ARTIFACTS, SHRINES, AND PUEBLOS

Papers in Honor of Gordon Page

Contributors:

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Stuart J. Baldwin
Richard A. Bice
Elizabeth Binggelli
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David M. Brugge
James S. Carson
Meliha S. Duran
Andrea Hawley Ellis
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Sinclair Hatch, Jr.
John Hayden
Stephen C. Jett
Frances Joan Mathien
James L. Moore
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Cheryl Muceus
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Errata

Volume 19

"The July 14th Feast Day Dances at Cochiti Pueblo, New Mexico: 1882, 1931, and 1990." The authors should read Charles H. Lange and Patricia Fogelman Lange.

"Yellow Jacket (5MT-11) Human Effigy Vessel." The title should read "Yellow Jacket (5MT-1) Human Effigy Vessel."

We apologize to the authors for any inconveniences these errors may have caused.
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No. 3 Collected Papers in Honor of Marjorie Ferguson Lambert.

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14 papers, 182 pages. 1994. $19.95
(One free copy with 1994 membership)

Nos. 1-20 (in print) are available from COAS Publishing and Research, 317 North Main, Suite 201, Las Cruces, New Mexico.

AWANYU: This quarterly journal was discontinued December 1977. For back issues, contact COAS Publishing and Research at the above address.

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

Artifacts, Shrines, and Pueblos honors Gordon Page for his numerous contributions to Southwestern archaeology and ethnography, especially in northern New Mexico.

Gordon's research interests in field archaeology are best reflected in his lifelong expertise in cartography. His mapping skills have resulted in many excellent site maps, both from survey and excavation projects. While words can describe an archaeological site, an accurate and well-drawn map truly documents the site, its features, and its topographical location. Gordon's mapping seminars have provided many field-school students with a thorough introduction on how to use published maps and how to make their own maps to record archaeological sites.

Gordon has unselfishly shared his knowledge of ethnography and archaeology. Avocational and professional archaeologists and anthropologists have all benefited from his fieldwork and research. The public, especially those who have participated in various Elderhostel and Ghost Ranch programs, has a better understanding of the prehistory of New Mexico and the general Southwest because of his instruction.

Gordon, on behalf of the Archaeological Society of New Mexico, thank you for all you have done for the society.

Meliha S. Duran
David T. Kirkpatrick

March 1994

The editors wish to thank Katherine Mitchell for her assistance with and contributions to the desktop publishing for this volume.

Photograph courtesy of Barbara Schmidtinsky.
A CHAPTER IN THE LIFE OF GORDON PAGE

Lillian H. Page

Gordon was born on May 24, 1911, in Stockton, California, where he resided with his parents until he was five years old. At this time with his family he moved to Spokane, Washington, after the loss of a brother who lived for only a short time. The family remained in Spokane, where his father was superintendent of a foundry until 1918, when they moved to Three Rivers, Michigan, where his father continued in the foundry business. It was here that his interest in Indians really began to surface, probably when rowing around on nearby Lake Storey, where they spent their summers. He read *Hiawatha, Two Little Savages*, and all the other Ernest Thompson Seton books, as well as any other stories that he could find. The family moved back to California and settled in Oakland in 1921 where a brother, Robert, was added to the family. Gordon attended junior high and high school in Oakland, graduating from Oakland High in 1929. While at Oakland High he was in ROTC and the Honor Society and earned his letter in crew.

His interest in Indian culture continued and was nurtured by the Boy Scout leader, "Bugs" Caine, who was a biologist and student of Indian lore. Eventually the Scout group formed an Indian Dance Group in which Gordon participated. The boys in the troop had to make their own costumes and learn the dances.

During his freshman year at the University of California, Berkeley (UC,B), he was asked by the minister of his church to teach a Sunday-school class of fifth- and sixth-grade boys. The class flourished and grew quite rapidly. The Sunday-school superintendent, on a visit to learn the reason for the popularity of the class, discovered that Gordon was teaching Indian lore in lieu of the Bible. Thus ended his career as a Sunday-school teacher.

He entered the University of California, Berkeley in September 1929 where he began studying architecture, geography, and geology. In 1930 he took leave of absence to work in an architect's office in Berkeley and attend night school at Beaux Arts, studying architecture. In 1931 he began working at an iron foundry in Berkeley as an apprentice core maker in order to earn more money and save to continue his education. He was able to continue his college work from the fall of 1932 until May of 1933 and to work part-time at the iron foundry.
At UC,B he had two young teaching assistants in geography and anthropology classes, Donald Brand and W. W. ("Nibs") Hill, respectively, who were working on their doctorates. They had a great influence on Gordon's future, as both became professors at the University of New Mexico. This played a large part in his decision to transfer to that institution. Two senior scholars, Dr. Carl Sauer and Dr. A. L. Kroeber, also had a definite influence in introducing him to their major areas of interest, geography and anthropology.

In September of 1933 Gordon transferred to the University of New Mexico (UNM). He boarded a bus for Albuquerque with $250 in his pocket, which he had saved from pouring molten iron into molds at the F. K. Simonds foundry in Berkeley all summer.

His slow bus ride to Albuquerque was filled with a romantic outlook at the Southwest—gravel highways, small towns, long freight trains, antelope racing along the highway, hogans, red cliffs, blue skies, and INDIANS.

He registered at UNM and declared geology and anthropology as double majors. He found a job tending a furnace, sleeping in the basement, and washing the family's evening dishes. Breakfast at the dining hall was affordable until he was able to land a part-time job there for meals. Toward the end of the semester he moved to Kwatka Hall (a men's dormitory that is now gone), where his living conditions improved. During the first few months of the semester he transferred his military enlistment from Berkeley to the 120th Engineers in the New Mexico National Guard.

In the spring of 1934 Dr. Edgar Hewett, head of the Department of Anthropology, needed a cartographer. He saw some of the maps that Gordon had drafted for some of his classes. Hewitt offered Gordon a part-time job as draftsman and crew excavator at two Anasazi sites across the Rio Grande near Bernalillo, Kuaua and Puarai. His acquaintance with Dr. Brand and Dr. Hill were most helpful in securing this employment.

Dr. Hewett had a long-range plan to excavate the site where Coronado had spent two winters in 1540. He supposed that Coronado based his large military expedition here while sending contingents as far east as Kansas and west to Grand Canyon. The plan was to locate the pueblo that housed Coronado's headquarters and to excavate the site, the rooms, and the kivas that existed there in 1540. In time he obtained funds from the Works Progress Administration (WPA) and other sources to complete the work by 1940, in time for the Coronado Expedition Celebration.

A crew of anthropology students was assembled. Work began on the sites in 1934. Gordon Vivian was Crew Chief, with a crew of about five students. About 10 Spanish-Americans (the term used at that time) who lived nearby provided additional labor. Some of the students were Wesley Bliss, who was an older student and had worked in the Gobi Desert as a paleologist; J. Charles Kelley; and others, including Gordon. (Editor's Note: A paleologist studies antiquities.)

One day in the late winter a workman opened a surface excavation in a square kiva and called Gordon Vivian's attention to a bit of white plaster. All work came to a halt while the crew crowded around. J. Charles and Gordon, who had been working in the south group of rooms, were shifted to the kiva. As the excavation continued and the walls began to emerge, it was evident that these walls were covered with murals.
Generally, the painting seemed to be in good condition and color, except for fragmentation on some of the figures.

Wesley Bliss directed the removal of the wall surfaces with murals as they were exposed. He jacketed the samples using a method he employed for samples collected in the Gobi Desert. When the gauze and plaster casing were dry, the murals were placed in lumber crates, and these crates, weighing 1 ton or more, were rolled up ramps, loaded on trucks, and taken to the University of New Mexico for study (Dutton 1963:27-30.)

In June 1935, with his senior year almost completed (except for six hours), Gordon was offered an opportunity to compete for an agricultural aid position in the Soil Conservation Service. Again finances forced a decision. He was accepted and was stationed at Steamboat Canyon on the Navajo Reservation.

During the fall he spent time at Dinnehotso in the northern part of the reservation, working with coworker, J. Charles Kelley. They were studying Navajo agricultural practices and making a dependency study of that area, by recording and reporting on Navajo families' dependency on agriculture and herding. The same technique was later applied to the Hopi.

At the end of the summer Kelley left the reservation to continue his education, and Gordon continued with the work. These reports (called schedules) recorded the number of persons in the family, the number of head of stock controlled, the range of the stock, the location of summer and winter homes, and the location of agricultural fields and clan affiliation.

That winter and the spring of 1936 Gordon spent working in the Chuska Mountains near Drolet Trading Post, located between Farmington and Gallup, New Mexico. The summer of 1936 through March of 1937 he worked in the Chinle and Kayenta area, in Canyon de Chelly, in the Black Mountain-Tuba City area of the Navajo, and in District 5. Later he worked in the Hopi Pueblos and Red Lake, Arizona, interviewing traders to obtain economic data by Land Management units, not particularly Hopi or Navajo areas. An attempt was made to find Hopi who could speak and write English so they could be trained to make surveys and reports on the Hopi towns. Since white census takers and interviewers were viewed with suspicion and were unacceptable in the Hopi community, this was essential to the study. Otto Llomavatui, a Hopi, was hired as enumerator in the Hopi towns, with Douglas Duma as his assistant.

Gordon returned and enrolled at University of New Mexico in 1937 while continuing to work for the Soil Conservation Service in Albuquerque part-time. During this time he worked in Sandia Cave with Dr. Frank Hibben (1941) as a volunteer. He received his B.S. in Geology from UNM in June 1938, and he returned to the Soil Conservation Service full time, engaging in watershed surveys in Colorado; in Snowflake, Arizona; and in the Apache-Sitgreaves National Forest outside the reservation until September.

He returned to the Hopi surveys, supervising the Hopi and Navajo Human Dependency enumerators and gathering material relative to sheep and cattle ranges of both the Hopi and the Navajo around the boundary of District 6. Evidence was also gathered of Hopi agricultural practices for purposes of soil conservation.
Gordon and Lillian were wed on December 24, 1938, in Berkeley, California. Gordon enrolled in graduate school at the University of California, taking courses in anthropogeography under Dr. Carl Sauer. He returned to the Soil Conservation Service and the Hopi Reservation in June 1939 and worked out of Keams Canyon, where he and Lillian lived. He was supervising Navajo enumerators Haske Naswood, Danny Bia, and Tommy Ettsen, who were fluent in spoken and written English. They were interviewing Navajo on range use around the boundaries of District 6. Page also interviewed white stockmen in various units around the boundary of Land Management District 6, relative to Hopi and Navajo range use.

In September Gordon and Lillian moved to Gallup, where he worked up his material, coordinating reports and putting together boundary information on Navajo and Hopi range usage. Upon completion in December 1939, this report was known as "The Page Report" (Page 1939). Work continued in Gallup and/or Window Rock with the Soil Conservation Service until he was called to report for active duty with the Army Corps of Engineers at Fort Ord, California, in July 1940.

Gordon and Lillian remained in Monterey, California, until the spring of 1941, when he was ordered to the 24th Division at Schofield Barracks, Oahu, Hawaii. Lillian remained in Monterey, where she had been teaching when they were married, until the end of the school year. In April after the Pearl Harbor attack on December 7, 1941, Lillian and their infant son, James, were sent to the mainland, coming to Albuquerque. Except for three months in 1943, Gordon remained in the Pacific theater with the 24th Division as a Combat Engineer. He served in Australia, New Guinea, and the Philippine Islands. He received stars for amphibious landings, a Bronze Star, and two Legions of Merit. His career in the U.S. Army continued until he retired as Colonel in 1966. He served in Virginia, Hawaii, Washington, D.C., California, Texas, and Italy. He graduated from Command and General Staff School, Ft. Leavenworth, Kansas; received a M.A. in Geology from the University of California, Los Angeles; graduated from Armed Forces Staff College, Norfolk, Virginia; was a graduate and professor at the National War College, Washington, D.C.; and received a M.Ph. in Regional Science from George Washington University, Washington, D.C. He retired as the Engineer Inspector General.

After retirement from the military and four years in the corporate structure in Washington, D.C., the Pages moved to Albuquerque (Lillian's birthplace) and purchased their present home in October 1970. They joined and became active in the Albuquerque Archaeological Society (AAS) and the Archaeological Society of New Mexico (ASNM). Gordon served as Vice President and President of AAS, and he served on the board and as Vice President and President of ASNM. He was employed by the state of New Mexico from January 1971 to September 1976, retiring as Deputy State Geologist.

His interest in archaeology had never dimmed, and with more time he was able to indulge his interest more fully. His previous professor and friend, Dr. Florence Hawley Ellis, invited him to participate in the archaeological seminars that she was conducting at Ghost Ranch, Abiquiu, NM, in 1977. This began an association with Dr. Ellis and with the Ghost Ranch. He has been crew chief at the seminars since 1978, working on the Butz Ranch, Rattlesnake Ridge, Baker Ridge, and Ghost Ranch surveys. He has served on the
board of the Florence Hawley Ellis Museum at Ghost Ranch. He joined the ASNM Field School at Heaton Canyon in 1980 and continued in that capacity until 1993. He received the ASNM Archaeological Achievement Award in 1986.

In the spring of 1983 the Albuquerque Academy approached Gordon about conducting a three-week study of a site on their property at Bear Canyon. Fourteen students from the Academy between the ages of 13–17 participated in the project. Training on surface survey, gridding, excavation, mapping, and laboratory work (conducted in the Sims cabin) were emphasized in the three weeks. The young people were cooperative and eager to learn—full of energy. Although a teacher was assigned as an assistant, he was available for only a day and a half before he departed for the East to continue his own educational studies. At the end of the project, the U.S. Forest Service in a resurvey of that area discovered that the land with the pueblo belonged within the Forest Service boundaries.

For three years Gordon was active in and lectured for the local UNM program sponsored by Elderhostel. He held lectures on Southwest Archaeology and History and conducted field trips to nearby sites of archaeological and historical interest, for which he received a Certificate of Appreciation from the UNM Learning Institute for Elders.

Lillian and the family have always been strong supporters in Gordon's projects. There were five sons born to Lillian and Gordon, four of whom are still living. Their eight grandchildren have been close, spending many summers with them at Ghost Ranch, often participating in the digs there. As yet none have shown their Grandad's interest in anthropology, but one never knows!

—Albuquerque, New Mexico

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<td>1940</td>
<td>Hopi Land Patterns. Plateau 13(2).</td>
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<td>1940</td>
<td>Socio-Economic Survey of the Navajo and Hopi Reservations. Socio-Economic Survey Division, U.S. Department of Agriculture, Soil Conservation Service. (Contributor)</td>
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**PAPERS**

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1979 AR 130 Site. Ghost Ranch Archaeology No. 1. Florence Hawley Ellis Museum, Ghost Ranch, Abiquiu, New Mexico.

1979 GBN III (Gallina Butz Site III). Ghost Ranch Archaeology. Florence Hawley Ellis Museum, Ghost Ranch, Abiquiu, New Mexico.


The literature of early archaeological explorations at Mesa Verde, Colorado, makes sporadic mention of the occurrence of walnuts and hickory nuts among materials recovered from cliff-dwelling sites. During the late 1970s and early 1980s, as part of a project to collate information on prehistoric trade into Mesa Verde, I collected data on these reported walnuts and hickory nuts.

THE KNOWN SPECIMENS FROM MESA VERDE

Specimens have been found in eight museum collections and/or archaeological sites. All specimens are thought to have come from archaeological sites on the Mesa Verde plateau of southwestern Colorado, unless otherwise specified (Figure 1).

Fewkes-Jeep Collection

The Fewkes-Jeep Collection is an assemblage of archaeological specimens put together in the early days of Mesa Verde National Park and stored at the Mesa Verde Museum. During the 1960s and 1970s, a public display in the museum contained a "black walnut shell bead" (shown in Howard 1968:28). In response to my request for a botanical identification of this specimen, Ronald Switzer, Superintendent of Mesa Verde National Park, (personal communication, September 2, 1976) provided the following:

The "black walnut" may well not be "black" (Juglans nigra) according to a report from our research staff. This particular specimen has been modified to the extent that positive identification is now difficult. The convolutions [longitudinal grooves] and the calyx end [proximal end] have both been ground and smoothed. Our guess, however, would be that the nut in question is Juglans rupestris. The relatively straight and parallel convolutions and the relatively small size suggest this interpretation. In addition, a small light colored protrusion on the calyx may be part of the calyx remnant which persists in Juglans rupestris.

During a visit to Mesa Verde National Park in August 1977, I examined this specimen and noted that it is a whole nut with the nutmeat still inside; it has two holes cut or drilled into the distal end; the shell is a dark
brown color and is about 1.3 to 1.9 cm in diameter.

The archaeological provenience of this specimen is unknown, but presumed to be a site on the Mesa Verde.

**Wilmarth Collection**

During the summer of 1892, Arthur F. Wilmarth, assisted by the Wetherill brothers, excavated artifacts from various ruins at Mesa Verde. The artifacts were exhibited on behalf of the State of Colorado at the World's Columbian Exposition at Chicago in 1893 and were subsequently deposited in the Colorado State Museum (Gillmor and Wetherill 1953:41–42; McNitt 1966:3, 327; Moorehead 1894:33; documentation on file at Colorado Heritage Center, Denver). When I visited the Colorado State Museum in August 1977, the collection was in the process of being transferred to the new Colorado Heritage Center, consequently I was not able to directly view the artifacts. The following information is based on catalog records and photographs.

Catalog B of the Wilmarth Collection lists a

[Catalog no.] 0403 [Collection no.] 142. Decorated round jar. Buried about (Burial Cave 19) six inches [15 cm] below surface, containing part of hair and wool [?] leggings. Cotton rag with bone and walnut beads tied in it. Three bone knives, several awls, pebbles, etc.

These bone and walnut beads (Catalog no. 0815, Collection no. 667) consist of two sets of two bone beads and a whole walnut strung together on a yucca (?) cord, the two sets tied together to form a possible rattle.
The bone beads are unidentified but might be made from turkey long bones. The walnuts closely resemble the Fewkes-Jeep specimen.

The seed jar in which the rattle was found is shown in Figure 3. It has been typed as Mancos Black-on-white by Sarah Nelson. It is about 11.4 cm high and 11.4 cm wide, with a mouth diameter of about 6.3 cm. Mancos Black-on-white dates to about A.D. 900–1150 (Breternitz et al. 1974:38). There is no clear indication of where on Mesa Verde Burial Cave 19 was located.

1888–1889 Wetherill Collection

The first collection of artifacts made by the Wetherill brothers from the cliff dwellings was put together in the winter of 1888–1889. It included materials from sites located both north and south of the Mancos River gorge, which cuts through the Mesa Verde. The collection was exhibited during 1889 in Durango, Pueblo, and Denver, Colorado, and was eventually purchased by the state historical society and deposited in the Colorado State Museum (Gillmor and Wetherill 1953:31–35; McNitt 1966:30–31, 324–325). This collection was also being transferred to the Colorado Heritage Center when I visited in August 1977, hence I was only able to view one string of bones and walnuts that was on display at the time in the Colorado State Museum.

The excavators published a catalog of the collection that lists three artifacts of interest here (McLoyd et al. 1889:14). The first, "1. Odd-shaped string of beads, made of turkey bones and hickory nuts," is a string of 10 bone beads and 4 whole nuts (Catalog no. 0812). The second, "3. Same as No. 1, except that the string forms a loop," is a string of 9 bone beads and 5 whole nuts (Catalog no. 0813). And the third, "4. Same as No. 1, except that the string forms a loop," is another string of paired bone and nut beads—8 of each (Catalog no. 0811). This last is shown in Figure 4.

The nuts, as shown in photographs (including Figure 4) and as viewed on display, are identical to the Fewkes-Jeep specimen, including their coloration, the perforation of each nut with two holes for stringing, and their general size (about 1.3 to 2.5 cm in diameter). They are clearly walnuts rather than hickory nuts.

Two loose whole walnuts (Catalog nos. 04906 and 04907) may have been attached originally to one of the four strings. This gives a total of 19 walnut beads in this collection. There is no definite archaeological provenience for any of the specimens, other than that they came from the cliff dwellings.

Hazzard Collection

The Hazzard Collection consists of five parts: (a) A second collection of artifacts from Mesa Verde cliff dwellings made by the Wetherill brothers in the winter of 1889–1990 (Gillmor and Wetherill 1953:35–38; McNitt 1966:31–32, 325–326). (b) A third collection from Mesa Verde cliff dwellings made by the Wetherill brothers in the winter of 1891–1892 (Gillmor and Wetherill 1953:38; McNitt 1966:32–33, 326). (c) A collection of artifacts from sites in side canyons on the east side of the Colorado River in Utah north of its confluence with the San Juan River made by Charles McLoyd and several others in the winter of 1891–1892 (Osborne 1964; Sharrock 1963:5–7). (d) Some artifacts apparently collected by H. Jay Smith from sites on the Mesa Verde during his visit in 1892 (Anonymous 1892; McNitt 1966:326–327; Sharrock 1963:3). (e) Artifacts collected from the area around...
Figure 2. "Rattle" from Wilmarth Collection; scale is in centimeters. Photograph reproduced by permission of the Colorado Historical Society.

Figure 3. Mancos Black-on-white seed jar from Wilmarth Collection that contained the "rattle" shown in Figure 2; scale is in centimeters. Photograph reproduced by permission of the Colorado Historical Society.
Cortez, Colorado, by C. M. Viets before and/or during 1892 (Sharrock 1963:8; Osborne 1964).

Both McNitt (1966:55) and Sharrock (1963:5–6) are in error when they state that the collection of artifacts from southeastern Utah that Reverend C. H. Green bought from Charles McLoyd is a part of the Hazzard Collection. In 1977 I located Green’s purchased collection at the Field Museum in Chicago, where it is known as the C. H. Green Collection.

The five collections were purchased by H. Jay Smith and Charles D. Hazzard and first exhibited to the public at the Seventh Annual Minneapolis Industrial Exposition in the autumn of 1892 (Anonymous 1892:41–80). Then the collections were exhibited at the World’s Columbian Exposition of 1893 in Chicago (Anonymous 1893; Moorehead 1894) and were eventually deposited in the University Museum, University of Pennsylvania, Philadelphia, where they are known collectively as the Hazzard Collection (McNitt 1966:32–33, 326–327; Osborne 1964; Sharrock 1963:15).

The catalog for the Minneapolis exhibition lists "1787. Jar of walnuts" (Anonymous 1892:57), while the catalog for the World’s Columbian Exposition lists "838. Vessel found filled with hickory nuts and bone beads" (Anonymous 1893).

In response to my request, Claudia Medoff, Keeper of Collections—American Section, located the jar and walnuts (Catalog no. 29–44–265) within the Hazzard Collection. Attached to the jar was an old tag reading "Bowl of walnuts from sand at Cliff House, Mancos Cañon"; the jar contained 17 walnuts and "some kind of dried grass" (Medoff, personal communication, February 28, 1979).

The jar is shown in Figure 5. Based on a careful study of the photograph, I assess it to be an early example of McElmo Black-on-white. Apparently it originally had a flat strap handle that was broken away sometime in the past. McElmo Black-on-white dates to about A.D. 1075 to 1275 (Breternitz et al. 1974:42).

Three of the walnuts were sent to me for analysis. They are illustrated in comparison to an English walnut (Juglans regia) in Figure 6. The English walnut is the introduced Eurasian species grown for commercial sale in the United States and Canada. The archaeological walnuts vary in length between 2.3 and 2.6 cm and in diameter between 2.2 and 2.4 cm; they are a dark reddish-brown in color, are slightly pear-shaped, have distinct longitudinal grooves but a fairly smooth shell surface, and have a nonprotruding seam (by seam I mean the joint between the two halves of the shell). In contrast, the commercial walnut is 3.9 cm long and 3.2 cm in diameter, is light yellow-brown in color, is more elongated in shape, has indistinct longitudinal grooves but a rougher shell surface, and has a protruding seam.

The three archaeological walnuts are not pierced for stringing. Only one of them is modified: its proximal end has been filed down, producing a series of parallel striations (Figure 7). This recalls the grinding of the proximal end on the specimen from the Fewkes-Jeep Collection.

The three walnuts were inspected by Dr. William C. Martin of the Biology Department of the University of New Mexico; he identified them as the species *Juglans major*.
Figure 4. String of bone and walnut beads from 1888–1990 Wetherill Collection; scale is in centimeters. Photograph reproduced by permission of the Colorado Historical Society.

Figure 5. Early McElmo Black-on-white jar from the Hazzard Collection. Photograph reproduced by permission of the University Museum, University of Pennsylvania.
Figure 6. Comparison of three walnuts from Hazzard Collection to a commercial walnut. Photograph by Duncan Perry.

Figure 7. Comparison of modified (right) and unmodified (left) proximal ends of two walnuts from the Hazzard Collection; smallest divisions on scale are millimeters. Photograph by Duncan Perry.
I suspect that Frederick Chapin, who visited the Wetherills at Mesa Verde in the spring of 1890, may be describing the excavation of the walnuts when he (1892:161-162) notes "another discovery was a bowl of walnuts—a nut which does not grow in Colorado. The bowl was found in a room at a depth of three feet [1 m], yet it was on an upper floor that had fallen in." This suggests that the jar of walnuts was part of the 1889-1890 Wetherill Collection. Part of this collection was taken from cliff dwellings in Mancos Canyon (Gillmor and Wetherill 1953:36; McNitt 1966:325), and the tag on the jar in the Hazzard Collection attributes it to a cliff dwelling in Mancos Canyon (see above).

Apparently Chapin was given one of these walnuts by the Wetherills, as he (1892:162, footnote) submitted one for identification:

Through Mr. Cosmos Mindeleff, of the Bureau of Ethnology, Mr. Femew, Chief of the Forestry Division of the Agriculture Department, has kindly given the following information: "The walnut which you left for inspection can be hardly anything else than Juglans rupestris, corresponding with specimens of the fruit on hand. The field of distribution I have noted on the enclosed map, as far as known. You will notice that it remains below the [Colorado] Plateau country."

According to the map furnished by Mr. Femew, Juglans rupestris is found in southwestern Texas, southern New Mexico, southeastern Arizona, and along the coast of California, between San Francisco and Los Angeles. The nearest approach of the tree to Mancos Cañon is about two hundred and fifty miles [400 km]. This fact also leads one to believe that the Cliff Dwellers perhaps traded with the Indians of the south. The walnuts were not perforated, so were probably not used as ornaments.

Chapin's information that "the walnuts were not perforated" also supports an identification of these with the Hazzard Collection walnuts. The difference in species identification between Martin and Femew is no problem (see discussion on taxonomy of Southwestern walnuts, below).

There may be more walnut artifacts in the Hazzard Collection: Sharrock (1963:176) lists "UMP:29^43-140...Prov. [Provenience] Utah. Description: Small walnut (?) rattles (?) strung in group of two." This may correlate with entries in the catalog for the World's Columbian Exposition: "659. Bone and hickory nut charm to hang on necklace" and "660. Ten hickory nuts used as ornaments on charms" (Anonymous 1893). If the Utah provenience indicated by Sharrock is correct, then these possible walnuts may be from the Colorado River sites excavated by Charles McLoyd and his associates in the winter of 1891-1892.

Smith-Hazzard Collection

After the Hazzard Collection was acquired by the University Museum of the University of Pennsylvania, a selection of materials was donated to the University of California at Berkeley, where they now reside in the Lowie Museum of Anthropology under the name of the Smith-Hazzard Collection (Osborne 1964; Sharrock 1963:15). I corresponded with Frank Norick, principal museum anthropologist at the Lowie Museum, regard-
ing walnuts in the Smith-Hazzard Collection, with the following results:

1. Three loose whole walnuts (Catalog nos. 2–3377, 2–3378, 2–3379) with lengths of 1.9 to 2.1 cm, maximum diameters of 2.1 to 2.3 cm, two have two holes near the distal end and the other one three holes near the distal end for stringing.

2. A compound artifact including a walnut 1.9 cm long and 2.1 cm in diameter. Norick gives the following description:

   Original entry states: "Amulet rattle of bone shafts and cañón walnut." This specimen consists of two bone tubes strung together with modern twine and attached to a skin strip which runs through perforations in the side of the walnut; four perforations in all. Mostly whole [shell] with [nut] meat. Bird bone shafts: cf. ulna and humerus of owl-size bird [Norick, personal communication January 8, 1978].

There is no archaeological provenience other than "Cliff Dwellers" for these specimens, hence they could be from either the Colorado River or Mesa Verde. They may be the items numbered 659 and 660 in Anonymous (1893).

Antell Collection

The Antell Collection contains the artifacts excavated on the Mesa Verde by Gustaf Nordenskiold in 1892. It is housed at the Museovirasto (National Museum), Helsinki, Finland. Nordenskiold (1893:Plate XLV, no. 11) illustrates and describes "half of a nut (Carva). Pierced at the end with two holes, and probably used as an ornament or amulet. Ruin 9." Nordenskiold's Ruin 9 is now known as Painted Kiva House (MV 557), located on Chapin Mesa, with tree-ring dates of A.D. 1199 and 1202 (Robinson and Harrill 1974:92).

Carya is the genus of hickories and pecans, with all native species restricted to the eastern half of North America (Brockman 1968:96–100). At my request, Mrs. Pirjo Varjola, Curator of the Bureau of Ethnology at the Museovirasto, submitted the nut for botanical identification to I. Kukkonen of the Museum Botanicum Universitatis, Helsinki. Dr. Kukkonen identified the nut as *Juglans microcarpa* Berl. (Varjola, personal communication April 7, 1977). The walnut is 2.4 cm long and 1.4 to 2.4 cm in diameter (Varjola, personal communication May 2, 1977). The photograph (Figure 8) indicates the shell color to be dark and shows the two stringing holes at the distal end. This nut thus closely resembles the specimen from the Fewkes-Jeep Collection and those in the Wilmarth and 1888–1889 Wetherill collections.

Fortified House Walnut

Nordenskiold (1893:46–47) cites John Wetherill's notes on the excavation of a burial room "in a ruin situated in a subdivision of Johnson Cañón" that mention the recovery of "a walnut." Other published accounts of this burial room (Gillmor and Wetherill 1953:36–37; McNitt 1966:31–32, 325–326) identify the ruin as Fortified House located in Acowitz Canyon (now known as Lion Canyon), a tributary of Johnson Canyon, and the period of excavation as the winter of 1889–1890. Consequently, the walnut may have ended up in the Hazzard or Smith-Hazzard collections.

Tree-ring dating from Fortified House (SMTUMR 2158) indicates construction from A.D. 1204 (Harrill and Breternitz 1976:379), thus a Mesa Verde-phase occupation.
Hoy House Walnuts

The only walnuts from archaeological contexts at Mesa Verde that do not date to the 1880s and 1890s are those reported from the 1974 excavations at Hoy House (5MTUMR 2150). These consist of (a) two whole walnuts, each drilled with two stringing holes near the distal end, and (b) a half shell with no evidence of modification (Nickens 1981a:28). These walnuts are identified as the species *Juglans major* (Torr.) Heller (Nickens 1981b:77).

Hoy House is located on a northern tributary of Johnson Canyon. Like many other cliff dwellings in the southern half of Mesa Verde, it shows an early occupation during the McElmo phase—indicated by a cluster of tree-ring dates in the A.D. 1140s—and a later period of major construction in the Mesa Verde phase—indicated by a cluster of tree-ring dates from about A.D. 1196 to 1212 (Harrill and Breternitz 1976; Nickens 1981a:16–17). It is not clear to which of these periods the walnuts belong.

SPECIMENS FROM OTHER ANASAZI SITES

Following the early recoveries of walnuts at Mesa Verde, others have occasionally been found at Anasazi sites on the Colorado Plateau.

Aztec Ruin

Earl Morris' excavation at Aztec Ruin, New Mexico, produced two recoveries of walnuts, as follow:

1. One or more whole walnuts with two holes pierced for stringing near the distal end from Room 48 (Morris 1919:98). Morris' illustration shows a walnut that looks identical to the various specimens
found at Mesa Verde. The nut (or nuts) came from a refuse deposit rich in vegetable matter that Morris (1928:307-308) assigns to the Chacoan, i.e., Bonito-phase occupation.

2. "Several very small walnuts, badly charred were taken from a mug" in Room 41 (Morris 1919:98). This "mug" is later described as a black-on-white bird-shaped vessel associated with Burial No. 16 (Morris 1924:154-161). A bird-shaped jar seems to me a more likely container than a mug; a charred cloth was also found within this jar. The walnuts had been heavily ground on their proximal ends, enough to wear away the shell and expose the interiors. Morris' (1924) burial table assigns Burial 16 to the Mesa Verdean occupation.

Pueblo Bonito

George Pepper recovered walnuts from three locations within Pueblo Bonito at Chaco Canyon, New Mexico, during his excavations:

1. "Three cañon walnuts, one of which has the top ground off and the sides smoothed" in Room 24 (Pepper 1920:97), apparently from a refuse deposit.

2. "Nine cañon walnuts were uncovered and two of these had been drilled for suspension, two holes in the upper part of each" (Pepper 1920:108). These were from a refuse deposit in Room 25.

3. "a cañon walnut (Juglans rupestris) which had been covered with gum and inlaid with turquoise" in Room 44 (Pepper 1920:205). Pepper's illustration shows an empty shell, with about two-fifths of the shell area carved and broken away.

During his subsequent excavations at Pueblo Bonito, Neil Judd (1954:103) recovered several more specimens:

Half a walnut (Juglans sp.), converted into a pendant merely by drilling two holes to meet below the convex surface near the apex...was picked up in Room 298....Another walnut shell, rubbed smooth on the outside and the base ground off, yet not identifiable as an ornament, was recovered in the passageway (Room 250) connecting Rooms 251 and 256....Unworked fragments of walnut shells (Juglans major or J. rupestris) were collected also in Rooms 246, 296, and 323 [Judd 1954:103].

It is not clear from the sources whether the reported walnuts are from the Bonito-phase occupation, the post-Bonito phase occupation, or both.

Canyon de Chelly, Arizona

Earl Morris (1925:298) excavated an infant burial from an unspecified site in Canyon del Muerto that contained "a rattle made of five walnut shells strung on a cord." Reference to this as a "cliff-dweller" suggests that it dates to late Pueblo III, or A.D. 1200s.

