Robinson and Warren 1971: Letter Report from the Laboratory of Tree-ring Research). The picture might not actually be this clear-cut: Jeancon found two components at the Llano site, and it is not clear whether the dates (collected by W. S. Stallings in 1935) came from the earlier or later component. The move to above-ground habitations would thus appear to have begun about A.D. 1225, and the three dated small sites were apparently not remodeled after A.D. 1240. Given the rapid rate of deterioration of adobe structures, it is unlikely that these small sites were occupied more than 20 years after construction, or after about A.D. 1260. The tight clustering of dates from all three small pueblos is intriguing and may suggest population movement into the area at A.D. 1234 or a rapid transition from pithouse to pueblo archi-
Figure 3. Excavated rooms at Pot Creek Pueblo.
Dates with which to examine the advent of aggregation in the Taos area come primarily from Pot Creek Pueblo (Figure 3). Pot Creek Pueblo is a multicomponent site, with pithouses underlying a series of pueblo rooms (Wetherington 1968). Most excavation has concentrated on the uppermost or latest pueblo rooms, although some subfloor excavations have taken place in all of the excavated mounds. The latest pueblo consists of ten roomblocks surrounding a trash dump and a plaza area with at least one big kiva. Six roomblocks have been wholly or partially excavated, and each consists of 10-36 rooms. The roomblocks often have a U shape surrounding a courtyard with an opening on the south, east, or both, and in two cases contained a small kiva. The coursed adobe rooms were primarily two stories in height, although one roomblock may have had four stories (Wetherington 1968). One hundred and forty-two rooms have been excavated in this uppermost pueblo to date, and these rooms constitute approximately one-half of the surface area of the site. Although size ranges of the estimated 300 (Wetherington 1968:82) to 800 (Woosley 1980:9) ground-floor rooms have been proposed for Pot Creek Pueblo, on the basis of the surface area, current evidence would suggest that the pueblo could only have consisted of 250-300 ground-floor rooms at its maximum extent (Crown n.d.). The majority of the lower-story rooms have no heating features and were undoubtedly used primarily for storage. Upper-story rooms with hearths are interpreted as habitation rooms.

A total of 231 tree-ring, 16 radiocarbon, 3 archaeomagnetic, and 28 obsidian hydration dates are available from Pot Creek Pueblo. The obsidian hydration dates range from A.D. 1173 to 1501 and will not be discussed further here. Fifteen of the radiocarbon dates come from the trash dump and range in age from 1400 B.C.-A.D. 1710 (Anne I. Woosley, personal communication 1987; Rebecca Procter-Weiss, personal communication 1987; SMU Reports 1363, 1489, 1490; AA-2439, AA-1148). The dates suggest contamination of materials in trash areas, and there is certainly no evidence that they bracket use of the pueblo per se.

By contrast, the 231 tree-ring dates suggest a relatively short occupation for the pueblo (Crown n.d.). The tree-ring dates from the latest component come from all 6 of the excavated mounds and 2 of the kivas, although 18 of the dates are unprovenienced. Figure 4 presents a stem-and-leaf diagram for the site (Letter Reports from the Laboratory of Tree-ring Research). Unprovenienced samples and samples from earlier components at the site are not included here. The dates strongly argue for construction of the latest and largest component primarily between A.D. 1270 and 1320. The cutting dates from these upper pueblo rooms range from A.D. 1257-1319, with no dates after A.D. 1319. The single archaeomagnetic date from the latest component comes from a burned room (Room 603) on Mound 6 that produced seven tree-ring dates ranging from A.D. 1265-1319. The archaeomagnetic sample came from the central basin in the room, which was fired only when the room burned, and thus should provide an abandonment or post-abandonment date for the room. It dated to A.D. 1325-1425 (Eighmy, personal communication 1987).
Unfortunately, this provides us with a long period of time after the last construction episode during which the room could have been abandoned and subsequently burned. Given the lack of construction dates after A.D. 1319, it seems probable that the pueblo was abandoned soon after that date (Crown n.d.).

On the basis of these dates, I have argued that the latest pueblo at Pot Creek was constructed initially in the A.D. 1270s, reached its maximum size and extent by A.D. 1300, and was largely abandoned by A.D. 1320 (Crown n.d.). Later, casual use of the area might account for the late dates from the trash area.

The earliest demonstrable aggregation in the Taos area would seem to have occurred then at about A.D. 1270. However, the mounds at Pot Creek Pueblo are artificial, built up 2-4 m above the surrounding ground surface through successive construction and abandonment of adobe rooms. Three of the excavated mounds were underlain by earlier pueblo rooms. Until more is known about the extent of these earlier roomblocks, it is difficult to evaluate when the population at Pot Creek Pueblo reached a size that we would consider "aggregated." The possibility must be entertained that the initial aggregation at Pot Creek Pueblo occurred prior to A.D. 1270 and was contemporaneous with the occupation at many smaller pueblos in the Taos area after A.D. 1225. Ongoing work in rooms under the latest Unit 6 rooms should provide a stronger basis for evaluating the dates for initial aggregation at Pot Creek Pueblo. Interestingly, the big kiva was constructed in A.D. 1318 and may not have been completed before the site was abandoned (Crown n.d.; Wetherington 1968).

Figure 4. Stem-and-leaf diagram of tree-ring dates from known contexts in the latest rooms at Pot Creek Pueblo.
CONCLUSIONS

In sum, the available data would suggest that Wetherington's original phase scheme still has utility in providing bracketing dates for some architectural developments. However, the clusters of traits used to define each phase do not appear synchronously at the phase boundaries. Pithouses, either isolated or in groups, appear in the mid-1000s in the Taos area and are the primary habitation unit until the early 1200s. There is currently insufficient evidence to demonstrate that pithouses continued to be used for habitation after the appearance of above-ground adobe pueblos (Woosley 1980, 1986:148). Jacal surface rooms are constructed adjacent to pithouses probably by the mid-twelfth century. Small kivas also appear by the same time. Coursed-adobe, single-story pueblos of 4-25 rooms are occupied at about A.D. 1225 and are abandoned by A.D. 1260. The aggregation at Pot Creek Pueblo probably predates the latest pueblo, initially constructed in the A.D. 1270s. Pot Creek Pueblo was occupied until some time shortly after A.D. 1320. The big kiva apparently appears in the Taos area by A.D. 1318, just prior to the abandonment of Pot Creek Pueblo.

One interesting facet of Taos area settlement patterning to emerge from examining the sequence of occupations is the remarkable continuity in use of specific locales for habitation. Virtually all dated sites are multicomponent, with portions of them occupied from the Valdez phase. This means that once sites with subsurface structures were established between A.D. 1050 and 1200, these same sites continued to be occupied. Through time, some sites were abandoned, but new habitation structures were simply built over the old ones at the remaining sites. Fewer sites were occupied in each time period, each with a greater population, but few new sites were constructed (Woosley 1986). This pattern of continuity in site occupation continues at Picuris Pueblo, where a pithouse constructed prior to A.D. 1225 was remodeled into a kiva and has been used and maintained to the present day (Dick 1965).

Obviously, much remains to be accomplished in order to understand Taos prehistory, and this understanding must rest on a firmer control of the dating for the area.

ACKNOWLEDGEMENTS

The field research on which this analysis is based was conducted under the auspices of the Southern Methodist University Archaeological Field School at the Fort Burgwin Research Center. Funding for analysis of tree-ring samples collected over the last 4 years was provided by the Institute for the Study of Earth and Man. The Laboratory of Tree-ring Research at the University of Arizona graciously analyzed 30 years worth of tree-ring samples found in storage at the Fort. Ruth Baker, Dr. David Meltzer, Rebecca Procter-Weiss, and Dr. Anne I. Woosley allowed me access to radiocarbon dates they had obtained from materials in the trash dump at Pot Creek Pueblo. I am extremely grateful to all of these individuals and institutions for their contributions. Any errors in interpreting these data are, of course, my own.

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The list of important contributors to the archaeological history of New Mexico would certainly be incomplete without the name and contributions of Dr. H. P Mera. Dr. Mera, who joined the Laboratory of Anthropology staff in 1931, published valuable information on a number of subjects, from Navajo textiles to Pueblo ceramics. In this paper I will discuss the collection produced by his systematic survey of the pottery of Northern and Central New Mexico, in hopes that this valuable resource will again receive the recognition and attention it deserves.

* * * *

In 1931, when Dr. H. P. Mera joined the Laboratory of Anthropology as staff archaeologist, he brought with him the beginnings of an Archaeological Survey Project. This project was a continuation of surveys conducted by Mera and others, for which there were already some 424 sites recorded. In the Laboratory of Anthropology Bulletin No. 9, Mera gives the background for this undertaking:

In 1922, the writer began a systematic surface survey of ruins contained within the boundaries of Santa Fe County, New Mexico, which, after the original project was almost completed, was further extended to cover the area presently to come under discussion. [Mera 1940:1]

A few sentences later, he describes that area:

The territory included with in the scope of this paper is that part of the Rio Grande Valley, together with its tributaries and culturally related areas, lying approximately between the 33rd and 37th parallels and between 104th and 108th degrees of longitude, all in the state of New Mexico. [Mera 1949:1]

The specific purpose of the Archaeological Survey Project was discussed by Mera in a letter written to Director Jesse Nusbaum on October 15, 1934. This letter was included in the Laboratory of Anthropology Summary Report, 1930-1934, compiled by Nusbaum in 1934. Mera described his project in his letter as follows:

The Survey is designed to show boundaries of cultural areas, the number of sites within such boundaries, and in general, to indicate localities where archaeological problems exist, thus making it easier for the excavator to select sites best suited to his purpose. It makes use of the following processes to record its findings:

First: A collection of surface material, which will indicate as fully as possible the cultural aspects of a given site. A selection of sherds is made and each piece is given the number of the site and kept in a drawer easy to access. [p. 1]
The original selection of sherds still exists at the Laboratory of Anthropology as the Mera Sherd Collection, and the cultural areas (ceramic provinces) are still relevant today. In many ways, we are heirs to the research Mera performed in the 1930s, for much of the information he gathered then is the foundation for contemporary ceramic studies.

The Mera sherd collection is invaluable for a number of reasons. Sometimes, as in the case with some of the San Marcial ceramic group, Mera's original collections are all that remain of the sites. Also, because Mera conducted the first really systematic survey of sites in New Mexico, he was the first to document many of the ruins. Often he described undisturbed sites where he was able to collect large surface sherds that now exist only under the protection of unexcavated earth. His site descriptions often include statements about the rapidly deteriorating state of a site as the result of erosion. It is probable that many sites have, by now, been completely washed out. In a real way, Mera captured a lot of information before it disappeared—a boon any researcher can appreciate. But the sherds themselves are only the material legacy he left.

Along with the pottery, Mera handed down a schema—a framework to make sense of the numerous piles of sherds he collected. He organized his collection in terms of ceramic provinces, which he identified according to the distribution of predominant ceramic types. For Mera, the presence or absence of pottery types at a site became a method of tracing "changes in centers of population" (Mera 1940:1). He defined these provinces by analyzing the occurrence of specific pottery types on the sites he surveyed. He then applied the new information to create geographical areas (Mera 1934, 1935, 1940). He created hand-drawn maps depicting, for example, the area occupied by the Jemez Black-on-white province in New Mexico (Mera 1936:Map 3). His discussion of "cultural areas" based on the ceramic provinces he created is indicative of the frame, or purpose, that dictated the nature of his work. He summarized it in this way:

The objective of the present study is to gain a general idea of the movements and shifts in a population, in some ways diverse in composition, but which, on the other hand, possessed in common certain cultural features that may be used as indices. It is on one of these features, a series of ceramic developments, that considerable reliance will be placed to indicate time intervals and spatial distribution. [Mera 1935:1]

This research design is important, for a large part of Mera's contribution to subsequent archaeologists was his definition of these cultural areas. These provinces continue to be basic reference points for the discussion of New Mexico ceramics. Regardless of whether a researcher assumes Mera's original groupings, or cites them with the intention of redefining an areas, they must almost always be acknowledged.

Researchers need the full context of Mera's work to best utilize the resource he created. His underlying purpose is closely reflected in his collection: he was attempting to illustrate his perception of population
shifts and patterns through the pottery of the involved cultural groups. He was not simply collecting sherds for general information. It is helpful to understand the assertions Mera made so that the problems within his system can be recognized. In order that the context of his work be accessible to researchers, the Laboratory of Anthropology had to maintain the collection with Mera's original ordering and documentation intact. The first six provinces in Mera's collection have been inventoried and entered into a computer file (see Appendix A: Inventory Lists). This file describes the current state of these collections, so that the information Mera bequeathed to the Laboratory can be easily accessed by contemporary researchers. However, because of the great lapse of time since Mera began to compile this resource and because of the many intervening hands that have passed over these sherds, the collection is no longer exactly as Mera intended. There are differences between the original provinces Mera defined in his publications and the areas represented by the sites actually found in his lockers with drawers of sherds. It is worthwhile, then, to explore these discrepancies.

In addition to inconsistencies between Mera's publications and his collection, which are described in Appendix B: Inconsistencies Between the Publications and the Collection, there are some noteworthy idiosyncrasies that exist in the structure of the resource itself. Most of these problems are involved in delineating the cultural areas that Mera postulates. Researchers should be aware of the maps on which he describes these areas (Mera 1935, 1940), as well as the gaps that appear in these depictions.

Mera describes one of his provinces as Red Mesa/Kwahe'e Black-on-white. He illustrates this group in Mera (1935:1), describing it there as Kwahe'e Black-on-white. It is depicted as a rather scattered group, ranging widely in location but centered around Santa Fe. The problem manifests itself this way: On this map, Mera shows no evidence of Kwahe'e Black-on-white sites in the Taos/Rancho de Taos area. However, several of the sites contained in his Red Mesa Kwahe'e locker are located precisely in that area. This northern contingent is not mentioned in his publications. Either Mera simply neglected to include this group of northern sites on his map, or he was ambivalent about their inclusion in the province. It could be that these sites were simply good examples of this early time period and not particularly useful examples of the ceramic type. Perhaps that is why they were included in the group locker but not on his map. His reasoning is unknown, but it is interesting that its vagueness reflects the still somewhat unsettled nature of the Red Mesa/Kwahe'e phase.

A similar situation exists with the San Marcial province. For some reason, this area has attracted relatively little attention, and it was not until the Rio Abajo Survey (Marshall and Walt 1984) that it again became the focus of a serious study. Mesa (1935:map 1) surveyed the San Marcial area in the late 1930s, with the assistance of H. W. Yeo. In 1980-81, when the members of the Rio Abajo Research Project returned to this area to perform their systematic survey, they were able to locate only a few of
Mera's original sites. The publication produced from this survey (Marshall and Walt 1984) notes the difficulty in relocating the sites from which Mera collected sherds: "Recent examination of the typesite area revealed the presence of very few sherds, suggesting that the Mera collection was total rather than selective" (p. 37) and "Definition of San Marcial phase components from surface observation is quite difficult, since these remains are substantially reduced" (p. 35). A key to explaining this difficulty lies in the locations of the San Marcial sites. Marshall and Walt (1984) describe the site locations of this group as "restricted to riverside locations" (p. 35). It could be that the sites originally located by Mera in the 1939s had been buried by flooding by the time the Rio Abajo Survey took place. If this is true, the sherds that now reside in Mera's San Marcial locker are the only material resources existing for those sites.

The relatively mysterious nature of this area is compounded by the fact the Mera mentions it only briefly in several publications. The most in-depth discussion is found in Mera (1935:25-26). In an article on southern ceramics, Mera (1943) makes a very brief mention of "the eleven sites showing San Marcial Black-on-white". However, Mera's locker for the San Marcial province holds only sherds from seven sites, three of which were added after Mera ceased to collect samples. (Mera did not assign LA numbers above LA 2275.) The four sites that are included in Mera's survey are located far to the north of his described San Marcial area. It is important here to keep in mind that the area Mera designated for this group of a very compact, southern one. Mera's map (1935:map 1) describes a very limited range for San Marcial. This is no longer accepted as an accurate geographic depiction of this ceramic phase. Marshall and Walt (1984:37-38) comment on the more northern occurrences of this phase, and Alan Ferg (in Hammack, Ferg, and Bradley 1983:54) accepts the idea of San Marcial occurrences in the Zia-Santa Ana area, though his main point is to emphasize the existing confusion of White Mound Black-on-white with San Marcial Black-on-white.

All this calls attention to the discrepancies within Mera's collection for this somewhat disputed phase. Perhaps Mera wished to suggest the continuum of this early pottery phase by including these northern sites in his collection. In any case, it is important to realize that the few sites that do remain in the San Marcial locker are sites that Mera chose to include in the group, but which lie outside the area he designated for it.

Similarly, there are three additional, minor anomalies involving sites that Mera assigned to a certain province, but which lie outside the area designated for that group. This occurs in the Biscuit ware province with Sites La 71 and 277; in the Santa Fe/Galisteo Black-on-white province with Sites LA 260, 406, and 407; and in the Jemez Black-on-white provinces with Sites LA 163 and 606. These exceptions should be noted. However, they are truly exceptions, for the bulk of Mera's described sites are consistent with their designated areas.

For the most part, Mera was quite careful when he described his cultural areas and quite
thorough in his discussion of the sites that represented those areas. It is appropriate that we rely on his initial work as a basis for much of the discussion of New Mexico ceramics, as long as we are fully and accurately aware of exactly what Mera's work means. Blindly accepting his hypotheses without questioning their context or validity might lead to inaccurate assumptions. And inaccurate assumptions, it seems, should be the inspiration for research, not its product. To use his collection in this way is to diminish the value of the tremendous store of information he did compile. His work provides a momentous base for further discovery. Just as Dr. Mera's contributions were inspired by his great love for the field of ceramics, the value of this collection stands as an ongoing inspiration for researchers to use this rich resource with clarity and understanding. Only in this way can we most fully explore the dynamic field to which he was so dedicated.

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## APPENDIX A

### Inventory Lists

### Rio Grande Glaze Province

LA numbers contained in the H. P. Mera sherd collection within Mera's Rio Grande Glaze province--drawers lu A through 2u E--encompass 241 sites. However, LA numbers above LA 2275 describe site collections obtained after Mera's work ceased.

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<th>LA Numbers</th>
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### Jemez Province

LA numbers included in the H. P. Mera sherd collection within Mera's Jemez province drawers 2u H through 21 C--encompass 71 sites in this group. However, LA numbers above LA 2275 describe site collections obtained after Mera ceased work.

<table>
<thead>
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Biscuit Province

LA numbers contained in the H. P. Mera sherd collection within Mera's Biscuit province--drawers 210 through 3u K--encompass 58 sites. However, LA numbers above LA 2275 describe site collections obtained after Mera ceased work.


Santa Fe/Galisteo Province

LA numbers contained in the H. P. Mera sherd collection within Mera Santa Fe/Galisteo province--drawers 3u L through 4u I--encompass 274 sites. However, LA numbers above LA 2275 describe site collections obtained after Mera ceased work.

Red Meas/Kwahe'e Province

LA numbers contained in the H. P. Mera sherd collection within Mera's Red Mesa/Kwahe'e province—drawers 4u J through 41 E—encompass 128 sites. However, LA numbers above LA 2275 describe site collections obtained after Mera's work ceased.


San Marcial Province

LA numbers contained in the H. P. Mera sherd collection within Mera's San Marcial province—drawer 41H—encompass seven sites. However, LA numbers above LA 2275 describe site collections obtained after Mera ceased work.

177, 586, 1151, 2010, 2011, 2942, 2944, 5055
APPENDIX B

Inconsistencies Between the Publications and the Collection

It is sometimes difficult to correlate Mera's publications with the actual collections. Some inconsistencies are outlined below.

1) LA 12 is located within the Santa Fe/Galisteo province, but is mentioned in Mera's writings as belonging to both the Rio Grande Glaze province (Mera 1940:29) and the biscuit province (Mera 1934:15).

2) LA 360 is on map 1 in Mera (1934) but is not mentioned in the text of that publication.

3) The following sites are located in the sherd drawers within Mera's Biscuit province: LA 245, 261, 300, 360, 369, 918, 920, 928, and 1372. However, Mera does not mention them in either publication (1934, 1935) where he discusses the Biscuit group.

4) The same situation occurs with the following sites, which are located in the sherd drawers within Mera's Rio Grande Glaze province: LA 174, 242, 680, 1134, 1246, 1247, 1250, 1278, 1497, 1794, 1860, 1861, 1887, 1995, and 2273. Mera does not mention them at all, in the context of any province, in Bulletins No. 5, 8, or 9 (Mera 1933, 1935, 1940, respectively). An exception occurs with LA 174, which is mentioned in Bulletin No. 6 (1934) as belonging to the Biscuit province.

A clue to the high number of sites residing in the sherd drawers that are not discussed in Mera's publications can be found in Bulletin No. 9. Here Mera states:

In this same connection, a great many sherd areas of small size were encountered during the survey that may well represent the former presence of other temporary seasonal structures but only those which possessed building outlines have been listed. All others in the list appear to have been erected with more thought to permanency. [Mera 1940:11]

It may be that some of the sites in the group above were added to the collection later. Mera may have overlooked or simply disregarded, some rightfully, Rio Grande Glaze sites that were only later deemed significant.

5) The following sites are mentioned in Bulletin No. 6 (1934) as belonging to the Biscuit province; however, they cannot be found within the drawers assigned to this group. Rather, they are located in lockers containing various other provinces. They are listed below by LA number, followed by the drawer in which they are found and the province designated for that drawer.
LA 625 is somewhat of an exception, in that Mera describes this site as having an almost equal percentage of Rio Grande Glaze sherds and Biscuit sherds:

It is also of interest to note that this dialectically different community also is distinguished from the rest in showing a very strong ceramic influence from the north, there being almost as great a percentage of Biscuit ware as there is of Rio Grande Glaze-paint pottery. [Mera 1940:28]

6) Similar inconsistencies appear in regard to the following sites, which are mentioned in Bulletin Nos. 5, 8, and/or 9 as belonging to the Rio Grande Glaze province. As with the supposed Biscuit sites mentioned above, they are located in drawers designated for various other provinces.
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<td>Historic</td>
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*Sites LA 500, LA 501, LA 543, and LA 724, which are now located in Chupadero province drawers, were once located in Rio Grande Glaze drawers. It is unknown when or why they were moved.

**LA 1274 is the same as LA 8139, which is located in a Biscuit drawer. However, the collection consists exclusively of Rio Grande Glaze-paint sherds.

7) There are also a few incorrect LA numbers in Mera's texts--instances where he has identified a specific site with an incorrect LA number. In Bulletin No. 6 (Mera 1934):
   Page 4--Mera describes LA 297 as LA 279
   Page 5--Mera describes LA 874 as LA 847
   Page 14--Mera describes LA 257 as LA 247

In Bulletin No. 9 (Mera 1940):
   Page 19--Mera describes LA 578 as LA 587

85
WHAT WENT INTO THE HOLES AND TRENCHES IN PREHISTORIC SOUTHWESTERN HOUSES AND KIVAS (Especially Anasazi and Mogollon)?

Florence Hawley Ellis and Andrea Ellis Dodge

It was on a spring day some 20 years ago that I decided I should ask some questions of one or two elders (members of a Middle Rio Grande Pueblo where I had known them for over 30 years). I had discovered earlier that, with a few quiet queries and no "pushing," the archaeologist might save him or herself a great deal of speculation and hypothesizing. However, first he or she must have developed close-enough ties to the living Indian to permit an occasional casual question as well as observation. This technique applies only if one has honestly cherished a fairly long acquaintance with Indians whose position in their tribe has equipped them with the answers needed, and then only if the archaeologist has honestly gained their confidence. Specialization by sex and duties in a native tribe is at least as real as in our own circles, and the special knowledge of one person often is unknown to others. But the beliefs of any people should never be shouted from a hilltop.

In 1959, after my summer field school group had uncovered a number of houses in Gallina villages, it occurred to me that I had asked some of my Pueblo friends if they did not place prayer feathers or other offerings into the floors, walls, and roofs as they built up their homes. They assured me that this largely had been their old custom for both houses and kivas, to secure the goodwill and cooperation of the spirit world. Moreover, they always called on the spirits to come and be a part of the personnel participating in esoteric activities. For generations they had cooperated with nature, and we as archaeologists doubtless have seen holes in kiva and house floors and walls in which spirits at one time were necessarily present, although evidence of anything within such openings has been reported but rarely. This may be attributed to centuries of decay or to excavators having overlooked traces of something which they had no expectation of finding in such a location. Small items of wood or fiber could not last through the centuries if any moisture reached them. (For more detail see Ellis [1952]; Hawley [1950]).

To discover an explanation for such remains, let us start with houses and progress to the esoteric side of construction and then gently move into kiva construction, where a few points may provide new brilliance to some archaeological flashlights.

HOUSE CONSTRUCTION CEREMONIES

When a Pueblo family has built a new house and is ready to have it blessed, the man of the family goes to request that ritual from one of the most important religious societies of his tribe. If the request is granted, the next day the women...
of his family concentrate their efforts on cooking in honor of the performing society for, although only the cook's helpers will be fed at the time, each society member is given bountifuls of food to carry home at the close of the ritual. These are his only pay.

In the evening, all the leading members of the society come to participate in the dedication. Their altar will be erected on the floor of the new house, along with the corn mother fetish that was made for each household member at the time of his initiation, which are stood in a row. Each of these fetishes consists of a perfect ear of corn surrounded with feathers secured by wrappings. The altar and fetishes provide the proper background atmosphere, for the ritual itself consists primarily of placing prayer sticks at certain spots in the house structure.

During preparation for this ceremony, six holes must be made to represent the six directions: for north, south, east and west, one hole is cut in each house wall; representing the above, one is made in the ceiling; and one representing the below is cut in the center of the clay floor. Prayer feathers are placed in the wall holes so that their bases are toward the out-of-doors and the fluffy tops point toward the room interior. Prayer feathers are placed "standing up" in the ceiling hole, symbolizing the sky. Layers of feathers are stacked horizontally in the hole in the floor, but with their bases toward the doorway, as if they had just walked into the room. Feathers also are placed in a hole in each corner of the foundation; today these must be placed beneath the wood floor.

In a seventh hole directly in front of the door opening, a hummingbird is buried (by chance a symbol of the Mexican deity Huitzilopochtli, The Mexican War God?).

A prayer stick is sealed into each wall directly to the side of the entrance doorway; these sticks are referred to as "roadside leaders or chiefs." Prayer sticks known as "road-heart finders" are placed in the ground outside, on either side of the door.

When a house has more than a main room, each room is supposed to be sprayed by mouth with water that has been blessed by the head of the society.

We know that archaeologists working with Basketmaker III and Pueblo I villages in the Four Corners find sites that contain what appears to be a kiva as well as a domicile where cooking facilities are of the usual "family type." We are much inclined to accept the native elders' statement that the head of a religious society, with his family, formerly lived in the kiva "meeting room" of the society, where that leader and his family were responsible for proper care of the fetishes owned by that society. We know that this custom still pertains for certain types of groups at Zuni and some other pueblos. I well remember that when I was working on the Laguna land claim, an elderly Laguna woman whom I had been advised to talk to went to her garage to bring a katchina-like figure, carefully wrapped and set away in a shoe box. She carried on the clan duty of perpetually tending this fetish during her lifetime. She laid it carefully in my lap for me to examine, but no, I am not going to sketch it for you!
ARCHAEOLOGICAL EVIDENCE FOR FLOOR CHANNELS

The derivation of kivas from pithouses has been pointed out since at least the late 1920s, and the derivation of our own most-used church architecture, even today, is generally recognized to be from the old, elaborate Gothic structures. Religious architecture, like religious beliefs, tends to perpetuate the past or some modifications of it.

Let us turn now, though briefly, to the archaeologist's finding of channels in kiva floors definitely of Pueblo IV period (late pre-Spanish but lasting into early post-Spanish times). Sapawe and Tsama were two closely related Tewa Pueblo ancestral sites. Both are located between 10 and 30 mi from Abiquiu, southwest of Taos.

Sapawe

Sapawe, described by Bandelier as the largest clay-walled pueblo ruin in New Mexico, was widely tested and partly excavated by University of New Mexico's summer archaeological field school under my direction during five 6-week seasons in the 1950s and 1960s. We investigated all seven plazas and cleaned out the big or "great kiva" in one plaza and a number of small or "religious society kivas" in others. These ancestral Puebloans probably were also using the private homes of their religious leaders as places for some of the meetings of the various religious societies rather than society members taking the time to construct kivas during a drought and/or a migration period. It also is possible that more than one religious society used a single kiva, as is true today in some cases.

The huge village of Sapawe seems to have evolved from the joining of a number of groups from smaller pueblos of the late prehistoric and even early Spanish period, possibly for increased security and, quite probably, also to develop early experiments using ditches for runoff and small-stream irrigation in the Chama drainage. According to ceramics dating, the impetus for this could have come in with small groups of immigrants abandoning the Four Corner Chaco-Mesa Verde regions, though in their major features the kivas of the Upper Rio Grande would not be confused with those of the Four Corners. The route up the San Juan, across the Continental Divide, and down the Chama has been the recognized road for travel from the San Juan Basin into the Rio Grande even in the historic period, and now modern roads follow much the same trail.

That the Chaco-Mesa Verde Pueblo sites represent, at least in part, ancestral homes of some Tewa branch of Tanoan linguistic background seems to be very likely, though it also appears almost unquestionable that some or even all of the Tewa and the Towa Tanoans and a considerable portion of ancestral Keresan speakers also may have lived there at one time. Many characteristics shown by historic Keresan groups and their ancestors hint that a portion of the Four Corners was at least a temporary home for them. We leave much investigation in this line for the next generation!

The single subfloor channel we unearthed in most of the Sapawe "religious society" small kivas appeared to have been kept filled to its brim with soil. Indeed, the adobe-plastered kiva floor of the past well may
have extended directly across these hidden channels. In most of the small kivas used by religious societies, the opening to the ventilator shaft was in the east wall. From just in front of that opening, a channel 6 or 7 in. wide had been cut to reach a point close to the central fire pit, where a mortar some 5 or 6 in. high and usually fashioned from volcanic scoria had been buried in the bottom of the trench. This "mortar" differed from mortars in general in that, just above the bottom interior on the side closest to the firepit, a hole, about 1/2 in. in diameter, had been cut or drilled through the lower wall of the mortar. The overall effect was that the hole in the base of the mortar pointed at an angle from the bottom of the trench to the area beneath the firepit. Except in a single instance, we found no evidence of the mortar having held anything. In one of these kivas in which the base of the mortar reached 3 in. or more below the base of the floor channel, we found a scattering of small pieces of turquoise and shell. These were strung out from just in front of the exterior of the hole in the mortar for over a distance of more than a foot, at such an angle that the most distant pieces of turquoise actually were in the edge of the ash that filled a hole extending downward some 2 or more ft beneath the firepit.

This ash hole beneath the firepit in most of the other kivas we dug held nothing esoteric except, in one case, a single cloud blower and in another kiva, 49 pottery cloud blowers! Cloud blowers are used in religious ceremonies, where the puffs of smoke are symbols of the clouds that the Pueblo farmers hope will bring rain to their crops. Such items, after ceremonial use, are supposed to be hidden away somewhere, though today not usually beneath the floor of the fireplace.

Tsama Pueblo

Let us shift location, somewhat, once again. After our five summer seasons at Sapawe, Florence dedicated our last UNM summer field school, in 1969, to sampling as much as possible of the ruins of Tsama Pueblo, a large ancestral Tewa ruin on the Chama that is contemporary with but not comparable to Sapawe in size.

Tsama had several plazas, and associated with these were numerous kivas; the majority, as always, were of the smaller, religious-society type. That same summer, we set one of our crews to doing enough test excavations so that we could know a bit, outside of what one finds in old government documents, about what constituted the original Abiquiu. The work necessarily was limited, but the results were simple, indicating that the village of Abiquiu, like Tsama, was archaeologically similar to the other Tewa Pueblos in the Chama country during the stage we know as Pueblo IV into V.

During our work at Tsama (which we hope to publish within the next 2 years), a set of kiva channels in Great Kiva C in Plaza D caught our attention as different--more simple and direct features than those already briefly described. Yes, there were small religious-society kivas scattered through several plazas here. But the most impressive was this Kiva C of the large or great type. I had set one crew chief and his crew to concentrated work exca-
vating it. Unfortunately, over the crucial weekend my notes were very scanty and the crew chief's notes, which should have been but were not turned in, never could be tracked down. We were fortunate eventually to have a brief coverage from the records of Steve Horvath, now of the Laboratory of Anthropology, who then had been working under another crew chief in the adjoining plaza and who lent us what he chanced to record for his own interest.

When I was called from elsewhere on the site to see something special just being uncovered in Kiva C, I could distinguish the definite but dim outline of two subfloor channels. These lead from in front of the firepit at the east side of the kiva—in a spreading angle—toward the kiva's west wall, essentially to the north, west, and south. We could see the edges of these channels, where the fill soil differed from the clay floor. They appeared to have been only 2 to 4 in. deep and perhaps 5 or 6 in. wide.

Other Evidences

At that time, none of our group was familiar with the kiva channels that had been found in the Taos-Picuris area, though we did know of several puzzling examples that had been reported in some Mogollon and other villages that could have been influenced by that widespread culture and might have provided the basis for this new development. It would be 4 more years before Lucretia Vikery Ottaway (1975) would cover this subject for the Taos-Picuris area and a part of the other apparently related Southwestern sites.

Ottaway's early example, Kiva A at TA 26 in the Taos area, covered the period of A.D. 1170-1250, making it only a few years younger than our Pueblo IV Great Kiva C at Tsama, located some 40 miles to the southwest. Both used four posts set into the floor as roof supports. The ventilator shaft was located at the east end of the kiva in these and the other small Tsama and Chama Valley kivas. A rectangular firepit with an adobe curb 6 or 7 in. wide had been constructed in front of the ventilator shaft opening. At TA 26, three subfloor channels (we had two) ran from the outer edge of the firepit rim to the base of the north, west, and south walls, as had the Tsama channels. The ends of these channels were well rounded both where they met the outer curb of the firepit and at the kiva wall. The channels of the Pot Creek (Taos area) example ranged slightly wider and deeper than those at Sapawe and Tsama and showed a plaster lining (Ottaway 1975:422-423). No mortar is noted, but, since it was not being looked for, it may have been missed. There is no notation of exploratory digging beneath these channels nor of a lowered ash area, but these two last items were not present at Tsama, though they are at Sapawi.

Ottaway (1975) provides additional data on kiva features, beginning with Herbert Dick's description of subsidiary ventilators, also called wall sipapus [wall channels],...sometimes found in the west wall [of a 'typical kiva' at Picuris.] Subfloor channels radiating out from the firepit in three directions were present....A 'wall sipapu' or subsidiary ventilator shaft was located in the west wall of at
least 7 of the kivas. In the small kivas which were completely excavated, the horizontal shaft opening of this west ventilator into the kivas range from being just under 1 foot to a little over 1-1/2 feet above the floor of the kiva... another kiva contained a subsidiary ventilator [constructed differently from the rest] in that it was built of coursed adobe, stone slabs and latillas rather than being dug into the wall. [This later kiva seems to have been a 'Big' or 'Great' kiva.] Parsons (1936) [makes] two references to kivas at Taos Pueblo with two ventilators.... In addition to the presence of subsidiary ventilators in the ruined kivas at Picaris, Dick (1965:99) [wrote]: "Several Picuris Indians had said that their modern kivas contain subsidiary ventilators." [Also in discussing the kivas at Picuris Dick goes on to say:] Finally, subfloor channels were found to be present in both the small kivas and in the Big Kiva. [p. 423-427]

Here stone or wooden slabs were laid over the channels before they were plastered in, as for a replacement of the entire floor. The ends of the channels next to the firepit were protected from the fire "either by plain ware sherds or by stone slabs." Some of the channels were stone lined, others were just plastered or cut.

Both here and at Picuris and elsewhere these floor and wall channels have been described by Pueblo informants as message channels or passageways for spirits, and in most though not all cases the floor channels are concealed. Many of the wall channels also seem to have been concealed or closed up. Details vary, but the overall concept of a hidden passageway for the spirits seems to have been applied both to big and small kivas.

Two examples of both kiva floor channels and "wall sipapu" channels have been recorded at Pecos, a site of Towa speakers only a few miles across the Sangre de Cristo Mountains. We have thus a major similarity in the presence of channels in this type of kiva and in the general type of small Tewa late prehistoric kivas in the Chama area and Upper Rio Grande.

A Contemporary Analogy

Our known contemporary kivas of this type are in a Towa pueblo that has two great kivas, a Squash kiva and a Turquoise kiva. The Squash is considered to be older and more like those of the past. Both kivas are rectangular and oriented to the south, as were the domiciles, both pithouses and surface dwellings, of the Gallina culture; this is a definite contrast to the east-west ancestral Tewa orientation of which we have been speaking. Kiva users enter the contemporary Towa kiva through the roof hatchway and then circle the room on the ground level to reach their proper places. The bench at the base of each wall is divided into sections by heavy roof beams and the pilasters that support those beams. At the base of the south wall is a ventilator opening that marks the center, as in the Gallina dwellings and in our one probable kiva of the same phase. In the contemporary kiva, six members of an important reli-
gious society sit on one side of this opening and six on the other. The same is true of the twelve most important members of two other religious societies, who sit on the floor but lean against the bench at the north end of the kiva. Kiva benches are not for humans to sit on, but to lean against. Spirits occupy the top of the bench.

These are features to be seen by anyone entering either of these two kivas. But, unseen from the surface and unknown by all except a small group of men who tend the kiva, are the two subfloor shallow channels that extend from the northwest to the southeast corner and from the southwest to the northeast corner of this kiva. As it was explained to me, these channels are refilled with short twigs taken from trees, which grow close to water in nearby canyons, about every 10 years when the kiva is refurbished. The channels thus are basically symbolic water-symbol routes used by the spirits. Our acquaintance with this resulted when one of our best friends in this pueblo came to ask if he might have permission to gather twigs from alder, juniper, and willow growing along the river banks on our land bordering the Santa Fe River. His companion briefly explained the purpose of this. The water spirits who are summoned at the beginning of each ceremony are the souls of the dead, the katchinas.

The twigs would fill, but only loosely, two channels provided for "spirit communication," through which the supernatural spirits summoned by the society members manage to enter the kiva and to settle themselves near, but not in, the fire basin. At the end of the ceremony, they are dismissed and return home as they came, through the floor channels.

At Tsama the "spirit communication channels" appear to have been connected to a wall channel that entered Kiva C from the top of its west wall and led into the floor channels. In the Towa kiva of today, to which I have referred, there is a sipapu at the point where the four floor channels meet, and from this point another channel or "covered trench" extends toward the firepit and the deflector near the east end of the kiva. This latter channel is said to be filled with ritual material, but, as with the two longer channels, the material, whatever it may be, is covered over so that it cannot be seen by persons attending ceremonies in the kiva. The channel contents are covered with soil and the twigs and are sometimes topped with thin bits of sandstone or other mineral material before the puddled adobe clay floor coating is smoothed over the surface. How long have kiva channels been incorporated into built-in kiva furniture? Perhaps some 1200 years?

Archaeological Evidence at Zia

Shortly after we completed our 1956 summer excavations on the bench between the Rio Jemez and NM State Highway 44, and less than a mile west of Zia Pueblo on its volcanic knoll, Natalie Vytlacil and J. J. Brody, two of our most advanced students registered to work on the six-week summer dig sponsored by the Department of Anthropology, University of New Mexico (for which Ellis had permission from Zia Pueblo's Council), suggested they would like to pull their field notes together and send off a brief paper for publication.

"Great," thought I, but
admitting to some puzzlement at the time as to whether we had sufficient data to provide a convincing explanation of the function of floor channels, which we found with careful trowel and whiskbroom work, that the original builders had incorporated into the lowest floors of these two Zia pithouses (all that were excavated at this site). It is from their brief description, plus the field notes of other participants in this dig, that the present data is transcribed.

The most prevalent of the potsherds found on the ground surface, above 6 in. of fill and floor, were Lino and Kana'a body sherds or their local variants. With them was a scattering of La Plata Black-on-red and San Marcial Black-on-white. Here we see a clear signature of Basketmaker III and Pueblo I Middle Rio Grande Anasazi as we then knew it. Surface sherds followed the same pattern. "The two floors do not represent a significant occupational time-difference" (Vytlacil and Brody 1958:177). The only late ware represented was "probably Modern Zia intrusive." Sherds here must be admitted to have been rare at best, a point that fits easily into our tentative classification of Structure I (which was 19 ft across) as a kiva, although the second and smaller pithouse apparently was "just a pithouse," its period quite certainly Basketmaker III. None of the other pithouses in this scattered group were excavated at this time. Our estimate of their time period was between A.D. 700 and 800 to 900.

As we were shown by Zia Pueblo friends and as has been observed and noted since by various other archaeologists, a string of scattered sites dated by surface potsherds as representing that same period may have existed as an extended village well before the period of above-ground construction and occupation of Zia Pueblo itself. According to our own excavation from present surface down to sterile soil (Ellis 1966), the construction of Zia Pueblo (LA 28) began at about A.D. 1200 or a few years later. This pueblo is still occupied, and new structures continue to be built even today, as well as extensive repairs being made to keep the houses and kivas in good shape. The brief six-week period of our summer field school did not permit excavation of more than two of the pithouses for which above-ground evidence was clear.

**Pithouse I**

Zia pithouses I and II, superficially, were much like each other and were basically very similar to the overall Anasazi and Mogollon pithouses of the Southwest. In Pithouse I, a passageway or ventilator shaft, measuring 4 ft 6 in. long, originally ended with a vertical entrance, providing a connection from the floor to the ground surface. The shaft opened at floor level, a few inches behind small post holes that indicated where a deflector probably had been erected, its function to cut an excess flow of fresh air from the outside through the ventilator shaft to the edge of a bowl-shaped fireplace. The juncture of the shaft with the pithouse was constricted to 10 in. at its widest point and narrowed to 6 in., making it fairly certain that the shaft was intended to improve ventilation rather than to allow the owners an entrance. Behind the fireplace was a shallow ash pit filled with fine white ash, presumably placed there at the
time the pithouse was abandoned, as was the custom in the Chama, Pajarito Plateau, and Gallina areas, and in some other areas in prehistoric times. A hole measuring 1 in. in diameter and 2 in. deep, which was filled with clean white sand and was located between the firepit and the northwest wall in a badly deteriorated floor area, may be identifiable as the sipapu (Vytlacil and Brody 1958:174). The entire upper floor of the pithouse had been burned black and red. The lower floor had not been burned but was found in very poor condition. In addition to the features just described, there was an adobe plaster-lined depression 1 ft 9 in. wide and 6 in. deep. This lay slightly south of the southeast-northwest alignment of the upper floor features, between the central firepit and the west wall. It originally had been covered by the upper floor. The two floors in some areas were superimposed and in other areas were separated by 2 in. of clean sand; little or no time lapse between use of the two floors could be deduced.

No artifacts were found on the lower floor, but the semi-flexed, partial skeletal remains of a young adult, probably female, lay on the upper floor northeast of the firepit. Traces of red paint...were found on the pelvic, one long bone, the skull, and the jaw. A piece of burned matting [made of reeds] covered the remains from waist to neck....Around the neck of the remains were burned fragments of twisted cord bearing traces of a vitrified material, possibly fused galena. Adjacent to the matting was a burned sandal, of plaited yucca strips. Near the feet were three beads of olivela shell, one of bone, and forty-six of a red berry seed identified as from a small bush in the Jemez mountains, strung on two-ply bast cord. Two corner-notched obsidian points and two scrapers were associated with the fill and the surface associated with this. A third similar point later was shown to this writer as having been pocketed and not reported on this dig. Ground stone items [included] two manos found on the floor--one a trifacetted two-hand specimen, the other bi-faced and for one hand. Also on the floor was a shallow basin metate of rhyolite. [Vytlacil and Brody 1958:175-177]

The pottery consisted of Lino gray, Kana'a or local relatives, and some white-slipped red ware with basalt temper, probably intrusive modern Zia ware. "...the single sandal and many beads presumably were grave offerings. The red paint on the bones probably had been body paint" (Vytlacil and Brody 1958:177). The sherds on the ground surface and on the floor were the same, Lino or Kana'a Gray, La Plata Black-on-red, and San Marcial Black-on-white.

It was agreed that the two floors of Pithouse I did not seem to represent a significant time difference. One of our Zia friends stated that he knew of a tradition where in the past, it was customary to place the dead in a house, to break vessels and other utensils in that house, and then to burn the structure. As we have no further verification of this in archaeological finds or as ethnological comments (until we reach Navajo times), the most positive statement we can make for this bit of
information is that grave offerings had been placed with the body when it was buried, but we cannot be certain of their intended meaning (Vytlacil and Brody 1958:178).

Pithouse II

Vytlacil and Brody (1958) describe Pithouse II as follows: The upper two feet of fill over Pithouse II consisted of sand containing sherds, yellow ochre, burned adobe, corn cobs, and cottonwood beam fragments. The eight inches of fill above the upper floor contained a large amount of burned roof material which in most of the area was separated from the floor by a thin layer of fine yellow sand. The lower floor level, much more prolific in features than the upper, lay immediately below the upper and gave no indication of being from a different occupation.

In about the center of the upper floor was a slightly depressed, unrimmed fire area containing charcoal mixed with burned selenite, [possible decorations on a necklace]. There were four roof support post holes, about equi-distant from each other and set out about three feet from the walls, [which] contained traces of burned juniper posts. The fourth was poorly defined and lacked any trace of wood. There was no ash pit, deflector, or sipapu. Two wall cists [apparently for storage] about a foot high, one and a half feet wide, and of indeterminable depth, had been dug in the northwest and the southwest wall sectors about eight inches above floor level.

The southeasterly-oriented ventilator (?) shaft could be traced for a distance of seven feet six inches. Its juncture with the pithouse wall was constricted, measuring only ten inches at its widest point and narrowing to six inches. Beyond this point the shaft widened to a maximum of three feet seven inches, then narrowed again at its traceable far end. Its roof, postulated from a two inch horizontal layer of adobe surmounting a continuous layer of charcoal and topped by earth containing scattered bits of charcoal, was one foot ten inches below ground level at its juncture with the pithouse wall. This tunnel mouth had been plastered. Inside the tunnel, traces of three floor levels and two wall widths gave evidence of remodeling. The topmost floor seemed contemporaneous with the upper floor of the pithouse, joining it in a 4-inch step-down formed by a sandstone slab. The two lower floors had no visible present connection with either of the pithouse floors. Fill in the tunnel above the top floor contained sherds, and an olivela shell bead, a fragment of a mano, three scrapers, a polishing stone, a deer bone, and small pieces of burned rabbit bone.

The shaft or tunnel has been termed a ventilator rather than an entrance way mainly because of its constricted 'neck'--too narrow and low to permit
use as a regular entrance. If this assumption is correct, a roof or another side entrance to the pit-house was necessary. [p. 179]

The actual entrance to this pit structure presumably would have been by way of a ladder coming down from an aperture in the roof. Although a number of small pits in the floor conceivably could have served to hold the butt ends of an entrance ladder, none could be definitely identified as having served that purpose.

Although several of the many small pits in the lower floor of the pithouse could have served as ladder-holes, these had been plastered over by the upper floor, which was devoid of any such depressions. Also, it must be admitted that the step at the room end of the tunnel can best be explained if the tunnel served as an entrance. However, Ottaway also mentions such a step in her paper, adding that most of the "subsidiary ventilators" opened somewhat above floor level.

The lower floor, of hard-packed sand covered with a thin layer of adobe, contained in addition to the central fire area and at least two of the roof support post-holes noted above, a total of twenty-one other pits, caches, bins, troughs and other depressions. [Vytalci1 and Brody 1958:179-189]

As Vytalci1 and Brody (1958) pointed out, the large number of holes in the lower floor (of Pithouse II) "may possibly be explained if some of them are considered to have been of ceremonial use. This is especially pertinent in respect to the large cist on the northeast side. The 'trough' [channel] may also be explained in this manner" (p. 183).

CONCLUSION

What we have since learned concerning floor troughs or trenches is that these, which are still in use today in some Rio Grande Pueblo kivas, occur in archaeological sites beginning at least about 1200 years ago. They are symbols illustrating the pathway provided for entering water spirits, which are important to today's Pueblo groups still, as they were in the past.

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SURFACE ASSESSMENT OF AN ARCHEOLOGICAL SITE: THE ROLLIE SITE, HEATON CANYON, GALLUP, NEW MEXICO

Beverly Engelbrecht and Mark Henderson

Since 1979 the Archaeological Society of New Mexico (ASNM) Archaeological Field School has concentrated its field efforts on excavating the Great Kiva located at the Vidal Site (LA 16254) in Heaton Canyon, Gallup, New Mexico. It was presumed that this kiva, following Chacoan tradition, would be accompanied by a Great House. However, it now appears that the Vidal Site Great Kiva may be an analogous situation to the Rinconada Community in Chaco Canyon, where a Great Kiva is associated with numerous small house residential sites.

The 1988 ASNM Field School chose the Rollie Site (GAS 542) in Heaton Canyon as a likely candidate to verify contemporaneity of a small house residential site in the vicinity of the Vidal Site Great Kiva. That year the site was topographically mapped, soil auger testing was conducted, and surface artifact data were collected. Reported here is the methodology and analysis of the data that characterize the surface distribution of artifacts on the Rollie Site. Surface distributions of artifacts, building rubble, and vegetation are examined in different ways to evaluate surface artifact sampling strategies that might be acceptable substitutes for the nearly complete, controlled, surface-artifact collection that was undertaken to characterize the age and function of the Rollie Site.

BACKGROUND AND SETTING

In this paper we examine the extent to which sampling strategies of surface artifacts may be considered as representative of the entire population of surface artifacts on Pueblo II-III (A.D. 1000-1150), small house sites in the upper reaches of the Puerco River near Gallup. We propose a method that may allow a systematic sample surface collection to be reliably substituted for the total collection of artifacts on sites in order to reliably estimate site age and function.

The Rollie and Vidal Sites are located in Heaton Canyon about 1.6 km northeast of downtown Gallup, New Mexico. Heaton Canyon drains to the south, occupying the basin of the Gallup syncline between the impressive Hogback (the Nutria monocline) to the east and Crownpoint (the Gallup anticline) to the west (see Figure 1 and 2; Hackman and Olson 1977). The valley floor is presently occupied by a deeply incised and still down-cutting main channel arroyo drainage. Bandelier (1892), in an early report of the area, describes a grass-covered valley floor dotted with prehistoric small house ruins. The first known excavations in Heaton Canyon were performed in the 1950s as part of a salvage excavation project for the El Paso Natural Gas-Transwestern Pipeline (Olson and Wasley 1956). Archaeological materials
Figure 1. Location of Rollie Site in Heaton Canyon.
were noted in the late 1960s and the early 1970s by members of the Gallup Archaeological Society (GAS). When the area was selected as the location for the Gallup City sanitary landfill, salvage excavations were begun by the GAS. In 1977 the Archaeological Society of New Mexico Field School was located in Gallup, with the initial purpose of assisting in the recovery of materials that might otherwise be lost to the landfill expansion. Two small house sites have been excavated by ASNM: LA 16255 (Kelley 1984:6) and LA 12143 (Brethauer 1980). A pithouse (JPHC-3) has also been excavated by GAS in Heaton Canyon (Palmer 1977).

In 1979 excavation began at the Vidal Site (LA 16254). An oval pit structure was completely excavated (Kelley n.d.) before excavation focused on the Great Kiva. The Great Kiva was initially believed to be a Late Pueblo I or Early Pueblo II structure because of the absence of a Great House. However, tree-ring dates clustering in the A.D. 1130-1150 range require at least partial reassessment of this notion. Nearly 100 prehistoric sites have now been identified and recorded in Heaton Canyon (Elizabeth Kelley and Sheila Brewer, personal communication n.d.). A long-term goal of the ASNM Field School is to determine what relationships, if any, exist between the Vidal Site Great Kiva and other structures in Heaton Canyon. For this reason the Rollie Site (GAS 542) was selected by the Field School in 1988 for further investigation.

The Rollie Site was named for a prominent local family that was instrumental in granting
permission for the ASNM Field School to conduct work in Heaton Canyon. The site was rerecorded in 1987 by the senior author of this article as a part of a project to obtain a provisional Archaeological Site Surveyor certificate in the ASNM Incremental Archaeological Certification Program. This program requires the completion of several Laboratory of Anthropology Archaeological Site Survey forms to meet certification requirements. A supplemental ceramic analysis work sheet in use for the Heaton Canyon area was completed.

The Rollie Site is located on a rise on the west margin of the main drainage in Heaton Canyon, approximately 500 m north of the Vidal Site. Immediately east of the site is the deeply entrenched (about 10 m) primary drainage in Heaton Canyon. Visible stone wall alignments and the abundance and diversity of artifacts on the Rollie Site indicate a substantial residential occupation of the Prudden unit type (Cordell 1984:239).

Vegetation on the site consists of six juniper trees, as well as sage, large rabbitbrush, and Russian thistle. Snakeweed or small rabbitbrush, rice grass, and grama grass constitute the predominant low-growing vegetation. Cliff-forming sandstone of the Bartlett Barren member of the Crevasse Canyon formation is exposed immediately to the west of the site. Evidence of sheep and goat grazing and pot hunting (particularly in the southwest quadrant) are found on the site. The structural remains of the site are essentially intact, while erosion has affected the eastern margin of the site (Figure 3).

The Rollie Site measures approximately 50 m (east to west) by 60 m (north to south). There is evidence of about 20 surface rooms in the western room block and 5 surface rooms in the eastern room block. Based on subsurface auger tests and the regional architectural pattern for Pueblo II residential sites, it is suspected that a circular subsurface structure is immediately southeast of the large room block. Although insufficient auger testing was conducted southeast of the smaller room block to confirm the presence of deep cultural soils, another subterranean structure is predicted to be present in this area.

Evaluation of the age and function of the Rollie Site was based on the results of three major operations: topographic mapping, subsurface stratigraphic augering, and surface artifact analysis. Complete records of this work are maintained at the ASNM Laboratory at Red Rock State Park near Gallup, New Mexico. These records are ultimately to be deposited with the Museum of New Mexico.

SURFACE COLLECTION PROCEDURES AND RESULTS

A collection was made of all portable artifacts (sherds, chipped stone, and small bones) in an area measuring 40 by 60 m on the surface of the Rollie Site. This collection was made in 2-by-2-m units. A 10-by-60-m area on the west margin of the site was not collected. The surface collection and analysis were conducted between July 11 and July 29, 1988. A total of 100 work hours was spent in the field performing this collection.

Field Methods

The collection of the 2-by-2-m units was performed by laying
Figure 3. Site map of the Rollie Stie.
out two parallel 30-m tapes, 2 m apart. Wire flags were placed on the margins of the site collection area and along the collection centerline at 2-m intervals to provide control for the tape lines. A total of 600 units were collected, resulting in a total collection area of 2,400 sq m.

Counts were recorded in six categories during collection: sherds, chipped stone artifacts, ground stone artifacts, bone fragments, unmodified sandstone rubble items, and shrub vegetation stems. As the collection was made, the collection unit number and raw counts were recorded on a grid map.

Ground stone artifacts and stone rubble were not collected. This material was recorded and analysed in the field and left in place. The stone rubble, presumably wall construction material, was counted in the field if it was larger than 8 by 4 cm in any two dimensions. When 50 stones were counted in any collection unit the count was stopped. Vegetative cover was estimated by counting the number of stems of shrub-sized vegetation (higher than 10 cm) in each 2-by-2-m collection unit.

Analysis of Surface Information

At the end of each day in the field, the collected artifacts were sorted and analysed. The artifact analysis took about 200 work hours to accomplish. The following quantitative results summarize the collected data, which characterize the site surface. The results are presented on distribution maps with the number in each cell representing one collection unit. North is to the top of each map.

Ceramics

A total of 6,408 sherds were collected (Figure 4, 5, Table 1). The sherds appear to be concentrated southeast of each of the room blocks.

The sherds were first sorted into two categories, painted (white ware) (Figure 5) or unpainted (gray ware). The painted wares were then further separated into design-style classifications that are also thought to have temporal significance. The gray wares were separated into plain (n=1,109, 17%), simple coiled (n=281, 4.4%), indented corrugated (n=3,832, 59.8%), and other (n=124, 1.9%) classifications.

The painted ware design styles were classified according to the analysis procedure developed by Sundt (personal communication 1988) for the ASNM Field School. These styles are Early Red Mesa (n=10, 0.2%), Red Mesa (n=141, 2.2%), Puerco (n=410, 6.4%), Gallup A (n=136, 2.1%), Gallup B (n=128, 2.0%), red wares (n=2, 0.01%), and unidentified others—primarily slipped sherds with no painted design (n=235, 3.7%).

Chipped Stone

Chipped stone was present in 271 of the 600 collection units. A total of 720 chipped stone artifacts were collected. Only one bifacial tool, a projectile point (see Figure 6, 7) was collected. Six flake tools and 12 cores or core/hammerstones were found. A total of 25 flakes were also noted, but no wear/use or retouch was observed. It is possible that the few tools found and the small size of the materials collected is a result of prior collection at the site.
Figure 4. Examples of painted and unpainted wares.
Table 1. Sherd Counts by the Type from Rollie Site and Sample Areas.

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<th>Sample Area III</th>
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<td>Tot%</td>
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<td>208</td>
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Table 1
Figure 5. Sherd distribution.

Figure 6. Chipped stone distribution.
Lithics

a Hammerstone fragments  b Chipped stone  c Point (l: 13 cm)

Figure 7. Hammerstone, chipped stone and projectile paint.

Chipped stone materials were sorted in the following categories: chert (a nonlustrous cryptocrystalline in a variety of colors; n=269), petrified wood (n=261), Chinle chert (a distinctive yellow or red/brown speckled siliceous material [Warren 1967:116,132]; n=123), chalcedony (defined as a translucent gray, white, or yellow cryptocrystalline; n=49), basalt (n=5), quartz and orthoquartzite (n=5), quartzite (n=1), rhyolite (n=3), and argillite (n=4). Petrified wood, Chinle chert, and other cherts were the most common materials. The absence of obsidian may be a result of previous collection of surface material or the generally rare occurrence of this material reported in the area.

The number of chipped stone artifacts appears to vary with the number of ceramic artifacts in trash deposit areas. There are two concentrations of chipped stone. One concentration is on the southeast (downslope) margin of the large trash area, and the other is just southeast (downslope) from the small trash area associated with the eastern room block.

Ground Stone

Twenty-two items were identified as sandstone exhibiting at least one ground surface. These were all fragmentary manos and metates. As with other artifact categories, the small and fragmentary nature of these items may be attributable to previous collection. The distribution map shows that a majority of the
ground stone artifacts are located in the midden area (Figure 8).

Bone, Shell, and Miscellaneous Material

Small bone fragments were collected, but all appeared to be recent remains of small mammals. The only large mammal bone was the right pelvis of an adult human located in a vandal's excavation. This material was reburied in this disturbed area of the site.

One fragment of shell of an unidentified species was also found. Several fragments of gypsum crystals were located on the site. Modern materials such as bottle glass and aluminum cans were noted on the site map and left in place.

Rubble

Sandstone rubble larger than 8 cm in length and 4 cm in width was counted within each collection unit and left in place. The distribution map (Figure 9) indicates two concentrations on the site area in the house mound and one in the midden area.

Vegetation

The vegetation on the site exhibits areas of open ground with a few grass plants and patches of rabbitbrush and sage shrub growth. The vegetation counts (Figure 10) do not reflect the patchy nature of the vegetation. This may be a result of the analysis technique. Each stem above 10 cm in height has an equal value. This enumeration technique does not take into account the amount of surface cover by larger shrubs. Several small plants above 10 cm in height may actually cover less ground surface than 1 large, well-established plant.

ANALYSIS OF THE BUCKET AUGER DATA

In order to evaluate subsurface deposits, 20 test holes were excavated on the Rollie Site using a 3-in.-diameter bucket auger (see Table 5). Each hole was augered to sterile soil or to large rocks that could not be penetrated. Thirteen of the auger excavations (labeled A1 to A13) were conducted on a north-to-south transect in an attempt to verify the location of the suspected subterranean structure or kiva. The remaining seven auger tests (labeled X1-4, X9-11) were placed in other locations where there appeared some possibility of additional subterranean architecture. Each auger bucket of soil removed 10-20 cm from each test hole. The horizontal location of each hole was established using transit measurements. (See Table 2 for auger hole data.) Each bucket of soil was described by recording a dry Munsell soil color and texture using standard soil sieves. Then each sieve was inspected for perishable and nonperishable artificial material. The materials found were bagged and labeled for future analysis and reference. Samples of soil were also bagged for each distinctive stratigraphic level for future reference or further analysis.

The deepest auger hole (A12) revealed approximately 2.2 m of cultural fill. This is suspected to be a subterranean pit structure. It is located on the southeast edge of the rubble mound (see Figure 2). The surrounding auger tests all struck rocks prior to encountering sterile soil.

Of the 95 sherds encountered
### Table

| Row # | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | Total |
|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------|
|       | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |      |
| 1     | 1  | 2  | 4  | 8  | 3  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 277  |
| 2     | 1  | 1  | 4  | 6  | 3  | 4  | 2  |    | 1  | 6  | 8  | 3  | 1  |    |    |    |    |    |    |    | 42   |
| 3     | 1  | 1  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 29   |
| 4     | 1  | 2  | 6  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 51   |
| 5     | 1  | 3  | 2  |    |    | 1  |    | 4  | 19 | 6  | 2  |    |    |    |    |    |    |    |    |    | 54   |
| 6     | 3  | 3  | 10 | 12 | 14 | 12 | 10 | 14 | 7  | 8  | 16 | 3  | 2  |    |    |    |    |    |    |    | 153  |
| 7     | 1  | 4  | 2  | 18 | 23 | 25 | 21 | 20 | 20 | 26 | 15 | 22 | 35 | 20 | 4  | 5  | 2  |    |    |    | 243  |
| 8     | 17 | 29 | 12 | 28 | 14 | 26 | 23 | 28 | 32 | 29 | 29 | 24 | 20 | 20 | 22 | 25 | 35 | 18 | 11 | 9  | 4  | 2  | 313  |
| 9     | 8  | 50 | 32 | 44 | 31 | 24 | 20 | 24 | 25 | 35 | 12 | 15 | 6  | 2  | 4  | 7  | 3  | 4  | 1  |    |    | 346  |
| 10    | 4  | 22 | 50 | 44 | 41 | 37 | 25 | 17 | 30 | 34 | 18 | 3  | 11 | 9  | 4  | 2  |    |    |    |    |    | 313  |
| 11    | 15 | 35 | 40 | 21 | 49 | 24 | 30 | 38 | 25 | 10 | 10 | 13 | 20 | 4  | 2  | 2  | 1  | 1  | 4  | 22 | 9  | 12 | 372  |
| 12    | 50 | 15 | 50 | 25 | 32 | 32 | 9  | 14 | 2  | 15 | 20 | 10 | 2  | 4  | 2  | 1  | 1  | 2  | 1  | 1  | 1  | 289  |
| 13    | 50 | 50 | 43 | 22 | 26 | 23 | 5  | 1  | 1  | 5  | 2  | 1  | 8  | 11 | 4  | 1  | 1  | 1  | 1  | 1  | 289  |
| 14    | 25 | 21 | 40 | 17 | 30 | 25 | 21 | 25 | 14 | 22 | 9  | 2  | 1  | 1  | 1  | 1  | 1  | 5  | 4  | 1  | 1  | 230  |
| 15    | 14 | 11 | 10 | 3  | 13 | 11 | 32 | 9  | 4  | 5  | 3  | 2  | 1  | 9  | 6  | 1  | 6  | 3  | 1  | 172  |
| 16    | 3  | 3  | 2  | 8  | 10 | 16 | 6  | 3  | 2  | 2  | 3  | 5  | 2  | 11 | 2  | 8  | 1  |    |    |    | 108  |
| 17    | 3  | 3  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 2  | 10 | 4  | 1  | 1  | 1  | 6  | 4  | 9  | 9  | 5  | 1  | 73   |
| 18    | 3  | 1  | 2  | 1  | 1  | 1  | 4  | 4  | 1  | 1  | 2  | 10 | 4  | 1  | 1  | 1  | 1  | 6  | 4  | 9  | 9  | 5  | 1  | 114  |
| 19    | 2  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 2  | 10 | 4  | 1  | 1  | 1  | 1  | 6  | 4  | 9  | 9  | 5  | 1  | 123  |
| 20    | 13 | 8  | 3  | 2  | 1  | 6  | 9  | 8  | 15 | 30 | 20 | 9  | 4  | 6  | 14 | 3  | 2  | 1  | 1  | 1  | 175  |
| 21    | 2  | 4  | 2  | 1  | 1  | 12 | 16 | 15 | 12 | 10 | 17 | 19 | 10 | 16 | 2  | 1  | 1  | 1  | 1  | 152  |
| 22    | 2  | 2  | 1  | 2  | 1  | 24 | 6  | 20 | 23 | 7  | 17 | 7  | 19 | 10 | 1  | 2  | 1  | 1  | 1  | 138  |
| 23    | 1  | 14 | 16 | 20 | 22 | 15 | 18 | 4  | 1  | 4  | 1  | 116 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 116  |
| 24    | 1  | 10 | 6  | 5  | 20 | 4  | 7  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 59   |
| 25    | 1  | 1  | 3  | 2  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 12   |
| 26    | 1  | 1  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 27    | 2  | 2  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 28    | 1  | 1  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 29    | 1  | 1  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 30    | 1  | 1  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Total | 222| 307| 286| 307| 244| 218| 183| 144| 107| 70 | 4053|
|       | 253| 216| 281| 287| 247| 208| 137| 203| 98 | 35 |      |

Mean Number of Sandstone Items per Cell = 6.76*
Standard Deviation of Sandstone Items per Cell = 10.21*
Each Cell Represents a 2m by 2m Collection Unit

*No more than 50 items 4 x 6 cm in any two dimensions were counted

**Figure 8.** Ground stone and bone distribution.

**Figure 9.** Rubble distribution.
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| TOTAL   | 95 97 83 100 89 83 96 96 87 78 80 88 98 89 92 50 86 107 63 90 1747 |

Mean Number of Shrub Plant Stems per Cell = 2.91
Standard Deviation of Shrub Plant Stem Counts per Cell = 2.11
Each Cell Represents a 2m by 2m Collection Unit

Only stems taller than 10 cm were counted

Figure 10. Shrub distribution.
in the auger holes, 24% were white wares and 76% were gray wares. This ratio of 3 gray ware sherds to 1 white ware sherd may serve as a baseline estimate of the proportions of gray ware to white ware sherds to expect on the surface of the site if no prior artifact collection had occurred on the site. Actually, the gray ware to white ware proportion on the site surface is now approximately 5:1.

THE CERAMIC ASSEMBLAGE AND SAMPLING STRATEGIES

The primary objective of the assessment of the Rollie Site was to determine the age of the site from the pot sherds. The complete surface collection and the analysis of the pot sherds was a time-consuming process. It would be desirable to assess contemporaneity of other sites in Heaton Canyon using a less time-consuming but just as reliable method. In an effort to develop an efficient method, the nearly complete collection can be used as a baseline for suggesting various sample strategies to apply to other sites. Samples were drawn from the sherd collection to determine what sample sizes and collection areas of the site might represent the population of sherds on the site as a whole. The characteristics of the sherd population and the samples drawn are described below.

Grab Collection

In order to fulfill the requirements for Archaeological Surveyor in the ASNM Incremental Archaeological Certification program, participants must complete the Laboratory of Anthropology Site Survey Form. This form requires no systematic method of reporting ceramic frequencies on archaeological sites. The ASNM Field School developed a format for reporting sherd frequencies in the Gallup Area, which was used for an initial report on the site as part of the Certification Program (Table 3). This system should ultimately be useful for seriating sites from surface collections, if sample sizes and biases can be controlled.

Artifact Population

Systematic collecting of all the artifacts on the site forced us to examine small-sized and drab material that might otherwise be ignored. The Rollie Site surface has been collected on previous occasions by archaeologists for temporally diagnostic artifacts and by specimen hunters for the larger and more distinctive artifacts. This high-grading certainly has skewed the results of this study. The extent of this skewing may be assessed in the future by comparing the ceramic assemblage from the Rollie Site to excavated assemblages of contemporary sites (see for example Brethauer 1980; Olsen and Wasley 1956; Scheick 1983) in the Gallup vicinity. The surface ratio of gray wares to white wares from the Rollie Site is approximately 5:1. The assemblages from the excavated sites show a much higher proportion of white wares.

The sherd counts from the surface collection indicate a temporal occupation of the Rollie Site in the Wingate phase, A.D. 1000-1130 (Anyon, Collins, and Bennett 1983; Olsen and Wasley 1956). Because the sherd analysis from the Vidal Site is not yet available, no formal seriation of sherds from
Table 2. Auger hole characteristics from the Rollie Site.

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Total 23 72

#Hit rock, not sterile
*b=bone, gs=ground stone, es=eggshell, ps=polished stone

113
Table 3. Sherds from first recording.

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<td>4</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Ware</td>
<td>18</td>
<td>36</td>
<td>14</td>
</tr>
<tr>
<td>SUBTOTAL</td>
<td>48</td>
<td>100</td>
<td>37</td>
</tr>
<tr>
<td><strong>PLAIN</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plain Gray</td>
<td>16</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Coiled</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Coiled Ind</td>
<td>63</td>
<td>77</td>
<td>48</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>SUBTOTAL</td>
<td>82</td>
<td>100</td>
<td>63</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>130</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4. Characteristics of the collection areas on the Rollie Site.

<table>
<thead>
<tr>
<th>Type</th>
<th>Total Surface</th>
<th>Sample Area I</th>
<th>Sample Area II</th>
<th>Sample Area III</th>
<th>Sample Area IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>COL. UNITS #</td>
<td>600</td>
<td>40</td>
<td>16</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Area (sq m)</td>
<td>2,400</td>
<td>160</td>
<td>64</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>% Site area</td>
<td>100.00%</td>
<td>6.80%</td>
<td>2.70%</td>
<td>1.36%</td>
<td>1.36%</td>
</tr>
<tr>
<td>SHERDS (% TOTAL)</td>
<td>100.00%</td>
<td>11.70%</td>
<td>7.00%</td>
<td>5.5%</td>
<td>3.25%</td>
</tr>
<tr>
<td>Avg. No. grid</td>
<td>10.68</td>
<td>18.73</td>
<td>28.00</td>
<td>44.50</td>
<td>26.00</td>
</tr>
<tr>
<td>Avg. sq m</td>
<td>2.67</td>
<td>4.68</td>
<td>7.00</td>
<td>11.10</td>
<td>6.50</td>
</tr>
</tbody>
</table>

Table 5. Sherd counts from 200 sherd white ware sample area (representing 120 sq m or 5% of site area).

<table>
<thead>
<tr>
<th>Type</th>
<th>No.</th>
<th>%</th>
<th>Total % for Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAINTED</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Mesa</td>
<td>26</td>
<td>12.7</td>
<td>13.3</td>
</tr>
<tr>
<td>Puerco</td>
<td>75</td>
<td>36.8</td>
<td>38.3</td>
</tr>
<tr>
<td>Gallup A</td>
<td>36</td>
<td>17.6</td>
<td>12.8</td>
</tr>
<tr>
<td>Gallup B</td>
<td>15</td>
<td>7.4</td>
<td>12.0</td>
</tr>
<tr>
<td>Other</td>
<td>52</td>
<td>25.5</td>
<td>22.1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>204</td>
<td>100.0</td>
<td>98.5</td>
</tr>
</tbody>
</table>
the two sites is yet possible to judge contemporaneity. A comparison with excavated assemblages may not, in any case, be meaningful because of the bias introduced by on-going surface collection. In other words, without a surface collection from an excavated site for control, it may be impossible to reliably seriate surface assemblages. In this case, the effort to select sites contemporary with the Vidal Site Great Kiva in Heaton Canyon based on a surface assemblage may need to wait until the ceramic analysis is completed at the excavated sites.

**Sample Strategy**

Four samples were drawn from the analysed sherd data. Samples were chosen to investigate differences that might occur between select sample areas of the site (see Figure 3). The first sample was a large transect designed to sample the major architectural feature of the site and to include the densest part of the large midden. The second sample included one area in each quadrant of the site. The third sample was a single area in the densest part of the large midden. The fourth sample area was chosen to include the densest area of sherds in the smaller midden associated with the small room block. A description and discussion of the salient characteristics of each sample area is found below and in Tables 1 and 4. The sample areas are also outlined in the artifact distribution maps (Figures 5, 6, 8, and 9).

**Sample I**

Sample I consists of forty 2-by-2-m collection units aligned in a south-to-north transect measuring 4 by 40 m through the approximate center of the site. This transect was placed to cover the densest concentration of artifacts in the trash area and a portion of the rubble mound. This transect covered 6.8% of the collection surface area but encompassed 11.7% (n=749) of the total sherds collected from the site. Even though this sample encompassed more than twice the area and contained approximately twice the number of sherds as any of the other samples, it is no more representative of the population than the spectrum of sherd distributions in two of the three other samples.

**Sample II**

Sample II consisted of four separate sample units scattered in each of the quadrats of the site. Each unit consisted of a 4-by-4-m collection block. Three of the blocks are located down slope varying distances from the large house mound. The other unit is placed in the large trash midden area. A total of 2.7% of the site surface and 7% (n=448) of the total number of sherds are represented. The collection unit in the trash midden accounts for half of the sherds in this sample and may have produced results little different from the other two samples dominated by the trash midden materials.

**Sample III**

Sample III consisted of a single block measuring 4 by 8 m located in the approximate center of the large trash midden. Only 1.36% of the surface of the site was included, but the sample yielded 5.56% (n=356) of all the sherds. Except for the absence of early Red Mesa
specimens from this sample, it included all the types identified in the other sample areas. The overall proportion of white wares to gray wares approximates the 5:1 ratio of the whole population.

Sample IV

Sample IV was a block of the same size as Sample III (4 by 8 m) but was located in the smaller trash midden area believed to be associated with the small eastern room block or rubble mound. This sample accounted for 1.36% of the surface area of the site collection area and only 3.25% (n = 208) of the total number of sherds on the site. This is the smallest total number of sherds in any sample. This sample produced a significantly higher number of white wares (28.1%) than for the site as a whole. Most of the white ware sherds have no painted design present and are therefore unidentifiable as to type. It is interesting to speculate that this may be a reflection of the suspected earlier site component in this area.

Comparison of Samples

The distribution of sherds is the inverse of the distribution of the architectural components on the site. Sophisticated statistical sampling methods might be applied to determine what blocks of collection units would be most representative of the site. But even without this statistical analysis, the complete collection of the site surface materials shows two concentrations of surface materials that might not have been identified. The samples in the total collection show two site components with different temporally diagnostic artifact spectra and distinct architectural features. Comparison of Sample III, associated with the large room block rubble mound, and Sample IV, associated with the small room block, delineate separate components of the site. Sample III most closely represents the percentage distribution of pottery types for the whole site, and Sample IV is the farthest from being representative.

None of the sample units included either of the two red ware sherds in the population. Due to the low frequency of this type it would not be expected that this type would be represented in a sample from the site. This distinctive type is temporally significant for dating the site and is probably the most subject to specimen collecting.

The proportions of gray ware sherds are remarkably consistent in all samples. For the population of gray ware sherds as a whole, about 21% are plain gray ware, and 72% are coiled indented. Each of the samples shows the same proportion of plain to indented gray ware. There is an obvious difference between these proportions from the Rollie site and other excavated assemblages in the Gallup Area (Brethauer 1980; Olsen and Wasley 1956; Scheick 1983).

Sample IV is the most different from the other samples (higher proportion of white wares; presence of early Red Mesa). However, because of the small sample size, these characteristics cannot be used with confidence to support the suspicion that the small eastern room block and nearby trash are an earlier site component. Excavation might confirm a difference in the temporal component.
Im prove d Sample Methodology

In order to obtain a representative sample of ceramic materials for temporal placement of sites, it might be necessary to implement a nested sampling approach. Such an approach might be as follows: A transect would be established through the densest part of each subjectively recognized, discrete concentration of sherds on a site. The sample size needed to confidently and reliably estimate population characteristics is an important experimental notion (Blalock 1972:213-215). The degree to which a sample represents the population increases with sample size; a large sample can be used more confidently than a small sample. The problem is to develop a sampling procedure for the temporally diagnostic ceramics (white wares) that can reliably reflect the population.

The problem is evident at the Rollie Site, where over 1,000 white ware sherds were collected. None of the sample areas selected appears to closely approximate the population proportions of white ware sherd types. This is probably the result of sampling error in small samples: only one sample includes more than 100 white ware sherds.

In order to develop a more representative, proportional sampling strategy, it was decided to select a sample area that would yield at least 200 white ware sherds in the densest area of artifact concentration. An area contiguous to and including Sample III was expanded until 200 white ware sherds were enumerated (Table 5). This sample more closely approximates the white ware ceramic percentages on the entire Rollie Site than any of the previously described samples. The area of this sample includes 120 sq m, or 30 collection units.

Conclusions

The findings of this study are inconclusive regarding the contemporaneity of the Rollie Site with the Vidal Site Great Kiva. Development of seriation tables from the region would be a major step in achieving the goal of chronological placement based on site surface studies. In order to develop seriation dating in the area it will be necessary to compare dated, excavated assemblages with controlled surface collections on the same site. It will also be necessary to assess biases introduced by specimen collection. Furthermore, careful assessment of site formation processes must be accomplished from excavated assemblages from whole sites, as is being done at the Vidal Site by ASNM, to fine tune the seriation chronology.

Once such a seriation chronology is developed, controlled surface collections may be useful in reliably establishing contemporaneity of archeological sites in the region. The assessment of the Rollie Site indicates that a reliable, representative sample consists of an area of less than 5% of the site surface constituting 10% of the surface sherds. However, in order to obtain this reliable sample the densest area of ceramic concentration on the site needs to be determined. Secondly, care needs to be used to determine whether there may be more than one site component. Thirdly, a running tally must be made of the number of artifacts collected. Without some controls over the nature of the sample drawn and the biases inherent in any surface archaeological
examination, results will be ambiguous. Ultimately, controlled surface collections used in tandem with a seriation chronology will allow confident assessment of site contemporaneity of sites from surface assemblages in the Gallup area.

ACKNOWLEDGEMENTS

This paper constitutes a portion of the report submitted by one of the authors, Beverly Engelbrecht, to Dr. Richard Chapman of the University of New Mexico to fulfill the requirements of Anthropology 499 (Independent Research). Both authors wish to thank Dr. Chapman for his enthusiastic support of this project and the efforts of the ASNM Field School at large. In addition, the project would not have been possible without the interest and support of Betty Kelley, Dick Bice, and Bill Sundt, motive forces (to be reckoned with) in the Archaeological Society of New Mexico. Without their liberal sharing of their knowledge and resources, the project would never have been initiated. We also wish to thank the Gamerco Associates for allowing continuing access to their property for ASNM's scientific purposes. Finally, thanks are due to Hal Rodriguez and Karen Castionni for reviewing the work in progress and this report. Additional thanks are due Hal Rodriguez for taking the artifact photos. Sheila Brewer and Owen Severence oversaw the production of the site map from which Figure 2 was redrafted. Sheila Brewer also lead the auger sampling crew. We hope that in some way the hope of the future can be based on the successes of the past. All errors of fact and fancy are of course the responsibility of the authors, although those named above can not be held blameless.

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Scheick, C. (compiler)  

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Two distinctive vessels styles, stirrup-spouts and double vessels, have been intro­duced into the Southwest from South America by way of Mexico. In this article, I trace their origin and distribution and discuss their function.

STIRRUP-SPOUTS

The stirrup-spout, applied to jars/bottles/canteens, is a unique shape, not to be confused with single-spouted jars with arched handles or with double-spouted jars that have an arch between the spouts. This highly specialized form consists of an arched, hollow handle attached to a vessel (whose outlines may vary from globular to shoul­dered, wedge-shaped, oblong, and even effigy), with a spout located in its center. As a bottle or canteen, it is a utilitarian shape, combining handle and pouring spout in one. However, only the multitude of elaborate effigy forms that it sometimes took in Peru suggests the range of variations possible within this one type.

The style appears sporadical­ly over a wide expanse of the New World. Most likely, despite the gaps between occurrences in both space and time, it had but one place of origin. For, as noted by Ford (1969:117), while the vegetal kingdom might pro­vide prototypes for early pot­tery shapes (i.e., the bottle gourd), it surely offers none for the stirrup-spout.

Distribution of Stirrup-spout Vessels

The earliest manifestation of the stirrup-spout vessel occurs in coastal Ecuador during the Machalilla phase, thought to begin about 2000 B.C. (Ford 1969:117). From Ecuador it seems to have spread early to the central highlands of Peru, where it was found in Kotosh Kotosh and Kotosh Chavin hori­zons after about 1100 B.C., and from there to Peru's north and central coasts shortly after 1000 B.C. (Ford 1969:Chart 16). In Figure 1 (a-i), these early forms are outlined, as are typ­ical globular vessels with thick stirrup-spouts from the Cupis­nique or coastal Chavin culture of the north and angular exam­ples from the later Gallinazo period of the Virú Valley, characterized by negative paint­ed pottery. Although it seems to have died out in the high­lands after 200 B.C., following the Chavin (Ford 1969:118), the stirrup-spout continued on the north coast, reaching a peak of popularity in the Mochica period (ca. A.D. 400-1000). It was greatly favored also during suc­ceeding Chimú times (A.D. 1300-1435).

Mochica pottery attained an unparalleled degree of excel­lence. Among countless exam­ples, some were near duplicates, mold made, sometimes with dis­similar slips; the chief differ­ence was in the stirrup-spouts, which were formed by hand.
Figure 1. Non-Southwestern Stirrup-spout Vessels:  

- a & b) Machalilla Striated Polished Plain and Machalilla Embellished Shoulder, Machalilla phase, Ecuador (Meggars, Evans, and Estrada 1965:Figures 88 & 78-8);  
- c) Kotosh-Chavin example from central highlands, Peru (Ford 1969:Chart 16);  
- d) Ancon Zoned Red, Guanape (earliest ceramic) period of the Virú Valley, Peru (Ford 1949:Figure 9);  
- e) Puerto Moorin period, Virú Valley (Ford 1949:Figure 9);  
- f) massive stirrup-spout form: coastal Chavin type from southern Ecuador (Collier and Murra 1943:Plate 10-4);  
- g & h) Gallinazo negative pottery, sharp shouldered, Virú Valley (Collier 1955:Figure 27b, c);  
- i) effigy jar, Gallinazo period, Virú Valley (Ford 1949:Figures 9);  
- j) Mochica Polychrome, Peru (Sawyer 1954:5);  
- k) Mochica black ware frog effigy (Sawyer 1954:13);  
- l & m) Huancaco Red and White, Huancaco period (Mochica/early Chimú), Virú Valley (Strong and Evans 1952:Figure 70-14 & 18);  
- n) Chimú portrait jar (Larco 1930:124);  
- o) Chimú effigy vessel depicting a pacay pod (collections of the Museo Nacional de Antropología y Arqueología, Lima; Milla Batres 1975:No. F/247);  
- p) Quento Polished Plain typical black ware jar with tiny bird at junction of spout and handle (Collier 1955:Figure 19b);  
- q) miniature snake effigy jar from Quimbaya, Colombia (Bennett 1954:Figure 160);  
- r & s) examples of archaic stirrup-spout jars from Tlatilco Valley of Mexico (Porter 1953:Figure 12);  
- t) Chupicuaro-like black Polychrome vessel from Museo Michoacana, Morelia, Mexico (Porter 1956:Figure 12s);  
- u) red-slipped jar from Tzintzuntzan, Mexico, with extra "teapot" spout (Dockstader 1972:No. 33);  
- v) stirrup-spout jar from Baja California (collections of the Southwest Museum; Brainerd 1949:Figure 1);  
- w & x) thick-spouted Mississippi period examples of Bell Plain from Sikeston Ridge, Missouri, area and Neely's Ferry Plain, lower St. Frances area, Arkansas (Griffin 1952:Figures 121r & 125c);  
- y) three-handled Mississippi period spouted bottle from southern Illinois (Phillips, Ford, and Griffin 1951:Figure 106e);  
- z) stirrup-spout jar from Tennessee with perpendicular spout (Myer 1922:Figure 8).
Mold-made pottery, although the technique made its appearance much earlier, was quite common in Mochica burials. Stirrup-spouts were attached through openings in the vessel body (through which liquid flowed into the handle), or sometimes, instead, they were butted onto the body rather than inserted through the holes (Collier and Murra 1943:124-125).

Stirrup-spout vessels of the succeeding Chimú period were fashioned in a great variety of forms and techniques, including portrait heads, also a Mochica feature. The most typical, however, were black, with a little bird, monkey, or similar decorative element delineated at the juncture of the stirrup and spout, as in an example with a tiny long-billed bird, illustrated by Collier (1955:Figure 19b) and depicted in Figure 1o; the delightful rendition of a pacay pod (Milla Batres 1975:F/247) in Figure lp; and as the one seen in Figure 2. While generally lacking among the Inca proper, stirrup-spout vessels continued to occur on the coast, and from the Virú Valley, Collier (1955:157) noted a stirrup-spout sherd of Inca-influenced or Inca-associated ware. Black ware stirrup-spout vessels resembling the Chimú style continue to be made on Peru's northern coast today (Ford 1969:118).

After Peru, one must travel a considerable distance to find additional examples. An assortment has been discovered in Mexico, but there are very few others between. Four (such as the one illustrated in Figure 1q) have been found in Quimbaya culture burials of northern Colombia, but none resemble the Peruvian style (Bennett 1944:63). They also are present in the Tairona culture of Colombia's Santa Marta Mountains, where modeled vessels were provided with stirrup-spouts (Bennett 1954:147-148). Probably these are relatively late (perhaps dating around A.D. 1000-1300), occurring geographically between older examples from Peru and from Central America.

In the latter region, an earlier, aberrant example was found at Playas de los Muertos, Honduras (Porter 1953:66). A brown-black stirrup-spout vessel from a collection in the Quetzaltenango Valley is very similar to the Peruvian Chavin variety. Its provenience is unknown, but it resembles other pottery of Quetzaltenango. If this were the place of origin, it would be the only stirrup-spout found to date in Guatemala (Porter 1953:62).

Nor are stirrup-spouts common in Mexico. Two are reported from the east, both from Tolome near the port of Vera Cruz (Porter 1953:49). And early (Preclassic) examples have come from late Zacatenco and from Tlatilco in the Valley of Mexico. The largest group (a total of nine) was found at the latter site (Porter 1953:40); Figure 12; Plate 10e & f); they also seem similar to those from coastal Chavin, although here they date circa 800-400 B.C. (Ford 1969:118). Two somewhat angular, wedge-shaped Tlatilco examples are outlined in Figure 1r & s). A later specimen, a beautiful, globular, black polychrome vessel (Figure 1t) is housed in the collections of the Museo Michoacana, Morelia. Although the provenience is not known, it is a ware typical of Chupicuaro, Guanajuato (Porter 1956:551; Figure 12s).

Stirrup-spouts appear with some frequency--much later--at
Tzintzuntzan, Michoacan, on Mexico's west coast, the region where the form seems to have been most concentrated (Lister 1947:Figure 6a; Moedano 1941: Figure 1, 14, & 15). A peculiar example from this Tarascan site (dating ca. A.D. 1250-1500) is a red-slipped stirrup-spout jar that has a second, teapot-like spout extending from its side (Dockstader 1972:no. 33; illustrated in Figure 1u). (The teapot-spout occurs in a context not related to a stirrup-spout at the same site.) A very similar specimen, combining stirrup and teapot spouts, has been illustrated by Lumholtz (1902:334) from Tuxpan, Jalisco, and he mentions still another from Uropan, Michoacan.

Finally, the semiglobular stirrup-spout vessel from the collections of the Southwest Museum (Figure 1v), is reported to be from Baja California (Brainerd 1949:Figure 1).

The next area in which stirrup-spouts are found is the Southwest United States, where pottery types have been more precisely dated than is always possible in other regions of the New World. Thus, we know that the form made its appearance here during Anasazi Basketmaker III (A.D. 500-700), probably by way of northwestern Mexico, the locale in which it seems to have lingered longest (Ford 1969: 118). Whether the Baja California vessel was derived from the same source, or whether—as Brainerd (1949:7) theorized—it may have reached there through diffusion from the Southwest is a tantalizing question.

Examples appear to be lacking from the Chichimecan region of Chihuahua, where later the great trading center of Paquimé, at Casas Grandes, had considerable contact with the Anasazi. The
form makes its final appearance in the eastern United States. Here its introduction was latest of all. It appears not to be found in Hopewell context, but does occur with some frequency in the Mississippi period, around A.D. 1200-1300 (Ford 1969:Chart 16). It does not seem to have been one of the early Mississippi forms and did not spread far after its entry (Phillips, Ford, and Griffin 1951:172). It was not, for instance, found in the lower Mississippi Valley or "Caddo" area, but primarily in Missouri and Arkansas (Phillips, Ford, and Griffin 1951). The most common form (see Figure 1w) is rather globular, with a short, wide spout; however, an aberrant example from Tennessee (Figure 1z) has a "melon" shape and stirrup handle with spout that is perpendicular to it (Myer 1922:Figure 8). A stirrup-spouted double jar came from Arkansas (Phillips, Ford, and Griffin 1951:Figure 106i; illustrated in Figure 12e). And, although a bit beyond the strict definition of the type, another rare Mississippi-period specimen, from southern Illinois, is a ring-based jar with three arched handles converging into a single central spout (Phillips, Ford, and Griffin:Figure 106e).

Again, the ultimate source of the Eastern stirrup-spout is uncertain, although Phillips, Ford, and Griffin (1951:172), as well as Brainerd (1949:7), favor the diffusion theory and an Andean point of origin. Thereafter it likely moved into the Southwest through western Mexico and thence to the Southeast (Ford 1969:119). Ford (1969:118) notes that its path may have been by way of the Arkansas River trade route that existed circa A.D. 1200.

Stirrup-spout Vessels of the Southwest

Although by no means equaling in quantity and variety the stirrup-spouts of Peru, those of the Southwest seem most numerous and long-lasting in comparison with other areas.

Except for trade ware, the type appears to be absent among the Mogollon and Hohokam. Among the Anasazi, it dates from Basketmaker III, coinciding with the period when pottery itself was first made by these ancestral Puebloans. The plain ware example seen in Figure 3a was excavated by Morris in the La Plata region of the San Juan River drainage, and its base shows the marks of the basket in which it was begun (Morris 1939:Plate 192a). Moving from Basketmaker to Pueblo I (A.D. 700-900), two other stirrup-spouts have been reported by Morris, dating during this period and also from the La Plata district (Figure 3b & c): a rounded vessel with a nearly neckless spout and a "doughnut"-shaped vessel with a stirrup top (Morris 1939:Plate 240f & c).

Another Pueblo I example, identified as a Kiatuthlanna Black-on-white stirrup pot, was found by Roberts (1932) in the Zuni area. He described it as a curious cross between a seed jar and a canteen. The bottom portion has a typical seed jar form, as far as the black and white vessels are concerned, but in addition there originally was a hollow loop handle of the stirrup type, as indicated by the dotted line in the drawing. [p. 115 and Figure 21a]

A copy of this drawing, including hypothetical handle and spout, may be seen in Figure 3d.
A Pueblo I compound vessel of Kana-a Black-on-white with stirrup spout handle (Figure 12a) was collected by Morris, provenienced to Bennett's Peak, New Mexico (Lister and Lister 1978:Figure 16). Another such vessel, spanning the time between Pueblo I-II, consists of two seed jars connected by a stirrup-spout handle--one is Kana-a Black-on-white, the other Black Mesa Black-on-white (Beals et al. 1945:165, Footnote 120). The authors point to the example to demonstrate that PI and PII pottery was being made by the same people at the same time.

A more conventional globular canteen with stirrup-spout (Figure 3e) is a Mancos Black-on-white example from Blanding, Utah (Lister and Lister 1978:Figure 16; Morris 1939:169). A specimen of Anasazi trade ware in the form of a Red Mesa Black-on-white canteen (Figure 3f) was discovered in a Three Circle phase Mogollon pithouse at the SU Site (Martin and Rinaldo 1947:Figure 129a).

Pueblo III (A.D. 1100-1300) examples include a Tularosa Black-on-white vessel (Kidder 1942:Plate 44g), here outlined in Figure 3g, and a small Klage-to Black-on-white canteen from Largo Canyon in the collections of the Museum of New Mexico (MNM; see Figure 4). Another MNM example is a PIII black-on-white miniature purchased at Zia Pueblo (Figure 3h).

From Chaves Pass, among the Western Pueblos, came a later PIII or PIV (A.D. 1300-1500) vessel of Jeddito Black-on-orange or Jeddito Black-on-yellow (Fewkes 1904:Plate XXXVIb; pictured in Figure 4). In addition to the illustrated example, Fewkes noted that several canteens of the stirrup-spout variety had been found (Fewkes 1904:64).

Martin and Willis (1940:Plate 53, 3) illustrate a vessel that may represent a PIV Sikyatki Polychrome example: a body shaped somewhat like the Jeddito specimen, with the remains of two hollow appendages at the top, which may be double spouts, but might even more likely be the vestiges of a stirrup-spout handle.

A stirrup-spout canteen from PIV Hawikuh (Figure 3i) has been described as decorated with purplish glaze on a creamy slip (Hodge 1923:20; Plate 28c). However, it was during the glaze-paint era in the northern Rio Grande region (A.D. 1300-1500) that the type appears to have reached its greatest vogue. This was especially true during Glaze III (A.D. 1400s), but examples are noted by Kidder from Glaze I to Glaze V. He cites specimens ranging from Glaze I-III found by Nelson in the Galisteo Basin, as well as fragments excavated at Pecos (Kidder 1936:270). And he illustrates one fragment of a Pecos stirrup-spout (Figure 3j), probably Glaze V--the restoration drawing based upon another specimen from the Galisteo Basin in the collections of the American Museum of Natural History (Kidder 1936:Figure 232). In addition, he has noted a stirrup-spout fragment from the Pajarito Plateau (Kidder 1915:Plate XVII, 7).

The collections of the Museum of New Mexico contain still another example from the Pajarito Plateau--Espinosa Glaze-polychrome (Glaze III) with broken handle--and the upper portion of a Kuaua Glaze-polychrome stirrup-spout canteen, also dating to the A.D. 1400s. In fact, a shoe box full of stirrup-spout fragments was recovered during excavations at Kuaua (Marjorie Lambert, person-
In addition to glaze wares made in some parts of the northern Rio Grande during the 1400s, black-on-white pottery was being manufactured in abundance. A fragmentary compound vessel of Bandelier Black-on-white from Tasam Ruin, now consisting only of one lobe and part of the handle, with spout, is illustrated in Figure 12.

Stirrup-spout vessels have continued to be made into historic times. Stevenson (1883), who reported upon ceramic collections made among the pueblos of New Mexico and Arizona in 1879, portrays an example from Laguna Pueblo (Figure 3k) with an angular, knobby handle and short spout (Figure 596), as well as stirrup-spout double vessels from Zuni (Figures 395 & 396), seen in Figure 12c & d. Also, there is a strange Jemez Pueblo canteen with two vertical handles rising from the top, supporting a rectangular, box-like element and, on top of this, a spout in the shape of a bird's head (Figure 676).

A beautiful "turnip"-shaped vessel obtained from Santa Clara, with simple polychrome decoration on a white slip (Figure 31) appears to date back to PIV (Stevenson 1883:Figure 706). Among forms of later Santa Clara painted ware, dated 1879-1920, are two stirrup-spout jars (Figure 3m & n) outlined by Le Free (1975:Figure 53), who also mentions the Stevenson canteen noted above (Le Free 1975:88). Still more recent is a flat-based micaceous vessel with tall stirrup-spout handle, pur-
Figure 4. Two Southwestern Canteens: a) small Klageto Black-on-white stirrup-spout canteen (Museum of New Mexico collections No. 43341/11); b) Jeddito Black-on-orange or Black-on-yellow canteen (Fewkes 1904:Plate XXXVI).

Chased by the Museum of New Mexico in 1949 (Figure 6). It was made by Mary V. Herrera of Picuris Pueblo.

Finally, to bring the subject full circle, there are the stirrup-spout canteens now being fashioned by innovative Navajo potter Betty B. Manygoats of the Shonto/Cow Springs area. Modeled after prehistoric Andean forms from pictures showed to her by trader William T. Beaver (Bruce Bernstein, personal communication 1989), they are usually decorated with applique elements such as horned toads or corn plants (Wright and Bell 1987:27). But a more elaborate form may be seen outlined in Figure 3o. It is a duck effigy with stirrup-spout handle, made by Betty Manygoats in 1988 and purchased from Beaver for the collections of the Wheelwright Museum of the American Indian.

DOUBLE VESSELS

Compound vessels may be double (either side-by-side or vertically tiered), triple, or even quadruple. However, the most common style consists of two containers, side-by-side, usually joined by a hollow bar near the base (permitting liquid to flow from one container to the other) and having a strap handle at the top. Sometimes, however, two vessels simply share a common partition wall, most frequently, but not always, with an opening from one to the other.
Figure 5. Glaze III Canteens: a) Espinosa Glaze-polychrome (Museum of New Mexico collections No. 21375/11); b) Kuaua Glaze-polychrome stirrup-spout fragment (Museum of New Mexico collections No. 44987/11).

Figure 6. Micaceous stirrup-spout jar made in 1949 by Mary V. Herrera, Picuris Pueblo (Museum of New Mexico collections No. 18957/12).
Distribution of Double Vessels

One of the earliest types of compound vessels was the whistling pot. In its simplest, pre-compound form, the latter consisted of a bottle with a centrally placed long spout and a strap handle connecting the spout and bottle shoulder. This type had its beginnings in coastal Ecuador during the Chorrera phase, ca. 1500-500 B.C. (Ford 1969:121). A more elaborate style added an effigy element. Prior to A.D. 500, compound whistling pots were developed from two jars (one usually an effigy in shape) joined at the base by a hollow tube. One jar was open mouthed; the other was closed at the top, except for a small opening that served as a whistle when air was forced through it by pouring water into the other vessel (Kidder, Jennings, and Shook 1946:190).

Whistling jars were popular in both Ecuador and Peru, where they lasted into the Inca period. A Peruvian Gallinazo phase double effigy vessel and two other Gallinazo forms, as well as a Huancaco double jar (a Virú Valley manifestation of late Mochica) are illustrated in Figure 7. Double effigy jars, which also appear in post-Mochica coastal Tiahuanaco (ca. 700-1000), consist of bottles with slender, tapered spouts joined to complex effigy vessels by flat, arched, strap handles at the top and bars near the base (Sawyer 1954:30-31).

Double vessels (of the non-whistling variety) have been recovered from southern Ecuador also; among examples illustrated by Collier and Murra is a late specimen found at the Cerro

Figure 7. Non-Southwestern Compound Vessels: a-c) Gallinazo period pottery from Virú Valley, Peru: negative painted double effigy vessel (Strong and Evans 1952:Figure 57-9); miniature double jar covered with dull white slip (Collier 1955:Figure 29e); double jar with arched handle and solid bar, Gloria Polished Plain (Collier 1955:Figure 32c); d) Huancaco period double jar, one spout open, one closed (Strong and Evans 1952:Figure 69-6 & Plate XVIk); e) late pre-Inca double vessel with connecting tube, from Cerro Narrio, southern Ecuador (Collier and Murra 1943:Plate 35-1); f) Quimbaya, Colombia, double effigy vessel in Red and White (Bennett 1944:Figure 13e); g) Chibcha double jar from Colombia (Bennett 1944:Figure 20h); h) miniature footed vessel from Costa Rica (Lothrop 1926:Plate CLXXXVe); i) Chiapa III black ware whistling jar, Chiapas, Mexico (Lowe and Mason 1965:Figure 11); j) whistling jar, Kaminaljuyu, Guatemala (Kidder, Jennings, and Shook 1946:Figure 179h); k) red-rimmed orange double jar with incised designs from Amapa, Nayarit (Bell 1971:Figure 12b); l) Bell Plain double bottle with opening between walls and flat strap at neck, Mississippi period, Arkansas (Phillips, Ford, and Griffin 1951:Figure 106h); m) Nodena Red and White double jar, bodies opening into each other, Mississippi period, Arkansas (Phillips, Ford, and Griffin 1951:Figure 112g).
Narrío Site near Cañar, from a period just prior to the Inca conquest. It consisted of two wide-mouth jars, side by side, with a connecting tube (Collier and Murra 1943:62 and Plate 351).

Bennett (1944:61) described double vessels from Colombia, including seven modeled examples, each flat-based with a straight, tubular spout and connected by a tube and flat bridge to a second container. Some of these were whistling pots. From Quimbaya came the effigy vessel illustrated in Figure 7 (Bennett 1944:Figure 13c). There was also a somewhat later Chibcha double jar: two spouted bottles joined by a flat bridge and arched handle (Bennett 1944: Figure 20h).

Costa Rica has provided an example of a double effigy vessel from the Nicoya Peninsula (Lothrop 1926:Figure 33). Dates are uncertain, but it is possible that Nicoya modeled ware can be related to Plumbate ware, known to have been manufactured and traded at least as early as the sixth century A.D. (Lothrop 1926:111). There were also five miniature double vessels, some footed and all joined by a bar at the base and two by an arched strap above (Lothrop 1926:Plate CLXXXVe-i). A full-sized Stone Cist ware vessel of this type has also been recovered (Lothrop 1926:363).

In Mesoamerica, the whistling jar seems to have been introduced during Chiapa III, sometime around 550-450 B.C. (Ford 1949:122). A double vessel/whistling pot dating about this era was recovered at Chiapas. Lowe and Mason (1965:215) note that it is one of the earliest known examples of the whistling pot and suggest diffusion from the south. Though whistling pots, as a type, occur much earlier in Ecuador, as a double vessel, it would seem to considerably pre-date the Andean variety (Ford 1969:Chart 16).

In discussing Mesoamerican whistling pots, Kidder, Jennings, and Shook (1946:192) noted that these appear to have been made over a long period of time, with a range from central Guatemala to Michoacan in west-central Mexico. They illustrated double examples from western Honduras, Guatemala, Michoacan, Oaxaca, and Tlaxcala (Kidder, Jennings, and Shook 1946:Figure 78). A red-on-cream double whistling pot of the effigy variety came from excavations at Kaminaljuyu, Guatemala (Kidder, Jennings, and Shook 1946:Figure 179h & i and Figure 79; Keleman 1944:Figure 141a). Porter (1953:47) mentioned a double whistling jar from Monte Alban and another such jar of the same period from Zinatlan.

A footed double jar was recovered at Amapa, Nayarit (Bell 1971:Figure 12b). Dating is uncertain, as levels at Amapa range from ca. A.D. 500 through Late Postclassic, but the author noted that most whole vessels came from the cemetery area (Bell 1971:705) and that the cemetery represented a fairly late occupation (Bell 1971:707).

Double jars from northern Mexico come from Casas Grandes and thus are later than early examples from the Southwest United States, where this type of pottery appears at least as early as PI.

They are still later in the Southeast; however, several examples have been found from Mississippi-period sites (Phillips, Ford, and Griffin 1951:Figure 106h-l), including a double fish effigy jar and the previously mentioned stirrup-spout double jar with bodies that open into each other. Some
of these may be seen in Figure 7. (There is also a trilobed compound vessel with a single spout from southern Illinois [Wray 1952:Figure 81a] which is a variant of the three-handled spouted jar illustrated in Figure 1y).

Southwestern Double Vessels

Among early Southwestern double vessels is a PI White Mound Black-on-white example dating ca. A.D. 750-800, collected near Manuelito, New Mexico, which is housed at the Museum of New Mexico (Figure 8); it consists of two bowls, each with its own interior design, joined at the rims and by a hollow tube near the base. The Kana-a Black-on-white vessel from Bennett’s Peak has already been mentioned. With other stirrup-spout vessels, it is pictured in Figure 1y.

A PI to PII Kana-a Black-on-white/Black Mesa Black-on-white double jar with stirrup-spout (Beals, Brainerd, and Smith 1945:165, Footnote 120) has also been noted. Two other double bowls (depicted in Figure 9) are among the collections of the Museum of New Mexico. One is a PI to PII Red Mesa Black-on-white example, where each bowl is decorated with a simple linear design; it came from the Rio Puerco region of Arizona. The other is a PII Escavada Black-on-white vessel from Site LA 143, Una Vida, in Chaco Canyon. Each bowl has a somewhat different interior design and wavey lines on the exterior. A missing third dish may have been attached to the other two.

A slightly later Puerco Black-on-white double jar in the collections of the Field Museum of Natural History has been illustrated by Martin and Willis (1940:Plate 72-7). Two globular bottles are joined below the shoulders, and their necks are
connected by a straight cylinder (see Figure 9).

The mug is a typical Mesa Verde Black-on-white (PHI) form, and these, also, were sometimes joined to create double vessels. One such example has been illustrated by Keleman (1944:Plate 104) and another by Watson (1961:51).

Although not so often as among the Anasazi, double dishes were sometimes found among the Mogollon. Bradfield (1929:Plate LXXXII, no. 264) has reported finding half of a Mimbres Black-on-white (A.D. 1000-1150) double bowl at Cameron Creek—the broken half had been ground off, leaving one flat side. And Swarts Ruin yielded a double bowl fragment (Cosgrove and Cosgrove 1932:Plate 89g). A similar complete example (Figure 9a) came from another Mimbres ruin (Cosgrove and Cosgrove 1932:Plate 89f).

The Casas Grandes culture, which had considerable contact with Mogollon and Anasazi peoples during the fluorescence of Paquimé (A.D. 1060-1340), though it seems to have lacked stirrup-sprouts, was fairly well supplied with double jars. The form and the Casas Grandes pottery types in which it occurred was discussed by Sayles (1936), who mentioned Playas Red and Ramos Black (pp. 31, 43) and noted that in Corralitos Polychrome, Incised (DiPeso's Corralitos Polychrome, Textured Variant), double jars connected by a hollow bar and arching handle were rather common (p. 39 and Plate IX).

DiPeso noted four Corralitos Polychrome double jars in connection with his description of the type (DiPeso 1974:2:209) and mentioned that effigy vessels and double jars seemed to be more numerous proportionately than in other polychrome types (p. 207). He illustrated one Corralitos Polychrome example (p. 218) that was very similar to two Museum of New Mexico vessels decorated with incised meander designs, and he pictured another Corralitos Polychrome double jar that had a small rectangular dish atop the handle (DiPeso 1974:2:Figure 312-2, p. 539), much like the Museum of

Figure 9. Southwestern Compound Vessels: a) Red Mesa Black-on-white double vessel from Rio Puerco, Arizona (Museum of New Mexico collections No. 19704/11); b) Escavada Black-on-white double bowl, LA 143: Una Vida, Chaco Canyon, New Mexico (Museum of New Mexico collections No. 20126/11); c) Puerco Black-on-white double jar (collections of the Field Museum of Natural History; Martin and Willis 1940:Plate 72-7); d) Mesa Verde Black-on-white double mug (Watson 1961:51); e) double vessel with a crude painted design, from a Mimbres site (Cosgrove and Cosgrove 1932:Plate 89g); f) Corralitos Polychrome, Textured Variant, with painted and incised meander design (Museum of New Mexico collections No. 7473/11); g) double jar, joined at sides and rims, black-on-white designs (different on each jar); from Kiva 6, Pecos (Kidder 1936:Figure 254a); h) Hopi double vessel from old Walpi, First Mesa, Arizona (Stevenson 1883:Figure 517); i) double paint cup, Zuni, New Mexico (Stevenson 1883:Figure 454).
Figure 10. Two Medio Period Double Vessels from Casas Grandes: Front) Corralitos Polychrome (School of American Research collections in the Museum of New Mexico No. 8337/11); Rear) Playas Red double jar with small receptacle on top of the handle (Museum of New Mexico collections No. 20569/11).

Figure 11. Double jar from Tesuque Pueblo, circa 1900 (School of American Research collections in the Museum of New Mexico No. 8127/11).
New Mexico Playas Red example whose photograph appears in Figure 10. Also in Figure 10 is a Corralitos Polychrome, Non-punched Variant double jar that seems to be a crude copy of El Paso Polychrome.

DiPeso noted that the bulk of northern pottery imports at Casas Grandes came from the American Southwest, specifically from areas to which the Paquiméans apparently traded the scarlet macaw—first in importance, the Rio Grande homelands of the eastern Pueblos, especially the El Paso sector (DiPeso 1974:2:626). One example of El Paso Polychrome that came from Casas Grandes is a double jar now in the collections of the Peabody Museum. It consists of two small jars, their sides connected by a hollow bar and their rims joined by a solid, curved handle (Cosgrove and Cosgrove 1932:93).

Back in the Rio Grande region, double vessels were less common. A PIV Bandelier Black-on-white stirrup-spout example has already been mentioned. From Pecos Pueblo, Kiva 6, came a black-on-white double jar joined at sides and rims (Kidder 1936:Figure 254a).

Historic-period vessels come from the Hopi area, from Zuni to the west, and from Tesuque Pueblo in the east.

Stevenson's catalog of Pueblo ceramics collected in 1879 contained a double vessel from old Walpi (Stevenson 1883:Figure 517): tapered jars joined near bases and rims by straight cylinders. Two Zuni wide-mouthed paint cups (Stevenson 1883:Figure 454) were joined by a bar near their bases and an arched handle at the rims. In addition, Stevenson (1883:Figures 395, 396) illustrated the previously mentioned stirrup-spouted double vessels from Zuni. Both specimens consist of two rounded jars with tapered necks arched to converge in a spout; in one case, they are also connected by a hollow bar; in the other, this feature is lacking (Figure 12).

Finally, there is the double jar illustrated in Figure 11, obtained about 1900 at Tesuque Pueblo. It consists of two low-bodied bottles with long, spout-ed necks, connected near the bases by a hollow bar and at the shoulders by an arched handle. Upper bodies are tan, and bases are polished cream.

CONCLUSION

Stirrup-spouted canteens and double vessels had their origins in coastal Ecuador and Peru, where they enjoyed great popularity. They achieved limited acceptance in a few parts of Colombia and Mesoamerica and found their way into the Southwest, probably by way of western Mexico. From here, both forms seem to have diffused to the Southeast, and the double jar into Casas Grandes.

Although they come in various shapes and sizes, they share certain basic features. The stirrup-spout vessel has a spout in the center of the hollow handle, and the compound vessel generally has a feature that permits liquid to move from one to the other, most often by means of a hollow bar, sometimes through an opening in a connecting wall. The two forms—stirrup-spout jar and double vessel—converge into one sometimes, but only occasionally.
Figure 12. Compound Vessels with Stirrup-spouts: a) Kana-a Black-on-white from Bennett's Peak, New Mexico (University of Colorado Museum; Lister and Lister 1978:Figure 16); b) Bandelier Black-on-white (one lobe missing) from Tsama Ruin, northern Rio Grande region, New Mexico (School of American Research collections in the Museum of New Mexico No. 8302/11); c-d) eccentric canteens from Zuni Pueblo (Stevenson 1883:Figures 395 & 396); e) Bell Plain double jar with stirrup-spout handle (Phillips, Ford, and Griffin 1951:Figure 106i).
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Mesa Verde Black-on-white bowls of the northern San Juan Anasazi display two styles of design layout: a banded and an all-over arrangement. The two styles are symmetrically very different and may derive from separate sources. Association of White Mountain Red wares with Mesa Verde pottery at Salmon Ruin suggests that this intrusive ware may have been a source of influence on Mesa Verden designs.

Mesa Verde Black-on-white is commonly divided into two broad categories based on design layout, banded and all over. The contrast between the two styles is immediately evident, and the distinction between banded and other styles has been made in various studies: Morris (1939); Lancaster et al. (1954); Reed (1958); Shepard (1957); Davis (1964); Brew (1946); Hayes (1964); and Rohn (1971). Detailed descriptions of the substyles of the all-over class are found in Morris (1939) and Rohn (1971). Design analyses are given by Shepard (1957) for Mesa Verde Black-on-white and by Carlson (1970) and Washburn (1977) for White Mountain Red wares. Washburn (1978) utilized symmetry analysis on Mesa Verde Black-on-white at Salmon Ruin in a comparison with mostly White Mountain Red ware types at El Morro and the upper Gila area. Similarities were noted in the frequency of certain symmetry classes, and these were ascribed to varying degrees of culture contact between the regions. The purpose of this paper is to expand the evidence of similarity between these types and to suggest that a process of design transfer operated in this case. The present evidence indicates that both the banded and the all-over styles are essentially contemporaneous and occur together in many localities north of the San Juan River in late Pueblo III times. Moreover, the ratio of banded to all over seems to be fairly constant spatially; Hayes (1964:70) reports that about 11% of the Mesa Verde Black-on-white sherds recovered on the Wetherill Mesa survey were of the all-over pattern. At Mug House, about 20% of the designs of McElmo-Mesa Verde Black-on-white vessels were nonbanded (Rohn 1971:149). To the south, along the San Juan River at Salmon Ruin, about 16% of the Mesa Verde Black-on-white sherds with identifiable layouts are of the all-over style. Statistics based on whole or restorable vessels, as opposed to sherds, would probably differ somewhat, but the basic impression is that the ubiquitous, all-over style is never a large proportion of the type in the region north of the San Juan River.

The persistent coexistence of two design styles within Mesa Verde Black-on-white requires an explanation. Many have felt that the two varieties had separate origins, specifically
that the all-over style owed its inspiration to other design developments outside the San Juan region. The use of solid areas versus hatchures in balanced motifs on some Mesa Verde Black-on-white has pointed to an origin in the Cibola or Little Colorado Red ware traditions to the south. Suggested origins include Puerco-Escavada (Davis 1964) and the "Tularosa style" (Hayes 1964; Rohn 1971). Identification of the similarity of the all-over designs with White Mountain Red wares has been made by Morris (1939), Carlson (1970), and Reed (1958). The latter expressed the view that "The all-over style, with interlocking hatched and solid elements, is essentially Tularosa style, and very possibly could be derived from Wingate Black-on-red imports" (Reed 1958:98). This hypothesis deserves further consideration.

White Mountain Red ware types of Wingate Black-on-red and Polychrome and St. Johns Black-on-red and Polychrome display numerous similarities to Mesa Verde Black-on-white.

Layouts within Mesa Verde Black-on-white may be divided into several categories, depending on how the field is partitioned. Most common are banded layouts parallel to the rim, in which the center of a bowl is left vacant. All-over layouts include bisected, trisected, and quartered layouts, in which the field is divided into two, three, and four portions, respectively. Layouts in White Mountain Red wares consist of the four types listed above, but are predominantly bisected or quartered. For this reason, it is postulated that the bisected and quartered layouts of Mesa Verde Black-on-white were derived from the red ware tradition in which they were so prevalent (see Figure 1). In Mesa Verde Black-on-white, these layouts have little earlier precedent in San Juan White wares and are relatively rare, compared to banded layout.

Both Wingate and Tularosa styles of balanced solid and hatchured decoration (Carlson 1970) are used in both the red ware and white ware. In Wingate Black-on-red, the Wingate style is dominant, while in St. Johns Polychrome, the Tularosa style predominates, although there is no 1:1 relationship between red ware type and style (Carlson 1970). In Wingate and St. Johns, hatched, barbed frets and scrolls are the most common motifs. Likewise, in Mesa Verde Black-on-white, there is an association of these motifs with halved and quartered layouts.

Other similarities include
a. bowls predominant over other vessel forms
b. increased use of thicker slips and high polish in PIII
c. everted or squared rims employed on bowls
d. exterior decoration on bowls either as bands or as isolated motifs
e. specific design elements and motifs commonly employed on both wares; e.g., interlocking scrolls, negative circles with dots, the "pueblo bird," and the "maltese cross."