SOUTHWESTERN WALNUT SPECIES

The botanical identifications of the walnuts from archeological contexts described above include the species names Juglans rupestris, Juglans microcarpa, and Juglans major. This does not mean that there have actually been three different species of walnut recovered from archaeological sites at Mesa Verde, but simply that there have been changes in the taxonomy of Southwestern walnuts over the past century.

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Fernweh's species identification of Chapin's walnut in the 1890s reflects an early classification that lumped all walnuts of western North America (from central Texas to California) into a single species, *Juglans rupestris*. The native walnuts of California have subsequently been recognized as two separate species, *J. Californica* and *J. hindsii* (Brockman 1968:94) and do not enter further into this discussion.

In 1904 *Juglans major*, the Arizona walnut of southern Arizona and New Mexico, was recognized as a separate species, leaving the term *J. rupestris* (the little walnut) to represent only the shrubby walnut of Texas, southeastern New Mexico, and northeastern Mexico (Sudworth 1934:102). The term *J. rupestris* shrank from representing all western walnuts to only referring to the easternmost of four species.

Subsequently, Johnston (1944:436) pointed out that the little walnut had first been described by Berlandier by the name *Juglans microcarpa*; by the rules of biological nomenclature, this name has precedence. Since about 1950 most botanical publications have accepted the name *J. microcarpa* in place of *J. rupestris* for the little walnut (e.g., Brockman 1968:94; Little 1950:42; Vines 1960:124–125).

A final complication is that not all botanists accept the Arizona walnut as a separate species from the little walnut because of reported intergrades between the two (see discussion in Vines 1960:124–126); they therefore accept *Juglans microcarpa* as the species name for all Southwestern walnuts (e.g., Benson and Darrow 1954:110–113). Kukkonen was probably following such a
lumping of the two walnuts in his identification of the walnut in the Antell Collection.

In summary, it appears that all botanically identified specimens from the Mesa Verde, Aztec Ruin, and Pueblo Bonito can be attributed to *Juglans major*, the Arizona walnut. Thus, it is likely that the unidentified specimens also belong to this species. In a number of cases the excavators originally identified archaeological nuts as hickories (*Carya* sp.), but subsequent botanical identification has always revealed these to be walnuts instead.

The modern distribution of the Arizona walnut is shown in Figure 9. It is found in canyons and along streams in oak woodland, desert grassland, and the uppermost part of the desert vegetation types defined by Little (1950:6–7, 43). Its altitudinal range of ca. 1,000 to 1,800 m (3,500 to 6,000 ft) places it in a biotic community transitional between the Upper and Lower Sonoran life zones. The only walnut trees growing on the Colorado Plateau north of the distribution of the Arizona walnut are a few nonnative trees planted by modern settlers, e.g. at farms in the San Juan River drainage (Hall and Flowers 1961:58).

Regarding the prehistoric climate of Mesa Verde, Erdman et al. (1969:57) concluded that "the climate of today approximates that of the 13th century in most significant aspects." More recently, Nickens (1981a:20) found that the available "data combine to indicate that there are no apparent differences between the modern ecosystem and that of the twelfth and thirteenth centuries, at least in terms of biotic components." Therefore there is no reason to think that native Southwestern walnuts were part of the local ecology of Mesa Verde at the time of deposition of the archaeological specimens.

### THE WALNUT AS A TRADE ITEM

Given that walnuts did not grow natively in the Mesa Verde and assuming that the Anasazi did not artificially maintain walnut trees in kitchen gardens (and there is no evidence for this), then the walnuts must have been imported in some way. The nuts seem to be too big and the drainage geography unfavorable to attribute this occurrence to natural means of transportation (wind, water, or animals). This leaves human transport as the only logical source.

In archaeological sites the social context surrounding the acquisition of exotic items is no longer observable and hence remains ambiguous. However, given that the nearest natural occurrence of walnuts to the Mesa Verde is on the order of ca. 260 km (160 mi) to the southeast in the Rio Grande drainage, it seems reasonable to attribute the presence of the walnuts at Mesa Verde to some form of prehistoric commerce.

The available temporal evidence on walnut occurrences at Mesa Verde suggests their importation during portions of the McElmo and Mesa Verde phases, perhaps A.D. 1100 to 1250. Walnut occurrences at the Aztec Ruin and Pueblo Bonito seem to be during the Bonito phase (A.D. 1050–1130) and in post-Bonito phase times (ca. A.D. 1130–1250?). At Canyon de Chelly the sole known occurrence may date to the A.D. 1200s.

Based on my knowledge of exotic materials in Mesa Verde archaeological sites, trade contacts toward areas where walnuts grow naturally seem to be directly to the south. For example, the pottery types Puerco Black-on-red, Wingate Black-on-red and Polychrome, and St. John's Black-on-red and Polychrome (with combined temporal spans...
of ca. A.D. 1030–1325) show geographic distributions north to the Mesa Verde and south into the walnut-producing areas along the Arizona-New Mexico border (Carlson 1970). The widespread distributions probably reflect the movement of prehistoric traders. The probable generalized route of walnut trade north toward the archaeological localities on the Colorado Plateau, where walnuts have been found, is shown by the large arrow on Figure 9.

The unmodified walnuts in the Hazzard Collection show that at least some of the nuts were imported without first being made into artifacts. The possibility remains, however, that some walnuts may have arrived as parts of completed artifacts; the rather standardized way in which walnuts from the Mesa Verde, Aztec Ruin, and Pueblo Bonito were pierced for stringing suggests this. So far there is no evidence to suggest an importation of walnuts as food items. The use of walnut artifacts is speculative, but the identifications offered by the excavators (i.e., "rattles," "charms," "ornaments"), all suggest decoration or possibly ceremonial sound-making uses.

Walnuts are only one of several items traded into the Mesa Verde from the south: pottery of types belonging to the White Mountain Red ware has already been mentioned above, but various Mogollon pottery types have also been reported, and other possible items include sea shells, turquoise, and various minerals. Despite the frequently quoted speculation by Cushing (1896:352–353) that salt from the Zuñi Salt Lake was traded northward in prehistoric times, the geochemical evidence militates against this (Baldwin 1976). Much evidence and analysis regarding the overall patterns of trade into Mesa Verde remain to be presented.

ACKNOWLEDGMENTS

Many persons at many institutions assisted me in collecting information from existing museum collections. These include: Ronald Switzer, Gil Wenger, Roger Trick, Carolyn Hail, and Dori Partsch at Mesa Verde National Park; Judith Kremsdorf Golden, Joseph Morrow, and Judy Heberling of the Colorado Historical Society; Mrs. Pirjo Varjola of the Museovirasto; Claudia N. Medoff and Jeannette Flamm of the University Museum, University of Pennsylvania; and Frank Norick of the Lowie Museum of Anthropology. Other persons helped to secure botanical identifications of walnut specimens, including I. Kikkonen of the Museum Botanicum Universitatis, Helsinki, and William C. Martin and Molly Struever (Toll) of the University of New Mexico. And I thank Duncan Perry for producing two of the photographs used in this report.

—Calgary, Alberta, Canada

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SOME THOUGHTS ON THE NAMING AND DATING OF SAN IGNACIO BLACK-ON-WHITE POTTERY (LATE CHACO-McELMO BLACK-ON-WHITE) IN THE NORTH-CENTRAL REGION OF NEW MEXICO

Richard A. Bice

The name "Chaco-McElmo Black-on-white" has been applied to a type of pottery that was manufactured for a short period of time in the immediate area of Chaco Canyon. It was somewhat aberrant to the region, as a carbon-painted ceramic in the midst of largely mineral-painted wares. It derived its name from McElmo Black-on-white of the San Juan region and without doubt came into being as a result of trade and other cultural relationships between the San Juan and Chaco Canyon dwellers. The San Juan design influence is stated by Toll et al. (1980:112) as follows:

The appearance of McElmo, along with changes in architectural style, trash deposition and burial practices, signals the growing role (and eventual dominance) of the San Juan region in the exchange system once dominated by Chaco Canyon. The gradual transition is reflected in the technological similarity between Chaco-McElmo and McElmo in Chaco Canyon.

Windes (1985:19) notes the early excavation history of Chaco-McElmo by citing H. H. Roberts Jr. (1927) for his analysis of pottery collected from four of the principal sites in Chaco Canyon. Roberts called the pottery "Chaco-San Juan."

Complications on the use of the name Chaco-McElmo arose when the name was picked to describe similar pottery found in much later sites in an area extending east of Chaco Canyon into the Rio Grande drainage, where it has been referred to variously as Chaco-McElmo Black-on-white and Late Chaco-McElmo Black-on-white, and at an early time the name "San Ignacio Black-on-white" was proposed.

In this study I address the unsettled matter by suggesting that the name be changed and that newly derived information be used to describe its dating signature. These recommendations are based on published attribute descriptions of the early and late versions of the pottery and on the analysis of both published and as yet unpublished data from three Albuquerque Archaeological Society projects, AS-3 (Prieta Vista), AS-8, and a cluster of sites surrounding AS-8, called Milpas.
WHAT'S IN A NAME

Windes (1985:22, 26) notes the confusing history of Chaco-McElmo Black-on-white and gives much credit to Franklin (1980, 1982a, 1982b) and to Toll and McKenna (1983) for their studies of the problem. He then focuses on pottery of that name as it occurs in the immediate Chaco Canyon region, where it was one of the dominant types for a short period during the late phases of occupation.

He provides the following date span for this pottery (Windes 1985:39):

Thus, from the available data, Chaco-McElmo Black-on-white can best be assigned a temporal range of about A.D. 1090/1100 to about A.D. 1140/1150. It may enjoy a short period of maximum, if not dominant, popularity soon after its inception until about A.D. 1120.

However, when the name "Chaco-McElmo Black-on-white" was applied to pottery of similar characteristics, which was made in later periods and found principally in an easterly direction from Chaco Canyon (Bice and Sundt 1972), the name, time, and space issues began to pose problems.

Sundt (1987:128-129, 136) addressed the issues during a restudy of the dating of many types of pottery found in central New Mexico. He initially used the designation of "Late Chaco-McElmo Black-on-white," but went on to suggest that the name of "San Ignacio Black-on-white" be substituted. However, in order to seriously consider this name change, we should understand the comparative attributes of the earlier and later versions. The comparison is made herein by using the descriptions provided by Windes (1985) and by Bice and Sundt (1972), respectively.

Chaco-McElmo Black-on-White

Chaco-McElmo Black-on-white is placed with the Chaco Cibola White-ware...because of the number of attributes it shares with the Chaco ceramic tradition....The attribute constellation of paste, temper and slip, and some vessel forms (pitchers and cylindrical vessels) mark Chaco-McElmo as of distinctly Chacoan manufacture [Windes 1985:26].

Designs: ...paramount use of Sosi style wide line decorations,...the use of dot groups, as fillers within blank space (i.e., parallelograms and checkerboards) or along the edges of thin oblique parallel lines.

Other major elements employed on Chaco-McElmo ceramics include sawteeth, often as opposing elements; checkerboards; a series of parallel lines within a band...or unbounded (often on bowls and the flared basal part of pitchers); open or negative rectangles...and key figures ending in frets (often interlocking).

Hatched elements are rare.

The normal Chaco-McElmo pattern is to ornament segments of the rim with small ticks (dots), often in groups.

Forms: ...about equal numbers of bowls and pitchers...with smaller frequencies of ladles, seed jars, ollas,
effigies, and nondescript small jars....Rim forms of Chaco-McElmo trend toward tapered, narrow flat rims, although most are tapered and rounded.

Temper: ...Sand (or crushed sandstone) comprises a large minority (23%) of the tempering materials, but sherd temper is found in the vast majority (68%)....Of interest is the number of sherds tempered solely with fine sparse fragments of trachyte.

Paint: ...Chaco-McElmo is decorated with carbon paint.

The carbon paint is often a faded dull purplish color...with indistinct edges.

Slip: ...thin, white, wash application and the practice of leaving unpainted portions of the vessel unslipped....The conservative use of slip is such that it is typical for potters to leave the lower area on jars,...ladles,...and bowls...unslipped. Often a narrow ribbon of slip is applied just under the rim on bowl exteriors and jar interiors...or across or around the bottom.

In some cases the bowl exterior of Chaco-McElmo is so highly polished that it is difficult to distinguish slip from the vessel paste and, with some, no slip is evident [Windes 1985:29, 31].

Late Chaco-McElmo Black-on-white

Paste (Tempered Clay): The paste of Chaco-McElmo...is most like that of the material found in the Chaco drainage proper or the uplands to the south. It is of the same shade of white to light gray...although the few sherds separated as varieties have a yellowish cast....Besides being moderately to heavily tempered (greater than 15%) with ground sherd, there are some grains of sand or occasional fractures of feldspars....All varieties of paste are hard; they break with a snap.

Surface Treatment: Essentially all bowl sherds were slipped on both the inside and the outside, or at least appeared so....The surfaces were generally smooth, compact, and somewhat lustrous. Occasionally, very fine crazing could be found....Inside surfaces were more highly polished than outside surfaces.

The clearest surface color approached white....slip on occasional pieces, and rarely, there may have been polishing action after painting, which appears to have picked up some paint and carried it over into the adjacent white areas, giving them a streaky or cloudy appearance.

Bowl surfaces were even, both inside and out, with little or no remnants left of the fabrication process. The few jars and closed forms were finished only on the outside surface; the inside was left rough from the scraping and evening process.

Painted Decoration: Virtually all vessels were painted with carbon paint on only one surface...bowls inside and jars outside.
Most of the paint is a fairly good black, especially in the narrow lines and small solid elements. Where paint was used as mass to fill larger solid areas, it is frequently thin, hence gray.

From large rim sherds...it seems that the usual layout was an encircling band....Bands with wide framing lines are twice as numerous as those without any framing lines. There is a slight suggestion that continuous band layouts are more common than paneled.

Linear design elements predominate, with most lines being narrow...or wide,...but many are...in-between....Mass, the use of paint to fill solid areas, is also common, either as very wide lines, solid triangles, or other motifs....Other elements also present include open triangles, chevrons, circles, and dots, including an occasional dotted rim. Hatching is most frequently diagonal, although parallel and perpendicular types occur, as well as square and diamond cross-hatching. Spaces are usually wider than lines. Both square and diamond checkerboards occur, and one instance of a checkerboard with dotted open spaces was recorded.

Several styles of design are represented, but none of them are in a particularly pure form....Suggestions of Sosi are intermixed with either a Tularosa or a Mesa Verde-like approach to decoration.

Mechanics and Manufacture: Most vessels were medium to large open bowls with thick walls and rounded rims...small open and closed forms were in a small minority.

Manufacture was apparently done by coiling and scraping.

Firing was done in a reducing atmosphere [Bice and Sundt 1972:104–117].

COMPARISON BETWEEN CHACO-McELMO AND LATE CHACO-McELMO

A summary comparison of the ceramic traits contained in the above listings is contained in Table 1. The two attribute sets are not parallel in structure, and the emphasis placed on traits differs somewhat. However, the chart has been prepared using not only the listed traits, but also the accompanying discussions in the references as well. It is thus believed to be a sound portrayal of the important comparative elements.

Table 1 shows that there are more attributes in common for the two pottery versions than there are differences. The principal differences have to do with vessel forms, temper, rim decorations, and painting designs. There may be some differences in slip and surface finish, but this is not fully apparent from the written descriptions.

The vessel form differences show an apparent greater predominance of bowls in the late version than in the early version. This can probably be explained by cultural environments rather than by intrinsic type traits. However, the temper differences may be significant. The Chaco-McElmo description shows a considerably higher reliance on sand, usually in the form of crushed rock, which is a San Juan trait. The Late Chaco-McElmo uses sherd or sherd and sand temper almost
Table 1. Attributes of Chaco-McElmo Black-on-white and Late Chaco-McElmo Black-on-white.

<table>
<thead>
<tr>
<th>Ceramic Attribute</th>
<th>Chaco-McElmo</th>
<th>Late Chaco-McElmo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paint Type</td>
<td>Carbon</td>
<td>Carbon</td>
</tr>
<tr>
<td>Paint Appearance</td>
<td>Faded, purplish, indistinct edges</td>
<td>Dark for thin lines. Grayish in large fills</td>
</tr>
<tr>
<td>Form</td>
<td>Bowls and pitchers predominate</td>
<td>Bowls predominate</td>
</tr>
<tr>
<td>Rim Type</td>
<td>Tapered round or flat</td>
<td>Round</td>
</tr>
<tr>
<td>Rim Decoration</td>
<td>Dots, often in groups</td>
<td>Dots uncommon</td>
</tr>
<tr>
<td>Temper</td>
<td>2/3 sherds, 1/4 sand, trace of trachyte</td>
<td>Sherd or sherd and sand. Small percent sand alone</td>
</tr>
<tr>
<td>Slip</td>
<td>Thin white wash. Unslipped where unpainted</td>
<td>Bowls slipped inside and outside; jars outside</td>
</tr>
<tr>
<td>Surface finish</td>
<td>Bowls smoothed inside and outside; jars outside. Bowls occasionally high polish outside.</td>
<td>Bowls smoothed inside and outside; jars outside. Slight lustrous polish. Occasional polish over paint.</td>
</tr>
<tr>
<td>Paint Decoration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encircling Band</td>
<td>Often</td>
<td>Often</td>
</tr>
<tr>
<td>Hatchure</td>
<td>Rare</td>
<td>Frequent</td>
</tr>
<tr>
<td>Sosi</td>
<td>Paramount</td>
<td>Suggestion</td>
</tr>
<tr>
<td>Narrow Line</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Checkerboard</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Diamond</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Interlocking</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

exclusively. This cannot be explained by differences in the availability of materials between the locales.

Similarly, a typical San Juan painting trait places ticks or dots on rim tops. The minimal use of this design element in the later Chaco-McElmo version, as well as the increased use of hatchures and the decreased Sosi emphasis certainly show a distinct trend of change in element design. Perhaps the trend can be explained by the exposure of the later pottery makers to the traits of other peoples over time and space.

Thus, from these comparisons the differences in temper and in paint-decoration elements appear to be the most important. Perhaps these differences alone do not provide a compelling reason for applying a different name to the later pottery version. However, pottery types are named to provide a short-

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hand to communicate not only physical attributes, but occurrence in space and time as well. The fact that the early Chaco-McElmo Black-on-white lasted only about 50 years in the immediate Chaco area is important in that it sets the type apart from the "Late" version that apparently enjoyed a life span of its own and is found toward the east. It is believed that these circumstances are enough to warrant renaming.

An excellent candidate for this name is Mera's San Ignacio Black-on-white. It was first used to designate what later became known as Late Chaco-McElmo Black-on-white when either Mera or Stubbs classified sherds collected between 1932–1937 on a survey conducted by the Laboratory of Anthropology (Bice and Sundt 1972:103; Smiley et al. 1953:36). The sites were in an LA 800 series clustered near Mesa Prieta in north-central New Mexico.

In keeping with Sundt's (1987:128) suggestion to use the Mera name, for the reasons just described, the name San Ignacio Black-on-white has been applied to the later version of Chaco-McElmo Black-on-white for use in the remainder of this paper.

**DATING SAN IGNACIO BLACK-ON-WHITE**

The second principal thrust of this paper is to shed additional light on the manufacturing date span of San Ignacio Black-on-white. This dating refinement assumes importance as an aid to current and future studies of sites containing this type of pottery.

Along with San Ignacio Black-on-white, Santa Fe Black-on-white pottery has been found to be the other predominant type in the sites studied in this report. Santa Fe Black-on-white has been widely reported upon, and the published date spans are generally accepted. Thus, the principal technique used in refining the San Ignacio dates is to compare the relative popularity trends of the two types.

In Sundt's (1987) recent updating of the dating signatures for many pottery types in New Mexico, he covered both the San Ignacio and Santa Fe types. He formalized the pottery dating signature as being the Limit, Best Range, and Mode dates and calculated the popularity Mode date as being two thirds of the way between the Best Range dates.

When discussing San Ignacio Black-on-white, Sundt (1987:140) suggested a Best Range from about A.D. 1233 to A.D. 1262 with a Mode at A.D. 1252. However, he considers these dates to be judgmental and poorly documented. In contrast, he considers the Santa Fe Black-on-white dates of Best Range between A.D. 1175 and A.D. 1300 with a Mode at A.D. 1258 to be good.

During the last two decades, three projects have been conducted by the Albuquerque Archaeological Society, studying sites located between the Chaco Canyon and the Rio Grande. In these projects, San Ignacio Black-on-white and Santa Fe Black-on-white have shared positions of dominance among all of the painted sherds collected.

The projects were Site LA 882 (AS-3) near Mesa Prieta, Site LA 13197 (AS-8) near San Ysidro, and the cluster of Milpas sites near AS-8. (The Albuquerque Archaeological Society was not able to match this cluster of sites to previously recorded sites in the area.) All sites share many of the same pottery types.
Table 2. LA 822 Painted Ceramic Types—Number/Percent vs. Dates.

<table>
<thead>
<tr>
<th>Inferred Dates (AD)</th>
<th>1220</th>
<th>1240</th>
<th>1255</th>
<th>1265</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Johns</td>
<td>16</td>
<td>6.5</td>
<td>23</td>
<td>8.7</td>
<td>22</td>
</tr>
<tr>
<td>Wingate</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Socorro</td>
<td>1</td>
<td>0.4</td>
<td>1</td>
<td>0.4</td>
<td>2</td>
</tr>
<tr>
<td>Tularosa</td>
<td>2</td>
<td>0.8</td>
<td>1</td>
<td>0.4</td>
<td>3</td>
</tr>
<tr>
<td>Puerco</td>
<td>1</td>
<td>0.4</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
</tr>
<tr>
<td>San Juan McElmo</td>
<td>1</td>
<td>0.4</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
</tr>
<tr>
<td>Kwahee</td>
<td>1</td>
<td>0.4</td>
<td>1</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>Santa Fe</td>
<td>92</td>
<td>37.2</td>
<td>88</td>
<td>33.5</td>
<td>122</td>
</tr>
<tr>
<td>San Ignacio</td>
<td>126</td>
<td>51.0</td>
<td>139</td>
<td>52.9</td>
<td>255</td>
</tr>
<tr>
<td>Red Mesa</td>
<td>1</td>
<td>0.4</td>
<td>1</td>
<td>0.4</td>
<td>2</td>
</tr>
<tr>
<td>Vallecitos</td>
<td>6</td>
<td>2.4</td>
<td>9</td>
<td>3.4</td>
<td>16</td>
</tr>
<tr>
<td>Totals</td>
<td>247</td>
<td>99.9</td>
<td>263</td>
<td>100.1</td>
<td>428</td>
</tr>
<tr>
<td>Other - w/o Santa Fe and San Ignacio</td>
<td>29</td>
<td>11.7</td>
<td>36</td>
<td>13.7</td>
<td>51</td>
</tr>
</tbody>
</table>

and existed between ca. A.D. 1200–1300, 50 to 150 years later than the principal terminus of Chaco Canyon occupation.

Site LA 882 (AS-3) Prieta Vista

Site LA 882 (Bice and Sundt 1972) is a small 15-room PIII pueblo located near the south end of Mesa Prieta. No datable tree-ring specimens were recovered from it, but dendrochronology dates are available from Site LA 875 nearby. Both sites are in the same cluster of settlements and appear to share similar archaeological characteristics. Each is known to have Santa Fe Black-on-white and San Ignacio Black-on-white as the dominant pottery varieties (Bice and Sundt 1972:103), Smiley et al. 1953:36). It is thus believed that the LA 875 dates can be applied to LA 882 for the purposes of this study.

The LA 875 tree-ring dates are as follows: A.D. 1233, 1239, 1241, two at 1257, two at 1259, two at 1260, and one at 1262. The dating samples came from test pits dug by Stallings, and none were believed to be from construction beams. The dates for LA 882, from the whole pottery collection, indicate that its primary occupation may have started as early as A.D. 1220 (Bice and Sundt 1972:176).

The pottery on Site LA 882 that lends itself to the present study was recovered from a series of checkerboard grids in the dump area. Four periods—Early, Early Middle, Late Middle, and Late—were chosen to
Table 3a. AS-8 Painted Ceramic Types—Numbers vs. Vertical Provenance.

<table>
<thead>
<tr>
<th>Ceramic Types</th>
<th>F</th>
<th>E</th>
<th>D</th>
<th>C</th>
<th>B</th>
<th>A</th>
<th>Site Surface</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kwahe-e Black-on-white</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Tularosa Black-on-white</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Santa Fe Black-on-white</td>
<td>5</td>
<td>11</td>
<td>27</td>
<td>17</td>
<td>50</td>
<td>93</td>
<td>189</td>
<td>392</td>
</tr>
<tr>
<td>San Ignacio Black-on-white</td>
<td>3</td>
<td>3</td>
<td>18</td>
<td>26</td>
<td>59</td>
<td>155</td>
<td>290</td>
<td></td>
</tr>
<tr>
<td>San Juan McElmo Black-on-white</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>16</td>
<td>26</td>
</tr>
<tr>
<td>St Johns Poly</td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>9</td>
<td>17</td>
<td>36</td>
<td>75</td>
</tr>
<tr>
<td>Glaze Misc</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Totals</td>
<td>8</td>
<td>18</td>
<td>54</td>
<td>47</td>
<td>89</td>
<td>182</td>
<td>403</td>
<td>801</td>
</tr>
</tbody>
</table>

represent the time-span of the dump. Dump strata were assigned to each period (Bice and Sundt 1972:50–57). Using the LA 875 dates and the site report date, the following ca. mid-period dates are assumed: Early—A.D. 1220; Early Middle—A.D. 1240; Middle—A.D. 1255, and Late—A.D. 1265. The sherd counts for pottery types that were present are shown by period in Table 2.

The pottery information is summarized statistically in Figure 1 by plotting dates against the percentages of San Ignacio Black-on-white, Santa Fe Black-on-white, and the total of the Other painted wares, to show three proportional trend lines. San Ignacio Black-on-white rises in proportion over time, while Santa Fe Black-on-white declines, and the sum of the Other types remains relatively constant. This suggests that, at this site, San Ignacio Black-on-white reached its Mode (or peak in popularity) later than Santa Fe Black-on-white.

**Site LA 13197 (AS-8)**

Site LA 13197, located south of San Ysidro, NM, is a PIII pueblo containing more than 40 rooms. The Albuquerque Archaeological Society carried out mitigation and stabilization excavation and studies from 1975 to 1983. Three progress reports were written (Bice and Sundt 1976, 1980; Sundt 1978). The final site report is currently in preparation, and some of its databases have provided the data used below.

The following dates were obtained from the site. Tree-ring dates are A.D. 1177 (believed to be earlier than the ceramics in this study), 1212, 1212, 1221, 1277, and 1283. Radiocarbon dates are A.D. 1265 ± 12 and 1265 ± 19. In addition, the presence of early Rio Grande Glaze ware, which would date no earlier than ca. A.D. 1300, provides another reference date for the site.
Figure 1. AS-3 Pottery Popularity Trends.

Figure 2. AS-8 Pottery Popularity Trends.
Table 3b. AS-8 Painted Ceramic Types - Numbers/Percent vs. Date

<table>
<thead>
<tr>
<th>Ceramic Types</th>
<th>Combined Strata/ Inferred Dates</th>
<th>F+E+D</th>
<th>C+B</th>
<th>A</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A.D. 1215</td>
<td>A.D. 1250</td>
<td>A.D. 1275</td>
<td>A.D. 1295</td>
</tr>
<tr>
<td>Santa Fe</td>
<td>43</td>
<td>54.2</td>
<td>67</td>
<td>49.4</td>
<td>93</td>
</tr>
<tr>
<td>San Ignacio</td>
<td>24</td>
<td>29.5</td>
<td>52</td>
<td>38.4</td>
<td>59</td>
</tr>
<tr>
<td>Other</td>
<td>13</td>
<td>16.3</td>
<td>17</td>
<td>12.2</td>
<td>30</td>
</tr>
<tr>
<td>Totals</td>
<td>80</td>
<td>100.0</td>
<td>136</td>
<td>100.0</td>
<td>182</td>
</tr>
</tbody>
</table>

The pottery data found to be most useful came from surface sherds compared with sherds from the stratigraphic excavation of a series of grids that crossed a wall bordering the dump-plaza on the southeast side. The sherd counts were grouped to represent four time-span periods, strata F+E+D, C+B, A, and Surface, with mid-points judged to be ca. A.D. 1210, 1250, 1275, and 1295, respectively. The types, numbers, and percentages of sherds for each period are shown in Tables 3a. and 3b.

The popularity trends for San Ignacio Black-on-white, Santa Fe Black-on-white, and the group of Other types are plotted in Figure 2. San Ignacio Black-on-white becomes increasingly popular over the time period, while Santa Fe Black-on-white shows a corresponding decrease. The sum of the Other types remains relatively steady.

**Milpas (Site Clusters Associated With AS-8)**

The ceramic data came from 27 of the Milpas sites surveyed by the Albuquerque Archaeological Society in 1981-1982 as part of the program designed to provide information on the settlement pattern surrounding AS-8 (Sundt et al. 1983). Only surface collections were made, so that no stratigraphic data and no tree-ring or radiocarbon dates are available. However, one good time-marker does exist, namely the presence or absence of Rio Grande Glaze ware. Those sites where this type of pottery is present are presumed to have persisted into the early A.D. 1300s, whereas those without the glaze ware are presumed to have been abandoned at earlier dates.

The terminal dates for the two groups were arbitrarily chosen as A.D. 1280 for those sites without glaze ware and A.D. 1310 for those sites with glaze ware. Thus sherd counts can provide gross popularity trends over time between San Ignacio Black-on-white and Santa Fe Black-on-white.

The composite summary of pottery data for the sites associated with each of the two terminal periods is shown in Table 4, and the popularity trends are plotted in Figure 3.
MILPAS POTTERY POPULARITY TRENDS
Sites W/ and W/O Glazeware

Figure 3. Milpas Pottery Popularity Trends.

PROPOSED DATE SPAN FOR
San Ignacio B/W

Figure 4. Proposed Data Span for San Ignacio Black-on-white.
Table 4. Milpas Painted Ceramic Types—Numbers/Percent vs. Date Periods.

<table>
<thead>
<tr>
<th>Ceramic Types</th>
<th>Early Sites W/O Glaze</th>
<th>Late Sites W/Glaze</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kuahe'e</td>
<td>23</td>
<td>3.4</td>
<td>4</td>
</tr>
<tr>
<td>Santa Fe</td>
<td>402</td>
<td>59.2</td>
<td>212</td>
</tr>
<tr>
<td>San Ignacio</td>
<td>190</td>
<td>28.0</td>
<td>111</td>
</tr>
<tr>
<td>San Juan McElmo</td>
<td>7</td>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>Tularosa</td>
<td>14</td>
<td>2.1</td>
<td>12</td>
</tr>
<tr>
<td>St Johns</td>
<td>41</td>
<td>6.0</td>
<td>21</td>
</tr>
<tr>
<td>Mesa Verde</td>
<td>2</td>
<td>0.3</td>
<td>0</td>
</tr>
<tr>
<td>Biscuit W</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Early Glaze</td>
<td>0</td>
<td>0.0</td>
<td>18</td>
</tr>
<tr>
<td>Totals</td>
<td>679</td>
<td>100.0</td>
<td>379</td>
</tr>
<tr>
<td>Other - w/o Santa Fe and San Ignacio</td>
<td>87</td>
<td>12.8</td>
<td>56</td>
</tr>
</tbody>
</table>

This shows a slightly increasing proportion for both San Ignacio Black-on-white and Other pottery between the two terminal dates, while the Santa Fe Black-on-white has a more pronounced decrease in popularity.

DISCUSSION AND CONCLUSIONS

Justification appears to exist for choosing a distinctive name for the pottery type that has been referred to as Late Chaco-McElmo Black-on-white. The name San Ignacio Black-on-white is proposed.

In refining the dates assigned to this pottery, proportional popularity trends between it and Santa Fe Black-on-white are compared.

While the study contains subjective choices for the center dates in the stratigraphic studies, each of the three independent sets of data show the same popularity trend. In all sets, the popularity of San Ignacio Black-on-white increases between about ca. A.D. 1220 and 1300, while the popularity of Santa Fe Black-on-white decreases during the same period. These trends lead to the conclusion that San Ignacio Black-on-white was somewhat later than Santa Fe Black-on-white in reaching its peak in popularity.

Considering the Sundt Mode date for Santa Fe Black-on-white, A.D. 1258, and the Best Range dates from A.D. 1175 to 1300, it would appear that a Mode for San Ignacio Black-on-white of A.D. 1270, with a Best Range span of A.D. 1180 to 1315 would be reasonable.

The time signatures for these two types of pottery, together with that of Chaco-McElmo Black-on-white, are depicted in Figure 4.
The sites providing the data for this study are in a limited region of north-central New Mexico, which contains most of the reported occurrences of San Ignacio Black-on-white. The validity of the conclusions if applied to pottery outside of this region is unknown.

Finally, the comparative dominance between San Ignacio Black-on-white and Santa Fe Black-on-white is reversed between AS-3 and AS-8/Milpas, with Santa Fe Black-on-white becoming more dominant in the easternmost sites. This apparent trend presents a question for research to further understand the pottery and cultural relationships of the region.

ACKNOWLEDGMENTS

I wish to acknowledge the field and laboratory work performed in past years by a great many members of the Albuquerque Archaeological Society. They gathered the field data, processed and curated the artifacts, and helped in the analysis. Without the thousands of volunteer hours that were spent on the AS-3, AS-8, and Milpas projects, this study could not have been undertaken. Please accept my thanks.

—Albuquerque, New Mexico

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Sundt, William M.

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Sundt, William M.

Toll, Wolcott, and Peter McKenna

Toll, H. Wolcott, III, Thomas C. Windes, and Peter J. McKenna

Windes, Thomas C.
In 1990, the Archaeology at Ghost Ranch seminar under the leadership of Dr. Florence Hawley Ellis turned its attention to sites on Ghost Ranch. The focus of excavation was a Piedra Lumbre phase site, Ghost Ranch 2 (LA 13674), that had been discovered in the 1970s. The apparent features of the site included a C-shaped low rock wall and remnants of three wooden posts built against a sandstone cliff. Scratched into the cliff face was the name "Nikolas Lovato, Avril 1916." One nearly complete Biscuit ware bowl was found in the nearby wash. Dr. Ellis' seminars had previously focused on the structural ruins of the Gallina culture, except for the seminar in 1976, when several of these Piedra Lumbre structures were excavated on Ghost Ranch; very little cultural material was found in these sites. Needless to say, Dr. Ellis was a little skeptical that we would find anything interesting at all at Ghost Ranch 2. But in the past four years, this crude rock shelter has yielded more than she or anyone else expected.