Banded Mesa Verde Black-on-white can be derived most easily from prior decorative styles in the San Juan White wares. Support for the continuity of the band style is seen in the stratigraphy of several trash-filled rooms at Salmon Ruin (Rooms 100, 102, 91), in which a temporal change is seen from (a) McElmo Black-on-white (Sosi and Dogoshzi styles), to (b) McElmo (banded style), to (c) Mesa Verde Black-on-white bands (formalized with multiple framers).
Figure 1. (top) Mesa Verde Black-and-White bowl designs from Salmon Ruin (drawn by Penelope Whitten); (bottom) Wingate Black-and-Red) and Wingate Polychrome bowl interiors (adapted from Carlson 1970 by Holly Franklin).
There is even a small amount of Mancos Black-on-white displaying banded decoration. Thus, the development of the band can be shown to be gradual and continuous within the San Juan series.

On the other hand, all-over styles such as bisecting and quartering do not appear in the Salmon sequence until after classic Mesa Verde Black-on-white band designs are produced. They therefore postdate the appearance of the banded decorations and appear fully developed when adopted. These layouts entered the Mesa Verde tradition relatively late and apparently together. Present evidence does not point to any significant time lapse between the initiation of the two, three, or four-part layouts in Mesa Verde Black-on-white.

The approximate temporal relationship between San Juan White wares and White Mountain Red wares is given in Figure 2; dates derive from Carlson (1970) and Breternitz et al. (1974). Wingate Black-on-red and Polychrome are approximately contemporary with McElmo Black-on-white, while St. Johns Black-on-red and Polychrome are coeval with Mesa Verde Black-on-white. This conclusion is supported by factor analysis of ceramic associations at Salmon Ruin, indicating that the most common red ware associations of McElmo and Mesa Verde Black-on-white are Wingate and St. Johns, respectively. Thus, from the time spans usually assigned to these types, there would be no temporal problem in design transfer from late Wingate and St. Johns to Mesa Verde Black-on-white.

Not only were appropriate, contemporary stylistic models from Mesa Verde all-over designs available in the White Mountain Red wares, but it is also likely that thirteenth-century potters north of the San Juan River were familiar with trade pieces of White Mountain Red wares. At Salmon, and apparently at Aztec Ruin also, White Mountain Red wares were the most abundant red wares in all phases. Although present in the Chacoan occupations of these sites, they also continued in importance after the decline of the Chacoan trading network in the mid-twelfth century. This suggests, incidentally, that the widespread distribution of White Mountain Red wares was somewhat independent of the Chacoan network. In the Mesa Verdean component at Salmon, White Mountain Red wares are the only series of red wares to appear, and these constitute the largest proportion of the limited universe of ceramic imports known in late PII times. From excavation of less than half of Salmon Ruin, about 1,800 sherds of this series have been recovered, of which about 400 are St. Johns Polychrome; several restorable vessels are also of this type.

The general use of solid-hatchure designs is not restricted to White Mountain Red wares; they are also commonly found in the Cibola White wares. However, there are several reasons to suspect that Cibola White wares were not the impetus behind the development of Mesa Verde all-over designs. Although there seems to have been both generalized and specific ceramic influence from the Cibola into the San Juan White wares, especially in Cortez and Mancos Black-on-white, such developments apparently had little carry-over into Mesa Verde Black-on-white times. The later types of the Chaco area, such as Gallup and Chaco Black-on-white, are not fully contemporary with the appearance of
Figure 2. Temporal relationship between San Juan White ware and White Mt. Red ware
solid and hatchure elements in Mesa Verde Black-on-white, and the use of solid and hatchure is quite unlike that of the Mesa Verde arrangements. Northern Cibola types are present as imports in the area along the San Juan River and on the Animas and La Plata drainages in PII times (Whalley 1978). However, it is equally clear that the introduction of Cibola White wares virtually ceased coincidental with the collapse of the Chacoan trading system (Yingst 1978) and the end of the Chacoan components at outliers such as Salmon and Aztec Ruins at about A.D. 1130 to 1150. Therefore, northern Cibola types would probably not have served as models for San Juan potters producing all-over designs after A.D. 1200.

Resemblances of some Mesa Verde Black-on-white designs to the southern Cibola types are evident in the use of the Tularosa style. However, direct transmission of this style from Tularosa Black-on-white is unlikely due to spatial and temporal factors. Furthermore, actual trade pieces of Tularosa Black-on-white are rare in the San Juan Anasazi. The style, though, was also present in the Red ware series, particularly in St. Johns Polychrome.

In sum, temporal-spatial considerations, documented intrusives, and specific parallels in design and nondesign attributes suggest an origin for Mesa Verde all-over patterns in the contemporary White Mountain Red wares. Colton's (1953) "principle of analogous types", illustrates the fact that design styles often cross-cut localized traditions of manufacture (at the ware and series levels). So, it would not be surprising to find decorative complexes manifested in both the red wares and the white wares. Although such influence may have been mutual, the direction of transmission is assumed to have been predominantly into the San Juan White ware rather than the reverse, since the similarities involved have historical precedent in the red ware tradition, but not in the white ware.

Geographic variability in Mesa Verde Black-on-white needs further investigation. It may be suggested, however, that the greatest deviation from the Wingate and Tularosa styles should occur in the northern range of the San Juan area, farther from the source of such influence. Intrusive White Mountain Red ware examples are probably most common in the southern part of the Mesa Verdean tradition. For example, Wingate and St. Johns Polychrome intrusives appear to be fairly common at sites such as Salmon Ruin along the southern border of the area. By contrast, PIII sites at Mesa Verde National Park generally produce few examples, less than half a dozen sherds per site, judging by Wetherill Mesa data (Hayes 1964). Hence, the availability of red ware examples to San Juan potters may have decreased from south to north. Although the amount of nonbanded versus banded Mesa Verde Black-on-white may not show any appreciable difference throughout the area (see above), the employment of the various classes of nonbanded or all-over decorations may not be equal in all parts of the region. Impressionistically, the all-over layouts, especially the offset quartered pattern, appear to match White Mountain Red wares more closely at Salmon than at Mesa Verde. On the other hand, trisected layouts (rare in the red wares) are more common at Mesa Verde than at
Salmon Ruin. Mug House at Mesa Verde yielded 14 bowls with three-part layouts out of 170 bowls (Rohn 1971:165). A similar vessel was recovered at Sun Point Pueblo (Lancaster et al. 1954). By contrast, the Mesa Verde Black-on-white vessel sample at Salmon, consisting of about 150 vessels, includes no examples of this variant of the all-over style. The isolation of the Mesa Verde itself, characterized as a "remote and peripheral corner" by Davis (1964:301), may be expressed in stylistic variants of Mesa Verde Black-on-white not commonly found in other areas of the type's manufacture.

The process by which designs were transferred may be hypothesized as involving San Juan potters copying red-ware trade pieces, especially along the southern border of the region north of the San Juan River.

Once adopted, the all-over style was used on Mesa Verde Black-on-white widely, even in areas not exposed to abundant red-ware imports from the south. In this process, Mesa Verdelan potters also took some artistic liberties with the all-over design style. Although many examples are faithful reproductions of White Mountain Red ware prototypes, others display only a generalized similarity in concepts of layout and solid-hatchure combinations. The use of trisected layouts and solids against complete background hatchure may be evidence of further stylistic evolution within the Mesa Verde pattern, away from the strict decorative canons provided by the White Mountain Red ware examples that were originally imitated.

Albuquerque

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INTRODUCTION

In the late nineteenth century, there came to New Mexico a scholarly man of remarkable dedication and energy. He was Adolph Bandelier, destined to become a world-famous ethnologist. He was followed by an equally energetic and dedicated scholar, Edgar Lee Hewett, founder and director of the first field training programs in archaeology and ethnology in New Mexico, who was later to become the earliest director of the School of American Research and Museum of New Mexico in Santa Fe.

Most of those who came to study, work on, and contribute to Hewett’s programs at Puye Ruin on the Pajarito Plateau and the Rito de Los Frijoles (now Bandelier National Monument) were to become giants in the field of American anthropology and also legends in their own lifetime. Some who were the most brilliant tended also to be the most eccentric and interesting. One or two, perhaps more, were a bit weird.

A partial list of participants in those early field camps in the heartland of the Tewa-speaking pueblos of the northern Rio Grande Valley includes Director Edgar Lee Hewett, Frederick Webb Hodge, Charles Lummis, Alice Fletcher, and Adolph Bandelier; also Alfred V. Kidder, Sr., Sylvanus G. Morley, John Peabody Harrington, Kenneth M. Chapman, Neil Judd, Earl Morris, Matilda Coxe Stevenson, Jesse Nusbaum, and Ralph Linton.

Had I not chosen a career in anthropology, I would not be recording the anecdotes that were told about—and by—many of these remarkable characters, a number of whom later became my mentors, associates, and lifelong friends.

What was their leader, E. L. Hewett, like? I am, of course, giving my own impression of him, with some added items from others. He had a commanding appearance; a massive, partially bald head; and a strong jaw. He was large boned and rugged in appearance, and it was with surprise that I came to realize, after 16 years of association with him, that he was short in stature. I recall one of my most vivid pictures of him on the University of New Mexico campus, circa 1931, striding along somewhat bowlegged, briefcase in hand, silver haired, and always wearing a dark blue suit. For some reason there always seemed to be a white English
bulldog following him. I thought it a touching sight: both with their massive heads, jutting jaws, and short bowlegs.

Hewett founded the Department of Archaeology and Ethnology, as it was then called, at the University of New Mexico. His accomplishments, too numerous to list here, are described in the Hewett anniversary volume, So Live the Works of Men, edited by Donald Brand and Fred E. Harvey. He died in December, 1946, at age 80.

I believe his best qualities were his vision, his expertise as a teacher, and most of all his great pioneering spirit. Had he not founded the early archaeology and ethnology field program, only 6 years after the turn of the century, Southwestern anthropology, as we know it today, might have been delayed 20 or so years longer. He had been influenced greatly by such men as Major John Wesley Powell, of the Bureau of American Ethnology, and especially by Adolph Bandelier.

The first annual meeting of the School of American Research was held in the Rito de los Frijoles during the summer of 1908. Present were Hewett; Alice Fletcher, a revered and lifelong friend; and Frank Springer. Adolph Bandelier was in the field with him.

I was an undergraduate at Colorado College, majoring in social anthropology, when I first met Hewett, who was a visiting lecturer talking on Southwestern and Mesoamerican prehistory. Through this meeting, Hewett was mainly responsible for my receiving the graduate fellowship in his archaeology department.

I vividly recall that a Navajo Yeibichai ceremony, complete with a chindee chase, was going on in Chaco Canyon while I was taking my Master's oral examination. To say that I was nervous in putting it mildly. It had rained the night before, and Escavada Wash, with its usual sand traps and pitfalls, had delayed the dean of the graduate school, who didn't particularly like anthropologists and especially Indians. He was in a foul mood. He was a Ph.D. psychologist, and I recall that one of the questions he asked was to prove to those present—if I could—that Indians were as intelligent as Whites! At the end of an hour or so, I was asked to step outside the little stone building where the orals were given, while the committee decided my fate.

As I waited, the Devil on a galloping horse whizzed by, with a band of Navajos, also on horseback, in hot pursuit. Finally, the dean came out, extended his hand, and congratulated me on passing. Others on the committee followed. I have always felt that my Colorado College mentor, W. W. Postlewaite, who was with our camp, was mainly responsible for my success. He had lent me his most powerful little fetish to hold while I was being quizzed.

I shall always be grateful to Hewett for giving me my chance to become a professional anthropologist. After I finished the field excavation of Paa-Ko (Lambert 1954), Hewett brought me to the School of American Research and Museum of New Mexico in 1937, where I spent 32 years as curator of archaeology and anthropology. These were probably the happiest years of my life.

Nor would I take anything for the seasons in the field camps of my generation: five field schools in the Jemez Mountains
at Battleship Rock and Jemez Springs. My first exposure to field archaeology was at the fourteenth-century Towa pueblo of Unshagi, where fieldwork was conducted for a number of years. We also attended lectures every afternoon. The daily routine was only broken when Hewett took the lot of us to the summer ceremonies at the nearby pueblos of Jemez and Zia. I met many Indians who were our assistants on the dig and others in the pueblos in the area. These were the first Indians I met, and many of them became lifelong friends. Only two or three are still alive.

Hewett always had a wonderful faculty. Those I remember best are Hartley B. Alexander, mythology of all races; Dr. William Bade, a Biblical archaeologist; Clyde Kluckhohn, an anthropologist; and Stuart Northrop, a geologist.

With the founding of his new department at the University of New Mexico, Hewett also launched an advanced training field school in Chaco Canyon. He had previously done some preliminary excavation at Chetro Ketl, assisted by Kenneth Chapman, Wesley Bradfield, and Sam Hud­dleston. Sam once told me that the two large masonry fire boxes in the Great Kiva there had been full of burned wood, charcoal, broken pots, and all kinds of bone. But no one was aware, he said, of the importance of such material in the early years of the twentieth century. Sam was ordered to dump all of it!

The Chaco camps that I remem­ber from the early 1930s were small and spartan, to say the least. I was introduced for the first time to uncolored, par­tially melted oleomargarine; watery beans; and cornbread, always with burned crust it seemed. There was also some­thing known as "case eggs." Our tents were placed in a row behind Pueblo Bonito, almost in the shadow of Threatening Rock.

I am still as much in awe of the ruined communities of Chaco Canyon as I was in 1931-1932, my first summers there. Rooms in Chetro Ketl were being uncovered, and the East Tower Kiva, et cetera, but the main interest was always in the Great Kiva, one of two there. It was there that the famous jewelry caches of jet, turquoise, and shell were coming to light. These were in niches hidden behind masonry plugs, set at intervals around the kiva walls above the banco. These caches are one of the most thrilling discoveries I remember. I look back on the 1932 season and see Ernest Thompson Seton, William "Mr. Bill" Postlewaite, and others standing there with Hewett and the students as Paul Reiter opened one of these. We saw, for the first time, a great offering placed there so many centuries ago. Hewett's right­hand men of that period are all gone now: Paul Reiter, Reginald Fisher, Gordon Vivian, and Stanley Stubbs. However, Vivian lived long enough to make a useful contribution to the archaeology of the great kivas of Chaco Canyon.

The late Paul A. F. Walter, Sr., a lifelong and loyal friend of Edgar Lee Hewett, described him best: "He was a benevolent despot." A strong-willed man he was, with an excellent legal mind. One seldom came out the winner when arguing with him. He had many friends and also some enemies. He seems to have mellowed a great deal by the time he and I met. I think it was "Mr. Bill" who gave him the title of "the chief." Around camp and at the Museum and School, we called him "daddy" or
"pappy" or "the boss." I think he knew this and was pleased. We also called him "el jefe," but not so he could hear us.

The Hewetts had no children and, since we were all young, a remark made by one of my peers of the early 1930s was put very well. "It is a good thing the Hewetts never had any children, for we are his children."

I saw Hewett angry only twice. Without raising his voice, he said what he had to, and I was glad then, equally so thereafter, that he never directed his wrath in my direction. I did not always agree with him. We had differences when it came to theory, stratigraphy, and classification. But I respected him always, and, above all, he was one of my best friends.

In the Museum of New Mexico, at Santa Fe gatherings, and around the campfires in the Jemez, the Chaco Canyon, and always at Pecos Conferences, I early on heard extraordinary tales of Hewett's associates of the Rito de los Frijoles and Puye days. The best stories I heard, however, came from Hodge, Kidder, and Morley, many of them told in the patio of the Palace of the Governors where the environs reminded them of something funny. They were speaking of peers who had been part of their lives and bonded to them for decades.

With the exception of Alice Fletcher, Charles Lummis, Frederick W. Hodge, and Adolph Bandelier, nearly all of the characters in this collection of stories had received their first field training in Hewett's early twentieth century camps. He gave them their opportunity to become archaeologists and ethnologists. They went on to become leaders in their chosen fields of endeavor, and all, including Hewett, laid the groundwork in American anthropology.

I think many of the stories that were told in my presence were exaggerated, mostly for effect, for I know there were many variations. Every time two or more of them would get together, the yarns would start. These bards were especially eloquent when they had a captive audience. It is unfortunate that those who could best record the stories died before doing so. Hodge once said that one of his main reasons for retiring to Santa Fe was to find time to write his memoirs.

And there were two others who were full of some very funny tales. One was Morley, who said to me in 1945, "When I finish The Ancient Maya, I am going to write my memoirs and, Baby, are they going to be hot!" He died before putting any of his funny stories in writing.

A quote from a letter to me from the late Dr. Alfred V. Kidder, Sr., best states my attempts to preserve some of their anecdotes. Kidder wrote to me, "Someday I'm telling myself I am going to write a book about the remarkable characters in the anthropological line whom I came to know, the two wildest ones being the said J. P. Harrington and Sylvanus Morley" (2/6/1963).

Personally, I often doubted some of the stories I heard about Harrington, but I knew finally that these were based on fact after the appearance of Encounter With an Angry God, written by Carobeth Laird, J. P. Harrington's long-suffering ex-wife. Her experiences with this man were unbelievable.

The office I occupied when I first joined the Museum staff in 1937 was a room on the northwest corner of the Palace of the
Governors' patio. I soon learned that it was the very one that was once the dwelling and laboratory of the brilliant and very eccentric J. P. Harrington. There are many tales of his occupancy here, and sometimes, especially when I would be working at night, I listened for the ghostly far-off laughter or the voices of Harrington and "Hewett's Chain Gang," as Kidder, Morley, Chapman, and Nusbaum (see Figure 1) named themselves while they were excavating with him at Puye and other nearby sites on the Pajarito.

Even today when I come into the Palace of the Governors, or enter its patio, I can see the figure of Hewett coming through the big, blue gate on the west side of the country yard, and I think of Hodge and Morley joking and laughing by the big tree. I strongly feel the presence of
Hewett and his "Chain Gang" here, and I hope their spirits will never disappear.

EDGAR LEE HEWETT AND FREDERICK WEBB HODGE HAVE AN EARLY MORNING VISITOR IN CAMP ON THE JEMEZ PLATEAU

I heard this story told a number of times in the late 1930s and during the 1940s. Both Hodge and Hewett told it, and, depending on which one recounted the incident, one aspect of the tale varied.

The two scientists were surveying archaeological sites in the Jemez Mountains. It was during the summer in the late nineteenth or early twentieth century. They would pitch camp in the late afternoon or early evening, taking turns at camp chores and tending the horses.

On the whole, it had been a good trip, as Hewett would tell it--weather perfect and everything else going well. Toward the end of the survey, they made a camp that both would not forget. They spread their bedrolls a short distance apart. Hewett tended the horses and cooked the evening meal, reminding Hodge that he was to take the morning shift.

They turned in early, since it had been a long day in the saddle. Dawn broke, and there was no sound of crackling fire or smell of brewing coffee. So Hewett, snug in his bed, called, "Frederick, it is time to rise and shine." No answer. He called a second, and then a third time. Silence. Finally, after a lapse of several minutes, he turned his head toward Hodge and quickly discovered why there had been no answer. Sniffing all around his partner's head was a very large bear!

As might be expected, when Hodge's turn would come to tell of this trip, it would be Hewett who remained silent, not answering the early morning call.

ALFRED VINCENT KIDDER, SR., ENCOUNTERS JOHN PEABODY HARRINGTON WHILE ON A EARLY SUNDAY MORNING STROLL, CIRCA 1909

This story was always one of Kidder's favorites: One Sunday in Santa Fe it was such a beautiful morning, he would recall, that I decided to take a walk. Going north from the plaza I eventually climbed up Fort Marcy Hill, from where one could get a splendid overview of Santa Fe as it was then. But when I got on top, I encountered such a strange sight that I could not believe my eyes. And I still can't. There was J. P. Harrington crawling along on all fours behind a big billy goat/sheep. It was emitting a steady stream of sounds as if resentment the stranger in back of it.

I called out, "J. P., what on earth are you up to?"

Putting his fingers to his lips, he answered in a low voice, "Be quiet, Ted. This goat has the best nasal glottal stop I've ever encountered."

HOW JOHN PEABODY HARRINGTON CURED AN ILLNESS, AS TOLD BY KENNETH M. CHAPMAN

J. P. was eccentric, to say the least, according to everyone who ever had any association with him. The incident that Chapman related in only one of dozens of stories about the linguist, who—with Chap, Nussbaum, and others—served on the first staff of the School of American Research and Museum of New Mexico.

When Hewett (Director of the School and Museum) was out of
town, which was often, it was Chapman's place to act as director. Chapman would open the Palace of the Governors' doors and greet the first visitors. As luck would have it, he also often had to be the janitor, too. For, if a ceremony was in the offing, Julian Martinez, the regular custodian, would take off for San Ildefonso. Chap said he would come early to fix the furnace, sweep, then put on a jacket as befitted a proper museum director.

As Chapman told it: J. P. lived and worked in a room with a large fireplace at the northwest corner of the Palace patio. He slept on the floor, got water from the pump, and did his cooking in the fireplace. He didn't care what he ate, living almost exclusively on cornmeal mush he prepared in a large black iron kettle. He would feed on this mess for days. One Sunday night when I was checking the Palace, I saw a light in J. P.'s quarters.

Intending to drop in only for a minute or two, I entered and was glad I came, for here was a very sick man, pale green in color, writing in his bed. I asked him what was the matter, and he pointed to the kettle. After I smelled, I asked him when he made it. "Oh, about four days ago," J. P. replied.

I wanted to go for the doctor, but the sick man would have none of it. I told him he had ptomaine poisoning. I knew a druggist, so told J. P. I was going for medicine. This he allowed. I bought a bottle of peragoric medicine, then walked until I found a store open and got some canned milk and a large bottle of Horlick's malted milk tablets. I returned to my patient's room, gave him some medicine, and then fixed some warm malted milk for him. He appeared to be interested in what I was doing and seemed so grateful. There was nothing else to do, so I said I'd leave the things with him and come by in the morning.

It was about 6:30 a.m. when I arrived. I was completely astounded to see a bright, cheerful J. P. hard at work, for I was sure he would not be up to much for several days, perhaps a week. I expressed my pleasure at seeing him so well. As I parted from him, I said, "Well, J. P., you won't forget to take your medicine and tablets will you?"

Whereupon he looked rather startled and then replied, "Oh, I already have. I took both bottles after you left last night."

MATILDA COSE STEVENSON TAKES JOHN PEABODY HARRINGTON ON A STUDY NIGHT CALL AS TOLD BY SYLVANUS G. MORLEY

Throughout his adult life, nothing mattered to J. P. except his linguistic studies. He was generally disheveled, unkempt, and according to the late Ina Sizer Cassidy, tied his shoes together with baling wire. Those who knew him best say he rarely had an adequate diet or enough sleep.

His stint in Santa Fe with the School of American Research and Museum of New Mexico was made a little easier than others he had before and afterwards, for E. L. Hewett, Director of the School and Museum, had allowed him a free room to live and work in. He had papers and notes everywhere--on the floor, pinned on chairs and walls. This was his home, his office, his castle. He hated to be interrupted, for with him anything unconnected with linguistics was lost time.
Although she knew full well how much his work meant to him, the aggressive Matilda Coxe Stevenson barged in on him one Sunday evening. "Tilly" was also headquartering in Santa Fe, pursuing studies among the Tewa-speaking pueblos. Her purpose in entering J. P.'s almost forbidden domain was to entice him into accompanying her to a well-known doctor's home nearby. He refused at first, but it became apparent she was not going to budge, so, more to get rid of her than anything else, he went along. He made it plain he did not want to stay long.

When they arrived and stepped up on the porch, they could see through the door into the living room. Occupying the area around the piano were the doctor's two pretty daughters and their young gentlemen callers. J. P. sized up the situation, saying they should leave at once, whereupon Tilly punched the doorbell with her chubby finger. One of the girls came to the door. She said their parents were called away, and she did not know when they would be back. Undaunted, Matilda opened the screen, pushing her huge bulk into the room, beckoning J. P. to enter. He felt ashamed and embarrassed as never before, he was later to tell Morley.

Matilda chose a rather wide chair with heavy wooden arm rests, sat down, and started to talk, as only she could. But even she could tell that she and J. P. were not welcome, for no one was listening to her, and she noted one of the boys making signs to the girls.

"Well, J. P., I expect we'd better be on our way." Rising as she spoke, she began to bow. There was a muffled giggle, and Tilly looked around to find herself tightly wedged in the chair she had been sitting in. As she was bowing, so was the chair!

**JUST CALL ME "MOTHER."**

**MORLEY'S VERSION OF HOW MATILDA COXE STEVENSON WAS NAMED "MOTHER" BY THE SANTA CLARA INDIANS**

Morley's favorite story should be prefaced by an explanation of Tilly Stevenson's personality and her place in Southwestern anthropology. She was domineering, demanding, strong willed, and determined to have her way to the point of ruthlessness. She was a born troublemaker. She was also much overweight and very heavy. Matilda Coxe Stevenson became an ethnographer through her husband, Colonel James Stevenson of the United States Geological Survey. In contrast to her, he was well liked, kindly, and greatly respected both in the Southwest and in Washington, D. C. He was Major John Wesley Powell's confident and right-hand man in matters pertaining to the Bureau of American Ethnology. He was the leader of many important expeditions to the Southwest, the first one in 1879 with F. H. Cushing and others. His expeditions were generally outfitted at Zuni Pueblo, and Tilly came along on many of them. He introduced the Mindeleff brothers to the Hopi towns and to Canyon de Chelly. He is credited with naming Canyon del Muerto for several dissected bodies he discovered there.

As time went on, Mrs. Stevenson became more and more interested in Indians, especially Zunis. The Colonel took copious notes, but seldom wrote them up, a task which his wife willingly undertook. After her husband's death, Major Powell appointed her to the scientific staff of the Bureau. Almost at once she
began to cause trouble for the staff, attempting to run the Bureau according to her whims. An attempt to remove her failed, for she resorted to devious ways by coercing members of Congress to intervene in her behalf.

Her two great contributions to Southwestern ethnography are classics even today. They are The Sia, and, of course, the 607 page opus, The Zuni Indians. Some of her associates of that period implied that certain data in these two works were actually collected by her husband, for the Colonel was well liked by the Indians, and he got on so much better than she did with these people. Nevertheless, she spent much of her time at Zuni after 1899, even after the publication, never losing interest.

With two major pieces of research published and behind her, Tilly was looking for other pueblos to conquer. Through Washington connections, she knew of Edgar L. Hewett's field camp and excavations in the Pajarito Plateau and Puye. In addition to his assistants and researchers, S. G. Morley, A. V. Kidder, J. P. Harrington, K. M. Chapman, and Jesse L. Nusbaum, who called themselves "Hewett's Chain Gang," there were Indians from Santa Clara and San Ildefonso helping with the excavations and surveys. She made use of influence again, and Hewett, although somewhat reluctant, agreed to introduce her to Santa Clara Pueblo friends. This was her target, and she settled herself into the camp.

Each of Hewett's field assistants in that camp of about 1909, all of whom became great in their time, have given their own versions of the Matilda Coxe Stevenson "Mother" story, but I have always liked Morley's the best, for he was so funny when he told it. Morley always prefaced he story with, "Was Tilly ever fat. My God, she had a derriere like a canal barge!"

She had been in Santa Clara only a few days when, according to Morley, she waddled into the Puyé mess tent, flushed and out of breath, and, after plunking herself down at the table, said with her hands clasped in joy, "Oh, I am so happy! The Santa Claras are going to be just like my beloved Zunis. They have named me 'Mother'."

As she beamed at everyone, J. P. Harrington, the linguist engaged in studying Tewa language and ethnography, said, "Mrs. Stevenson, what is the word for mother?"

"Why, they called me Po-hog-ha-ii, isn't it lovely!"

With that, Harrington jumped up and rushed from the tent, trying not to laugh. We followed as soon as we could, caught up with J. P., and asked him what the joke was. Harrington began laughing and, when he could reply, said, "The word they gave her meant 'big fat lady with a rear end as large as Puyé Mesa'." (NOTE: This is a broad translation according to Morley. The real meaning is more vulgar.)

ALFRED V. KIDDER, SR., ON SYLVANUS G. MORLEY, AS TOLD TO MARJORIE F. LAMBERT IN 1963

Somebody certainly ought to write a biography of Morley. There never was anybody like him, and he accomplished an enormous amount in the way of opening up the forest-buried cities of the Old Empire in the Peten. I was with him one time in that region. When we went into camp and he got under the mosquito net to take his clothes off, his right leg was completely covered with large, purple
spots. I thought he had come down with some terrible disease, but when he looked at the disfigurement, he said, "Oh, that's nothing. It's merely a pocket-full of pills that I use to purify this damn bush water."

THE STRANGE DISAPPEARANCE OF SYLVANUS G. MORLEY, A KENNETH M. CHAPMAN STORY

One day in late summer, Chapman, Nusbaum, and Morley had to go to Albuquerque to meet a dignitary coming in on the train from California. They were to meet the visitor in the Alvarado Hotel.

The present paved highway between Santa Fe and Albuquerque had not yet materialized, and the journey down and around the hairpin turns of old La Bajada Hill was hair raising under the best of circumstances. Neither Chapman nor Morley could drive, so it was up to the ever-daring and skillful Jesse to man the wheel. "Driving with Jesse was never restful, and this trip was no exception. It was something to remember," said Chap.

The three were in an open Ford or Dodge touring car. Chap couldn't remember the make, but it was well past its prime, groaning, boiling, always blowing its tires, and its top leaked. As Chap recalled, it was a beautiful morning, not too cool, not too hot. Nusbaum was in the driver's seat with Chap beside him. Morley was in the rear seat, which he would share on the return journey the next morning with the passenger they were sent to meet.

There had been some rain a few nights before, and here and there on the steep, narrow, rough, and very dangerous dirt road were huge basalt boulders that had rolled down during the storm, but these were only a greater challenge to the intrepid driver who maneuvered the old car in and out of each dangerous area.

Since leaving Santa Fe, Morley had been talking nonstop in his usual jovial manner until the car began to bounce him from side to side and up and down, whereupon his verbiage became punctuated with streams of profanity. At one especially bad place, Jesse couldn't avoid hitting a deep pothole. "It was either doing this or go over the cliff," said Chap.

Finally, Nusbaum got the old car down to the bottom of La Bajada Hill. It was at this point that Chapman turned toward the back seat to see why Morley hadn't answered a question he had asked. To his horror and amazement, the seat was empty.

There was nothing else to do but to turn around and labor back up the grade in search of Vay Morley. "Needless to say, we were very concerned," Chap said.

They were about a third of the way up when the radiator began to pour steam out through the hood of the car, "But through the steam we could see in the distance a small and somewhat battered Morley limping along, and we could hear his outpouring of blasphemy in both English and colorful Spanish."

It seems that when Jesse hit that pothole, Morley had been thrown from the car, had fallen over the edge of the narrow road, and had rolled over and over until a bush stopped him. The breath has been knocked out of him, so he couldn't call out.

Morley's pride was hurt worse than his small, light body, and since the three of them were such good friends, he didn't hold a grudge too long. "But when Vay told of this adventure, he could sure curse Jesse," Chap
would exclaim.

ELSIE CLEWS PARSONS
COMES TO CHICHEN ITZA,
AS TOLD MANY TIMES
BY SYLVANUS G. MORLEY

With few exceptions we did not encourage visitors to Chichen Itza during our work there. It disturbed and interrupted our activities, and the excavations were of a dangerous sort. In addition to the scientific participants, we employed a large crew of Mayan Indian men, inhabitants of the surrounding area.

Much to our dismay, who should turn up one day but the intrepid, determined ethnographer, Elsie Clews Parsons. She was bent on getting as much information as she could about the Yucatan Maya in as short a time as possible--hence coming to us was a starting point. She had come with proper letters of introduction, so there was no help for it. We had to have her around for awhile.

Elsie was all over the excavation. Notebook in hand, she was constantly interrupting one of us to ask her questions and talking all the time. She wanted to make some comparative observations, she said, about the Yucatan Maya people. Our workmen and their families were her targets.

One day when things were particularly hectic on the Temple of the Warriors excavation, Earl Morris and I could no longer endure her interruptions. She asked Earl a question, and he said, "Ask the boss." (Morley loved to tell this part of the story.) The next thing I knew she was saying, "Oh, Dr. Morley, do these Maya men wear anything under their kilts?"

I was mad. I said, "Madam, I do not know. I suggest you go find out for yourself."

The next thing I knew, there arose screams from Parsons as a small Mayan workman chased her off the top of the temple with his machete brandished above his head.

A NEW YORK DEBUTANTE VISITS CHICHEN ITZA: ONE OF MORLEY'S FAMOUS AND OFTEN-TOLD STORIES

In the early years of Carnegie's excavations and restorations at Chichen Itza, I received an urgent letter from Ted Kidder. He informed me of the imminent visit of a young girl, about sixteen as I remember. Kidder urged that she be shown every courtesy, since she was the grandchild of one of New York's foremost families--all of whom were also staunch supporters of Carnegie's Mesoamerican work.

The day arrived when we met her in Merida to drive her to our Chichen Itza headquarters. She was a lovely young thing, turned out in Abercrombie & Fitch's idea of expensive and appropriate field gear. The girl was obviously very bright and much interested in everything she saw, asking one question after another. I assigned an Indian girl to her as personal maid, telling her to settle in, that I would personally conduct her on a tour of the various features of Chichen Itza the following day.

After breakfast we started. I took her to the Temple of the Warriors, El Castillo, the Ball Court, and the Observatory. Then, after lunch and siesta, we again met, setting out along the camino to the Cenote. As we walked along, I was telling her about the sacred rites enacted at the edge of the large and deep feature, including the
sacrifice of young virgins. We arrived at the spot where such rites were performed, and she leaned slightly forward, gazing intently at the murky waters far below. At that point I had my arms outstretched toward her, as if to grasp her, and I was saying, "Then the priest, or his attendants, would loft the virgin up and toss her into the depths below."

Whereupon Miss New York emphatically said, "But Dr. Morley, I am not eligible!"

THE MORLEY EXHIBIT OF SPANISH COLONIAL ECCLESIASTICAL ART, TOLD BY M. F. LAMBERT

In 1945, the Morleys gave a large portion of their collection of Mesoamerican church art to the Museum of New Mexico. Morley had acquired most of the ecclesiastical items as a result of the 1917 earthquake in Mexico. The pieces were purchased partly to help church officials repair or rebuild damaged religious structures. Hewett and Morley decided that an exhibition of the gift should be installed and opened in the late summer or early fall. As curator of the Palace, it was my job to install the show and have it ready in time for a big public event. The event was to be in a suitable room at the east end of the Palace of the Governors.

All through Morley's professional life he was renowned not only as a Mayan scholar, but he was also famed far and wide for his profanity. He did not resort to vulgarity or obscenity, but to express himself without a string of blasphemy was an impossibility.

As installation progressed, Morley, who knew nothing about exhibit techniques, became more and more excitable and critical. He would bound into the exhibit area, change many objects around, or place them elsewhere, without consulting me. He meant well, but the interruptions were indeed a strain. To top things off, it was the height of the tourist season and hordes of people were pouring through the building. Many of them would lean over a barrier that divided the gallery from the adjoining room. Their curiosity and questions became an added strain.

The day came when the installations were almost finished. Apollonio Rodriguez and I were trying out a pair of spotlights that were intended to highlight a pair of mannequins dressed in spectacular priestly vestments. These were standing in front of the altar. As soon as we turned on the lights, I knew they were too bright. Then, just as a large group of people from the Glorieta Baptist Assembly came through the adjoining room, Morley came in with a visiting historian. But before any introductions could be made, Morley exclaimed in a loud voice that carried well into the next room, "Jesus Christ, God almighty, Marjorie, you've got the whole damn place lighted up like a New Orleans sporting house!"

A PRACTICAL JOKE PLAYED ON S. G. MORLEY, AS TOLD BY K. M. CHAPMAN AND S. G. MORLEY

There seems to have been great camaraderie among those who participated in the early field camps operated by E. L. Hewett in the Rito de los Frijoles (now Bandelier National Monument) and in the Puye summer sessions. Particularly close were A. V. Kidder, S. G. Morley, K. M. Chapman, and J. Nusbaum. They were learning how to become
archaeologists, but were never so busy that they could not take time off to play a practical joke on one another.

This time it was Chapman and Nusbaum who played a joke on Morley, but it was a joke that could have become very serious. Chap never liked to hear Nusbaum tell of what they did. And I don't think Morley ever quite forgave them for it, either, for we heard him tell of the incident in a very blasphemous way. The incident took place one summer in the Rito field camp. Chap was recording petroglyphs; Morley and Nusbaum were assigned to excavate rooms and talus structures.

Morley's thoughts and interests were already turning toward the cultures of prehistoric Mesoamerica, and he enthusiastically talked about the subject at every opportunity. "He would bend the ear of anyone who would listen, and we decided to test his knowledge," said Nusbaum.

So one night Chapman and Nusbaum stayed up all night creating a prehistoric Mexican anthropomorph. Chapman blocked out the figure, and both he and Jesse carved it—not a hard job since nearly all the stone in the canyon was soft. After the carving was done, Chapman, the artist, painted in soft, faded-looking colors. Just before dawn they carried their treasure to the portion of the dig that Morley was excavating. Nusbaum, the field man, skillfully planted it for the victim to discover the next day. By this time the two culprits were becoming thoroughly ashamed and sorry for their prank. They agreed to confess, so the next morning before breakfast they went to Morley's tent and made a clean breast of it. Morley was livid with fury, exploding with a loud stream of profanity that could be heard all over camp and from one end of the canyon to the other. The air was blue with his curses.

To quote Morley, who told Lambert his version in 1945, "I said to them, 'Goddamn both of you, how could you let me stand up in front of all those prominent people and made such a goddamn bloody fool of myself?"

... MORLEY'S HUMOR, TOLD BY MARJORIE F. LAMBERT

Alfred Kidder, Sr., lifelong friend of Sylvanus G. Morley, once wrote me saying that John Peabody Harrington and Vay Morley were the "two wildest" among his early associates in the field of anthropology. And he was right about both of them, but I have always wondered why he excluded Charles Lummis, who was as eccentric as the two that Kidder named.

Morley was appointed director of the School and Museum following the death of Edgar L. Hewett. In the short time he was our director, he literally
kept the whole place in an uproar. He was highly energetic and funny, joking and calling his friends on the phone, except when he was dictating the manuscript for his book, The Ancient Maya. He rarely used the executive office in the Palace of the Governors, preferring instead to work in a small office next to mine, which faced on the patio. He liked to see the hordes of tourists streaming by to see the stagecoaches.

I never felt that Morley took the directorship of our organization too seriously. It was only when he was the center of attention on the stage of Saint Francis Auditorium that the man's genius and serious side took command, especially if he was lecturing on his favorite subject, Mayan hieroglyphic writing. His penetrating voice could be heard everywhere. As a next-door neighbor in the row of Palace offices on the north side of the patio, I learned a lot, whether I wanted to or not.

Each morning he would come bouncing and stumbling through the blue gate at the west end of the patio. Often he would bump his head and then swear a blue streak in both English and Spanish. Generally he prefaced his working day by stopping in the Business Office just west of my laboratory, or into mine, and he nearly always had a new joke. Some of them are not printable, but here are some of his favorites, which he told me many times.

1. Two kindly, elderly ladies, feeling sorry for an old deaf widower, decided to invite him to a church social. Since he was pretty feeble, they seated him in a chair against one of the walls and went to get him some food. When they returned, they brought with them a tall, middle-aged man dressed in black. To the old widower they said, "Mr. Jones, we want you to meet our new deacon."

The old man replied, "I can't hear you, he's what?"

The old lady chirped a bit louder, "He's our deacon and the son of a bishop."

Old man: "Oh, hell, they all are!"

2. Morley bounces into my office and without a 'good morning' says, "Hey, did you hear the one about the dumb secretary? She was so dumb she though VAT 69 was the Pope's telephone number."

3. Say, do you know the difference between Mrs. Franklin D. Roosevelt and the Panama Canal? Answer: The Panama Canal is a busy ditch.

4. A WPA worker dies and gets as far as the Pearly Gates. After checking his records, Saint Peter says he cannot let him enter. His life has not been good enough. He sends him downward, and the worker ends up at the gates of hell. He pounds and pounds on the door, which at long last finally opens, after much groaning and squeaking, for it was frozen. Out peers the Devil, ice all over his horns, body, tail, and pitchfork. The Devil says, "Who are you and what do you want?"

Man: "I'm So-and-so, and I got killed on a WPA Project. Saint Peter sent me to you."

With frosty breath the Devil blows on his frozen fingers
and roars, "Oh, yes, I know what you are. You're another one of those lazy Roosevelt sons of bitches who let all of my fires go out!"

5. At a very important Indian Arts Fund meeting one afternoon, some very influential and important Santa Feans were present. Morley was explaining the rather complicated structure of our institution. A fine-looking old lady, really a grand dowager, who was dressed in flowing black and wearing a large black hat, said, "Please, Dr. Morley, could you explain just what is the difference between the School of American Research and the Museum of New Mexico?"

Quick as a flash, Morley replied, "That is easy, Madam. The School of American Research is that very convenient fig leaf behind which the Museum of New Mexico has hidden all these years!"

DR. HEWETT, SAM HUDDLESON, AND THE BOYS WHO PLAYED RED POCKET, AS TOLD TO MARJORIE F. LAMBERT BY STANLEY STUBBS

Both Dr. Hewett and Sam Huddleson were well up in years when I first came to work at the Museum of New Mexico. I had already come to know Sam in the early 1930s, when he came to the field school in the Jemez Mountains. Sam was superintendent of buildings and grounds and was invaluable in many ways. At the time Hewett had employed Sam, the latter was teaching shop and woodwork at the old Santa Fe Indian School. Sam was very much involved with the building of the Art Museum, which opened in 1917. He carved the corbels and beams for that edifice, as well as making all the furniture.

In speaking of Sam, Director Hewett would often say that Sam probably knew more archaeology and ethnology than most anthropologists. And I believe that this was true, for Sam was an inexhaustible source of information. He had been on most of the early expeditions of the School and Museum. He could give specific details of Wesley Bradford's Three Circle and Cameron Creek excavations, had been with Lansing Bloom at Giusewa, and with Hewett at such places as Gran Quivera, Chaco Canyon, and elsewhere.

One would find Santiago Naranjo of Santa Clara and various other Indians from San Ildefonso or Santa Clara in Sam's shop behind the Art Gallery. He was a warm, generous host and one who had a great respect and fondness for Indian friends. He would set up cots and feed them and was especially watchful over them during Santa Fe's annual Fiesta.

Sam told Lambert that there had been an incident that made Hewett very angry with him, "and that was once in Chaco Canyon when he caught me playing red pocket with the boys."

I never got to ask him about the incident, but some years later, long after Sam's retirement and death, Stanley Stubbs told a group of us about the ridiculous game of red pocket and how poor old Sam became the target of Hewett's anger.

Stubbs' account went something like this, as I recall. He and Paul Reiter had found a deposit of reddish-purple pigment near the camp in Chaco Canyon. They had nothing to carry samples in, so used their back pockets. On the way home they got rained on. The pigment
melted, and when they arrived at their tents, they discovered that each had large red patches on their backsides, just like baboons! For some reason, this struck them both as being very funny.

Shortly thereafter, they went back to the deposit of pigment, collected a quantity of it, and distributed it among the male students of the field school. The trick was to sneak up on someone and drop some of the pigment into the victim's back pocket without getting caught. Then, when the opportunity arose, the next step in the game was to pour or throw water on the seat of the victim and yell, "Red pocket!"

"We would all laugh uproariously," said Stubbs. "All of us played, and when Sam Huddleston came out to Chaco to help with some maintenance work, we first hooked him, and then he joined in with the rest of us. He wore his two big patches for a day or two, until he discovered who put the pigment in his pants pocket.

"The next day on the dig, and just as Sam was sneaking up on his victim, Dr. Hewett's voice rose in anger behind him. Among other things, he said, 'Sam, don't you think you're a little too old to be playing kindergarten games with backward children? I'm surprised and ashamed of you.' Then he got the rest of us together and delivered his ultimatum: 'No more red pocket, boys, or out of camp you all go.'

"We never played it again, because no one ever disobeyed Hewett and got away with it," Stan said.

AFTERWORD BY MARJORIE F. LAMBERT

Since my retirement from the Museum of New Mexico, I have made an effort to record 40 or so of the stories that are so much a part of the heritage given us by the giants who shaped Southwestern and American anthropology. These are some examples of their wit and charm.

Curator Emerita
Museum of New Mexico
Santa Fe

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Opinions differ on the origin of ceramics found on Spanish Colonial sites. There is evidence suggesting that the Tewas of neighboring pueblos manufactured pottery and traded it to the Hispanics and evidence suggesting that the Hispanics themselves made their own pottery. My intent here is not to try to resolve the issue but to objectively discuss both sides of the argument.

INTRODUCTION

In 1988, staff archaeologists from the Research Section of the Laboratory of Anthropology, Museum of New Mexico, excavated two Hispanic sites near Abiquiu. La Puente (LA 54313) dated to the Spanish Colonial period and is believed to be one of the earliest settlements in the Chama Valley. Several trash pits within the right-of-way on the south side of US 84 were excavated. On the north side of the highway, a small group of houses now sits where the structural portion of the site was located. Early aerial photos show mounds and wall alignments in that area, and the current residents report encountering wall segments and sherds while plowing their fields. A second site, the Trujillo House (LA 59658), was an eight-room adobe house with an associated trash-filled borrow pit and dated to the American Territorial period. The standing walls were razed in the 1940s, but the floors and portions of walls below the present ground surface were still intact at the time of excavation.

During the ceramic analysis from these two sites, several technological differences became apparent within the assemblages that potentially represent the dichotomy between Tewa and Hispanic wares. In the following discussion, the Black wares and Red wares will be referred to as plain wares, in contrast to the polychromes, which are considered decorated wares. The most obvious difference was in the temper. Tewa Black wares (also known as Kapo Black and Santa Clara Black) and Red wares (San Juan Red-on-tan and Tewa Red ware) typically have vitric tuff temper, often with pumice and/or fine sand mixed in. Hispanic Black ware (the term used during this analysis) and Casitas Red-on-brown, which will also be referred to as Hispanic Red ware, had fine to medium sand temper; occasionally a very small amount of tuff or pumice was mixed in. Differences were also observed in surface treatment. The Tewa Black wares had a thick slip and were well polished, while the Hispanic Black wares were thinly slipped and not as highly polished. Tewa Black bowls were generally well slipped on both the interior and exterior, while Hispanic Black ware bowls were usually slipped on the interior, with only a narrow band extending over the rim onto the exterior.
The same temper differences were observed within the Red wares. San Juan Red-on-tan and Casitas Red-on-brown both have a red band below the vessel rim. Again, surface treatment differs between the two. The red slip was applied with a rag on Casitas (Charles Carrillo, personal communication 1988), leaving uneven edges between the Red band and the polished buff surface. A brush was used on San Juan red-on-tan, producing a fine line with an even edge. A red band was the only decoration found on San Juan red-on-tan, while crude, rag-applied designs including scrolls, circles, and bulls-eyes sometimes decorate Casitas bowl interiors (Dick 1968:81). The red band on San Juan jar exteriors does not extend over the rim onto the interior, while this is a common occurrence on Casitas jars. As with the Hispanic Black wares, the band around the interior of Casitas bowls usually continues over the rim onto the exterior, forming a narrow band. These types are so similar that Hispanic Black ware might be referred to as a smudged Casitas, in the same way that Tewa Black ware is a smudged Red ware.

Significant differences were seen in the amount of plain wares recovered from each site. At the Colonial site, there was slightly more Tewa Black ware than Hispanic Black ware. Interestingly, there was more Hispanic Red ware than Tewa Black wares, and the Tewa Red wares comprised only a small percentage of the sample. On the Territorial site there was a significant increase in Hispanic Black ware over Tewa Black ware. There was also a slight increase in Hispanic Red ware, which was less common than Hispanic Black ware, but slightly more plentiful than Tewa Black ware. Tewa Red wares still made up only a small percentage of the assemblage.

Changes were also observed in the jar to bowl to soup plate ratios. Tewa Black ware was the only type that remained consistent in vessel form over time. In descending order of frequency, Tewa Black vessel forms were jar-bowl-soup plate, at both sites. In contrast, Hispanic Black forms were dominated by bowls, with jars being more common than soup plates at the Colonial site. And soup plates were more common than jars at the Territorial site. Hispanic Black bowls increased in percentage through time, while jars decreased sharply. The percentage of soup plates remained consistent on both sites.

Tewa Red wares and Hispanic Red wares both followed the same pattern of bowl-jar-soup plate during the Colonial period, although Hispanic Red ware had a higher percentage of bowls and a lower percentage of jars than Tewa Red wares. A dramatic shift was seen on the Territorial site. Tewa Red ware vessels were almost all jars; only a few bowls and no soup plates were found. Hispanic Red ware followed the same pattern as Hispanic Black ware, with bowls being dominant, followed by a few soup plates and hardly any jars. This is not to say that all of the Territorial-period jars were Tewa Red wares and all of the bowls were Hispanic Red ware. Most of the plain ware jars were Tewa black and Red wares, and most of the bowls were Hispanic Black ware. At the Colonial site, most of the jars were Tewa Black wares; most of the bowls were Hispanic Red ware; and most of the soup plates were Hispanic Black ware.

By not including other ceramic types in this discussion,
these conclusions might be misleading. Tewa Polychromes appear to influence the jar-bowl ratios in the plain wares. At the Colonial site, there is a high percentage of Tewa Polychromes, and more than half are jars. This ratio is higher than that of any of the plain wares. Since most of the plain wares had a higher percentage of bowls than jars, it would appear that polychrome jars were preferred. Few polychromes were found at the Territorial site. Perhaps jars were not as necessary in the Territorial period because of Euro-American goods that became available after the opening of the Santa Fe Trail.

X-ray fluorescence was performed on plain wares from both sites by Bart Olinger of Los Alamos National Laboratories. Analysis revealed identical chemical signatures between the Tewa wares and the possible Hispanic wares. This does not necessarily imply that they were all made by the same people; there are several plausible alternatives. First, the Tewas and Hispanics may have been obtaining clay from the same source. Second, San Juan women who married Hispanic men may have continued to use the pueblo clay source. Third, the same clay may outcrop at different locations within the same geological formation. Thus, an outcrop close to San Juan Pueblo and another close to Abiquiu would have the same x-ray fluorescent signature. More analysis of both clay and temper sources is needed to test these possibilities.

HISTORICAL BACKGROUND

Following his excavations at Pecos, Kidder (1936) concluded that the Plain Red and Plain Black wares came into general use during the period following the Pueblo Revolt. He found the Red wares to be typically sand tempered, while the Black wares were almost evenly split between sand temper and tuff temper. The two Black wares could usually be distinguished macroscopically. Tuff-tempered sherds were usually thinner, the surface was better smoothed, and the paste was homogenous in appearance. The paste of the sand-tempered sherds is not as fine and had visible grains of coarse sand. Sand temper also occurred within the polychromes, though the majority were tuff tempered. Again, the sand-tempered variety had a coarser, more friable paste. They were noticeably cruder in workmanship, often being carelessly smoothed, with a thin and streaky slip and a poorly executed design (Kidder 1936:542-544).

Brody and Colberg (1966) found three varieties of Black wares at the Ideal Site, a nineteenth-century Spanish homestead near Placitas. The first was probably a utility ware, since only the interiors were polished and the exteriors were left rough. The second type was a polished Black ware with pulverized tuff temper, resembling modern Santa Clara pottery. The third type ranged in surface color from gray to black and was occasionally brown or red. Surface finish varied from poor to well done, and tuff temper could be seen macroscopically. This type of temper was not found in sherds that these authors examined from any of the other sites. The tuff was tentatively identified as coming from Frijoles Canyon. However, since this pottery could not be associated with any local pueblos, Brody and Colberg (1966) remark that "it may be a Spanish-made pottery (but) we simply
do not know enough as yet about the pottery-making habits of the nineteenth century, both Indian and Spanish, to draw any firm conclusions" (p. 16).

At Las Huertas, also near Placitas, Ferg (1982) found that about half of the Black ware sherds had sand temper, rather thick walls, and poorly polished surfaces. He states that "the source of this material is uncertain, but it is almost certainly not Tewa in origin, as temper, thickness, and finish are all in marked contrast to the Kapo Gray and Kapo Black at the site" (Ferg 1982:40). Casitas Red-on-brown was also found in the Las Huertas ceramic assemblage, and Ferg was convinced that it was a Spanish pottery type, based on Dick's (1968) findings at the site of Las Casitas, near El Rito. Sherds from the type site were tempered with local sand, and, in conjunction with the lack of this ceramic type in pueblo assemblages, Dick (1968) argued that Casitas was of Hispanic manufacture.

At Paraje de San Cristobal, a Territorial site in the Rio Abajo region, a coarse, sand-tempered ware fitting the description of Carnue Plain was found (Boyd 1986). This pottery type is common in southern New Mexico and has been considered to be Hispanic in origin. Paraje was a considerable distance from the northern Rio Grande pueblos, and that may have been a factor in obtaining pottery. Boyd (1986:235) suggests that Indian pottery may have been harder to get late in the Territorial period and that the locals began making their own.

A Hispanic pottery-making tradition has been documented by several researchers. Hurt (1939) recorded a tradition of Black ware and Red ware pottery produced by the residents of the village of Manzano, occupied between 1824 and 1870. His informant was an elderly Mexican woman whose aunt was one of the potters. The technique for making pottery was said to have been taught to the villagers by a Navajo woman, though neither the technology nor the pottery itself resemble Navajo ware. The sherds are thick, poorly fired, sand-tempered pottery with a plain black, gray, brick red, or cream-colored finish. Hurt and Dick (1946) later refer to these wares as Manzano Coarse ware, Manzano Black Burnished ware, and Manzano Thin Red-on-buff. These names were later revised to Carnue Plain, Kapo Black (named by Mera 1939), and Casitas Red-on-brown (Dick 1968). Since Hurt and Dick believed that these wares did not resemble either prehistoric or historic pueblo pottery and since no transitional forms had been found, they suggested that this style was introduced by the Spanish missionaries from Mexico or by the Mexican Indians who came with them (Hurt and Dick 1946:309). They felt that once the new ceramic styles were introduced to the Spanish-American settlers in New Mexico, they then began to manufacture their own pottery.

The exact source for these pottery types in Mexico is unknown. However, there are strong resemblances between the Manzano wares and prehistoric wares found on the Rio Balsas in Mexico (Hurt and Dick 1946:309). Wendorf and Reed (1955) also believe these types were introduced from Mexico, stating that "this seems to be the most plausible explanation, since the strongest appearance of these types was in the area first colonized, and since essentially
similar pottery was made in southern Mexico" (p. 156). Mera (1939) concedes that Black wares first appeared at the end of the seventeenth century, since polished black sherds are rarely found at pre-Revolt sites, but he believes that this treatment was merely a new and refined version of a method used prehistorically. Smudged bowl interiors occurred more or less continuously along the lower and middle Rio Grande from before the twelfth century until the beginning of the eighteenth century. It might simply be the result of a natural progression that bowl exteriors were eventually smudged as well.

Though only plain wares are being considered here, I will make a brief mention of a Hispanic micaceous pottery tradition. At Cordova, ethnohistoric research by Brown et al. (1978) documented a barter system practiced by widows and single women. A micaceous clay source was located near the village. Women who had no land or means of acquiring food made pottery, which they then traded for the amount of grain or beans it took to fill the vessel. A similar tradition has been documented at the village of Abiquiu (Cordova 1973).

Many innovations in ceramic styles and manufacturing techniques were noted at seventeenth-, eighteenth-, and nineteenth-century Spanish sites in the Cochiti area. These include pottery comales, soup plates, ring-base vessels, fiber-tempered pottery, mold-made vessels, mica-slipped utility wares, and new decorative styles (Warren 1979:235). Mexican Indians were often members of Spanish Colonial households, and these changes have been attributed to a Mesoamerican influence. Warren (1979) believes that the settlers not only introduced a new style of pottery, but that they produced their own ceramics for almost 300 years. They moved into the Cochiti area after the Reconquest and selected tempering materials that differed from those used by the local pueblos, producing plain red, black, and red-on-buff wares. These changes first appeared at seventeenth-century sites such as Las Majadas. Many of these changes apparently continued into the next two centuries. Hemispherical bowls came into use during the eighteenth century, replacing the traditional shouldered style, and soup plates were common. During the nineteenth century, there was a general trend toward uniformity in vessel form and a decrease in decorated vessels (Warren 1979).

Carrillo (1987) is perhaps the most outspoken proponent of a Hispanic ceramic tradition. Here, semantics become an issue. Carrillo makes a distinction between "Spanish" and "culturally Hispanic" populations (personal communication 1988). The latter encompasses several groups, in particular Genizaros (detribalized and Hispanicized Indians, largely Hopi and Plains groups at Abiquiu). Mexican Indians who accompanied Spanish families to New Mexico and later became acculturated into the Spanish lifestyle, Pueblo and Genizaro women who married Spanish men and had families, and the descendants of these populations are all considered culturally Hispanic. Evidence of this mixing is apparent in the ceramics, with the Mexican influence affecting the plain wares and the pueblo influence exhibited in the decorated wares.

The Genizaros were an important influence during the Colo-
nial period, and they may have been one of the main suppliers of pottery. Documentation both at Abiquiu (Cordova 1973) and the Genizaro village of Belen indicates that they made pottery and traded it to their Spanish neighbors. The Genizaros were generally looked down upon because they were part Indian, they were poor in both land and money, and they had acquired a reputation of being lazy, thieves, and gamblers, probably as a result of the first two factors. The resident Franciscan priest at Abiquiu claimed the Genizaros were lazy because they would not weave even though they knew how and would not plant enough food for their families, despite having good land. Instead, they traded the pottery their women made for food and rented their lands to neighboring Hispanics at exces-
vive rates (Horvath 1979). These actions were frowned upon by the Franciscans, but perhaps indicate that the Genizaros did not identify with either the Pueblo or the Hispanic traditional roles, creating their own economy that relied heavily on barter to attain the basic necessities.