The general Ghost Ranch area has a history of occupation extending from the Archaic period through the Anasazi culture, the Piedra Lumbre (Kemrer 1992; Schaafsma 1979), and the early Spanish and Modern periods. Many of the Piedra Lumbre structures were excavated before the Abiquiu Reservoir was completed; the reservoir adjoins Ghost Ranch's 8,400 ha (21,000 acres) to the south. Archaeologists seem to agree that the Piedra Lumbre phase dates to the early Historic period or A.D. 1650–1750, that the architecture of this phase incorporates rock shelters and boulders, and that such sites are usually located with southern exposures near intermittent or permanent drainages (Kemrer 1992:67–69).

LOCATION

Ghost Ranch 2 (GR-2) is located in Rio Arriba County in the east pasture of Ghost Ranch on the Bull Canyon drainage, at an elevation of 1,981 m. Found on the northern bank of a floodplain, the site is close against a south-facing sandstone scarp that rises 3 to 5 m. The cliffs are topped with scattered piñoñ and juniper; close around the site are grasses, wolfberry, and cholla. The site was mapped to include an area 18 m northwest-southeast by 13 m. Looking south from the rock shelter, the Bull Canyon drainage has intermittent water flow, and within .4 km (.25 mi) is a year-round spring.
GR-2, Excavation Grid-1993, Including Depths b.d.

Figure 1. Drawing of excavation grid of GR-2.
METHODOLOGY

The site was first surveyed for surface features and artifacts by the members of the Archaeology at Ghost Ranch seminar. Participants of the seminar are usually divided into four groups doing site locational survey, topographic mapping, excavation, and laboratory work. Excavations have been carried out by members of an excavation group, under the supervision of Jim Shibley, working for two weeks each year over the last four years. The C-shaped low rock wall and the three wood posts suggested recent historical use as a crude dwelling or an animal pen. The excavation crew began a 1-by-15-m test trench that bisected the site and extended from the cliff face, through the rock wall, and continued downslope 10 m further (Figure 1). The meter squares were then excavated in 10-cm levels, and the soil was sifted with .635-cm (¼-in.) gauge screen. Artifacts were cataloged and are now stored in the Florence Hawley Ellis Museum of Anthropology at Ghost Ranch. Samples were collected for pottery analysis, dendrochronology, radiocarbon dating, obsidian-hydration dating, and pollen and flotation analysis.

Subsequent years of excavation have broadened the initial trench eastward and westward, 1 to 2 m. Excavations have proceeded to 1.5 to 2.0 m below the surface (Figure 2).

SOIL DESCRIPTION AND STRATIGRAPHY

The soil throughout the site was soft and ashy in texture. The surface soil was tan in color. On the north side of the wall, inside the structure, the soil beneath the tan surface layer was gray to a depth of somewhat over a meter, with the exception of a blackened burn layer at approximately 20 cm below the surface (Figure 3). At the deepest portion of the excavation, the soil changed to a reddish tan, matching the sandstone cliffs of the upper Bull Canyon drainage. All of the soil above this layer, with a total depth of almost 2 m, was probably cultural, according to Dr. Les McFadden of the Department of Earth and Planetary Sciences at University of New Mexico (personal communication 1993).

FEATURES

In addition to the surface structure mentioned (Figure 4), other architectural features were discovered. Inside the wall, two levels of fragmented flagstone floors were uncovered at 10 and 20 cm below the surface. The floor found at 10 cm was quite level and extended 4 m west from a large flagstone threshold slab found at a break in the rock wall. The 20-cm floor was thicker and more irregular.

A nearly continuous layer of charcoal was sandwiched between the two floors. Within this charcoal layer were found burned and intact logs or poles, parallel to each other, and perpendicular to the cliff face. Our hypothesis is that these poles were the remnants of vigas from a burned and fallen roof, perhaps supported by the still-visible roof-support posts and shallow pits in the cliff face.

Excavation in the interior of the shelter revealed fairly uniform soil filled with lithic and pottery artifacts. By contrast, in the center of the shelter, about 1 m below the surface, a large rock slab, 1 by 4 m in area and .5 m thick, lay horizontal and parallel to the cliff face. A matching cavity in the cliff face above leads to the likely speculation that this slab fell from the cliff face or overhang some significant time in the past and that it was purposely filled in and around and built upon at a later time. If the stratigraphy is fairly uni-
form, this "great fall" could have happened somewhat over a thousand years ago. Excavations below the level of this slab are continuing. In addition, a large cylindrical rock, 2 m long and 30 cm in diameter, is being uncovered; whether it is a cultural feature or another rock fall has yet to be determined.

At a depth of 80 cm below the surface, outside and below the rock wall, was found a large, slab-lined fire hearth filled with charcoal (Figure 3). The slabs were arranged in a funnel shape, becoming closer together toward the bottom. One Bandelier Black-on-gray sherd (dating A.D. 1400 to 1550) was found in association with this hearth (Franklin 1991:3). Three other smaller, cobble-lined hearths were found throughout the site along the length of the test trench.

**POTTERY**

Pottery sherds were found on the surface and within the excavations of GR-2. Most were found in upper levels between 75 and 150 cm below datum. According to pottery analysis done by Dr. Hayward Franklin, eight of the sherds from depths of 10-40 cm below the surface were San Juan Red-on-tan. This pottery has been dated from A.D. 1700 to the early twentieth century but was most popular during the nineteenth century. One sherd from 15 cm below the surface was classified by Franklin as Potsuwi'i Gray, which dates from A.D. 1400 to 1550. Franklin (1991:2) concluded from the samples "that there is indeed a time stratification" from the surface down to the depth of 100 cm, that the "sherds are from the general Tewa tradition, spanning the historical period" and even further, and that they are "derived from the Pajarito Plateau cultures, "back at least to the 1400s. Thus, the pottery typing alone provides us with layers of historic-to-late-prehistoric cultures, down to a level of approximately 1 m below the surface. The excavations below the 1-m depth were devoid of pottery.

**LITHICS**

Numerous lithic artifacts were found throughout the site, both on the surface and within the excavations. Lithic finds include projectile points, bifacial tools, scrapers, hammerstones, cobbles, fire-cracked rock, manos, metates, drills, cores, flakes, and assorted debitage. The projectile points are primarily of Polvadera and Jemez obsidian, some of Pedernal chert, and a few samples of quartzite. The maximum size of the projectile points is 4 cm, with most in the range of 1.5 to 2.0 cm long (Figure 5).

Thirteen representative samples of obsidian lithics were submitted for obsidian hydration measurements to Dr. Christopher Stevenson at the Archeological Service Consultants of the Diffusion Laboratory in Columbus, Ohio (Stevenson 1992). The upper levels (20–30 cm below surface) of the excavation in the rock shelter contained two points from the seventeenth and nineteenth centuries (A.D. 1623 and 1856). These dates correspond well with the Tewa pottery sherds found at approximately the same depths. A set of three obsidian lithics from the area of the slab-lined fire hearth, whose base was at a depth of about 70 cm below the surface, are clustered in age from the early thirteenth century to the mid-fourteenth century (A.D. 1206, 1306, 1369). These dates roughly correspond with the Bandelier Black-on-gray sherd found near the hearth, providing at least a tentative guess at the age of that feature.

Deeper lithics from .5 to 1 m below the surface inside the shelter include obsidian points that were culturally shaped in the
eighth, ninth, and tenth centuries (obsidian hydration dates of A.D. 794, 825, 909). This represents the maximum estimated age for the rock shelter to date. Obsidian samples from depths 1.5 to 2 m below the surface are being analyzed at the present time and may push back the dates of habitation to still earlier times.

BONES AND MISCELLANEOUS

Twenty-seven bones or bone fragment groups were found, mostly of small animals, a few of large animals, and none from human beings. Most were found between the surface and 70 cm below surface. One iron fragment about 8 cm in length was found near the surface inside the walls of the structure.

SUMMARY

A south-facing shelter in an overhanging cliff has been used as a camp site for over a thousand years, into the twentieth century. The most "recent" shelter, the Piedra Lumbre phase, had a low rock wall, vertical posts, and suggestions of a horizontal pole roof extending out from the cliff face. Twice the shelter was crudely floored with flagstones, once before and once after a roof was burned. Pottery analysis and obsidian-hydration results provide evidence of use from the seventeenth
Figure 5. Representative projectile points from GR-2 (shown actual size).
to nineteenth centuries, and the Nikolas Lovato signature of 1916 seems to indicate even later service. About 70 cm below the surface, a slab-lined fire hearth and associated artifacts give evidence of a prehistoric Tewa occupation. The lowest occupation is of unknown cultural affiliation but stretches back to A.D. 794.

Further excavation at GR-2 may involve more extensions of the test trench in a further search for cultural features inside and outside the Piedra Lumbre structure. It should be recognized that the wall features are of recent origin, and they sit on the modern surface. The extent of earlier uses below the surface is not fully apparent; the entire human story at this site remains to be explored. Since artifacts continue to be found at the lowest levels of the site, deeper levels may be excavated profitably. A search for adjoining activity areas outside the walls may determine the overall cultural organization of the site.

Little did Dr. Ellis suspect the amount of cultural deposition to be found at GR-2. Through the Archaeology at Ghost Ranch seminars that she began in 1971, participants will continue to excavate and explore this site and others on Ghost Ranch land.

—Ghost Ranch Archaeological Seminar, Abiquiu, New Mexico

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There are 45 separate countries in the New World. Of these, 19 are Spanish-speaking, 18 are English-speaking, 1 is bilingual English and French, 3 speak French, 2 Dutch, 1 Portuguese, and 1 Danish.

The languages, except for Danish, represent the major colonial powers in the New World in the seventeenth and eighteenth centuries. Not one of the 45 countries has a Native American language as its primary tongue, and in only one, Paraguay, is an American Indian language, Tupi-Guaraní, even an important literary vehicle. How did it come about in the New World that the aboriginal tribes and empires were entirely replaced by polities that were linguistically and culturally off-shoots of European nations rather than of indigenous societies, in contrast to the situation in Asia and Africa? It has been, to a large degree, a matter of population dynamics, for in all of the New World countries, the indigenous peoples suffered cataclysmic declines in numbers following contact with peoples from the Old World.

The first and most obvious cause of this population loss was the military superiority possessed by the European powers. The complex political, religious, and military organization of the Europeans provided advantages that were less apparent. Additionally, the effects of defeat must be taken into account. Defeat frequently entailed economic deprivation such that vitality and health were adversely affected. Often it led to further wars, revolts, and punishment, so that submission did not necessarily guarantee the prospect of living in peace. None of these advantages were unique to the success of the colonial powers in the New World, however. In Africa, and to a lesser degree in Asia, the indigenous peoples faced similar handicaps in their confrontations with Europeans.

There was one difference between the encounters of the Old and New worlds. Europe, Asia, and Africa had been in contact with each other for millennia. Disease organisms, while sometimes restricted by climate to the tropics, spread widely, and the large numbers of people provided host populations that could sustain infections through the centuries. A coevolution of humans and microorganisms had long been underway, augmented by a few cultural adaptations to epidemic disease. When an organism that causes epidemic disease is introduced to a human population that has had no prior exposure, the impact can be devastating. The
peoples of the New World had been completely isolated from Old World diseases for several millennia at the time of contact (Thornton 1987:44-45). Adaptation to these diseases was largely a natural process until the discovery first of vaccinations and later of antibiotics, although a few cultural practices of earlier times did help. In general, medical knowledge among both the Europeans and the Indians was inadequate to the need.

Dobyns (1966:414) generalized a formula to calculate the length of time required for a population to reach equilibrium, which he termed nadir, or the lowest population in the tribe's history. He proposed that nadir tended to occur about 130 years after contact or the first exposure to epidemic disease, and that depopulation was at a ratio of 20:1 between contact and nadir. He relied primarily on the disease factor as a cause of depopulation, a natural process that might be expected to vary little between different tribes. The formula works as a rule-of-thumb but is inadequate in specific situations.

The primary fallacy in Dobyns' method is the lack of attention to historical events. Wars, loss of resources, loss of population through enslavement, emigration and intermarriage, and gain through immigration may interact with the frequency and impact of disease in many ways. Still, his hypothesis is based more on empirical data than upon supposition about disease, and it provides one useful method to calculate aboriginal populations.

The core population of New Mexico in precontact and early colonial times was that of the Pueblo Indians. The Arizona Pueblo people, the Hopi, will be considered separately. Although the Hopi were normally included as a part of New Mexico in colonial times, their history is distinct. They remained independent from the time of the Pueblo Revolt of 1680 until the establishment of a federal agency in their country in the late nineteenth century. The Texas Pueblo settlements in the El Paso area, while also a part of the general Pueblo Indian population, have a sufficiently different history as well.

**NEW MEXICO PUEBLO POPULATION**

The population totals for the pueblos from Pecos on the east to Hawikuh on the west and from Qualacú on the south to Taos on the north are given in Table 1. Figures believed to be based on actual census data, supplemented by one estimate, are used for the years after 1700. Only totals are given in hopes that these will cancel out many of the discrepancies apparent in the data for individual pueblos. Where counts by pueblo are lacking in the sources, the label "census" is followed by a question mark. Totals for which the itemized figures are rounded to hundreds, fifties, and twenty-fives are omitted from the post-1700 listing. The sixteenth- and seventeenth-century figures are of necessity estimates, although the figure for a year sometime between 1638 and 1659 (Ivey 1989) is based on actual counts at a few of the missions. The only early estimate left out is Castañeda's for 20,000 at the time of Coronado's expedition, one that is clearly far too small.

This tabulation is designed to overcome some of the problems raised by Palkovich (1985) in her attempt to analyze population among the Eastern Pueblos by eliminating all or most of the less-reliable figures that she used. It provides some rather clear trends.

First, there is an obvious rapid decline from the late sixteenth century to about 1680. The losses during the early part of this period
### Table 1. New Mexico Pueblo Population Totals for Selected Years.

<table>
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<tr>
<th>Year</th>
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<th>Remarks</th>
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Note: Census figures with an asterisk omit some pueblos. Those with a question mark are based on totals only, as the figures for individual pueblos do not appear in my sources. Sources consulted: Palkovich 1985; Ortiz 1979; Littell and Graham n.d.; Bancroft 1962.

can doubtless be attributed largely to epidemic disease. While we know that there were losses from warfare, they were far from sufficient to account for the extent of the decline, even assuming that Spanish commanders suppressed some figures in order to avoid punishment. Pueblos fled to join the free tribes from time to time in the seventeenth century, but prior to the Reconquest, the numbers involved were probably small in terms of total population. It would also appear unlikely that there were any great losses from intermarriage with members of Spanish society.

Loss of resources was a severe impact during this period. During the exploratory phase, losses were very direct but affected only certain pueblos. Coronado’s large contingent depended heavily on local resources, which was particularly costly for the Southern Tiwas (Simmons 1979:178). The Espejo
expedition again struck hardest at the Southern Tiwas. When the colonists arrived in 1598 there began a more long-lasting series of demands. The *encomienda* and *repartimiento* gave legal sanction to exploitation of Indian labor and property (Brugge 1985:112; Simmons 1979:179–83).

The Pueblo Indian adaptation to the environment was a precarious one, closely attuned to the local climate. Large surpluses of food stored for the recurring drought periods were quickly exhausted by Spanish demands, and famine was the inevitable result (Bancroft 1962:150; Schroeder 1979:241; Wilson 1982:24). The resulting stresses also made people more vulnerable to infectious disease.

The effects of the Pueblo Revolt and the Reconquest led to dislocation of large numbers of people. The Tompiro towns had already been abandoned in the 1670s, prior to the revolt, as had most of the Zuni pueblos aside from Hálona. The people of the various Southern Tiwa villages were scattered—some during the 1670s and some by the Revolt itself. Losses in the battles fought during the period, coming after the decline of the previous century or more of exploration and colonization, were of greater consequence than those suffered during the initial contacts, for each person killed represented 8 to 12 people living during the earlier epoch. The Spaniards were seldom in a position to report accurately on Indian losses in these engagements, but they did give precise figures on Indians taken south for resettlement at new missions established in the El Paso area. During Governor Otermin's administration, at least 702 people went south to found the new pueblos of Ysleta del Sur, Senecú del Sur, and Socorro del Sur (Bronitsky 1987:162). Another 70 people were taken captive by Governor Cruzate in 1689 and transported south, where they probably were added to the population of the new villages (Espinosa 1988:37). Conversion of these figures by the ratio of depopulation between the 1580s and the 1680s would represent the equivalent to a loss of about 7,700 at the earlier time.


Schroeder (1979:239) was able to map 130 pueblos within New Mexico that were abandoned during early historic times. Only 61 of these pueblos are identified by name in the documentation during the exploration and early colonization periods. Twenty pueblos survived into the early eighteenth century. The earliest good population figures available following the Reconquest, for the year 1706, suggest that some 6,440 to 8,052 Pueblo people remained in their native regions. There began a new trend in population figures about this time, one that implies that the lower figure for 1706 is as close as we can come to a Dobyns nadir for the New Mexico Pueblos. Assuming this to be the case, it is of interest to do the calculations that Dobyns suggests. Twenty times 6,440 gives 128,800, a figure that is at least of a similar order of magnitude to the earliest population estimate. The date is 123 years after that estimate, not far from the 130 years of the formula. Actual initial contact came over 40 years prior, however, and
the possibility that some diseases might have spread at an even earlier date along native trade routes cannot be discounted. As a rule-of-thumb calculation, the result is surprisingly close to that predicted by Dobyns (1966).

Recovery did not follow closely upon the cessation of decline. Rather, the population stabilized. For more than two centuries it hovered between 8,000 and 10,000, with only rare highs and lows. There appears to have been two limiting factors on population growth. First was the determinedly traditional nature of Puebloan society, an essential boundary marker for the Indians for this entire period. Characterized as compartmentalization (Dozier 1961), this process gave the Pueblo people a means of defense against the persistent efforts of the Spanish to change their culture. Second was the static land-holding pattern. Pressure for land among the Hispanics thwarted significant growth of Pueblo lands, and the additional pressures of Anglo settlers following the Mexican War merely aggravated a long-standing situation. On the other hand, the protection offered by the missions and by a more-effective enforcement of Spanish laws prevented conditions that might have led to further population decline.

The rapid increase in Pueblo population in the present century has usually been attributed to the benefits of modern medicine. Three other factors probably also had significant influence. First is the institution of formal membership for each tribal entity. This made it possible for all who left the pueblo to maintain membership indefinitely and to pass that privilege on to their children. Second has been the increase in economic opportunities both on and off the reservations. Last, the greater prestige associated with Indian ancestry in modern society has done much to persuade those who could to make the choice to retain their Indian identity.

But this is not the entire story. The communities founded by the refugees who went south to the El Paso area in the 1680s still exist. The people of Socorro del Sur and Senecú del Sur consider themselves Hispanic today. Ysleta del Sur continues to identify with the Pueblo Indians, and a more recently founded town, Tortugas in southern New Mexico, also asserts its Southern Tiwa heritage (Bronitsky 1987:160–61; Houser 1979: 336–337). The Hopi Tewa retain a New Mexico Pueblo identity, but they are now a part of the Hopi Tribe (Stanislawski 1979:587).

Less closely identified with their Pueblo ancestors are the people among the neighboring non-Puebloan tribes who descend, at least in part, from fugitives, refugees, and captives who became a part of what were then free Indian nations. Lacking the detailed data that might make possible a count of such individuals, history and oral tradition leave little doubt that there were Pueblo people in all three categories and that their emigration helped their host tribes to survive in greater numbers.

**Hopi Population**

Hopi demographic history has the strongest parallels with that of the New Mexico Pueblos. The early estimates (Table 2) show the same rapid decline up to about 1680. There are no estimates for the immediate post-Reconquest period, but the high figures for the middle years of the eighteenth century indicate a growth that can be attributed to large numbers of refugees among them. That the arid Hopi country should support a population that rivaled that of the
### Table 2. Hopi Population Figures from Selected Years.

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<th>Year</th>
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<td>1846</td>
<td>2,450</td>
<td>1912</td>
<td>2,272</td>
</tr>
<tr>
<td>1850</td>
<td>8,000-10,000</td>
<td>1930</td>
<td>2,752-2,842</td>
</tr>
<tr>
<td>1853</td>
<td>1,000-6,720</td>
<td>1940-42</td>
<td>3,444</td>
</tr>
<tr>
<td>1854</td>
<td>2,000-2,500</td>
<td>1948-50</td>
<td>4,405</td>
</tr>
<tr>
<td>1857-58</td>
<td>3,500-7,000</td>
<td>1964</td>
<td>4,950</td>
</tr>
<tr>
<td>1859</td>
<td>6,000</td>
<td>1970</td>
<td>4,857</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1980</td>
<td>7,100</td>
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</table>

Note: Figures for 1638-59, 1745, 1775, 1780, and 1869 are based on census data. The remainder are estimates. Sources include: Ortiz 1979; Littell and Graham 1964; Bancroft 1962; Montgomery et al. 1949, Navajo & Hopi Indian Relocation Commission 1981.

Pueblos in the well-watered Rio Grande drainage can be explained in no other manner. The decline from 1745 to 1780 probably is indicative of the civil unrest that this high-density population brought about and the departure during those years of refugees and their descendants for their old homes to escape the effects of drought (Brandt 1979:345; Montgomery et al. 1949:29-34, 36-40). The few figures available between 1780 and 1869 are all estimates. The wide variations are indicative of their low reliability. The census data beginning in 1869 suggest that all but the lowest of these estimates were greatly exaggerated. A steady growth from 1869 to 1964 is indicated. The growth possibly began shortly after 1780, the Dobyns nadir date. A computation of the Dobyns formula would place the aboriginal population at 15,960. This would appear to be high in terms of the carrying capacity of the Hopi country, and two factors may be influencing the result. First, the total includes at least one village of people descended from refugees and probably several clans of similar origin in the other villages. Second, the late date may indicate that the true Dobyns nadir, that which was primarily the result of epidemic disease, was masked by the large number of refugees in the villages when the nadir was reached. If that should be true, the Hopi may have begun a recovery at a much earlier date than is apparent in the population data.
Table 3. Navajo Population Figures from Selected Years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Year</th>
<th>Population</th>
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<tbody>
<tr>
<td>1626-29</td>
<td>30,000</td>
<td>1866</td>
<td>7,700</td>
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<td>1680</td>
<td>8,000</td>
<td>1867</td>
<td>7,300-9,000</td>
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<td>5,000</td>
<td>1869</td>
<td>8,000-15,000</td>
</tr>
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<td>1745</td>
<td>2,000-4,000</td>
<td>1870</td>
<td>8,500-15,000</td>
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<tr>
<td>1786</td>
<td>2,800-3,500</td>
<td>1871</td>
<td>8,234</td>
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<td>1807</td>
<td>7,000-8,000</td>
<td>1872</td>
<td>9,114</td>
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<td>1831-39</td>
<td>10,000</td>
<td>1874</td>
<td>9,068+</td>
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<tr>
<td>1846</td>
<td>5,000-14,000*</td>
<td>1875</td>
<td>11,768</td>
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<td>1848</td>
<td>8,000-15,000</td>
<td>1877</td>
<td>11,868</td>
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<td>1849</td>
<td>5,000-12,000</td>
<td>1878</td>
<td>11,850</td>
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<td>1850</td>
<td>10,800</td>
<td>1884</td>
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<td>7,000</td>
<td>1886</td>
<td>17,358</td>
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<td>5,000-100,000</td>
<td>1887</td>
<td>17,838</td>
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<td>1854</td>
<td>8,000</td>
<td>1890</td>
<td>17,204</td>
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<tr>
<td>1855</td>
<td>7,500-10,000</td>
<td>1900</td>
<td>21,826</td>
</tr>
<tr>
<td>1857</td>
<td>8,000-15,000*</td>
<td>1910</td>
<td>22,455</td>
</tr>
<tr>
<td>1859</td>
<td>12,000-15,000</td>
<td>1920</td>
<td>30,473</td>
</tr>
<tr>
<td>1860</td>
<td>15,000</td>
<td>1930</td>
<td>40,858</td>
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<td>1861</td>
<td>7,000</td>
<td>1940</td>
<td>48,722</td>
</tr>
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<td>1863</td>
<td>10,000-15,000</td>
<td>1950</td>
<td>69,167</td>
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<td>1864</td>
<td>8,000-16,000</td>
<td>1961-62</td>
<td>93,377</td>
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<tr>
<td>1865</td>
<td>7,400-15,000</td>
<td>1981</td>
<td>166,519</td>
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</table>

Note: The totals through 1870 are estimates, while those for subsequent years are based on census figures from the Bureau of Indian Affairs and the Bureau of the Census. Sources consulted include: Ortiz 1979; Johnston 1966; Littell 1967; Benavidez 1945.

NAVAJO POPULATION

The Navajo data are of no greater reliability for the early periods than are those for the pre-1700 Pueblos, but they do suggest some interesting similarities and differences (Table 3). Some rather far-reaching inferences are required in order to make any sense at all of the earliest figures. These first estimates were written by Fray Alonso de Benavides (1945:85, 89) and were based on information obtained from a military officer who had fought that tribe. Benavides himself never visited Navajo country. He wrote that the tribe had at least 30,000 warriors and a total population of 200,000—these figures appear fantastic. Assuming that Benavides confused somehow this second-hand data, it may be more realistic to infer that the total Navajo population was about 30,000 and that the 200,000 was originally applied to all of the
Apachean peoples whom Benavides considered to be one "nation."

These are more realistic numbers, and they reflect the correct orders of magnitude at least. One fact seems certain—the Navajo did constitute a large and powerful tribe in the early seventeenth century. There are no further data until the 1740s, more than a century later, when estimates ranged from 2,000 to 5,000 (Hill 1940:402–410). A population decline similar to that experienced by the Pueblos may be inferred. In 1786 a governor of New Mexico surmised that the Navajo numbered some 700 families with 4 to 5 members each, yielding a range from 2,800 to 3,500 (Reeve 1960:204). This is shortly after the very severe smallpox epidemic of 1780–1781. Use of either the 2,000 count for 1745 or the 2,800 count for 1786 as a Dobyns nadir might be justified, but the smaller figure is the more conservative. This would allow a calculation of 40,000 for the time of contact. If Espéjo's meeting with Querecho near Acoma in 1582 was the initial contact, a period of 163 years is indicated. The Navajo may have been slower to reach a nadir population, which can perhaps be attributed to the immigrant fugitives from Spanish rule prior to the Pueblo Revolt and the Pueblo refugees during the Reconquest.

One further qualification is required. The immigrant population should not be included in any calculation of the Navajo contact population, for the immigrants' ancestors were Puebloans at that time. Immigration of only about 500 refugees during the Reconquest would represent some 10,000 ancestral people at time of contact. This assumption, admittedly a rash guess, allows for a population estimate of 30,000 Navajo at contact. The count of 10,000 might be added to the Pueblo total.

An estimate in 1807 of 2,000 warriors would permit postulation of a total population of 7,000 to 8,000. From that time forward there is evidence of an increasing population, although the divergent estimates of the early Territorial period must be recognized as being influenced by political views and wishful thinking.

Thus the Navajo figures do seem to fit the pattern of the other tribes. The beginning of Navajo population growth certainly precedes that of the New Mexico Pueblos, more resembling that of the precocious Hopi, although a precise date cannot be established. An educated guess would suggest that it was already underway during the occupation of the Dinétah, the region in the upper San Juan drainage where the Apachean hosts and the Puebloan immigrants forged a new way of life. Certainly the archeological remains indicate a degree of prosperity and cultural growth that should be reflected in the demographics (Carlson 1965; Powers and Johnson 1987; Roessel 1983).

**DISCUSSION**

The earlier success of the Navajo and Hopi in reversing the population declines may perhaps be attributed in part to the fact that they were free to chart their own course in a manner that the subjected Puebloans were not. They were able to adopt introductions from the Old World, changing these to fit into their own ways of life as they saw fit. They were free to control land use by their own customs without the complications imposed by white authorities. They were unencumbered by the pressures for conformity that impelled the New Mexico Pueblos to erect solid barriers to culture change as social markers. Living as neighbors of the Whites, but free of their rule, the Navajo created a pastoral society of their own that mirrored in many ways that of the
local Hispanics, but one that was distinctly Indian. Similarly the Five Civilized Tribes of the southeastern United States developed agricultural societies that reflected much of the English culture of the southern colonies, and the Iroquoian Five Nations adapted in New York. The Hopi solution may have approximated even more closely the agricultural adaptations of the Iroquois. Fertility had long been a major concern in Indian religions—fertility of crops, animals, and people. With renewed growth came a renewed faith in their own religious beliefs and a new hope for survival. The revitalization of the Pueblo Revolt found expression in the success of both tribes.

Thus it is apparent that the Dobyns formula can be used as a rough rule-of-thumb, but events such as wars, lose or gain of land, economic innovations, immigration, and emigration may modify greatly the course that population decline and recovery may take in any particular instance. A precipitous decline in population was inevitable. Even today, high mortality caused by disease occurs when isolated tribal peoples of the Amazon are exposed to contact with the mainstream Brazilian population, despite the availability of modern medical assistance. In contact-period New Mexico, tribes had no real knowledge of the causes and physiological effects of the introduced diseases. Only the acceptance of immigrant populations might have helped them ameliorate the initial effects of disease in colonial times. Once the period of natural adaptation had passed, something well over a century in most cases, a tribe free of additional impacts from contact rebounded with surprising vigor.

By 1930 the Navajo could count about as many people as were represented by their Dobyns nadir as their contact population. The probable tribal contact population had been achieved a decade earlier, but the immigrant Pueblo peoples had been so thoroughly integrated into the tribe that they must, of necessity, be included in any calculation of recovery rates. There was apparently but little time lost in an equilibrium state following the drop to nadir. The New Mexico Pueblos, on the other hand, experienced a long period of rough equilibrium. Hopi followed its own path as it accepted a large number of refugee immigrants and later rejected many of them, but the group also then began a period of growth.

The people who moved south to El Paso saw the absorption of two of their pueblos into the mainstream Hispanic population, but the one that retained Indian identity also was able to found a new pueblo about 1850 near Las Cruces in New Mexico. Population figures for this southern group are too variable to reveal much about their demographic history, however, perhaps because the population included many who vacillated between Indian and Hispanic identities.

Retention of ethnic identity has been the key to recovery. If a people was able to persevere as a sociocultural entity, ultimate recovery was almost as certain as was the original decline. A general increase has characterized total Indian population of the United States since about 1900. Between 1950 and 1980 the Indian population increased by 281 percent, almost 6 times the rate of growth of the general population (Thornton 1987:160). The survival struggle of the tribes that remain today has not been in vain.

—Albuquerque, New Mexico
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The coming of the railroad to Albuquerque in 1880 transformed a sleepy Hispanic village into a wild West boom town. This paper will trace the history of Albuquerque's first subdivision, Huning's Highland Addition. Born on the steps of the train station, this neighborhood grew, matured, declined, and was revitalized over the century that followed. Its architectural heritage is a legacy of Albuquerque's past that residents are working to preserve and restore for future generations.

NEIGHBORHOOD BOUNDARIES

The boundaries of Huning's Highland Addition have been defined several times by several different official and nonofficial bodies to result in the original Plat map, the Historic Overlay Zone, the Sector Plan, and the Neighborhood Association. Generally these agree that the area is roughly bounded by Grand Avenue on the north, I-25 or Locust Street on the east, Iron Avenue on the south, and Broadway Boulevard on the west (Figure 1). It is laid out in a basic grid pattern of 46 blocks, each having six 50-by-142-ft lots facing east and six lots facing west. The blocks are each divided by an alley running north/south (Albuquerque 1979:2).

HISTORIC CHRONOLOGY

The story of Huning's Highland Addition began in March of 1880 when three men—Franz Huning, William C. Hazeldine, and Elias S. Stover—began buying up land five miles east of Old Town Albuquerque. Franz Huning, a merchant and trader on the Santa Fe Trail, had come to Albuquerque in 1850, intending to go to California for the gold rush—as a merchant, not a miner. Working his way west, he stopped in Albuquerque, became enchanted with New Mexico, and stayed the rest of his life. By 1880 he was one of Albuquerque's most prominent businessmen, owning a large flour mill and a general merchandise store in what is now Old Town Simmons 1982:154). Elias Stover came to town in 1876 to open his mercantile store, Stover & Co., on the plaza. He felt that getting established ahead of the railroad was the best strategy. A year later William Hazeldine, a prominent lawyer and speculator in Santa Fe, moved to Albuquerque to establish a branch of his already successful
Figure 1. Huning Highland/Sector Plan Area (Albuquerque 1987:4).
law firm with William Breeden (Simmons 1982:205).

The New Mexico Town Company, a front for the New Mexico and Southern Pacific Railroad Co. (the New Mexico subsidiary of the Atchison, Topeka, and Santa Fe Railroad), had been formed earlier that month, on March 3, 1880, to buy land for the railroad right-of-way and facilities. The three men bought large plots of land to the north and south along what would become the railroad line and additional land stretching between where the station would be and the village of Albuquerque, now known as Old Town. This land would become New Albuquerque or New Town. A portion of those land purchases would become Huning's Highland Addition (Simmons 1982:218). The title documents to lots in the Addition show that on March 20, 1880, Cristobal Armijo and Juanita Griego de Armijo sold to Franz Huning for $1 a parcel of land bounded "on the North by the land of Elias Stover, on the South by the land of Antonio Garcia, on the East by the hills, and on the West by the Acequia Madre of Barelas" (Bernalillo 1880:1).

The railroad arrived shortly after the land purchases, on April 5, 1880, with great fanfare. Platting of Huning's Highland Addition took place in December of that same year. Col. Walter G. Marmon surveyed the streets and chose their names. The east/west streets were named for minerals: Copper, Gold, Silver, Lead, Coal, and Iron. Not surprisingly he named three of the streets Huning, Hazeldine, and Stover. In the Highlands the north/south streets were named Arno for Huning's 11-year-old son, Edith and Walter for Marmon's own children, and High Street; this was as far as the Town Company thought New Town would ever expand and was the city limit until after 1900. The main street that crossed the railroad tracks to downtown commercial areas was appropriately named Railroad Avenue (now Central Avenue), and a broad north/south boulevard was laid out at the western edge of the Highlands to separate the residential area from the busy railroad facility; this is Broadway Boulevard (Simmons 1982:224).

New Town boomed after the railroad arrived. As a place for a home, Huning's Highland had many advantages. It was close to the railroad and commercial area, above the chronic flooding dangers west of the railroad, and well drained on the sloping sand hills. By 1888, 63 percent of the 536 lots in Huning's Highland Addition had been sold (Simmons 1982:225). The neighborhood was settled by professionals, business merchants, and railroad workers. Houses were built by and for Anglo-Americans in the current styles of the time in the East and Midwest, where most of the newcomers had their roots. They built with wood, stone, and fired brick—materials with which they were familiar—rather than the adobe predominant in New Mexico structures. During these formative years the neighborhood was "The" place to live in Albuquerque.

Prominent residents of Huning's Addition in these formative years included Joshua Raynolds, President of the First National Bank, whose house took up an entire block on High Street (308 High SE); Thomas Hughes, editor of the Albuquerque Daily Citizen (204 Walter SE); Bernard Rodey, who crafted the legislation that established the University of New Mexico (UNM) in 1889 (209 Arno SE); Charles E. Hodgin, namesake of Hodgin Hall at UNM and a guiding force in early Albuquerque public schools and the university (402 Edith SE); and Edward B. Cristy, the architect for the first Pueblo-style...
buildings at UNM (201 Walter SE) (Simmons 1982:315). Other prominent residents included William Whitney, proprietor of The Whitney Company, a large hardware dealer (302 Walter SE); Matthew W. Flourney, Vice President of the First National Bank (100 Arno SE); Jacob Korber, a dealer in buggies, wagons, hardware, and eventually automobiles (301 Arno SE); and J. C. Baldrige, the owner of J. C. Baldrige Lumber Company, still operating in Albuquerque nearly 100 years later (610 Broadway SE). Probably the most infamous residents were David and Ruth Greenglass, who passed military secrets to Julius Rosenberg after World War II and ended up in Federal prison for espionage (209 High NE) (Davis and Rock n.d:20).

In the early part of the twentieth century more and more people came to Albuquerque for the healthy climate, to chase the cure for tuberculosis. St. Joseph's Sanatorium was built on Grand Avenue in 1902; Presbyterian Sanatorium soon followed on Railroad Avenue just east of the Highlands. The lungers, as they were called, sometimes stayed in canvas-roofed cottages where they could get plenty of fresh air.

By 1920 most of the lots in Huning's Highland Addition contained houses, and the neighborhood settled in for its maturing years. The streets were paved in the early 1920s. With the coming of the automobile, closeness to downtown lost some of its luster. People could drive to town quickly and easily. By 1930 the Silver Hills neighborhood to the east was developing as Albuquerque expanded. It became the new prestigious place to live. In 1937 Railroad Avenue, renamed Central in 1908 to reflect its importance as a thoroughfare, was designated Route 66 (Albuquerque 1987:7). Commercial development engulfed the route and began encroaching on the quiet streets.

After World War II Albuquerque experienced another tremendous boom with an accompanying housing shortage. Many of the grand homes of Huning's Highland Addition were divided into small apartments, and additional rental units were built to the rear of the large lots. Between 1946 and 1950 the area within the Albuquerque city limits tripled in size (Simmons 1982:372). In the early 1960s the two major highways intersecting in town, old Route 66 (now Interstate 40) and north/south Interstate 25, were realigned and made into freeways. The interchange (now known as the Big I) was completed in 1966 (Simmons 1982:375). The freeways cut the addition from the pulsating and growing northeast heights and isolated it, so it was destined to deteriorate with the downtown. The designation of Lead and Coal as arterial one-way streets in 1949 had already separated it from neighborhoods to the south.

The government policies of the 1960s encouraged "urban renewal," which really meant "tear down the old and put up new buildings." Fortunately, Huning's Highland Addition did not get "urban renewed" and was allowed to deteriorate in peace.

With the coming of the 1970s, a new era dawned all over the country. People finally recognized that there should be some control on growth and that maybe older buildings had some style and substance that was of value. Young urban professionals began to move into the Highlands for some of the same reasons as the original residents: convenient location, neighborhood amenities, and fairly inexpensive, high-quality homes with character. Nomination of the district to the National and State Historic Registers in
1978 brought recognition that Huning's Highland was worth preserving and protecting. The city followed by creating the first Historic Overlay Zone, with design guidelines and regulations to protect this important district (Albuquerque 1979:2). In succeeding years slow but steady progress has been made in the preservation and restoration of Huning's Highland Addition.

ARCHITECTURAL VARIETY

Although Huning's Highland Addition was Albuquerque's first subdivision, it was definitely not tract housing. Each home is unique and different, and there is a wide variety of the styles of the time.

One of the oldest surviving houses in the neighborhood is the hipped-roofed cottage at 204 Amo NE (Figure 2). The house is built of cobble stones in concrete with cut stone quoins on the corners. It was stuccoed in the 1920s and has had several additions over time (see Figure 3; Eden 1979:58).

Probably the most common house style in Huning's Highland is the Victorian cottage (Figure 4). L-shaped with a gable end facing the street, they are brick or clapboard wood siding. The gable usually has decorated shingles; often there are two entry doors from the front porch, one to the living room (under the gable) and one to a bedroom. Some have upstairs rooms under the high-pitched roof. An unusual variation on the cottage, in brick at 306 Walter SE, was built before 1896. It has a tower that seems to be glued onto the side with a wrap-around porch.

A second common house style is the hipped box (Figure 5). It has a simple square box shape with a hipped roof that slopes equally in all four directions. It usually has four rooms and a porch the full width of the front. Again, it sometimes has upstairs rooms under the high-pitched roof, as in this example. This particular home at 324 Edith SE was built around 1900. It is a variation of the hipped box with a curve or ski jump at the edges of the roof, double-column supports for the porch, and some decorative elements on the second-floor dormer. The house has changed very little over time, except for loss of some decorative elements around the dormer and a lovely picket fence.

Although not many stone houses were built in the neighborhood, there are many concrete cast-block homes that look like stone (225 High NE; Figure 6). Angelo De Tullio, an Italian emigrant, built a cast-stone factory between Arno and Edith on Copper Avenue around the turn of the century. From this factory came the cast stone for the houses in the neighborhood, including the ornate Italian villa that De Tullio built for himself. Unfortunately, it was torn down in 1974 to make room for a vacant lot (Davis and Rock n.d.:17).

The Queen Anne style is distinguished by decorated and shingled gable ends, turned wood porch posts and fret work, wrap-around porches, multiple intersecting gable roofs, and sometimes towers and turrets (Davis and Rock n.d.:13). Huning's Highland has many homes with variations and combinations of these features. The home at 210 Walter SE (Figure 7) is a particularly fine example. Its three-story tower, tall windows, and the foundation high off the ground give it a feeling of great height. The wrap-around spindled porch and intricate gable decorations accentuate the Victorian-era charm presented by the circa-1898 brick structure.
Figure 2. 204 Arno NE, Circa 1890 (Albuquerque Museum Photo Archive, Cobb Collection).

Figure 3. 204 Arno NE, 1993.
Figure 4. 400 High SE, Victorian Cottage.

Figure 5. 324 Edith SE, Hipped Box Style.
Figure 6. 225 High NE, Cast Stone.

Figure 7. 210 Walter SE, Queen Anne Style.
There are several Dutch Colonial Revival-style homes in the neighborhood. They share the Gambrel-style roof as their distinguishing feature. The one at 323 Edith SE (Figure 8) has particularly clean lines with a simple porch supported by Doric columns. The one at 207 High NE has a lovely Paladian window to highlight its Gambrel lines. At 120 Walter SE, a tower was added to form a mixture of Queen Anne and Dutch Colonial styles.

Tuberculosis-cure seekers had their own style of houses. The cottages on Silver Avenue at High (Figure 9) were oriented so that the wind could blow fresh air through them. Two are of cast stone, one is brick, and one is clapboard. A two-story structure on the alley behind had a canvas roof. They all originally had generous screened porches (Davis and Rock n.d.:24). The simple shotgun house at 409 Walter SE was built before 1892 for lungers. The front and back doors could be opened to let the wind blow through. It and a twin house that used to be next door both had canvas roofs (Sanborn Company 1908:22).

The unusual house at 201 Walter SE (Figure 10) was built in 1896 by architect E. B. Cristy. To the basic rectangular structure he added three octagonal projections on the north and east sides. Oval windows give views to Walter and Gold (Davis and Rock n.d.:27).

At 410 Edith SE is the only example of the Stick style in the Highlands (Figure 11). Built before 1892, its narrow horizontal siding is delineated by contrasting boards to resemble exterior framing. Elaborate moldings decorate the gable ends and the windows. Unfortunately, its lovely porch and distinctive lines have been marred by an addition on the front.

Dr. P. G. Cornish built a large, solid-massed house at 123 Walter SE at the turn of the century (Figure 12). It has the look of Second Empire or Mansard style with a coved cornice at the eaves and a cast-iron widow’s walk at the crown of the roof. Just recently the porch was restored by removing an artificial stone covering.

William Whitney built the World’s Fair Classic-style brick house at 302 Walter SE in 1907 (Figure 13). A pressed-metal cornice encircles the roof line below the parapet. Classic Greek columns support the large front and side porches. There is fine woodwork around the entry and throughout the house.

When Jacob Korber built his house in 1916, he was influenced by Frank Lloyd Wright’s Prairie style (Figure 14). It was one of the last houses built during the neighborhood’s formative period and had all the latest gadgets, including a central vacuum-cleaning system and laundry chutes in each bedroom (Davis and Rock n.d.:36).

The California Bungalow-style house at 112 Walter SE was built in 1920 for lawyer Henry G. Coors (Figure 15). It is constructed of cast stone and has three distinctive eyebrow vents to the upstairs.

Some old commercial buildings still survive in the Huning’s Highland Addition. Figure 16 shows a distinguished cast-stone structure at 214 Arno NE that was built in 1908 as a grocery store and residence for Henry Auge (Davis and Rock n.d.:18). Originally it had graceful arched windows to light the interior of the market.

James S. Carson
Figure 8. 323 Edith SE, Dutch Colonial Revival Style.

Figure 9. High and Silver, Tuberculosis Cottages.
Figure 10. 201 Walter SE, Octagonal House.

Figure 11. 410 Edith SE, Stick Style.
Figure 12. 123 Walter SE, Second Empire/Mansard Style.

Figure 13. 302 Walter SE, World's Fair Classic Style.
Figure 14. 301 Arno SE, Prairie Style.

Figure 15. 112 Walter SE, California Bungalow Style.
Schools have always been important to Huning's Highland. Albuquerque Academy built Perkins Hall, a large, three-story building at Railroad and Edith, in 1890. In 1891, the first public schools in Albuquerque were established. Two of the four grammar schools and the only high school were in Huning's Highland. Albuquerque High School, at Central and Broadway, was Albuquerque's only high school from 1914 until Highland High was built in 1948.

**HUNING'S HIGHLAND ADDITION IN THE 1990S**

What is happening now to the Huning's Highland Addition in the beginning decades of the second century of the neighborhood? As was noted earlier, the Historic Overlay Zone provides guidelines and regulations to protect the district. The guidelines "do not govern land use questions, nor do they require that any previously existing structures be altered against the owner's wishes. The Guidelines are not intended to return the District to any style of architecture prevalent in the past, or dictate that new construction be made to resemble any old-fashioned style. These Guidelines are concerned, however, with the relationship of buildings and spaces to one another, and with encouraging the preservation and enhancement of the visually positive in the District. The Guidelines, therefore, view changes to existing buildings not only as they affect a given building, but as they influence surrounding structures" (Albuquerque 1979:2). However, because of the State and National Register status of the district, state income tax credits and low-interest loans are available for preservation and restoration projects that meet the design guidelines. This is intended to encourage restoration rather than new construction.

Several projects in the last few years have involved innovative ideas for reuse of
old structures and designs for new ones. The decorative brick-style Plunkett Apartments at 420 Coal SE were built in the late 1920s. Through the years they were allowed to deteriorate and attract undesirable tenants. With the determination of HELP (Home Education Livelihood Program) and city involvement through HUD (Housing and Urban Development), the building has been given new life. It now houses mentally and physically handicapped people who are functioning on their own but are supervised by the UNM mental-health staff.

The Cafe Broadway, serving Spanish food at 602 Broadway SE, opened last year in a redesigned old house. The Artichoke Cafe, at 424 Central SE, has for many years been one of Albuquerque's finest restaurants. The award-winning townhouses in the 200 block of Edith SE, built in 1986, demonstrate how new construction can harmonize with Victorian-era houses without imitating them. Careful attention was paid to details of massing and scale to blend with nearby older homes. Habitat for Humanity, made famous by President Jimmy Carter, built a home at 321 Arno SE in the Spring of 1992. The original house on the lot was too deteriorated to save when the group acquired it. The new home was built entirely with volunteer labor.

In all of the above cases the design and construction were closely coordinated with the Landmarks and Urban Conservation Commission and the Huning Highland Historic District Association. By working together and cooperating, a solution satisfactory to all parties was brought to fruition.

But, Huning's Highland Addition is not just historic architecture, it is a vital and active group of individuals and families interested in their neighbors and their neighborhood. The Huning Highland Historic District Association is the neighborhood advocacy group for residents and businesses. They are involved in all aspects of neighborhood activity. This includes fighting prostitution, other crime, and graffiti; passing zoning and building regulation; and organizing a number of social activities. There is an annual "Tour of Historic Interiors" with five or six houses open for visitors. Held in conjunction with the Albuquerque Balloon Fiesta and the local Greek Church Festival, this event provides an opportunity for all of Albuquerque to see its historic past and allows residents to show off their homes. Each Christmas season the Huning's Highland "Dickens of a Dinner" provides a six-course progressive Christmas feast with each course served in a different home decorated in Victorian Christmas style. These two events also act as fund raisers to provide monies for neighborhood improvement projects such as tree planting, trash receptacles, and paint to cover graffiti. In addition, periodically there has been a Victorian Street Faire and block parties where neighbors get to know each other better. A group is currently revising and updating the "Huning Highland Neighborhood Walking Tour & Arm Chair Guide," a guide to houses in the neighborhood for walkers.

And last, but hopefully not least, a neighborhood archive is being compiled. It will contain photographic records of the current status of buildings, historic neighborhood photographs, and other historic documents, oral histories, and anything else that helps to define the character of Huning's Highland. An example of other things in the archive is a package of love letters found hidden in an attic during a restoration project; these add a personal note on conditions in the neighborhood during the 1930s. This paper is

James S. Carson
the result of research performed while compiling information for the archive.

CURRENT PROBLEMS

Unfortunately, not everyone in Huning's Highland is interested in preserving the neighborhood. Many absentee landlords purchased the large homes and broke them into apartments in the 1950s and 1960s. Since that time the houses have been allowed to deteriorate and crumble. Low rents from rundown apartments attract tenants that have little regard for the historic significance of the buildings or the neighborhood. The city government and most of the city's residents have little interest in preservation, as evidenced by the fates of historic buildings that have disappeared. The Alvarado Hotel, the Santa Fe roundhouse, the county courthouse, Huning Castle, the train station, and most of the downtown have all been torn down. Businesses encroaching on the neighborhood—such as hospitals, churches, and fast-food stands—insist they can not reuse old buildings and must tear them down to make way for new. Some residents who bought their houses because they were cheap, do not care about their character, are insensitive to restoration, and make alterations that change the visual street scape. Some people bypass or ignore the Landmarks and Urban Conservation Commission regulations. The city permitting agencies have no understanding of the intent of the Historic Overlay Zone and issue permits without questioning the effects on the neighborhood.

CONCLUSION

In this paper I have attempted to illuminate the history and activities of one small section of Albuquerque. From its origins in the 1880s, through the maturing years, the decline of the 1940s through the 1960s, and the revitalization of the late 1970s and 1980s, Huning's Highland Addition has always been a unique part of Albuquerque. History and preservation are alive and well, at least in this small section of the city. Friends and neighbors working together can and will insure the continued vitality and integrity of this gem of Albuquerque's Victorian past.

NOTES

Photos by Ann Carson except where noted. The information contained in this paper was presented, with accompanying slides, at the annual meeting of the Historical Society of New Mexico on April 23, 1993, in Albuquerque and, on May 9, 1993, at the annual meeting of the Archaeological Society of New Mexico, also in Albuquerque.

—Albuquerque, New Mexico

REFERENCES CITED

Albuquerque, City of

Bernalillo, County of
1880  *Quitclaim Deed*. Bernalillo County Records, Book K, p. 44, Bernalillo.

Davis, Mary P., and Michael J. Rock

Eden, Susanna

Sanborn Map Company

Simmons, Marc
The Herbert Yeo Collection, which is housed in the Laboratory of Anthropology, Museum of New Mexico, represents several decades of avocational work by a renown New Mexico engineer. Much of Herbert Yeo's professional engineering and nonprofessional archaeological work were conducted in Doña Ana, Sierra, and Socorro counties, although he visited archaeological sites throughout New Mexico and Arizona. He located both archaeological and rock-art sites, assigned each site a unique number based on the site type, mapped the site if it contained features, placed it within the township and range system, and photographed important features and rock-art panels. However, although the Yeo Collection is an important resource of archaeological data, it has been underutilized.

From September 1989 through September 1990, Elizabeth Ayer and Meliha Duran of Human Systems Research, Inc. (HSR), sorted, labeled, and stored the paper and photographic materials in the collection using archivally approved handling methods and storage materials. Additionally, they created three computerized databases that can be used to retrieve materials in the collection. Finally, a report on the procedures and decisions for handling the materials (Duran and Ayer 1990) and a user's manual for accessing the collection were prepared.

In this report we described Yeo's life and his archaeological collection, present the methods used to process and store his manuscript and photographic collection, describe the computerized databases that were created, summarize the research potential of the collection, and make recommendations.

INTRODUCTION

The Herbert Yeo Collection consists of typed site descriptions and observations, maps, field notebooks, photographs and negatives, and correspondence. The archival collection resides in the Archaeological Records Management Division (ARMS) in the basement of the Laboratory of Anthropology, Museum of New Mexico, with additional materials in the Branigan Library, Las Cruces; the Rio Grande Collection, New Mexico State University; and the library at the University of Texas at El Paso (UTEP).
Prior to this project, the collection at ARMS had been stored in three file drawers and was used only by serious researchers who were willing to dig through volumes of paper. Only three archaeologists had seriously used the collections within the past several decades, although they recognized its important:

- Michael Marshall (Marshall and Walt 1984) used the collection while preparing the SHPO-funded Rio Abajo survey of the Rio Grande Valley in Socorro County;

- Steve Lekson used site maps and notes for a similar survey in Sierra County (Lekson 1985) and while recording the Cottonwood Spring site on White Sands Missile Range (Lekson and Rorex 1987); and

- Patrick Beckett typed (before the days of copy machines) a reference copy of some of Yeo's site descriptions for his MA thesis (Beckett 1973).

In 1989, the State Historic Preservation Office (SHPO) requested proposals with matching provisions

- to catalog and index the collection in such a way that it would be more useful to researchers and to the Archaeological Records Management System (ARMS) staff,

- to develop the negatives so that they could be identified, and

- to store the materials in archivally approved storage facilities so that they would be better preserved.

Betty Ayer and Meliha Duran of Human Systems Research, Inc. (HSR), prepared the proposal that was accepted.

During October 1989, the materials were evaluated, the negatives were counted, and initial plans were made to organize and catalog the collection. Tim Seaman of ARMS provided organizational guidelines for the computer databases that would be used to index the collections. Between October 1989 and August 1990, the bulk of the collection was cataloged in Las Cruces.

The request for proposal for the project specified that the collection contained 500 safety negatives. An initial count of the negatives indicated that, in fact, the collection contained 880 silver-nitrate negatives, which are highly flammable, and 450 safety negatives. Subsequently, while storing the collection, an additional 100 silver-nitrate negatives were found. The cost of making contact prints and new negatives for these almost 1,000 silver-nitrate negatives proved to be significantly higher than the amount that was allotted through the original grant. An adequate match could not be arranged when additional funds were allocated. Tim Seaman decided to allow HSR to concentrate its efforts on the portion of the project that could be handled under the original grant and to leave the photographic work to another project. Safe storage of the additional 950 silver-nitrate negatives required considerable extra supplies and labor.

HERBERT YEO'S PROFESSIONAL AND AVOCATION INTERESTS

Herbert Yeo (see Figure 1) was born in Carnegie, Pennsylvania, on January 7, 1877. He graduated from Franklin College, in Athens, Ohio, in 1898. Ten years later he began a long and distinguished career as a professional engineer in New Mexico, serving in several capacities (see Table 1). He retired to Las Cruces in 1947, at the age of 70, and
died on October 1, 1954, at the Veteran's Hospital in Bayard, New Mexico.

His avocation was locating and recording archaeological and rock-art sites throughout New Mexico (see Table 2). It has been said that he believed that the resource would soon be completely destroyed because of increased population in the state and no legislation to protect sites. Using his engineering skills, he prepared hand-drawn maps of several parts of the Rio Grande and its major tributaries, showing locations of sites, based on known survey landmarks. He was reputed to be the fastest man with a plane table, and his surface site maps are well executed and reportedly accurate. He may have supplemented his observations of surface features with limited testing (Lekson and Rorex 1987).

Although his notes and photographs describe trips with local ranchers to visit sites, Yeo must have spent much of his spare time wandering the river valleys and mesa edges, looking for sites.

Yeo recorded hundreds of sites on his own. Initially he identified the sites by a chronological number, keeping a listing of where the sites were located. Later, he assigned numbers to the sites that identified their type—campsites, fortified sites, village sites, etc. According to his correspondence, in the 1930s he began to send sherd collections to H. P. Mera of the Laboratory of Anthropology for identification. Mera typed the sherds for Yeo, added them to the Laboratory's statewide sherd collection, and gave those sites Laboratory of Anthropology numbers. Therefore, some of the sites have very early LA numbers.

Within the photographic collection, possibly half of the photographs are of rock-art sites. The remaining materials include site photographs, some family photographs, a few photographs of water works and work parties, and a few photographs of early archaeologists and anthropologists in the Southwest.

During the 1950s, again according to the correspondence, Yeo collected a number of volumes of site descriptions, photographs, and maps and sent them to Stanley Stubbs of the Laboratory of Anthropology. For these, Stubbs authorized that Herbert Yeo to be paid out of state funds.

Yeo shared his expertise in the Jornada Mogollon area with such archaeologists as

Figure 1. Herbert W. Yeo. Masonic photograph, from Rio Grande Historical Collections, New Mexico State University.

Meliha S. Duran and Elizabeth Ayer
Table 1. Chronology of Herbert Yeo's Professional Life (Rio Grande Historical Collections n.d.).

<table>
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<th>Date</th>
<th>Employer</th>
<th>Contribution</th>
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<tr>
<td>1908-17</td>
<td>Reclamation Service</td>
<td>Worked on Elephant Butte and related irrigation projects, helped design irrigation system in Rincon, Mesilla, and El Paso. Wrote significant report on hydrographic and irrigation conditions in the Rio Grande Valley.</td>
</tr>
<tr>
<td>1918</td>
<td>U.S. Army, Corps of Engineers</td>
<td>As captain, provided training during World War I.</td>
</tr>
<tr>
<td>1918-27</td>
<td>Private practice, Las Cruces, Doña Ana County, Surveyor</td>
<td></td>
</tr>
<tr>
<td>1927-31</td>
<td>State Engineer of New Mexico</td>
<td>Investigated water and irrigation matters.</td>
</tr>
<tr>
<td>1931-33</td>
<td>International Boundary Commission, Private practice</td>
<td>Conducted investigations for Elephant Butte and Carlsbad Irrigation Districts.</td>
</tr>
<tr>
<td>1934-42</td>
<td>Soils Conservation Service</td>
<td>Investigated and constructed numerous projects, studied sedimentation problem in Rio Grande Basin.</td>
</tr>
<tr>
<td>1942-47</td>
<td>Corps of Engineers, Albuquerque</td>
<td>Continued silt studies for flood and sediment in Middle Rio Grande projects.</td>
</tr>
</tbody>
</table>

Donald Lehmer, who excavated the Los Tules site in the Mesilla Valley and two sites, Alamogordo I and Alamogordo II, in the Alamogordo area (see Lehmer 1948) and with H. P. Mera, who was interested in ceramic sequences throughout the state (see Mera 1943). Photographs in his collection show Yeo with Lehmer, Mera, Evon Z. Vogt, and others.

When Yeo became ill and spent some time in the Veteran's Hospital in Bayard, he continued to work on his notes. One stack of materials in the collection had a note that it had been returned from the hospital. When Yeo passed away in 1954, he left the bulk of his archaeological material to the Laboratory of Anthropology, with duplicates for Texas Western College (now UTEP) and the Branigan Public Library in Las Cruces. In 1955, Stew Peckham (personal communication, 1990), of the Laboratory staff, collected the boxed materials from the attic of the bank that served as executor of the will. Duplicates were apparently later delivered to the other two repositories. The Laboratory of
Anthropology has by far the most complete collection, as well as all the negatives for the hundreds of photographs.

Yeo was recognized in Las Cruces as an expert on the prehistoric inhabitants of the area. In 1949, he wrote a section on the prehistoric occupation of Doña Ana County for a centennial publication assembled for the city; drafts of this manuscript were found in the collection (volume 49). However, only a paragraph of Yeo’s manuscript was included in the final publication (Las Cruces Centennial Corporation 1949).

**COLLECTION DESCRIPTION AND CONDITION**

When the project began, the Yeo Collection was found in a file cabinet in what was then the Survey Room, now the Archaeological Records Management System. The prepared volumes, which Herbert Yeo had three-hole punched and stored in cardboard report covers with two-prong metal paper fasteners, were intact, except that the covers were frequently torn and the outer pages were frayed. However, most of the text was typed, and most of the pages that Yeo had apparently considered finals were on high-quality bond typing paper. The remaining paper materials were stored in file folders; often the labels were erroneous, either from handling the materials or reusing the folders. Many of these folders contained pages that Yeo had apparently removed, revised, and replaced with corrected versions in the final volumes. These draft pages contained unrelated text on the back and corrections in Yeo’s hand, and they were frequently on inexpensive typing paper. However, Yeo had not discarded these pages; he had simply put them into a miscellaneous notebook or recycled them for other drafts.

Some of the volumes on Doña Ana, Sierra, and Socorro counties he may have produced in quantity to provide each repository with copies. These volumes alternated sheets with a 1/2- to 1-page site description and a page with two site photographs. The site descriptions include location (township, range, section), description of the area, features, and often the list of ceramics provided by H. P. Mera. When comparing the books between the various repositories, it is evident that some have carbon copies of the text and photograph captions. Also, a folder of extra covers was found, and in some volumes extra copies of photographs were stuck between the pages. In some cases, there are three or four copies of each of the typed pages—an original and carbon copies.

The photographs were, for the most part, glued to the pages that contain the typed captions. Draft pages often contain one photograph and a hole where another photograph and the backing paper had been torn out. The photographs that were not in the volumes were in small, flat boxes.

The 3-3/4 by 5-1/2 in. negatives were stored in negative books with glassine sleeves. In these, 1,350 negatives were stored in 10 books of 100 glassine sleeves each. In some of the earlier books, only a few negatives had been put in each sleeve, as Yeo apparently took only a few photographs of each site. These were separated by one or two empty sleeves. In some of the later books, some sleeves contained up to 20 negatives, with the whole group identified only as designs from a single rock-art site.

Safety negatives were usually clearly labeled as such in the margin. Silver-nitrate negatives are not labeled, but can be easily tested, if necessary. (When a small sliver of negative is ignited with a match, it combusts...
Table 2. Listing of Volumes in Herbert Yeo Collection, Santa Fe.

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<td>1954-67</td>
<td>Letters, newspaper articles</td>
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<td>Correspondence, Laboratory of Anthropology</td>
<td>1932-33</td>
<td>Letters, bills</td>
<td>38</td>
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<td>Prehistory, Doña Ana County</td>
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<td>unknown</td>
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<td>101</td>
</tr>
<tr>
<td>51</td>
<td>Flat File</td>
<td>1931-54</td>
<td>Originals of sketches</td>
<td>76</td>
</tr>
<tr>
<td>52</td>
<td>Lists of H, C, P, G, B, and A Sites</td>
<td>1931-54</td>
<td>Lists of sites, LA numbers</td>
<td>136</td>
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<td>Volume Status</td>
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<td>Site data, sketches</td>
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<td>Negatives</td>
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<td>Negatives</td>
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<tr>
<td>A-12</td>
<td>Photo file</td>
<td>unknown</td>
<td>Miscellaneous photos</td>
<td>196</td>
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</table>

Rapidly. This procedure should be conducted only under an exhaust hood or in a well-ventilated room.

Only one of the silver-nitrate negatives was unsalvageable; the negative had discolored and disintegrated in the center. This negative was removed from the collection. Possibly 15 percent of the silver-nitrate negatives have crumbled along the edge.

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However, since there was no evidence of the missing film within the glassine sleeves, they may have crumbled as a result of a previous storage technique used by Yeo, himself. Some of the silver nitrate negatives were slightly discolored to a pink or brown; a few had small spots that contained no emulsion.

Oversized maps had been drawn in ink on coated linen, and each map was signed by Herbert Yeo. These are in excellent condition. Yeo had made blue line copies from most of the maps; these were folded and inserted into the notebooks. The blue lines are still in good condition.

Several types of indexes were extant for the collection; most of them were in Herbert Yeo's handwriting. Many of the volumes contained indexes by site. He compiled several indexes of the volumes. Each negative book contained a handwritten index in the front; typed versions of these were also available. Also included was a typed list of sites and locations (within the U.S. Public Land Survey System, with reference to the New Mexico Principal Meridians), with hand-written notations as he added his site-type numbers and Laboratory of Anthropology numbers.

**METHODOLOGY**

The project consisted of two major operations. The materials in the collection were stored in an archivally approved manner. As they were handled, they were also identified, whenever possible, and entered into a computer database.

*Storage Procedures*

After consultation with Willow Powers, archivist for the Laboratory of Anthropology, various storage methods were devised for the materials in the Yeo Collection. All materials used for storage are acid-free, lignin-free, buffered, and archivally approved.

For the paper materials, we maintained the order of Yeo's volumes. We made no attempt to move materials that were obviously out of order, as we decided that the catalog system would lead the user to its location. Obviously identical pages were assigned the same number. Each bound volume or folder was given a volume number, and the pages were numbered consecutively within the volume. In several cases, Yeo had numbered the pages in pen; to these we added the volume number in pencil. Otherwise, we numbered the pages in pencil in the upper right-hand corner. In a few cases, where the pages were numbered but were in no apparent order, a new series of numbers was given.

All metal was removed from these pages, including paper clips and staples. In many cases, where volumes consisted of many pages of photographs, Yeo had stapled strips of file folders along the binding edge of each page to make the binding thicker. These were also removed. Any bits of stray paper with notes deemed unrelated to the collection were removed. Some of these marked photographs that Yeo was supposed to or did copy for a friend. Some of the pages were cheap lined school paper or other types of paper; these contained notes Yeo had written in pencil. Because this paper is less stable than the rest of the sheets in the collection, these pages were Xeroxed onto bond paper and both sheets were numbered with the same page number.

The photographs were left on their pages, whenever they were secure. More than half of the photographs were glued solidly to the pages. The rest had been mounted by
cutting slits in the pages and inserting the corners of the photographs into the slits. If the paper was torn or the photograph was loose, the photograph was put into an envelope and numbered but left in place within the volume.

Paper materials were placed in archival file folders, approximately 20 sheets per folder. The folders were placed in Hollinger storage boxes. Enough folders were included to fill the box loosely, while not breaking the volumes, unless absolutely necessary. Some boxes contain several smaller volumes. Four small notebooks, three with locational information and one original field book with notes and drawings, were also stored in a box. Fifty volumes were safely stored in about 30 boxes.

Oversize items, such as original maps and drawings, as well as a few 15-minute USGS maps with site locations, were stored in large file folders in a separate drawer in the Survey Room of the Laboratory of Anthropology. The items were also given a volume number and stored approximately eight to a folder.

All film negatives were numbered. Yeo had numbered many of them, probably using a fountain pen, by volume and sleeve number when he originally stored them in the negative books. During this project, the unnumbered negatives were numbered according to the sleeves in which they were found. In this way, if Yeo had included the sleeve number in his index, the identification of the negative would be maintained. The unnumbered negatives were marked with a felt-tipped, photographic pen.

All the negatives were approximately 3-¾ by 5-½ in., whether they were silver-nitrate or safety negatives. Each negative was stored in a separate envelope of archival paper, with the negative number on the outside. Paper sleeves allow the silver-nitrate negatives to breath; this is more desirable than either the glassine or plastic sleeves, neither of which allow air passage. Also noted on the envelope was the condition of the negative. Nitrate negatives and safety negatives were stored in separate boxes, called Hollinger shoe boxes. The original indexes from the negative books are stored with the negatives.

Loose photographs were stored in 8½-by-11-in., loose plastic sleeves, which would fit in file folders within one of the Hollinger storage boxes.

**Computer Cataloging**

Three computer databases were designed to contain information on the Yeo Collection, each serving a separate purpose. They were created on a Macintosh computer using the database program within Microsoft Works. This program proved to be compatible with Tim Seaman's Macintosh system, and, ultimately, with the ARMS site database.

As each volume was identified, it was listed in a volume database with contents, number of pages, dates, condition, and other descriptive data (see Table 2 for list of volumes).

Within each notebook, pages containing site data were cataloged by site number into a second database. The second database contains volume and page number, site numbers, and information on whether collections were taken. Provisions were made to include Yeo's chronological number system (although he discontinued use of these numbers in later volumes); Yeo's site-type number; and, whenever possible, a Laboratory of Anthropology number. The latter were traced through Yeo's locational notebooks, the
The third database contains information on the figures (photographs, maps, etc.), especially type of figure, volume and page number, site number, and location, if identified. If the figures were found to be in several locations, such as the flat file and within one or more volume, they were cross-referenced. No attempt was made to include the negatives, as they are adequately indexed in Yeo's typed list.