However, there is historical evidence discounting a tradition of Hispanic pottery manufacture (Adams and Chavez 1956; Hackett 1937; Schroeder 1964; Snow 1984). Snow rejects the premise primarily on the grounds that the evidence is scarce and that the oral traditions are not trustworthy. He believes that these traditions refer to a period no earlier than 1800-1850 (Snow 1984:105). There are several instances of local Franciscans implying that Spanish colonists did not make pottery. In 1761, Fray Pedro Serrano complained that the alcaldes of New Mexico "do not visit their pueblos except to...gather pots, plates, jars, jugs, etc..." (Hackett 1937:486). In 1776, speaking of the Spanish settlers, Fray Atanasio Dominguez states that "they do not know how to make pottery, the father supplies what is necessary" (Adams and Chavez 1956:123). And in 1795, Fray Jose de la Prada remarked that Genizaro women of Abiquiu "made pottery which was sold to the vecinos for food supplies" (Swadesh 1974:41).

Regarding the Manzano ceramic tradition reported by Dick, Snow (1984:94-95) cites Hurt's (1939) description of the smudging technique. Hurt's informant claimed that "the vessel was covered with a thin layer of ground liver and then fired. This resulted in a carbonized black exterior" (1939:247). Snow expressed surprise at Hurt's uncritical acceptance of this technique and suggests that he was unfamiliar with historic pueblo pottery manufacture, since he made no comparisons between his Manzano ware and contemporary smudged Black wares of Santa Clara and San Ildefonso. Still, Snow (1984:98-99) concedes that Spanish Americans may have made micaceous pottery at Cordova. However, he feels that if they did, the technique was learned from Jicarilla, Taos, and Picuris women who all shared the same clay source. He apparently differentiates between "learned behavior" and a "ceramic tradition." The oral accounts from Manzano and Cordova are thus dismissed as being little more than circum-
stantial fact and romantic folklore in support of the claim that pottery was a 'traditional' Hispanic craft in those villages. [Snow 1984:99]
The suggestion has been made that there was no need for Spanish colonists or their descendants to produce pottery (Snow 1984:101-102). This is based on evidence that the production and exchange of pottery by the Pueblos and the Apaches was a significant economic activity in New Mexico, eliminating the need for colonists to make their own. There are many nineteenth-century observations documenting Pueblo women trading pots to the Spanish for food and of Pueblos producing excessive amounts of pottery for trade (Bloom 1938; Davis 1938; Moorehead 1954). At Zia Pueblo, in the 1880s, Matilda Stevenson (1894) noted that the women labor industriously at the ceramic art as soon as their grain supply becomes reduced, and the men carry the wares to their unfriendly (Spanish) neighbors for trade in exchange for wheat and corn. [p. 12-13]

Jicarilla Apaches reportedly visited the San Juan Basin every summer to trade pottery for wheat, corn, beef, and mutton (Dittert et al. 1961:157). Pottery from San Juan Pueblo was manufactured as a trade item for the Spanish American market and was traded to the Hispanics of Canones for kaolin slip (Schroeder 1964:46).

Another factor contributing to the belief that Hispanics did not make pottery was the fact that they regarded ceramic manufacture to be beneath them. In 1807, Zebulon Pike commented that "a vast quantity" of pottery was made by the "civilized (Pueblo) Indians, as the Spaniards think it more honorable to be agriculturists than mechanics" (Quaiffe 1925:305). In Latin America, pottery production was traditionally the role of Indians, who were at the bottom of the socioeconomic ladder. Thus, pottery manufacture was considered to be a very low status activity.

Originally, there is no doubt that the Spanish colonists were dependent on their Pueblo neighbors for a wide variety of domestic needs. There was a shortage of iron in New Mexico in the Colonial and Mexican periods, particularly at frontier settlements such as Cochiti (Snow 1973:43-44) and Abiquiu. This led to a reliance on the pueblos for many domestic needs, including pottery, since iron cooking pots were not available. Majolica was a luxury item, so Pueblo bowls and plates would also have been needed. With the seventeenth-century encomienda, or tribute, system no longer in use, pottery in the eighteenth century was obtained through barter.

Hayes (1981:73), in discussing Tabira Plain at Gran Quivira, noted that pitchers in the late European form were universally of crude manufacture and had such a thick paste that they were separated out and given a new name. He suggests that the crude pottery was probably made primarily for the Spanish by the neighboring pueblos, either for trade or as tribute. Wiseman (1988:29-30) agrees with this scenario, remarking that Indians would typically not have produced their best wares for the Hispanic market. When the encomienda system was abolished after the Pueblo Revolt, the Pueblos were no longer forced to make pottery for the Spanish.

It is possible that "inferior" styles may have originated during the pre-Revolt period and may have continued to be produced into the Colonial period. However, if this were the case, why were the pueblos producing
traditional, well-polished, tuff-tempered jars in addition to poorly polished, sand-tempered bowls for trade? It could be argued that the bowls and soup plates were "inferior" because they were not traditional pueblo forms, and therefore the Indians had less interest using traditional temper and slip. But the Spanish undoubtedly would have been aware of this inconsistency and would have demanded the same quality as they saw in the pueblo jars. Conversely, the bowls and soup plates may be of Hispanic manufacture. These are relatively easy forms to make, especially since they all appear to have been molded. More bowls and plates than jars were probably needed, since constant, daily use entails more breakage than jars used for storage, which are not handled as much.

CONCLUSIONS

Regardless of who actually made the pottery in question, the fact remains that two similar but distinct ceramic traditions occur throughout the state. Dick (1968) feels that Casitas ranges from Mesilla north to southern Colorado, and it appears that the sand-tempered Black wares may have a similar distribution. Despite Snow's (1984:93) assertion that pottery found at Hispanic sites is indistinguishable technology from pueblo ceramics, analysis from several Spanish sites, including La Puente and the Trujillo House, demonstrates the opposite. Both the Black wares and the red-on-buff wares have fine to coarse sand temper and are generally more friable than the tuff-tempered Tewa wares. The extent of slip and polish also differs on both the red and the Black wares, and design style and quality vary within the Red wares. There is enough of a difference to suggest that Tewas were not producing this pottery.

There is convincing evidence for both sides of the controversy. The pueblos probably did supply the colonists with pottery when they first settled in New Mexico. Eventually, though, through intermarriage and acculturation, pottery manufacture may have become an integral part of Hispanic society. Further ethnographic and archaeological research is needed to settle the dispute and to provide information on the extent of acculturation in Colonial New Mexico.

Museum of New Mexico
Santa Fe

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In 1905, Edgar Lee Hewett conducted some fieldwork while he was employed by the Smithsonian Institution, Bureau of American Ethnology. Much of the work was survey, but excavations were carried out at five sites on the Pajarito Plateau. Because only limited reference to his work has been published, I have prepared a report based on his field notes. Information from the field notebook regarding collections was compared with accession information obtained from the Smithsonian Institution. Discrepancies between these two sources and some of Hewett's later publications are discussed, and suggestions for future research are presented.

INTRODUCTION

The publication of as much information as possible from any archaeological fieldwork is always desirable. In this report I provide new data on five sites located on the Pajarito Plateau and excavated by Edgar Lee Hewett in 1905. At that time, Hewett was working on behalf of the Smithsonian Institution, Bureau of American Ethnology (BAE); one of his assignments was to gather data about sites on public lands to be used by custodians of the public trust to protect, preserve, and properly utilize these cultural resources. The results were published as a series of reports on specific areas (Holmes 1906). Hewett's 1906 publication on the Jemez Plateau provided a description of the area; a short description of each site, some of which were accompanied by maps; and a brief reconstruction of the local culture history. The excavations of burials at several sites were mentioned in passing (Hewett 1906:12), but the sites were not named, nor were the excavation details presented. The artifacts and human burials that were recovered are curated at the Smithsonian Institution, and a thorough analysis of these remains would provide additional information about cultural adaptations on the Pajarito Plateau.

The question of why excavations were undertaken has not been stated explicitly. In 1905, Hewett was at the major turning point of his life—a point of transition from educator to archaeological researcher. Between 1890 and 1903, Hewett's anthropological and archaeological interests were growing as a result of his love of the outdoors, his curiosity about man in the past and present as an adjunct to the science of teaching, and the realization over time that the study of the science of man was his life's goal (Hewett 1946:123-126). In 1903, his contract at the New Mexico Normal University in Las Vegas was not renewed because the Board of Regents did not agree with his philosophy of education (Chauvenet 1983:47), which focused on a hands-on, outdoor
experience in addition to class-
room activities (Hewett
1946:103). At that point,
Hewett decided to obtain his
Ph.D. Because travel in Europe
was important to them, he took
his wife Cora abroad; they
traveled and he studied at the
University of Geneva in 1904
(Chauvenet 1983:48-50). By late
1904, his father had died, his
wife's poor health had continued
to deteriorate, and the Hewetts
had settled in Washington, D.C.,
where he had accepted a position
with the Smithsonian Institu-
tion, Bureau of American Ethno-

Hewett's previous explora-
tions in north central New
Mexico and his 1904 report
indicated that he was highly
qualified to carry out this
assignment. One of the duties
of this position included summa-
rizing the cultural resources of
the Jemez Plateau. Thus, Hewett
was provided with an opportunity
to earn a living while working
with data that were to be incor-
porated into his dissertation on
prehistoric man in the American
Southwest and Northern Mexico
(Hewett 1908). When Cora Hewett
died in 1905, Edgar immersed
himself in his work, which also
included lobbying for passage of
the Antiquities Act of 1906, a
goal toward which he had been
working since 1900.

Hewett's 1905 field notebook
covers the period from April 20
to July 28, as he was exploring,
mapping, making collections, and
learning what he could from
native informants. The Jemez
Plateau was considered to encom-
pass an area extending from the
Colorado state line on the north
to the Canada de Cochiti on the
south and from the Rio Grande on
the east into the Jemez Moun-
tains, in order to cover much of
the recently established forest
reserve (Hewett 1905b). It was
divided into three subareas:
the Pajarito Plateau, the Chama
drainage, and the Jemez Valley.
Hewett recorded a few comments
obtained from his Tewa compan-
ions about the meaning of site
names and listed 30 words and
their translations; these have
been included in later diction-
aries of the Tewa language
(Harrington 1919, 1920). Hewett
visited at least 41 sites, some
of which were unnamed and are
difficult to locate based on his
descriptions; 21 sketch maps
accompanied the notes. Because
the information on nonexcavated
sites is either published in
Hewett's 1906 report with better
maps or elsewhere as later
archaeologists have reported on
surveys and excavations in the
area, they will not be discussed
further. This report will
concentrate on the 1905 excava-
tions that, with the exception
of the burial mounds at Otowi
(Hewett 1938:130-132), have not
been presented in much detail
elsewhere.

Why Hewett never published a
full report on these sites is
not clear. Several factors must
be considered. By late 1905
Hewett was appointed a fellow of
the Archaeological Institute of
America (AIA). His duties
included an investigation of and
report on the Mesa Verde area, a
comparative study of art and
architecture of Puebloan sites
and ancient sites in Mexico,
lectures throughout the country
for the AIA, and administrative
All this, plus writing his
dissertation in French, made for
a hectic and full schedule. In
January 1907, Hewett was ap-
pointed Director for American
Research by the AIA, which in-
volved setting up the School of
American Archaeology (later the
School of American Research),
choosing its permanent location
in Santa Fe, and organizing its research program and funding (Chauvenet 1983:71-72). It was a job he held for four decades thereafter. It is easy to understand, therefore, why a report could go unwritten.

THE EXCAVATIONS

The five excavated sites are Otowi, Tsankawi, two small pueblos located near a sawmill on the Ramon Vigil grant, and +Perage (see Figure 1 for approximate locations). I attempted to correlate site names with numbers on file at the Laboratory of Anthropology. I have taken the liberty of reorganizing the information recorded in the notebook into more logical sequences for presentation but have included all the data. Hewett's measurements were in feet and inches, and, because many of them were only approximations, they have not been converted into the metric system. Information on collections has been correlated with data provided by the Smithsonian Institution, Bureau of American Ethnology, Accession No. 45665.

Otowi (LA 169)

Hewett (1905a:15-16) noted that Otowi looked the same in 1905 as it did when he left it in 1900, with no signs of any exploration in the ruin. From May 18 through May 27, he and three workmen excavated two mounds and four rooms at this site (Hewett 1905a:33-53, 4 maps). The locations of the mounds in relation to the pueblo are indicated in Figure 2. Because there are some discrepancies between the field notes and the published summary of his work (Hewett 1938:130-133), all data from the notebook will be presented and the differences between the two sources noted.

The South Mound

There are discrepancies between the size of the south mound as drawn on Figure 2 (ca. 70 by 40 ft) and the measurements in the field notebook, which agree with his later discussion (100 by 80 ft) (Hewett 1938:130). Hewett described this oblong mound as about 100 ft in diameter and 6 ft high in 1905. A 10-ft-wide trench was placed across the middle, running in a west-to-east direction. Forty burials were recovered from this trench; most of them were located between 15 and 30 ft from the western edge of the mound (Hewett 1938:130). Two similar trenches branched off perpendicular to the south (Figure 3a).

Two major stratigraphic levels could be discerned. The upper level, which encompassed nearly all of the aboveground material, consisted of a dark black soil that was interspersed with thin layers of ash. (The ash was not noted in the 1938 report.) Burials were encountered throughout this level, but they were found most often at depths of 3 ft and 6 ft from the surface. Hewett (1938:131) indicated this burial mound was highly disturbed from the addition of more burials through time. As a result, bones were often displaced, and the remains of individuals could not be distinguished from the lot. The lower level included the hardpan (described as gray tufa in the 1938 report) into which several burial pits—which were approximately 3 ft long, 1 ft 3 in. wide, and 1 ft deep—were excavated. After the bodies were interred, the graves were covered with gravel. (The gravel was not reported in 1938).
Figure 1. An outline of the Pajarito Plateau providing locations of sites excavated by Hewett in 1905 in relation to some other known historic and prehistoric settlements. A wagon trail connected Buckman, a railroad stop on the east side of the Rio Grande, with the sawmill at the foot of the Jemez mountains.
Hewett (1938:130) estimated that a total of 15,000 cu ft of dirt was removed from this mound.

Notes on individual burials were sketchy and incomplete. Many were secondary or urn burials, and nearly 20% were infants (Hewett 1938:131). He published two photographs of the urn burials (Hewett 1938:Figures 68 and 69). Information from the field notebook is summarized in Table 1.

On Day 1, the initial trench extended 20 ft into the mound where the soil was 5 ft deep. A total of 16 burials was found; five of these were infants, two were youths, and one was a "genuine" urn burial. The majority of the skeletal remains were in bad condition. The urn burial was considered to be the first perfect example of this type of secondary burial ever recovered by Hewett; all previous ones consisted only of an inverted bowl placed over the head. Other artifacts recovered that day included two perfect bowls, each with 12-in. diameters and designs similar to those on bowls recovered from Tsirege and Tsankawi (in 1900); a small brown bowl (with a fragment recovered from another location); a small medicine jar; and a few bone and stone tools. (See Hewett [1938:132-133] for a general discussion of the artifacts.)

Notes for Day 2 indicate that the skeletal material recovered was generally in bad condition. One more urn burial was recovered (Table 1). The total number of interments at the end of the day was 35, and a total of 12 pieces of pottery were noted to be in fair shape.

By Day 3, the mound was 6 ft high where excavations were being carried out. Many skeletons were found, but all were in

Figure 2. Map of Otowi, based on Hewett (1906:Figure 6), indicates locations of the two mounds excavated in 1905 in relation to other features at the site.
Figure 3. Plan views of areas excavated at Otowi in 1905; no scales were provided.

a) Location of trenches in the South Mound.

b) Excavated area of the South Mound at the end of day 4.

c) Sketch of West Mound indicating areas excavated. No cardinal directions were indicated.

d) Sketch of excavated rooms.
Table 1. Otowi-burials recovered from the South Mound.

<table>
<thead>
<tr>
<th>Day</th>
<th>Burial(s)</th>
<th>Descriptive Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>#1 infant</td>
<td>Located 12 ft from west on south side. Skeleton was &quot;ruined,&quot; skull was &quot;perfect.&quot;</td>
</tr>
<tr>
<td></td>
<td>#2 adult</td>
<td>Located 14 ft from west, 4 in deep in gravel. Skeleton was &quot;ruined,&quot; skull was &quot;perfect.&quot;</td>
</tr>
<tr>
<td></td>
<td>#3 ?</td>
<td>Found under a drain; badly disintegrated.</td>
</tr>
<tr>
<td></td>
<td>Urn burial</td>
<td>Bowl about 2 ft below surface was inverted over the head. Small bones and ends of long bones rested inside of a bowl, but the head did not. This bowl, #3 in the catalog (which was not with the field notes), had a 12-in. diameter.</td>
</tr>
<tr>
<td></td>
<td>7 burials</td>
<td>Located 13 ft from west. All were in bad condition.</td>
</tr>
<tr>
<td>2</td>
<td>Urn burial</td>
<td>Small bowl held many small bones and the ends of long bones, some meal, cord, etc. Skull rested on top of the bowl, with another bowl above.</td>
</tr>
<tr>
<td>3</td>
<td>Urn burial</td>
<td>In fine shape. Head covered with matting, potter's clay, some ashes, and half of a large bowl. Small bones and the ends of long bones were &quot;displaced&quot; about the head. All were covered by an inverted large bowl that had a 13-in. diameter.</td>
</tr>
<tr>
<td>4</td>
<td>Infant</td>
<td>Found with moist clay ready for pottery making.</td>
</tr>
<tr>
<td></td>
<td>Child</td>
<td>Urn burial No. 4. A large bowl over a small ollita and incised ornaments were found with the skeleton.</td>
</tr>
<tr>
<td></td>
<td>?</td>
<td>Approximate urn burial; bowl was over the head.</td>
</tr>
</tbody>
</table>
bad shape. Some of these came from the transverse cut in the middle of the mound; this area was found to be more productive than the area previously excavated (Hewett 1905a:40). The pottery was also in poor condition. The total now reached 50 burials and 35 bowls.

The work on Day 4 continued in the east-west trench and in the second transverse trench. By the end of the day, excavations had covered much of the burial mound (Figure 3b). The soil still averaged 6 ft thick, but was much drier. At the end of the day, total burials numbered approximately 80; bowls, 40.

In summary, a total of 80 burials, 50 bowls, and a few other artifacts (clay, meal, cord, and incised ornaments) were excavated. At least five of the burials were classified as urn burials. Some of the burials must have been in the pits. Burials were found in almost every possible reclining position except fully extended. The prevailing position was with the skeleton on its back, the head and neck raised so that the chin was on the chest with the face toward the east, and the knees drawn up to the chin. Hewett (1938:131) indicated the majority of burials from other sites in the region were not placed on the back but face down in the fetal position (see discussion below for Tsankawi). Overall, the condition of the burials was so poor that Hewett felt they would not survive shipment. He saved only some "good" skulls and long bones.

Bowls were almost always found near the head and often had been intentionally broken at the time of interment. Bowl diameters ranged from 3-15 in., but a large percentage were small sized. Twine was found around the neck and loins; matting was recovered about the face. Braided hair was noted, as was sufficient evidence of fire to lead Hewett (1905a) to remark that "the funeral pyre must have been almost universal" (p. 46).

**The West Mound**

This smaller mound was estimated to be 30 ft in diameter and from 1-3 ft high. In 1938, Hewett discussed a 3-ft retaining wall constructed to irregular pieces of tufa around the lower rim of this mound to prevent erosion. The area excavated is indicated in Figure 3c. Hewett records that 25 burials and 22 bowls were recovered by one man working a single day. Some of the burials had been near the surface. Hewett (1938:131) indicates seven of these were infants. Many of the burials in this mound were children and were associated with little pottery. Based on the number of pots and burials, it is inferred that adult burials were accompanied by two or more bowls.

**Pueblo Rooms**

Four rooms, somewhere in this 600-plus room pueblo, were excavated in one day. Figure 3d indicates that two smaller rectangular rooms (measuring 5.5 by 5.5 ft) were fronted by a longer room (measuring 6 by 14 ft), which extended across the front of both of the smaller rooms. One additional, but slightly shorter, room was located adjacent to the long room. Contents of these rooms were meager: a pipe, a few bone awls, and a few heavy stone implements.
The Otowi Collections

A list of materials recovered by Hewett can be compared with the list of boxes he prepared to send to the Smithsonian Institution (Table 2). He had rejected items he considered worthless prior to packing the boxes; it is inferred that about half of the skeletal material and about 85% of the ceramics were saved.

Correspondence on file at the Bureau of American Ethnology includes a 1909 request for return of some of the Otowi material. A few catalog cards were annotated "returned 2/3/10." His later report (Hewett 1938:132) indicates that some of the Otowi material was at the Museum of New Mexico, as well as at the U.S. National Museum.

Tsankawi (LA 211)

Hewett (1938:133-134) reported that the main mound and two smaller mounds at Tsankawi had been excavated and that the methods he used and the material he recovered were similar to those discussed for Otowi. The main cemetery, from which 32 burials were recovered (Hewett 1938:134), had been excavated in 1900. Mound A (Figure 4a) is probably the main mound.

Between June 5 and June 9, 1905, two of the mounds near the pueblo were trenched (Hewett 1905a:62-71, 4 maps). There is some question, however, about the identification of these mounds. The field notes indicate that the first mound to be excavated was located at the northwestern corner of the pueblo, but the compass directions on the sketch map of the site that accompanied the field notes (Figure 4a) present east and west opposite their normal position. If reversed, Mound B would be the mound in the northwestern corner. In the field notes, Hewett wrote that the second mound to be excavated was Mound C, yet Figure 4a indicates that this mound on the south side of the pueblo was not excavated. Because of the shape of Mound C drawn in this sketch and that of the trenched mound (Figure 5b) match, it is inferred that Mound C was excavated in 1905, not the irregularly shaped mound A.

Mound B, Northwestern Mound

Two trenches, each about 10 ft wide, were placed in this oval-shaped mound that was 100 ft long and a little over 3 ft high. The location of the 10-ft-wide and 20-ft-long trenches are indicated in Figure 5a.

Burials were uncovered soon after the first trench was begun. The information on individual burials from this site is summarized in Table 3. The second burial was noted at the rock bottom of the mound. While other burials were found and some of them marked on the map, they were not described. Excavations ceased after a day and a half because the mound seemed nonproductive, with only six skeletons and eight bowls (two rejected) having been recovered.

Mound C

This 40-ft-long by 18-in.-high mound was trenched in less than three days. The shallow soil was dark and contained little rock. The first trench was 25 ft long, but it was expanded at right angles so that a 40-by-20-ft area was uncovered. At least 13 burials were found in the initial trench. Information on those burials

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Table 2. Materials from Otowi, 1905.

<table>
<thead>
<tr>
<th>Items Recovered, per Notebook</th>
<th>Items Prepared for Shipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 + burials</td>
<td>81 packages of osseous remains consisting of entire skeletons or related parts</td>
</tr>
<tr>
<td></td>
<td>1 box of unrelated bones, skulls, long bones, etc. (probably parts of 20 burials [Hewett 1938:131]).</td>
</tr>
<tr>
<td>125 pieces of pottery, some entirely destroyed by excavation, many intentionally broken at burial</td>
<td>77 pieces of whole pottery</td>
</tr>
<tr>
<td></td>
<td>32 pottery fragments</td>
</tr>
<tr>
<td>24 (2 dozen) bone awls</td>
<td>1 box of miscellaneous small implements (pipes, awls, etc.)</td>
</tr>
<tr>
<td>6 (half dozen) bone flutes</td>
<td></td>
</tr>
<tr>
<td>6 (half dozen) bone whistles</td>
<td></td>
</tr>
<tr>
<td>12 (1 dozen) pipes</td>
<td></td>
</tr>
<tr>
<td>? miscellaneous articles</td>
<td></td>
</tr>
<tr>
<td>(possibly twine, matting, ornaments mentioned in text)</td>
<td></td>
</tr>
<tr>
<td>? numerous polishing stones</td>
<td></td>
</tr>
</tbody>
</table>

that were described to any extent in the field notes are included in Table 3.

Collections

A total of 29 burials were recovered, 28 of which were shipped along with 12 bowls and some stone implements. Files at the Bureau of American Ethnology indicate that 44 bowls, 2 bowl fragments, 1 saucer, and a "lot" of fragments were received from the 1905 excavations at this site. This inconsistency in numbers of objects shipped versus the number catalogued poses questions about the contents of this collection. While the burial counts match fairly well, 25 versus 28, the source of the additional ceramics is undetermined.

The Buckman's Sawmill Sites

One man spent one day, June 14, at Buckman's Sawmill Site No. 1 removing about 100 sq ft of a mound that was 50 ft long and no higher than 2 ft (Hewett 1905a:74-75, 1 map)(Figure 6). Four skeletons were recovered; they were generally found lying in an extended position under heavy blocks of tufa rock. Evidence of fire was noted with all burials; only broken pottery and "thunderballs" accompanied these individuals.

One day, June 16, was spent at Buckman's Sawmill Site No. 2, an older, rectangular pueblo (Hewett 1905a:76, 1 map)(Figure 7). In a nearby mound, an 8-ft-wide east-west trench revealed dry black soil from 1/2-3 ft high.
Figure 4. Plan views of Tsankawi indicating relationships of burial mounds and roomblocks.  

a) Overall plan of site.  

b) The northwestern corner of the site, including Mound B.
Figure 5. Mounds Excavated at Tsankawi in 1905:
Top. Mound B located in the northwestern corner of the pueblo.
Bottom. Mound C located south of the pueblo.
Table 3. Tsankawi burials recovered from Mounds B and C.

<table>
<thead>
<tr>
<th>Mound</th>
<th>Burial</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>#1</td>
<td>Located 3.5 ft below surface and about 2 ft from beginning of trench. Found under a stone. Skull wrapped in matting and twine; twine also found at neck and arms. Two broken bowls recovered.</td>
</tr>
<tr>
<td>B</td>
<td>#2</td>
<td>Located 3 ft below surface &quot;at rock bottom&quot; and 3 ft from beginning of trench on opposite side of trench from Burial #1. Head, arms, legs to feet, and backbone wrapped in cord. Corn cobs were lying on body.</td>
</tr>
<tr>
<td>C</td>
<td>#1-4</td>
<td>Recovered in main trench. Two were accompanied by bowls.</td>
</tr>
<tr>
<td>C</td>
<td>?</td>
<td>Located where east trench turned. It was found in a pit 15 in. wide, 3 ft. long, and 15 in deep.</td>
</tr>
<tr>
<td>C</td>
<td>#11</td>
<td>Located 3 ft further down east trench. Also found in a pit; accompanied by a bowl, matting, and some &quot;curious sticks.&quot;</td>
</tr>
<tr>
<td>C</td>
<td>#12</td>
<td>Located 3 ft further on. No bowl, but some basketry present.</td>
</tr>
<tr>
<td>C</td>
<td>#13</td>
<td>Located 2 ft north.</td>
</tr>
</tbody>
</table>

The burials of six adults and two children were recovered; all were poorly preserved except one skeleton, found under heavy rocks, which was in good condition. All burials showed evidence of fire. Animal bones and "thunderballs" were present in the mound. A whistle, an awl, and a few pieces of broken pottery were considered to be "almost no artifacts." Pottery was either black corrugated or black-on-white. Hewett indicated that the stature of the skeletal remains from this site was small compared to others found at previously excavated Pajaritan sites. As Hewett (1904:649) noted that no cemeteries or burials were found at small sites excavated near Tsirege, the reference is probably to the larger pueblo mounds.

Sawmill Sites Collections

Hewett indicated that no portion of the burials were kept, yet documents at the BAE record eight burials from Site X on the Ramon Vigil Grant. Another site, listed only as N.M.?, had remains from four
Figure 6. Map of Buckman's Sawmill Site No. 1.

Figure 7. Map of Buckman's Sawmill Site No. 2.
burials. One artifact was also recorded. Because no other sites fit the descriptions of work performed in 1905, it is assumed that the burials from these two sites do match the material in the Smithsonian Institution.

Perage (LA 41)

The Tewa of San Ildefonso regarded Perage as a pre-Spanish ancestral pueblo. In one report, Hewett (1906:18) remarked that no traces of Spanish influence were found; thus, it is inferred that one of the reasons for excavations was to confirm this claim. Excavations at Perage began during the afternoon of June 22, after obtaining permission from the Governor of San Ildefonso Pueblo (Hewett 1905a:79-87, 1 map). Hewett noted some prior excavations had taken place; this was probably in Rooms 1, 2, and 3, which he measured. He measured and excavated three more rooms, Rooms 4, 5, and 6 (Figure 8). Although he referred to a master map of this site, it was no longer attached to the notebook, so that the location of these rooms within the site cannot be determined. They are not indicated in his published report (Hewett 1906:Figure 5).

The information recorded for these six rooms as provided in Table 4. The smallest, Room 2, was 6 ft 3 in. by 3 ft 6 in.; Room 5 was the largest at 8 ft 4 in. by 6 ft 5.5 in. Three east-west doorways connected adjoining rooms: Room 1 with Room 2, Room 4 with Room 5, and Room 6 with an unnumbered room to the east. Round windows, with a diameter averaging 6.25 in., were present in two rooms. There was no mention of floor features, but the floor in Room 6 was higher than the floors in Rooms 4 and 5 to the north by 1 ft. Remains of smoke were found in Room 6 but were noted to be absent from Room 4. Broken pottery was recorded in the southern half of Room 6.

Adobe was used to build the walls and partitions. Room walls were 9.5 to 10.5 in. thick and constructed of adobe layers that were from 6 to 12 in. high. Two partition walls were described. The first, in Room 3, which was only partially excavated, was 11.5 to 12.5 in. thick and 15 to 20 in. high. The second was built into "a large room" (probably Room 1); it was not made of regular bricks but from adobe piled up in an irregular manner. No straw was present in the adobe.

Collections from the three excavated rooms included a box decorated with serpents, rain clouds, and figures of beings, a "lot" of drab-colored pottery fragments, a "lot" of yellow-brown pottery fragments, and a "lot" of animal bones. Notes in the accession records indicate that the box was returned to Hewett in 1910.

SUMMARY AND CONCLUSIONS

Based on these few notes, it is apparent that Hewett was searching for burial mounds that would provide both skeletal remains and whole or nearly complete artifacts. He rejected what he considered worthless; yet the tallies, when provided in his field notes, sometimes compare well with the catalog numbers for Accession No. 45665 at the Smithsonian Institution, Bureau of American Ethnology. In some instances, however, there are major discrepancies, such as the larger number of vessels from Tsankawi that were catalogued. In addition, Hewett's excavations of only a
Table 4. Recorded data on rooms at Perage.

<table>
<thead>
<tr>
<th>Room</th>
<th>Measurements</th>
<th>Doors</th>
<th>Windows</th>
<th>Walls</th>
<th>Other Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5'6&quot; x 6'3&quot; to Rm. 2</td>
<td>1-6 diam.</td>
<td>2-7 diam.</td>
<td>6.5-9.5 thck</td>
<td>Windows were both round</td>
</tr>
<tr>
<td></td>
<td>16.5&quot; wide</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>6'3&quot; x 3'6&quot; to Rm. 1</td>
<td></td>
<td>5.5&quot; diam.</td>
<td>11.5-12.5 thck; 15-20&quot; high</td>
<td>Partition wall measurements given</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>8'4&quot; x 5'9.5&quot; to Rm. 5</td>
<td></td>
<td>131-13.5&quot;</td>
<td></td>
<td>Completely excavated.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>8'4&quot; x 6'5.5&quot; to Rm. 4</td>
<td></td>
<td></td>
<td></td>
<td>Partially excavated</td>
</tr>
<tr>
<td>6</td>
<td>7' x 5'10&quot; to unnum. room to east; 9.5-11.5 x 28&quot;</td>
<td></td>
<td></td>
<td></td>
<td>Partially excavated. Floor 1 ft higher than in rooms to north. Smoke noted, broken pottery.</td>
</tr>
</tbody>
</table>

few rooms in the large pueblos versus the number of rooms available for excavation indicate these rooms were of secondary interest in 1905.

The materials that were collected have never been discussed as part of specific site reports, even though Hewett (1938) included some of them in an overall discussion of the Pajarito Plateau. Unfortunately, provenience information is almost nonexistent, and Hewett's culling of objects prior to leaving the field indicates that what does remain is heavily biased toward complete objects or better-preserved material.

With regard to the burials, several observations can be made:

1. The burials in the larger sites were never fully extended, but those from one small site were. Hewett (1938:134) noted that the full-length burial was probably introduced to the Pueblo Indians with Christianity, but that it had also been found in a few pre-Spanish localities.

2. Stones were present over one burial at Tsankawi and occurred with burials at one of the small pueblos.
Figure 8. Plan view and notations about three excavated rooms at Perage.

Hewett (1938) made no comment about this custom. Thus, burial customs among large and small sites seem to differ, as do those among some of the large sites in that these burials from Otowi were on their backs rather than face down.

3. There was a contrast between grave goods at small and large sites. "Thunderballs" and pottery fragments were present in the two small pueblos located near the sawmill, but whole pots, twine, cord matting, pipes, and corn were found with burials from mounds in the larger sites. The term "thunderball" was not clarified; it may refer to "small spherical balls of agate" that Hewett (1938:132) noted were found at Otowi.

4. There was a contrast in burial customs between the presence of mounds on two small sites located near the sawmill versus the lack of cemeteries and burials at small sites near Tsirege (Hewett 1904:649).

5. Skeletal remains from one of these earlier small sites suggested shorter stature than did remains from other, previously excavated sites, which are assumed to be all from later, large sites.

6. Vessels were found with adults and usually not with children.

Several of these observations were not discussed by Hewett (1938:134-135) in the overview of burial practices he wrote many years later. Despite the shortcomings in the note-taking and collections, with current questions about reburial of skeletal remains and associated grave goods, it is imperative to use these materials wisely and soon. We cannot wait another 84
years before employing tech­niques to evaluate diet and health of prehistoric popula­tions. The 1905 data and obser­vations derived from them that are presented in this report indicate differences in burial practices through time (the small versus large sites), among burial modes at one time (Hewett 1938:134-135), and between areas on the Pajarito Plateau (the variation in positions of buri­als between Otowi and Tsankawi). Even though the records are poor, there are several lines of inquiry to examine during future research.

National Park Service
Santa Fe

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POSTULATED MOVEMENTS OF THE TANO OR SOUTHERN TEWA
A.D. 1300-1700

Stewart Peckham and Bart Olinger

The earliest approaches to prehistory in the Rio Grande region have always been somewhat at variance with those used by slightly later archaeologists who worked in the Four Corners area of New Mexico, Colorado, Utah, and Arizona. Compared to the Rio Grande, the latter area was a tierra incognita; archaeologists started from scratch with no help from Spanish documents, Puebloan oral traditions, or the dating techniques that have been developed in the past 60 years. They gradually established long developmental sequences, but these had only postulated antecedents and were not directly traceable to post-A.D. 1300 continuations in the Rio Grande region and elsewhere.

In central New Mexico, it was the pioneering research of Adolf Bandelier (1890-92) that later archaeologists emulated in attempting to trace the ancestors of specific modern pueblos. There was no accumulated archaeological data to assist him when he began his work in 1880--no records of previous excavations and surveys, no pottery types and sequences, and no tree-ring dates. The time concepts he dealt with came from the relatively few Spanish documents that had survived the Pueblo Revolt of 1680, plus the Pueblo origin legends and the timeless recollections of Indians who were 100 years closer to the prehistoric period than we are today.

Bandelier used Spanish documents to identify which modern pueblos were occupied during the first century of Spanish colonization. During the first decade of the twentieth century, J. P. Harrington (1916) also learned which abandoned ruins were considered by the Indians to have been villages that their ancestors lived in before the arrival of the Spanish. Even though neither the Pueblo informants nor the anthropologists had any idea how much earlier such ruins dated, the gap between history and prehistory had begun to close. This trend continues, thanks to the effective use of early documents by later archaeologists and ethnologists such as Schroeder (1979), Schroeder and Matson (1965), Reed (1943), Snow (1975, 1976b), and others. However, as Snow points out, "...the fit between archaeological data and documentary or ethnohistoric 'facts' is exceedingly complex and they are often at odds" (Snow 1976b:162). Rio Grande archaeologists still commonly rely on Bandelier's research model: beginning with the present and working back into the past, and asking themselves, "since we know where the Pueblos are today, where were they 100 years ago, or 500 years ago," and so on.

Much research continues to be devoted to figuratively or literally retracing the steps of several generations of Spanish explorers whose few surviving reports often yield contradictory information as to what pueblos were where, when they were
visited, and who lived in them. Picking up where Bandelier left off, early archaeologists working in the Rio Grande provinces focused almost exclusively on the Protohistoric period (A.D. 1450-1700) with its rich, pre-Contact pueblos and early Spanish mission sites. They found stratified ruins, but most sites revealed only ceramic change during the long, undifferentiated Pueblo IV period. Longer-term developments, extending back into the past, such as were observable to the west, could be postulated, but even as late as the 1950s, relatively few earlier sites had been recognized on surveys, fewer had been excavated, and none had been reported upon.

Relying only on historical documents, archaeologists rarely explained how the Pueblo people got to be where they were before the arrival of the Spanish. Virtually all recorded Pueblo origin legends seemed to apply only to post-A.D. 1300 events and places, i.e., those following the great abandonment of the Pueblo areas of the San Juan Basin in the late thirteenth century. Legends relating to the periods before A.D. 1300 appear to be totally forgotten.

GALISTEO BASIN AND OTHER POSSIBLE TÉWA SITES

As an example, consider the Galisteo Basin—sometimes called the Tano Basin—located 24-32 km south of Santa Fe. Beginning with Coronado in 1540, different Spanish explorers passed through this region and visited from one to three of its pueblos, today called Pueblo Galisteo, Pueblo San Lazaro, and Pueblo San Cristobal.

Although pre-A.D. 1698 Spanish documents refer to only the three inhabited historic Tano pueblos in the Galisteo Basin, some documents state that San Marcos Pueblo (25 km south of Santa Fe) was also a Tano village, though others say that it and Cieneguilla (12 km southwest of Santa Fe) were Keres villages. Still others in that region—Pueblo Largo Blanco, Pueblo Colorado and Pueblo She—were either missed or were already abandoned by the time of the Spanish entradas.

By 1583, Espejo had identified the inhabitants of these villages as the Tamos or Atamues, though he is unclear about the source of his information. He explored only as far north as Cochiti, so he did not visit the Tewa pueblos to the north of Santa Fe. The terms he got may have been Keres or Tiwa approximations of the Tewa terms. Today, we refer to them as the Tano, a name derived from the Tewa term Tanuge, which translates to "live down country plain," apparently meaning the people who live somewhere to the south on the broad, largely treeless plain that extends south from Santa Fe. Apparently, the Tewa sometimes used the term tanu to refer to almost any Indians living south of them. However, for the Tano of the Galisteo Basin, there was a difference—they, too, were Tewa-speakers, Southern Tewa. Their language apparently differed little from that spoken by the Tewa pueblos of the Españaola Valley north of Santa Fe.

Linguists, using glottochronology, generally agree that the separation between Tewa and Tiwa from a common Tiwa-Tewa ancestor was the last major episode in the differentiation of the Tanoan language into its constituent groups: Tiwa, Tewa, and Towa (Davis 1959; Hale and Harris 1979). In attempting to fit linguistic data to a recon-
struction of the Rio Grande cultural sequence (Wendorf and Reed 1955), Trager (1967:340) suggests that the Tiwa-Tewa split occurred about A.D. 1100-1200, roughly coinciding with the Rio Grande Coalition period (A.D. 1150 or 1175 to 1325). Perhaps because the Tewa and Tano people spoke the same language, little thought has been given to possible events that might have occurred during their gradual separation.

Sites of the Coalition period (Figure 1) occur widely in the Rio Grande region, but the area of their greatest density was north and east of a line that can be drawn from Jemez Pueblo on the west to the southeastern edge of the Galisteo Basin on the east. This roughly corresponds to the area of distribution, as defined by Amsden (in Kidder 1931) and by H. P. Mera (1935), of the period's diagnostic pottery type, Santa Fe Black-on-white. This area includes the broad valley of the Rio Grande extending from near Velarde on the north, downstream, into White Rock Canyon, below San Ildefonso Pueblo. Other coalition sites occur in the Rio Chama drainage from near Abiquiu, El Rito, and Ojo Caliente, on the northwest to Española. Still other contemporary sites are concentrated along the drainages flowing west from the Sangre de Cristo Mountains and along the eastward-flowing drainages of the Jemez Mountains (or Pajarito Plateau). Collectively, these districts comprise what has been called the Tewa Basin.

North and west of Santa Fe is a conspicuous, arid, largely unoccupied upland—measuring 40 km north to south, and 35 km east to west—that seems to have formed a natural boundary between much of the Tewa Basin and its southern neighbors along the middle Rio Grande and in the Galisteo Basin. Close to the Sangre de Cristo foothills, however, this relatively low topographic divide was barely 10 km wide, which posed no substantial barrier to southward extension of Tewa settlement from the Rio Tesuque into the drainages of the Santa Fe River and the Galisteo Creek. Still, this separation of northern and southern Tewa settlements may have been sufficient to encourage those in the Santa Fe area and southward to begin to see themselves as an entity apart from their northern kin.

Large and medium-size Coalition pueblos occupied bluffs and bottomlands at intervals along the Santa Fe River valley from eastern Santa Fe downstream for 25 km to the vicinity of La Cienega. Two of the largest of these--Pindi (LA 1) (Stubbs and Stallings 1953) and the Agua Fria School House Site (LA 2) (Kidder 1915)--comprised an extensive community straddling the Santa Fe River near Agua Fria, a Santa Fe suburb. Another major Coalition site lies 1 to 2 m beneath the City Hall in downtown Santa Fe, extending northeast and southwest along Marcy and Johnson Streets. Another site concentration is on top of and around the slopes of Fort Marcy Hill on the northern edge of Santa Fe, and another is on the south side of the river, along East De Vargas Street, near the P.E.R.A. Building in the State Capitol complex.

Important Coalition or Early Classic period settlements occupied foothill locations along several drainages to the southeast of Santa Fe. These include Arroyo Hondo Pueblo (LA 12) (Schwartz and Lang 1973); Arroyo Hondo II (LA 76); Pueblo Alamo (LA 8) (Allen 1973);
Figure 1. Coalition and Classic Period Sites.
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pindi</td>
<td>70</td>
</tr>
<tr>
<td>2</td>
<td>Aqua Fria Schoolhouse</td>
<td>76</td>
</tr>
<tr>
<td>3</td>
<td>Cienega</td>
<td>78</td>
</tr>
<tr>
<td>4</td>
<td>Chamisalocita</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>Los Aguajes</td>
<td>82</td>
</tr>
<tr>
<td>6</td>
<td>LA Bajada</td>
<td>91</td>
</tr>
<tr>
<td>7</td>
<td>Pueblo Alamo</td>
<td>92</td>
</tr>
<tr>
<td>8</td>
<td>Arroyo Hondo I</td>
<td>98</td>
</tr>
<tr>
<td>9</td>
<td>Cieneguilla</td>
<td>111</td>
</tr>
<tr>
<td>10</td>
<td>Nambe Pueblo</td>
<td>122</td>
</tr>
<tr>
<td>11</td>
<td>Las Madres</td>
<td>126</td>
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<tr>
<td>12</td>
<td>Pueblo Galisteo</td>
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<td>Cuyamungue</td>
<td>170</td>
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<tr>
<td>14</td>
<td>Pueblo Blanco</td>
<td>182</td>
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<tr>
<td>15</td>
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<tr>
<td>16</td>
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<td>9154</td>
</tr>
<tr>
<td>37</td>
<td></td>
<td>10607</td>
</tr>
</tbody>
</table>
Chamisalocita (LA 4); Las Madres (LA 25) (Dutton 1964); and the Manzanares Site (LA 1104), also listed as (LA 10607) (Steen 1980). Eastward, along the southern and eastern foothills of the Sangre de Cristos, were the Coalition pueblos of Pecos (LA 625), Forked Lightning (LA 672), and Rowe (LA 108) in the upper Pecos Valley. Other possible Tewa—or at least Tanoan--Coalition villages were built closer to the eastern New Mexico plains near Ribera, on the Pecos River; south of Las Vegas, such as Tecolote (LA 296); and as an isolated settlement near present-day Watrous.

By the late 1300s, Pindi and perhaps the other villages along the Santa Fe River had been abandoned. Arroyo Hondo Pueblo still survived, but by A.D. 1410 (Schwartz and Lang 1973), it too was abandoned. This left a depopulated gap, 20 to 30 km wide, between the main Tewa settlements and those in the Galisteo Basin. Although the population movement could have been back to the north into the Tewa Basin, the earlier growth and cohesiveness of the more southerly villages suggest that they drew away from the northern Tewa to fend for themselves as the Southern Tewa or Tano in the Galisteo Basin.

Many of the Galisteo Basin Coalition period settlements appear to have begun as temporary clusters of small pit houses. On top of these structures, or in nearby locations, Tano Basin populations consolidated and built the major villages we know of today as Pueblo Largo (LA 183), Pueblo Galisteo (LA 26), Pueblo Colorado (LA 62), Pueblo Blanco (LA 40), Pueblo She (LA 239), Pueblo San Cristobal (LA 80), Pueblo San Lazaro (LA 92), Pueblo San Marcos (LA 98), and possibly Pueblo Cieneguilla (LA 16) (Nelson 1914).

CERAMIC EVIDENCE

However, the growth and influence of the Galisteo Basin pueblos increased during the later fourteenth century, and by the fifteenth and sixteenth centuries, they were the principal makers or users of glaze-on-yellow pottery. A. H. Warren (1979:190) found that much of this distinctive pottery was made at San Marcos (LA 98), which is situated close to the highly mineralized Cerrillos Hills and thus may have controlled the principal sources of both turquoise and the lead minerals for glaze-decorated pottery.

Significantly, Warren also found glaze-on-yellow pottery common almost 30 km northwest of San Marcos, along the Rio Grande near present-day Cochiti Dam, at the Museum of New Mexico's excavations at the Alfred Herrera Site (LA 64555) (Lange 1968) and at Pueblo del Encierrro (LA 70) (Snow 1976a). She observed that fourteenth-century potters in this area first produced scoria-tempered Glaze A Red pottery and received Glaze A Yellow pottery in trade. However, by the early fifteenth century, and coincident with new dwelling and kiva construction, locally made glaze-on-yellow pottery with rhyolite tuff temper became dominant at Site LA 70. Warren inferred that at least some of bearers of the glaze-on-yellow tradition had migrated from a pueblo in the Galisteo Basin (possibly San Marcos) to LA 70 (and to LA 6455).

As shown by tree-ring dates and ceramics, for a time Sites LA 6455 and LA 70 probably comprised a more extensive
community that straddled the Rio Grande. Based on her petrographic and stylistic analyses of glaze-decorated potsherds from both of these sites, Warren proposed that, by A.D. 1450, the bearers of the glaze-on-yellow pottery makers had left the village, going to points unknown—perhaps back to the Galisteo Basin. However, almost simultaneously, LA 70 was reoccupied by people who made another distinctive, light-slipped pottery, Espinoso Glaze-Polychrome (Glaze C) pottery dating from A.D. 1425-1500. This type was in the tradition of pottery from the growing center of pottery manufacture, Tongue Pueblo (LA 240) (Barnett 1969), located on Tongue Arroyo, 12 km east of San Felipe Pueblo and 30 km south of LA 70.

A clustering of tree-ring dates (Robinson et al. 1972:76-77) shows that the last kiva construction at LA 70 took place between A.D. 1515 and 1520, suggesting that the Tongue contingent may have remained at that pueblo until at least the early 1520s or somewhat later. By this time, an early version of Glaze E pottery (Puaray Glaze Polychrome)—with deep-red, solid elements and black glaze framing lines on a red-orange slip—was being produced at LA 70.

In his final report on Pueblo del Encierro, Snow (1976a:A218) suggests the possibility that the pueblo had been occupied by an existing mixed ethnic population joined by Keres and Tano increments. This suggestion is presumably based, at least partly, on the successive occurrences of presumed Tano and then Tongue ceramic traditions and the fact that Keresans ultimately occupied the entire area.

We have no real idea who the original inhabitants of Sites LA 70 and LA 6455 were, but the preponderance of glaze-on-yellow pottery at LA 70 implies an early Tano presence. Additionally, we do not know whether the prehistoric Tongue people were Tano or Keres; early Spanish documents seem to allow either alternative.

Bandelier (1892:145) refers to Cochiti origin legends that tell of their first village being Tyuonyi (LA 82) in Fríjoles Canyon, where all the Keres lived together. Eventually, they left Tyuonyi and moved south, stopping temporarily at three to five more pueblos—including Yapashi (LA 250), Ha-a-tse (LA 370), and Kuapa (LA 3444)—before settling at Cochiti (LA 126). Occupation of Yapashi and Ha-a-tse ended in Glaze C or D times, perhaps corroborating this southward Keres migration.

While excavating at Site LA 6455, Cochiti Project Director Charles H. Lange recounted a labor problem that led to replacing Cochiti laborers with a crew from Santo Domingo—Dr. Lange likes to live dangerously. One day during a lunch break, a Santo Domingo worker asked Dr. Lange, "Who lived here" (at LA 6455)? After giving an "I don't know" reply, Lange was told that the Santo Domingo's ancestors lived at the site. Apparently, the Santo Domingo man was of the Ise (or Mustard) clan whose original members were Tanos from San Marcos Pueblo. They moved to Santo Domingo between 1782 and 1794, bringing with them an oral tradition that placed their earlier Tanoan ancestors in the Cochiti area.

The exact sequence of events leading to the establishment of Keres settlements along the Rio Grande and east of it is not clear. Cochiti informants told Bandelier that their ancestors
did not live at LA 70. Perhaps by association, LA 6455 on the west side of the river was not a Keres pueblo, either. Likewise, they laid no claim to the Glaze A-C site Tashkatze (LA 249), on the east side of the Rio Grande directly opposite Cochiti Pueblo. This would seem to confirm that the Keres had yet to reach the Rio Grande by as late as the first quarter of the sixteenth century.

Warren (1979:194-200) notes that the Laboratory of Anthropology survey collection from Cochiti Pueblo shows only a Glaze A through D sequence. More recent work by Dodge (1981) shows Glaze E there, as well. Thus it is possible that even Cochiti Pueblo, or parts of it, may have seen a brief abandonment before Keres people moved into it during Glaze E times (circa A.D. 1515-1600).

By the early sixteenth century, styles changed and ceramic developments at Site LA 70 had progressed through San Lazaro Glaze-Polychrome (Glaze D, dating 1490-1515) to Puaray Glaze-Polychrome (Glaze E, dating 1515-1600). The latter type was produced during that site's last construction interval. Thus, LA 70; LA 6455; LA 7 (La Bajada or Tze-nat-ay, the Tano name for the pueblo), located 10 km southeast of LA 70; and perhaps even Cochiti itself may have been abandoned more or less simultaneously during the first half of the 1500s.

There is a temptation to attribute this abandonment to a local drought, but climatic reconstructions by Dean and Robinson (1977, 1978) show only a brief drought episode during the early 1500s that, at least for the first two sites, could have been offset by their proximity to the Rio Grande. Other possible causes might include internal factionalism, interpueblo warfare or the arrival of the Keres along the Rio Grande, to name a few.

Where did these makers of Puaray Glaze-Polychrome from the Cochiti area go? A likely direction is north. Tree-ring dates show that the last kiva at Site LA 70 was constructed between 1515 and 1520. Tree-cutting activity, indicated by a small cluster of tree-ring dates in the mid-1520s, occurred together with an interval of new construction and reuse of rooms at Puyé (LA 47). Puyé is located 40 km north of Cochiti, on the Pajarito Plateau, west of modern Santa Clara Pueblo. This construction may indicate the arrival of migrants from Tanoan pueblos near and just east of the Rio Grande near Cochiti. Possibly coincidental with this construction was the quite sudden appearance at Puyé of large quantities of a locally tempered variant of Puaray Glaze-Polychrome that duplicated Glaze E pottery from 40 km to the south.

Prior to the 1520s, the original inhabitants of Puyé were users, if not producers, of vegetal-painted Biscuit ware--principally Biscuit B (Bandelier Black-on-gray) and Biscuit C (Cuyamungue Black-on-tan). Each of these types is markedly different from the contemporary glaze-decorated ware of the Middle Rio Grande region. There is no question that the glaze-decorated pottery was there in quantity and was at least associated with the South House (Morley 1910). Sylvanus Morley, in his field notes of the Puyé excavation, records evidence of at least 38 previously abandoned rooms with new floors and wall modifications, suggesting reuse of the structure.
In discussing the glaze-decorated pottery found in the northern Pajarito Plateau, Anna O. Shepard (1942:183) noted that H. P. Mera of the Laboratory of Anthropology considered the Puye glaze pottery intrusive, but she showed conclusively that it had a local temper, which she called "devitrified tuff." This was further shown by Warren's broad-ranging research at Site LA 70, and more recently by X-ray fluorescence microscopy studies of Puye pottery by Bart Olinger of the Los Alamos National Laboratory (1987a, 1987b, 1988).

The X-ray fluorescence fingerprints for Glaze E sherds from LA 70 still need to be analyzed for comparison with those from Puye, though neither similarity nor difference would necessarily invalidate the presence of an intrusive group of glaze potters at Puye. However, Olinger has discovered that the red slip of the Puye glazes is identical to that found on other Glaze E sherds collected by H. P. Mera at Santa Clara Pueblo. The implication here is that the Glaze E potters at Puye ultimately abandoned their mountain home--by about A.D. 1577, the latest tree-ring date for that site--and moved down to Santa Clara by the Rio Grande. This event roughly coincided with a period of severe drought (A.D. 1577-1587) that affected the Puye district (Dean and Robinson 1977, 1978) and further substantiates the Santa Clara tradition that Puye was its ancestral village.

More significantly, Olinger finds that, with the decline of glaze-decorated pottery at Santa Clara--probably by A.D. 1600--potters of that pueblo adopted the red slip for their own ash-tempered, carbon-painted pottery. Thus, they may very likely have been the originators of the succeeding, long tradition of polychrome pottery, such as Sakona Polychrome and Tewa Polychrome, which began during the early to mid-seventeenth century.

On the assumption that the reoccupation of Puye in the sixteenth century was by a group of glaze-making potters from the Middle Rio Grande, possibly the Tano, it occurred to Peckham that their 300-400 year separation from their northern Tewa kin might have resulted in some difference in the Tewa dialect spoken by Santa Clara people as opposed to that spoken at other Tewa pueblos. Peckham consulted with several people from Santa Clara Pueblo who said, "Oh, yes, other Tewa people always make fun of Santa Clara because they speak funny." Regrettably, Tano was essentially extinct by the early twentieth century when John Peabody Harrington began to document Pueblo languages, and there is no way to verify any putative Tano impact on the dialect of the Tewa spoken at Santa Clara.

Although a Tano component may not be definable within Santa Clara Pueblo today, one of Harrington's Santa Clara informants noted the existence of a ruin, Qwapi, "whose people were Tanu," located at La Mesilla, on the east side of the Rio Grande southeast of Santa Clara (Harrington 1916:291-292). Hewett (1908:33) also reports a site, Whapige, at about the same location, which his informant considered to be an ancestral village of the Whapitowa "clan" of San Ildefonso. If the sites are the same, there also may be some Tano descendants at San Ildefonso.

CONCLUSION

Without dwelling further on
where other Tano settlements may be, we propose that the prehistoric range of the Tano was more extensive than just at late Classic pueblos of the Galisteo Basin, and that between A.D. 1400 and perhaps as late as 1580, Tano settlements extended west to the Rio Grande near Cochiti and Santo Domingo.

Additionally, it is even possible that parts of Pecos Pueblo and its neighboring pueblos during the Black-on-white (Kidder 1958:55-62) and early glaze periods also may have been Tano. It is interesting to note that, in the post-Revolt period, the Governor of Pecos in 1731 was a Tano (Kessell 1979:541, Footnote 32), and "some Tano families" were living at Pecos as late as 1794 (these perhaps were new arrivals from Galisteo, finally abandoned at about that time, [Kessell 1979:353]).

If any of the above pueblos was once occupied by Tano people, it would seem to indicate that a resumption of population stability in the Rio Grande region following the Coalition period was slow to take place, and there was still much moving around of small, if not large, groups of people during the Classic period. As archaeologists, we often hope for the stabilities of culture that allow us to examine orderly sequences, to distinguish diagnostic pottery types, to search out redistribution systems, to recognize craft specialization, and to discern governing hierarchies and intraregional alliances. However, such indicators of cultural systems are not as neat and pristine as we would like them to be, and unstable conditions are often more informative.

ACKNOWLEDGEMENTS

An earlier version of this paper was presented at the 1987 Pecos Conference at Pecos National Monument.

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Among the ongoing controversies in Southwestern archaeology is the issue of prehistoric interaction between Mexico and the Southwest. Did Mexican cultures influence the development of the Hohokam, Mogollon, and Anasazi? If so, then to what degree was prehistoric Southwestern cultural development a result of Mexican influence, direction, or even control?

Recent discussions of this problem focus on specific traits, especially on items presumably traded between Mexico and the Southwest, such as copper bells, macaws, turquoise, shell, and other exotic or precious commodities (Lange 1986; Mathien 1986; McGuire and Howard 1987; Nelson 1986; Reyman 1987). One trait, pseudo-cloisonné, refers both to specific items and to a decorative technique, the idea for which might also have diffused from Mexico into the Southwest.

Pseudo-cloisonné (often incorrectly called cloisonné; it has neither the metal wire strips welded to a metal back plate to outline the design nor the enamel filler of true cloisonné) was first reported from Pueblo Bonito some 70 years ago (Pepper 1920:51-53); it has been reported from Anasazi sites and also from Hohokam sites for more than half a century (e.g., Haury 1937; Judd 1954; Roberts 1930; Vaillant 1932). Ekholm (1942) was probably the first to use the term pseudo-cloisonné, but Castillo Tejero (1968:52) claims it originated with Spinden (1913). Holien (1974, 1977) is the authority on pseudo-cloisonné and should be read.

Pseudo-cloisonné is defined thus: A style of investment decoration in which the object is covered with a base coat (overall investment) that is then excised in patterns; the resulting cells are inlaid with contrasting colors, separated by thin bands of the remaining base coat (Holien 1974:160; 1977:1). This decorative technique can be applied to objects made from almost any material. In the Southwest, pseudo-cloisonné was used to decorate basketry, ceramics, gourds, stone, textiles, and wood (Holien 1974, 1977; Reyman 1971; see Table 1).