A disk copy of the database was provided to ARMS for interactive use by ARMS staff and researchers. Printouts of each index were made to be stored with the collections; these were Xeroxed onto archival bond paper. A complete copy of the index was also made available.

Since the cataloging was conducted, the data on those sites with Laboratory of Anthropology numbers have been added to the ARMS computerized database. A search of an area containing a site documented by Herbert Yeo will reference the Yeo collection, providing the researcher with the location of site descriptions, maps, photographs, and ceramic listings for the site.

RESEARCH POTENTIAL OF THE COLLECTION

The Yeo Collection consists of site descriptions, site maps, locational maps, photographs and negatives, and sherd collections. Also included are his observations on the prehistory of the area, some of his correspondence, some of his field books, and other papers. These materials can be used for various research projects, such as but not limited to the following:

1. Site locational/distributional data can be used generally to study settlement patterning by site type and temporal period. As 7.5-min. USGS maps were not available to Yeo, some locations are not exact, but he provided general site locations and descriptions. Yeo also classified the different types of sites, such as campsites, village sites, fortified sites, etc. His sherd collections were typed by H. P. Mera and are stored in the sherd collection in the Laboratory of Anthropology. When used in conjunction with the site distributional data, the sherd collection provides important temporal data.

2. The site descriptions, lists of ceramic types, and sherd collections can be used to date sites for which no temporally diagnostic materials remain on the surface. These collections are particularly important for such phases as the San Marcial in southern Socorro County, because San Marcial Black-on-white sherds are now very rare as surface manifestations.

3. Yeo's rock-art photographs are excellent, as he chalked in the etched lines of each petroglyph so that the designs would show. Whether or not this procedure is acceptable today, his photographs, especially from the Three Rivers site and from Black Mesa at Santa Tomas in the Mesilla Valley, provide valuable data for studies of rock-art elements within the Jornada Mogollon area. This documen-
tation is particularly important, because many of the panels at such sites have since been damaged or removed.

4. Yeo’s text and photographic documentation for archaeological and rock-art sites provides an important management tool for studying deterioration through natural causes or as a result of increased population in areas of New Mexico. Many of the sites in Southern New Mexico have been vandalized, and erosion has affected the condition of the sites. The Yeo Collection provides data on the condition of the sites when they were recorded between the 1930s and the 1950s, which can be used, in conjunction with modern documentation, to evaluate natural and human effects on the sites.

RECOMMENDATIONS

Specific storage alternatives were selected for the variety of materials in the collection. The alternatives lead to specific recommendations for maintaining the collection and monitoring its condition.

1. Provide cool storage for silver-nitrate negatives.

The 1,000 silver-nitrate negatives, which were stored in paper sleeves in separate boxes, should be placed in a cool, stable environment within the Museum of New Mexico. Cold storage is recommended (Jude Southward, Colorado Historic Museum, personal communication 1990).

2. Print negatives.

To derive the full benefit of the photographic collection, all of the negatives should be printed. The least expensive yet acceptable method would be to make full-sized contact prints. The negative numbers should show in the prints for easy sorting. Full-sized contact prints would facilitate identifying the contents of the negative files.

These could then be compared to the photographs in the volumes, to identify which negatives are not represented by photographs in the collection. It is expected that at least half of the negatives are not contained in the notebooks.

3. Make new negatives to replace the silver-nitrate negatives.

Since the silver-nitrate negatives are unstable, they should be replaced. For the approximately 1,000 silver-nitrate negatives in the collection, new negatives should be photographed from the contact prints. When this is done, the silver-nitrate negatives should be burned under the supervision of the Santa Fe Fire Chief or stored in a fire-proof facility.

4. Make a back-up copy of unstable sheets.

Most of the pages in the finished or partially finished site volumes are good-quality bond paper and have survived well. Some of the earlier volumes contain hand-written drafts on poor-quality tablet paper or are typed on cheap typing paper. Also, a number of pages are partial sheets, which are difficult to handle. Some of these were Xeroxed onto archivally stable paper, in order to provide a full-sized copy in case the small sheets were lost. The rest should also be copied on archival-quality bond paper.

5. Periodically check the condition of the collection.

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The numbering system provides an unambiguous location for each sheet within a file folder and then a storage box. However, the pages are loose within the file folders. As researchers use the pages, the condition of the material should be checked. The pages within the folders should be straightened, and the order of the pages and folders should be checked. If the pages shift too much within the folders or if the pages become bent or torn, a new storage system may need to be devised.

6. Trace the remaining Yeo materials.

The collections of Yeo materials in the Branigan Library and what is now the UTEP library contain duplicates of the bound volumes that are housed in the Museum of New Mexico.

However, many more sites are listed in the ARMS files as being recorded by Herbert Yeo than were found in the Yeo Collection. Specific areas that are not well represented in the Yeo Collection material are Arizona and northern New Mexico counties such as McKinley and Sandoval. Additional collections may exist, possibly in Arizona. Some effort should be made to locate these materials and to copy at least those that are relevant to New Mexico.

7. Provide opportunities to publish the collection.

The collection contains excellent records and photographs of a diminishing resource. The site descriptions contain site-locational data and should not be published as they are. The descriptions and site maps could be published, with only general locational data. Publishing some of the data would encourage archaeologists to use the collection.

The remainder of the material consists of very good quality rock-art photographs. These would provide an excellent basis for one or more publications on rock art of various areas of New Mexico. The variety of motifs recorded is astounding. Also, many of the panels that Yeo recorded are now defaced or removed. The researchers recognized one panel from near Winston that has been defaced since Yeo photographed it. Others may not even exist today. Publishing the rock-art material would provide an important reference.

CONCLUSION

Herbert Yeo collected a significant body of archaeological data in the form of site descriptions and maps, supplemented with photographs and identified ceramic assemblages, long before contract archaeology, rigorous field methods, 7.5-minute USGS maps, and cadres of trained archaeologists. The State Historic Preservation Division recognized the importance of the collection by providing funding for this project. We have documented both the cataloging and the storage of the collection to encourage its use and to make the procedures available for use on other archival collections.

—Human Systems Research, Inc.,
Las Cruces, New Mexico

ACKNOWLEDGMENTS

The work on the Herbert Yeo Collection was funded by a National Park Service grant administered by the Historic Preservation Division, Santa Fe, through
Human Systems Research, Inc., Tularosa and Las Cruces.

The work was conducted entirely by the two grant recipients. The project was administered by Meliha Duran and Karl Laumbach. The staff of the Survey Room, Laboratory of Anthropology, Museum of New Mexico, was especially helpful. Tim Seaman and Rosemary Talley took time from their busy schedules to arrange work space and to provide materials, information, and other assistance, as needed. Willow Powers, archivist for the Museum of New Mexico, provided much-needed advice on archival storage methods and materials.

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Rio Grande Historical Collection  
The Cacique's job in a Pueblo may be one of the oldest communal positions. He is responsible for the sacred well-being of his entire tribe. Pueblo Indians believe Tiamunyi (cacique) was created to take the place of Tsityostanako, the Mother of All, and of Utctsiti, the mother of the Indians. It is his responsibility to take care of the people and work (i.e., ceremonially, magically) for them; he is to be father and mother to them (White 1962:127). During the past 100 years, ten Tiamunyi have guided the Zia tribe.

Once appointed to the Cacique group, the position is a lifetime commitment terminated only by death. The individuals appointed into the cacique group are selected from among the older eligible males in the Wacpa (Sage), Coyote, and Corn clans. There are only three or occasionally four individuals in this group—the Tiamunyi, the Right-hand Tcraikatsi, the Left-hand Tcraikatsi, and possibly another. They ascend to the position of Tiamunyi in the order of their appointment to the group.

One hundred years of caciques for the Zia are listed in Table 1. There should be one or two more Tcraikatsi appointed in the year or two following Vincente Shije's ascension to Tiamunyi. Table 1, as validated by Zia Elders, should correct and supplement the published information (Stevenson 1894; White 1962) on the order in which past Caciques (Tiamunyi) have served. Membership in this group of tribal priests does not exclude a man, like the position of Catholic priest, from having a family, though he may long since have become widowed. Reproduction is too important a function from which to exclude a man. Membership in other societies would occur only if acquired before appointment to the Cacique group, and appointment to a secular office, after assuming membership, would never occur, since the Cacique is responsible for appointing secular officers. The Cacique (Tiamunyi) would, if anything, be considered a member, or senior to, the Religious Council composed of the heads of the most important religious societies, not a tribal officer.

One of the more interesting contributions made by a member of this group has had far wider implications than he expected. Magic, especially sacred (good) magic, often begins with an almost insignificant act that blossoms.
Table 1. 100 Years of Caciques.

<table>
<thead>
<tr>
<th>Tribal Membership No.</th>
<th>Name</th>
<th>Birth-date</th>
<th>Clan</th>
<th>Period served as full or acting Tiamunyi (Cacique); (date of death)</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
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<td>Cochiti Wacpa</td>
<td>?</td>
<td>?</td>
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<tr>
<td></td>
<td>Felipe Plata 2</td>
<td>1819</td>
<td>?</td>
<td>? to 1890</td>
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<td>Juan Ramon Shije 3</td>
<td>1860</td>
<td>Coyote</td>
<td>1890 to 1914</td>
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<tr>
<td>&quot;There was no Tiamunyi in 1915 [and the] ... last Warrior [scalp] Society member [required to install the officer who installs the Cacique] died in 1916&quot; (White 1942:127)</td>
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<td>Juan Shije 4</td>
<td>1842</td>
<td>Sia Corn</td>
<td>1917 or 1918 to 9/6/43</td>
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<td>1890</td>
<td>Sia Wacpa</td>
<td>1943 to 7/5/53</td>
<td>10</td>
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<td>1881</td>
<td>Acoma Corn</td>
<td>1953 to 3/30/65</td>
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<td>74-0332 Jose D. Pino</td>
<td>1887</td>
<td>Antelope Wacpa</td>
<td>1965 to 8/29/77</td>
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<td>74-0215 Avaristo Medina</td>
<td>1924</td>
<td></td>
<td>Cochiti Wacpa</td>
<td>1977 to 2/26/84</td>
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<tr>
<td>Z-0219 Juan I. Medina</td>
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<td>1984 to 1990</td>
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<tr>
<td>Z-0500 Vicente Shije 10</td>
<td>1930</td>
<td></td>
<td>Sia Corn</td>
<td>1990 to ?</td>
<td></td>
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<tr>
<td>Z-0265 Gerald Pino 11</td>
<td>1964</td>
<td>Y'aak'a (com)</td>
<td>Tcraikatsi (Right Hand)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:

1 White 1962:128.
2 The father of Lucia Salas (Plata; No. 110 on 1904 census [White 1962:128]).
3 Probably Gacitiwa and Gyeiro, the Indian names given White by two different informants as to the predecessor of Juan Shije, are one and the same person, both having been noted as married to Dominga (i'tiye; No 98 on the 1904 census) and both noted as belonging to the Coyote clan. Gacitiwa was Juan Ramon Shije, "husband of Dominga (No. 98 on 1904 census) who was mother of Juan Diego Shije (or Herrera)" (No. 107 on 1968 census) (White 1962:127; Zia current census files).
4 Last installed, or full, Tiamunyi (White 1962:127). From this point onward the position of Tiamunyi was held as Acting Tiamunyi by the senior Tcraikatsi of the cacique group, and a new junior Tcraikatsi was selected from the requisite clan that was no longer represented in that group.
5 Jose Gachupin was husband to Andrea Toribio Gachupin (Coyote clan), and father of six children: George, Felix, Elias (Zia census Z-0074), Manualita (74-0470), Helen (Z-0083), and Gloria (74-0025). White (1962:128) mentions Jose serving as third Tcraikatsi chosen in 1916. According to the dates he served as Cacique, he was the second not third Tcraikatsi. His birth and death dates were obtained from the Zia Census, and his children from my notes, as verified with the Zia Census.
Table 1. 100 Years of Caciques. (Notes cont'd)

6 Chosen in 1916 according to White (1962:128; Zia Census).

7 Noted by White (1962:128) as Jose P. Pino, chosen in 1916. Additional data from Zia census records and Zia Elders.

8 Son of Lorenzo Medina, an ex-service man chosen for the cacique group in 1954. He signed the Tribal Membership Adoption Ordinance as Cacique, but he was one of those who refused to apply for membership, saying he did not have to prove that he was a member. The lack of this completed form left no direct records about him in the census files (White 1962:128; Zia Census).

9 Ex-service man chosen for the cacique group in 1954. He died after unsuccessful heart bypass surgery (White 1962:128; Zia Tribal Census).


11 Chosen for cacique group in 1990, after the death of Juan I. Medina (Dodge 1988; Zia Census).

In 1988, having finished a project to make their dialect of Keresan a written language and to add the native name and clan of each tribal member to the census, they were moving on to other forms of preserving their cultural heritage while becoming integrated into mainstream society. Their library, built in 1985, had some space the Tribal Administrator and Council felt could be used to greater tribal benefit. There was space for a small museum, which would review Zia's past both for Zia Pueblo's and the greater public's edification. For this, professional museologists were called; they procured artifacts from local museums and archives with which to design their exhibit depicting Zia's past and to integrate an introduction to written Zian.

Also, Zia recently initiated a scholarship fund to promote higher education in their young people. The scholarship promotion and museum projects, occurring about the same time, were combined. The opening of the new museum would be an appropriate beginning for a day of celebration designed also to raise funds for the scholarship. Using a traditional dance that would not profane any sacred aspects of the culture fit in perfectly—a dance such as the Crow Dance.

Other Pueblo fairs usually center around craft shows accompanied by traditional dances, or they are combined with frequent examples of traditional sacred dances. In Zia this fair consisted of the museum opening followed by alternating Crow and Buffalo dances. The dances continued until around 5 o'clock pm. Though cameras were not permitted, a poster of one of the Crow Dancers and post cards of several Crow Dancers had been prepared for sale.

Zia's Crow Dance is unique among Pueblo dances because its history is fully known. About 1920, while working in Grants, 200 km (125 mi) southwest of Zia, Jose D. Pino, then in his 30s but later a cacique, and some friends from Zia needed to return home. Having no available travel funds, Jose suggested that they perform a public dance to raise those funds.
The others said "But, how can we do that, we don't have any of our costumes?" Jose said, "That's all right, don't worry about it, I'll fix that." They said, "We don't even have moccasins here," and he replied, "Then we'll dance barefoot."

"What about headdresses?"

"Don't worry. We'll get some horsehair and make them" (Pino 1992).

The resulting costume was one of the simplest that is used for any Indian dance today. Though it has evolved, it is still very similar to the original costume. The main dancers are entirely painted black, and they wear only a long red g-string extending below the knees; this matches the two "lipstick" stripes across the dancer's face that cover the mouth and eyes. Soft eagle feathers blow from the corners of the breach cloth, complementing the single, long tail feather that extends from the front of the headdress. The present headdress is a roach of black horsehair, like the Roman soldiers or the Plains Indians wore. Originally the horsehair hung down with four tail feathers tied along the length. When moccasins are used, they are the tall man's moccasins with a tongue, tied with skunk skin cuffs around the heel. The breach cloth, held up with a cord, is bound with a concho belt onto which large sleigh bells are attached. The simplicity of the unadorned but polished black male body is accented by a simple squash blossom necklace, a single arrow carried in one hand, and an eagle feather in the other. "The clowning of the dancers makes it a winner. People love it" (Pino 1992). The Crow Dancer behaves...
like the comical and curious crow—swooping, pecking, and investigating everything it finds, particularly shiny coins and paper money that are thrown to them.

"Like Rudolf the red-nosed reindeer who isn't allowed to play in any of the reindeer games, only one figure in the dance is different." This crow, instead of being black, is painted white. He is not allowed to participate with the others and is the brunt of all the jokes. These crows' actions are very similar to those of the koshares clowns, but acquisition of money, not teasing and joking with the crowd, is the point.

"The Crows don't come in lines from the kiva as in other dances. After the chorus arrives the Crows may climb up the back side of the houses and jump into the plaza from a roof, or from any side. They run all over" (Lucero and Lucero 1992; Pino 1992). And they leave the same way, like a flock of crows. When one of the Crows finds something to be curious about, he will pick at it with the arrow, just as if it were his beak.

At one dance someone threw out a rubber snake, and two of the crows picked it up almost simultaneously. They bickered over it. They put it in their mouths and pulled back and forth. "When one let go, the rubber snake snapped into the other's face, making him do a flip. It was all very funny."

This time instead of just letting people throw coins at the dancers, says one of the organizers, "We put a big jar in the center of the plaza into which people put their donations. That is the way we did it in the 1930s when we used a famous potter's vessel. She had been all over the U.S. showing pottery making and was well known. It made the vessel special too. People used to throw coins at the dancers just as they throw things at crows. That is how the original dancers earned their travel money" (Lucero and Lucero 1992; Pino 1992). For the scholarship dance, people either threw coins or walked over to put bills and checks into the jar. Some large checks were turned in at the tribal booth, where the posters and raffle tickets on a new car were sold.

Since its 1930s birth, the Crow Dance has been performed at the Gallup ceremonials, where it won Best of Show; at the University of New Mexico Johnson Gym; and before several other audiences. It has not been open to the non-Pueblo public since about 1975, but it has been regularly performed at Zia, especially by school children to entertain their parents.

It is significant that the magic Crow Dance, which raised such a nice principal for the Scholarship fund, has become traditional, though not religious. It was originated by a member of the Cacique group. It ties the raising of money into the acceptable use of certain traditional practices, particularly when connecting them with projects that profit the community as a whole. And nothing can be more basic to a community's well being, spiritually as well as otherwise, than the education and thus survival of its future generations, whether that education is in traditional or more contemporary subjects.

–Florence Hawley Ellis Archives, Albuquerque

NOTES

1 Clans listed in the census records from which the Cacique group may be selected are W'aaashba (Sage), Yaak'a (Corn), Yaak'a wisiina (Corn in shreds), Gasha'yaak'a (White Corn), Srudzuuna (Coyote), and Srudzuuna

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ishduwa (Coyote Arrow). The lineages listed by White (1962:127, 185) of Acoma Corn, Sia Corn, and Antelope Corn; Acoma Antelope, Sia Antelope, and Cochiti Antelope; and Sia and Antelope Walpa are distinguished presently in the membership records only as Corn or Walpa. There is no antelope in any form.

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RELIGIOUS PRIVACY—BACKGROUND

Religious privacy is important no matter what one's religion. The problem for Southwestern Pueblo peoples2 pivots on two basic points. First is their belief that, if their religious concepts and rituals are divulged to outsiders, those facets lose power. Secondly, past religious and cultural persecution have increased their need for religious privacy. Robbery of religious objects and derogation of the associated rituals have made Indians seriously fear that objects, places, and occasions sacred to them are still likely to be desecrated.

Though non-Indians may be sympathetic by intention to the rights and religion of other peoples, avoiding sacred areas in Indian country may not be easy. The initial problem is in understanding the broad tenets that are important to the Indians religion, as well as the importance of shrines within that religion.

When the Spaniards established their first settlement at San Juan del Yungue, the Pueblos had the highest culture among the natives of what became the United States. By 1680, Pueblo suffering from Spanish suppression became so unbearable that the individual tribes, uncharacteristically, banded together to drive out the invaders. The Spanish population was small compared to the already decimated Indians, but the Spaniards had guns and horses against the Pueblos' bows and arrows.

The Pueblos, wishing no more deaths on either side than necessary, cut off the water flowing into the Spanish headquarters, the Governor's Palace in Santa Fe. When the Spaniards realized the effectiveness of this siege, they agreed to leave. Pueblos, unlike Plains Indians, emphasize the basic ideals of peace and quiet; seeing no reason for further attack or harassment, the Pueblo warriors simply watched to ensure the Spaniards' departure.

But 12 years later, the Spaniards returned after two quick punitive expeditions that tested the situation and intimidated those tribes they contacted. The Pueblo tribes, accustomed to acting as corporate units or city states, not an allied or unified whole, were unable to defend their land.
The Reconquest was not bloodless, as frequently averred by the conquerors. Both the Pueblo conquest and reconquest, which lasted through 1710, resulted in tremendous disruption and diminution of the Pueblo population. Many villages were abandoned temporarily, some permanently. Several Pueblo groups moved into Hopi or Navajo areas to avoid Spanish oppression. Only a portion of these people eventually returned, leaving Tano Village on the second Hopi mesa and a large Navajo clan that today recognizes its Jemez Pueblo ancestry.

Some tribes ceased making pottery at that time, and others lost most of their fundamental social and household organization. Jemez only resumed pottery making during the present century. And the patrilineal Tanos, who joining the Hopi, had to adopt the strong Hopi matrilineal-matrilocal system in order to "fit" into their new local pattern.

The Spaniards made the Pueblo Indians swear allegiance to the king, something Pueblos hardly could have understood, and, contrary to actual Spanish law, forced considerable contribution of labor and/or goods as a form of taxation. More devastating though was the Spanish insistence upon Native conversion to Catholicism.

A major result of this early religious persecution was the Pueblo conviction that all Native religion must be hidden from non-Indians, in thought, word, and deed. To retain as much ancestral culture as possible, it must become invisible to outsiders. For centuries Pueblo children were taught by parents and Pueblo officers to keep Indian religion and even native life and language as secret as possible from non-Indians. Progressively since the 1940s this attitude is beginning to relax and even Pueblo religion is sometimes minimally discussed with trusted researchers when relevant bits are required in tribally important law cases. But the Pueblos still feel the best protection against criticism, punishment, ridicule, and eventual loss of the old ways is to shelter them.

The Pueblos, most conservative of all U.S. Indian groups, have been raised to understand that their ancestral ways lasted because they worked under many types of duress. Thus, presumably, tradition would be safer than new non-Indian ways. Some years ago a Santo Domingo friend of my own age told me that his doctor had advised open-heart surgery, but he decided not to risk that...
unknown treatment. "It probably is good for
white people," he said, "but we don't know
anything about it for Indians." He died soon
after.

BASIC TENETS OF NATIVE RELIGION

Pueblo people feel it is important that
they do their part with right action (obedience
to God's laws), periodic purification, and ritual,
so that (a) the supernatural counterparts of
our material earth will reciprocate, ensuring
continuance in the ordained way; (b) the seas­
sons will progress, bringing sufficient precipi­
tation to produce food but not flooding; (c)
there will be fertility for plants, animals, and
children; and (d) natural disasters, disease, and
wars will be averted. Harmony will continue.
And importantly, Pueblos always direct their
actions toward universal benefits, not just per­
sonal, ending prayers with "...and, if there is
any left over, may it come to us."

All religions contain universal con­
cepts but, unlike missionary religions, the old
Pueblo concept contends that if one freely
"gives away his religion" (lets it be known) to
outsiders, it no longer holds as much strength.
They recognize that, as any secret ceases to
hold its mystery, it also becomes emasculated,
losing its power, and thus becomes useless.

Archaeological evidence indicates the
Pueblo Sun or Sky Father (more or less
equated with the male Christian God) and
Earth Mother (broadly equated with the
Virgin Mother Mary) were venerated by
Pueblo peoples as early as a few centuries
A.D. Today, as in the past, the Sun Father is
supposed to receive a daily dawn offering of
prayer and prayer meal. He appears to be a
distant, asexual super being who dwells
"somewhere" but whom one does not directly
petition for aid. Like the Virgin Mary, Earth
Mother is much closer and more approach­able, and her aid is frequently sought by indi­
viduals as well as by the various religious
leaders. Thus pilgrimages to seek her aid at
shrines may be private affairs or involve
groups of varying sizes.

Two other dominant spirit personages
in the Pueblo constellation are the Twin War
Gods. These sons of the Sun, symbolized by
the Morning and the Evening stars, are
thought to live on mountaintops, each of
which thereby becomes a shrine. Their pri­
mary importance is not in matters of war, as
our translation of their names would indicate,
buts in the protection and aid they furnished
the Pueblo people during early mythical times.

Communication with Earth Mother or
other types of spirits is primarily through
shrines. They are locations where the spirits
are believed to be at hand, or possibly to live,
thus a shrine area may be small like the sipapu
in a kiva or quite large.

SOCIETIES

Within Pueblo culture different relig­
ious organizations (societies) concentrate on
different specialties that were believed to
ensure the proper, smooth functioning of the
Pueblo's relationship with nature. Each soci­
ety has its leader, assistants, and members; the
hierarchy of these is determined not by the
age of an individual or his or her qualifica­
tions, but by the order in which he or she
joined the society. Members fall into different
categories according to their sex, duration of
membership, and the amount of esoteric
"learning" each has acquired therein. Societal
duties are similarly divided. Each society as a
whole is responsible for a particular ceremo­
nial activity within the annual calendar. Each
religious society usually goes into a four-day
retreat in the society house four times per
year. During that time, the members
themselves solely to the society's particular responsibilities. The retreat may culminate in a "public" dance for tribal members, though dances put on by religious societies are rarely open to the non-Indian public.

In addition to its ritual paraphernalia and supplies, each religious society owns special secrets, not to be divulged even to nonsociety Pueblo peoples. Society membership and participation in the prescribed activities of the group is a serious responsibility, for should one fail to be present, to completely concentrate, or to perform these activities correctly, he or she personally would be at fault, but everyone (the tribe, other tribes, and all peoples of the world) would suffer.

Because of this perception of universal influence, when anything appears to be out of harmony (not to be functioning correctly), everyone in the pueblo, and especially within the religious societies, searches his or her heart to determine whether he or she has fully cooperated during the ritual activities. "Out of harmony" may manifest as anything unusual. During all ceremonies, everyone is expected to concentrate on the ends being "worked for" by the society and to make sure that none have "a bad heart" (a term usually referring to a person knowingly participating in witchcraft).

During each society's retreat, secret rituals are performed, but there may also be pilgrimages to particular shrines by particular religious officers, the whole religious society, or the entire resident Pueblo membership. Most retreats involve the preparation of "prayer offerings" (objects made carefully, in prescribed manners, of prescribed materials, while thinking only good thoughts), which are then placed upon specific shrines where they carry the prayers of their makers to the appropriate supernatural. This whole procedure involves purification of society members and sometimes of the entire Pueblo. These procedures rely heavily on faith, but mainstream medical groups today are also increasingly stressing that faith in the practitioner and his prescriptions is a necessary ingredient or totality of any effective treatment.

The collection of ritual and medicinal supplies is the responsibility of particular religious officers or individuals in each Pueblo. Because New Mexico is arid, collection is often required over a large area to avoid extinction of some plants, or particular mineral products are mined. Collection areas though jointly used for many purposes also are considered amorphous sacred areas, though not shrines.

SHRINES

Shrines clearly are central to the practice of Pueblo religion, whether located within the village or at a distance. Shrines that have fallen out of present use remain sacred and revered, since each shrine is like a telephone receiver, whose line communicates with the supernatural switchboard even when rarely employed. Each shrine contains a sacred power to be respected and never desecrated.

Death of a Shrine

Shrines ordinarily are not considered movable. Having discussed this question with a number of elders from different Pueblos, I find that when a tribe has been forced to move a long distance from its former home, substitute shrines in the new area replace those now too distant to be visited with any regularity. But this applies only to moves of hundreds of miles, such as those necessitated in the twelfth and thirteenth centuries by the long period of increasing dryness, which was possibly accompanied by a shift from winter- to summer-dominant precipitation in their
homeland. However some major distant shrines continued to be visited by a few religious leaders for several subsequent generations. Shrines thus handled may be directly addressed from afar by reverently placing one's thoughts in the location of the distant shrine or by visiting its newly designated substitute.

One of my elderly Acoma friends told me that when he was a schoolboy, in the early 1900s, his grandfather and two other important religious officers regularly led two burros loaded with prayer offerings northward. The men not the burros carried the food and water. First they stopped in Chaco Canyon to deposit part of their load in old shrines there, then they continued walking to the opening of the prehistoric foot trial into Mesa Verde. At the base of that chimney rock, now known as Mitchell's Butte, they deposited more offerings and continued north for two more days. In a shrine at the edge of Ute Mountain they deposited the last of their offerings. My friend thought this most-northern shrine probably represented the Shipap through which Acoma's ancestors emerged from their original home in Earth Mother's underworld.

I took my Acoma friend with another religious leader and some of their families through Chaco to Mitchell's Butte, seeking these now-lost shrines. Without detailed knowledge of their location, and with all the cultivation, construction, and change in that area, the farthest-north shrine was not definitely identified. But a big shrine in a large white wash near Yellow Jacket ruin, to which stones from many other locations had been brought, was thought to fit the descriptions both Elders remembered, and it was two days walk northward from Mitchell's Butte.

This little story shows something of the migration pattern for at least one group of Acoma ancestors and their reverence for ancestral shrines, but it also contains modern magic. I found many years later that our trip had been blessed by the Gods, for one of those children accompanying us was so impressed by her trip that she became a lawyer who now works for her tribe in Washington, D.C. She attributes her profession and goals to our pilgrimage.

Problems in Shrine Use

Through history many shrines and collection areas that once belonged to a tribe have passed from that Pueblo's control. Major shrines and collection areas are frequently revered and periodically visited by representatives of more than one tribe. When ownership of these areas is jealously held by only one tribe or has actually passed entirely out of Pueblo control, it presents considerable religious duress, especially to those most often using it. Native efforts to retrieve these areas sometimes remind me of Christian crusaders during the Middle Ages trying to retrieve their major shrine, Jerusalem, from non-Christian "owners."

When shrine locations are no longer owned by Indians, there are problems in addition to access. One major concern is desecration, knowing or otherwise. I aided Taos Pueblo in regaining use of their Blue Lake, the most important of their shrines—but also very important and periodically visited by representatives of several other tribes. Taos Elders spoke in horrified tones of non-Indian fishermen tossing the offal from their catch into those sacred waters, of beer cans and trash being left at water's edge camp sites, and of horses tethered on the lake's brink where their body wastes seep down the shoreline. To the Elders these conditions were comparable to contamination of holy water in a Catholic baptismal font.

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Types of Shrines

When "white men" first hear of Pueblo or other people's shrines, they usually ask: What is a shrine? How might an outsider recognize them? Are all shrines of equal importance? Who visits them and when? Why aren't they public property for "whites" to use too? The answers to these questions are not simple, for they are interrelated. Today's Indians are very hesitant to discuss types, appearance, or location of shrines because, when in the past that knowledge became available, disturbance followed.

Some shrines certainly are more important than others, and some shrines that once supported considerable traffic have died. As the cultural import or religious activity with which a shrine is associated shifts or dies out, so too do the shrines. These changes result from economics, acculturation, proximity of non-Indian residents, or even the death of particular religious societies responsible for upkeep and use of the shrine.

Devereaux (1966) discusses the death of what probably was the most important of all the sacred sites for one conservative Pueblo. During the late 1800s, a Spanish American family built their house and began cultivating a small farm within .25 mi (.4 km) of this sacred cave, located on public land some 80 mi (128.6 km) north of the Pueblo. No group of people could congregate or carry on any rituals without being observed by these farmers, so use of the location had to be abandoned. Even after the family moved, the occasional visit of even single Indians was noticed and discussed by local Spanish Americans. Word spread and I, over 100 mi (160 km) in the opposite direction, heard of this cave from an Anglo sociologist.

In the past, the antlers from deer killed during the hunting season were left relatively briefly on a family's roof. Then they were taken to forest shrines where thanks was given to the deer for relinquishing their lives, and prayers were said for deer fertility. Now the piles of antlers around pueblo chimneys grow several seasons deep before this return trip. Certainly hunt shrines still exist, but they are less used than in the past when hunting was of considerably more economic importance.

Both the shrine of the stone lions, in the Bandelier National Monument, and a second shrine of the same type near Cochiti originally each had two mountain lions side by side, carved from the living rock. Some years ago a non-Indian, supposedly hoping to find gold beneath it, dynamited one of the Cochiti pair. As a result the religious society responsible for its care asked me to facilitate moving the remaining lion.

A 1984 newspaper pictured the Bandelier stone lion shrine neatly ringed with deer antlers. "White" hikers had reported observing the results of this native ceremony on public lands, and the press made news not just quiet gossip out of this bit of religion. If non-Indian hikers or Forest Service employees at work glimpse groups of Indians, word of these locations is certain to leak out, inviting more "chance" or "concealed observers" on similar later dates. This could mean abandonment of those shrines. Areas from which herbs and other items that are required for native rituals have for centuries been collected likewise may have to be abandoned because gatherers or signs of their activity alert outsiders.

Pueblo silence concerning their shrines, however, has resulted in enough ignorance that some non-Indian disturbances are probably merely unknowing and thoughtless.
thefts. On three separate occasions in the early 1950s, I was called upon to return the same stolen shrine items. I had worked on the land claim covering the area where the items were found.

On the first of these occasions two white couples had spent a weekend, with the men prospecting for uranium, then of high value, and the women amusing themselves with hiking and climbing. The ladies found a major hunt shrine containing a considerable collection of animal skulls, some decorated with paint, accompanied with assorted offerings. Knowing nothing of Pueblo Indians or their customs, these people decided they had found early Apache trinkets that they could sell.

They offered the items to the Fred Harvey Museum shop in Albuquerque's Alvarado Hotel. The knowledgeable attendant, refusing to buy such artifacts, suggested the items be taken to the Maxwell Museum of Anthropology at the University of New Mexico. She then promptly called the Museum and when the carton arrived and was opened, the director of the Laboratory of Anthropology in Santa Fe was called in. Backed by his notification of the National Park Service, the Museum confiscated the items and notified the finders of their violation of the Federal Antiquities Act of 1906. By their agreeing to the return of the items to the rightful owners these people were excused from prosecution for their unknowing actions. That is when I was called in.

During our land-claim study (Ellis 1956, 1966) of that Pueblo's "ash pile," I had been working with one of the Pueblo's important religious leaders. When I arrived at this Elder's house with the box in the back seat of my car, I told him I had an important matter to disclose to the men of his village. He immediately sent messengers to summon all adult males present in the pueblo.

The serious tone of the meeting, conducted in their own language, of which I only know two or three words, was matched by their very obvious gratitude to me and the others involved in returning these sacred things. When I suggested that the shrine be moved onto reservation land and nearer their village, they explained that moving a shrine is quite impossible, for theirs or any religion. Within the next two years, I had to return the same items twice more under similar circumstances. Needless to say the Pueblo became increasingly worried about that shrine. In 1985 I was delighted to participate in a land claim that incorporated ancestral lands containing this and other shrines into that Pueblo's reservation (Ellis et al. 1985).