**THE PUEBLO BONITO SPECIMENS**

Three specimens of pseudo-cloisonné decorated sandstone, all fragments of larger objects were excavated from Pueblo Bonito and are curated at the American Museum of Natural History. Pepper (1920:51-53) discusses only two of these: H-12743 (Figures 1-4, left) and H-12742 (Figures 1-4, right). H-12743 came from room 9; H-12742 "was found in another part of the ruin" (Pepper 1920:51), and catalog notes (Pepper n.d.) at the museum indicate the provenience was one of the northern rooms.

Pepper makes no mention in his report of the third specimen, H-12164 (Figures 1-4, center), but he cataloged it and noted its provenience as "one of the southern rooms" (Pepper n.d.).
<table>
<thead>
<tr>
<th>Specimen No.</th>
<th>Item</th>
<th>Material</th>
<th>Condition</th>
<th>Provenience</th>
<th>Excavator</th>
<th>Present Location</th>
</tr>
</thead>
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<tr>
<td>None given</td>
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<td>textile?</td>
<td>whole</td>
<td>Room 13</td>
<td>Pepper</td>
<td>AMNH</td>
</tr>
<tr>
<td>H-319</td>
<td>arrow shaft</td>
<td>wood</td>
<td>fragment</td>
<td>Room 2</td>
<td>Pepper</td>
<td>AMNH</td>
</tr>
<tr>
<td>H-3016</td>
<td>carved object</td>
<td>wood</td>
<td>fragment</td>
<td>Room 25</td>
<td>Pepper</td>
<td>AMNH</td>
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<tr>
<td>H-4500</td>
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<td>Room 32</td>
<td>Pepper</td>
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</tr>
<tr>
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<td>wood</td>
<td>whole</td>
<td>Room 33</td>
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<tr>
<td>H-5961</td>
<td>pестle</td>
<td>stone</td>
<td>fragment</td>
<td>Room 64</td>
<td>Pepper</td>
<td>Museum of the American Indian-Heye Foundation</td>
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<tr>
<td>H-6828</td>
<td>mortar</td>
<td>basalt</td>
<td>whole</td>
<td>Room 80</td>
<td>Pepper</td>
<td>MAI-HF</td>
</tr>
<tr>
<td>H-7040/7041</td>
<td>coiled basketry</td>
<td>fiber</td>
<td>fragments (about 60)</td>
<td>Room 83</td>
<td>Pepper</td>
<td>AMNH</td>
</tr>
<tr>
<td>H-9159</td>
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<td>pine</td>
<td>fragment</td>
<td>Room 63</td>
<td>Pepper</td>
<td>AMNH</td>
</tr>
<tr>
<td>H-12163</td>
<td>altar piece?</td>
<td>wood</td>
<td>fragment</td>
<td>Room 168</td>
<td>Pepper</td>
<td>AMNH</td>
</tr>
<tr>
<td>H-12164</td>
<td>mirror back?</td>
<td>sandstone</td>
<td>fragment</td>
<td>&quot;southern room&quot;</td>
<td>Pepper</td>
<td>AMNH</td>
</tr>
<tr>
<td>H-12742</td>
<td>mirror back?</td>
<td>sandstone</td>
<td>fragment</td>
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<td>Pepper</td>
<td>AMNH</td>
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<td>Pepper</td>
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<tr>
<td>335229a, b</td>
<td>rattle?</td>
<td>gourd</td>
<td>2 fragments</td>
<td>Room 225</td>
<td>Judd</td>
<td>Smithsonian Institution</td>
</tr>
<tr>
<td>335231</td>
<td>spindle whorl</td>
<td>juniper</td>
<td>fragment</td>
<td>Room 266</td>
<td>Judd</td>
<td>SI</td>
</tr>
</tbody>
</table>
Figure 1. H-12743 (left), H-12164 (center), H-12742 (right), (photograph by Jonathan E. Reyman).

Figure 2. Color representations for H-12743 (left), H-12164 (center), H-12742 (right) (see Figure 5 for color key; drawing by Bonnie Lauber-Westover).
Figure 3. Reverse sides of H-12743 (left), H-12164 (center), and H-12742 (right) (photograph by Jonathan E. Reyman).

Figure 4. Color representations for reverse sides of H-12743 (left), H-12164 (center), and H-12742 (right) (see Figure 5 for color key; drawing by Bonnie Lauber-Westover).
Figure 5. Color Representation Key.
The lack of specific proveniences for H-12742 and H-12164 is puzzling, but I think it likely that both specimens were found in backdirt rather than in situ. Thus Pepper could note only the general area of the site from which they came. I cannot explain his omission of H-12164 from his report, Pueblo Bonito. Given Pepper's attention to detail, it seems unlikely that he forgot this unusual specimen. Yet he devotes little space to discussing most of the southern rooms where, by his account, he did only minor excavating and found little of particular interest (Pepper 1920:339). So he may have overlooked H-12164 when writing up his notes for the site report.

Although a number of objects from Pueblo Bonito made from a variety of materials are decorated with pseudo-cloisonné or other investment techniques (Table 1), these two sandstone objects (H-12742 and H-12743) have received the most attention in the literature. Spinden (1913:236) apparently misidentified H-12743 as pottery, and Roberts (1930:10) indicated that the items were fragments of "Toltec pottery." Whether Roberts' reference is to the two sandstone pieces or to some other objects (see Table 1, e.g., H-7040/7041) is unclear from his report. Judd (1954:230), looking at H-12742 and H-12743 through the glass of the museum display case, was unsure whether they were pottery or stone. I had the same experience when first looking at them in the same case in 1970, even though I knew that they were sandstone. Similarly, I could not be certain, until I examined them, that H-7040/7041 were pseudo-cloisonné decorated basketry; this was also Holien's (personal communication 1976) experience.

Vaillant (1932), probably referring to H-12743, states "The cloisonné specimen found at Pueblo Bonito is not pottery but sandstone, and there is a strong possibility of its being of local manufacture (p. 9)." Roberts' original notes at the National Anthropological Archives seem to indicate that his published reference (1930:10) is to H-12742/12743. There is no indication that he examined the pieces other than through the glass of the display case.

Significantly, neither Judd, Roberts, nor Vaillant makes any reference to H-12164. I can only assume that they never saw it or did not recognize it for what it is. I did not see it during my initial work with the collection in 1970-71, nor did Holien see it when he worked at the AMNH two years later. It was only after museum personnel completed an inventory of the collection in 1979, and a colleague and I went through the materials drawer by drawer in 1980, that I rediscovered H-12164 and was able to study it.

The three specimens are shown in Figures 1-4; a color key is provided in Figure 5. No standard color chart was available when working at the museum. However, I took color photographs and slides of each specimen and compared them for accuracy with the three specimens before leaving the museum. Graphs were matched later by three separate observers, including me, against Munsell (1976) chips. Figure 5 represents the consensus on color values, but readers should be aware that there may be minor discrepancies between each value and the actual color; the colors are as accurate as possible under the circumstances. Meas-
Table 2. Selected data for pseudo-cloisonné decorated sandstone from Pueblo Bonito.

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Characteristic</th>
<th>H-12164</th>
<th>H-12742</th>
<th>H-12743</th>
</tr>
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<tr>
<td>Length (mm)</td>
<td></td>
<td>85.5</td>
<td>32</td>
<td>63</td>
</tr>
<tr>
<td>Width (mm)</td>
<td></td>
<td>38.5</td>
<td>20.5</td>
<td>42</td>
</tr>
<tr>
<td>Thickness (mm)</td>
<td></td>
<td>7</td>
<td>7.5</td>
<td>9.5</td>
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<td>Weight (g)</td>
<td></td>
<td>23</td>
<td>52</td>
<td>5.5</td>
</tr>
<tr>
<td>Design/Colors</td>
<td>Geometric design; pigment on both sides; dark green, light buff, yellow, and red.</td>
<td>Eye (bird?); pigment on both sides; black, white, blue (light turquoise), red.</td>
<td>Feather headdress or costume; pigment on both sides; dark red, black, white, and light buff.</td>
<td></td>
</tr>
</tbody>
</table>

Measurements and other data for the three specimens are in Table 2. Holien (1974, 1977:270-271, 389, 403; see also Reyman 1971:274-277) discusses H-12742/12743. There is no need to repeat his analysis here, except to note that both pieces are probably fragments of pyrite mosaic mirror backs. H-12742 is decorated in the pseudo-cloisonné technique that Holien classifies as I-C-2-b (Investment- Base coat Inlaying- Excision Inlay- Simple Refil [alveolate; discrete cells of inlay]); H-12743 is decorated with technique I-C-2-b/c (the same as H-12742 except for Compound Refill [with intrusion into previously inlaid zones] in addition to Simple Refil [Holien 1977:389, 403]). Specimen H-12164 is significantly different from the first two pieces. Whereas H-12742/12743 have parts of personages or costumes on their decorated surfaces (Holien 1974: 168; 1977:270; Reyman 1971:274), H-12164 is decorated solely with a geometric motif in colors quite different from those used on H-12742/12743. The dark green on H-12164 is especially unusual (Figure 2, center).
On the basis of the slides and photographs, Holien (personal communication 1981, 1986) has some reservations that H-12164 is decorated with the same technique (I-C-2-b/c) as the other two pieces, and he could not determine the sequence of color application. My examination of H-12164 and comparisons with H-12742/12743 using Holien’s (1977) analytical system indicate that all three are decorated with the same basic technique, although there may be some variations in the secondary techniques used on H-12164. The condition of H-12164 makes analysis more difficult than for the other two pieces. What is clear, however, is that H-12164 is different in both colors and motifs from H-12742/12473; it certainly has a different appearance from both and is less ornate and less intricately worked than H-12743.

Like the first piece H-12164 is probably a fragment of a mirror back (Holien personal communication 1981). The surface area where the catalog number is marked (Figures 3, 4) seems to have been deliberately smoothed in preparation for applying the pyrites or for some further treatment. It should be noted that polished, circular pieces of iron pyrites (e.g., H-3767 from Room 33) were found by Pepper (1920) at Pueblo Bonio, although he does not mention them. Judd (1954:292) also found iron pyrites at the site.

COMPARISONS

Holien (personal communication 1986) thinks that H-12164, specifically its geometric motif, is suggestive of a possible link with Chalchihuites area cultures. He also suggests a possible link between H-12742/12743 and materials from the site of Alta Vista, Zacatecas, also in the Chalchihuites area (Holien 1977:271). Holien thinks these last two specimens bear a marked resemblance as well to mirror backs from the Hohokam village known as the Grewe Site. He (1977:270) tentatively identified the motifs on the Grewe Site specimens as representations of the Mexican deity, Tezcatlipoca. By extension, this identification could be applied to the Pueblo Bonito specimens.

A comparison of all three Pueblo Bonito specimens with materials from the Alta Vista phase at several sites (e.g., Cerro de Moctehuma, Totoate) reveals both general and specific resemblances to Vista Paint Cloisonné (see Kelley and Kelley 1971:165-169, Plates 47-49). The most notable similarity is between H-12743 and the specimens shown in Plate 49 c, f, and especially s. There are also general similarities in the interlocking "key" design on H-12164 with motifs on several of the Mexican specimens. Kelley and Kelley date the Alta Vista phase to A.D. 300-500; Holien (1977:299-300, 338) places it at A.D. 700-900 using more recent carbon-14 dates. In either case, the material is early enough to have been the prototype for the Pueblo Bonito specimens. However, the Alta Vista phase materials are all decorated ceramics, whereas the three Pueblo Bonito specimens are sandstone. Furthermore, to the best of my knowledge, no Pueblo Bonito pseudo-cloisonné materials are ceramic. Thus, any Mexican-Anasazi interaction was probably in terms of the idea of the decorative technique and, perhaps, motifs rather than in the exchange of specific objects, though we cannot exclude the possibility of Mexican
manufacture for the Pueblo Bonito specimens. Casas Grandes (Paquimé) in Chihuahua seems a likely source for some pseudo-cloisonné items found at Hohokam and Anasazi sites, assuming that the objects were made in Mexico, per se, and not in the Southwest. Casas Grandes seems to have been the source for macaws and possibly copper bells; it may also have been a redistribution center for shell (DiPeso 1974; Reyman 1971).

A comparison of the three Pueblo Bonito specimens with materials from Casas Grandes, however, is not very productive. At Casas Grandes, pseudo-cloisonné was used on bone nose skewers, shell armlets, and a Strombus shell trumpet (DiPeso 1974: 616-617). The "key" design in Figure 421-2/right (DiPeso 1974) bears a faint resemblance to the motif on H-12164, and the eye of the bird motif on the same figure somewhat resembles that on H-12742, but the similarities are not definitive. Other pieces from Pueblo Bonito (Table 1) are more like those from Casas Grandes (see DiPeso et al. 1974: 403, Figure 503-6/5), but only in a general way.

The closest parallels to the Pueblo Bonito specimens, especially the pseudo-cloisonné decorated wood and basketry, are from the "magician" burial and related materials (McGregor 1943: 277, Figure 5, Plate I/ Figure 2). The basket depicted in Figure 5 (which is not from the burial but from another site) closely resembles the basketry fragments (H-7040/7041) and the painted board (H-4500) from Pueblo Bonito. These same Pueblo Bonito specimens and also the painted mortar (H-6828) are quite similar in terms of the decorative motifs to three painted bone items from Las Colinas (see Szuter 1988: 400-402). The Las Colinas specimens are from a general Sedentary period pit (Szuter 1988: Figure 10.1a) and a Sacaton phase cremation (Szuter 1988: Figure 10.1b, c), so they could overlap chronologically with the Pueblo Bonito specimens. That the Las Colinas items are painted bone might also tie them to some of the Casas Grandes objects noted above. The similarities among these materials are close enough that, taken together, the materials probably constitute a decorative type or tradition for which Holien (1977: 269) suggests the term Colorado River Variant.

I have argued for a Mexican connection with the "magician" burial, including the possibility of his being a local native with ties to one or more Mexican cultures (Reyman 1971, 1978). Comparison of the Pueblo Bonito materials with specimens from other sites so far seems to support Vaillant's suggestion, noted earlier, that the Chacoan materials were manufactured locally. Of course, the decorative technique and motifs could still have originated in Mexico: the technical complexity, the more-or-less continuous distribution from Mexico to the Southwest with the earliest occurrences in Mexico, and the appearance in the Southwest in conjunction with Mexican items such as copper bells and macaws are indicative to me of a Mexican origin for pseudo-cloisonné decoration. Pepper (1920: 52) thought the Pueblo Bonito items were closest to materials from Panuco (Vera Cruz) and Jalisco.

Further detailed studies and comparisons need to be made, ideally with all materials on hand in one place. Until then, it seems unlikely that more definitive statements can be made regarding similarities and
SUMMARY

The rediscovery of H-12164, an unusual object, is another small bit of evidence for prehistoric Mexican-Anasazi interaction. In conjunction with other rediscoveries (Reyman 1982, 1989), it demonstrates the value of re-examining existing museum and library collections. With funding for field research often hard to obtain, existing collections can provide study materials and primary data at an economical cost.

ACKNOWLEDGMENTS

This research was funded by NSF grants GS-2829 and BNS87-01657, Wenner-Gren Foundation Grant-in-Aid 4012, and Illinois State University. Figures 2, 4, and 5 were drawn by Bonnie Lauber-Westover. The assistance of Thomas E. Holien, Martin K. Nickels, Faye Mini-Reyman, and Jason Nation is gratefully acknowledged. C. Randall Morrison and R. Gwinn Vivian provided the Las Colinas data. The help of Anibal Rodrigues and The American Museum of Natural History was invaluable. The author alone is responsible for errors of fact or interpretation. Illinois State University

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THE SONORAN STATELETS REVISITED: URBANISM IN THE SERRANA PROVINCE OF NORTHEASTERN SONORA

Carroll L. Riley

In the period A.D. 600 to 1100, much of the Greater Southwest was occupied by subsistence agriculturists, utilizing basic brown ware pottery and living in scattered pithouses or simple rectangular stone and adobe structures. These "Mogollon-like" groups extended from central Arizona and New Mexico, southward to Sinaloa, Durango and Zacatecas.

Out of this Mogollon-like base rose the sophisticated urbanized culture of Casas Grandes (or Paquimé). In the late prehistoric times, during the final phases of Paquimé, there appeared the "kingdoms" of Marata, Acus and Totoneac. These polities collapsed a number of generations before the arrival of the Spaniards, but memories of them remained, and the earliest Spanish explorers heard traditional accounts of them. Their exact locations are still unknown.

Marata and its neighbors may be--at least in part--ancestral to the historic Sonoran statelets of northeastern Sonora, known both from archaeological work on the Sonora River, and from Spanish documents of the earliest entradas (1536-65). These urbanized statelets--vigorous, warlike, and deeply involved in regional trade--did not survive Spanish aggression and European disease. They had disappeared by the early part of the seventeenth century.

INTRODUCTION

When the several parties of the Coronado Expedition came through Sonora during the period 1539-1542, they followed the mountain valleys in the Yaqui and Sonora river systems. This is the region that various writers, including myself, have termed the Serrana. The native Indian groups in the Serrana impressed members of the early Spanish expeditions. There were large populations along those valleys of the Sonora River, and of the Moctezuma, the Nuri, and probably other segments of the Yaqui system. In interpreting the archaeological and ethnohistorical data, some anthropologists and geographers have postulated politically sophisticated groups--the polities to which I have given the name "statelets" (Riley 1987).

Probably most or all scholars agree that there were reasonably large populations in the area, but some question the statelet concept. Whether the various Spanish writers, especially Castañeda, Jaramillo, Obregón saw, or whether they essentially told the truth, is under contention, as is the interpretation of the actual archaeological evidence. What I shall do here is sketch my own interpretation of what was the actual situation leading up to and during Coronado's time, with a disclaimer that a number of excel-
lent scholars do not see things as I do.

PREHISTORY OF NORTHWESTERN MEXICO

Before turning to the situation in 1540, let me give a brief sketch of the prehistory of Northwestern Mexico. If we go back several hundred years before Coronado's time, say (in very rough terms) the half-millennium period from around A.D. 600 to 1100, we find nothing of the economic and political complexities of later times. In the Serrana, there lived a subsistence-level farming people of what is called the Rio Sonora culture. As documented by Amsden (1928) and Pailes (1972, 1976, 1978), the Rio Sonora culture extended from extreme northeastern Sonora to the Fuerte River of Sinaloa. Pailes (1978:136) thinks that the Tacuichamona culture of Sauer and Brand (1932:28, 64; see also, Phillips 1989) from the Sierra de Tacuichamona region of central Sinaloa may be a related complex. However, the descriptions of Sauer and Brand are very incomplete.

In the northern part of Sonora, the Rio Sonora occupation occurred in the floodplains of the major rivers and adjacent large arroyos. The Indians utilized maize, beans, squash, gourds, and perhaps cotton. Pailes (1978:139-140) documents these simple farming groups for the middle Sonora River, while Lister (1958:41-57, 70, 109) reported similar populations of agricultural peoples for the Bavispe region in the Yaqui River system and the east-draining Rio Piedras Verdes, a tributary of the Rio Casas Grandes. The earlier part of the Casas Grandes Viejo period of west-central Chihuahua, delineated by DiPeso (1974:1:99-176), represented a somewhat similar culture. The groups described by Pailes and DiPeso were primarily pithouse dwellers, while the people investigated by Lister lived mainly in rock shelters in flat-roofed, rectangular rooms of adobe sometimes reinforced with cobblestones or vertical posts.

These simple agricultural groups are sometimes referred to as "Mogollon," or "Mogollon-like." For northern Sonora, Pailes (1976:221-222) has pointed out the similarity of the Rio Sonora material culture to that of the Mogollon phases--George-town, San Fransisco and Three Circle. In particular, the Rio Sonora plain and incised or punched brown wares look very much like the Mogollon Alma pottery. At Casas Grandes, DiPeso's Convento phase--and to some degree the Pilon phase--of the Viejo period contained pottery very similar to Alma and Reserve ceramics. Lister's sites in the region of the Bavispe and the Rio Piedras Verdes actually contained a variety of Alma, Reserve, and Three Circle wares from the Mogollon inventory (Lister 1958:69-77).

In point of fact, there seems to have been a rather extensive north-south distribution of agricultural peoples living in pithouses or simple stone and adobe structures, who made various basic brown wares, either plain or with incised or impressed decorations. Such groups extended from the Mogollon area, southward, for into Mexico. In the southern part of the range was the Loma San Gabriel culture of the Durango-Zacatecas area first identified by J. Charles Kelley (1985:273; see also, recent work by Michael S. Foster [1978, 1985]). Loma
San Gabriel began by A.D. 400, or even earlier and continued for perhaps a thousand years. At the moment, there are no clearly defined temporal subperiods in Loma--though this surely will change as more archaeological work is done. The Loma people were subsistence agriculturists who produced simple brown and red-on-brown pottery, a generalized "Mogollon" type. The Loma people utilized house platforms with an enclosure formed by stone slabs set on end and paved with flat stones.

A number of years ago, Howard Winters and I advanced the idea that at least one branch of the Loma people may have become the historic Tepehuan Indians (Riley and Winters 1963). This is significant, for the Tepehuan, both prehistorically and historically, look to be important middlemen in spreading ideas up and down the northern sierra region of Mexico from Mesoamerica to the Southwest. These Indians are on the southern end of what seems to have been, aboriginally, a continuous distribution of Tepehuan-Piman peoples or, as they are called today, Tepiman (Wilcox and Sternberg 1983:225-228). By historic times, this Tepiman speech distribution had been served in the area of the upper Mayo and upper Verde region, but Sauer (1934:82) points out that, in as late as the seventeenth century, the Tepehuan, immediately south of this gap and the Pima to the north spoke dialects so similar that Spanish chroniclers occasionally confused them. Wilcox (1986:142-145) believes that before their distribution was broken, the Tepimans moved up and down the Tepiman corridor, acting as agents of exchange along the northern portion of the Sierra Madre Occidental. I think it likely that at least some Tepiman exchange continued well into historic times.

The rise of what I call the Sonoran statelets, out of a Rio Sonora base, began probably sometime in the fourteenth century. At that time stone and adobe surface structures appear, and by the fifteenth century large towns had developed--with irrigation and public buildings (Doolittle 1984:18-20). The statelets seemed to have formed with the development of primate towns, controlling surrounding villages and hamlets, usually in separate segments of a river drainage. Sauer, Doolittle, and I, using somewhat different bases for calculation, have suggested a population in the Serrana at Coronado's time of perhaps 70,000 people (Doolittle 1988:106-107; Riley 1987:57, 352-353; Sauer 1935:4-5).

The work of Pailes and Doolittle indicates that the population in the Serrana increased drastically between A.D. 1000 and A.D 1540. Pailes (1980:33-35; see also Pailes and Reff 1985:361) thinks that a portion of this increase came from a westward expansion in the later phases of Casas Grandes. Doolittle (1988:59), pointing out the relative paucity of Chihuahuan ceramics in the Sonoran sites, suggests a basically autochthonous development. Phillips (1989) has recently evaluated the two positions and leans somewhat to Pailes' point of view.

I must admit that I cannot make up my mind on this rather important point. Charles C. DiPeso and I once had plans to do a joint field investigation that would bear directly on the problem. We wanted to test the hypothesis that the collapse of Casas Grandes left a series of
regional "kingdoms" (as the Spanish called them) scattered through northeast Sonora and northwest Chihuahua, perhaps extending over into the southernmost part of western New Mexico and eastern Arizona. We never carried out this plan, but I hope that someone will do it sooner or later.

HISTORIC REFERENCES

Three kingdoms are named in the Spanish records—Marata, Acus, and Totonteac first mentioned by Marcos de Niza. The whole situation vis-a-vis these places has been confused by modern scholars who insist on locating them in the upper Southwest. For example, from Coronado's time, Acus has been identified with Acoma on the grounds of a somewhat similar name. Marcos' information, however, indicated that the two places were not the same, and Coronado, in 1540, who first suggested that they were, admitted that he was guessing (Hammond and Rey 1940:72-73, 173). Totonteac had been identified with Hopi on no grounds whatsoever. In Marcos' account, Totonteac is clearly south and east of Cibola (Hammond and Rey 1940:72), whereas Hopi lies to the north and west. Modern scholars, wedded to the Hopi identification, often cite Díaz's statement that the Totonteac people raised cotton (Hammond and Rey 1940:160). Cotton was, of course, grown at Hopi, but it was also important in the Sonora Valley (Riley 1987:60-61). Other fragments of information about Totonteac given by Marcos, Díaz, and Coronado himself (Hammond and Rey 1940:72-73, 160, 173) sound nothing like Hopi.

The etymologies of the three place names are unclear. Marata conceivably is formed from the Opata preposition ma, which means "with" in the sense of being part of a company (Pennington 1981:200). Totonteac is probably Piman and means something like "Ant Place" from the Piman word for ant, totoni. Acus might be related to the Piman word aki, a ravine or arroyo (Saxton, Saxton, and Enos 1983:3, 59, 70). Except perhaps for Totonteac, these derivations are all very tentative. With so little to go on, I am not sure that onomastic studies will ever help us very much. However, I do think that archaeologists will eventually discover these three places. DiPeso and I in separate publications (DiPeso 1974:3:778; Riley 1976:27) have suggested that Acus and Marata were somewhere near the international Four Corners region (where Arizona, New Mexico, Sonora, and Chihuahua almost come together), and this might be a good place to start looking.

The kingdoms of Marata, Totonteac, and Acus probably coexisted with the Tardio period peoples of Paquimé or Casas Grandes. When Ibarra and his party in 1565 saw this great ruin, they described it as if it had recently been deserted. Since toponyms have a powerful tendency to resist change, I think there is a good chance that Casas Grandians called their city or their territory something like Paquimé. This does not help us a great deal, for we have no idea what language the word Paquimé comes from. The name might be Suma—at least there were Suma speakers living in the Casas Grandes area a century after Ibarra—but suggestions range all the way from Huichol to Zuni (DiPeso 1974:2:295, 653-654).

To sum up, we can say that
the kingdoms of Marata, Acus, and Totonteac flourished during the late phases of Casas Grandes. In 1539, when Marcos de Niza made his trip, the memory of them was still fresh among the Gila or Salt River Pima; Marcos heard tales of Marata and the other places and obtained their general locations. But Marata, Totonteac, and Acus, like Paquimé itself, had collapsed several generations—perhaps a century or more—before the coming of the Spaniards.

It was another group of provinces and kingdoms that were listed by the various mid-sixteenth century Spanish explorers, Cabeza de Vaca, Díaz, Coronado, and the Ibarra party. These are the historic Sonoran statelets, and, if they were actually descended from Marta and its neighbors, there would appear to be some sort of Casas Grandes connection. At the moment, however, we simply do not have enough information on the genesis of sophisticated societies in Sonora.

We do know a great deal about the statelets in the sixteenth century, including the names of a number of them. If we take only groups that are mentioned both by Coronado and his men in 1539-42 and also by Ibarra's people in 1564-65, we have the following: Señora, Corazones, Batuco, Comupa (Cumupa), and Arispa or Arispe (Guarispa, Guaraspi, Ispa). These, and half a dozen other groups (see Figure 1), made up the two confederacies of the Sonoran statelets that Ibarra and his party reported. The Sonoran Indians lived in good-sized towns of adobe and stone houses, with large public structures that included temples and possibly ball courts. They practiced irrigation agriculture and had a widespread trade in a number of commodities, including slaves, shell, turquoise, cotton goods, salt, and exotic birds and their feathers. There was an incipient class system and some sort of religious hierarchy. Warfare was especially well developed, and the statelets could muster armies of hundreds or even thousands of men (see Riley 1987:39-96, 349-361; 1989:139-141).

The statelets disappeared at some point between 1565 and 1625. Their descendants, the Opatas and certain of the Lower Pima, were still in the area when the Jesuit missionaries moved into northeast Sonora in the early seventeenth century, but these Indians lived in rancherias, their population already in serious decline. The drastic cultural changes and the simplification that took place in the last decades of the sixteenth century can probably be attributed, in large part, to the ravages of European disease (Reff 1989). Whatever the specific reason or reasons, the vigorous and vital statelets reported by Coronado and Ibarra were no more.

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Figure 1. The Sonoran Statelets as of A.D. 1540.
1. An earlier draft of this paper was presented at the symposium, Coronado: His Trail and His Times. Southwest Center, University of Arizona, Tucson, September 29-30, 1989.

2. For a critical commentary on statelets see Doelle (1989); for a defence see Doolittle (1989).

3. Around A.D. 1200 various of these Mogollon peoples also spread eastward into the lower Conchos valley and, still later, northward into the Cibola-Tusayan region (Riley 1987:166-167, 289-292).

4. Wilcox (1986:143; see also Wilcox and Sternberg 1983:226-228) suggests that this intrusion into the Tepiman distribution took place in the eleventh or twelfth century A.D. and involved the Varohío and related groups (Chínipa, Témori, and Tubar) who in all likelihood were Taracahítians. In fact, they may all have been Tarahumar-speaking, though Sauer (1934:33) believed it possible that the Chínipa spoke Opata.

5. Dr. Bernard L. Fontana drew my attention to the plausible Pima derivation of Totonteac. I had originally suggested a possible, but much less likely, Nahuatl origin for the name.
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THE PINE TREE SITE: A GALISTEO BASIN PUEBLO IV SHRINE

Polly Schaafsma

The Pine Tree Site consists of two painted rock shelters in close proximity in the Galisteo Basin. The paintings are in the Pueblo IV Rio Grande style and include figures of horned serpents, various ceremonial personages, faces or masks, and a shield. On the basis of the iconography and site situation, the lower shelter is tentatively identified as a shrine to Masau'u. The Pine Tree Site is viewed as one of many shrine locations associated with a major Galisteo Basin pueblo ruin.

INTRODUCTION

My subject is two painted rock shelters in an isolated area of the Galisteo Basin, south of Santa Fe, New Mexico. The Pine Tree Site is an inclusive term for both overhangs in close spatial association, one in the caprock vicinity and the other a short distance downslope. Within the upper overhang, a crack in the sandstone filled with broken prayer sticks or arrows clearly indicates that these shelters functioned as shrines. Other isolated Pueblo IV painted rock shelters in the Galisteo Basin have been described by Nelson (1914:43, Footnote 1) and Lang (1977). Among these is Arrow Cliff, named for the numerous arrow offerings formerly present in the rock crevices at the site.

The Pine Tree Site is located about 2 mi from a major pueblo ruin in a small sandstone canyon that cuts through a mesa sparsely forested with pinyon and juniper. Small stands of ponderosa pine can be found in the dry canyon bottom. (A specific location is not given in order to protect both the site and the land owner.) The nearest pueblo was occupied from about A.D. 1250 until the Pueblo Revolt.

The Pueblo IV period in northern New Mexico and Arizona, following the Anasazi abandonment of the San Juan drainage, was a period of population coalescence and artistic fluorescence. Between A.D. 1350 and the Pueblo Revolt in 1680, the northern Rio Grande drainage was the setting for large Pueblo towns comprised of concentrated local populations together with an influx of Pueblo peoples from the Colorado Plateau and possibly from the Mogollon area to the south. Early in the fourteenth century, several large pueblos and a number of smaller ones were established in the Galisteo Basin (Nelson 1914).

Geographically, the Galisteo Basin is a large open area of low relief. The Galisteo Arroyo and its tributaries have a small amount of intermittently flowing water at all times of the year. The surrounding landscape consists of slightly rolling grasslands, bordered by low pinon and juniper-covered sandstone mesas. Distinctive features are two long, high basaltic dikes that stretch roughly east and west across the basin for several miles.

With the exception of San Marcos, which was a Keres-speaking pueblo, historic docu-
ments indicate that the Galisteo was the home of the southern Tewa, also known as the Tanos. Archaeological evidence shows that these sites, with beginnings in the thirteenth century, grew to become large pueblos, some with over 2,000 rooms. Four of these major villages were abandoned early in the sixteenth century. In the four remaining, Franciscan missions were founded subsequent to Spanish settlement in the northern Rio Grande Valley after 1598.

Throughout the Galisteo Basin, on the basaltic dikes and on the sandstone cliffs near various pueblos, an unprecedented amount of rock art was made during the few hundred years that these town were occupied. The dikes and cliffs harbor literally thousands of petroglyphs, and rock paintings occur in small concentrations among the secluded recesses in the sandstone. The imagery derives from a Pueblo world view expressed in mythology and religious beliefs ancestral to those of the contemporary Pueblos. Conservatism and continuity in Pueblo religion since the fourteenth century allows us to turn to the ethnographic records for an interpretation of this rock art. The rock art itself, known as the Rio Grande Style, has been described at length elsewhere (Schaafsma 1972:129-163, 1980:243-289).

DESCRIPTION

The Pine Tree Site shelters are situated roughly one above the other, separated by a small slope. The upper is the larger of the two, encompassing an area about 4 m high, 10 m wide, and 4 m deep. These figures are approximations, as no measurements were made at the site. Paintings in white, yellow, and red occur on the back wall and ceiling of the upper shelter, and there are indications of limited use of black paint as well. Superimpositions and traces of imagery underneath the last painted figures indicate that the shelter was repainted on several different occasions. On the right-hand side, below the main painted area, a crack in the sandstone is filled with broken sticks, which are the remains of prayer offerings of pahos or arrow (Figure 1; see Ellis and Hammack [1968] for description of offerings in a similar context). Traces of red designs are visible in the vicinity of the crack.

The painting in this shelter is dominated by two simple but large horned serpents almost a meter in length. One is painted on the ceiling in yellow, ochre-colored clay and the other, white and larger, is on the wall below, along with various other figures (Figure 2). The white serpent is given emphasis by a red eye and a red protruding tongue, and the horn is distinctive in its bluntness. White dots seem to be present on the body, although this is not certain. This serpent is painted on top of the lower portion of two ceremonial figures. The one on the left has a tall, possibly feathered headdress, and in his left hand he carries a crook prayer stick to which is attached a circular object. In his right hand he holds a long, curved stick resembling a bow. To the right is a comparable personage with a red stripe in his headdress and more clearly defined feathers. The remains of other paintings are visible in this area, including a face or mask with red eyes and horns. Continuing to the right and above the serpent, that here
Figure 1. Broken pahos or arrows in crevice in upper shelter.

Figure 2. Large horned serpent, ceremonial figures, upper shelter. Figure on left holds a crook prayer stick with attached circular object in his left hand. Body of serpent approximately 14 cm wide.
emerges from a crack, are traces of other paintings, including a figure in white with red head decoration. His arms are bent and uplifted, and he holds a staff and a club. What appear to be three small figures crowded together superimpose his lower body (Figure 3). Fragments of other painting in red are also present, suggesting that there were several episodes of painting. However, there was probably no significant time lapse between them.

High on the wall above the paintings last described is another series of paintings consisting of several round splotches in white and yellow ochre; crudely painted anthropomorphs in yellow ochre; a white, horned mask over the latter; and a sun, a white circle outlined in red with projecting lines in four directions (Figure 4). There is also a well-painted mud-head mask in red ochre. This figure is slightly under life-size. Beneath this and to the left are white traces of the outline of a third serpent.

A few small, simple petroglyphs approximately 12 to 15 cm across occur near the edge of the shelter and complete the inventory of figures in the upper overhang. Pecked into a black, painted surface are two unbounded faces, three horned masks or faces, a small bird, snake, and a horned toad or frog (Figure 5).

Down slope from the upper shelter is a small overhang or crawl space not more than 1 m high, over 1 m deep, and 3 or 4 m in length. A blocky sandstone outcrop forms the flat roof and back wall of this low aperture, and in front are the remains of a dry-laid masonry wall (Figure 6). The surface of the rock inside is smooth and smoke blackened, and white paintings have been made on the surface.

On the roof are two thick, short, zigzag lines in white and a carefully executed negative handprint (Figure 7). Viewing this involves crawling into the shelter and lying on one's back. On the vertical back wall are four figures that seem to have been conceived of and painted as a unit (Figures 8 and 9). Dominant are two circular designs estimated to be between 30 to 40 cm in diameter. The one on the left is a shield; on the right is a face or mask. Anthropomorphic forms in profile occur on the left side of both the mask and the shield and reach out toward them. The shield is divided with a vertical white band from which four prongs or horn-like elements emerge on the right. The left-hand side is painted in and decorated with two white circles, one above the other. In addition to the figure with its arms outstretched on the left, other white lines confuse what is happening. These seem to relate to other, now-incomplete figures on top. To the right of the shield, the large face or mask is painted in white; the head is very wide and not really circular. Small, round circles define the eyes, and the mouth is rectangular with a suggestion of teeth. On the left, the possible anthropomorphic form reaches toward the head, with three clearly defined appendages. The rock paintings in these shelters, together with the paintings that occur in the cliff recesses near San Cristobal Pueblo, are stylistically consistent with one another. In their bold simplicity, restricted use of color, and lack of detail, they contrast with Rio Grande style paintings of the southern Tiwa in the Manzano Mountains (author's slide files)
Figure 3. Ceremonial figure and remains of other designs. The body of the horned serpent in Figure 2 emerges from the crack on the lower right. Dotted areas are white; hatched, red.
Figure 4. Upper right of upper shelter. Paint splotches, anthropomorphs in yellow ochre, a sun, horned face, and mudhead mask. The latter is slightly under lifesize. Below and to the left of the mask, white paint outlines indicate the presence of a third serpent, now faded.

Figure 5. Petroglyphs, upper shelter. Figures do not exceed 15 cm in length.
Figure 6. View of the lower shelter. Aperture is about 1 m high. Remains of a dry-laid masonry wall are visible on the left.

Figure 7. White paintings of a negative handprint and zigzags on the smoke-blackened ceiling of the lower shelter.
Figure 8. Paintings on back wall (left) of lower shelter. White anthropomorph (left) and shield with white design of circles and barbed element. The definition of the left side of the shield in red paint is not visible in the photograph. Shield is estimated to be between 30 and 40 cm in diameter.

Figure 9. White possible anthropomorph and face/mask, on blackened right-hand side of lower shelter. Scale is comparable to figures on the left (Figure 8).
and with the rock paintings of the Tompiro and Piro near Abo and Socorro in which there is a wider use of yellow, red, and even green paint and where the figures are painted in exquisite detail (Cole 1984; Schaafsma 1980:Plate 25, 26). In their degree of refinement and in the variety and use of color, the southern Tiwa and Piro paintings are more similar to figures from Pueblo IV kiva murals (Dutton 1963; Hibben 1975; Smith 1952).

**INTERPRETING THE PAINTINGS**

The subjects painted in the Pine Tree Site rock shelters are representative of an iconographic system that derives from the world view and religion of the Pueblo IV period. As indicated in the above discussion, many of the images in the rock shelters are present in contemporary Pueblo religious iconography. It was hoped that an interpretation of the figures would suggest possible functions of the overhangs. Ironically, the lower overhang, with fewer paintings, seems more amenable to this treatment than the diverse and sometimes ambiguous group of figures in the upper shelter.

**The Upper Shelter**

In the upper shelter, the various elements seem to have been painted at different times, and therefore all of the figures that are present today may not have functioned together as an iconographic whole. Most of the human figures, although ceremonial, as indicated by feathered headdresses and the objects they carry, are too generalized to be identified as specific personages.

Among the held objects is the crook prayer stick, or paho, described above (see Ellis and Mannack [1968:37, Figure 7] or White [1932:plate 14] for illustration of actual artifact). These pahos were made by bending the tip of a flexible stick and securing it with a string tied to the staff. Ellis and Hammack (1968:34) note that crooks were also made for the Horned Serpent, representing irrigation, and in this instance there is a dramatic association between the figure holding the crook and the Horned Serpent.

A review of the ethnographic literature, however, indicates that crooks are used in a wide variety of ceremonial contexts. At Jemez, for example, Parsons (1925:102) was told that crooks were used to "pull down the rain" or to "catch water from the sky," and she illustrates crook pahos bound together with other prayer sticks for the kachinas and cloud people. At Acoma, White (1932:127) was told that crooks were offered for strength on long trips. He also notes that they are carried by kachinas in dances. At Zuni they are a symbol of longevity and are included in offerings at the winter solstice (Stevenson 1904:120). Among the Hopi they are used in numerous contexts (Smith 1952:194; Stephen 1936:17, 23, 47 [Soyal]; 216 [Powamu]; 596, 658-59, 706 [Snake-Antelope]; 817 [Flute]; 851 [Lalakon]; Figure 65 [War God Society altar]). Fewkes (1898:703-704) also emphasized the importance of the association between crooks and the god of war.

Furthermore, modern crooks differ, depending upon whether they are made for Winter or Summer Solstice ceremonies and depending upon which religious society is depositing them (Ellis and Hammack 1968:34). The one in the painting has no
distinguishing features, although the round object below the crook could be a "gift" or additional offering attached to the prayer stick (Gary Roybal, personal communication 1989). Such an offering could take the form of a miniature netted shield (see White 1932:Plate 15t). At Acoma, a miniature shield attached to a miniature bow and arrow were made as prayer offerings to Masewi, the Elder Twin War God (White 1932:127). In summary, because of the variable uses of the crook and the lack of any really diagnostic imagery, the significance of the crook and the attached object in the painting remain ambiguous.

The Pine Tree Site figure with the crook also holds a bow in the other hand. To the far right, another ceremonial participant holds long objects that could represent a yucca whip and a club.

The painted and pecked horned masks and faces that occur throughout the shelter defy specific identification, although two-horned figures among contemporary Hopi kachinas are for the most part either guards and whippers or ogres.

Figures that lack specific distinguishing characteristics are the mudhead mask, the sun disk (the white circle bounded with a red outline with red features in four directions), and the horned serpents. The mudhead mask, the sun, and the two figures in yellow are clustered together with paint splotches on an upper level above the white paintings. The two animated figures in yellow near the mudhead mask could also be clowns. Certain clown impersonators in contemporary Pueblo dances both on the Rio Grande and at Hopi are painted in this color.

Mudhead-like masks appear with horned serpents in Galisteo Basin petroglyph sites, and this is certainly an unequivocal rendition of this being. Today mudhead clowns are known only from the western Pueblos. Further, the traces of paint indicating the former presence of a third serpent below this mudhead mask are of particular interest. Kiva dramas involving mudheads struggling with horned serpents are enacted in March kiva rituals at Hopi (Fewkes 1903:48-49, 114, and Plate XXVI). In this context, the serpent is a fertility figure associated with the miniature corn fields that he owns, knocks down, the "harvests" (Titiev 1944:123). There presence of this motif in the Galisteo Basin, here and elsewhere, suggests that a similar ritual may have been performed by the southern Tewa.

The horned serpent itself is a very complex personage who is conceived of both as an individual and a multiple being. Two complete serpents dominate the imagery in the cave. Here, however, they are not shown as a pair, although they are often regarded as such and so depicted in rock art (Schaafsma 1972: Figures 116, 125). Further, there is no way to ascertain whether or not directional symbolism is implicit in their colors (Tedlock 1979:499). Young (1988:134) describes a Zuni rock art site at which six feathered and horned serpents, or Kolowisi, are painted in six colors to correspond to the six directions. It is said that the horned serpent inhabits springs and underground water, which he controls, and he is held responsible for destructive floods, especially as punitive measures. There are a number of Zuni and Hopi myths that recount these
episodes (Nequatewa 1936:85-102; Young 1988:148). The stars and other explicit sky and war symbolism with which the horned serpent is often closely associated in the Rio Grande style is absent here. What particular meaning these renditions of this multifaceted deity had for Pueblo IV visitors to this shelter rests in the realm of speculation. In summary, although the imagery painted in the upper Pine Tree shelter can be discussed in terms of today's Pueblo religious and ceremonial symbolism, the functions and supernaturals to which this shrine was dedicated are not readily apparent.

The Lower Shelter

The handprint and thick lines in white on the ceiling of this shelter were described above. The handprint, which appears to be that of a young man, could have been left as a signature of a ceremonial participant, a practice that may be explained in terms of contemporary Pueblo practices. In this context, leaving one's handprint on the wall of a sacred place brings a blessing to oneself. Also, a leader may leave his handprint on a kiva wall at the completion of a ceremony to indicate that his religious duty has been carried out (Ellis and Hammack 1968:35).

Only four elements are visible on the back wall: the face, the shield, and two white, anthropomorphic forms that reach out to each of them. The significance of the latter figures is unknown. The large face or mask devoid of ornamentation compares favorably to an 1894 drawing of Masau'u (Dockstader 1979:528, Figure 3(16)), the Hopi god of the earth surface, the Underworld, fire, death, and germination and rebirth. This god is usually depicted with a round, skull-like head, round eyes, and mouth, and he may have teeth (Stephen 1936:317, Figure 188). The only deviation from this pattern in the Pine Tree Site figure is that the mouth is rectangular. Ogres and beast gods are also shown with rectangular mouths (often large) with teeth, but they also have horns and other distinguishing headgear and sometimes facial markings.

Masau'u is also one of the major Hopi war gods (Malotki and Lomatuwy'ma 1987:158) and a patron of the Kwan, a warrior society. His house is said to be underground, and the surface of the earth is the roof of his second story. The location of the Pine Tree figure seems to be highly significant, situated as it is, deep under a shallow overhang and close to the ground (Figure 6). The overhang itself could symbolize the Underworld. That the meaning of an image may be linked to its physical context is corroborated by Young's (1988:174-175) research at Zuni. Other unornamented, large, round faces with round eyes and round or small, rectangular mouths are found in Rio Grande-style petroglyphs. Many of these are pecked at ground level or back in low cracks (author's slide collection), either location could be symbolic of Masau'u's realm.

The shield design with circles on one side and barbs springing from a central band is common in Rio Grande style rock-art (Schaafsma 1972:Figure 137; 1980:Figure 200), and it occurs in Pottery Mound kiva murals from the same time period (Hibben 1975:Figures 103 & 104). It is also worth noting that the same shield appears as a petro-
glyph at Sikyatki (author's slide collection). It does not, however, seem to occur ethnographically (see Wright [1975] and McCoy [1984] for a variety of historic shields). The closest historic approximation is a Jemez shield design consisting of a horizontal band decorated with circles and from which two bison horns rise (Wright 1976:48-49).

Wright (1976:92) suggests that, in some cases, shield decoration may have served as identity devices "for the various tribes." The wide distribution of this shield pattern from the Southern Tewa region to Pottery Mound near Los Lunas in the southern Tiwa/Piro region would seem to negate this idea, at least as far as this prehistoric shield design is concerned. The Hopi example from Sikyatki, however, is probably Tewa in origin, as are other petroglyphs in that vicinity (Stephen 1936:Figure 513).

Wright (1976:91) also observes that motifs depicted on shields are not merely decorative but are powerful symbols of war and defense that may be regarded as having magical powers on the power to enlist supernatural aid. It is suggested here that the rather ambiguous barb element on the shield may represent horns and/or the related men's societies. It is particularly suggestive of the latter. At Hopi, the Ahl (Horns) and Kwan (Agave) societies are groups that were relied upon in time of war to weaken the enemy.

The Kwan are named after the agave or century plant, the central stalk of which is protected by bayonet-like leaves; the Ahl represent the horned animals, particularly the mountain sheep, which are noted for their sharpness of vision and hearing. These two societies, who once cooperated in protecting Hopi villages against external enemies, now play an important role in Tribal Initiation and in the ceremonial system. [Eggan 1950:93]

Of particular interest in regard to the iconography of the lower shelter is the complex association between Masau'u and the Kwan as described by Titiev (1944:131-138). Thus, assuming the identity of the face/mask and the interpretation of the curved elements on the shield to be correct, the paintings in this shelter comprise a related symbol system. This is to be expected as, unlike the paintings in the upper shelter, they also form an aesthetic whole.

Fewkes (1906:350) comments that the most complex shrines at Hopi contain idols or images to which the shrine is dedicated. Assuming the identifications suggested above are correct, the lower overhang appears to be a shrine to Masau'u. In addition to prayers to Masau'u that ask for increased moisture and long life (Telayesva 1942:287), Masau'u's assistance is also sought by warriors (Nequatewa 1936:26). The close association of the shield and the Masau'u image suggests that this rock shelter may be a place where such requests were made.

Hopi shrines to Masau'u without rock art are described by Malotki and Lomatuway'ma (1987), Talayesva (1942), Stephen (1936), and Fewkes (1906). Some are shrines to travelers, because Masau'u owns and guards the earth and protects those who travel on it (Malotki and Lomatuway'ma 1987), and offerings are left at these spots by those passing by. Brush piles on
Masau'u shrines are the accumulations of offerings thrown on by wood gatherers (Fewkes 1906:353; Stephen 1936:263, 266). First Mesa Masau'u shrines vary from a spot marked by cairns to one that is "simply the angle between two immense boulders' with many offerings (Stephen 1936:1005). More relevant to the current discussion is a description of a shrine to Masau'u at the foot of the mesa at Oraibi where Masau'u is described as living in a big crack (Talayesva 1942:43, 91-92). Talayesva describes another in the Grand Canyon on the Salt Trail. The latter is reminiscent of the lower Pine Tree rock shelter in that it is located under a huge rock, and one must crawl inside to leave offerings (Talayesva 1942:240).

It is interesting that the face and handprint in this lower shelter are comparable to imagery illustrated by Ellis and Hammack (1968:Figures 2 & 3) from Arrow Grotto, a major underground shrine from the Jornada Mogollon, about 140 mi to the south. In spite of the significant physical differences between a true cave and a low overhang, the Underworld is implicit in the situation of both sites.

DISCUSSION

In any attempt to interpret the iconography of Pueblo IV rock art in the Rio Grande Valley, one must turn to the ethnographic documentation of the western pueblos of Zuni and Hopi, and particularly the latter, for comparative information. Many of the personages depicted in the Rio Grande style rock art of New Mexico have not been described for and do not seem to be present in the repertoire of ceremonial beings documented by ethnographers in the late historic Rio Grande pueblo villages. Because they appear in the rock art of the eastern Pueblos prior to the Pueblo Revolt in 1680, however, one can assume that they were once present in the Rio Grande Valley and its environs. Pueblo ceremonialism and especially the masked kachina dances in New Mexico were severely curtailed by the Spanish before and after the Revolt. Historical documents describe how the Spanish regarded kachina performances as diabolical and attempted to suppress them (Hackett 1937:131-142). Many specific kachinas may have been eliminated among the Rio Grande Pueblos at this time, and others may have been introduced into the western Pueblos by emigrants out of New Mexico. Following the Pueblo Revolt, a number of Rio Grande puebloan groups moved west to escape Spanish domination. At the time of the Revolt, the Galisteo Basin was largely abandoned by the Tanos, or southern Tewa, and scholars concur that later Tewa emigrants to First Mesa at Hopi in the early 1700s were the former residents of the Galisteo Basin pueblos of San Cristobal and San Lazaro (Eggan 1950:139; Stani-slawski 1979:600). Today their descendants live at Hano and continue to speak Tewa. This group was preceded by the Asa Clan, earlier Tewas who also moved into First Mesa and became Hopi speakers.

How Masau'u fits into this picture is not certain. At the Hopi shrine of Willow Springs, petroglyphs show a profile figure with a protruding brow that the Hopis identify as Masau'u (Malotki and Lomatuway'ma 1982:Figure 4, 7-9; Michaelis 1981:6). This Galisteo Basin petroglyph and other
more plausible Masau'u faces, including the Pine Tree site painting, may confirm the presence of Masau'u in the Rio Grande during Pueblo IV. Today, however, he is seemingly absent, although it is possible that the Keres Elder Twin war god, Masewi, to whom are ascribed similar attributes, is a contemporary eastern survivor of this new exclusively Hopi god (White 1923:Plate 3 and p. 47). It is reasonable to suggest that Masau'u was probably one of the main deities targeted for extinction by the seventeenth-century Spanish Inquisition. As god of fire and death, he resembles the Christian Devil, although his color is black (Stephen 1936:150). Even today Baptists on the Hopi Mesas make this same connection (Malotki and Lomatuway'ma 1987:261).

The Pine Tree Site in the Context of Pueblo Shrines

Shrines in the Pueblo world are many, and they vary in form and location according to their function and significance. In general, they identify sacred space in the Pueblo landscape and are devotional places where communication with the supernatural can take place. They often relate places and landforms to mythic events and thus mythic time. Therefore shrines are places where the boundaries are collapsed, as they function to integrate man, his history, and the supernatural with the landscape of daily life.

During the Pueblo occupation of the Galisteo Basin, it is reasonable to believe that a multitude of shrines were revered by every pueblo. Ortiz (1969:1824) describes an elaborate complex of shrines for the northern Tewa, and First Mesa Hopi shrines are described by Fewkes (1906), who was quick to point out that there were so many that he could not possibly consider all of them. Archaeologically we can expect a similar sequence of sacred locations to be associated with each pueblo ruin. As with contemporary shrines, however, many of these localities are marked either by a single stone or a pile of stones, or they are completely natural. Perishable offerings have long since vanished. Few of these types of sites leave any real clues for future archaeologists. The Pine Tree site is one of the few Pueblo IV painted rock shelters where the remains of offerings confirm the fact that this was a location where communication with the supernatural took place.

Other known Pueblo IV Galisteo Basin shrines with rock art include a stone circle with a tall stone slab with a pecked figure of a ceremonial figure or supernatural near Pueblo Largo (Nelson 1914:70-71), a stone enclosure on a hilltop, and several rock shelters painted with ceremonial figures near the ruin of San Cristobal Pueblo (Lang 1977; Nelson 1914:43, Footnote 1). Petroglyphs are found in abundance on the sandstone cliffs and boulders near the Galisteo Basin sites of Pueblo Blanco and San Cristobal, and, at the latter site, paintings occur as well. It is probable that shrines occurred in these vicinities near the villages, but today it is difficult to isolate particular shrine localities where offerings might have been deposited and rites performed. Likewise, the large basaltic dikes that run for several miles across the Galisteo Basin landscape are covered with petroglyphs, and it is again probable that shrine
localities were singled out. There is rarely, however, any distinguishing evidence. Both the petroglyph areas near the villages and those on the dikes were generally accessible to many and have a public aspect. Many areas of the dikes are at a considerable distance from any pueblo, and the probable shrines associated with the petroglyphs in these areas may have been visited by residents of more than one village. These sites contrast sharply with the private and secluded nature of the Pine Tree site and other small painted rock shelters in the Tiwa, Piro, and Tompiro regions (Cole 1984; Lang 1977). These isolated sites are more likely to have been somewhat secret and sacred locations visited by members of specific religious societies on ritual occasions and not accessible to the entire population of the associated pueblo. The fact that the imagery at these sites is painted as opposed to pecked is probably important. As described from ceremonial contexts at Zuni, paint—depending on its source, method of preparation, and possible admixtures of shell, turquoise, coral, and the flower petals—may be considered sacred and have magical powers (Bunzel 1932a:519, 1932b:859-861). Thus, painted imagery is likely to be regarded as being more powerful or efficacious than petroglyphs (Young 1988:191-192).

SUMMARY AND CONCLUSIONS

The Pine Tree Site is a shrine consisting of two rock overhangs in a secluded area about 2 mi from a major Pueblo IV ruin in the Galisteo Basin. Both shelters contain paintings of religious significance, and the upper shelter houses offerings in a rock crack. The rock art is typical of Rio Grande style paintings found elsewhere in the Galisteo Basin and can be dated between A.D. 1350 and 1680. This kind of secluded shrine site with paintings in typical of the Pueblo IV period, and similar painted rock shelters are known from elsewhere in the southern Tewa, the southern Tiwa, and the Piro regions. The Pine Tree site is believed to be only one of many shrines associated with the nearby major pueblo ruin.

On the basis of the imagery present and the site situation, it is suggested that the lower shelter is a shrine to Masau'u as war god and that it may have been patronized by a warrior society. The iconography of the upper shelter is much less specific, and its ritual focus is not readily apparent. The question of how imagery at ethnographic Pueblo shrines relates to their meaning and patronage is a topic that needs systematic study to elucidate the meaning of prehistoric shrines.

The mudhead-serpent association and the Masau'u-like face in the lower overhang are not unique to these shelters, but similar figures occur elsewhere in the Galisteo Basin. These and other elements in Rio Grande style rock art suggest ideologies and rituals no longer present in the eastern Pueblos but that are present ethnographically at Hopi. Explanations for such discrepancies between the archaeological record and the ethnographic present can be attributed at least in part to events related to the Hispanic occupation of the Rio Grande pueblos.
ACKNOWLEDGEMENTS

I would like to thank Donald A. Herbst of Santa Fe for introducing me to the Pine Tree Site and Karla Katz for her photos of the ceiling in the lower shelter.

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Young, M. Jane
TUNQUE PUEBLO--WHO LIVED THERE?

Albert H. Schroeder

The pueblo ruin known as Tunque, comprising 29 structures, some up to several hundred feet long, is located 13 mi downstream from Paako (San Pedro Viejo) Pueblo, which is near the source of Arroyo San Pedro. It flows from south to north and empties into Tunque Arroyo, which joins the Rio Grande opposite San Felipe Pueblo. Both Paako and Tunque have yielded horse bones and other material, indicating occupation in historic times (Barnett 1969:13; Nelson 1916a:179), but neither of these sites exhibits the remains of a chapel or a mission structure. Both seem to have been referred to in documents of the Spanish explorers dating between 1540 and 1598. Neither seems to have been mentioned after the 1620s.

The Coronado documents of the 1540-1542 expedition passed two unoccupied pueblos between the Rio Grande and Pecos Pueblo, going east from the area of present-day Bernalillo (Hammond and Rey 1940:300). These seem to have been San Lazaro and Galisteo Pueblos (Schroeder 1979:248). Also mentioned are seven pueblos to the side of this route toward the "snowy sierra," obviously Sandia Mountain (Hammond and Rey 1940:258). This is the area in which Tunque Pueblo lies. This group of pueblos was referred to by several later Spanish explorers in the late 1500s.

The Rodriguez-Chamuscado entry of 1581-1582 seems to have been the first to refer specifically to Tunque and other nearby pueblos. It was reported to be in a valley with a north-flowing stream (Tunque Arroyo) that entered the east bank of the Rio Grande. Three pueblos were seen—one close to the Rio Grande, which the Spaniards called Castilblanco, had 200 dwellings (old San Felipe Pueblo on the east bank); a second of the same size farther up the arroyo that they called Buena Vista (Tunque Pueblo, because of the view from the slopes of the mountains); and a third with 70 houses that they named La Barrenca (LA 443 or another pueblo farther upstream). It was here that the Spaniards learned of 11 or 13 more pueblos farther south "of a different nation and tongue from these" (Bolton 1952:147) up to three-days journey away, which probably included Paako (if it was not the pueblo of 70 houses), the Saline Pueblos, and those of the Gran Quivira region (Hammond and Rey 1927:49; Schroeder 1979:248-250; Schroeder and Matson 1965:162).

Antonio de Espejo in 1582-1583, after visiting the Pueblo of La Tiete (San Felipe), went some seven leagues on a new route to visit the mines of Santa Catalina, "so named by the friars and by Francisco Sanchez Chamuscado," according to the journal of Espejo's party. Nearby were some mines about which the journal states "that in few places are there more favorable conditions for mines" (Hammond and Rey 1929:117-118). Santa Catalina Pueblo may well have been Tunque (Schroeder 1979:249), located near several mineral deposits (Warren 1969).
Curiously, the journals of the Rodriguez entry do not mention any place by the name of Santa Catalina. However, Obregon, after interviewing men who were on either of these expeditions of the early 1580s, wrote in 1584 that in addition to mineral deposits one league from San Marcos Pueblo in the Galisteo Basin, there also were deposits in the Province of Ubates (on the north end of the Sandia range). This province, he remarked, included Santa Catalina and four other pueblos and was five leagues from San Marcos and 1 day's journey from the Tanos Province (Bolton 1952:188-189; Hammond and Rey 1928:301). Thus, he did not include Tunque and its neighbors among the Tanos.

In 1598, records of the Juan de Onate colonization refer to mineral deposits called Anunciacion near which were nine or ten pueblos and some salines of white salt. These minerals were said to be six leagues from San Marcos at the Pueblo of El Tuerto (LA 232). From here he went two leagues to the first pueblo behind the mountain (probably Paako on the east side of Sandia Mountain [Schroeder 1979:249]), which he indicated was the last pueblo of Puaray, and then south five leagues to the first pueblo of the Salines (Chilili) and beyond (Hammond and Rey 1953:393). Zarate Salmaron in the 1620s referred to a number of mineral deposits, including those "in the mountains of Puaray" (Sandia Mountain) and "in Tunque at the entrance" (Milich 1966:56), perhaps those near El Tuerto and Tunque Pueblos. The mineral deposits near Tunque may well have included those of the Montezuma Mine (Warren 1969).

Gaspar Castano de Sosa in 1591, having left San Marcos Pueblo and nearby mineral deposits, went to Santo Domingo. After settling his colonists there, he left with 20 men in search of mineral deposits and a pueblo he had not visited. He went into the mountains (Sandias), where he found two pueblos deserted a few days before because of a war, according to his Indian guide. These might have been any of five to seven pueblos previously reported in this area of Tunque and another pueblo (LA 443) in a nearby canyon to the west (Schroeder and Matson 1965:160-162).

Pottery studies also indicate, as did bones of horses and Spanish items from the ruins, that Tunque was occupied in historic times. By the middle of the 1400s, ceramics from this site had replaced that of other major pottery-making pueblos as a popular trade item in the upper middle Rio Grande Valley. During the 1500s, Tunque ceramic trade was at its peak, but near the end of the 1500s, the pueblo seems to have been abandoned, and other ceramic centers replaced it. However, part of the site was reoccupied in the late 1600s (Warren 1969, 1981:70), though this occupation is not noted in existing contemporary documents. A Spanish-period reference to the pueblo occurs in a joint petition by Santo Domingo and San Felipe Pueblos for land. It stated that on the proposed eastern boundary was "an ancient pueblo called the Pueblo of Tunque" (Bandelier 1892:109).

Most investigators who have concerned themselves with Tunque and it neighboring pueblos as well as Paako have followed Bandelier (1892:115) in identifying these people as Tanos (Hodge 1912:2:838; Lambert 1954:5-7; Nelson 1916b:7-8). Reed (1943) suggested that they
might be Keresan. Three statements of the late 1500s strongly suggest that these people were Tiwas. In 1584, as noted above, Obregon stated that the Province of Ubates was one day's travel from the Tanos (Hammond and Rey 1928:301), thus indicating it was not in the Tanos Province. Fourteen years later, Onate went from El Tuerto and then "to the first pueblo [Paako] behind the sierra, last pueblo of Puaray" and the following day to the first pueblo of the salines (Chilili) to the south" (Hammond and Rey 1953:393). Since Onate had passed through the Tiwa Pueblos on the Rio Grande but had not been among those on the east side of the Sandias up to this time, obviously he would not have referred to the last pueblo of Puaray as such if he was not so informed. Since the Indians of the Puaray were classed as Tiwas, and he had visited El Tuerto just before reaching the last pueblo of Puaray, it would appear that El Tuerto was one of the Tiwa-speaking pueblos. This situation may well imply that the Tiwa pueblos extended around the north end of the Sandias all the way to Paako.

Most of all of Onate's assignments of the friars were organized by linguistic groupings or provinces--Picuris, Keres (Rio Grande Pueblos), Jemez, Sias (Keres west of the Rio Grande), Tiwas, Tanos, and Tewas. Unfortunately, the remaining pueblos were lumped into one group as the Province of Pecos, which included all the pueblos from Pecos as far south as the Tompiros of Abo (Hammond and Rey 1953:345-346). No specific mention is made of the pueblos that might be identified as those on the north end of the Sandias, and they are not included among the assignments in the Tiwa province either.

The third statement is that of Bustamente on the situation in 1581-1582. After going up the Tunque Arroyo and visiting three pueblos, the Spaniards learned that farther upstream (to Paako and south?) were 11 more pueblos of a different language or tongue (Bolton 1952:147). Since one or another statement already considered definitely rules out Tanos as the occupants of the north slopes of the Sandias and suggests that the pueblo (Paako) on the back side of the mountain, "the last of Puaray," was Tiwa-speaking, Bustamente's statement about a nation and a language change upstream from La Barranca seems to agree with that of Onate.

There does remain the possibility that the people of Tunque might have been Keresan-speakers. If so, then the language assignment to the south among the 11 to 13 pueblos on the east side of the mountains could be either Tiwa or Tompiro. Since Onate's statement on the last pueblo of Puaray does seem to indicate that it was definitely of the Province of Puaray (and probably Tiwa-speaking), the data of the late 1500s suggest that Tiwas were on the north slopes of the Sandias and Tompiros on the east side.

In addition to the above, most of the contemporary references of the 1600s to the pueblos of the Sandias refer to them as Tompiros (Schroeder 1964). Moreover, Espejo in 1582 visited the two pueblos in the western area of the Tompiros and was informed that there were 11 pueblos in that province, which he called Magrias (Hammond and Rey 1929:76-78). This agrees nicely with statements about the pueblo, nation, and language situations south of the north
end of the Sandias. Moreover, Father Alonso de Benavides in the 1620s stated that, as one drew away from the Keres "10 leagues toward the east [from San Marcos], the Tompíra nation begins. Its first pueblo is Chilili. It extends [south] for more than fifteen leagues through these regions, through fourteen or fifteen pueblos..." (Hodge, Hammond, and Rey 1945: 65-66). Among these he included Gran Quivira, which he called Xumanes. Another similar report of this decade is that of Father Estevan de Perea. He brought a number of friars to New Mexico whom he assigned to the Humanas "and among those called Piros and Tompiros." Among the assignments he made were those to the pueblos Humanas, Abo, Quaraí, two to the Piros, one to Santa Fe, and two to other pueblos I cannot identify (Hodge, Hammond, and Rey 1945: 211-212).

Because of Benavides' and Perea's statements, along with other evidence (Schroeder 1964), I suggest that the Tompíro language was dominant on the east side of the Sandias, that the distribution of the Tiwa language on the Rio Grande curled around the end of the Sandias to Paako, that the Keres extended an unknown distance up Tunque arroyo, and that the Tanos were restricted to the Galisteo Basin. Whether Tunque was a part of the Tiwa extension around the north end of the mountains to Paako or was a Keres intrusion up Tunque Arroyo, as was San Marcos on the west edge of the Galisteo Basin, remains a question.

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FIELD ARCHAEOLOGY--REMEMBERED PASSIONS

David E. Stuart

Most archeologists regularly write "memoirs" without even realizing it. Each set of field notes is a memoir of sorts. First, all the human, personal touches are removed, then the remaining field data are used to create formal archaeological reports. That is how archeologists speak to one another in public. In this paper, however, I have done just the opposite. Focusing primarily on the human touches leaves a recognizable "memoir"--one which is about the more private side of archaeology and of archeologists.

I first came to New Mexico in the winter of 1967. Still young and full of dreams, I had already lived many places and tried various kinds of work, but all I really wanted was to become an anthropologist. In 1967 the Department of Anthropology at the University of New Mexico was the third best in the nation. Third best! And I had been fortunate enough to be admitted. So, just after Christmas in 1967, I packed up my old, gray Rambler and departed our family's home above the Monongahela River in Morgantown, West Virginia.

That year had been a hard one. My father died first. Grandmother followed him not long after. My twin brother, John, had gone into military service at the height of the Vietnam War. Nearly every week brought news of classmates' coffins sent home from 'Nam. And there was no work anywhere in the coal country of northern West Virginia.

So I headed West, passing landmarks that still seemed romantic to me: lovely old Marietta on the Ohio River; Paducah, Kentucky, where all the cross-country truckers stopped; and Cairo, Illinois, on the great Mississippi. At Cairo I ate late-night grilled cheese sandwiches with chile con carne at an otherwise empty diner and thought of Mark Twain--then turned south to drive quietly on through the night. At dawn of the second day, an incredible sun rose like a giant orange ball above the cotton fields surrounding West Memphis. Fort Smith on the Arkansas was the last true river town.

I spent the second night in foggy Elk City, Oklahoma. I slept until early afternoon, then gassed up for the final 700 miles to Albuquerque.

After crossing New Mexico's state line, I stopped for gas again and surveyed my new surroundings. The air was clean but dry, and surprisingly harsh winds carried the distinctive smell of parched earth. A moonlit horizon rolled endlessly uphill and westward until darkness erased it entirely. My eyes and nose told me it was very different here, so I was satisfied.

The old Rambler made Albuquerque before dawn. Tijeras Canyon's jagged rocks were still starkly backlit by a low-hanging moon. Then came Albuquerque itself--a shimmering surprise of neon and incandescent lights that filled the huge basin below. That first morning I slept in the De Anza Motor Lodge on central Avenue. My plan was
to spend four, perhaps five years in New Mexico, earn a doctorate and go off to even more exotic places as an anthropologist. But, things didn't turn out quite that way.

I did finish my academic agenda in May of 1972, but did not have the money to attend graduation ceremonies. So, though dead broke, at age 27, I quietly became UNM's 13th Doctoral graduate in Anthropology. Even though I wasn't rich, New Mexico certainly was! This state turned out to be a far, far more compelling place than I had ever imagined. As I became involved with Southwestern archaeology, it was humbling to discover that there were as many known archaeological sites here in New Mexico as had been recorded in all of old Mexico, where I studied archaeology as an undergraduate. Oh, it's true that the local sites weren't as grand or as well-known as the great pyramids at Teotihuacan, Mexico. But the entire state was literally a living museum. A 10,000-year-old saga of human endurance, hopes, dreams, and failings had already unfolded here before modern America was formed. I was awe-struck by all of it.

Moreover, New Mexico's landscape is simply magnificent. During graduate school, I spent lots of time out in the countryside, driving, walking, or looking for archaeological sites. I absorbed the name of every small town, every country, and every railroad siding, while reading as much local history as I could find. In those four years I became powerfully familiar with the Land of Enchantment.

After the doctorate, I needed a job, so I moved on. But no exotic destination was in the cards. I taught college in Florida for two years. Teaching was okay, but St. Petersburg wasn't. Florida was flat, it was hot, and it was boring. So I resigned a comfortable teaching post and came back to New Mexico in the summer of 1974. I didn't have a job, but it didn't matter much. The state already had its hands on me and wasn't going to turn me loose.

The return from Florida was joyous! I had married in 1971. So my wife, Cynthia, was with me. When we reached Santa Rosa, we stopped the car (by now it wasn't a Rambler anymore; it was an old green Volvo) and I jumped out, dropped to my knees by the side of the road and actually kissed all that beautiful, dry New Mexico dirt! Lord! I was thankful to be back!

I figured some type of job would work itself out. It did, in due course. That summer, I took day work at the University of New Mexico, writing proposals to help the Office of Contract Archeology get going. Contract archaeology was new—a bright and shining field where archaeologists went out on "bid" jobs, rather than grant research or teaching posts, and did field archaeology for clients like Anaconda, Gulf, Exxon, the Public Service Company, or the Gas Company of New Mexico. Anywhere Federal money was used in altering the landscape we went and did archaeology. God, it was exciting!

I think often of the other young archaeologists who were involved in founding UNM's Office of Contract Archeology. Frank G. Broilo, its first Director, is now long dead. Charles Reher edited the landmark work, Settlement and Subsistence Along the Lower Chaco River, got a Ph.D., and returned to his home state of Wyoming. Charles Carroll came to us from
Vietnam and wrote field reports beautifully. Charles now lives in Socorro and works as a BLM archaeologist.

Richard Loose was there, too. Rich did more than his share of the really creative, pioneering work of discovering the "Chaco phenomenon" in the 1970s. Rich would map ancient roads, project an average distance to the next "hypothetical" Chacoan outlier, then talk his employers (at that time the Public Service Company of New Mexico) into lending him helicopter air time so he could fly over, locate, and photograph these Chacoan "outliers." They really were there!! So, early on, Richard Loose was instrumental in what we now know about the Chaco phenomenon. Eventually it became a big deal in North American archaeology, but Rich never got fair credit. While he was busy working at archaeology, others were just as busy grabbing the limelight. That's the most disappointing aspect of our profession. Rich now works as a laser optics specialist at the White Sands Missile Range and lives in the village of Organ.

William Allan was another of the founding archaeologists at the Office of Contract Archaeology. Bill is one of the brightest I ever met in this business. For sheer smarts, I don't know anyone who'd top him, unless it would be my old roommate, John Broster. Bill and I walked a lot of miles together over the years. But he couldn't make a good living in contract archaeology either. Bill went on to work for the Bureau of Indian Affairs as an Environmental Scientist. Quite recently, he moved to California to work in another government agency. I miss him, and I miss John Broster, too.

John did a lot with high altitude archaeological survey (there really is a lot of 'stuff' up there in the mountains if you look for it!), until leaving New Mexico for his native Tennessee. He teaches occasionally at Vanderbilt and is Associate State Archaeologist --tax dollars well spent!

My thoughts haven't turned to these individuals accidentally. Nowadays I do administrative work--a far cry from field archaeology. I still teach archaeology and do a little field work in the summers, but, mostly, I'm a desk-bound administrator, so memories of the field often haunt me in the small hours of the night.

Right now it is just before dawn, on an early August day in 1989, and, as those of you who read this book know, my task is to pay tribute to Bill Sundt, whom I came to admire and respect through my association with the Albuquerque Archaeological Society. Unlike all of the others I've mentioned, Bill is an "amateur" archaeologist. Amateur, in the same sense that an Olympic athlete is an "amateur"--consummately skilled, yet untainted by the corruption of compromising his skills to accommodate the values of those who issue the paycheck.

Few of us stop to realize just how much said, written, and done by professional archaeologists is "shaped" by powerful external expectations. Most professional archaeologists inadvertently speak with many voices that seriously detract from the passions that brought them to the profession in the first place, whether by slyly rewriting an article to pander to the bias of a particular editor or by declaring (in a contract archaeology report) a site "significant" that none of us would ever bother to excavate for free on our own time. Bill
Sundt doesn't have this problem—he still has both his passion and his virtue. Since it clearly isn't virtue which ties Bill Sundt to the rest of us "professionals," it must be the peculiar nature of our passion that unites us. Let me explain this to those of you who haven't yet experienced this emotion.

You see, field archaeology is not just a way of life or a job title or a particular university degree. It is a passion, sometimes even an obsession, with the details or clues found on the landscape. Archeologist's brains often record all this as a series of "motion" pictures based on scenes of one field day upon another. Each scene is built on a day of walking, of looking, or of excavating, but, above all, of intensely observing everything around as one interprets archaeological remains in the field. It is as if each successful day in the life of a field archaeologist becomes an indelible print—fixed forever in the brain by the peculiar passion for details that infects all of us.

In tribute to Bill Sundt, I have chosen two special days—days I still remember with the same passion that first brought me to New Mexico 22 years ago in a little gray Rambler. Later, I wrote up these days, intending them for a popular audience. I now share them with you.

OCTOBER 6, 1976/ANCIENT WINTERS ALONG HIGHWAY 44

Four days of bitter cold and wind-driven snow have left their mark on New Mexico's high country. All is still and silent. Sheet ice crusts boulder-strewn hillsides, and even the mountain jays hide in dark oak thickets.

Travelers are stranded in modern towns like Tucumcari, Santa Rosa, Taos, and Raton. In places, food is scarce and the National Guard must bring supplies to armories and truck stops. Welcome to New Mexico. Land of harsh contrasts, long roads, and cold, unyielding mountains.

These sudden winter storms always remind me of Bluebird Mesa, which forms the skyline east of Cuba. There, a number of us were taken by surprise on a mild morning in 1976. We had gone up there to do some elk hunting—a needed interlude during a long, tedious archaeological survey. Without warning, layer after layer of remarkable, leaden clouds rushed in from the west. With them came the winds, and air temperatures fell 40 degrees in several hours. Then came the snow—2 inches an hour, maybe more.

At first it was beautiful, turbulent, and exciting. Our party was well-equipped with food, camping gear, and two trucks. There were five of us, archaeologists all. We were younger then, but not greenhorns. Between us, we had worked nearly 50 field seasons from Alaska to the Ecuadorian Andes.

It sounds romantic, but it isn't. Archeology isn't a profession. It's a disease: broken trucks, broken legs, and broken dreams. I never knew a real archaeologist, man or woman, who understood just why he or she did it. Nor one who didn't utterly dread the day when his or her legs gave out, and it was finally over.

As the snow piled up on Bluebird Mesa, nearly 50 years of experience went into a decision. We could risk losing the trucks and hope to reach Cuba, or we could sit it out and risk
spending a fair portion of the winter in white birch country more than 1.5 miles above sea level. We chose to risk the trucks.

The next few hours seemed like days. Neither truck was powerful enough to negotiate the glassy slick Forest Service track by itself. So we chained them together. With a driver in each, the rest walked beside the trucks. Armed with stout poles we levered spinning wheels back onto the road at each curve that dropped off into snowy nothingness. We did get to Cuba. But it was a humbling experience. It took luck, skill, and a generous dose of modern technology to break out of country once inhabited by a succession of prehistoric mountain peoples.

No one knows how long ago the first families settled into the rugged highlands between Cuba and Dulce. But modest, circular pithouses were constructed even before the birth of Christ. Pottery was still unknown, and the daily economy depended more on hunting and gathering wild foodstuffs than on the stingy harvest of small-cobbled corn.

Later, by the A.D. 800s, larger, deeper pithouses were built, and settlements had grown. On some grassy knolls, 10 to 15 families lived while tending gardens in nearby creek beds. Most years, harvests were sufficient to provide at least a meager diet until early spring. Deep pithouses were comparatively warm. Thermally efficient, semisubterranean houses have recently been rediscovered by environmentalists. Still, every scrap of wood needed to fuel winter hearths was laboriously cut with stone tools. Many winters, no exposed timber could be chopped and hauled once waist-deep snows enveloped the highlands bordering U.S. Highway 44.

In the A.D. 1200s, sandstone citadels, granaries, and fortified cliff palaces replaced pithouses throughout most of this remote region. South-facing cliff dwellings absorbed winter sun just as do today's passive solar buildings. Villages were large, but the local economy remained unstable. So warfare and raiding consumed many settlements. Only after protracted droughts in the late A.D. 1200s were these forested mesas finally abandoned for lower, warmer valleys.

Contemporary Indian peoples do have their share of social and economic troubles. We too often focus on the problems, forgetting that many of these same folks are descended from families who passed nearly 1500 ancient winters in northern New Mexico's legendary snow country. In those days there was no National Guard to bring food and to open snow-covered trails. Yet they endured.

The five archaeologists who once fought their way down Bluebird Mesa's snowy west face can never again be gathered. Broken trucks, broken dreams, and God's call have taken their toll. Yet the Mesa will stand forever—in tribute to a rare kind of endurance little understood in the modern world.

* * * *

Yes, my memories of that day do tell you about how archaeologists look at the landscape, react to it, recall it, bond to it, and form close bonds to one another. But archaeology isn't all about middle-aged scholars looking back on their younger days with nostalgia. Each and every day on the landscape is an adventure. Each is a communion. Each day is a story about begin-
nings and endings--the remains of people long gone. It is also a story about our sense of today as we sweat, or hurt, or hunger, or yearn for things that never will be, or perhaps never were. Human beings do archaeology, and archaeology isn't just about ancient peoples on an ancient landscape. It is about how all peoples, everywhere, face the beginning and ending of the days of their own lifetimes. And it is about the collective hopes of those societies to achieve immortality.

So I want to share another day with you. A day with a different tone. This day I have entitled "Hidden Canyon."

JULY 14, 1984/HIDDEN CANYON

For so small a canyon it is remarkably isolated, especially since Rio Rancho lies only several miles away. Hidden Canyon is a short, nasty gash in the black basalt mesa west of Albuquerque. An eerily quiet place, it is both mysterious and unpredictable. Below it lies Albuquerque's Petroglyph Park.

When the canyon's mood is right it radiates that kind of primitive power that can draw children outside to sit and shiver in the chaos of a summer's lightning storm. Today I have brought my friend Julia with me. She's 12, and I am her tutor. She doesn't need one, but is tolerant and enjoys field trips to ancient places, so it has been a pleasant association.

I never really understood my fascination with Hidden Canyon until I brought Julia with me. As we stood looking down into the canyon, she became instantly alert and cautious. The canyon's steep walls are a treacherous jumble of boulders, sagebrush, and loose sand. Rattlesnakes live in a hundred crevices.

The canyon's east wall is covered with ancient petroglyphs, or rock engravings. Most of them were carved between A.D. 1300 and 1600, but the canyon has drawn humans to it for thousands of years. A decade ago I found a giant bison's tooth on its rugged floor. Nearby lay the broken base of a Folsom lance head, nearly 10,000 years old.

Both could have been washed into Hidden Canyon from anywhere atop the mesa, which slopes upward toward the volcanic cones a mile or so away. Or Paleoindian peoples could have ambushed the herds of giant bison then living on the West Mesa's lush grasses. Driven to the edge of Hidden Canyon, shaggy, 2-ton beasts would have fallen into the bone-shattering abyss of sand and black boulders below the mesa's rim.

Gradually the climate became drier and hotter, so the giant bison disappeared. By 5000 B.C., the Paleoindian hunters had gone and Archaic peoples, who relied more heavily on vegetable foods and small game, wandered the area. Between 3000 and 5000 B.C., most of the local lance heads were made from nodules of fine-grained black basalt found right on the mesa's edge.

Julia and I have maneuvered partway down into the canyon where it is blistering hot. I look under every shady bush for coiled prairie rattlers and test the stability of each boulder before turning to pull her to the next rocky perch where she can photograph the ancient carvings.

The most spectacular petroglyphs lie across the canyon, halfway up the cliff face. As we make our way toward them, a young coyote, busy-tailed and
burnt orange in color, glides away, pauses to watch us, then disappears over the mesa's black volcanic rim. Lush patches of dense, green bushes line a moist seep in the canyon floor. Coyote tracks are everywhere.

Finally, we reach a huge engraved shield. As I hold Julia steady on the narrow, angular boulder, she meticulously photographs the carving from several angles. Julia wants several shots good enough to publish in my next book and is willing to work for just the right one.

The photographs taken, she hands me her camera, then edges down from her perch--still cautious, still alert. Our job done, we move slowly, boulder-to-boulder, feeling out each step as we cross the canyon once again.

I am fascinated by all of this. Julia is young, strong, and fearless. She jumps horses over fences--it is her special passion. The very thought scares me witless. Yet she treats this canyon with mature respect.

So gradually I came to understand Hidden Canyon and to recognize my own private obsession with it. This is a powerful, unforgiving place, capable of grinding up stronger and wiser folks than either of us are ever likely to meet.

Once out of the canyon we look back. Only the east wall is carved. The west face is untouched--an eerie contrast. Julia wants to know why. I have no answer.

Two days later the Albuquerque Tribune carries an unpleasant story of a man's body found among Hidden Canyon's dark boulders. For 100 centuries this place has drawn the young, the strong, the brave to it--and taught them about mortality.

* * * *

I've shared two days in the life of a field archaeologist with you. Two days that are an indelible part of me. I could easily share another ten, another hundred, or perhaps even a thousand. But I don't think you'd learn much more about a day's work in archaeology, or the surprisingly passionate voices with which archeologists often speak to one another in private. I suppose its true that such vividly remembered days could take place anywhere. But, for me, they are, quite simply, more possible here in New Mexico. For in New Mexico, the faint voices of 600 human generations still echo across a dramatic landscape. And archeologists like Bill Sundt still wander that landscape, hand cupped to ear, in order to receive their precious, fading messages.

University of New Mexico
Albuquerque
A REASSESSMENT OF CHACO CYLINDER JARS

H. Wolcott Toll

More localized than copper bells, more meaningful than naked macaws, Mesoamerican in form but local in production, able to be interpreted in a thousand ways--cylinder jars in Chaco stand to tell us something important about the Chacoan way. Whether one believes Chaco can best be explained as a Mesoamerican colony, a ranked society based on differential production, a regional system of communities following an interaction adaptation to compensate for patchy crop success, or a ceremonial center reliant on the distribution of turquoise, the extremely restricted distribution of cylindrical jars or vases (Figure 1-8, Table 1) call loudly for interpretation. Pepper (1920), Judd (1954, 1959), Washburn (1980), and Neitzel (1985; Neitzel and Bishop 1987) have provided descriptions and interpretations of cylinder jars. As a basis for evaluating such interpretations and for proposing one different from those so far formulated, I present an assessment of variability in this vessel form using available data.

As indicated by its name, the vessels are more or less cylindrical, but most specimens deviate from perfect cylinders by flaring toward the base, the rim, or both. The majority have flat bases at close to a right angle with the more or less vertical walls. Most have some means of suspension, whether small loop handles or perforations near the rim (Figures 1-8). Measured examples average 24 cm in height, but ranging from 14 to 35 cm, and 11 cm in orifice diameter, ranging from 6.5 to 17 cm (Table 2).

CYLINDER JAR DISTRIBUTION IN SPACE AND TIME

As noted by Pepper (1920), Roberts (1927), Judd (1954), and Washburn (1980), the cylindrical form is well known in Mesoamerica, and these students are unanimous that the Chaco examples must have been stimulated in some way by Mesoamerican interaction. Mayan cylinder jars clearly had special significance and were painted with historical and mythological scenes and texts (see, for example, Gifford [1974]). Though many of the Mayan examples are on legs, and others are shorter and broader, a number are quite similar in shape to the Anasazi ones. Most are from the Classic period and probably date 100 or more years earlier than those from Chaco. Washburn (1980) suggests Oaxaca as a source of inspiration or even for actual vessels found at Chaco. The form also occurs in the Mississippi area probably more nearly contemporaneously with the Chaco examples (Griffin 1952, Figures 78, 144b, 152 180g; Willey 1966:5-29, 5-49). While apparently also scarce there, the form seems likely to be more common than in the Southwest. Were the temporal and spatial distributions of cylinder forms in the Southeast somehow comparable to that in
Figure 1. Examples of cylinder jars from Pueblo Bonito. Included are (a) a plain white ware jar (form similar to red ware examples), (b) a carbon-painted jar with solid elements, and (c,d) mineral-painted, hatchured white wares. No scale available for these four vessels, but the remaining figures (2-8) are to approximately the same scale; further data on individual jars are provided in the appendix. Jar (b) is the clearest example of a Chuskan carbon-on-white (Nava Black-on-white) vessel identifiable from photographs.
Figure 2. Chaco and Gallup Black-on-white cylinder jars from Pueblo Bonito. Jars (a) and (b) have unusual in-curving rims and were recovered from the west wing; (c) is the only known example of a double jar from Chaco with linked bases and broken link about two-thirds of the way up the vessel (compare with Figure 10). Note the mixture of horizontal and diagonal design layouts in the two halves of (c) and top and bottom of (d). Jars (e) and (f) have unusual designs for Gallup; (g) is an example of the most frequently repeated design on cylinder jars.
Figure 3. Chaco and Gallup Black-on-white cylinder jars. Note the incomplete hatching at the top of (b).
Figure 4. Chaco and Gallup Black-on-white cylinder jars. Series showing similar designs and the two most often repeated designs (b,h,i,j and c,e,f). Note that even on the vessels with repeated designs there are differences in handle shape and placement, design deployment, and vessel form. Jar (a) is one of the two reported from near Pueblo Alto.
Figure 5. Mineral-on-white jars with unusual design elements. The plain hatchure bands of (d) and (f) are not uncommon, but the triangles (i-l), t-shapes (h), triangular hatchure (g) and straight concentric rings (a-c) are less common on other vessel forms. The decoration on (e) is reminiscent of an early (PI) example from the Piedra district.
Figure 6. Solid-element cylinder jars, including Puerco (mineral paint) and Chaco McElmo (carbon paint) Black-on-white. Jar (a) has a diagonal design layout and comes from the west wing (compare to 2a,b); (b) is the only known example of a strap handle from rim to rim. Jar (d) is reported to have come from "near Pueblo Alto" (compare the handles with 4(a) of the same provenience). Jar (f) appears to be complete but may have been ground; it does not seem to be represented in the height measurements.
Figure 7. Undecorated white ware cylinder jars, primarily from Pueblo Bonito Room 28. Jar (a) is the tallest known Chaco cylinder jar; (e) approximates the flared forms of the four red ware cylinder jars and clearly shows the use of "slip-slop."
Figure 8. Undecorated white ware cylinder jars. Note the variety of sizes, shapes, and handle types and placements.
Table 1. Proveniences of PIII or earlier Anasazi cylinder jars.

<table>
<thead>
<tr>
<th>Provenience</th>
<th>Number</th>
<th>Association</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PUEBLO BONITO</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Block</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room 28</td>
<td>111&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Cache, 63 pots</td>
<td>Pepper 1920:120-2, 359</td>
</tr>
<tr>
<td>Room 28B</td>
<td>8</td>
<td>Cache</td>
<td>Judd 1954: 210, 374-5</td>
</tr>
<tr>
<td>Room 32</td>
<td>3</td>
<td>Ornaments, staffs, tools, partial burial</td>
<td>Pepper 1920: 129-163, 359</td>
</tr>
<tr>
<td>Room 33</td>
<td>2</td>
<td>14 burials, many goods</td>
<td>Pepper 1909: 212, 221</td>
</tr>
<tr>
<td>Room 39B</td>
<td>19</td>
<td>no burials</td>
<td>Pepper 1920: 198-9, 359</td>
</tr>
<tr>
<td>Room 53</td>
<td>1</td>
<td>Adult, scattered child</td>
<td>Pepper 1920: 212, 359</td>
</tr>
<tr>
<td>Room 52/32</td>
<td>20</td>
<td>no burials</td>
<td>Pepper 1920: 198-9, 359</td>
</tr>
<tr>
<td>Room ?</td>
<td>1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>?</td>
<td>Pepper 1920: 210</td>
</tr>
<tr>
<td>Room 109</td>
<td>1</td>
<td>no burials?</td>
<td>Pepper 1920: 361</td>
</tr>
<tr>
<td>Room 309</td>
<td>1</td>
<td>no burials?</td>
<td>Judd 1954: 374-5</td>
</tr>
<tr>
<td>East Block</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room 62</td>
<td>2</td>
<td>no burials?</td>
<td>Pepper 1920: 360</td>
</tr>
<tr>
<td>Room 65</td>
<td>1</td>
<td>no burials?</td>
<td>&quot;</td>
</tr>
<tr>
<td>Room 76</td>
<td>1</td>
<td>no burials?</td>
<td>Judd 1954: 212, 374-375</td>
</tr>
<tr>
<td>Room 251</td>
<td>1</td>
<td>no burials?</td>
<td>&quot;</td>
</tr>
<tr>
<td>West Block</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room 320</td>
<td>3</td>
<td>8 adult, 2 child burials</td>
<td>Judd 1954: 212, 374-5</td>
</tr>
<tr>
<td>Room 326</td>
<td>1</td>
<td>1 infant, 10 adult burials</td>
<td>Washburn 1980: 71-2</td>
</tr>
<tr>
<td>Room 329</td>
<td>6</td>
<td>17 adult, 6 child burials</td>
<td>&quot;</td>
</tr>
<tr>
<td>Room 330</td>
<td>6</td>
<td>17 adult, 6 child burials</td>
<td>&quot;</td>
</tr>
<tr>
<td>Room 105</td>
<td>1</td>
<td>no burials?</td>
<td>Pepper 1920: 361</td>
</tr>
<tr>
<td>Room 67 (Kiva)</td>
<td>1?</td>
<td>no burials?</td>
<td>&quot;</td>
</tr>
<tr>
<td>Front Rooms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room 136</td>
<td>1</td>
<td>no burials?</td>
<td>&quot;</td>
</tr>
<tr>
<td>Room 163</td>
<td>1</td>
<td>?</td>
<td>Pepper 1920: 362</td>
</tr>
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<td><strong>Pueblo Bonito</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td>192</td>
<td></td>
<td></td>
</tr>
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<td>Provenience</td>
<td>Number</td>
<td>Association</td>
<td>Reference</td>
</tr>
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<td>--------</td>
<td>---------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Pueblo Alto</td>
<td>1</td>
<td>midden</td>
<td>Toll &amp; McKenna 1987</td>
</tr>
<tr>
<td>&quot;Near Pueblo Alto&quot;</td>
<td>2</td>
<td>?</td>
<td>Martin and Willis 1940</td>
</tr>
<tr>
<td>Pueblo del Arroyo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room 15</td>
<td>4⁵</td>
<td>2 partial femurs</td>
<td>Judd 1959:18, 156-8</td>
</tr>
<tr>
<td>Tri-wall</td>
<td>1</td>
<td>none?</td>
<td>stabilization</td>
</tr>
<tr>
<td>Trash</td>
<td>1</td>
<td>trash</td>
<td>Winde p.c. 1981</td>
</tr>
<tr>
<td>29SJ1360</td>
<td>1</td>
<td>surface</td>
<td>McKenna and Toll 1984</td>
</tr>
<tr>
<td>29SJ633</td>
<td>1</td>
<td></td>
<td>McKenna and Toll 1989</td>
</tr>
<tr>
<td>Bis sa'ani Site 31</td>
<td>1</td>
<td>extramural</td>
<td>Franklin 1982: 904</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(small site)</td>
<td></td>
</tr>
<tr>
<td>LA 59497</td>
<td>1⁶</td>
<td>extramural burial</td>
<td>Post 1989</td>
</tr>
<tr>
<td>Black Hat, NM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(San Diego Museum)</td>
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<td></td>
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<tr>
<td>Piedra District--PI</td>
<td>1</td>
<td>surface room</td>
<td>Roberts 1930: 107</td>
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<tr>
<td>Museum of NM--PII</td>
<td>1</td>
<td>?</td>
<td>Judd 1954: 210</td>
</tr>
<tr>
<td>Navajo Reservoir--PI-PII</td>
<td>2⁵</td>
<td>roof fall pithouse floor</td>
<td>Eddy 1966: 394, 578</td>
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<tr>
<td>Non-Bonito</td>
<td>18</td>
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<tr>
<td>Subtotal</td>
<td>18</td>
<td></td>
<td></td>
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<tr>
<td>OVERALL TOTAL</td>
<td>210</td>
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</tr>
</tbody>
</table>

**Key:**
- a 1 polished red
- b double vessel
- c 3 polished red
- d 1 plain gray miniature

**Notes:** Adjacent rooms are indicated by lines. Association refers primarily to burial association, but notes other known caches, etc. Pepper (1920:121) lists 114 cylinder jars from Room 28, but the tabulated value of 111 is used here (see Judd 1954:210 n 49). Room 32 is tabulated as having 3 cylinder jars, but Pepper (1920:130, 133, 134, 140) indicates 4; Judd (1954:212 n50) counts 5. Pepper (1920:359) shows 2 cylinder jars from Room 36, but (1909) and (1920:168) show 2 from Room 33—they are listed with Room 33 here. Room? is based on Pepper's reference to "one or more" found by Moorehead in "adjacent rooms"; this may include the double jar seen here in Figure Cc; Moorehead (1906:44) shows this vessel and describes it as from "underground rooms." Thus there may be at least 5 more cylinder jars from Pepper's excavations.
Table 2. Measurements for cylinder jars, with comparative figures for selected contemporaneous forms; all measurements in mm.

<table>
<thead>
<tr>
<th>Dimension/Ware</th>
<th>n</th>
<th>mean</th>
<th>C.V.</th>
<th>min.-max.</th>
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<tr>
<td>CYLINDER JARS</td>
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<tr>
<td><strong>HEIGHT</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Red ware</td>
<td>4</td>
<td>250.2</td>
<td>3.4</td>
<td>241-260</td>
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<tr>
<td>Black-on-white</td>
<td>82</td>
<td>233.5</td>
<td>12.0</td>
<td>140-295</td>
</tr>
<tr>
<td>without Black Hat</td>
<td>80</td>
<td>235.8</td>
<td>10.3</td>
<td>180-295</td>
</tr>
<tr>
<td>Plain white</td>
<td>51</td>
<td>240.3</td>
<td>12.9</td>
<td>198-350</td>
</tr>
<tr>
<td>All</td>
<td>137</td>
<td>236.5</td>
<td>12.2</td>
<td>140-350</td>
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<tr>
<td><strong>NECK DIAMETER</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red ware</td>
<td>4</td>
<td>157.0</td>
<td>5.1</td>
<td>150-168</td>
</tr>
<tr>
<td>Black-on-white</td>
<td>67</td>
<td>101.7</td>
<td>17.1</td>
<td>74-155</td>
</tr>
<tr>
<td>without Black Hat</td>
<td>65</td>
<td>101.2</td>
<td>17.2</td>
<td>74-155</td>
</tr>
<tr>
<td>Plain white</td>
<td>49</td>
<td>112.0</td>
<td>21.2</td>
<td>65-170</td>
</tr>
<tr>
<td>All</td>
<td>120</td>
<td>107.7</td>
<td>20.9</td>
<td>65-170</td>
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<tr>
<td><strong>BASE DIAMETER</strong></td>
<td></td>
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</tr>
<tr>
<td>Red ware</td>
<td>4</td>
<td>82.8</td>
<td>6.2</td>
<td>76-88</td>
</tr>
<tr>
<td>Black-on-white</td>
<td>78</td>
<td>102.8</td>
<td>18.9</td>
<td>63-149</td>
</tr>
<tr>
<td>without Black Hat</td>
<td>76</td>
<td>103.8</td>
<td>18.6</td>
<td>75-149</td>
</tr>
<tr>
<td>Plain white</td>
<td>41</td>
<td>109.1</td>
<td>17.3</td>
<td>60-145</td>
</tr>
<tr>
<td>All</td>
<td>123</td>
<td>104.2</td>
<td>18.7</td>
<td>60-149</td>
</tr>
<tr>
<td><strong>NECK: HEIGHT RATIO</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Red ware</td>
<td>4</td>
<td>.63</td>
<td>2.4</td>
<td>.61-.65</td>
</tr>
<tr>
<td>Black-on-white</td>
<td>11</td>
<td>.50</td>
<td>35.3</td>
<td>.31-.82</td>
</tr>
<tr>
<td>without Black Hat</td>
<td>9</td>
<td>.43</td>
<td>20.4</td>
<td>.31-.58</td>
</tr>
<tr>
<td>Plain white</td>
<td>47</td>
<td>.47</td>
<td>18.9</td>
<td>.28-.64</td>
</tr>
<tr>
<td>All</td>
<td>62</td>
<td>.48</td>
<td>23.2</td>
<td>.28-.82</td>
</tr>
<tr>
<td>without Black Hat</td>
<td>60</td>
<td>.47</td>
<td>20.2</td>
<td>.28-.65</td>
</tr>
<tr>
<td>COMPARATIVE FORMS</td>
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<td></td>
</tr>
<tr>
<td>Puerco B/w pitchers</td>
<td>78</td>
<td>166.9</td>
<td>17.2</td>
<td></td>
</tr>
<tr>
<td>Gallup B/w pitchers</td>
<td>77</td>
<td>168.8</td>
<td>18.2</td>
<td></td>
</tr>
<tr>
<td>Puerco B/r bowl</td>
<td>23</td>
<td>101.2</td>
<td>16.5</td>
<td></td>
</tr>
<tr>
<td>P-II corrugated jar</td>
<td>68</td>
<td>145.2</td>
<td>24.0</td>
<td></td>
</tr>
<tr>
<td><strong>ORIFICE DIAMETER</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puerco B/w pitchers</td>
<td>78</td>
<td>83.8</td>
<td>19.1</td>
<td></td>
</tr>
<tr>
<td>Gallup B/w pitchers</td>
<td>79</td>
<td>83.7</td>
<td>14.7</td>
<td></td>
</tr>
<tr>
<td>Puerco B/r bowl</td>
<td>23</td>
<td>216.4</td>
<td>14.8</td>
<td></td>
</tr>
<tr>
<td>P-II corrugated jar</td>
<td>68</td>
<td>106.7</td>
<td>22.6</td>
<td></td>
</tr>
</tbody>
</table>

Black Hat = double cylinder vessel from LA 59497
the Southwest, exciting possibilities for long-range contacts are raised (see Lekson 1983).

Most of the Anasazi cylinder jars known can be placed typologically and contextually in the latter A.D. 1000s to the early 1100s (see below). There are some possible precursors to the cylinder form, including "beakers," an uncommon form usually in red ware, found in pre-920s contexts (Blinman 1988), though this form tapers more toward the orifice. Small cup-like forms occur in Basketmaker sites (D. Wilson, personal communication 1989), as well as occasionally in Pueblo II sites (such as the Spadefoot Toad Site, 29SJ629 [Toll and McKenna 1981]). "Feather boxes" are cylinder shaped, but open on the side (see Roberts 1930:Plate 33); Roberts thought the forms to be related, but Morris (1939:167) gives compelling reasons to think otherwise.

One of the most similar early forms was found by Roberts in the Piedra District, and, unlike red and gray ware feather boxes and beakers, it is a black-on-white vessel. The decoration on the early example he recovered consists of series of parallel vertical lines (reminiscent of Figure 5e); it is shorter (133 mm) than any of the Chaco examples, but the diameter (105 mm) falls near the mean of the later jars (Table 2), and it has holes near its rim. Finding this vessel seems to have changed Roberts' mind about the Mesoamerican origin of cylinder jars; in his dissertation he wrote: "There is of course the possibility that they may have developed in situ from smaller vessel forms but it is more probable that they were the result of Mexican influence" (1927:89). Just three years later he says: "Cylindrical vases have hitherto been considered a form peculiar to the Chaco Canyon, Pueblo Bonito especially, as well as a late development in pottery shapes [citing Pepper 1920:Plates 2-6; pp. 117-122]. To find an example in a Pueblo I site at so great a distance from the locale of the type is of special interest. It shows definitely that such a form was an early Pueblo development" (Roberts 1927:106). From the same general area, two cylindrical forms, one a gray ware miniature, are also reported from the Navajo Reservoir District (Eddy 1966:394). This black-on-white vessel is quite similar in height to the one reported by Roberts: it is 12.2 cm high but is only 6.6 cm in diameter. It is classified as Arboles Black-on-white; both the vessel and the design are reddish, probably due to a firing accident. The design is a diagonal checkerboard panel with a line around the base. Judd (1954:210) reports a PII cylinder jar of unknown provenience with interior and exterior decoration in the state museum in Santa Fe, unquestionably the vessel shown in Whiteford et al. (1989:Figure 14, p. 110). Though it is labeled a "beaker," this vessel is 22.4 cm high and 17.8 cm in diameter at the rim (well within the size ranges of cylinder jars [Table 2]), and its shape is similar to some shown in the plates (Figures 4i, 5a, 6d, e, h), though it lacks lugs. The design of ticked triangles framed by parallel lines is clearly Red Mesa Black-on-white, and presumably the vessel is earlier (i.e., A.D. 900-1040) than the other known decorated cylinder jars (dating to A.D. 1040-1125), making it the only known temporal link between the Pueblo I vessels from the Piedra and the Pueblo
II-III vessels from Bonito. A search through the collections now held at the Museum of Indian Arts and Culture in Santa Fe did not yield any other cylinder vessels other than the PI example from the Navajo Reservoir, peculiar round bottomed Potsui'i Incised vessels (probably also mentioned by Judd), and modern Hopi vases. No cylinder jars are reported from Chimney Rock Pueblo (Eddy 1977), however, which is where they would be expected on architectural and temporal grounds if the form had persisted until around A.D. 1100.

There is little doubt that the white ware cylinder jars were made in the San Juan Basin and decorated in styles of their time and place, but the use of other Mesoamerican items in special contexts, the significance of the form in Mesoamerica, and the distribution of cylinder jars makes some symbolic link to Mesoamerica seem probable.

In 1950 Judd (1954:210-214) made an inventory of Anasazi cylinder jars then known, and few additions are necessary to make the list current today (Table 1). Of 210 known cylinder jars, 205 (98%) come from Chaco Canyon, 191 of those (91% of the total) come from Pueblo Bonito, and the great majority of the Bonito examples come from just a few rooms. Only seven cylinder jars have been reported from sites outside of Chaco Canyon, and one of those is from Bis sa'ani Pueblo, located very nearby. Moreover, some of the non-Bonito examples in Table 1 are unconfirmed, some are questionably included in this vessel class, and five of the sixteen are sherds rather than whole vessels. It is possible that some cylinder jar sherds have been identified as being from the upper portion of straight-sided, white ware pitchers, a relatively abundant form. The form is, however, well known and quite distinctive, especially near the base of the vessel (Figure 9), and one for which archaeologists in the Chaco area are likely to have been looking. There are surely more cylinder jars reported for archaeological contexts, and perhaps even some in the literature; nonetheless, the 100-year sample we have shows a remarkably confined distribution of this simple form.

It is unlikely but uncertain whether sherds are included in Hyde's (Pepper 1920: 359-363) table, so that the Pueblo Bonito cylinder jar count might well be even higher. While it may be that this distribution is an artifact of the location of high volume excavations, a case can also be made that Pueblo Bonito stands apart from all the other sites in the Chaco system. It is different from other Chaco great houses by virtue of its central location, the presence of several other caches of material (see especially Pepper 1920); the number of stories; its mounds, which are distinctive both because there are two and because they are the most highly formalized of all Chaco mounds; the presence of burials; and, again, cylinder jars. Since over half of the known cylinder jars come from a single cache in Room 28 of Pueblo Bonito, the lesser amount of excavation at other great houses perhaps makes it less likely that other cylinder jars would have been found. Extensive excavation at Chetro Ketl, Una Vida, Aztec, Salmon Ruin, Bis sa'ani Pueblo and community, and Pueblo Alto has produced one cylinder jar fragment. Pueblo del Arroyo, the great house
spatially closest to Pueblo Bonito, is the provenience of four complete vessels and two sherds (Figure 9). All four complete vessels are from a single room, reiterating the tendency for multiple cylinder jars to be found in single rooms. The virtual absence of cylinder jars from smaller sites seems reliable; the Chaco Project recovered two solitary sherd candidates: a good possibility from 29SJ1360 (McKenna and Toll 1984), and a less likely one from 29SJ633 (P. J. McKenna, personal communication 1989).

The association of cylinder jars with burials is somewhat ambiguous (Table 1). Room 28 at Pueblo Bonito, which contains the major cache of cylinders, is adjacent to several rooms containing human remains but contains none itself. Several other rooms containing cylinder jars do contain human remains, but the deposits are disturbed and the remains are scattered; in these cases, the number of individuals in each room exceeds the number of cylinder jars.

In Room 33, which contains 12 disturbed burials and 2 intact burials, the 2 cylinder jars recovered are from above the wooden floor that separates the disturbed burials from the intact ones (Pepper 1909, especially p. 222). The intact burials are accompanied by large quantities of ornaments and other elaborate goods, including a basketry cylinder covered with a turquoise mosaic. The two pottery cylinders, then, come from a mixed deposit including flutes, "ceremonial sticks," beads and pendants, at least 23 other vessels, and the disturbed burials. While some of the jewelry was associated with individuals, few of the other

Figure 9. Cylinder jar sherds from Pueblo del Arroyo; (a) is carbon-painted and trachyte-tempered and is clearly a product of the Chuska Valley; (b) is mineral painted and sand-and-sherd tempered.
goods could be so assigned, though one of the cylinder jars was next to a cranium (Pepper 1909:212). Pepper (1909:210) attributes the burial disturbance to "swirling waters," but this is hard to envision in a room with an intact roof located in the center of the roomblock containing quantities of extremely well preserved wooden artifacts. The majority of burials in Bonito are disturbed (see also Judd 1954), making human agencies of disturbance seem more likely. Reyman (1978:252-256) also discounts the effects of running water (see also Frisbie 1978:213), but suggests that the disturbed individuals were sacrificed to accompany pochteca individuals. Barring severe dismemberments, however, at least some of the scattering of remains must have occurred considerably postmortem, and the possibility of prehistoric disturbance of these rooms must also be entertained.

Therefore, while the cylinder jars from Pueblo Bonito come from areas in the site that do contain burials, there is little to indicate that these vessels were used as grave goods, at least for specific individuals. As Pepper (1909) says:

The vessels buried with the bodies [in Room 33] are of the common forms, such as were found in the living rooms. There was one exception, namely, the cylindrical jars; but judging from the numerous specimens from Room 28, and from the fact that none were found in the mound or rock burials, they were used, no doubt, primarily in ceremonies, probably constituting part of certain altar paraphernalia. [p. 251]

Judd (1954) sees their meaning differently:

"Although none of our vases lay closely associated with a body, I have no doubt all were burial offerings and on a plane with other vessels from the same rooms. [p. 212]

This question of interpretation will be further examined below. The double cylinder jar from the Gallup area was in clear association with a burial (Post 1989).

VARIABILITY IN CYLINDER JARS

Washburn (1980:73, 78, 82) argues that the consistency in size, shape, and decoration of the cylinder jars collected by Pepper from Pueblo Bonito indicate mass production of these vessels (see also Neitzel 1985), perhaps by relocated Mesoamerican artisans. Variability in ceramic vessels is often hard to measure, and, aside from some scatter plots, Washburn does not really provide means of assessing variability. Judd (1954), on the other hand, gives greater stress to the variability within his smaller group of vessels, and my position is that the variability is more striking than the uniformity, especially for a series of pots all probably having the same function and produced during a very short period of time. My discussion provides various estimations of the variability in this vessel class; illustrations of 85 cylinder jars (Figures 1-10) are the most important tool for this task. The vessels in these plates were photographed by several different people (see appendix for figure information) for different purposes. Ideally all would have been photographed identically so that all the figures could have been reproduced at the same scale. An
Figure 10. Double cylinder vessel from LA 59497, around 100 km west of Chaco Canyon. No Anasazi cylinder jar of known provenience comes from as far away from Chaco Canyon as this one. The scale of this photo is different from that of the other figures; these cylinders are also the two shortest known (14-14.5 cm). See also the double vessel in Figure 2(c). (Photo by Nancy Warren, courtesy of the Research Section, Museum of New Mexico).

effort has been made to make the scale as uniformly as possible, but the result is only approximate. One compensation for the inability to have these vessels reproduced to precisely the same scale is to examine the photos of Room 28 showing the cache in situ (Judd 1954:Plate 6; Pepper 1920:114-115). Where available, heights are given for vessels in the appendix.

Typological Variability

Cylinder jars from Chaco may be divided into three main classes: decorated white ware (black-on-white), undecorated white ware, and red ware. The 133 vessels for which there are height measurements are distributed as follows: 60% Black-on-white, 37% plain white ware, and 3% red ware.

Types

Stylistic and technological information indicates that cylinder jars fit into the following traditional types, in approximate order of frequency: Chaco, Gallup, Chaco McElmo, Puerco, Toadlena, and Nava Black-on-whites. This list does
not include the Chuska Valley mineral-on-white types (see Windes 1977), since they are considered to be variants of the Chaco Cibola series and since their identification requires that temper be known. In addition, there is the disproportionate number (when compared to other collections) of plain white wares and red wares.

The type assemblage indicates a fairly restricted temporal span for cylinder jars. With the unlikely exception of the jars having only parallel lines (Figure 5a-c, e), none of the decorated jars illustrated here could be considered Red Mesa Black-on-white, making it probable that all postdate A.D. 1040, which concurs with Judd's finding that no cylinder jars or fragments were found in sealed, earlier deposits.

The presence of considerable Chaco Black-on-white and a few Chaco McElmo Black-on-white cylinder vessels places many of the jars in the latter A.D. 1000s and early 1100s, but the scarcity of carbon-painted vessels makes it seem probable that they did not extend far into the twelfth century (see Windes 1984a). Judd (1954:211, 213) also considered the vessels to be relatively late ("New Bonitians"), though he was concerned that the rooms containing the majority of all cylinder jars were in a part of Pueblo Bonito that he considered to belong to the "Old Bonitians." Cylinder jars in Chaco correspond quite closely, then, to the period of maximum extent of Chaco's involvement in the system and to the period of the most intensive building of great houses in central Chaco Canyon--ca. A.D. 1055-1110 (Lekson 1984; Toll 1985).

Hatchure

The majority of the decorated group is painted with designs attributable to Gallup and Chaco Black-on-white (Figures 2-5). Counts from photo collections and plates indicate that the wider framing lines and the finer hatchure of Chaco Black-on-white are more common on cylinder jars than is the Gallup Black-on-white style hatchure, where hatchure lines are less fine. This proportion is counter to that in large collections from contemporary sites, where Chaco Black-on-white is never a large percent and Gallup Black-on-white is the most abundant decorated type (e.g., Pueblo Alto [Toll and McKenna 1987; Windes 1984a]. There are also several designs that are uncommon on other contemporary decorated forms, including stacked triangles, chevrons, t-shaped figures, and horizontal bands of parallel lines (Figure 5). Washburn (1980:76) notes that there are several designs that are repeated on five to ten jars, and some of these repetitions may be seen in the figures. A few of these repeating vessels are so similar that photos require some study to determine that they are in fact different jars, but most have enough different features (such as design deployment, handle placement and orientation, and variations in vessel shape) that they do not look like exact duplicates.

Solid Designs

In addition to the more common hatchured vessels, there is a group with solid-painted elements (Figures 1b, 6, 9), with a variety of motifs. There
is very little in the way of hatchure-solid counterchange (the closest example being Figure 1b). The vessel described by Post (1989) is a wonderful example of the use of solid and hatched elements by the same potters: one of the two linked vessels has a Gallup Black-on-white design, while the other is painted with solid, Puerco/Escavada Black-on-white elements (Figure 10).

### Technological Attributes

Paint type, slip, and temper are all difficult attributes to identify without direct access to the vessels in question. Nonetheless, some identifications can be made from photographs, and a few cylinder jars have been examined "in the paste." The decorated vessels are unquestionably mostly mineral painted, but there are also some that are carbon painted. Likely carbon-paint examples seen in the figures include 1b, 6b, d, e, g, h (also Judd 1954: Plate 67b). Slipping also shows a range; the mode is the thin, chalky slip seen most often in the Chaco Cibola series, but variation in thickness and streakiness is quite apparent in the plain ware examples (Figures 7, 8). Judd (1954:211) notes differences in polish, slip, and rim decoration among the 17 vessels he recovered. A substantial number of both plain and decorated white ware cylinders exhibit "slip-slop," where the slip extends inside the vessel orifice (for example, see Figure 7e); 12 (71%) of Judd's vessels exhibit this practice. Slip-slop is also common in other closed Chaco forms (see Windes 1984a). A few of the cylinder jars have markings on their bases consisting of wide lines of slip on unslippered backgrounds. Similar marks using either paint or slip are found on other forms and may be maker's or owner's marks (Windes 1984a). As noted by Judd, only the Red Mesa Black-on-white vessel discussed above shows interior decoration; this vessel has a series of linked chevrons just below the interior rim (see Whiteford et al. 1989:110).

In combination with its carbon paint, the surface texture and design of the vessel in Figure 1b suggest strongly that this vessel is from the Chuska Valley. Some of the few vessels examined by members of the Chaco Center staff appear to contain trachyte temper, which is characteristic of the Chuska Valley, about 70 km west of central Chaco Canyon. The Chuska Valley was the site of production of great quantities of gray ware found in eleventh-century Chaco contexts (see e.g., Toll 1984, 1985), as well as a distinctive carbon-painted white ware (Windes 1977). Of two cylinder jar fragments recovered from Pueblo del Arroyo since Judd's work there, one is decorated with solid-element designs in carbon paint and heavily trachyte tempered, and the other is mineral-painted with sand-and-sherd temper (Figure 9). Trachyte is also found in significant numbers of mineral-painted sherds of latter eleventh-century Chaco, and the single cylinder jar sherd from 29SJ1360 is trachyte tempered and mineral painted (McKenna and Toll 1984), as is the possible cylinder jar sherd from 29SJ633. Further, there are several squiggle-hatchured Gallup and Chaco Black-on-white cylinder jars (Judd [1954:211] says "fully half" of his specimens have this type of hatchure); this form of hatchure has been found to associate with trachyte temper...
in the Pueblo Alto collection (Toll and McKenna 1987). It is thus likely that an appreciable percentage of the extant cylinder jar assemblage contains trachyte temper and was made in the Chuska region.