Native peoples are aware of the non-Indians' tendency to ignore others' rights. Unfortunately, non-Indians do not recognize items on a shrine as obviously belonging to the person or group that set them there. Thieving from shrines became less common with publication in newspapers of prosecutions under the Antiquities Act of 1906. Still, until the Repatriation Act of 1990 we often heard of the more spectacular cases where Zuni War God images disappeared from their important shrines and Hopi kachina masks from their sacred storage locations in spite of the several publicized occasions when the FBI were called to locate the culprits and confiscate their loot.

San Juan Pueblo lost not just the contents but a whole mountaintop shrine to the Forest Service, which constructed a fire tower directly over it, as I have twice mournfully and with a smoldering touch of bitterness been told by a San Juan Elder who is now dead. Another similar lost shrine was described by

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Santo Domingo Elders (Ellis and Ellis Dodge 1985b; Ellis et al. 1985). Whether the Forest Service at the time was simply ignorant or uncaring about the possible significance of these stone-outlined ovals is unknown. Though such places are supposed to be protected, without non-Indian knowledge of the locations and significance of such shrines, this type of sacrilege continues.

The most common type of shrine to be expected on such high places is that known as an "'earth navel'...a keyhole-shaped arrangement of stones in which the bottom end is always kept open and pointed toward one or more of the Tewa villages" (Ortiz 1969:141, n6). It functions as a sacred center in two respects: first, as a place from which to communicate with the spiritual world, and second, as a place that gathers blessings from three world levels of the Tewa (and some other groups), directing them, through the open end and stone-outlined approach paths, to the villages that use it (Ortiz 1969:141, n6). When such a mountain shrine is sacred to more than one tribe, it will have entrance paths pointing toward each tribe. That tribe's representatives use their own entrance when placing prayer offerings inside the shrine circle so that the Gods will know from where the offerings came.

The first published report on an earth navel shrine was by W. B. Douglass (1912, 1915), a geographic surveyor working on the borders for a proposed National Park. His articles meticulously describe what he discovered when he climbed to the crest of Tsicoma Peak, the highest peak in the Jemez range. This is the most sacred of the Tewa directional mountains, and the seven trails into the shrine indicate its use by six Pueblo tribes plus the Navajo, who adopted the shrine after their ancestors' arrival in the early A.D. 1500s.5 We regret that Douglass took the contents of the shrine and that he broke faith with the San Juan resident who told him their significance, but that publication has since been beneficial to several tribes who used the shrine, in different law suits. Douglass' unauthorized publication is the type of behavior that has earned non-Indians the distrust of the Indians.

There is another of these earth-navel shrines, 40 ft (12.2 m) in diameter, along with four cardinal point shrines, drawn and described by Jeançon (1923:70–73), located at Poshuoinge in the Chama Valley. In the 1960s, when I led a field school for the University of New Mexico, we discovered an additional earth-navel shrine on a flat-topped low hill about .5 mi (.8 km) southwest of Sapawe Ruin, which was occupied at about the same time as Poshuoinge (ca. A.D. 1300–1600). Neither of these shrines appears to be in use currently, probably because of non-Indian proximity.

Every Tewa pueblo has a low stone pile forming an "earth mother navel shrine" in the middle of its plaza or, as at Santa Clara, in each of the plazas. Note the difference in terminology here between this and the "earth navel shrine"; the two honor different deities or (more probably) somewhat different depictions of the same deity. The earth mother navel shrine marks the sacred center of the village and is the source of its blessings (Ortiz 1969:21).

Some shrines, such as the shrine of the stone lions in Bandelier National Monument, are easily recognized by outsiders. Many other shrines also visually depict characters from the mythical past, with the spirit of the original supernatural that is still thought to visit it. There is a man who was turned to stone in the course of one myth, a stone
woman from another, and various animals. Other natural forms are thought to resemble certain parts of human or animal bodies that may add power to cures or ritual activities dealing with the cures. Natural stones, weathered or otherwise assuming recognizable shapes, are believed to be more powerful shrines or small fetishes than any carved by humans (Ellis 1969). One natural shrine figure originally was believed to be an elderly Pueblo lady turned to stone, but now instead is said by some to represent the kneeling Virgin Mary.

There are many other types of shrines besides those we have discussed. All known ancestral occupation sites are shrines because the ancestors moved on to become cloud people, who are bringers of rain. Many but not all shrines have a stone pile or a stone-outlined area a few feet (a meter) across in or near them where prayers are said and a small offering is left from the pouch of sacred meal every male is supposed to carry.

The ash heaps in living pueblos (deposits of household debris consisting primarily of ash from the fires but also sweepings containing dry things like potsherds and the remains of old baskets) are similar to ancestral sites since they contain things used by those that came before. In the past they also sometimes contained burials. Feather offerings are often placed on any of these shrines, for whatever has been associated with one's ancestors will forever carry something of the spirit essence of those persons.

Because ash heaps are sacred, in the more conservative Pueblos outsiders are not permitted to walk onto them, and archaeologists' test trenches in such a pile, most important in determining duration of the pueblo's occupation, have only been acceptable in rare instances (only four by 1985 when this paper was originally written) where the data was of serious importance to that tribe's current land claim.

Ties to ancestors also appear in relation to shrines associated with water spirits, as members of the important religious societies are thought to go to the underworld of Earth Mother after death, but they return to our world as cloud beings bringing precipitation when the living townspeople request it. All water is sacred, whether in rain, springs, lakes, or rivers. Springs and lakes are thought to originate with the ground water of the underworld lake on the edge of which Earth Mother lives. Many katsina figures when visiting our earth are believed to emerge by way of natural water sources.

Shrine Activity

How is one to recognize an active shrine? Some of the Pueblos, to discourage thievery, desecration, and destruction, have adopted the system of taking offerings to a shrine but burying those offerings nearby or putting them under a stone a number of feet (a meter) away. Thus the absence of offerings does not indicate inactivity. Even at a shrine where offerings are openly left, such as near a pueblo, the old and weather-worn items are periodically removed to neaten the area and to provide space for new gifts. The supernatural beings are more likely to recognize fresh offerings when the older ones have been removed.

At Jemez conflict between Indians and Anglos emerged over the handling of the local springs. The U.S. Forest Service decided that a certain headwater spring, where they saw no visible Native use, should be developed. They felt that cleaning and stabilizing the sides of the spring's small pool would encourage use of the water by both Indian and White
visitors. If one is considering drinking or bathing in the water, this is certainly true, but the Pueblos were not consulted about their use or concerns.

Had they been consulted they might have revealed enough of their deep concern with such sacrilege that some adjustment could have been made with the improvements so that Pueblo needs were also accommodated. Water coming freshly out of the earth at many specific headwater springs is required, much like "holy water," for some of the most important Pueblo religious ceremonies, but it is considered contaminated and hence entirely unusable in a ritual context if it touches anything pertaining to the non-Indians. This, of course, includes all of the Anglo improvements, simple or elaborate, regardless of the good intentions. Placement of the improvements some distance from the actual spring might possibly have satisfied the needs of both cultures.

This type of problem has plagued Indians, for trying to explain, especially to those now in control of once-Indian lands, rarely helps but reveals information that may later prove detrimental. When it has become necessary to reveal the location of a shrine, normally some surrounding space is also designated. The size of area that is needed to be necessarily and constantly free of intruders if that shrine is to retain its Pueblo religious connotations and use can be compared with the Anglo concept of a religious relic and the church it is housed in. The shrine itself may be small, but the necessary area surrounding it is "the people's church." Zia and Jemez representatives repeatedly reiterated this to me during our handing of their dispute with the U.S. Department of Energy over Indian exclusion from the Redondo Peak area during geothermal investigation and proposed use (Ellis and Ellis Dodge 1982). Anglo Church space, being enclosed, is necessarily very limited in comparison to the space used by those accustomed to worship in nature's own house. Just as one sees numerous individual chapels in a large cathedral, with each side chapel dedicated to a particular saint, so one finds numerous sacred areas and smaller shrines within this Native church.

—Florence Hawley Ellis Archives, Albuquerque, New Mexico

NOTES

1 Reiteration for public access of a paper submitted at court (Ellis and Ellis Dodge 1985a).

2 "Pueblo" written with a capital P properly refers to the tribe, the culture, the members of a Pueblo tribe, and the name of that tribe, actually a nation. Example: San Juan Pueblo. When the same word "pueblo" is written with a small letter, it refers to the architectural unit or units inhabited by the people of that tribe.

3 Most of the Pueblo peoples were and still are matrilineal, but the Tanoans (Tiwa, Tewa, Towa, and Tano) appear to have always favored the bilateral system, with strong emphasis on patrilineality.


5 Parsons' (1939:241, Fig. 16) drawing of this shrine, done by a San Juan townsman, is not accurate but conveys the same data.

6 This case (Ellis and Ellis Dodge 1982) was prepared for court in relation to the use of this area for geothermal heat and the exclusion of the Indians from the area. The case was
never submitted to the Judge, but the report is on file with lawyers in Washington. It still contains classified data.

7 Introduction to classified report and map prepared by Andrea Ellis Dodge on the specific religious areas belonging to San Juan, San Ildefonso, and Santa Clara to be avoided in the installation of a high-voltage line to Los Alamos.

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Jeançon, J. A.

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Parsons, Elsie Clews
THE TEACHER, THE GHOSTS, AND THE SNAKE: PRELIMINARY RESULTS OF EIGHT FIELD SEASONS AT RATTLESNAKE RIDGE

Sinclair Hatch, Jr., John Hayden, Cheryl Muceus, Mary Purdy, Pat Trusell, and Fred Trusell

The prehistoric Rattlesnake Ridge community (LA 35648) is composed of nine single-unit dwellings, two multiple-room dwellings, three towers, three pithouses with related surface storage rooms, and a reservoir system and a possible second reservoir. These features are strung out atop Rattlesnake Ridge, also called the BG20 cluster, but they are considered to be part of a single prehistoric Gallina village. This site was chosen by Dr. Ellis, at that time director of the Archaeology Seminar for the Ghost Ranch Conference Center at Abiquiu, New Mexico, to extend her focus on the study of the Gallina people.

Dr. Ellis and crew (as many as 60 participants) began work on Rattlesnake Ridge in 1976 but did not return until 1983; the work was completed on the Gallina features in 1989. Rattlesnake Ridge is the same site as Rattlesnake Point, the name used by Dr. Frank Hibben in the late 1930s when he began excavations in the area. Hibben (1938:131) used the term "Gallina" and H. P. Mera (1938:236) used "Largo" for the same cultural attributes when both were doing work north of Llaves in the 1930s. In the archaeological literature, the two terms are often combined, "Largo-Gallina," but Dr. Ellis preferred the name "Gallina." Whatever the name used, the cultural manifestations are large single-room surface houses (unit houses), at times in combination with pithouses; a few multiple-room dwellings; and towers that were possibly used for signaling. Interior house features usually include a fire hearth, a deflector, a ventilator shaft, a sipapu, a flagstone floor, storage bins south of the hearth, and benches around the north, east, and west perimeters of the rooms. Gallina ceramics include carbon-painted decorated ware and pointed-bottom utility vessels. Specialized stone tools are the poll-notched axe and the large crested arrow-shaft straightener. Agriculture was practiced, and many of the Gallina structures were burned. The earliest tree-ring dates for the Gallina phase are A.D. 1039, and the latest is A.D. 1275 (Ellis 1988:29, 34).

Dr. Ellis' original plan was to excavate all of the features that comprised the prehistoric Rattlesnake Ridge community "in the hope of reconstructing a picture of family and village life" (Ellis 1976:3). This would be accomplished using the ethnoarchaeological method (a combination of archaeology and ethnology for which Dr. Ellis was quite famous). She had finished her work on the
Turkey Springs sites near the village of Canjilon and was sure that these sites represent meat and plant-harvesting villages and that the home villages were those such as Rattlesnake Ridge and the Carricito community near Llaves. The purpose was to determine the relationship between the Gallina home villages and the seasonally occupied mountain sites such as Turkey Springs.

Dr. Ellis and her Ghost Ranch crew had previously excavated several unit houses on the Butts Ranch south of Llaves, and they returned to that area during the years between 1976 and 1983. Because of her work on land-claim cases with the pueblo of Jemez in 1956, Dr. Ellis wished to pursue the connection that Reiter (1938) had suggested, that there were links between prehistoric Jemez architecture and that of the Gallina culture.

This paper is a synopsis of work accomplished on Rattlesnake Ridge, a compilation of reports written by the crew chiefs involved. Those crew chiefs were James Bain, Brian Blanchard, Bruce Campbell, Andrea Dodge, Sinclair Hatch, Jr., John Hayden, Mary Lu Moore, Cheryl Muceus, Gordon Page, William Perret, Mary Purdy, Darlene Shibley, Jim Shibley, William Sundt, Pat Trusell, and Fred Trusell. Their reports are on file at the Florence Hawley Ellis Museum of Anthropology and the Supervisor's office of the Santa Fe National Forest. Even though some crew chiefs have since died (as has Dr. Ellis), they were very much a part of this research project. As you might have guessed from the title of the paper, Dr. Ellis was "the teacher" (this is how she often referred to herself), "the ghosts" are those of Ghost Ranch, and "the snake" indicates Rattlesnake Ridge.

The remainder of this paper discusses the features excavated on Rattlesnake Ridge by type: pithouses, unit houses, multiple-room structures, towers, and the reservoir. Features were given BG20 numbers within site LA 35648 (see Table 1).

**LOCATION**

Rattlesnake Ridge is an upthrust sedimentary formation in Rio Arriba County in northern New Mexico, north of the village of Llaves. The elevation of the site is about 2,255 m. The Rattlesnake Ridge site is in the Cuba District of the Santa Fe National Forest, is approximately 800 m long (Figure 1), and spans the width of the top of the ridge, about 200 m at its widest point. Rattlesnake Ridge gets its name from the outline of a rattlesnake seen along the steep eastern edge of the ridge—this snake being the outcropping Lewis shale.

The ridge is topped with piñon, juniper, occasional ponderosa pine trees, and small scrub oak thickets. Unit-house depressions are filled with sagebrush and other shrubs, grasses, and prickly pear cactus.

**PITHOUSES**

Two pithouses and one possible pithouse can be found at Site LA 35648 (the BG20 cluster). Another pithouse, Feature BG20-11 (not shown on Figure 1), across the fence and south of the parking area used by Ghost Ranch crews, was not excavated.

Feature BG20-1, a possible pithouse near the two pithouses located west of BG20, Tower 1, was trenched using a backhoe. A house floor was found 2.4 m below the surface, but the walls were in poor shape. On this floor lay a piece of charred wood that dated to A.D. 1209+B.1 Excavation of the pithouses was abandoned because the removal of huge quantities of overburden for minimal
Table 1. Features at Rattlesnake Ridge, LA 35648.

<table>
<thead>
<tr>
<th>Feature Type</th>
<th>Feature No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pithouse</td>
<td>BG20-1, (2 possible pithouses, unnumbered features*)</td>
</tr>
<tr>
<td>Unit House</td>
<td>BG20-3, -6, -7, -8, -10, -1N, -2N, -3N, -4N</td>
</tr>
<tr>
<td>Multiple-room structures</td>
<td>BG 20-4 and -5 (2-room structure)</td>
</tr>
<tr>
<td></td>
<td>BG20-9 (3-room structure)</td>
</tr>
<tr>
<td>Towers</td>
<td>BG19, BG20 Tower 1, BG 20 Tower 2 (known also as Hormigas site and -N6 on Bice's map)</td>
</tr>
<tr>
<td>Reservoirs</td>
<td>BG20-2 and unnumbered possible reservoir* (Bahti 1949:52)</td>
</tr>
</tbody>
</table>

Note: * is not on map (Figure 1).

cultural artifacts was not an efficient use of the seminar participants' labor.

**UNIT HOUSES**

Nine features—BG20-3, -6, -7, -8, -10, -1N, -2N, -3N, and -4N—are the unit houses or single-room domiciliary structures on Rattlesnake Ridge. All but Features -2N and -8 were excavated. The unit houses were typically built on north-south, east-west axes, constructed with massive, roughly 1-m-thick stone walls (Figure 2). Entrance to the house was down the smoke hole in the roof by means of a wooden ladder. The interior features were usually found in the southern portion of the room. The fire hearths were placed slightly south of the center of the structure, with an ash pit and fire deflector to the south, in line with the ventilator shaft opening. Typically, food-storage bins were aligned with the fire deflector, and sometimes benches were found along east, west, and north perimeters of the room interiors.

Many of the unit houses are floored with flagstone or paving stones, at least in a portion of the room if not throughout (for example, Features BG20-3N, -4N, and -10). Part of the floor in Feature BG20-7 was built by excavation into the bedrock; in Feature BG20-10 fill had been added to raise the south end of the floor, since it was built on sloping bedrock. Floors are typically level within a few centimeters.

Feature BG20-3 is a large unit house measuring 6.07 m east-west and 6.45 m north-south; it is composed of walls of undressed stones roughly laid. The house lies southeast of the reservoir, Feature BG20-2, and the BG20, Tower 1. A 1-m test excavation was dug just north of the center of the room to discover the depth of the floor. Potsherds and a portion of the mouth of a crushed pot were found in the southwest corner of the test pit. At the same level and in the center of the north wall of the test pit was a deposit of charcoal. This was identified as pine by Dr. Ellis and was determined to be too small for tree-ring dating. There was no trace of burnt adobe or latillas that would indicate a roof that had burned or collapsed. No further work was done on this structure.
Figure 1. Gallina Sites on Rattlesnake Ridge (reprinted by permission of Dick Bice).
Figure 2. Plan view drawing of Gallina unit house.
Feature BG20-6, a unit house, is downslope about 50 m from Features BG20-4 and -5. Immediately to the west and south, the hill falls away steeply, and a great amount of wall material has shifted in that direction. The interior measurements of the structure are 5.0 m north-south, 4.4 m for the east wall and 4.92 m for the west wall. Only one badly decayed wooden roof support post was found during the excavation. It was identified as Douglas fir by Dr. Ellis, and it did not warrant dendrochronology analysis.

Very few artifacts or cultural trash and no evidence of roof material were found during the excavation. Fragments of burned sandstone recovered in the northeast and northwest corners indicate that the room had been only lightly burned. It is thought that the room was abandoned and the building material used elsewhere and that it was not destroyed in an attack.

Feature BG20-7, a unit house near the south end of Rattlesnake Ridge, is almost square, measuring about 5 m on each side. The house was constructed on a hill of substantial slope, with part of it excavated into the hill. Despite this the floor is even within a few centimeters, and the area north of the storage bins is paved with large sandstone slabs. The walls show remnants of having been plastered with a thin layer of clay. The locations of all four roof-support posts were found. The fire pit is deep and slab-lined.

The unit had been severely burned, presumably in the same raid leading to the destruction of other houses in the area. Evidence from this house supports the conjecture that the raid took place in the fall, when the corn harvest had been placed on the roof to dry. Great quantities of fused corn cobs were found in the burned roof material, as well as remnants of rooftop corn cribs.

Based on Jemez oral tradition, Dr. Ellis (1976:5–6) has written that the houses on Rattlesnake Ridge may have been purposefully torched. It was thought that, if some villages appeared to be more successful than others at hunting or agriculture, these successes were explained because those people "had resorted to cooperation with witches." Those inhabitants who were thought to cooperate with witches or who might be witches were eliminated, usually by burning their homes.

At floor level, excavators encountered a crudely constructed wall made by setting sandstone slabs on edge for a length of approximately 3 m starting at the north wall. This slab wall is some 50 cm tall and shows no evidence of burning. This led to our conclusion that the structure may have been briefly reinhabited after the fire.

Feature BG20-10 is the southernmost unit house on the ridge. The floor plan is "typical Gallina," but almost every one of those conventional features has its own individual character. The house was constructed on sloping bedrock with dirt brought in to raise the south end of the floor to the same level as the bedrock at the north end. The fire pit is 56 cm deep, slab-lined, with a clay collar 20 cm wide. The deflector is massive with walls 20 cm thick. It is shaped like an horno sliced in half vertically. The storage bins are quite narrow, about 26 cm inside, and large ears of corn could not have been laid crosswise in them. The east bin contains clay of a different and more uniform texture than the fill.

The walls are 60 cm thick, made of large, unworked sandstone rocks held together with great quantities of clay mortar. The walls had been plastered with a thin coat of clay; the east wall had two coats. Some
workers felt the inner coat had a design of inverted triangles, but this design was so indistinct that skeptics outnumbered believers. Three roof-support posts were located, but the northwest post proved elusive. The roof material contains enough sandstone slabs about 1 cm thick that it was suggested the roof had been paved with them.

The house is 5.3 m north-south and 4.6 m east-west. Unlike other houses of the community, this house shows no evidence of having been burned. In view of the quantities of corn found in houses higher on the ridge, the complete absence of corn in this house was perplexing. The clay in the storage bin, coupled with these two observations, led Dr. Ellis to conjecture that the inhabitants of Feature BG20-10 might have been potters who traded their wares for food rather than growing their own.

Feature BG20-1N is the first unit house north of BG20, Tower 1. Excavation of this structure began in 1988 but was not completed. All four walls and three of the four corners were located; a tree is growing over the probable location of the southeast corner. The structure is about 5 m north-south by 6 m east-west. A 1-by-1-m test pit was dug in the northwest corner of the room for the purpose of locating the floor, which was encountered at 1.5 m below datum. The test pit also revealed a bench along the north wall. The badly decayed northwest roof-support post was found in the bench, and subsequently the northeast roof-support post, also badly decayed, was found at the other end of the bench. Excavation ended some 50 cm above the floor that had been found in the test pit.

The third unit house to the north of the tower is Feature BG20-3N, a large room measuring 6.75 m north-south by 5.9 m east-west. There was evidence that the structure was burned, with the center of the blaze located in the northeast corner, but damage to the room was not nearly as severe as that suffered by Feature BG20-7. Wood and charcoal samples provided four tree-ring dates: A.D. 1095p to 1243v, A.D. 1114p to 1212vv, A.D. 1117 to 1243r, and A.D. 1175 to 1231vv.

Interior features (bins, benches, a fire pit, a deflector and a ventilator shaft) are all exceptionally well made and in very good condition. Several details are of particular interest. A rectangular floor cist was uncovered along the east wall in the northeast corner of the room. It was lined with fitted field stones and clay, forming a rounded basin to a depth of 37.5 cm below the flagstone floor. Several broken ceramic vessels were found in the cist, as well as a lump of what Dr. Ellis called "sacred yellow clay"; yellow is a sacred color to modern Pueblo people.

The highlight of the 1989 field season was the excavation of the fire hearth found in the traditional location, just to the south of the room's center. The five-sided pit was lined with well-dressed, vertically placed sandstone slabs that were neatly plastered into place. At 2.43 m below datum a large stone slab was found lying at a 45-degree angle within the hearth fill. It was surmised that it may have been the hearth floor kept in place by stones and soil beneath. The stone was removed and at 80 cm below the hearth rim the clay, sand, and ashy charcoal bits became wet and muddy. At 92 cm below the rim we hit a solid sandstone slab. The vertical stone slab lining also ended at this level. This stone slab (66 by 55 cm and 5–8 cm thick) was removed with a pry bar and beneath it was a 36-cm stratum of very wet, gritty soil. Below the soil layer was a single layer of cobblestones. We found that the cobblestones lay within a basin-shaped area that was chipped out of the bedrock. The basin was 7.5 cm deep at the
center, and a "dimple" was formed within it. The cobble found in this center dimple was larger and more regularly shaped than those around it. Dr. Ellis felt quite sure that the center cobblestone found within the dimple represented the sipapu. She surmised that there was religious significance in the choice of river cobbles for the bottom layer of the pit, symbols of the people's constant need for water.

Feature BG20-4N is the northernmost unit house excavated by Dr. Ellis and her Ghost Ranch crews. The unit is located just north and east of Feature BG 20-3N. There was some evidence of digging in the unit house prior to 1986, as a piece of newspaper with a 1934 date on it was uncovered. The disturbance did not obstruct basic understanding of dimensions or features, and the finding of some clues pointed to normal and vigorous domestic activity.

All four roof-support posts and interior walls were uncovered, establishing a room of 5.4 m by 5.5 m, making the unit house virtually square. Because much of the floor rested on or was just slightly above bedrock, there are no subsurface cists. There is the predictable fire hearth, a deflector, storage bins, and a ventilator shaft in the south wall, but no benches were found. The imprint of the left foot of a child was discovered in the adobe floor of the ventilator shaft. Also found near the ventilator was what Dr. Ellis thought was a tiny, yellow figurine in the form of a pregnant woman.

Large amounts of charcoal and a large number of culinary sherds in the northeastern quarter of the house provide evidence of a fire hearth on the roof. Roof fires could have been used for the purpose of signaling; however, it is more likely that the fires were used in meal preparation.

**MULTIPLE-ROOM STRUCTURES**

Features BG20-4 and -5 form the only two-room structure on Rattlesnake Ridge. Feature -4 is the east room of the house, and Feature -5, the west room. This structure stands out both in the quality of the construction and the excellent preservation of artifacts found in the rooms.

Two levels of occupation were found in Feature -4. The upper level contains seven storage rooms built upon the rubble of an earlier occupation. One of these storage rooms has a raised log floor. The three small rooms on the west and north sides have flagstone flooring, and dividing walls demarcate the various rooms. The two storage rooms on the east are not floored and do not seem as finished as the others. Dates for this second occupation are A.D 1249+vv to 1256v.

The earlier occupation proved to be a traditional Gallina unit house with a rather shallow fire hearth and a fire deflector showing clear ladder impressions on the back, upper edge. Benches were found running along the west, north, and east walls. The storage bins are rather larger than average and are found in a different configuration but still well within the range of traditional Gallina construction. One date obtained from this level is A.D. 1139vv.

The lower level of the house was severely burned; the hottest spot was the center of the room, just north of the fire pit. In that area the remains of five individuals were found—three adults, one adolescent or small adult, and one child (Purdy and Shibley 1985:8–10). These are not burials; indeed, it is certain that they died as a result of accidental or purposeful burning of the structure. A human hair piece or chongo was found in the area behind the western storage bin. The hair
was not found in association with a body, but it appears to have been laid aside for storage. Dr. Ellis, after consultation with Pueblo friends, identified the hairpiece as a "baby," the name given to this item in historic times. Such a hairpiece is sometimes used by older Pueblo folks when they want to look their best for ceremonies. One wraps one's own hair around the baby to make the chongo look sufficiently thick and smooth.

The house fire did not destroy or change the floor features to any significant degree. We were extremely relieved the fire did not destroy the interesting mural found on the plaster facing of the north and east benches. Executed in black paint, the designs consist of a bull's eye of concentric circles, pennants, horizontal lines, and a stylized tree or sunflower with a bird figure perched on a lower branch (Figure 3).

Feature BG20-5, the west room of this two-room structure, measures 5 m square for the overall interior space. Cultural fill from this room also indicates two occupations. A date of A.D. 1120 vv was obtained from the lower level, and dates for the second occupation are A.D. 1238 vv to 1242 r. These dates correspond well with those gleaned from Feature BG20-4. Eleven burned bodies were found in the fill associated with roof material; 8 more bodies were on the floor of the structure, and 1 body was in a storage bin.

Typical Gallina interior features were encountered with two exceptions. First, the southeast corner was converted into a compartment that was roofed over with an access opening in its northeast corner. A large amount of shelled corn had been stored therein. The surface of the roof may have served as a horizontal work/storage facility. Second, the benches along the north and east walls are made up of storage bins. Every bin appears to have been at least partially filled with shelled corn (beans and corn in one) along with one or more ceramic vessels.

The presence of roof storage bins has been substantiated with the excavation of Feature BG20-5. Evidence from the fill suggests that bins, probably similar in size and shape to the western floor bins, were built on the roof along the northern portions of the east and west walls and all the way across the north wall. Further, this U-shaped area may have been covered by a ramada or extensive drying racks, as indicated by significant amounts of wood material in the fill that could not be readily associated with the roof alone.

Fourteen complete or nearly complete ceramic vessels were found in Room -5. These and all of the 5,724 sherds recovered fall into three major types: Gallina Black-on-gray, Gallina Plain, and Gallina Utility. The variety of vessel types is limited to bowls, jars and ollas with or without lugs, cooking pots, ladles/dippers, and possible effigy pots.

Features BG20-4 and -5 were attacked, many if not all the occupants were killed, and the twin unit was set on fire. All of the 16 individuals found in those two rooms were badly burned. The positioning and condition of the bodies suggest more than death by accidental fire. One youth (Body 7 in BG20-5), who was wearing bone bead ornaments (earrings?), had hidden in a bin and had been overlooked. The scene demonstrated the aftermath of what had been a violent struggle between inhabitants of the house and their attackers.

Only one three-room structure was built on Rattlesnake Ridge, Feature BG20-9. Only two of the three rooms were excavated, Rooms A and C. Room A is the northernmost room and measures almost 7 m north-
Figure 3. A portion of the mural with sunflower and bird.
south by 6.5 m east-west. The southeast quadrant was not excavated because of the piñon tree growing there, which also served as site datum. This room was not burned but the roof beams were borrowed for use elsewhere, as only the bases of the two northern roof-support beams were found in their sockets.

The usual features were found: a fire deflector, a hearth, benches on all sides (not just three sides), and storage bins in the southwest quadrant. The hearth was rimmed with an adobe collar and was excavated into the yellow sandstone bedrock. No sipapu was found excavated into the hearth floor. The floor throughout the room is paved with flagging stones. No ventilator opening was found on the south wall, probably because there was another room to the south; a bench was built along the south wall instead.

Very few artifacts were found in this room, compared to others on the ridge, but two interesting items were recovered. One is a bowl-shaped concretion of yellow sandstone that had two potsherds attached to the sides with yellow clay, which Dr. Ellis thought might be a sipapu because of its yellow color. The other item is a yellow sandstone concretion bowl-shaped object that had been ground on the base and sides.

Room BG20-9C is situated east of Room B at the edge of the ridge; in fact, most of the east wall had fallen down the slope. The north and south walls are about 3 m long, and the west wall is 5 m long and built on a true north-south alignment. Back dirt from the excavation was put into Room B.

Again, most of the Gallina architectural features—including the ventilator shaft, a fire deflector, a fire hearth, southern bins, and north and west benches—were uncovered. The position of the deflector was uncertain until it was uncovered only 5 cm above the floor; it was possibly destroyed by roof fall. The fire hearth has a false bottom composed of flagstones, which were removed. Excavation of the hearth continued until it bottomed out about 1 m below the floor. In the northeast corner of the hearth floor is the sipapu, which was excavated 6.5 cm into the yellow bedrock.

A mural on the north bench face consists of black inverted triangles painted on the light-colored plaster. Two stacked triangles are bordered by single black inverted triangles.

TOWERS

There are three towers on Rattlesnake Ridge: BG19, BG20 Tower 1, and BG20 Tower 2 (or the Hormigas Site, numbered BG20-5N and -6N on Bice's site map [Figure 1]). Dr. Ellis and Ghost Ranch crews excavated BG19 and Tower 1 BG20.

The BG19 tower had previously been excavated in 1949 by Dr. Frank Hibben and field-school students from the University of New Mexico. However, there were no field notes from that excavation, and Dr. Ellis felt it was important to remove Hibben's backfill and discover the extent of his excavation.

This tower is a rectangular feature with rounded corner; it is built directly on bedrock, measures 6 by 5.10 m, and is oriented on a northwest-by-southeast axis (Figure 4). The well-made, stone-lined fire pit is chiseled out of bedrock and has an adobe collar around the edge. The deflector is almost entirely gone, and the southeast and southwest bins are badly deteriorated. A bench with poorly preserved top and facing is built across the southwest interior wall, continuing around the west corner and across
Figure 4. Map of BG20, unit house, pithouse and tower, and BG20-2, reservoir (Bice 1980:Figure 10).
the west end of the north wall. Vertical wood supports about 5–6 cm in diameter were placed on the floor, out from the wall some 21 cm, at intervals of 12–27 cm. In the space between the room wall and the wood supports is fill of loose soil, small stones, charcoal bits, sherds, ash, and other detritus. When the fill was at the correct level, the top and facing of the bench were plastered.

The structure proved to have a double wall; the 50-cm-thick interior wall was built first. A second wall was then constructed about 1.5 m outside the initial wall, but it is only 28 cm thick. The fill between the two walls is rock, earth, charcoal bits, and numerous potsherds and other trash.

There is no evidence that Feature BG19 ever sustained the violent fire suffered by the neighboring tower and nearby home sites. The walls and floors show only light, ritual burning. It appears that the tower was abandoned peacefully. The tree-ring date for this structure is A.D. 1034. The unit house adjoining the tower had a cutting date of A.D. 1243. The presence of traditional Gallina interior features seems to suggest that this tower was used as a habitation, perhaps by the family responsible for using the tower for signaling, watching, or whatever function was needed.

Feature BG20, thought to be a signaling tower, was originally excavated by Dr. Hibben's crew in 1947. It was reexcavated by Dr. Ellis because she believed the primary occupation floor had not been found. This tower is located in the center of Rattlesnake Ridge community.

The inside measurement of the circular tower is 5.0 m on the north-south axis and 4.27 m on the east-west axis; it is built of flat sandstone slabs laid in adobe mortar. The walls measure about 1.7 m thick with the thinnest wall being a little more than a meter thick. Charred roof-support beams from the 1947 excavation established dates of A.D. 1085, 1087, and 1092 for timbers used in the initial construction of the tower (Pendleton 1952:151). Dr. Ellis' crew did find the flagstone floor Hibben's crew found in 1947, as indicated by a 1945 penny left there. After augering in the southeast sector of the room and hitting sterile yellow clay, it was decided that this is indeed the first occupation floor.

RESERVOIR

According to Bahti (1949:52), there are two reservoirs atop Rattlesnake Ridge. One of these, BG20-2 (Figure 4), was tested by Dr. Ellis and crew in 1976. The reservoir system includes a shallow, grass-covered basin, 10 by 15 m, surrounded by raised wooded banks that in some areas appear to be artificial. A low rock wall extending south from the southeastern corner of the reservoir must have been used to divert drainage into the basin from higher ground there. A second low sandstone ridge east of the north end of the rock wall diverts drainage from the higher eastern terrain. The reservoir and diversion walls were mapped, and the reservoir was tested to find the original bottom. Water containers could have been filled at a well, a small rock-lined basin found at the edge of the pond. This well, along with potsherds found in one trench, define the original elevation of the reservoir. The storage capacity of the reservoir was estimated to have been 335 cu m or about 334,910 liters (88,500 gal).