It is probable, however, that the majority of cylinder jars correspond to the majority of other white wares from Chaco in containing sand and sherd temper; this is the case for the single cylinder jar sherd from Pueblo Alto, which is Gallup Black-on-white. Vessels with sand-and-sherd temper are potentially from a large area, including Chaco Canyon and much of the San Juan Basin, as well as areas in which other tempers were also used. While some cylinder jars may well have been made in Chaco, a large portion of the Chaco region was using this nonspecific temper type and clays from the same widely exposed geologic formations. Current interpretations of ceramic exchange suggest that those areas probably produced more pottery than Chaco Canyon, due at least in part to fuel shortages (e.g., Toll 1985).

Neitzel and Bishop (1987) performed a neutron activation analysis on a series of vessels from Pueblo Bonito, Pueblo del Arroyo, the purported outlier of Allentown in eastern Arizona, and Black Mesa. This analysis showed compositional differences among the three geographically distinct areas, but that vessels from Pueblos Bonito and del Arroyo were indistinguishable. The Chaco vessels included in the analysis were 12 cylinder jars and 37 bowls recovered by Judd. The variability found for the cylinder jars is slightly greater than that for the bowls: 75% of the cylinders were placed in the largest group while 79% of the bowls were. Moreover, while another set of bowls was placed in a second group, the three other cylinder jars were not grouped by the statistical analysis. This small sample suggests two important things: cylinder jars fall into the same compositional pool as the majority of other Chaco white wares, and, within that group, there are some that are substantially different in chemical composition. A thin-sectioning analysis of the entire cylinder jar series in combination with other sourcing methods (neutron activation, x-ray fluorescence) would provide an excellent basis for making further interpretations.

Shapes and Production

Perhaps the most enlightening thing about the ability to see a large number of cylinder jars in one place is that there is such a large range of shapes within the class and that a range of skill in production is apparent. Thus, while Washburn's (1980:79-82, 85) tally of the numbers and types of handles is useful, it does not communicate how variably they are placed or how variable some of the handle types are. Some of the cylinder jars are indeed nicely executed, from forming to finish (Figures 2a, d, i, 3a, f, g, 6j); these are the vessels most often seen in plates (Neitzel and Bishop 1987; Pepper 1920; Washburn 1980). Others sag to one side, lean, bulge, or have large fire clouds (Figures 3f, 4f, 5e, 6i, 7i, 8b, g). Moreover, there is variation in shape: a few, including the red jars, have wider mouths than bases (Figures 3i, 7e, 8n; Judd 1959:Plate 55); others are the opposite (Figures 1c, 2i, 5a, c, 7g); some have slightly flared rims and bases (Figures 2d, f, 3b, 6j); some
have incurving rims (Figures 2a, b); most are squared at the base, but some curve to a somewhat smaller base (Figures 2a, b, e, 4a, 8a).

Washburn (1980) argues that the majority of cylinder jars were produced by one or two potters:

Evidence that these Room 28 cylinder jars were the work of one or, at the most, a very few potters, comes from close examination of the construction techniques and workmanship and the manner of design execution....Other evidence which suggests the 'mass-produced' workshop nature of these cylindrical forms is the identical nature of the designs. Repetitive use of a pattern is almost non-existent on Anasazi wares where the same design elements are repeated but there is endless variation in the specific ways they are combined. [pp. 73-77]

If all or some of the cylinder jars were mass produced, examining Figures 1-8 here should give some perspective as to the nature of that process--considerable latitude in shape was certainly allowed from one vessel to the next. Rather than remarkable uniformity, however, I see a group of vessels with a few similar sets and with variability similar to that in other vessel forms. While some of the design elements are uncommon to other Gallup and Chaco Black-on-white forms, many are not and, as Jernigan (1986) says with regard to the nonexistence of pattern reuse, "recurrent use of design patterns is characteristic of Anasazi ceramic decoration" (p. 31).

Variability in cylinder jars must be compared to variation in other Anasazi vessels. In a subsequent analysis of the occurrence of designs through time and across space, Washburn (1984:130) shows that the five designs that occur on cylinder jars in this analysis all occur at other sites, three of them at five or more other sites. This demonstration shows two things: (1) that at least some cylinder jar decoration is within a range seen in other Anasazi vessels, and (2) that smaller sites and other vessels are likely to be part of the same type of production.

Considering a stack of vessels in a room to be mass produced is quite possibly subject to confusion in archaeological provenience and production provenience and may well be a carry-over from earlier assumptions of self-sufficient pottery production (Plog 1980a). The assumption that most sites provided most of the pottery consumed at the site is quite clearly flawed throughout the Southwest. Multiple production localities are represented in most Chaco ceramics and seem quite probable for cylinder jars as well.

The Red Cylinder Jars

The four "red ware" jars, on the other hand, are a very uniform group (see Table 2; three of these jars are pictured in color in Judd [1959:Plate 55]). Pepper (1920:122-125) posited Mesoamerican origins for these vessels, suggesting that they were the models for the white ware vessels; Washburn (1980) agrees and argues for Mesoamerican derivation for all of the cylinder jars. Shepard (in Judd 1955) described the paste as containing "sherd temper with 'a noticeable preponderance of white paste particles' plus 'a scattering of well
rounded quartz grains'" (p. 156). This paste description could easily be applied to the White Mountain Red wares, the main red ware source in Chaco during the late eleventh century. Judd (1959: 154-157) notes the similarity of finish between two traditionally shaped, red ware seed jars from Pueblo del Arroyo and that of the cylinder jars. Given this paste description, it is also possible that these cylinders are some form of polished Mogollon Brown wares (perhaps Showlow Smudged), as Judd's color photos and their high polish suggest. Red wares were apparently not produced in the San Juan Basin, so there is little question that the red cylinder jars were imported; the distance of that import, however, remains to be ascertained.

That the form of the red cylinder jars is quite different from most of the white ware cylinders makes it unlikely that these vessels were models, given the regularity with which Anasazi potters produced other forms. Surely if the potters themselves had been Mesoamerican (Washburn 1980:82), they could have more faithfully reproduced the southern form. Finally, three of the four red ware cylinder jars were found at Pueblo del Arroyo, where they constitute half of the whole or partial cylinder jars from that site. As will be discussed below, this further sets these vessels apart as a group; their status as models also seems less likely, given their separation from the main cache of cylinder jars.

**Metric Variability**

A descriptive summary of cylinder jar measurements is presented in Table 2. As is true of the photographs, there is a range of available measurements, and they have been taken by a number of different people. Dr. Washburn (1980) kindly provided her measurements of individual plain jars and grouped measures for the decorated specimens from her study of the Pepper collection at the American Museum of Natural History. Pepper (1920) gives dimensions for the vessels in his handsome plates, and these figures have been used to replace appropriate cases in Washburn's grouped data. Judd (1954, 1959) provides height and base diameter for the specimens from his excavations, and Natalie Pattison took heights and orifice diameters on a number of other jars for the National Park Service.

Table 2 gives descriptive statistics for the three most common measurements in each of three cylinder jar ware categories. For comparison, measurements for four other vessel groups from a large collection of whole vessels of comparable age from the Rio Puerco of the West (Manuelito area), housed in the San Diego Museum of Man, were measured by N. Pattison. These vessels are from a lot purchased by Edgar Hewett around 1915 and probably derive mostly from burials. They clearly do not come from as highly localized a provenience as do the cylinder jars, and bowls, pitchers and jars are likely to subsume a number of functional categories, whereas cylinder jars probably had one function.

The measurements show several things adumbrated by the figures. The four red ware cylinder jars are a remarkably consistent group in all dimensions, and they are quite different from the white ware cylinders. While the height of this group is similar to that of the white
wares, the orifice is markedly larger, and the bases are markedly smaller. In combination with their lack of means for suspension, then, there are only a few plain white vessels (as Figure 1a and 7e) that are likely to have been modeled on the red ware vessels. The plain white vessels as a group are much more similar to the black-on-white jars, though the means for the plain vessels are consistently somewhat larger than those for the decorated ones. Comparison of the three dimensions between the plain and decorated groups showed that only the bases were significantly different (Student's t=-2.76, p=.007). Because of its size and provenience, figures are shown for white wares with and without the double cylinder from Black Hat (Post 1989, Figure 10). This affects the ranges in the heights, base diameters, and especially the orifice-to-height ratios.

The coefficient of variation (CV), the standard deviation divided by the mean (expressed as a percentage), provides a simple statistic for comparing the metric variability of different samples. The CV is well illustrated by comparing the values for the red ware cylinders with the others. Cylinder jar height is by far the most consistent dimension in all variants; except for the in-base diameter, the plain white group is the most variable.

With the exception of vessel height, the coefficient of variation values for the cylinder jars are very similar to those for the other forms. The variability of the Puerco Black-on-red bowl and Gallup Black-on-white pitcher diameters is less than that of the white ware cylinder jar orifices. Miniature vessels were removed from the pitcher group on the basis of small measurements in each of the pitcher classes (orifice diameters of less than 55 mm and heights of less than 100 mm). Removal of all pitchers with orifice diameters of 55 mm or less of course reduces the coefficients of variation of all dimensions, from 24-27 to 15-19, but is easily justified functionally and metrically.

While this comparison of metric variability lacks significance levels, my main point in this presentation is that the variability in cylinder jars is similar to that in much more common forms. The degree to which coefficients for cylinder jars are lower probably relates to the fact that they were all intended for the same function, rather than to the fact that they were all made by the same artisan. This functional argument is quite easily made, given the extremely limited spatial distribution of the form, but it is more difficult to demonstrate. Again, precise sourcing would answer at least some questions.

AN ALTERNATIVE INTERPRETATION

Rather than representing the products of just a few potters and just a few sites, it is possible to argue that the variability in cylinder jar paste, form, paint, and manufacture is sufficiently great that they represent quite the opposite. That is, it seems equally possible that cylinder jars represent a large number of sources each emulating a form for a very specific purpose. While it was clearly important that the form be approximated, it may in fact have also been important that a vessel from a specific source be different enough to distinguish it in a
mass of similar vessels, such as that found in Room 28 at Pueblo Bonito. There are a few vessels that are remarkably similar, and these vessels may well be duplicates from the same source or perhaps may express some relationship among sources (see especially the groups in Figure 4). The ultimate test of this proposal is physical-chemical and petrographic analyses, and the best result of this discussion would be the execution of a controlled, detailed study.

The possibility that the cylinder jars derive from a number of sources has interesting cultural implications. The regional nature of the Chaco system has become increasingly apparent over the last 15 years. Cylinder jar distribution and locale of manufacture may contain insights into the mechanics and thus the nature of the regional socioeconomic system. The primary identifiers of the Chaco system are public constructions such as roads, great houses, and great kivas. Great houses are considered by many to be elite residences. A number of recent examinations of these structures, however, suggest that the number of living features is small and that the quantity of material present is disproportionate to the living facilities. It may be, then, that rather than stressing the elite aspects of these structures, their community use and ownership is of greater relevance to understanding the system (see for example Windes [1984b], Marshall et al. [1979], Lekson [1984], and Toll [1984], [1985]; for an opposing view see Sebastian [1988]).

Plog (1980b) has proposed that ceramics were a means of identifying social groups and interactions to participants. I suggest that cylinder jars represent a very specific instance of just this process. That is, cylinder jars seem to be limited, to a remarkable degree, to Pueblo Bonito, the focal site of the main cluster of Chaco sites. These vessels appear to have been made in a variety of locations, yet to date they are unknown in those removed locations. The form is a simple one compared to several other Anasazi closed forms, suggesting that its production and use may have been somehow controlled. This would suggest some form of control, but would also depend on the existence of a strong consensus that such vessels had a specific use and an important meaning. Such a mechanism of control is consistent with a relatively mobile population in which access to and use of large specialized structures is open to a broad segment of the people. There is very little indication of the function of cylinder jars, but they do show some wear, including scratches on the interior and loss of handles (Washburn 1980). Could it be that these vessels had a role in a ritual and were kept in community house rooms between celebrations?

The mechanism of control will remain elusive, but I suggest that cylinder jars were produced by communities of the Chaco system and were placed in its most significant structure as expressions of participation. The complex of sites--including Pueblo Bonito, Chetro Ketl, Pueblo del Arroyo, Pueblo Alto, and Casa Rinconada--constitutes one of the densest concentrations of Anasazi architecture anywhere. A number of structures, features, and deposits there seem best understood when viewed as community projects, possibly with commemorative functions, including massive
constructions and mounds with great quantities of possibly intentionally destroyed ceramics. Of all the parts of this complex, Pueblo Bonito contains by far the greatest known deposits of unusual and highly crafted artifacts. It also stands apart from what is known of other great houses by the presence of several burials accompanied by vast quantities of grave gifts. Caching symbols of system participation--cylinder jars--in Pueblo Bonito, the system repository, fits well with the conception of the Chaco system as a related group of communities and their public features. In such a location, the cylinder jars would be available for use in ceremonial events when these took place in the center.

There are several groupings of cylinder jars that may fit into this interpretation. While the argument here is basically that cylinder jars are diverse in production and decoration, there are definitely subsets of them, and some of these seem to be localized in provenience. Pepper (1920:198-199) judged that the "mass" of cylinder jars from Room 39B "seem to be larger than those found in Room 28, but are otherwise similar." As noted above and by Washburn (1980), there are several designs that are repeated or closely related--examples of the two most common designs found by Washburn (shown in figure 4b, h, i, j, 2g, and 4c, e, g) were found by Pepper in the central roomblock and by Judd in the west roomblock. Most notable, of course, is the fact that only one of nearly 200 vessels from Pueblo Bonito is red ware, while three of six Pueblo del Arroyo vessels are red ware. Judd (1954:211, Plate 67e-g) found three jars with incurring rims and diagonal design layouts (Figure 3a, b), this rim form does not seem to occur in any other location, and the design layout (which recurs on a solid-element jar from the same part of the site [Figure 6a]) seems less common elsewhere (but see Figure 3a-c, probably from Room 28). Only one of Judd's 17 jars is undecorated white ware, but nearly a third of Pepper's 173 are; the single Bis sa'ani cylinder jar sherd is also undecorated. The two cylinder jars from "near Pueblo Alto" (Figures 6d and 4a) have similar handles consisting of perforated extensions from the lip that do not seem to recur on the Pueblo Bonito examples (but see Figure 6h).

These subvariations could mean any number of things, but how do they fit into this hypothetical context for cylinder jars? Taken literally, the number of cylinder jars should equate with the number of actively participating communities in the Chaco system at around A.D. 1100. Even with the continued discovery of communities and areas that may relate to the Chaco system, 200 sounds high. It seems quite likely that placement of goods at Pueblo Bonito took place on some cycle. If so, at least some of the design repetition might have resulted from multiple placements by one community. Alternatively, closely related subsets may be from sectors of the system--road-linked groups, perhaps. A similar suggestion might be made for explaining why all the cylinder jars were not found in one room--perhaps different areas had ties to different parts of Pueblo Bonito and Pueblo del Arroyo. If designs expressed relationships, why are so many cylinders undecorated? Washburn (1980:77) asks
whether decoration at a later time was intended; while refiring is a possibility, it seems at least as likely that these vessels were finished (note the fired, but incomplete design in Figure 3b). It is probable that production of pottery was much more common at some communities than others (Plog 1980a; Toll 1985), and, if the cylinder jars came from many different communities, some of the communities represented may not have had a tradition of vessel decoration. Finally, what about the few strays not from the central Chaco complex (Table 1)? It has been noted that several are single sherds, perhaps explicable as significant souvenirs. The examples from the Navajo Reservoir and Piedra Districts are too early to be considered part of this use for cylinder jars, though their existence does illustrate that the form was not difficult to produce or necessarily foreign to Anasazi ceramic possibility. The two others (both of questionable provenience) may just not have made it to their destination. The double cylinder from Black Hat looks like it is an imitation, though its finish and size set it apart. It is tempting to speculate about the persona of the individual with which it was buried: a rebel? a person of importance? a functionary of the Chaco system? a pretender? Again it shows that a cylinder jar could have been made anywhere, but they just were not.

Clearly, speculation has taken over here. The speculation is, however, partially testable, and it provides a different perspective on an intriguing and manageable data set. There is little doubt that cylinder jars had a very particular significance to the Anasazi, and identifying that significance stands to tell us a lot.

ACKNOWLEDGEMENTS

Most of all I want to thank Bill Sundt for providing an impetus for putting this paper in a more final form, but there are many other people who also contributed. Dorothy Washburn provided the bulk of the measurements used in this paper. Mary Lou Fricke and Natalie Pattison took most of the original photographs. Fran Vogel did a great deal of patient, careful darkroom work (sometimes more than once due to poor instructions from me), and he did it cheerfully. Nancy Warren provided the photo of the double cylinder jar. Louise Stiver patiently went through the Museum of New Mexico pottery collection with me looking for Judd’s elusive cylinder jar and then retrieved its dimensions when it became clear that it was a “treasure of the Lab of Anthro.” The paper benefited greatly from readings by Peter McKenna, Tom Windes, and especially Steve Lekson, and from discussions with Eric Blinman and Dean Wilson. Lekson has known all along that cylinder jars were ceramic drums like those found at Casas Grandes, but my myopia precludes my discerning that and many other truths.

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Santa Fe
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## APPENDIX: FIGURE INFORMATION

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| FIGURE 2. Gallup and Chaco Black-on-white | | | | |
| a. SI | PB-326 | Judd 67g | 285 | NP |
| b. SI | PB-320 | Judd 67E | 288 | NP |
| c*. Peabody | PB? | - | - | NP |
| d. AMNH | PB-28 | Pepper Pl.4, Fig. 43 | 240 | MLF |
| e. AMNH | PB | - | - | MLF |
| f. AMNH | PB | - | - | MLF |
| g. AMNH | PB | - | - | MLF |
| h. MAI | PB | - | 240 | NP |
| i. AMNH | PB-28 | Pepper Pl.2 | 255 | MLF |

* was found by Moorehead; Pepper 1920:210 references "one or more" found by Moorehead in rooms adjacent to Room 32.

| *FIGURE 3. Gallup and Chaco Black-on-white.* | | | | |
| a-f. AMNH | PB | - | - | MLF |
| g. AMNH | PB | Pepper Fig. 43 | - | MLF |
| h-j. AMNH | PB | - | - | MLF |

| *FIGURE 4. Gallup and Chaco Black-on-white.* | | | | |
| a. Field | Alto? | Martin & Willis 1940 | 202 | M&W |
| b. AMNH | PB | Washburn? | - | MLF |
| c. AMNH | PB | - | - | MLF |
| d. AMNH | PB | - | - | MLF |
| e. AMNH | PB | - | - | MLF |
| f. AMNH | PB-28 | - | - | MLF |
| g. AMNH | PB | - | - | MLF |
| h. AMNH | PB | - | - | MLF |
| i. SI | PB-330 | Judd 68j | 228 | NP |
| j. SI | PB-329 | Judd 68h | 228 | NP |

| *FIGURE 5. Gallup Black-on-white groups.* | | | | |
| a-h. AMNH | PB | - | - | MLF |
| i. MAI | PB | - | 243 | NP |
| j. AMNH | PB-28 | - | 257 | MLF |
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| l. MAI | PB | - | 190 | NP |
### FIGURE 6. Solid element designs

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<td>-</td>
<td>-</td>
<td>M&amp;L</td>
</tr>
<tr>
<td>j. AMNH</td>
<td>PB</td>
<td>-</td>
<td>-</td>
<td>M&amp;L</td>
</tr>
</tbody>
</table>

*f. appears to be full height but may be partial

### FIGURE 7. Undecorated whitewares.

<table>
<thead>
<tr>
<th>No./Located</th>
<th>Provenience</th>
<th>Other Figures</th>
<th>Height mm</th>
<th>Photographer</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. MAI</td>
<td>PB</td>
<td>-</td>
<td>350</td>
<td>NP</td>
</tr>
<tr>
<td>b. MAI</td>
<td>PB</td>
<td>-</td>
<td>236</td>
<td>NP</td>
</tr>
<tr>
<td>c. MAI</td>
<td>PB</td>
<td>-</td>
<td>255</td>
<td>NP</td>
</tr>
<tr>
<td>d. MAI</td>
<td>PB</td>
<td>-</td>
<td>235</td>
<td>NP</td>
</tr>
<tr>
<td>e. MAI</td>
<td>PB</td>
<td>-</td>
<td>230</td>
<td>NP</td>
</tr>
<tr>
<td>f. SI</td>
<td>PB330</td>
<td>Judd 68k</td>
<td>209</td>
<td>NP</td>
</tr>
<tr>
<td>g. MAI</td>
<td>PB</td>
<td>-</td>
<td>200</td>
<td>NP</td>
</tr>
<tr>
<td>h. MAI</td>
<td>PB</td>
<td>-</td>
<td>230</td>
<td>NP</td>
</tr>
<tr>
<td>i. MAI</td>
<td>PB</td>
<td>-</td>
<td>245</td>
<td>NP</td>
</tr>
</tbody>
</table>

### FIGURE 8. Undecorated whitewares

All (a-n) are as follows:

<table>
<thead>
<tr>
<th>No./Located</th>
<th>Provenience</th>
<th>Other Figures</th>
<th>Height mm</th>
<th>Photographer</th>
</tr>
</thead>
<tbody>
<tr>
<td>a-n. AMNH</td>
<td>PB</td>
<td>-</td>
<td>-</td>
<td>M&amp;L</td>
</tr>
</tbody>
</table>

### FIGURE 9. Cylinder jar sherds from Pueblo del Arroyo

<table>
<thead>
<tr>
<th>No./Located</th>
<th>Provenience</th>
<th>Other Figures</th>
<th>Height mm</th>
<th>Photographer</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. NPS</td>
<td>Trash</td>
<td>-</td>
<td>-</td>
<td>NPS</td>
</tr>
<tr>
<td>b. NPS</td>
<td>Tri-wall</td>
<td>-</td>
<td>-</td>
<td>NPS</td>
</tr>
</tbody>
</table>

### FIGURE 10. Double cylinder jar from LA 59497, Black Hat

<table>
<thead>
<tr>
<th>No./Located</th>
<th>Provenience</th>
<th>Other Figures</th>
<th>Height mm</th>
<th>Photographer</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNM</td>
<td>Post 1989</td>
<td>145</td>
<td></td>
<td>NHW</td>
</tr>
</tbody>
</table>
Abbreviations:
Located: AMNH=American Museum of Natural History; SI=Smithsonian Institution; MAI=Museum of the American Indian; Field=Field Museum of Natural History, Chicago; Peabody=Phillips Andover Peabody Foundation; NPS=National Park Service Chaco Center; MNM Museum of New Mexico (temporary).
Provenience: PB=Pueblo Bonito (-room number); Alto?=the two jars from "Pueblo Alto" are of uncertain provenience "near Pueblo Alto" (see Toll and McKenna [1987]).
Other Figures: Pepper are all Pepper (1920); Judd are all 1954 plates; Washburn refers to Washburn (1980).
Photographers: MLF=Mary Lou Fricke; NP=Natalie Pattison; AMNH unknown photographer from the 1920s; M&W=Martin and Willis; NPS=Fran Vogel or Jerry Livingston; NHW=Nancy Warren, Research Section.
The prehistoric and historic Galisteo Basin Pueblo of San Lazaro, LA 91 and LA 92, is being studied for domestic and irrigation water supply. In this paper I describe a small, rock-hewn reservoir at San Lazaro. The Pueblo was reported by Nelson (1914:95) and is described in Prehistoric New Mexico; Background for Survey (Stuart and Gauthier 1981:102). Other reservoirs at this site will be covered in a separate paper.

LOCATION AND LAND OWNERSHIP

San Lazaro is located 7 mi southeast of the present-day community of Cerrillos, 6.8 mi south of Pueblo San Marcos (LA 98), and 4 mi west from Pueblo Blanco (LA 40).

San Lazaro Pueblo is located on private land and is not open to the public.

PHYSICAL CONDITION OF THE RESERVOIR TODAY

This small reservoir is approximately the size and shape of a modern-day bathtub. The reservoir was mapped with a cloth engineering surveying tape using U.S. engineering units of measure, feet and tenths of feet, and inches where applicable (Turney 1985:43).

An outcropping of Galisteo sandstone (Darton 1928:52) facing east-northeast provides an excellent drainage area and a site for construction of the reservoir. Galisteo sandstone is yellow colored and coarse and contains many petrified logs. The reservoir has been excavated into the lower end of the sandstone slope and is some 10 ft above a small gulley, which also has exposed sandstone in the bottom (Figure 1). The reservoir and appurtenances are in excellent condition with no vandalism or graffiti.

METHOD OF CONSTRUCTION

No modern-day steel tool marks have been found, indicating the reservoir and channels were constructed using stone picks and probably stone mauls. The north-center bottom of the reservoir has a round, possible mortar hole 1.4 ft in diameter, that is quite visible. The reservoir shape is roughly a parallelogram with nearly vertical walls. It appears the excavation may have been done in several stages. The builders may have constructed the large mortar hole first, found it collected water nicely, and then enlarged the volume and added the collection channels.

The reservoir capacity is approximately 58 cubic ft holding 440 gal. The drainage area is 350 sq ft, and a 2-in. rain would fill the reservoir.

In the sandstone rock above the reservoir, and extending nicely grooved channels placed so as to collect all the precipitation that would fall on the rock (Figures 2-4). The slope or dip of the sandstone is 15 degrees. Tool pick marks are visible in the 0.25-ft-deep by upslope for some 35 ft, are very
Figure 1. Pueblo San Lazaro, rock-hewn reservoir, drainage area, and drainage channels.

Figure 2. Reservoir and one of channels.
0.25-ft-wide channels (dimensions vary). The pick marks are curved, indicating a swinging motion with a hafted pick. Several large irregularities in the sandstone were carefully circumvented by the channels. Sides and bottoms of the channels are quite smooth. Chuck Lange accompanied me on a field trip and suggested that the channels appeared to be smoothed using the edge of a mano or similar stone. A small amount of water poured into the channel raced down slope into the reservoir. The reservoir even had an overflow channel on the north end.

In the gulley below the rock formation and in another rock outcrop are several shallow mortar holes which also collect a limited amount of water.

I estimate the reservoir may have taken three person-days to excavate. It is estimated the channels required some 10 person-days to carefully locate the channels, to remove the sandstone with a pick, and then to smooth the bottom and sidewalls.

**HISTORIC OR PREHISTORIC?**

No sherds were found in association with the reservoir or drainage area that might indicate a date of usage. The absence of metal tool marks on the sandstone and the presence of stone pick marks in the channels indicate the reservoir is dated to the San Lazaro occupation.
Figure 4. Drainage channel.
Table 1. Weather Stations Adjacent to San Lazaro Pueblo.

<table>
<thead>
<tr>
<th>Location</th>
<th>Years of Record</th>
<th>Elevation (ft.)</th>
<th>Precipitation (in.)</th>
<th>Evaporation (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerillos</td>
<td>5</td>
<td>5700</td>
<td>13</td>
<td>No record</td>
</tr>
<tr>
<td>Galisteo</td>
<td>9</td>
<td>6075</td>
<td>13</td>
<td>No record</td>
</tr>
<tr>
<td>Santa Fe</td>
<td>114</td>
<td>7200</td>
<td>14</td>
<td>66*</td>
</tr>
<tr>
<td>San Lazaro**</td>
<td>--</td>
<td>5950</td>
<td>13</td>
<td>No record</td>
</tr>
</tbody>
</table>

* 20 years of record.
** Included for comparison.

PRECIPITATION AND HYDROLOGY

San Lazaro is currently assumed to have been occupied between A.D. 1300 and 1700, and the Pueblo had in excess of 3,000 rooms (Smiley 1988:2).

To determine precipitation at San Lazaro, a study was made of tree-ring growth indices from A.D. 1300 to 1700 and from 1910 to 1939. Indices for the period the pueblo was occupied were 0.32 and for the present day are 0.30 (Dean and Robinson 1977:81-102, 142-104). This information indicates the precipitation was much the same as today.

Precipitation and evaporation information is available from nearby weather stations, giving some information on present-day weather in the Galisteo Basin.

This information will be used. Table 1, above, presents location of weather stations (Gabin and Lesperance 1977:335, 337, 341).

For hydrological operation of the reservoir, a model based on the following assumptions is made. Since precipitation amounts at Cerrillos and Galisteo are quite similar, the monthly information for Cerrillos will be used. The closest data on evaporation is Santa Fe, which will be used. In accordance with standard civil engineering practice, evaporation will be adapted to the reservoir site. Three aspects of the reservoir site greatly reduce the evaporation rate: (1) The site is on an eastern slope, which will receive only morning sun; (2) the side walls of the reservoir will cast shadows, which will greatly reduce evaporation; (3) and a hill to the immediate west of the reservoir vastly reduces western winds. Evaporation accordingly is reduced to 30%. It is also assumed that all water in the reservoir was used each month. Table 2 represents available water in a normal year. It must be borne in mind, the weather does not always adhere to the normal year.

Thus, on an average, 2,515 gal (9,520 1) of water could be taken from the reservoir (Table 2).

By using a clean rock drain-
Table 2. Reservoir Operation.

<table>
<thead>
<tr>
<th>Month</th>
<th>Precipitation (in.)</th>
<th>Corrected Evaporation (in.)</th>
<th>Percent Reservoir Full</th>
<th>Gallons Per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>0.86</td>
<td>0.0</td>
<td>43</td>
<td>190</td>
</tr>
<tr>
<td>Feb</td>
<td>0.73</td>
<td>0.0</td>
<td>37</td>
<td>163</td>
</tr>
<tr>
<td>Mar</td>
<td>0.57</td>
<td>0.0</td>
<td>31</td>
<td>136</td>
</tr>
<tr>
<td>Apr</td>
<td>1.07</td>
<td>0.6</td>
<td>48</td>
<td>211</td>
</tr>
<tr>
<td>May</td>
<td>0.68</td>
<td>0.8</td>
<td>26</td>
<td>114</td>
</tr>
<tr>
<td>Jun</td>
<td>1.66</td>
<td>0.9</td>
<td>74</td>
<td>325</td>
</tr>
<tr>
<td>Jul</td>
<td>2.89</td>
<td>0.8</td>
<td>150</td>
<td>440</td>
</tr>
<tr>
<td>Aug</td>
<td>1.62</td>
<td>0.7</td>
<td>74</td>
<td>325</td>
</tr>
<tr>
<td>Sep</td>
<td>0.81</td>
<td>0.6</td>
<td>35</td>
<td>154</td>
</tr>
<tr>
<td>Oct</td>
<td>0.71</td>
<td>0.4</td>
<td>82</td>
<td>132</td>
</tr>
<tr>
<td>Nov</td>
<td>0.54</td>
<td>0.0</td>
<td>26</td>
<td>114</td>
</tr>
<tr>
<td>Dec</td>
<td>0.93</td>
<td>0.0</td>
<td>48</td>
<td>211</td>
</tr>
<tr>
<td>Total</td>
<td>13.07</td>
<td>4.8</td>
<td></td>
<td>2,515</td>
</tr>
</tbody>
</table>

age area, 100% runoff would be obtained, no water will be lost to percolation or evaporation, and the water would be sparkling clear.

By studying the precipitation table, it becomes evident that the builders of the small reservoir and drainage area matched the normal available water with the size and capacity of the reservoir, as the reservoir would only overflow in July.

It is probable that the builders observed precipitation and runoff, and if the reservoir overflowed too frequently, they merely enlarged the reservoir.

**PURPOSE OF CONSTRUCTION**

The purpose of obtaining this small amount of water for a pueblo the size of San Lazaro presents a most puzzling question. The reservoir is located approximately 200 ft from a dependable spring. Although this spring is undoubtedly the reason the location was selected for San Lazaro, the spring is generally described as brackish (Nelson 1914:96). Measurement of the spring water with a Betz conducto-bridge indicated 1,200 micromhos, whereas the City of Santa Fe municipal water system
measures 600 micromhos. This indicates a high mineral content, and the water would be termed nonpotable. The spring water is drinkable, having a quite flat taste, but it would be undesirable because it would not suds during washing. The spring water also probably has a cathartic action. Further testing is required on the mineral content of the spring water.

Use of the water can only be guessed. The reservoir supply is too limited to be of value in the event of low flows in the spring or muddy water in the creek. It is doubtful if the effort would be made to construct the reservoir just for the purpose of having a better-tasting water.

The yucca or soapweed plant (Yucca glauca) (Nelson 1969:83) roots or amole (Cobos 1983:9), are well recognized in the Southwest for their sudsing or soap action. Native women have long used the roots for washing their hair. In conversation with several well-known archaeologists, they feel yucca roots were used by prehistoric people. As the yucca roots would not suds in the spring water, it is a possibility that the people of San Lazaro constructed the small reservoir just for the purpose of hair washing. There would have been sufficient water for this purpose.

The persons who constructed the reservoir displayed a keen sense of practical engineering.

ACKNOWLEDGEMENTS

I wish to thank Forrest Fenn for his assistance and cooperation in providing access to the site. Bill Sundt is to be thanked for his overall assistance in mapping. Dr. Charles H. Lange's visit to the site and comments are highly appreciated. Regge Wiseman reviewed the manuscript, and his constructive comments were most useful. Tim Maxwell is thanked for his assistance. My wife Mary is also to be thanked for her usual and dependable assistance.

Santa Fe

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AERIAL PERSPECTIVES ON PREHISTORIC AGRICULTURAL FIELDS OF THE MIDDLE RIO GRANDE VALLEY, NEW MEXICO

W. H. Wills, Thomas A. Baker, and Lee A. Baker

Aerial survey in the Middle Rio Grande Valley of New Mexico has revealed extensive systems of prehistoric agricultural fields that probably date between A.D. 1200 and 1600. While some of these systems have been noted by investigators in the past, the spatial extent and geometric complexity of these fields is only visible from the air. The presence of a large dry-farming technology in the Middle Rio Grande is important to our understanding of demographic processes in this region during the late prehistoric period.

INTRODUCTION

Recent aerial survey in the Middle Rio Grande area of New Mexico has identified extensive systems of abandoned agricultural fields associated with late prehistoric pueblo communities (Figure 1). These systems consist of contiguous, rectangular, cobble-bordered enclosures that have surface manifestations of rock walls or grid patterns formed by differential vegetation growth and/or variation in soil color. In some locations these grid patterns extend over several hectares, and in one case grid systems have been photographed extensively within a 15-sq-km area. The placement of these grid systems on mesa tops and hill slopes indicates a dry-farming strategy rather than irrigation, although there is evidence for associated features designed to control run-off flow.

The presence of cobble-lined agricultural plots in the late prehistoric period of the Rio Grande Valley (ca. A.D. 1200-1600) has been known for nearly a 100 years, but only recently have archaeologists attempted to systematically describe and interpret these features (Buge 1984; Cordell, Earls, and Binford 1984; Fiero 1978; Lang 1980; Maxwell and Anschuetz 1987; Tjaden 1979). Most of these field systems have been recorded in the Northern Rio Grande Valley, particularly in the drainages of the Rio Chama, Rio Ojo Caliente, and El Rito Creek (Figure 1). Archaeologists estimate that the prehistoric fields of the Northern Rio Grande have a total area of at least 786,579 sq m (Cordell 1984; Cordell, Earls, and Binford 1984).

Our aerial reconnaissance in the Middle Rio Grande Valley has identified nine distinct areas of abandoned agricultural systems (Figure 1); seven are discussed in this paper. One of these is very close to the modern pueblo community of Zia, one is close to San Felipe Pueblo, two are in the vicinity of Cochiti Pueblo, and three are in the Galisteo Basin. These modern communities are Keresan speakers, and probable archaeological evidence exists for occupation of the Middle Rio Grande by Keresan groups since about A.D. 1200 (Ford, Schroeder, and Peckham 1972; Strong 1979). The limited evidence for prehistoric puebloan settlement in the modern Keresan district prior to A.D. 1200 means that many of
Figure 1. Locations of abandoned field systems in the Middle and Northern Rio Grande Valley observed from the air: (1) El Rito Creek, (2) Ojo Caliente, (3) Jemez River, (4) San Felipe Area, (5) Cerros Del Rio, (6) La Bajada Mesa, (7) San Lazaro Ruin, (8) Cerro Pelon, (9) Pueblo She.
these ancient field systems were likely produced by ancestral Keresan communities. Most of the large prehistoric settlements in the Middle Rio Grande date to the Classic period, between A.D. 1325 and 1600, and this appears to be the time when the grid field systems were constructed (see Haeker 1987:105).

Middle Rio Grande Valley field systems exhibit a range of shapes and locations (Figure 2). The most common feature is an array of contiguous rectangular square plots, about 4 by 4 m, located on the flat, sandy tops of mesas (Figure 3). These arrays typically include hundreds of plots and in some cases may represent thousands. Associated with some of these arrays are larger rectangles, usually found in groups of fewer than 50 (Figure 4). Another common feature consists of linear cobbles borders that apparently follow slope contours and are not subdivided into grids (Figure 5). Both grid plots and linear borders occur on slopes, frequently south or west-facing. A striking pattern is the placement of bordered features along the sides of arroyo drainages, which effectively constitutes a system of terraces (Figure 6). Check dams are found in the bottoms of some arroyos (Figure 7), apparently designed to trap sediments, impound runoff, reduce runoff velocity, direct water over adjacent grid fields, or some combination of each of these functions. Most of these features, particularly in the Cochiti area, occur in areas with moderate to dense tree cover and are nearly impossible to see as patterns at ground level.

METHODS

Agricultural field systems were located entirely by aerial reconnaissance. Numerous flights were made over areas considered likely locations for agricultural fields, usually at daybreak when oblique sunlight casts long shadows and helps highlight features with low topographic relief. All flights were made in a Piper Supercub (PA-18) aircraft at airspeeds of approximately 105 mph and at altitudes ranging between 305 to 450 m (1,000 and 1,500 ft) above ground level. Photographs were taken with a variety of cameras and films, although the pictures in this article were all obtained with a hand-held SLR camera, 200 mm lens, and Kodak TMAX film.

The results reported herein are preliminary and are based almost entirely on aerial photography. The effort so far has been primarily a reconnaissance survey to identify patterns and to provide information for future systematic aerial recording. The unexpected complexity and extent of these features prompted us to submit this report at a relatively early stage in our analysis. Our next step is to begin recording field systems from the air using a computerized, airborne navigation device that will allow us to encode precise geographical coordinates as the aircraft passes over specific locations. These encoding flights will be flown as flight lines with constant altitudes. Ground verification has so far been limited to features identified on state property owned by the University of New Mexico just south of Bandelier National Monument. Ground checks indicate that tremendous small-scale variation exists within larger field systems, such as gravel-mulching, that cannot be detected from the air. The University of New Mexico will undertake a systematic surface investigation of Middle Rio Grande agricultural fields in the near future.
DESCRIPTION OF FIELD SYSTEMS

Four general types of field systems were observed during our aerial survey.

Zia Pueblo

Agricultural field features in the Zia area exhibit a wide range of shapes, sizes, and configurations (Figures 2, 4 and 6). These features are concentrated in a roughly 8-sq-km area between the communities of San Ysidro and Zia Pueblo along left terraces of the Jemez River, at elevations varying from 1,672 to 1,733 m. Local soils are primarily classified as the Christianburg-Navajo association, and the frost-free season ranges between 157 and 239 days (Dodge 1982:9).

Dodge (1982:8) speculated that this area would have been dry farmed prehistorically, but he
Figure 3. A grid field system on the Cerros del Rio.
Figure 4. Large field plots bordered by cobble walls near the Jemez River, northwest of Zia Pueblo.
Figure 5. Parallel ridges following slope contours, on the Cerros del Rio.
Figure 6.  Slope terracing near the Jemez River, northwest of Zia Pueblo.

Figure 7.  Arroyo-bed terracing and check dams on the Cerros del Rio.
apparently was unaware of any supporting archaeological evidence. Ellis and Dodge (1989:49) mentioned irrigation ditches and reservoirs at sites near modern Zia but did not provide specifics or note any dry-farming fields. Vivian (1974:100) made an anecdotal reference to fields on the mesas near Zia Pueblo. A photograph of some of the field features was published in National Geographic Magazine (Canby 1982:576), although mistakenly identified as part of the Chama area field systems.

Cerros del Rio

The largest field systems that we recorded are in the vicinity of Cochiti Reservoir, primarily on the west and southwest slopes of the Cerros del Rio, east of the Rio Grande. The Cerros del Rio fields occur extensively within an area of 15 sq km, at elevations between 1,642 and 2,067 m. These fields are on ridge tops and hill slopes, within arroyos, and on outwash alluvial fans (Figures 3, 5, and 7). In addition, a series of smaller field systems encompassing an area of 0.25 sq km is located on the western terraces of the Rio Grande across from the Cerros del Rio on the Canada de Cochiti Grant.

Annual rainfall in the Cochiti Reservoir area averages between 250-300 mm, while the area generally has 140 to 180 frost-free days. Soils on the southern flanks of the Cerros del Rio are mostly volcanic derivatives of the Majada-Calabasas-Apache association. Interestingly, Ramage (1977) felt that these soils are not particularly good for agriculture.

Agricultural field features have been recorded in the Cochiti Dam area before, primarily during survey projects in the 1970s. Chapman and Biella (1977) listed 34 sites that consisted entirely or in part of agricultural terraces made of basalt cobble ridges. These sites had a total estimated surface area of 36,391 sq m. Our aerial surveys indicate that agricultural features are much more extensive than this figure, but also that the features are extremely difficult to recognize except from the air. Photographs of basalt walls in the Cochiti Reservoir area that appear to be agricultural features are published in Biella and Chapman (1977:208) and in Ferguson and Rohn (1987:45).

Galisteo Basin

Several discrete field systems have been photographed near large pueblo ruins in the Galisteo Basin. These are not as extensive as those near Zia or Cochiti and are not as variable in shape and construction. Soils in the basin are primarily clay loams; annual precipitation over the last 100 years has averaged 234 mm; and the frost-free period ranged from 120 to 180 days, depending on local microclimactic conditions (see Kelly 1980; Tuan et al. 1973).

One small field system is located about 4 km southeast of San Lazaro ruin, on an isolated ridge, at 1,915 m elevation. The system consists of parallel ridges of rubble with irregular wall dividers, spread over an area of approximately 100 sq m (Figure 8). Two field systems are evident on the eastern side of Cerro Pelon, 1 and 3 km north of Pueblo Blanco ruin, respectively. One field is about 400 sq m, and the other is at least 1,000 sq m; both are a series of parallel ridges placed on outwash fans at 1,930 m elevation (Figure 9). We have not identified fields close
Figure 8. Ridge-top field system southeast of San Lazaro Ruin.

to Pueblo Blanco, although Turney (1988) described four prehistoric reservoirs near the site.

A third system is located about 1 km north of the Pueblo She ruin at 1,885 m elevation on an outwash fan that drains west (Figure 10). This small field (ca. 250 sq m) is also a series of parallel ridges apparently designed to capture precipitation runoff and sediment. Here, as at the fields north of Pueblo Blanco, faint traces of walls suggest that portions of the fields may have been buried by alluvium.

Additionally, Haecker (1987) reported small alluvial-fan fields consisting of plots and rock alignments on the western side of the Ortiz Mountains, about 10 km east of San Felipe pueblo. Although the fields were not described in detail, they are particularly interesting because they are often associated with small dwelling structures or field houses. According to
Figure 9. Ridged fields on outwash fan north of Blanco Ruin, Galisteo Basin.

Figure 10. Ridged fields on outwash fan north of She Ruin, Galisteo Basin.
Hecker (1987:103), the individual field complexes do not exceed 200 sq m.

**Other Field Systems**

Patterns not described herein that seem to indicate prehistoric agricultural fields have been noted in several locations on the high terraces above the Rio Grande west of Santo Domingo and San Felipe pueblos and in dense concentrations along the top of La Bajada Mesa east of Cochiti Reservoir (Figure 11). The La Bajada Mesa fields are extremely similar to those on Abiquiu Mesa (Cordell 1984:206), to Antelope Mesa in northeastern Arizona (Smith 1971:7), and to field systems near Safford, Arizona, that exceeded 60 ha (Woosley 1980:323). In addition, grid patterns have been photographed near the Pueblo of Abo, in the Salinas district.

**DISCUSSION**

Grid plots, contour borders, and circular pits are typical features of prehistoric field systems to the north in the Northern Rio Grande (Cordell, Earls, and Binford 1984). Excavation of some grid plots in the Chama area revealed gravel-mulch construction, where fist-sized cobbles were collected and used to line the bottoms of individual plots. Numerous researchers suggest that the purpose of gravel-mulch plots was to preserve ground moisture by inhibiting evaporation or to raise surface temperature and thus artificially extend the growing season (Cordell 1984). In the arid yet cold climate of northern New Mexico, water-deficiency and short growing seasons are the two major constraints on agricultural production. However, the two proposed functions of gravel-mulching seem to be logically incompatible in the same feature, since raising the surface temperature should increase evapotranspiration. It may be instead that mulching served one or the other purpose, depending on grid placement, and that the tremendous variety of topographic settings where agricultural features have been identified in the Middle Rio Grande Valley suggests a corresponding range of production functions. The circular depressions sometimes found with grid systems are interpreted as barrow pits from which gravel and soil were obtained to build the agricultural features (Maxwell and Anschuetz 1987).

Detailed investigations of the Chama area grid systems reveal that they were constructed over long periods of time, with earlier features often modified by later building (Buge 1984). The construction of cobble-bordered plots required high initial labor costs, as well as subsequent high maintenance costs. A major expense was simply keeping plots from silting in as runoff carried sediment into the grid fields.

Despite the formal similarity of newly identified grid fields in the Middle Rio Grande Valley with those studied in the Chama area, we do not yet have the excavation data that would confirm more precise parallels, such as the use of gravel mulch. However, the heavy labor costs estimated for Northern Rio Grande field systems indicates a similar level of investment for agricultural fields in the Middle Rio Grande Valley.

The location of these field systems on mesa tops and slopes confirms arguments by other researchers (Cordell, Earls, and Binford 1984:239) that the importance of nonirrigation farming in the prehistoric Rio Grande Valley has been underestimated.
ologists once thought that rapid population immigration to the Rio Grande Valley after A.D. 1200 was due to the irrigation potential offered by the river, even though direct evidence for prehistoric river irrigation is exceedingly sparse. However, large prehistoric settlements are generally found on tributary drainages, and a majority are concentrated on high mesas that seem to control access to the upland forests of the Jemez Mountains. It is not until the historic period, following the introduction of European crops, livestock, and technology, that evidence appears for a major use of alluvial bottomlands along the Rio Grande.

However, there is probably a historic analogue for field systems located at some distance from population centers. Until the twentieth century, many Pueblo communities, including
Cochiti (Lange 1959), were essentially abandoned during the agricultural season as families moved to temporary housing in their widely dispersed fields (Ferguson and Hart 1985; Preucel 1988). Seasonal dissemination made cultivation easier by reducing daily travel costs, and during the winter families returned to the larger community. A similar pattern seems almost the only interpretation for the extensive field systems in the Middle Rio Grande Valley.

The establishment of large and complex field systems away from immediate community environs indicates a complicated pattern of land use predicated to some extent on the cooperation of a large work force. It also indicates that large or aggregated settlement location was conditioned by factors other than proximity to agricultural land, most likely including access to natural resource areas such as mountains (see Cordell, Earls, and Binford 1984:240). Future reconstructions of late prehistoric economic systems in the Rio Grande Valley that do not incorporate the existence of large field systems at some distance away from settlements will clearly be inadequate to explain community subsistence.

The presence of prehistoric dry-farming systems in the Middle Rio Grande area helps explain the rapid population build-up of the thirteenth and fourteenth centuries. Archaeological excavations indicate a far greater increase in population during this time period than can be accounted for by indigenous population growth. Much of this demographic expansion is represented by aggregation of population into very large settlements (sites with 500 or more rooms) that must have placed considerable strain on local resource productivity. Prehistoric crops consisted only of maize, beans, and squash. Without the technology to clear alluvial bottomlands, and lacking the traction and manure of domesticated animals, prehistoric agriculturals must have employed the only viable option for intensifying agricultural production to accommodate rapid population growth—extensive field systems designed to capture runoff precipitation. Since there was no adequate fertilizer to replenish the marginal desert soils in which these field systems were established, an expectable result would have been increasingly extensive systems over time as more plots were added to compensate for declining productivity in older gardens (see Sandor, Gersper, and Hawley 1986).

Spatially extensive prehistoric field systems in the Middle Rio Grande Valley may provide evidence for such a process. Moreover, if fields became more extensive over time as soil productivity declined and the distance to primary settlements increased, the abandonment of some large sites could have been related to greater costs associated with field expansion. In other words, some of the well-known patterns of settlement abandonment in the Rio Grande Valley may be attributable simply to the long-term impact of an agricultural economy on particular localities, in addition to traditionally cited factors such as drought or warfare.

Finally, we note that there appears to be variation in the spatial configuration of field features among different areas. In the Jemez River area, extensive grids often radiate away from a central area of larger rectangles (Figure 2), a pattern we have not seen in other regions. In the Galisteo Basin,
fields are much less evident than in the Rio Grande area and seem to consist only of ridges designed to trap runoff from mesa slopes. Although our observations on spatial variation are still largely impressionistic, we think there may have been important differences between these areas in the specific agricultural practices. The variation evident in the internal organization of field systems, the amount of relative labor for wall construction, and the distances from fields to the nearest large prehistoric settlements indicate that in different areas and/or time periods between A.D. 1200 and the historic period, the Middle Rio Grande was not characterized by a single agricultural economy. Instead, it may have been that individual settlements varied substantially in their degree of commitment to agricultural production and in their investment in production strategies.

ACKNOWLEDGEMENTS

Unfortunately, time constraints prevented us from having colleagues read this paper. We sincerely hope that any errors of omission or attribution are balanced by our enthusiasm for presenting this data to the profession. We did manage to have Bob Powers, Tim Maxwell, and Kate Speilmann look at our photographs and even persuaded Jane Kepp and Patty Crown to fly over the field systems. Both Jane and Patty discovered fields we had not seen. Dario Rodriguez of the Technical Application Center, University of New Mexico, has provided technical assistance.

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THE LOBO'S PAW
As Recounted by Jay T. Brown

Joe Winter

This true story about Ernest Thompson Seton and the wolf called Lobo was collected by Joe Winter, during an archeological survey in the Cimarron Seco Valley in 1985. It was told to him by Jay Brown, a rancher who lives 13 miles down the valley from Folsom. Brown provided the essence of the story, while Winter researched and wrote it. Many of the characters mentioned in it, including Mike Devoy and Jay's grandfather, were local pioneers and early cowboys. This version is excerpted from Cimarron Seco: The Life, Times, and History of a Dry Cimarron Valley Cowboy, a manuscript by Brown and Winter.

Oh, I could tell you a lot of stories about Mike Devoy and my grandparents and this ranch, about the old timers who settled along the Cimarron Seco and the wild animals and the wild times they had to contend with. Everyone in this valley has their own stories and history, their own view of how the frontier was civilized, but I think they'd all agree that one of the strangest and most bizarre episodes has to do with the Lobo's paw. That old paw was nailed above the door of one of Mike Devoy's ranch houses, and it was given to Mike by the great artist-naturalist Ernest Thompson Seton.

You see, Mike had two ranch houses—one for himself and the other for the guests who were always dropping in to visit. He built them right next to each other, near the spring in the big cedar grove where there was protection against the blizzards that killed so many people and cattle in the late 1800s. Both were made of big, 24-foot-long ponderosa pine logs from up on top of North Mesa. Both also had corner fireplaces and massive rafters running the lengths of the ceilings, which were made of layers of brush and hay, with flat, dirt roofs on top of them. Back in Mike's days there would have been all sorts of food and gear hanging from the rafters—smoked hams, deer haunches, shoulders of beef, hides, bridles, saddles, scythes, hammers, guns, all kinds of other tools and implements. But when Granddad bought the ranch in 1915, he dismantled one of the houses log by log, carefully numbering each of the logs and hauling them up the side canyon where he put the cabin back together again as a bunkhouse. That's where Mom and Dad lived after World War I, and where I lived till I was six. And in its place Granddad built a big stone house, the house where Mom now lives, and he left the other log house up against the corral.

In 1962 I decided to tear down the second house, since it was in a state of near-collapse. One day I was salvaging the logs out of it when Elmo Traylor dropped by during one of his regular visits to the valley. Elmo was the district game warden, and he was always stopping by to talk and visit whenever he came through the valley. Anyway, he pitched right in and
started helping me, and that was how he noticed the gray wolf paw nailed to the wall above the door. It was about 6 inches long and 3 inches wide, and despite all the years of dust and dirt and neglect, its fur was still a lustrous dark gray, and its claws were long and shining. All around it on the wall were a lot of those little metal stars from old tobacco cans that Mike had nailed there, almost a hundred years ago.

"What's that paw doing up there?" asked Elmo.

"Why, that's the Lobo's paw," I answered.

"What do you mean, the Lobo's paw?" There was a hint of suspicion in his voice, and he was looking at me like he didn't know whether to believe me or not.

"You know, Elmo. The Lobo. The one that Ernest Thompson Seton trapped, back in 1894."

"Well, I'll be damned. How in hell did you get it?"

I proceeded to tell him how Seton came by on his way out of the valley, with the carcasses of Lobo and Blanca tied to his mules, and how he spent the night with Mike Devoy and gave him the paw for good luck. And Elmo told me everything he knew about Lobo and the other gray wolves that roamed throughout the country in the late 1800s, and how wolf hunters like Seton hunted down every last one and exterminated the entire population.

As a kid growing up in the Dry Cimarron Valley in the 1920s, I knew all about Ernest Thompson Seton and his wonderful animal stories and drawings—about "Lobo, the King of the Currumpaw" and "The Pacing Mustang" and the other real animals that lived in this part of New Mexico in the 1890s. And I read everything else he wrote that I could get my hands on— even "Two Little Savages" and the other children's books—and I learned how he gave up wolf hunting to form the Woodcraft League and the Boy Scouts of America and how he built Seton Village near Santa Fe.

But most of all I used his books to learn about wild animals, for I dreamed about becoming a great hunter and trapper when I grew up. Living on a ranch like I do and having fought in World War II, I did become a hunter of sorts, though I killed so many animals that now I can't stomach the thought of killing even a rabbit, I've grown that soft-hearted.

But back then, in 1894, there were wild animals all around that had to be killed, 'specialy the buffalo wolves that drove many a rancher to despair. Seton and other professional hunters were hired to exterminate them—to trap, shoot, and poison them with strychnine, to run them down with wolfhounds, to track the packs to their dens where they killed the pups. Seton was different, though, than the other hunters—those hard, frontier types who loved to kill just for the thrill of killing—for he was an artist and a naturalist, and he wrote beautiful stories about the Currumpa Valley.

Ernest Thompson Seton (Figure 1) was born in England in 1860, and when he was five years old, his family emigrated to Ontario, Canada, where they lived as pioneer farmers. There he found a rich, green land filled with dark forests and deep lakes; he was fascinated by the wild birds and animals, and he began to study and draw and paint them and write stories about them. By the time he was 18, he was an accomplished artist. At 19 he returned to England to study at
Then he returned to Canada, but he found that Ontario was becoming tame, so he moved west, to the frontier province of Manitoba where his brother had a homestead. Now he was in his element—painting, hunting, collecting, observing everything around him, and eventually becoming Chief Naturalist for the whole Province!

He was also becoming a recognized artist, and in 1883 he moved to New York City where he accepted a commission to draw 1,500 illustrations for an animal book. Then it was back to Europe again—this time to Paris, where he studied and painted under the masters.

While he was in Paris in 1890, Seton made the acquaintance of the daughter of a rich New York businessman named Louis Fitz-Randolph, who also happened to be the owner of the L Cross F, a big cattle outfit just to the south of here in the Corrumpa and Canadian valleys. In 1892 he returned to New York where he met Fitz-Randolph and learned that the ranchers in northeastern New Mexico were having just an awful time with gray wolves. Huge packs of these savage beasts were decimating the cattle herds, but there was very little that could be done about it, since they were so intelligent, much more intelligent than your average dog. Seton figured he could kill them, though, so he offered to work for Fitz-Randolph as a professional trapper, in return for expenses, bounties, and hides. Fitz-Randolph accepted, and Seton boarded a train and headed west, to the Corrumpa Valley in the New Mexico Territory.

Now all this happened in the 1890s, after cattle replaced the buffalo on the plains. Three hundred years previously, before horses and guns were adopted by the Indians, there were millions upon millions of buffalo roaming across the plains in immense herds. About their only enemy was the buffalo or gray wolf, which thrived off the herds, helping them in a fashion by weeding out the old, the sick, and the infirm, thinning the herds and following them on their annual migrations south during the winter and back north in the spring.

All this was a fine, natural arrangement as long as there
were buffalo, but as soon as they were wiped out by hide hunters in the 1870s, cattle were brought into their former range, and the buffalo wolves turned to the new source of meat. By 1880 the wolves were wreaking havoc throughout the West, and in some areas, such as northeastern New Mexico, they were killing over 100 head of stock apiece each year. At $10 per calf, each wolf was costing about $1,000 a year, which was an enormous amount of money by 1890 standards, not to mention by today's.

At first it was fairly easy to trap and poison the wolves, since they weren't used to being hunted like that, but by 1890 they learned how to avoid traps and poisoned meat, and their numbers were increasing. That was why men like Ernest Thompson Seton and other wolvers became very important in the High Plains along the base of the Rocky Mountains—they used traps, guns, strychnine, and other poisons; they hunted down the wolves with ferocious packs of wolfhounds; they destroyed the wolves' dens; and finally they drove them out of New Mexico.

Seton took the Santa Fe Railroad to Pueblo, Colorado, where he switched to the Colorado and Southern, or what was previously know as the Denver, Texas, and Fort Worth. The C & S took him past Trinidad, Trinchera, and Branson, and on down through the cedar brakes in Emery Gap and across the cottonwood-filled Dry Cimarron Valley all the way to Clayton, which at the time was a wild little cowtown of 400 people on the edge of the prairie between the Corrumpa and Canadian valleys (Figure 2). It was only five years old back then, having been founded in 1888 as a camp for cattlemen and a shipping point on the new railroad. All it was was a windswept collection of wood and adobe buildings, set under the hot, New Mexican sun, without any trees for shade or much of anything else, 'cept a lot of saloons.

Seton arrived on a crisp autumn day in late October of 1893, and he spent two nights in the Clayton House, across from Albert W. Thompson's General Store. The locals were amused when they saw him.