SUMMARY

The Archaeology Seminar sponsored by the Ghost Ranch Conference Center and directed by Dr. Florence Hawley Ellis spent 8 two-week field seasons excavating the prehis-
toric Gallina community on Rattlesnake Ridge. Beginning in 1976, the project con­tinued from 1983 through 1989. The results of this research project contributed new data to that information already known about the Gallina culture. The ridgetop seems to have been occupied in the early 1000s and again in the 1240s. Because of the 1209+B date found in the pithouse at Feature BG20, we can surmise that pithouses were inhabited at the same time as surface houses, not only earlier. Excavation of the false floors of the Gallina fire hearths was revealing, as was finding *sipapus* in the hearths beneath the floors. No strictly ceremonial rooms, such as a kiva, were found; some unit houses were thought to have also been used as kivas.

It is now known that the conflagration that destroyed the community on Rattlesnake Ridge occurred in the fall, when there was plenty of corn being dried for the winter on the rooftops. The amount and size of the corncobs leads us to believe that the people here were successful at farming. It is still not known who the attackers were or the reason for the attack; we may never know. It is quite possible that the Rattlesnake Ridge Site was destroyed because the inhabitants were thought to be in cooperation with witches.

Much more information can be gleaned through further analysis of the ceramics, the stone tools, and the pollen and flotation samples removed during excavation. The information we have shared here is just the beginning

—Ghost Ranch Archeological Seminar, Abiquiu, New Mexico

NOTES

1 Codes for tree-ring dates:

B: bark is present;

r: less than a full section is present, but the outermost ring is continuous around available circumference;

v: a subjective judgment that, although there is no direct evidence of the true outside on the sample, the date is within a very few years of being a cut date;

vv: there is no way of estimating how far the last ring is from the true outside, and many rings may be lost;

+: one or a few rings may be missing near the outside whose presence or absence cannot be determined because the series does not extend far enough to provide adequate crossdating;

++: a ring count is necessary beyond a certain point in the series because crossdating ceases.
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1938 *The Jemez Pueblo of Unshagi, New Mexico*. Monograph of the University of New Mexico and the School of American Research, Albuquerque and Santa Fe.
Many but not all of the native groups of the Southwest created wayside rock piles (and occasionally piles of vegetal material), upon which the passerby would make an offering of a stone or a green sprig or some other object, usually securing it with a stone, accompanied by a prayer. Purposes for these included protection on the trail, good luck on the journey, and elimination of fatigue. Such practice is global and extremely ancient. Southern Athapaskan use of cairn trail shrines may represent a phenomenon brought from the North but modified by preexisting Puebloan practice.

For thousands of years, cairns—human-built piles of stones—have been erected by various groups and for various purposes: as trail markers, as boundary (and later survey) markers, to cover graves, as "dummy" hunters, to clear fields of rocks, and simply for amusement. A specialized form of stone pile is the wayside cairn shrine, on which an offering of a rock, grass, a twig, or other object or substance is placed by the passerby, with a prayer of petition or thanks. Such cairn trail shrines are found extremely widely (although by no means universally) in the world (e.g., Frazer 1913:8–30; Jett n.d.a, n.d.b), including in the greater southwestern United States (Jett 1986, n.d.c). In the Colorado Plateau region, their antiquity is unknown—they have rarely been reported archaeologically—but they have been attributed to as early as the Late Pleistocene in the Sonoran Desert (Hayden 1976:282, 285–287).

NAVAJO TRAIL SHRINES

Trail shrines are known ethnographically for all Apachean tribes of the Southwest, including the Navajo of the Four Corners region (Lange and Riley 1970:31; Loh 1971:87; McSparron 1950; The Navajo Times 1971; Newcomb 1970:7; Van Valkenburgh 1940; Wyatt 1941:39). Curtis (1970:Plate 30) wrote,

Scattered about the Navaho reservation are many cairn shrines. The Navaho, when alone or in parties, on approaching one of these gathers a few twigs of piñon [pine] or cedar [juniper], places them on the shrine, scatters a pinch of sacred meal upon it, and makes supplication for that which he may habitually need or which the moment demands.
Distribution and Function

As well as others (e.g., Farmer n.d.; James 1976:59; Van Valkenburgh 1940), I have observed such shrines in use or with fresh twigs or small branches in the Canyon de Chelly (see Figure 2) and Chuska Mountain areas of Arizona and New Mexico in the 1970s, 1980s, and 1990s and earlier (Figure 1). Watson (1964:22) mentioned them for Beautiful Valley, Arizona; Van Valkenburgh (1940:77) referred to one near Hunters Point, Arizona; and Farmer (n.d.) spoke of shrines in New Mexico's old Navajo country (Dinetah), west of the Chama Valley, in the Jemez Mountains, and near Cabezon. Kluckhohn and Leighton (1958:142) wrote that "By the side of old trails of The People, there can be seen cairns three to five feet high made of stones, twigs, bits of turquoise, and shell. These objects have been deposited by individuals on a journey, uttering a prayer..." (see also, Downs 1972:100; Kluckhohn 1949:75). Referred to as trail shrines, travel shrines, wishing piles, wayside altars, etc., these structures are known to the Navajo as tse ninajaįįhí, "where stones are repeatedly placed"; they were used in pre-Ft. Sumner (i.e., pre-1864) times. According to Van Valkenburgh (1940:6-7), the first such pile is said to have been started on the western side of sacred Gobernador Knob, New Mexico, by the crippled and blind boys who later became the supernaturals Hashch'įį Tsoh (Big God) and Bagh-woo'ahinahii' (With-a-Row-of-Teeth; identity and translation uncertain).1 Reichard (1950:392) noted that "Big God may be a god of thunder or lightning" and is evil.

In the Enemyway myth, warring quadruped monsters and flying monsters threw river boulders down on either side of a gap. These rocks represented enemy ghosts. Leftover stones were piled into heaps, and weeds, grass, and shrub and tree foliage were tossed onto the rocks. In another passage, a rock pile restored life to Crow.

Trail shrines are established by medicine men. "Formerly, a prayer was said petitioning that no blood should be shed upon stones, plants or water" (Haile 1938:72–73, 97, 189–191). Reichard (1950:594) indicated a probable association between the rocks of the cairn and flint (used for arrow points). Matthews (1887:415) wrote that mythical couriers established many shrines while doing their daily training circuits around Mt. Taylor, New Mexico, dropping a stone each lap.

Although the original offering at the establishment of a Navajo trail shrine may be a semiprecious "jewel" (e.g., turquoise or shell), and although such an offering at any time is more efficacious than a twig, a fresh sprig from a tree or shrub (commonly, pine or juniper) is the usual offering. A stone may be placed upon the twig to secure it, especially if the weather is windy, or a stone alone may be placed on the pile, following an appropriate prayer. Formerly, warriors placed yucca leaves on the shrines, with the points oriented in the enemy's direction (Van Valkenburgh 1940:8–9).

Offerings are made only on the journey to somewhere, not on the return; the purpose is to ensure happiness or good luck en route or at the destination. To avoid bad luck—presumably from these agencies—no burned, lightning-struck, or whirlwind- or snake-touched object should be used in making the offering (Van Valkenburgh 1940:9). Examples of requests in typical prayers are that "things will go my way," and "I'll have the respect and friendship of people" (Young and Morgan 1980:731). Van Valkenburgh (1940:8) gave the following prayer:
Placing rocks, Male One
Placing rocks, Female One
Everywhere I go myself
May I have luck
Everywhere my close relatives go
May they have their luck.

My Navajo consultant, Chauncey Neboyia (b. 1909), stated (personal communications 1974, 1982, 1986) that the stone would be placed on the side of the pile corresponding to the direction toward which the passerby was traveling. He would pray for good luck on the journey. If one wanted to pray for rain, one could go to a trail shrine, even if not traveling, and place a stone on the top of the pile (see Figure 1). Neboyia knew of no rule regarding location of shrines, nor of any use to counteract fatigue.

I have observed trail shrines—1.2 to 1.5 m (4 or 5 ft high)—at or near the heads of steep trails or steep parts of trails, as well as along relatively level trails. Young and Morgan (1980:731) stated that the shrines are "usually on promontories," but this appears to refer to shrines not along trails (Figure 2). The Navajo also occasionally erect shrine cairns not along trails, but at prehistoric

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puebloan sites, and cairn graves are also known (Jett and Spencer 1981:202–203, 205). Rock piles were also used as scarecrows and pasture boundary markers, and they were made by sheepherders to pass the time (Brugge 1981:75–80; Hogan 1989:69; Sciscenti and Greminger 1962:9, 14; Sessions and Williams 1979:210, 225–226). Cairn trail markers, with no shrine function, also exist (Jett n.d.d).
A Specialized Navajo Travel Shrine?

South of Canyon de Chelly, Arizona, region is Traveling Frogs Shrine, which has affinities to trail shrines. My informant, DS, had learned a little about it from a local sheepherder, but the site's full function is still under investigation.

Traveling Frogs Shrine's centerpiece is a large, two-lobed, dark-sandstone concretion perhaps .6 m (2 ft) in length and resembling a frog in shape, its "head" oriented more or less toward the south. Informant DS has seen pollen smeared onto its "mouth" (a weathered bedding plane). At the time of my visit there were small slivers of turquoise, fragments of white shell, and one discoid shell bead in a little hollow on the "frog's" back. Surrounding this large concretion was a ring of 15 smaller, spherical concretions. The sheepherder had said that these stones—and many more "prettier" but now missing ones—had once formed a line tens of meters (dozens of feet) long down the gentle slope behind the "frog" and that these represented its babies. There were also several quite small two- and three-lobed concretions tucked under the "chest" of the "frog."

Adjacent to the "frog's" left hind "haunch" was another large but lighter-colored concretion that connected the "frog" to what, if placed along a trail (as it was not), would be taken as a wayside cairn shrine. It consisted of a knee-high pile of stones of various kinds holding down juniper sprigs and other vegetal material. DS had each of us (including three Anglos) take a sprig in the right hand and a stone in the left hand (if in the right hand, it would be inappropriately weaponlike), as done with trail shrines. He had us stand around the cairn while he prayed and then sang for several minutes in Navajo. We all then placed our sprigs on the pile and laid the stones atop the bits of greenery to hold them in place.

The cairn and the procedure were as if the pile were a trail shrine. That this may be a specialized travel shrine is suggested not only by the cairn but also by one of the Navajo names for the place, Ch'ál Lkáhí, "The Tracking [or Traveling] Frogs." (However, the alternative name is Ch'ál Sidáhí, "The Frog Sitting Up" [Jett 1993].)

APACHE TRAIL SHRINES

Van Valkenburgh (1940:6) wrote, "I have been told that certain Apache groups also use the rock and twig piles, but have been unable to verify the information." I have found verification in the published and archival literature and from contemporary workers. Curtis (1970:133) wrote that "in secluded spots in the hills and mountains are found round cairns, with cedar [juniper] and other twigs deposited upon them. These are shrines at which the Apache make offerings to their favorite gods." Although it is not certain that these were trail shrines, more explicit references by others imply that they were.

Opler's (1941:312) Chiricahua Apache informants stated that a wayside shrine is a pile of rock and stones about four feet high [1.2 m] and eight feet wide [2.4 m]. There are four holes in the center. The foundation is east and west, and the holes are running toward the east. You pick up a stone or leaves and pile this to the four corners—east, south, west, and north—while you pray. It's asking a blessing.

One goes to the left side of the pile, drops in the offering, and returns. One informant stated that the purpose was to obtain long life.

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and good luck. "These shrines are now used primarily as a place of contemplation and prayer by persons starting on a perilous trip." An informant said, "if you go to the place and drop a stone on the pile already there or throw on a sprig of juniper tree, you will return safely."

Morris Opler (personal communication 1979) stated that Mescalero and Jicarilla Apache also used trail shrines. Gifford (1940:185) noted Mescalero and Lipan wayside shrines where offerings of twigs and rocks were made. The Mescalero believed that the "God Nayizone put four [rocks] originally and each year 1 since." They prayed "for long life, etc.," but the Lipan did not pray. The function is "Not to remove fatigue." The

L[anero Jicarilla had] offering place[s] on trail[s]...Prayed [to] earth deity for long life. Ol[ero Jicarillas] threw down sticks or grass at offering--places alongside trail. One offering-place near Taos was rock.

Bandelier wrote in 1883 of

so-called Post Office Hill [c. 8 miles north of Ft. Apache, Arizona]. It is a ridge in the woods, and on it a pile of stone pebbles, rocks, twigs, of all descriptions: of sabinos [junipers], cedar [also juniper], pines, live oak, etc. This pile corresponds to the apachitas of Peru, every Indian passing by deposits his offering....The people here believe that the Indians convey information to each other by means of these deposits, and therefore have given it the name [Apache post office] [Lange and Riley 1970:83].

Bandelier also wrote that in 1884 Mr. S. S. Brannen told him "of the custom of the [White Mountain] Apache, whenever they pass one of the artificial stone heaps (as between Show Low and Ft. Apache—last year), to deposit on it each one a stone and two twigs placed crosswise, the stone holding down the twigs. Thus their number [i.e., the number of Apaches who have passed] can be ascertained" (Lange and Riley 1970:193; Bandelier's original manuscript included a sketch of a cross in a circle—presumably representing the stone atop the crossed sticks).

A previously unpublished letter to John Wesley Powell by Grove K. Gilbert (1879) confirms certain of these observations:

While in the Apache country with Lt. Wheeler in 1871 and 1873 I noticed several artificial stone heaps of a special character. Each was close to a trail and one was at the crossing of two trails. While I think I saw as many as 4 or 5 I can definitely recall but two, both in Arizona. One is about 15 miles [24 km] south west from Camp [Fort] Apache near the junction of White Mountain and Prieto creeks [present White and Black rivers], the other on a high ridge north of the head of Aravaipa Canyon. Each heap is made of the loose rock of the vicinity piled in an irregular cone 3 or 4 ft high [.9 to 1.2 m]. In general the sides of the cone are steep enough to indicate that the stones were laid on and not merely thrown together. Among the stones appeared many bits of grass and other plants, and some of these were so fresh as to show that they had been plucked only a short time before. I did not learn their intent, but the title "Indian Postoffices" is current among frontiersmen and shows that someone
had regarded them as a means of communication.

Keith H. Basso (personal communication 1979), from observation and from informants, indicated trail-shrine use in the territories of the Aravaipa and Pinal bands of San Carlos Apache and among the Northern (and probably the Southern) Tonto Apache.

Additional light is thrown on Western Apache practices by Reagan (1930:302), who, in various areas of the Ft. Apache Reservation, observed trail shrines or "Apache post offices" that

usually consist of a pile of stone on which [juniper] twigs and shingle rock are placed by each passer-by, over which they then sprinkle cattail-flag pollen and pray to the gods of the zenith and nadir and to the gods of the four winds. Many of these altars are of the nature of a thank offering [for a difficult stretch of trail, such as a steep climb, well passed].

One cairn was on the divide between Carrizo and Cibicue canyons. Reagan also observed a travel shrine consisting only of various kinds of wood piled around a saguaro cactus. He found both types of shrines to be located on divides.

Basso (personal communication 1979) affirmed trail-shrine use among the White Mountain and Cibecue bands. Baeza (1977:10) wrote that when White Mountain medicine men made pilgrimages to the summit of sacred Mt. Baldy, "On their way they gathered stones and piled them in little altars at the top of the mountain, to signify that it was a holy place" (also northwestern California practice [Chartkoff 1983:750–52]).

ARCTIC AND SUBARCTIC TRAIL SHRINES

Although most or all Southern Athapaskan (Apachean) groups used trail shrines, and although they are also recorded for the Californian Athapaskan Sinkoyne, Hupa, and probably Cilula (Chartkoff 1983:750–52; Goddard 1913; Jett 1986), there is much less evidence of their employment by Northern (Canadian and Alaskan) Athapaskans. The late Roscoe Wilmeth and June Helm (personal communications, 1979)—respectively, an archeologist and an ethnographer specializing in Canadian Athapaskan studies—reported no knowledge of the phenomenon in the North. Although I have not thoroughly searched the literature, Malcolm Farmer pointed out to me that about 1770, Hearne (1911:163) made the following observation about trailside rock piles in Athapaskan Yellowknife territory in the Mackenzie District: "it was the universal custom for every one to add a stone to the heap...for good luck." Archaeological rock piles of unknown function in southern Alberta have, accordingly, been pointed out as hints of possible prehistoric Athapaskan presence (Perry 1980:288; Wormington and Forbis 1965:193).

Two non-Athapaskan, Salishan groups of southwestern British Columbia are also recorded as having used heap shrines. The Lilloet, when hunting or near the mountain Po'pesament, would visit a pass, where they would whip their legs with bullrushes after praying that no rain or snow might come, that their scent be taken away, and that the hunt be successful. The rushes were deposited on a pile (Teit 1906:2:279). The neighboring Shuswap used cairns, including at Whipsaw Creek, on the Similkameen and Hope Trail, placing a stone or a branch when passing (Dawson 1891:9:38). Also, among the

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Unalaska Aleut, hilltop cairn burials had a stone added by all passersby (Cook 1809:479). The Shuswap's immediate neighbors included the Athapaskan Beaver and Sarsi, groups linguistically very closely related to the Apacheans (Hoijer 1956), and all this, plus the universality of trail-shrine use among Southern Athapaskans, raises the possibility of a Northern origin for cairn trail-shrine utilization among the latter (Perry 1991).

However, other possibilities to explain Apachean use exist, notably acquisition from Pueblos after the Athapaskans' arrival in the Southwest. (My questioning of Plains and Great Basin ethnographers and archaeologists and sampling of the literature has not turned up evidence of cairn trail-shrine use in those regions, nor among upland Yumans.)

**PUEBLOAN CAIRN TRAIL SHRINES**

Employment of trail shrines has been recorded for a number of pueblos. In some cases, utilization resembles that of Apacheans, but in other cases the shrines appear to be more specialized. Their use among various Puebloan groups is inventoried below.

**Hopi**

Gilbert's 1879 letter states,

Last autumn I saw a cairn of the same kind [as the Apache's] on a trail leading from the Moqui [Hopi] villages to Moenkopie and about 10 miles [16 km] from the latter place. A few days later I asked an Oraibe chief named Tu-bi³ about it, and he gave me (through an interpreter) the following account.

The Moquis have for a long time cultivated land at Moenkopie, paying visits to attend their crops but not living there. The journey of 45 miles [72 km] is made in a single march because there is no water on the way. When the Moqui has paid his visit, performed his work, and started home, he is very tired. Arriving at the cairn he plucks some grass, rubs it on his weary thighs, and deposits it on the cairn, placing a stone on it to hold it. The fatigue is transferred to the grass and remains with it, while the Moqui goes on his way refreshed.

Stephen, in 1893, described the origin of this practice (Parsons 1936). When the Snake Clan migrated from Navajo Mountain, Utah, to the Hopi's First Mesa, Arizona, Maasaw, god of earth, death, and war, refused to let them settle at Walpi on First Mesa.

The Snake [clansmen] made a stone heap at the place where Masau' "closed the trail." Masau' later relented...but told them that whenever they should be returning home from a journey when they came to this cairn they had made they must lay a bit of wood, a tuft of grass, or a portion of their burden on it, he would thus know that the Hopi who passed were thinking of Masau'wù. For him Masau'wù would have kindly regard and would protect him on future journeys, but those who neglected to make an offering would incur his anger and be in danger of death.

Nearly every trail now has a cairn upon it at some point, and when a tired Hopi passes it he takes a bunch of grass and rubs his head, arms, legs, etc. and places the tuft and a small
portion of his burden on the heap, placing a stone on the tuft, or a bit of wood, to hold it secure...[and] asks Masau' for his protection [Parsons 1936:151, 604, 610, 613, 621, 631, 635].

Prayer sticks and maize meal are sometimes offered at the "original" shrine.

Fewkes (1906:553-54) described more specialized First Mesa travel shrines:

Along the top of a ridge...are four piles of stones mixed with small fragments of wood. These occur at intervals alongside the trail...in former days those setting out to gather wood on returning with their loads threw on the piles offerings to the god Masauû in the belief that by so doing they avoided fatigue.

There are numerous other small shrines of this kind near the East [First] mesa, some of which are collections of small stones thrown there by passing Indians....

Fewkes (1906:353, 359) also described another cairn shrine containing fragments of stone and other objects, as well as an additional shrine to Maasaw consisting of twigs and branches left by passing firewood carriers and piled against a boulder with offerings of prayer sticks, bowls, etc., but not stones. Maasaw was impersonated by warriors in battle; he is not only the god of war, death, and the earth but is also the tutelary god of travel (Malotki and Lomatuway'ma 1987:3, 84–85; Parsons 1939:348; Wright 1979:114).

Two piles of fist-sized agate rocks at the head of the Hopi Salt Trail's final descent to the Little Colorado River are probably also wayside shrines (Butchart 1965:36–37; Eiseman 1959:26–27).

**Zuni**

Zuni anthropologist Edmund J. Ladd told me of a cairn wayside shrine atop the sacred mesa Towayalane Mountain, where the traveler deposits a stone after spitting on it and says a prayer to be rid of fatigue (Jett 1991).

When training for the *ti'kwane* (foot race), a Zuni man would repair to a mesa top near the village via a rock trail.

A few feet below the summit there is a stone heap 6 to 7 feet [1.8 to 2.1 m] high and fully 15 feet [4.6 m] at the base, and just before reaching this spot the runner takes a small stone in each hand; he expectorates on the one in the left hand and carries it two, three, or four times around his head from left to right or the reverse and throws it upon the stone heap that he may be rid of his tired breath so that he can start the run with new breath and not loose it....A second stone heap stands a short distance beyond the line [at the end of the training course]. The stone carried in the right hand is...pushed over the course beneath the right foot....one is never sure of success until one has carried one's stone to the ["luck"] line with one's foot and cast it upon the second stone heap. When this has been accomplished a man may be sure of winning the race or may risk high wagers on the races [Stevenson 1904:323].

Theodore Frisbie (personal communication 1979) observed a number of small cairns near Hawikuh on the western Zuni
Reservation while walking with members of the War Society (Bow Priesthood), with which the cairns are associated. The men would pick up fragments of petrified wood from gravel on the ground and throw these onto the piles as they passed. Triloki Pandey (personal communications 1979) confirmed Zuni use of specialized trail shrines. He wrote,

One is just on the outskirts of the Zuni pueblo where the victorious Bow Priests used to offer commal and prayersticks after their return to Zuni. The other I have seen is near the route which the Shalakos [masked impersonators of the rain-makers' couriers] take on their arrival to Zuni. It is located south of the village. The priests offer prayer sticks and commal there before crossing the Zuni river and coming to the village.

(Ellis [1969:168] noted that petrified wood was used in Zia war/hunting shrines, probably owing to the idea that petrified wood is the bone of giants killed by the War Gods.)

**Other Historic and Prehistoric Pueblos**

Wayside shrines appear to be absent among the contemporary Taos Indians (John J. Bodine, personal communication 1979). However, Van Valkenburgh (1940:6) stated that trail shrines were found among the Acoma (Western Keres), Santa Ana and Zia (Eastern Keres), and Tesuque (Tewa). But an admittedly less-than-exhaustive perusal of the ethnographic literature did not reveal descriptions for these pueblos, although other cairn shrines are occasionally described (e.g., Douglass 1917; Harrington 1916:308). Bandelier (1910:99) wrote of Tewa *tapu*, "little stone heaps around many of the pueblos in general....According to pueblo interpretation, each stone lying on twigs in one of these heaps signifies a prayer." Bandelier compared these to travel shrines in the Andes, and although not specified, possibly the Tewa heaps related to travel as well. Parsons (1939:308) noted that in Puebloan territory, "On mesa, mountain or hill the War gods, as guards or watchmen of the town, will have their shrines, usually rough stone piles...."; but these would not ordinarily be considered travel shrines. There are many cairns near Acoma and Acomita dedicated to the Shiwanna (Cloud People) or Kachinas; these are treated somewhat similarly to trail shrines:

When one puts a rock on one of these columns he first holds it up, spits on it, and then lays it down "so no bad luck will happen." When one has gone on a long trip and is about to return, it is proper for him to pick up a rock or stick, spit on it, and throw it backward, so no evil will follow him [White 1932:125].

These practices seem certainly to be related to cairn trail-shrine use among other groups.

The late Albert Schroeder alerted me to the following from Antonio de Espejo's report of his 1582 expedition to New Mexico:

just as the Spaniards have crosses along the roads, the people [the now-extinct Piro] set up, midway between the pueblos, their artificial hillocks (*cuecillos*) built of stones like wayside shrines, where they place painted [prayer] sticks and feathers, saying that the devil will stop there to rest and talk to them [Hammond and Rey 1966:220].

This would seem clearly to refer to cairn trail shrines. The Spanish may have suppressed
this pagan practice (although in Latin America, such shrines were often Catholicized, and they were not unknown in Europe).

Regarding the feathers mentioned by Espejo, we may note that Ellis (1969:174) contended that "the Jemez, the Hopi, and the Navajo place feathered strings in shrines or on a mountain divide as they cross it"; Parsons (1939:290) wrote of Jemez, "On a journey a man might put down, particularly at a divide, a short feathered string."

I know of no published accounts of definite prehistoric Anasazi trail shrines. Small to moderate-sized cairns of fairly large rocks at the heads of cliff-descending stairways along Chacoan roads and trails in New Mexico seem likely to be trail markers rather than travel shrines (Hayes 1981:40; Tom Windes, personal communication 1979; see also, Trombold 1991). A few nonmarker cairns have been found along Chacoan roads, but their functions are not clear (e.g., Nials et al. 1987:102–05). However, Joe Ben Wheat (personal communication 1983) has seen what appears to be a true trail shrine on an approach to a pass on the east side of the Baylor Mountains, north of Van Horn, Texas. Individual fragments of pottery, perhaps from canteens, were found among the stones; the ware was Chupadero Black-on-white, a Mogollon-affiliated pottery dating to about A.D. 1400.

CONCLUSIONS

Regarding the question as to whether Apaches' use of cairn trail shrines was something their Athapaskan ancestors brought from the North or whether the practice was acquired from Puebloans, there is no unequivocal answer. At least one Canadian (and three Californian) Athapaskan people employed such shrines for "good luck," but I have no other indication of Northern Athapaskan use of such shrines—although Salishan neighbors of the Athapaskan Beaver and Sarsi used them—or more information regarding their utilization and associated beliefs among the Yellowknife. There is no present evidence of great antiquity of either Northern or Puebloan use of cairn wayside shrines (although the practice is very ancient in the Sonoran Desert and, presumably, globally). According to the information presently available, Puebloan use differed from Apaches in some ways, including Puebloan deposition of feathers, prayer sticks, and pottery, and expectoration. However, both peoples deposited foliage, stones, and cornmeal or pollen and asked for blessings or protection, and, at least among the Navajo and Western Puebloans, there was an association with war and training. Whereas the Hopi used such shrines to rid themselves of travel fatigue, this is explicitly denied for the Navajo and Apache, who generally requested good luck or specific results regarding their journeys or other matters. My guess would be that use of cairn trail shrines was a practice brought from the North by proto-Apaches but one to which was added, in the Southwest, certain Puebloan concepts—e.g., depositing meal or pollen and perhaps war and protection associations.

ACKNOWLEDGMENTS

A number of individuals—most are named in the text—contributed observations or references. I wish particularly to acknowledge the contributions of Malcolm F. Farmer, who published on the Diné during the 1940s and who supplied me with several references as well as the illustrations.

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NOTES

1 This does not conform to the myth of the Stricken Twins associated with Nightway (Matthews 1902:265).

2 Mentions of Gilbert's 1871 work at Camp [Fort] Apache and among the Aravaipa Apache who "settled with the Pinal Apaches on San Carlos Agency, Arizona," at Camp Grant are in the report of George W. Wheeler's geographical surveys west of the hundredth meridian (Wheeler 1879:393, 397, 405, 407).

3 Tuba City, Arizona, established by Mormons in 1875, "was named for Tuba, Chief of the Hopi pueblo of Oraibi" on Third Mesa (Colton 1931:1). In exchange for this honor and for being given the use of horses, plows, and scrapers, Mormon-convert Tuba permitted the pioneers to settle. In 1873, H. D. Haight had found out that "Tuba himself with a party of about twenty-five is occupying a spring called Moencuppy and is farming..." (Tanner and Richards 1977:129–30). Gregory (1915:117) stated that Tuba and his family appeared to have been the only Hopi living year-round at this oasis in 1880. Navajo and Paiute depredations had curtailed permanent Hopi occupation after the mid-eighteenth century, but the protective presence of the Mormons at Tuba encouraged permanent Hopi reoccupation of Moenkopi village.

4 I am not aware of this practice among the Navajo.

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n.d.b Cairn Trail Shrines in Meso- and South America. Manuscript in the author's possession.


Jett, Stephen C., and Virginia E. Spencer

Kluckhohn, Clyde

Kluckhohn, Clyde, and Dorothea Leighton

Lange, Charles H., and Carroll L. Riley (editors)

Loh, Jules

Malotki, Ekkehart, and Michael Lomatuway'ma

Matthews, Washington


McSparron, Cozy

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Opler, Morris Edward

Parsons, Elsie Clews


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Tanner, George S., and J. Morris Richards

Teit, James Alexander
Trombold, Charles D. (editor)

Van Valkenburgh, Richard F.

Watson, Editha L.

Wheeler, Geo[rge] M.

White, Leslie A.

Wormington, H. M., and Richard G. Forbis

Wright, Barton

Wyatt, Charles D.

Young, Robert, and William Morgan, Sr.
Some excellent prehistoric craftsmanship went into the manufacture of pendants, rings, bracelets, and nose plugs of red argillite, a kind of indurated claystone. The energy expended on this material, its unusual color, its workability, and its widespread occurrence in southwestern sites argue that it was a prized substance [Jemigan 1978:214].

In terms of the sophistication of forms there is sufficient evidence from all three areas of the Southwest—Hohokam, Mogollon, and Anasazi—to suggest that at least a few individuals spent enough time making jewelry to produce technically excellent and artistically meritorious pieces. Some Hohokam shell work, Sinagua mosaic and nose plugs, and Anasazi carved turquoise and jet could not have been produced by any farmer who decided to grind out a gaud for himself or his wife. On the other hand, the majority of the simpler jewelry of the prehistoric Southwest could have been made by that same farmer [Jernigan 1978:228].

Information from survey and excavations in Chaco Canyon indicates that argillite ornaments are among the jewelry items made and worn there prehistorically. In this review, sources of argillite, evidence of its use, and the objects made will be evaluated to provide clues to the social organization of the Chaco Anasazi.

Data come from three sources. During the 1970s National Park Service survey of Chaco Canyon (Hayes 1981), there were several references to sources of "red dog shale" on the survey forms, and a number of artifacts from that material were collected. Analysis of materials from all sites excavated during the Chaco Project suggest that argillite had been used from the Archaic/Basketmaker II period through Pueblo III (Mathien 1985). Yet, there was very little evidence of workshop areas that included debris from manufacture of argillite objects. Two sites that had been excavated prior to the 1970s, however, had evidence for argillite jewelry making.
(Mathien 1984): Bc 51 (29SJ 395) contained a considerable number of red shale pieces in Room 34; these were recovered by Gordon Vivian during stabilization. At Kin Kletso (29SJ 393), there were a few pieces of argillite among the minerals found in the ash fill/refuse of Room 5. Several questions remained.

1. Where were the sources for this material?
2. Why were so few work areas for argillite ornaments identified?
3. Were the manufacturers of argillite pieces the same people who produced the turquoise, jet, and shell ornaments?
4. Did argillite have the same value as ornaments made from other materials?

**SOURCES**

A number of terms have been used to describe red shale ornaments on survey forms and in published reports. Brand (1937:55) defined argillite as a schist or slate derived from clay and probably obtained from the argillaceous shale beds in the Allison member or from the Lewis or Kirtland shales found in and around Chaco Canyon. He also defined reddle as a clay or red ochre mixture that resembles argillite, but is softer. It is found in beds near Tseh So (29SJ 394, Bc 50) and was probably also obtained from local shales (Brand 1937:61). In the analysis of ornaments and minerals, I use argillite to cover red dog shale, red claystone, and reddle (Mathien 1985:46).

In addition to the geological background provided by Brand (1937), the Chaco survey files identify several areas that were considered sources of red shale, and one site, 29SJ 1825, was classified as a quarry. This quarry is located on the south side of West Mesa in the area known as South Gap (Figure 1). In his description of the site, J. Thrift indicates that a "burnt? shale quarry at the base of the talus has a 1.5 m wall of exposed shale and 1 m+ front of wall is mounded waste from quarry." Two hearths were present. No date was assigned. Further west along the west side of West Mesa are several more outcroppings in Sections 18 and 21 of Kin Klizhin quad. Additional locations of red shale include the talus on the west side of Chacra Mesa (just east of Fajada Butte).

In 1990, I explored several locations in the canyon to evaluate the material in several of these deposits. The range of color and quality of material within the same layer varies considerably within a short distance. The outcropping that is visible on the west side of Chacra Mesa, east of Fajada Butte, contains excellent-quality shale. Bands of dark gray shale were interspersed among the red. The reds range in color from an orange-red to a maroon-red. Evidence of burning varied; in some areas it was from 1–10 cm thick. In one area the gray shale was 0.3 cm thick; it includes pieces that showed banding across a gray shale that ranges in color from orange on one side to a reddish color on the other side. There was also a pale yellow layer ca. 10 cm thick. The shales are all fine grained, with a quality similar to some of the higher-quality ornaments in the collections that came from the small sites excavated by the University of New Mexico field schools (see Mathien 1985:Appendix C for detailed lists of argillite ornaments).

To the northeast along Chacra Mesa, the burned shale outcrop displays a range of colors from light orange to maroon red with a limited amount of gray. The texture of the deposit in this area is fine, but not as fine as that described above. It would still make good ornaments. Slightly further north and east, there is a lighter burn high up on the talus. This was not examined thoroughly; the
area is smaller, and the material of poorer quality and much more friable.