"Just one of them tenderfeets from the east," said one, "goin' out to the L Cross F to show Jess Tanner and Joe Callis how to catch wolves. A hell of a mess he'll make of it."

Tanner and Callis were local wolvers of some repute. Tanner used wolfhounds, while Callis used strychnine. In one 6-week period in the early '90s, Callis poisoned 107 wolves.

After exploring around town and checking out the animals in the grass along the railroad tracks and in the mud puddles
and all, Seton rode with the mail carrier to Fitz-Randolph's L Cross F Ranch on Pinabetitos Creek, 25 miles southwest of town. From there he set up shop in a small ranch house near Mount Tabor, about 30 miles south of here. And he went right to work trapping for wolves, coyotes, and bobcats; collecting birds; keeping a journal about the animals he saw and killed and the cowboys, trappers, and residents of Clayton that he met.

He wrote about Harry Wells' Whiskey Joint and Old Red Murphey the bartender and the Dude who became Deputy Sheriff and the wolf hunters and cowhands he ran into on an almost daily basis. He observed everything--hawks and insects and prairie dogs and how they lived and died --and he didn't hesitate to describe it the way it was, both the good and the bad. He captured the prejudice of the times as well as the good side, and by today's standards he painted a rough picture, such as when he described how a foreman of the L Cross F killed a Mexican in a shootout over a woman at the annual Christmas Ball, and how the man had to flee to Wyoming.

"Say, Jack," said one of the cowboy's friends, "this here is greaser country. They've got a greaser sheriff, a greaser judge, and a greaser jury. You are supplying them with a greaser stiff. Ain't this here climate liable to turn onsala-brious?"

Those were the exact words, at least as recorded by Seton in his autobiography, and he wrote a lot of others like them, using the language and terms of the time. And while they may offend us today, it's important to read them, no matter how bigoted they sound, in order to appreciate what people went through and how they treated each other.

Anyways, when it came to wolves, he started out trying to kill them with strychnine. He hid it in fresh cow and horse meat, which he left on the prairies for the wolves to eat. And it worked, till a terrible accident occurred--a cowboy on a nearby ranch mistakenly drank some wolf poison out of an unmarked quinine bottle, and his friends had to stand by in horror as he writhed on the floor, twisting and turning like an ant under a magnifying glass in a beam of sunlight, dying just an awful death. Seton therefore turned to traps. He purchased 100 double-spring wolf traps, and he caught over 100 coyotes, but nary a wolf.

Then he heard about the Corrumpa Valley to the north, the best cattle country around, he was told, and thus the best wolf country as well. And he heard about one wolf in particular that he swore he'd kill--Lobo, it was called--an immense gray wolf of almost supernatural cunning, a were-wolf, the Mexicans said, the leader of a small but savage pack that took a terrible toll of cattle, horses, and sheep throughout the Corrumpa Valley. Lobo weighed 150 pounds and left paw prints 5 inches across. He killed everything he came across. Once he ran over the backs of a large herd of huddled sheep in order to kill the goats at its center, thereby forcing the flock to scatter in all directions so he could kill the sheep at his leisure. On another occasion, his pack killed 250 sheep in a single night, and in the 5-year period before Seton arrived they killed over 2,000 head of stock. They even ran down a herd of antelope, which was unheard of, and their attacks on cattle and sheep became
so severe that the ranchers put a bounty of $1,000 on Lobo's head.

Wolves from all over New Mexico and west Texas tried to kill him, including Jess Tanner, whose wolfhounds were lured into a trap and torn to pieces by Lobo and the pack. The wolves roamed throughout the prairies and canyons of the Corrumpa country, always on the move. They'd spend a few days in the pine forests at the headwaters of the Corrumpa on Sierra Grande, killing cattle and sheep, then they'd move north into the brakes of the Cimarron or south to Seneca Creek, and finally they'd ravage the main part of the Corrumpa Valley.

Seton moved to a small, abandoned rock house on the desolate mud flats of the Corrumpa floodplain. Even the distant hills a half-mile away on the edge of the valley were carved out of different-colored layers of mud and sculpted by the wind and rain into eroded lumps of clay preserved by a resistant layer of volcanic cap-rock.

At first it seemed like an empty valley, devoid of trees, plants, and animals, but soon Seton came to realize that it teemed with life—that its prairies and meadows contained thousands of birds, reptiles, rodents, and other small animals—and that the lord of them all was Lobo. And it was here that he was inspired to write the first of his wonderful stories—the story about Lobo and his mate and how his loyalty to her led to his death. It was also here that he conceived the idea of the Pacing Mustang—a wild bronco that loved liberty so much that it jumped to its death off the edge of a mesa when it was caught by an old bronc buster named Tom Turkey-track.

Seton tried everything to catch Lobo—he used traps, guns, even the dreaded strychnine—but nothing worked. He followed the faint trails and mutilated carcasses left by the pack for months. He hired the best cowboys in the country to help him—Charlie Winn and the roper Billy Allen, who had worked down on the XIT in Texas and up on the Cross L here on the Cimarron. He buried scores of traps along the canyon trails, and he set out poisoned meat among the boulders and juniper trees with great skill and cunning.

Nothing worked. The wolves always knew when there were traps or poison around, and they avoided them like the plague, or worse yet they sprang the traps out of spite and scattered dung and urine on the poisoned meat (Figure 3).

Seton was ready to give up when some Mexican shepherds told him that Lobo had a new mate—a pure white bitch they named Blanca, who was frisky and playful and given a greater degree of freedom by Lobo than the rest of the pack. Seton set out to observe her in the hopes that he could use her to catch Lobo. From her tracks he realized that she ranged farther afield than the rest of the wolves, and that she was less fearful of traps and more careless than the others. So he made a special trap for her. He took the severed head of a cow, attached a long chain to it, tied a trap to the chain, and buried both the chain and the trap underneath the head and eliminated all signs of the ruse as best he could.

And sure enough he got her. When he came by with one of the L Cross F cowboys the next morning, he discovered that she'd been caught in the trap
Figure 3. Lobo and Blanca. From H. Allen Anderson's "Ernest Thompson Seton's First Visit to New Mexico, 1893-1894", New Mexico Historical Review, October 1981, p. 380. Original drawings by Ernest Thompson Seton.
and that she'd dragged the chain and head off a ways, with Lobo at her side. At first Seton couldn't find her, but eventually he caught up, for the horns on the cow head had become wedged in some rocks and she lay on the ground, panting with thirst and gnawing at her paw, desperate to escape. And he saw how beautiful she was, with her white fur shining in the sun, and he photographed her. Then he and his cowboy assistants threw their lassos over her head and slowly they rode their horses off in different directions, till the ropes strangled her, blood poured from her mouth, and she was dead.

Now that he had a proper trap Seton set out to capture Lobo. All that day he heard him howling from the nearby mesa, howling and crying for his dead mate, and that night the great wolf came right to the door of the rock house, where he tore Seton's helpless dog apart. By now Lobo was half-mad with grief and very reckless, so the next day Seton cut off one of Blanca's paws, buried traps along every trail in the canyon, and marked the trails with Blanca's paw print, hoping that Lobo would dash off after them, into one of his traps.

The following day nothing happened, but that night Billy Allen arrived to say that the cattle along the north branch of the Corrumpa—near where the Cross L cowboys had been killed by Arapahos and Cheyennes only 20 years before—were acting mighty strange. They were bawling much louder than usual and were much more active, especially the bulls. In the morning, Seton and Billy rode out to investigate, and sure enough there was Lobo, surrounded by bellowing cattle, with all four of his paws caught in traps and all the chains tangled together (Figure 4).

Up close he was ferocious-looking—with long, curved fangs exposed beneath snarling lips, and the fur all along his back bristling with hatred. Again Seton photographed his prize, and again he and Billy Allen threw their lassos around its neck and rode off in different directions. But as the wolf started to strangle, Seton had second thoughts, and he yelled:

"No, no! Billy, not that! Slack up. We'll take him back alive."

So they trussed him up like a turkey, with a rope around his massive muzzle and a stick tied between his jaws, and they hauled him back on a terrified horse to the rock house, where he was chained up in the pasture, with his jaws still roped shut. That night he died.

Five days later, Seton was caught in a trap of his own making and forced to flee the valley with a price on his head. The trouble had begun a few months earlier when he had decided to visit "Big Joe" Callis, the Texas Ranger turned wolf hunter and outlaw who lived on a small ranch 30 miles south of Mount Tabor, where his father and younger brother ran cattle.

The northeastern corner of the New Mexico Territory was a wide open, almost-lawless land in the 1890s, and the few laws that were on the books were made to be broken, or at least bent, even by the good citizens and honest ranchers. And men like Joe Callis weren't honest—they were outlaws, not much different than Black Jack Ketchum and William Coe—outside of society and totally without scruples. Several months before Seton arrived, Callis shot one of his own brothers, so there were warrants out for his arrest.
But Seton was determined to learn all he could about wolfing, and against the advice of his friends, he visited the outlaw and accompanied him on a trip to "inspect" some cattle on the North Canadian.

That night they camped next to the chuckwagon on the bank of the Canadian, down in some willows on a sandy beach. As the flames of the campfire shot up into the black night air and the stars sparkled in the dark sky above, Callis drew three brands in the sand next to the fire. He didn't tell Seton what they were, but Seton must have known, since he'd been around cattle for a while, and they were simple brands, like the Cross L, which is an L made into a cross (L), or the L Cross F-- an L followed by an F made into a cross (LF). Then Callis turned to Seton and said:

"They say yer purty good with pictures. Kin ya draw me one that includes all these here signs?"

Seton picked up a stick and fiddled in the sand awhile, rearranging the brands and moving them around, till finally he came up with a single drawing that incorporated all three.

"Sure I can," he said. "How's this?"

At first Callis didn't say anything, he just looked at the drawing intently, studying it for about 30 seconds, then he kicked sand over it with his foot and muttered, "Naw, that's not what I had in mind. Forget it."

In the morning Seton began to realize what was going on when the outlaw took a branding iron and set it into the glowing coals of the breakfast fire. He left it there for 15 or 20 minutes while he drank his coffee and told Seton about wolves,
minutes while he drank his cof-
fee and told Seton about wolves,
till the iron was red hot and
glowing with incandescence. Then he pulled it out and began
working on it, hammering it and
changing its shape, modifying
the soft, hot metal as a black-
smith would until it resembled
the brand that Seton had drawn
in the sand.
"Just touching it up," was
all he said, but Seton knew he
was in big trouble.
Now while this was going on,
the brother and father were
chasing down cattle in the
thick, thorny mesquite groves
away from the river and bringing
them into the camp. Not their
own cattle, Seton noted, but
cows and calves belonging to
other ranchers, each with one or
another of the three brands that
Callis had drawn in the sand.
And each time they brought in a
beef, they'd rope its feet and
throw it to the ground. Their
sturdy cow ponies would pull
back on the rope tied to their
saddles, and the beef would be
helpless on the sand. Then
Callis would apply the brand,
covering up the old brand with
the new one that Seton had
designed, the counterbrand that
changed another man's cow into
his own.
By now Seton knew what was
going on, and he objected,
saying that he didn't like what
he saw and that he was leaving.
"Take one step and I'll kill
ya," said Callis, as he dropped
the branding iron and drew his
pistol from his belt. Seton was
sure that he was about to die,
that Callis was going to shoot
him in the gut and leave him in
a shallow grave, but then Big
Joe's brother interceded on his
behalf, reminding the outlaw how
Seton had to keep his mouth
shut, seeing as how he was the
one who made the brand.

And he did—he kept his mouth
shut about this and a half dozen
other occasions when he saw how
"unused" cows or sheep were
taken by local ranchers, or how
another law was broken by men
who walked a fine line between
rustler and cowboy. But several
months later, just after he
cought Lobo, he was asleep in
his bed near Mount Tabor when
there was a tapping on his
window, just above his head.
And who should it be but the
Dude who became Deputy Sheriff,
warning him that Big Joe Callis
had been arrested for rustling,
and that Seton was next. It
seems that Joe had gotten roar-
ing drunk in Harry Wells' Whis-
key Joint, and he'd spilled the
beans about how Seton had made
him a slick counterbrand.
"I say, you'd better go while
the gettings good," said the
Dude in his clipped English
accent. "Or I'll have to detain
you in the morning. There's a
warrant out for your arrest."
So that was how Ernest Thomp-
son Seton got run out of the
country, and that was also how
Mike Devoy came into possession
of the Lobo's paw. Since he
couldn't leave by way of Clay-
ton, where the Sheriff was
waiting to arrest him, Seton
headed due north toward the Dry
Cimarron Valley, with the car-
casses of Lobo and Blanca and
the hides of a hundred coyotes
tied to the backs of his mules
and packhorses. About 20 miles
north of town he dropped down
into McNees Crossing on the
Corrumpa, where the tracks of
the old Santa Fe Trail are
carved into the bedrock of a dry
riverbed, and where a young man
from Missouri was murdered by
Pawnees in 1828 as he slept on
the bank of the creekbed.
That's why they call the place
McNees Crossing--after the name
of the young kid who was killed
there--and that's where Seton crossed the Santa Fe Trail, on his way out of the country.

Now I realize his journals and notes don't mention that he left by this route or even that he visited Mike Devoy. But neither do they mention that he trapped a gray wolf named Lobo, or that he was run out of the country for counter-branding. All that came later--in his many stories--and I guess he never got around to telling how he visited Mike Devoy. But Mike did, and he told my grandmother, and she told me.

So anyhow, after he left McNees Crossing, he headed even further north through the Brakes of the Cimarron, and he followed the trail down through the pine and juniper trees in Road Canyon to Carrizozo Creek and beyond it to the Dry Cimarron itself. For a full day he followed the Dry Cimarron upstream, past Wedding Cake Butte and Battleship Rock and the other big, sandstone mesas, till the canyon narrowed and the grass became greener and he arrived here at Mike Devoy's place late in the afternoon.

"Stay for supper," said Mike. Mike was famous throughout the country as a gracious host and an excellent cook. Cowboys on the way to roundups and other travelers frequently stayed at his place. It was sort of an inn--and he was always happy to have guests, for he never married and it was lonely out here at the edge of civilization.

After supper was over Seton accepted an invitation to spend the night in the extra ranch house. And in return for the meal and hospitality, he told Mike about capturing Lobo with Blanca as bait and the other details of his adventures as a wolf hunter.

In the morning Mike fed him a big breakfast of side meat and home fried potatoes and eggs. Then he loaded up his mules and said goodbye and prepared to leave. But first he wanted to give Mike a little gift, so he said, "Mike, do you need any wolf traps?"

Mike thought about it a little while, before answering, "With a fellow like you around, I don't guess so."

"I'll leave some anyways."

So he gave Mike four traps, four big, double-spring wolf traps. But that wasn't all he gave him, for he pulled a clasp knife out of his pocket and cut off Lobo's right front paw. And he held that paw up to the wall of the house, just above the door, and he used the butt of his six shooter to nail it to the wall. "For good luck," was all he said as he nailed it to the wall.

"Well sir, the Lobo's paw stayed up on that wall for 68 years, till 1962 when I tore down the old ranch house to use the logs for firewood. Leonard Sumpter always claimed that Lobo was the last gray wolf killed in New Mexico, and I guess probably he was, 'cause I never heard of another. And when Elmo Traylor came by he asked for that paw, so he could send it to the Smithsonian Institution in Washington, D.C. I gave it to him. Later on I got a letter of thanks from some big shot in Washington. I don't know what they did with that paw, but you can see Lobo's hide over at the Philmont Scout Ranch, up at Cimarron, tacked to the wall in the Seton Memorial Library and Museum.

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Lithic raw materials were basic to human cultural adaptation in the prehistoric Southwest. The quality and availability of raw materials was important to the manufacture, form, and function of chipped stone tools used in everyday living. Accordingly, archaeologists are sharpening their perceptions of the dynamics of raw material procurement and its implications to their studies (see Fitting and Stone [1969], Bamforth [1986], McAnany [1989] and Keeley [1989] for examples).

The quality of lithic raw materials can facilitate or limit the manufacture of chipped stone tools. Factors affecting quality for knapping purposes include texture, luster, surface character, cortex, color, transparency, flexibility, sharpness of removed flakes, amount of resistance to the force necessary to remove flakes, and homogeneity of mass. Pockets of crystals, foreign deposits, cleavage planes, and fissures can make an otherwise good material difficult to work (Crabtree 1967:9).

The geologic distribution of suitable knapping materials is another matter. The best materials are generally limited to specific areas and are not widely available in quantity. In north-central New Mexico, several sources were well known to prehistoric peoples and include various obsidians and Pedernal chalcedony of the Jemez Mountains. These materials, or the artifacts made from them, were widely distributed throughout the prehistoric time period (from Paleoindian to Classic Pueblo) in northern New Mexico (Warren 1974). Whether the material was acquired in the raw state or as finished artifacts, or by direct acquisition or exchange, probably varied according to social and economic circumstances.

Thus, for most purposes, most prehistoric peoples used lesser quality materials that were more abundant and closer at hand. In the Santa Fe District (Figure 1), gravels of the Santa Fe group bear a variety of cherts, jaspers, and chalcedonies that can be found over a large portion of the bajada flanking the Sangre de Cristo Mountains (see for example, Wiseman [1978]). The chalcedonies are essentially the same as Pedernal chalcedony and probably represent cobbles transported by the Rio Chama from that source. Small pebbles of obsidian have also been reported in the vicinity of the Tesuque Valley north of Santa Fe, but the geologic context is currently unknown (R. Weber, personal communication 1986). Also found is a distinctive red jasper in abundance at the mouth of Santa Fe Canyon in eastern Santa Fe (S. Peckham, personal communication 1984). Similar, or perhaps identical, red jasper is a constituent in the gravel deposits of the Santa Fe group.

A common characteristic of the materials in the Santa Fe group is that the cobbles of the purer, finer-grained cherts and
Figure 1. Map of New Mexico showing locations of the Santa Fe district, Middle Rio Grande Archaeological Region.

Chalcedonies are usually internally fractured because of the battering they experienced during stream transport. Tougher cherts, quartzites, etc., are more immune to internal fracturing and therefore are less commonly flawed. However, they are also more difficult to knap. Thus, even though similar, materials such as the red jasper are not necessarily equal in quality for knapping purposes to those from less energetic environments.

Charles McNutt (1969:177) states that obsidian was the primary material used for projectile points during the Kwahe'e period (ca. A.D. 1050-1200), a late manifestation of the Developmental period in the northern Rio Grande province. An examination of projectile points and projectile point preforms from several sites in the Santa Fe district confirm this for five of the seven sites for which data are available (Table 1). However, at the KP Site and nearby Site LA 21963, red jasper is dominant.

The remainder of this paper explores the reasons behind these observations. The inquiry focuses on two aspects, the nature of obsidian usage in the district and the exceptions to the pattern represented by the KP Site and Site LA 21963.

One way to investigate artifact material usage is to look at lithic debitage in conjunction with the artifacts from sites. At the KP Site, obsidian constituted less than 2% of the debitage (Wiseman 1989). Casual observation at several of the veys elsewhere in the district (see Wiseman 1978) show obsidian
Table 1. Artifact* materials by site for the Santa Fe district.

<table>
<thead>
<tr>
<th>Site</th>
<th>Obsid.</th>
<th>Red</th>
<th>Jasper</th>
<th>Other</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pojaoque Grant Site (LA 835)</td>
<td>56</td>
<td>9</td>
<td>29</td>
<td></td>
<td>94</td>
</tr>
<tr>
<td>Number</td>
<td>60%</td>
<td>10%</td>
<td>30%</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tesuque By-Pass, Area A (LA 3294)</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Number</td>
<td>89%</td>
<td>11%</td>
<td>0%</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tesuque Valley Site (LA 742)</td>
<td>13</td>
<td>4</td>
<td>6</td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>Number</td>
<td>57%</td>
<td>17%</td>
<td>26%</td>
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<td>100%</td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arroyo Negro (LA 114)</td>
<td>18</td>
<td>4</td>
<td>7</td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>Number</td>
<td>62%</td>
<td>14%</td>
<td>24%</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mocho (LA 191)</td>
<td>18</td>
<td>2</td>
<td>8</td>
<td></td>
<td>28</td>
</tr>
<tr>
<td>Number</td>
<td>64%</td>
<td>7%</td>
<td>29%</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LA 21963</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Number</td>
<td>27%</td>
<td>46%</td>
<td>27%</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KP Site (LA 46300)</td>
<td>5</td>
<td>17</td>
<td>1</td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>Number</td>
<td>22%</td>
<td>74%</td>
<td>4%</td>
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<td>100%</td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Projectile points and projectile point preforms. Data are from Museum of New Mexico collections, McNutt [1969], and Wiseman [1989].

debitage to be scarce on habitation sites and across the landscape in general. When found, cherts, chalcedonies, and red jasper are the most common materials. Also, the few flotation samples processed from Santa Fe district sites clearly indicate that obsidian was not being processed to any great degree. The one exception is Site LA 835, a group of at least 17 architectural localities and a great kiva (Stubbs 1954). Systematic surface observations at each of the localities show the percentages of obsidian to vary from 6 to 20%, with a site average of 12% for 2,827 inventoried items (site files, Museum of New Mexico).

An examination of the obsidian artifacts and other items of that material reveals additional facts relevant to this discussion. Several different varie-
ties, as denoted by colors and inclusions, are represented. These are clear black without inclusions, clear black with lamellar black streaks, clear black with gray ash spherules, black with profuse fine gray ash particles (Polvadera obsidian), and translucent dark brown and opaque black varieties. Most of these variations derive from the Jemez Mountains (see Warren 1979), though exact sources are not known for all.

The artifacts and debitage indicate that the obsidian takes several forms at the Santa Fe district sites. Most flakes are rather small, usually being 1 cm or less in length. Occasionally, flakes as long as 4-5 cm and lacking cortex are found. Other forms include small pebbles up to 3 cm long. Most of the preforms and projectile points were made from thin flakes, but occasionally, an extraordinarily thick one is found. Judging by the ratios of thickness to length and width, the steep edges, the multiple hinge fractures around the circumference, and the contorted shapes, these artifacts were made from small pebbles of the type just mentioned.

These data allow us to draw several conclusions. Clearly, some of the obsidian items were made in Santa Fe district sites from local pebbles and large flakes. The large flakes and many (most?) of the preforms and finished artifacts, however, were probably imported from outside the district. Whether the imported items were procured directly or indirectly cannot be ascertained at this time. However, it should be noted that evidence of Late Developmental period occupation of the Jemez and Pajarito areas, as well as of the Rio Grande canyon north of Cochiti, is scarce, indicating only sporadic use of these areas at this early time (B. Larson, personal communication 1988; Hubbell and Traylor 1982). If intermediaries were used, they probably resided in the Cochiti area, where several Developmental period components have been excavated (Lange 1968). If not, then direct procurement by Santa Fe district residents, such as those of Site LA 835, is indicated.

This leaves us with the question about the dominance of red jasper artifacts at the KP Site and LA 21963. As mentioned in an earlier section of this paper, red jasper is found in two contexts, as a constituent in Santa Fe group gravels and as nodules at the mouth of Santa Fe Canyon. Because the gravels are found over a broad area of central and northern Santa Fe County, the red jasper was available to knappers at all of the sites under study.

The reason that red jasper was not used more frequently for artifacts probably has to do with the fact that the cobbles were battered during transport from the source area to the location of deposition. The internal fractures and cones of percussion caused by this battering make systematic knapping difficult and unpredictable. This is not to say that the material was not used for other purposes, for numerous flakes were produced and presumably used as cutting and scraping implements with little or no further modification.

In contrast, the nodules at the mouth of Santa Fe River Canyon suffered little or no battering since they are found close to their point of origin. Internal fractures and cones of percussion would be minimal. Since the KP Site and LA 21963 are within a couple of kilome-
ters of this source, the materi-
als would be readily accessible
to the inhabitants. Thus, it is
likely that, having a source of
good red jasper at hand, the
inhabitants of the KP Site and
LA 21963 preferred to use it
rather than the more costly
obsidian for the majority of
their artifacts.

In summary, McNutt's (1969)
characterization that obsid­
ian was the primary material
used for projectile points
generally holds true for sites
of the Late Developmental
period in the Santa Fe District.
Most of the obsidian was ob­
tained as large flakes, pre­
forms, and finished artifacts
from outside the district. Future investigations should
determine whether the obsidian
was obtained through intermedi­
aries such as the peoples of the
Cochiti district, through direct
acquisition by peoples from one
or more of the villages (such as
LA 835 near Pojoaque), or both.
Exceptions to the pattern are
occasionally noted—for in­
stance, sites within the area of
the City of Santa Fe. The
peoples of these sites (for
instance, the KP Site and the
nearby LA 21963) relied more
heavily on locally available
materials such as red jasper,
apparently because a good source
of quality material was close at
hand.

Museum of New Mexico
Santa Fe

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ETNICITY AND THE PRODUCTION OF MICACEOUS WARE
IN THE TAOS VALLEY

Anne I. Woosley and Bart Olinger

The production of historic micaceous ceramics in the northern Rio Grande is ascribed to both Puebloan and Athapaskan, particularly Jicarilla Apache, sources. In the Taos Valley, micaceous pottery is often linked with Tiwan potters, though its presence in historic archeological sites is used to identify them as Apache. Considering several lines of complementary evidence—including data recovered from settlement survey as well as pertinent eighteenth-century historic documents, together with X-ray fluorescent analysis of micaceous sherds from site locations within and outside the valley—we address issues of Puebloan, Athapaskan, and, to a lesser extent, Spanish interaction. We attempt to differentiate possible components comprising the Taos Valley micaceous pottery assemblage. We also assess the potential value of using micaceous ware as an ethnic marker to distinguish the cultural affiliation of historic sites.

INTRODUCTION

The historic ceramic tradition of the Taos Valley is restricted to the production of plain wares, especially micaceous pottery. Manufactured in limited quantities in the valley today, micaceous ceramics are believed to extend at least back to the seventeenth century (Gunnerson 1969:26; Baugh and Eddy 1987:794), though their precise origins, as well as the cultural affiliation of early micaceous potters, remain uncertain. Both the Jicarilla Apache (Abel 1915:6, 530; Goddard 1913:143; Gunnerson 1974:153-157; Keleher 1964:48-49) and the Tiwans from Taos Pueblo (Batkin 1987:197; Ellis and Brody 1964:316; Frank and Harlow 1974:27) created micaceous pottery, and both occupied the valley from about 1700 into the first decades of the nineteenth century. Micaceous material recovered from excavation at Taos Pueblo, assumed to be locally manufactured, is called Taos Micaceous (Ellis and Brody 1964:318). In contrast, sherds looking exactly the same as those from the Pueblo but found in surface scatters elsewhere in the Taos Valley are used as diagnostic indicators of historic Apache settlement and Athapaskan pottery production (see, e.g., Laboratory of Anthropology Sites Files, LA 32475, LA 32464, LA 32468). Observers have long commented on the similarities between Apachean and Puebloan micaceous wares, which makes it extremely difficult to distinguish one from the other (Batkin 1987:197; Brugge 1983:282-283; Opler 1971:29-33; Snow 1984:98; Stevenson 1883:417). Confusion surrounds the possible sources of micaceous pottery production in the Taos Valley, and, in fact, probably both Puebloan and Jicarilla Apache potters are responsible for the historic micaceous wares made there.

Utilizing several lines of evidence, we explore the nature of the Taos Valley’s micaceous pottery tradition. Documents,
particularly those describing the eighteenth century, combined with settlement survey data, amplify our knowledge of the valley's historic Puebloan and Athapaskan residents. X-ray fluorescence or XRF analysis is used to separate or categorize the valley's micaceous ceramics by their chemical characteristics. Our sample consists of surface pottery collections derived from sites across the valley and from stratigraphic excavations at Taos Pueblo and the Glasscock Site. With these data, we examine eighteenth-century Puebloan/Athapaskan interaction and examine the issue of ethnicity in terms of possible sources for the production of Taos Valley micaceous pottery. We also assess the potential value micaceous pottery may have as a diagnostic indicator of the cultural affiliation of its makers.

HISTORICAL BACKGROUND

Athapaskans or Apacheans had already moved into New Mexico west of the Sangre de Cristo Mountains by the time sixteenth-century Spanish explorers pushed northwards along the Rio Grande. Alvarado (in Winship 1896:595) also reports them in the Albuquerque-Bernalillo area in 1540, and Castaneda describes their predation of pueblos in the Galisteo Basin (Hammond and Rey 1940:258; Schroeder 1968:295). From the beginning, though some Apachean groups attacked certain pueblos, much Athapaskan/Puebloan interaction involved trade (Hammond and Rey 1953:400-401). In 1593, Apacheans wintered near Acoma (Hammond and Rey 1929:111-112; Schroeder 1984:135), and they lived in dwellings outside Picuris and Taos for extended periods when trading with the pueblos (Hull 1916:324-326; Schroeder and Matson 1965:124). Zaldivar's 1598 journal reports that Athapaskans were friends of Taos and Picuris Pueblos (Forbes 1960:91-92). By the 1620s, they are noted throughout the Rio Grande Valley (Hammond and Rey 1945:89, 306), and, by this time, their mobility was greatly enhanced with their adoption of horses (Worcester 1944:226).

In the Taos Valley (Figure 1), European settlement began in earnest during 1598, or almost 50 years after initial Spanish contact (Hammond and Rey 1953:484-485). Relations between indigenous residents and Spanish newcomers were immediately stormy, and an alliance between Taos Pueblo (also Picuris) and the Apache was established as early as 1609 (Hammond and Rey 1953:342, 345; Jenkins 1966:88). When the Pueblo revolted against its Spanish friars and soldiers in 1640, many Taos residents fled to the Cuartelejo Plains region of eastern Colorado and Kansas, seeking sanctuary with the Apache (Espinosa 1936:179; Hackett and Shelby 1942:245; Jenkins 1966:88; Scholes 1936:324). Continued conflict culminated in the Pueblo Revolt of 1680, in which Taos Pueblo was deeply involved (Hackett 1937:328-332; Hackett and Shelby 1942). The Reconquest followed, between 1694-1698, with the Spanish ultimately returning to the valley by 1706 (Jenkins 1966:90).

During these tumultuous years, Athapaskans and Puebloans forged strong cooperative alliances and presumably also shared much cultural knowledge (for examples, see Opler 1944:91-97; Parsons 1939:1039-1064). Within the context of borrowed and adapted cultural attributes, interestingly, the most recently proposed date for the beginning of Apache pottery
Figure 1. The Taos Valley survey area showing major landforms.
production is no earlier than 1625 (Baugh and Eddy 1987:794), i.e., during the initial period of intense Athapaskan/Puebloan reciprocity as they joined forces against the Spanish. Athapaskan pottery making is suggested to grow from their prolonged contact with Puebloan potters on the one hand (Brugge 1982:283-288; Gunnerson and Gunnerson 1971:9) and Plains Village agriculturalists on the other (Baugh and Eddy 1987:794).

During the eighteenth century, Tiwans, Jicarilla Apache, and Spaniards constituted the Taos Valley's three main ethnic groups. At this time relations of the former two toward the latter altered dramatically, responding in part to predations from a common adversary, the Comanche. The indigenous Tiwa population embraced the base of the Sangre de Cristo Mountains at Taos Pueblo. After the Reconquest, Spanish settlers slowly returned to the valley and were awarded land grants with the Pueblo's approval. The Cristobal de la Serna (1710), the Francisca de Gijosa (1715), and the Antonio Martinez grants (1716) were the first grants recorded (Jenkins 1966:91-92; Martinez 1968; Woosley 1987:8). By 1750, the official census of Taos Pueblo, which actually also included much of the valley, numbered 540 Indians (Tiwans and Jicarilla Apache) and 125 non-Indians (Adams 1954:57; Kelly 1940:363).

While Spaniards recolonized the Taos Valley, Jicarilla Apache, retreating from Comanche pressure, crossed the mountains to establish semipermanent settlements at various valley locations (Abel 1915:269; Gunnerson 1974:163). Incidentally, the name Jicarilla, to distinguish them from other Apachean groups, appears in Spanish documents about 1702 (Espinosa 1942:337). Between 1722 and 1727, the Jicarilla settled along the Rio de las Trampas (Gunnerson 1974:203), now known as the Rio Grande del Rancho (see Jenkins [1966:97], who identifies it as the Rio Chiquito). In 1731 both the Jicarilla and Spanish settlers were named in a complaint by the Pueblo to the Spanish Governor concerning livestock theft and damage to crops (Gunnerson 1974:216; Jenkins 1966:94-95; Spanish Archives of New Mexico n.d.). This case illustrates the changed attitudes held by Indian and Spanish valley residents who, while still actively squabbling, now looked to the territorial government in Santa Fe rather than to violent reprisals to adjudicate their grievances. Two years later Padre Jose Ortiz del Velasco founded a Jicarilla mission in the valley. It prospered under his successor Padre Mirabel, and the 1734 mission census listed 130 persons (Adams 1953:224; Declaration of Fray Miguel Menchero, Santa Barbara, May 10, 1747, in Hackett 1937:403; Kelly 1941:55; Thomas 1932:96-97; Villasenor Sanchez 1748:240). Unfortunately, the mission's precise location remains a mystery, as some eighteenth-century chroniclers place it north of Taos Pueblo instead of south of it along the Rio de las Trampas (e.g., Villasenor, Menchero, and Morfi in Thomas [1932]). Given the contradictory nature of some historical geographic descriptions, several locations, including the Rio de las Trampas area, are equally possible (for a detailed discussion see Gunnerson [1974:216-219]). The evidence for Jicarilla settlement along the Rio de las Trampas (i.e., the Rio Grande del Rancho) is, however, persuasive.
Bishop Crespo describes "tame" Apache living there in 1738 (Adams and Chavez 1956:112; Bancroft 1889:240-242), and Bishop Tamaron mentions them again in 1760. On route from Picuris to Taos, he writes:

...we traveled though pine forests and mountains until we descended to the spacious and beautiful valley they call the valley of Taos. In this valley we kept finding encampments of peaceful infidel Apache Indians, who have sought the protection of the Spaniards so that they may defend them from the Comanches. Then we came to a river called Trampas, which carries enough water. [Adams 1954:56]

In addition, an anonymous statistical report (on file in the Archivo del Servicio Histórico del Ejercito in Madrid) contains the following note appended to the 1765 census information for Taos, "two leagues from Taos in the Arroyo de las Trampas live 20 families of unconverted Indians of the Jicarilla Apache nation who contribute everything that is ordered of them by the Alcalde mayor" (Cutter 1975:350).

The impact of the Comanche threat that drew Tiwan and Jicarilla together with their erstwhile enemies, the Spanish, throughout the eighteenth century cannot be underestimated. Raids devastated life and property to the extent that all valley residents--whether Puebloan, Jicarilla, or Spanish--frequently sought the shelter of pueblo walls. Some non-Tiwans lived in Taos Pueblo more or less permanently until the end of the century (Adams 1954:57; Adams and Chavez 1956:112-113, 251; Jenkins 1966:98; Thomas 1931:21). But, besides the need for mutual protection, increas-
las Trampas, stood as godfather to Apaches baptized at Taos Mission in 1719 and again in 1722 (Archives of the Archdiocese of Santa Fe, Baptism 45; reported in Wroth 1979:19). In the 1760s, a small Rio de las Trampas community is said to have consisted of Taos Indians, Jicarilla Apache, genizaros or detribalized Indians, coyotes or persons of mixed descent, as well as Espanoles or Spaniards (Wroth 1979:16).

Tiwa-Jicarilla-Spanish relations weakened as the Comanche threat abated with the beginning of the nineteenth century, as the political-buffer and economic-facilitator role previously played by the Jicarilla was no longer necessary. The cooperative balance between the three groups collapsed entirely with the onset of the American period, the elimination of Spanish-Indian policy, and the pejorative attitudes, especially toward Athapaskans, brought by American military personnel and settlers to the northern Rio Grande frontier (August 1981; Tyler 1980; Utley 1961).

ARCHAEOLOGICAL EVIDENCE FROM THE POST-RECONQUEST PERIOD

Full-coverage survey was conducted to identify the Taos Valley's historic settlement distribution and, by extension, its micaceous pottery tradition (Figure 2). Historic sites were most commonly recognized by the ceramics they contained, only rarely by the presence of architectural features, and through corroborating historical documentary evidence, in some cases. General survey boundaries for the survey area include the Sangre de Cristo Mountains on the east, the Rio Grande flowing through its deep gorge on the west, the Picuris Mountains to the south, and the Rio Hondo to the north. The Rio Grande del Rancho Valley, a narrow upland valley that opens onto the Taos Valley proper, was also added. Ninety-three sites containing micaceous pottery were recorded in a total area surveyed, or 57 sq km. Several other micaceous sites have been reported in the Picuris Mountains and north of present-day Taos Pueblo (Laboratory of Anthropology Site Files; Girard 1986) on lands adjacent to the survey boundaries; they are not included here. Surface ceramic collections recovered from sites across the Taos Valley were compared with previously excavated materials from Taos Pueblo (Ellis and Brody 1964) and from the Glasscock Site on the eastern flanks of the Sangre de Cristo Mountains (Gunnerson 1969:25-30). The results are discussed below.

The majority of the 101 historic Taos Valley sites containing micaceous pottery consisted of artifact scatters with other discernable surface features absent. Micaceous pottery often occurred with other historic ceramics, frequently Powhoge Polychrome, a ware believed to be fully established by 1750 (Batkin 1987:38-41; Harlow 1973:31-32) and less often, San Juan or Nambe Polished Black. Lithic tools and debris, especially obsidian and basalt projectile points, were abundant, though ground stone implements were not. A few metal points were also recovered. Hearths and stone features in the form of rock rings and clusters or piles are associated with several sites (Figure 3). Though difficult to interpret, rock piles have been identified as wayside Apache shrines (Opler 1975:151) and with rings related to Apachean house construction (Gunnerson 1969:30). Site size
Figure 2. Distribution of recorded micaceous sites in the Taos Valley.
Figure 3. Example of a rock ring often interpreted as the remains of Apache shelters and one of the few surface features associated with micaceous sites in the Taos Valley.
ranged from tiny pot drops to artifact scatters stretching hundreds of meters along ridges above perennial streams and intermittent arroyos. One large site covered over 23,000 sq m. Many sites contain both historic and prehistoric materials, a mix not surprising since the valley's optimal occupation areas (with good soils and permanent water) were inhabited from prehistoric times on up to the present day.

The emerging distribution of historic sites containing micaceous pottery includes several distinctive concentrations, as well as more dispersed, sporadic occurrences in some areas of the Taos Valley (refer to Figure 2). Twenty-six sites occupy locations in the Rio Grande del Rancho Valley on knolls and terraces above two perennial streams, the Rio Grande del Rancho and the Rito de la Olla. Sites occur in heavily wooded pinyon-juniper forests, commonly at elevations of 2,500 to 2,800 m. Micaceous pottery sites are situated on both ridges bordering the Talpa Valley, especially where the Rio Chiquito joins the Rio Grande del Rancho. Fifteen sites are identified in and around the modern Talpa village and the Talpa reservoir. Another 22 historic sites cluster at the mouth of Miranda Canyon (i.e., where the Arroyo Miranda opens onto the Taos Valley) and near today's village of Llano Quemado. Nineteen sites are also located in foothill locations of the Picuris Mountains, some along the Arroyo del Alamo, between 2,400 and 2,500 m. Five sites stretch along the ridge above the Arroyo Seco, and the remaining micaceous pottery sites occur singly, scattered across the southern portion of the valley.

Typical locational attributes characterizing all micaceous pottery sites combine upland settings of presumed good vantage with good access to permanent streams or intermittently flowing drainages. Some sites are in dense woods, as those of the Rio Grande del Rancho Valley, but many occupy exposed ridges above open grazing and/or arable land. Site locations are undoubtedly tied to economic endeavors of farming, stock keeping, and hunting.

THE MICACEOUS POTTERY ASSEMBLAGE

Both traditional analysis results and x-ray fluorescent analysis results provide information on micaceous ceramics.

Micaceous Pottery Description

Micaceous pottery recovered from Taos Valley sites conforms to the descriptions originally proposed for Ocate and Cimarron wares of northeastern New Mexico (Gunnerson 1969:26-27, 33). More recently, these types were subsumed under a broader classification, Sangre de Cristo Micaceous (Baugh and Eddy 1987:797). Taos Valley sherds indicate vessels were made of micaceous clays. In cross-section, paste appears laminar, with mica flakes lying parallel to interior and exterior surfaces. Numerous sand grains, perhaps added as additional temper, are also visible. Vessels are constructed by paddle and anvil thinning, and striations are apparent on exterior and some interior surfaces. Such marks may be evidence of corn cob smoothing. Interior smudging is not uncommon, and many vessels carry a float or slip. Exterior surface color ranges from buff to gray to red, with many sherds exhibiting a definite gold or silver
metallic sheen. Rims vary, as some are flattened and others rolled, either out-flaring or straight. No whole vessels were recovered, though rim forms and large wall sherds suggest a preponderance of globular, wide-mouth jars, ollas, and hemispherical bowls accompanied by a few so-called pinch pots. All bases were either flattened or slightly rounded, in contrast to the pointed forms usually associated with Navajo pots. In terms of wall thickness, the sample of 545 sherds measured fell into two distinct groups; 60% were 4.2 ± .4 mm thick, and 40% measured 5.2 ± .6 mm.

X-ray Fluorescent Analysis

Taos Valley micaceous materials were remarkable in their visual similarity from site to site. Furthermore, the surface micaceous assemblage was indistinguishable from either the micaceous pottery recovered at Taos Pueblo or from other northern New Mexico sites examined in museum collections. Consequently, a chemical analysis, in this case x-ray fluorescence or XRF, was employed in an attempt to differentiate the possible components comprising an apparently uniform micaceous pottery assemblage that were not otherwise discernable by visual inspection. We felt that such separation could help establish if Taos Valley micaceous pottery was made in a single locality or if multiple production sites were indicated. Because micaceous wares, unlike most other Southwestern ceramics, were usually manufactured directly from the clay source with little or no refinement, XRF might also indicate the number of clay sources exploited by historic potters. Finally, we wondered if XRF could help clarify the puzzle of precisely who produced Taos Valley micaceous ceramics—Puebloans or Athapaskans.

XRF Methodology

The XRF technique is described in some detail (Bower and Snow 1984:291-295). A simplified XRF method is used by Olinger (1987:1-5) in which sherds are exposed to monochromatic x-rays, which cause elements in the paste to fluoresce x-rays of specific energies. The element count of each sherd is deduced by counting the number of x-rays of known energies. Olinger found that all pottery has singularly high x-ray counts from iron, zirconium, and strontium. Consequently, though all elements are measured, these three in particular are used to determine the homogeneity or heterogeneity in a specific group of sherds. By plotting the percentage of x-ray counts from these three elements for each sherd, the characteristics of a group of sherds are graphically represented.

XRF Results

XRF results for micaceous pottery from Taos Valley survey sites are plotted (Figure 4). Though highly dispersed, four clusters probably represent four clay sources. Two of these account for well over 50% of the ceramics analyzed. The first, or most dense, centers at 27% Zirconium (Zr) and 7% Strontium (Sr), and the second peaks at 28% Zr and 12% Sr. A third sparse cluster is evident at 21% Zr and 5% Sr, and a fourth is scattered between 40% and 50% Zr and 4% Sr. The dispersed nature of these plots suggests that Taos Valley micaceous ceramics derive from a number of sources (either clay sources or produc-
tion localities), not all of them necessarily in the valley, though two clusters clearly dominate.

Because Taos Pueblo is traditionally identified as the primary center for historic northern New Mexico micaceous pottery manufacture, sherds recovered from the pueblo's refuse mound (Ellis and Brody 1964:316-327) were also analyzed and compared to micaceous material from Taos Valley survey sites. Taos Pueblo refuse mound results are plotted (Figure 5) and, once again, a similarly dispersed pattern having three discernable clusters appears. The strongest cluster centers at 18% Zr and 7% Sr. Though overlap between the micaceous material from Taos Valley sites and that from the refuse mound is obvious, the densest cluster characterizing the valley sites (i.e., the 27% Zr and 7% Sr cluster) is virtually absent from the Taos Pueblo micaceous assemblage. XRF analysis indicates, therefore, at least five clusters within the micaceous pottery assemblage from sites across the valley, including Taos Pueblo.

Another group of micaceous sherds was then analyzed from the Glasscock Site (Gunnerson 1969:25) on the eastern side of the Sangre de Cristo Mountains, in order to compare clusters from within the Taos Valley to more distant nonvalley locations. The dispersed pattern reflective of Taos Valley micaceous sites reappears at Glasscock, with the single discernable cluster at the site corresponding to the dense, 27% Zr and 7% Sr cluster characterizing micaceous sherds from the Taos Valley (Figure 6). This conspicuous cluster is, however, scarcely indicated by any micaceous pottery from the Taos Pueblo refuse mound.

By way of contrast to the multiple clusters apparent in the Taos Valley micaceous pottery assemblage, it is instructive to compare these to a strong chemical cluster characteristic of a single production locality or clay source. Another historic utility ware, a plain brown ware, was produced at Taos Pueblo at the same time micaceous pottery was made in the northern Rio Grande. Both brown and micaceous pottery occur throughout the Taos Pueblo refuse mound. XRF analysis of this plain brown pottery (called Taos Utility ware by Ellis and Brody [1964:320-323]) shows a dense cluster centering at 33% Zr and 8% Sr, with virtually no dispersion (Figure 7). This prominent chemical cluster denotes a well-established ceramic ware, strongly suggestive of a single clay source and production center, perhaps Taos Pueblo. It is in sharp contrast to the dispersed chemical clusters describing the micaceous pottery assemblage, which suggest a variety of sources and/or production localities. In fact, most of the wares believed produced by Taos Pueblo, whether a prehistoric black-on-white pottery or a historic plain utility ware (analysis currently underway by the authors), display marked chemical clustering. This situation is unlike that describing micaceous pottery from the refuse mound, even though only a limited number of micaceous clay sources are known to exist within the vicinity of Taos Pueblo.

DISCUSSION AND CONCLUSIONS

The post-Reconquest history of the Taos Valley is complicated by the appearance of three separate cultures, the indige
Figure 4. XRF results of micaceous pottery from all Taos Valley sites except Taos Pueblo. Four definite chemical clusters are apparent, the strongest centered at 27% Zr and 12 Sr, 21% Zr and 5% Sr, with the weakest scattered between 40% to 50% Zr and 5% Sr.

Figure 5. XRF results of micaceous pottery from excavations at Taos Pueblo refuse mound. One chemical cluster dominates at 18% Zr and 7% Sr. Two weaker chemical clusters are apparent at 45% Zr and 5% Sr and at 25% Zr and 15% Sr. These chemical clusters partially overlap clusters from sites elsewhere in the valley, though the strongest there, the 27% Zr and 7% Sr, is virtually absent at Taos Pueblo (compare with Figure 4).
Figure 6. XRF analysis of micaceous pottery from the Glasscock Site located on the eastern side of the Sangre de Cristo Mountains. The strongest chemical cluster is apparent at 27% Zr and 7% Sr and corresponds to the dense cluster evident in the micaceous pottery of Taos Valley survey sites, not represented at Taos Pueblo.

Figure 7. XRF results of plain brownware (Taos Utility) from os refuse mound showing a single, dense chemical cluster at 33% Zr and 8% Sr with other little dispersion. Such a strong clustering is suggestive of a well-established pottery tradition, dependent on a single clay source and/or production locality.
nous Tiwa and by more recent arrivals, the Jicarilla Apache and Spanish settlers. These newcomers, especially the Spanish, greatly impacted the lives of the original residents and profoundly altered existence in the Taos Valley from then on. Settlement survey data, historical documents, and XRF analysis are used not only to better understand the historic peoples who inhabited the valley, but to explore the nature of an emerging material tradition, Taos Valley micaceous pottery production.

The distribution of sites containing micaceous pottery identified during archeological site survey corresponds remarkably well to the placement of Apache settlements in the Taos Valley by eighteenth century Spanish chroniclers. At many micaceous pottery sites, associated Powhoge Polychrome sherds, a ware well established by 1750 and suggested to fall primarily between 1760 and 1820 (Francis H. Harlow, personal communication 1987), provide a relative temporal marker. Las Trampas (i.e., the present day Talpa Valley along the Rio Grande del Rancho) and the mouth of Miranda Canyon on a trail between Taos and Picuris Pueblos are two areas most frequently cited (and best described) in Spanish accounts as being settled by the Jicarilla. These locations also exhibit a great many micaceous pottery sites. Jicarilla moving across the Sangre de Cristos to escape Comanche predation settled in the Talpa Valley, finding arable land to farm without interfering with existing Tiwan fields nearer Taos Pueblo. The Jicarilla were welcome in the valley in any event, because they had a long history of friendly relations with Taos Pueblo going back at least to 1609, when the two groups joined against the Spanish. By the eighteenth century, alliances among the valley's residents included not only Taos Pueblo and the Jicarilla, but also Spanish settlers, all of whom were united against the Comanche raiding their settlements.

The many micaceous pottery sites on both sides of the Rio Grande del Rancho, near Talpa and Llano Quemado, are ideally situated in proximity to arable land, but others occur in intermediate localities (e.g., the Picuris foothills or the Rio Grande del Rancho valley) with good access to wild resources of forested uplands as well as lower-elevation riparian habitats. This settlement distribution, suited to diverse subsistence practices involving horticulture and wild resource exploitation, is in keeping with Jicarilla lifeways. Though they practiced agriculture, hunting remained a Jicarilla staple as they consistently maintained a high degree of mobility (Opler 1975:154). The semisedentary nature of their occupation of the Taos Valley should not be underemphasized.

Given the general consensus that the Jicarilla produced micaceous ware by 1700 (Baugh and Eddy 1987; Brugge 1982, 1984), and because micaceous pottery occurs together with eighteenth-century painted Tewa ceramics in areas described by contemporaneous Spanish visitors as occupied by the Jicarilla, we ask if, indeed, the Jicarilla were the producers of this pottery. This question has relevance for historic Jicarilla Apache archaeology in the northern Rio Grande, particularly because, like other highly mobile people, their sites are notoriously difficult to identify. Assigning cultural affilia-
tion to micaceous potters is further complicated by the fact that Taos Pueblo, too, is traditionally equated as a center for micaceous pottery production.

Recent assessment of Apache pottery making offers convincing arguments that the Apache learned the skill from already-established ceramic-producing traditions, specifically northern Rio Grande Puebloans and Central Plains Village peoples (summarized in Baugh and Eddy 1987; Brugge 1982, 1984). Certainly, extensive historical documentation points to an intense period of Puebloan/Athapaskan interaction during the later sixteenth century and throughout the seventeenth century when, for example, Tiwa refugees regularly fled eastward across the mountains to the Apache for sanctuary from the Spanish. There was ample opportunity for acculturation (Bandelier and Hewett 1973:76; Brugge 1979:103; Gunnerson 1974:170; Opler 1944:91-97; Parsons 1939:937-938, 1053-1056).

Pottery making was probably one of these learned skills resulting from the sharing of ideas. The semisedentism suggested for the Jicarilla after 1700 could serve to encourage ceramic manufacture, while the use of micaceous clays, needing little alteration once collected, might appeal as a craft to an essentially mobile people. During the nineteenth century, a time when the Jicarilla ranged throughout northern New Mexico and southern Colorado, east and west of the Sangre de Cristo Mountains, their pottery making was well documented. (In the 1850s Kit Carson describes a Jicarilla encampment near Picuris Pueblo where pots were made to trade [reported in Taylor 1969:274]; see also Domenech 1860:II:8]; Goddard [1913:143]; Abel [1915:6, 530]; Gifford [1940:50-51]; Opler [1946:94-95]; Keleher [1964:48-49]; and Gunnerson [1974:156-157]). That the tradition must have some temporal depth is indicated by Opler (1938:239-241), who writes that the "Hactcin" showed the Jicarilla how to make pots, bowls, and pipes, telling them that they would live by this means and that they were to instruct the young in the art.

If, as seems likely, the Jicarilla in part learned pottery making from Puebloans living amongst them in the Cuartelejo at various times between about 1600 and 1700, they became closely linked with micaceous ware shortly thereafter. Indeed, recalling their semisedentary nature, the use of micaceous clays, which required much less processing compared to other contemporary ceramics made by sedentary Puebloans, could even have been a Jicarilla innovation. In this regard, Gunnerson (1959:152) reports that he was shown heirloom pots (and baskets) received in trade from Jicarillas at Taos Pueblo and that he was informed that Jicarillas taught the Tiwans how to make the pots (i.e., micaceous pots). Furthermore, the micaceous clay used by Rio Grande Puebloan potters is known as "Apache" clay (Gunnerson 1959:152; Guthe 1925:2).

Turning to the Taos Valley micaceous pottery itself, XRF analysis of sherds from sites within and outside the valley identifies five definite chemical clusters implying the existence of multiple clay sources and/or production centers. These results may indicate a semisedentary people ranging throughout a region, exploiting numerous micaceous clay sources and making pots as needed for domestic use and trade. This
situation is in contrast to a single chemical cluster characteristic of a settled people mining clays from limited source locations over time, as is the case, for example, for the historic plain brown utility ware produced by Taos Pueblo.

Another bit of suggestive evidence that may connect the micaceous pottery found in Taos Valley sites (other than the Pueblo) with the Jicarilla is the complete lack of associated plain brown utility ware (i.e., Taos Utility ware) so common at Taos Pueblo. If Tiwans produced both plain brown and micaceous utility pottery, we might expect to find both wares in Puebloan sites. However, because they virtually never occur together in historic sites that contain micaceous pottery (except at Taos Pueblo), perhaps these sites represent the Jicarilla settlements of the Taos Valley. In addition, the lack of surface architectural features at most micaceous sites may be symptomatic of Jicarilla Apache, rather than Pueblo, construction. Rock rings or piles are the only surface elaborations ever found at or near micaceous sites (see Opler [1975:154] for a discussion of Jicarilla building and avoidance practices). Besides the lack of clear Puebloan elements in these micaceous-pottery sites, an absence of Spanish artifacts, including Majolica pottery, is also worth noting. Instead, a vast quantity of chipped stone tools of all types occurs together with the micaceous pottery.

A possible alternative source of micaceous pottery production to either Jicarilla or Puebloan potters not mentioned earlier is Spanish potters producing some micaceous wares (see Warren 1981). In an absence of supportive evidence at this time, we must agree with Snow (1984) that pottery making was the monopoly of the Puebloans and Jicarilla, who traded it to Spanish settlers, and that the deep-seated social and economic ideological values held by the latter precluded their manufacturing pots themselves (p. 103-104). There are many attributes, vessel form and size to name but two, linking micaceous pottery to established Rio Grande Puebloan utility wares (for a detailed discussion see Brugge [1982:285-288]).

But, can micaceous pottery be properly used as an ethnic marker to distinguish Jicarilla Apache settlements from historic Tiwa sites in the Taos Valley? Archaeological and historic evidence, some of it circumstantial but when taken together persuasive, suggests that micaceous pottery sites located in the vicinity of the Talpa Valley and in Miranda Canyon reflect Jicarilla settlement. These sites occur in areas most fully described by contemporary historians as settled by Jicarilla Apache during the eighteenth century. They contain artifacts believed to be made by the Jicarilla at that time; do not exhibit concurrently made Tiwa pottery from Taos Pueblo--though trade ceramics, especially Powhoge Polychrome produced by Tewa potters, also occur; and are ephemeral in their architectural elaboration. All these attributes are consistent with the semisedentary Jicarilla. Elsewhere in the Taos Valley, such as in the Rio Grande del Rancho Valley, the lack of good corroborating historical documentation makes cultural affiliation of micaceous sites more problematical. The main obstacle in differentiating Jicarilla from Puebloan-made micaceous pottery is the great similarity
in sherds from site to site across the Taos Valley. The XRF analysis establishes several clear chemical clusters—including the strongest, which peaks at 27% Zr and 7% Sr—and characterizes much of the micaceous sherds recovered from survey sites. This distinctive chemical cluster is almost absent at Taos Pueblo, which instead shows several weak clusters of its own. We tend to think that Taos Pueblo was not a major micaceous pottery-producing center in the sense that it was responsible for the preponderance of the northern Rio Grande's micaceous wares. Rather, the random, weak multiple clusters describing micaceous ceramics from the refuse mound suggest that, though Taos Pueblo made some, the Pueblo probably traded for much of it. Their trading partners were the Jicarilla. We feel the multiple chemical clusters in sherds from the Taos Valley sites indicate a semisedentary people exploiting a variety of clay sources and potmaking locations. The strength of the two strongest chemical clusters suggests that certain clay sources were more frequently exploited than others and, possibly, also the commitment to micaceous pottery production at Jicarilla settlements.

Even so, great caution must be exercised when using the presence of micaceous pottery as a diagnostic indicator of either Jicarilla Apache or Tiwa potter ethnicity. Micaceous pottery was produced by both and probably traded between them and to Spanish settlers. A Jicarilla-made cooking pot might be used by Tiwans in a pinyon nut collecting trip to the Picuris Mountains, and Spaniards might receive cooking pots and ollas in trade from either Jicarilla or Taos Pueblo potters. The problem of distinguishing between use and production of material remains occurring in sites will potentially blur the ethnic affiliation of some sites, especially small, specialized activity localities. Ultimately, it may be possible to identify the ethnicity of the potter who produced a particular vessel by chemical analysis, but not who used it.

In conclusion, the micaceous ceramic tradition of the Taos Valley is the consequence of both Jicarilla Apache and Taos Pueblo potters. XRF analysis identifies multiple chemical clusters, suggesting several clay sources and/or production localities. Though actual pottery making was probably learned from the Puebloans (and influenced by Central Village Plains groups) during times of prolonged contact and intense cultural sharing, direct use of micaceous clays for containers may be a Jicarilla innovation. Good congruence exists between micaceous site distribution and recorded Jicarilla settlements, but care should be exercised if using micaceous sherds as an ethnic marker. Historical documents describing the eighteenth-century Taos Valley show this to be a period of much Puebloan-Jicarilla-Spanish interaction, particularly in terms of political and economic cooperation. The emerging micaceous pottery tradition appears well suited as a trade commodity and was undoubtedly widely exchanged, not only among the residents of the Taos Valley, but with more distant peoples elsewhere in the northern Rio Grande.

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