On the west side of West Mesa and south of Padilla Well are the shale hills that were noted during survey (in Sections 18 and 21 of the Kin Klizhin quad). Here the material is not as compact; it is similar to Brand’s (1937) definition of reddle. The colors tend to be more orange to red, and there is no evidence of the grays that are present near Fajada Butte.

A total of 53 sites that were recorded during the initial NPS survey had argillite ornaments on the surface (Table 1); dates assigned by Hayes (1981) range from the Archaic/Basketmaker II through Historic periods. These survey sites with argillite on the surface tend to be located mainly near the sources west of West Mesa, but some sites are located in the main canyon on the north side of West Mesa and near Fajada Butte.

In summary, argillite is available from numerous sites in Chaco Canyon and along the south sides of West Mesa and South Mesa. Although the color and quality of the material varies, the artifacts collected during survey and excavation reflect probable use of various nearby sources, in addition to the documented quarry.

**EVIDENCE OF JEWELRY MANUFACTURE**

Argillite jewelry making at some sites is inferred from survey data. Sites with unusual amounts of argillite on the surface include 29SJ 1882, where 18 pieces were
recovered. The pieces include 5 possible pendant fragments, 2 somewhat disc-shaped pieces (oval and round), and 11 other worked and unworked pieces (Figure 2). This site was recorded as a 10–15 room pueblo with 7 kivas and a long history of occupation from the Basketmaker III through Pueblo II periods.

At 29SJ 353, 12 pieces were recovered (3 pendants, 2 pendant blanks, 1 pendant fragment, and 6 worked pieces). This is an 8–10 room pueblo with 1 kiva that was dated to the Basketmaker III-Pueblo I period.

The next highest number of pieces recovered came from 29SJ 352, a Pueblo I-Pueblo III site with 25+ rooms, 3 kivas, and a great kiva. One disk, 1 cylinder, and 6 pendant-type pieces were collected. At 29SJ 462 and 29SJ 1897, 5 and 4 pieces were collected, respectively. Three pieces were collected from each of the following: 29SJ 464, 29SJ 1873, 29SJ 1879, and 29SJ 1272. All but the latter site are located in Section 17 of the Kin Klizhin quad; 29SJ 1272 is in Section 28 of the Pueblo Bonito quad. It is inferred that jewelry making took place at several of the sites surveyed, particularly 29SJ 1882 and 29SJ 353 during Basketmaker III-Pueblo II, based on the number of items and the presence of raw material, partially worked pieces, and finished items.

The number of argillite ornaments recovered from sites excavated by the Chaco Project is not large (Mathien 1985). For instance, at Pueblo Alto (29SJ 389), the only great house excavated during this project, there were 48 argillite pieces among the 3,377 ornaments and minerals recovered (Mathien 1987:Table 6.1). At the smaller sites, the numbers were also few. For example, at 29SJ

Figure 2. Argillite artifacts from 29SJ 1882 (5 pendant fragments or blanks, 2 possible disc pieces, and 11 other worked pieces) (FS 1725).
1360 there was 1 argillite artifact among 4,006 ornaments and minerals; however, 1 well-made dark shale necklace consisted of 3,948 beads (McKenna 1984:Table 5.1). Yet turquoise was abundant, especially after A.D. 900, and several areas where turquoise jewelry was made have been identified (Mathien 1984).

As noted above, two sites with jewelry-making debris that includes argillite are Be 51 and Kin Kletso (Mathien 1984). Both of these sites are dated to the later phases of development in Chaco Canyon; the second story of Room 34 at Be 51 falls in Pueblo II (the Classic and Late Bonito phases) and the fill of Room 5 at Kin Kletso in the Late Bonito phase.

Ornaments found during survey include pendants (including blanks and fragments), beads, cylinders, disks, a button fragment, and an eccentric or effigy shape. This does not represent the entire range of shapes; among the ornaments recovered from the small sites excavated by the University of New Mexico field schools are animal effigies and flower-shaped pieces (Mathien 1985:Appendix C).

Ornament from survey vary in color. Similar to the source material described on the west side of Chacra Mesa, several pieces range from red to gray (in one piece; Figure 3). The quality of the argillite found on survey was poor in general. Most of those from the areas west and south of West Mesa are coarse-grained, crumbly, and poorly shaped (Figure 1).

Although there are some well-made argillite ornaments among the Chaco collec-
Table 1. Argillite Artifacts Recorded on Survey or Found Among Survey Collections in Chaco Canyon.a

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Quadb</th>
<th>Datingc</th>
<th>FS No.</th>
<th>Material</th>
<th>Color</th>
<th>Classification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>29SJ 110</td>
<td>KKQ S30</td>
<td>BMIII-PI</td>
<td>1405</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant blank</td>
<td>Ground on two sides and three edges. Incomplete perforation .28 cm. Stiations</td>
</tr>
<tr>
<td>29SJ 112</td>
<td>KKQ S30</td>
<td>PI, EPIII</td>
<td>1847</td>
<td>Shale</td>
<td>Red</td>
<td>1 worked piece</td>
<td>Ground on two sides and three edges. Irregular shape</td>
</tr>
<tr>
<td>29SJ 114</td>
<td>PBQ S1</td>
<td>LP II, PII</td>
<td>831</td>
<td>Pendant</td>
<td>Red</td>
<td>1 pendant</td>
<td>ON LOAN TO CHACO</td>
</tr>
<tr>
<td>29SJ 151</td>
<td>KKQ S33</td>
<td>LP II</td>
<td>1367</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant blank?</td>
<td>Ground on two sides and 4 edges. Rectangular</td>
</tr>
<tr>
<td>29SJ 158</td>
<td>KKQ S32</td>
<td>PI-EPIII</td>
<td>857</td>
<td>Bead</td>
<td>Red</td>
<td>1 pendant fragment?</td>
<td>Ground on all sides. .13 cm perforation</td>
</tr>
<tr>
<td>29SJ 215</td>
<td>PBQ S23</td>
<td>BMIII</td>
<td>1387</td>
<td>Shale</td>
<td>Red</td>
<td>1 bead</td>
<td>ON LOAN TO CHACO</td>
</tr>
<tr>
<td>29SJ 227</td>
<td>KKQ S36</td>
<td>PI</td>
<td>1402</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant fragment</td>
<td>Ground on two sides and 3 edges. .28 cm perforation</td>
</tr>
<tr>
<td>29SJ 241</td>
<td>PBQ S16</td>
<td>Archaic/ BMII</td>
<td>1080</td>
<td>Shale</td>
<td>Red</td>
<td>1 worked piece</td>
<td>Ground two sides and two edges. Irregular</td>
</tr>
<tr>
<td>29SJ 247</td>
<td>KKQ S4</td>
<td>BMIII</td>
<td>4</td>
<td>Pendant</td>
<td>Red</td>
<td>1 pendant</td>
<td>Ground on two sides and 4 edges. .32 cm perforation. Rectangular. Unusually well done</td>
</tr>
<tr>
<td>29SJ 298</td>
<td>PBQ S28</td>
<td>PI-III</td>
<td>355</td>
<td>Slate</td>
<td>Red</td>
<td>1 pendant blank?</td>
<td>Ground one side and two edges. Broken</td>
</tr>
<tr>
<td>29SJ 319</td>
<td>PBQ S36</td>
<td>BMIII?</td>
<td>1378</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant fragment?</td>
<td>Ground on two sides and three edges</td>
</tr>
<tr>
<td>29SJ 352</td>
<td>KKQ S17</td>
<td>PI-PIII</td>
<td>1434</td>
<td>Red stone</td>
<td>Red</td>
<td>1 cylinder</td>
<td>ON LOAN TO CHACO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1497</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant fragment</td>
<td>Ground on two sides and two edges. .24 cm perforation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1498</td>
<td>Shale</td>
<td>Red</td>
<td>1 large disk</td>
<td>Ground on two sides and edges. .94 cm perforation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1499</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant blank</td>
<td>Ground on two sides and four edges. Rectangular</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1500</td>
<td>Shale</td>
<td>Red/ pink/ gray</td>
<td>1 pendant</td>
<td>Ground on all sides, with striations. Drilled from two sides with .19 cm perforation. Oval</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1501</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant</td>
<td>Ground on two sides and four edges. .14 cm perforation. Rectangular</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1502</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant blank</td>
<td>Ground on two sides and four edges. Rough</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1503</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant blank</td>
<td>Ground on two sides and one edge. Striations</td>
</tr>
<tr>
<td>29SJ 353</td>
<td>KKQ S17</td>
<td>BMIII-PI</td>
<td>1437</td>
<td>Shale</td>
<td>Red/ pink/ gray</td>
<td>1 pendant</td>
<td>Ground on all sides, with striations. Perforation drilled from two sides is .22 cm across. Teardrop</td>
</tr>
</tbody>
</table>
Table 1. Argillite Artifacts Recorded on Survey or Found Among Survey Collections in Chaco Canyon (cont'd).

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Quad&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Dating&lt;sup&gt;c&lt;/sup&gt;</th>
<th>FS No.</th>
<th>Material&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Color</th>
<th>Classification</th>
<th>Comments</th>
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<tbody>
<tr>
<td>1438</td>
<td>Shale Red</td>
<td>Pendant</td>
<td>1</td>
<td>ON LOAN TO CHACO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1767</td>
<td>Shale Red</td>
<td>worked pieces</td>
<td>4</td>
<td>Ground on sides and edges, one with striations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1768</td>
<td>Shale Red</td>
<td>worked pieces</td>
<td>2</td>
<td>Ground on two sides and two edges. Fragments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1770</td>
<td>Shale Red</td>
<td>worked piece</td>
<td>1</td>
<td>Ground on all sides and edges. Perforation drilled from two sides. Tear drop.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1773</td>
<td>Shale Red</td>
<td>fragment</td>
<td>1</td>
<td>Ground on two sides and one edge. Irregular</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>153</td>
<td>BMIII, PI-III</td>
<td>Pendant</td>
<td>1413</td>
<td>Ground on two sides and three edges. Perforation. Broken</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29SJ 395</td>
<td>PI-LPIII</td>
<td>Pendant</td>
<td>1941</td>
<td>Ground on two sides and one edge. Semirectangular</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29SJ 460</td>
<td>KKQ S17</td>
<td>PI, Historic</td>
<td>1782</td>
<td>Ground on one side and one edge. Irregular</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29SJ 461</td>
<td>KKQ S17</td>
<td>LPII-EPIII</td>
<td>1784</td>
<td>Ground on two sides and two edges. Irregular</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29SJ 462</td>
<td>KKQ S17</td>
<td>BMIII-PI, EPII</td>
<td>115</td>
<td>Ground on sides and edges. One with .53 cm perforation drilled from two sides.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>29SJ 464</td>
<td>KKQ S17</td>
<td>PI-PII</td>
<td>1785</td>
<td>2 worked pieces</td>
<td></td>
<td>Ground on two sides and three edges</td>
<td></td>
</tr>
<tr>
<td>29SJ 466</td>
<td>KKQ S17</td>
<td>PI</td>
<td>86</td>
<td>3 worked pieces</td>
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<td>Various ground surfaces.</td>
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</tr>
<tr>
<td>29SJ 470</td>
<td>KKQ S30</td>
<td>PII-EPIII</td>
<td>2000</td>
<td>1 worked piece</td>
<td></td>
<td>Ground on two sides. Semirectangular</td>
<td></td>
</tr>
<tr>
<td>29SJ 479</td>
<td>KKQ S20</td>
<td>PI-II</td>
<td>1856</td>
<td>1 worked piece</td>
<td></td>
<td>Ground on two sides and three edges. Irregular</td>
<td></td>
</tr>
<tr>
<td>29SJ 626&lt;sup&gt;e&lt;/sup&gt;</td>
<td>PBQ S29</td>
<td>PI-LPIII</td>
<td>122</td>
<td>Shale Red</td>
<td></td>
<td>Ground on two sides and two edges. .24 cm perforation</td>
<td></td>
</tr>
<tr>
<td>29SJ 754</td>
<td>PBQ S13</td>
<td>PII-EPIII, Historic</td>
<td>213</td>
<td>Shale Red</td>
<td></td>
<td>Ground on one side and part of one edge. .52 cm perforation. Possibly a disk with a hole.</td>
<td></td>
</tr>
<tr>
<td>Site No.</td>
<td>Quadb</td>
<td>Datingc</td>
<td>FS No.</td>
<td>Materiald</td>
<td>Color</td>
<td>Classification</td>
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</tr>
<tr>
<td>39SJ 834</td>
<td>PBQ S14</td>
<td>PIII</td>
<td>226</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant blank</td>
<td>Ground on two sides and two edges (poor). .25 cm perforation</td>
</tr>
<tr>
<td>29SJ 846</td>
<td>PBQ S11</td>
<td>LPII-EPIII, Historic</td>
<td>263</td>
<td>Slate/shale</td>
<td>Red</td>
<td>1 button fragment</td>
<td>Perforation</td>
</tr>
<tr>
<td>29SJ 895</td>
<td>KKQ S8</td>
<td>BMIII, PI</td>
<td>1628</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant</td>
<td></td>
</tr>
<tr>
<td>29SJ 1015</td>
<td>PBQ S10</td>
<td>PI-IPIII</td>
<td>1601</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant blank?</td>
<td>Ground on two sides and three edges. Striations</td>
</tr>
<tr>
<td>29SJ 1055</td>
<td>PBQ S10</td>
<td>PI-EPII</td>
<td>233</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant blank?</td>
<td>Ground on one side. Broken part of flat circle</td>
</tr>
<tr>
<td>29SJ 1080</td>
<td>KKQ S10</td>
<td>BMIII</td>
<td>1895</td>
<td>Shale</td>
<td>Red</td>
<td>2 worked pieces</td>
<td></td>
</tr>
<tr>
<td>29SJ 1272</td>
<td>PBQ S28</td>
<td>PI-III</td>
<td>359</td>
<td>Slate</td>
<td>Red</td>
<td>1 disk</td>
<td>Ground two sides and partially on edges</td>
</tr>
<tr>
<td>29SJ 1278</td>
<td>PBQ S28</td>
<td>PI-PIII</td>
<td>394</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant blank</td>
<td>Ground on two sides and three edges. Rectangular</td>
</tr>
<tr>
<td>29SJ 1602</td>
<td>SRQ S26</td>
<td>PI-III</td>
<td>527</td>
<td>Shale</td>
<td>Red/pink</td>
<td>1 pendant blank</td>
<td>Ground on two sides and four edges. Rectangular</td>
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<tr>
<td>29SJ 1651</td>
<td>SRQ S25</td>
<td>PI-II</td>
<td>619</td>
<td>Shale</td>
<td>Red</td>
<td>1 effigy/eccentric</td>
<td>Ground on two sides and several edges</td>
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<tr>
<td>29SJ 1789</td>
<td>PBQ S1</td>
<td>Historic</td>
<td>699</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant blank</td>
<td>Ground on two sides and three edges. .29 perforation</td>
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<tr>
<td>29SJ 1829</td>
<td>PBQ S22</td>
<td>BMIII</td>
<td>859</td>
<td>Pendant blank</td>
<td>Red/gray</td>
<td>1 pendant blank</td>
<td>Ground on all sides and edges. .30 cm perforation. Semirectangular.</td>
</tr>
<tr>
<td>29SJ 1869</td>
<td>KKQ S17</td>
<td>PI-II</td>
<td>1702</td>
<td>Shale</td>
<td>Red</td>
<td>1 worked piece</td>
<td>Ground one side. Irregular</td>
</tr>
<tr>
<td>29SJ 1872</td>
<td>KKQ S17</td>
<td>PI-II</td>
<td>1708</td>
<td>Shale</td>
<td>Red</td>
<td>1 worked piece</td>
<td>Ground 2 sides and one edge</td>
</tr>
<tr>
<td>29SJ 1873</td>
<td>KKQ S17</td>
<td>PI-III (MV)</td>
<td>1747</td>
<td>Shale</td>
<td>Red</td>
<td>1 possible pendant blank</td>
<td>Ground one side. Irregular</td>
</tr>
<tr>
<td>29SJ 1879</td>
<td>KKQ S17</td>
<td>PI-II</td>
<td>1749</td>
<td>Shale</td>
<td>Red</td>
<td>1 worked piece</td>
<td>Ground on two edges. Semirectangular</td>
</tr>
<tr>
<td>29SJ 1879</td>
<td>KKQ S17</td>
<td>PI-II</td>
<td>1762</td>
<td>Shale</td>
<td>Red</td>
<td>1 bead blank</td>
<td>Ground on one side and one edge.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1762</td>
<td>Shale</td>
<td>Red</td>
<td>1 bead blank</td>
<td>Ground on two sides. .17 cm perforation</td>
</tr>
<tr>
<td>29SJ 1882</td>
<td>KKQ S17</td>
<td>BMIII-PII</td>
<td>1725</td>
<td>Shale</td>
<td>Red</td>
<td>5 pendant fragments or blanks</td>
<td>Ground on two sides and several edges. One is drilled with a .43 cm hole; another has a possible drill hole</td>
</tr>
</tbody>
</table>
Table 1. Argillite Artifacts Recorded on Survey or Found Among Survey Collections in Chaco Canyon (cont’d).

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Quadb</th>
<th>Datingc</th>
<th>FS No.</th>
<th>Materiald</th>
<th>Color</th>
<th>Classification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>29SJ 1894</td>
<td>KKQ S17</td>
<td>PII-PIII</td>
<td>1804</td>
<td>Shale</td>
<td>Red</td>
<td>2 discs ?</td>
<td>One is ground on two sides, all edges. The oval piece is ground on one side only.</td>
</tr>
<tr>
<td>29SJ 1896</td>
<td>KKQ S17</td>
<td>PI-III</td>
<td>1827</td>
<td>Shale</td>
<td>Red</td>
<td>11 worked pieces</td>
<td>Ground on various sides and edges. One has a possible drill hole on one side.</td>
</tr>
<tr>
<td>29SJ 1981</td>
<td>PBQ S9</td>
<td>LPII- EPIII</td>
<td>2021</td>
<td>Shale</td>
<td>Red</td>
<td>1 worked piece</td>
<td>Ground on two sides and two edges. .40 cm perforation drilled from two directions. Rectangular</td>
</tr>
<tr>
<td>29SJ 2049</td>
<td>PBQ S26</td>
<td>LPII-LPIII</td>
<td>1545</td>
<td>Pendant blank</td>
<td>Red</td>
<td>1 pendant blank</td>
<td>Roughed out rectangle, not ground</td>
</tr>
<tr>
<td>29SJ 2090</td>
<td>KKQ S21</td>
<td>PI</td>
<td>905</td>
<td>Pendant</td>
<td>Red</td>
<td>1 pendant fragment</td>
<td>Ground on one side and three edges. .28 cm perforation. Poor quality material</td>
</tr>
<tr>
<td>29SJ 2153</td>
<td>KKQ S17</td>
<td>PII-EPIII</td>
<td>1813</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant blank</td>
<td>Ground on two sides and edges. Irregular/trapezoidal</td>
</tr>
<tr>
<td>29SJ 2154</td>
<td>KKQ S17</td>
<td>BMIII-PI</td>
<td>1816</td>
<td>Shale</td>
<td>Red</td>
<td>1 pendant blank/ fragment</td>
<td>Ground on two sides and edges. Well done</td>
</tr>
<tr>
<td>29SJ 2160</td>
<td>KKQ S20</td>
<td>BMIII-PI</td>
<td>1830</td>
<td>Shale</td>
<td>Red</td>
<td>1 worked piece</td>
<td>Ground on two sides and one edge. Irregular</td>
</tr>
<tr>
<td>29SJ 2166</td>
<td>KKQ S20</td>
<td>BMIII-PI</td>
<td>1832</td>
<td>Shale</td>
<td>Red</td>
<td>1 worked piece</td>
<td>Ground on two sides and one edge. Irregular</td>
</tr>
</tbody>
</table>

Notes:

a Original list taken from site survey forms and catalog lists. Data verified by examining artifacts in collection.
b Quad sheets: PB Pueblo Bonito; KK Kin Klizhin; SR Sargeant Ranch.
c Dating taken from site survey forms. Although some sites have been resurveyed since the original records were prepared, no dates were changed because it is thought that changes would bias the analysis.
d Original recorder's classification.
e Artifact stamped 29SJ 629.
tions (e.g., several pieces from the collections from the University of New Mexico field schools in the 1930s and 1940s), the quality of work is not as good as that devoted to turquoise. For example, the mosaic pieces from Pueblo Alto (Mathien 1987:Plate 6.14, upper right) include some nicely shaped red shale rectangles, but these are not as small as the turquoise pieces found with them. The shaped argillite pieces from this site (Mathien 1987:Plate 6.9) do not exhibit the same workmanship as a geothite figure (Mathien 1987:Plate 6.10).

For those that did make such jewelry, the time involved in making these items must have been minimal. Haury (1931) experimented with the production of a fine-grained pelitic red rock similar to archaeological specimens found in the Arizona State Museum collections. Drilling took over 15 minutes using an Echinocactus wislizini Engleman spine on one side. Crotty (1983:33) drew on Haury's experiments and the techniques discussed by Jemigan (1978:199) to estimate the production of six beads per hour for red argillite. The few argillite ornaments recovered from survey and excavation in Chaco Canyon do not indicate great sums of time were spent on their manufacture.

In summary, the relatively few argillite artifacts recovered from sites in Chaco Canyon, the poorer quality of the material, and the less care that went into forming the artifacts, support Jernigan's (1978) hypothesis that very few artisans or crafts people were employed in argillite jewelry making. I suspect that argillite ornaments were not made by jewelry craftsmen early in the Chaco sequence; any farmer could probably make his own argillite jewelry. Even after turquoise jewelry making areas were established, argillite jewelry making was not a high priority. The dates for Bc 51 and Kin Kletso suggest that argillite is included among the materials used in jewelry workshops somewhat later. Perhaps with changes in social organization in the A.D. 1100s, there is an increase in use of this material. Support for this hypothesis comes from Swift (1980), who documents a claystone bead-manufacturing area at Shumway Pueblo, an Early Pueblo III village. Colors ranged from pinkish orange to pinkish red. This is the only other site where red stone manufacturing has been documented, as far as I know. It, too, is late in the temporal sequence. It seems, therefore, that the people who made turquoise ornaments generally were not the same people who made argillite ornaments. After A.D. 1100 some jewelry makers may have included argillite among the materials used, or there may have been people who made only argillite ornaments.

THE VALUE OF ARGILLITE

The number of argillite ornaments among the Chaco collections is few in comparison with turquoise, shell, and other stone beads (Mathien 1985). Akins (1986) reviewed the burial data; the most elaborate burials were found in two areas of Pueblo Bonito. Over 56,000 pieces of turquoise were found with the burials in Room 33; one red inlay stone was among the materials recovered with the 12–14 adults found above the wooden floor in this room. Below the floor with Burial 14 was a cache with many turquoise and shell pieces but only "a long inlay of red stone" (Akins 1986:117). In Room 330 (which was part of a cluster of several rooms that formed the second largest burial area at Pueblo Bonito) there were unfinished red shale pendants as part of the material recovered with up to 32 burials. There were considerably more ornaments of turquoise and shell (Akins 1986:124). In her list of burials from Chaco Canyon, the only other red or pink shale ornaments were recov-
erected near Una Vida with an infant and child who had two pink pendants (Akins 1986:Table B.1).

The small number of argillite ornaments, both in sites and with burials, is taken as evidence that they were not as treasured or valuable as the turquoise, shell, shale, or calcite items that were in greater abundance in the excavated sites (Mathien 1985).

**IMPLICATIONS FOR SOCIAL ORGANIZATION**

There is much more evidence from survey that argillite ornaments were being made at sites close to their sources and very little evidence of unfinished or broken pieces and debris in the sites identified as having jewelry workshop material. Therefore, it is assumed that the manufacturers of argillite jewelry were not the same people who made turquoise ornaments. This suggests that some groups of people had different materials available to them. Those who made turquoise items probably spent more time in shaping this harder material into finished pieces. People who made argillite items produced few of them and most of them required less skill to manufacture. The lack of argillite ornaments with burials or in site excavations and the overwhelming numbers of other types of ornaments listed in site reports suggest that the value of this material was less than that for turquoise, shell, shale, etc.

In conclusion, although there are some very nicely made argillite pieces among the collections from Chaco Canyon sites, this locally available material was probably used by anyone who was interested in making a bauble. It was not, however, among the prized possessions of the inhabitants of the Canyon.

—National Park Service, Albuquerque, New Mexico

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The Taos District has long been considered an Anasazi backwater, lagging behind developments elsewhere in the Pueblo world. However, recent studies suggest that the area is instead an Anasazi frontier. Studies of agricultural systems demonstrate that this area did not lag behind the central Rio Grande in terms of farming technology. A wide array of dry-farming features is found in the Taos district, and evidence suggests that these systems were supplemented by limited irrigation by the fourteenth century. The types of farming features found in the Taos district are discussed and placed in a theoretical framework.

INTRODUCTION

The Taos District lacks evidence of occupation by farmers before A.D. 110 and was on the Pueblo frontier until the nineteenth century. Isolation and conservatism are assumed to characterize this occupation from its beginning until today, and its position at the edge of the Anasazi world has caused Taos to be considered a bit backward, lagging behind developments elsewhere (Cordell 1979a, 1989; Herold and Leubben 1968; Peckham and Reed 1963; Wetherington 1968). Two factors contributing to this view are the use of pithouses at a late date and historic conditions at Taos Pueblo. However, this developmental lag is perceptual rather than real. Instead of an anachronism resulting from conservatism or slow development, residence in pithouses was related to settlement on a frontier. Historic conditions of isolation and conservatism at Taos Pueblo have been projected backward to become a fundamental characteristic of the area's occupation. However, the suitability of modern Pueblos as analogies for their ancestors is questionable (Cordell 1979b:146–147). While modern pueblos have often remained culturally distinct, many customs and beliefs have been affected by their Euro-American neighbors. Thus, historic patterns cannot be confidently projected backward.

If isolation and conservatism caused cultural development in the Taos District to lag behind the rest of the eastern Anasazi region, this tendency should be visible in nearly all aspects of northern Pueblo life. In particular, changes in farming technology should occur later around Taos than in the regions where those innovations originally appeared. However, if the attributes cited as signs of conservatism and isolation are actu-
ally evidence of movement onto a frontier, changes in farming technology should occur at about the same time and for similar reasons as elsewhere in the region.

**FARMING FEATURES IN THE TAOS DISTRICT**

While regional overviews generally discuss the extensive and complex farming features at Chaco Canyon, the Rio Chama Valley, and Mesa Verde, there is usually a lack of similar information for the Taos District (Cordell 1979a, 1979b; Moore 1981; Stuart and Gauthier 1981). However, rather than indicating the level of cultural development, this is attributable to insufficient survey coverage and reporting. When the available data are examined, it is evident that a sophisticated and complex farming system was also used in the Taos District.

Bandelier (1892:32–33) was the first to mention farming features in the region, noting "extensive vestiges of garden plots" near Ranchos de Taos, which he compared to features in the Rio Chama and Ojo Caliente valleys, central Arizona, and the Sierra Madres of northern Mexico. From these comparisons it appears that he was describing gridded fields, which were divided into a series of cells by stone alignments.

During his studies in the region, Jeançon (1929:3) noted numerous "tower sites" between San Fernandez de Taos and Taos Pueblo, as well as "long lines of broken ditches." The towers are piles of rock less than 1 m high and 1 to 7 m in diameter. Greiser and Greiser (1989:3) concluded that these features are evidence of field clearing rather than the remains of structures. Similar rock piles occur along the Rio Lucero, where they are associated with extensive systems of contour terraces and cobble-bordered grids.

During a survey of the Taos plain, Steen (1976) found eroded grids or contour terraces and rock piles. While burials were found under two rock piles, the other features are similar to those occurring elsewhere in the district (Jeançon 1929; Greiser and Greiser 1989), suggesting they were related to field clearing. A few check dams have also been found in this area (Boyer 1991).

Numerous and extensive farming features have been recorded near Picuris Pueblo. First noted by H. P. Mera (n.d.), the Peñasco Alto Site (LA 926) contains an extensive array of farming features covering hundreds of hectares atop the flat ridge that separates the Rio Pueblo and Rio Santa Barbara valleys. In 1963, Woodbury (n.d.) examined three areas next to an airstrip near the center of this site, all of which contain cobble-bordered grid systems in various stages of completion. Walls bordering the grids were built of rock cleared from the surface.

Peñasco Alto was also examined by Nemaric (1975) and Snow (1975). The site was estimated to cover 3.8 km and contain hundreds of cobble-bordered grids (Nemaric 1975:7). A few probable field houses were noted, mostly in areas overlooking the Rio Santa Barbara or Rio Pueblo (Nemaric 1975:7). Extensive contour terracing was also present, as were apparent diversion walls used to control run-off (Snow 1975).

Nemaric (1975) also found six smaller farming complexes east of Picuris in the Rio Pueblo Valley. Vadito West (LA 12747) covers 1 ha and contains cobble-bordered grids and contour terraces. Kwahe'e Black-on-white sherds were associated with these features, and a few possible field structures were noted. Peñasco Grande (LA 12748) is a probable field that covers 2 ha and is bounded by a 200-m-long stone wall. Pottery scattered
across the site suggests both prehistoric and historic use. Dos Peñascos (LA 12749) contains grids and contour terraces as well as historic structures. Farming features cover 2 ha at this site and were thought to be prehistoric, though they may have been reused more recently. Contour terraces and grids cover about 1 ha at the Grant Boundary (LA 12570) and Vadito II (LA 12752) sites, and 2 ha at Vadito I (LA 12751). Pottery at the latter two sites suggests use between A.D. 1100 and 1200.

During a timber-sale survey, Gauthier and others (1978) recorded several farming sites north and west of Picuris. The largest (LA 16765) covers 80 ha and contains contour terraces and cobbled-bordered grids. The remains of small, eroded grid systems were found at two other sites (LA 16758 and LA 16762).

Several surveys along the Rio Grande del Rancho have also located farming features. Herold and Leubben (1968) surveyed the valley from the Rito de la Olla to its confluence with the Rio Pueblo, recording 110 sites. Two contained "check dams," which are more accurately classified as contour terraces. Possible cobbled-bordered grids were noted at four other sites. Another survey recorded 283 sites along the Arroyo Miranda and the Rito de la Olla, in both cases near their confluence with the Rio Grande del Rancho (Kriebel 1983). Contour terraces were found on 25 of these sites, 32 contain grids, and check dams were recorded on 6 sites (Kriebel 1983:5). Woosley (1980, 1983) documented numerous farming features around Pot Creek Pueblo and Llano Quemado, including check dams, contour terraces, grids, retaining walls, and rock alignments. Farming features were said to occur in virtually every location containing potentially arable land (Woosley 1983).

Unfortunately no numbers or more detailed descriptions were provided.

More recent studies around Pot Creek Pueblo found that farming features are abundant on the alluvial fan that the village occupies. In addition to those described by Woosley (1980, 1983), a survey by Boyer (1989) identified possible canals and artifact scatters thought to represent fields or field houses. Closer examination indicated that some of the channels are actually natural gullies; however, at least two may be developed water courses. Site LA 71190 contains one of the probable canals and was examined by the Office of Archaeological Studies. Adjacent to the canal was a large expanse of level ground covered by a diffuse artifact scatter. While farming features were absent from this area, pollen studies showed it was a corn field; it was probably watered by the canal, which runs across the alluvial fan and carried water diverted from the Rito de la Olla. The canal can still be traced for a distance of .6 km; it borders the uphill side of the artifact scatter, which is now covered by a dense growth of trees.

Site LA 71189 is another farming site located just east of the field. Three farming features were defined at this site, including a cobbled-bordered contour terrace, a large rock pile, and an L-shaped rock alignment. A soil sample from behind the contour terrace contained a high concentration of corn pollen, demonstrating the agricultural function of that feature (Dean 1991). The rock pile was first thought to be natural; however, an examination of other parts of the fan showed that these features are common in the area and served as repositories for cobbles removed from fields during cultivation. Areas around rock piles are usually devoid of surface cobbles, and they sometimes occur in lines or as the corners of farming plots.
The function of the L-shaped alignment is problematic. Its association with farming features suggests it had a related use, possibly to redirect runoff from the terrace or to retain soil. Unfortunately, the alignment was not contiguous, and those functions require an unbroken wall. Another possibility is that the stones formed the base of a field structure similar to the Hopi kishoni or uncovered shade (Mindeleff 1989:218).

Survey by the Carson National Forest located numerous farming features upslope from these sites (Kriebel 1989). Two possible canals were noted (LA 84517 and LA 84519), both with check dams built across them. Numerous contour terraces, grids, rock piles, and cobble alignments were found at seven other sites; these seem to have been used between A.D. 1100 and 1350. While farming features were recorded on sites that also contained structures, they were not necessarily related to the residential features. Farming devices are extensively distributed across this area, and their location next to structures may simply be fortuitous.

**ECOLOGICAL REASONS FOR BUILDING WATER- AND SOIL-CONTROL FEATURES**

Farming in the Taos District appears to have followed a trajectory of increasing complexity related to population and environmental trends similar to those occurring elsewhere in the eastern Anasazi region. The area was not used by farmers until the A.D. 1100s, when higher-than-average precipitation may have provided enough moisture for successful agriculture. More predictable rainfall allowed occupation by a residentially mobile population living in pithouses, and prime, well-watered lands along intermittent streams and floodplains were probably farmed during this period.

As the population grew in size and became familiar with the environment, small pueblos began to appear around A.D. 1200 and were probably occupied for much longer periods than were the pithouses. By the late 1200s or early 1300s, the residents of these small pueblos had begun to combine into large villages such as Pot Creek Pueblo. The farming features described earlier do not seem to have been used before the population began occupying the more residentially sedentary small villages. This mirrors their occurrence elsewhere and is related to the effect of sedentary communities on local environments.

The construction of water- and soil-control features is one in a series of responses to stress on the food-production system and was usually adopted only when less-expensive options were unable to relieve the stress (Moore 1981). Less-expensive options include switching to alternate food sources, increasing field size or farming more distant areas, moving to an unused part of the local region, and redistributing population through alliance networks. This sequence is neither linear nor exclusive, and combinations of lower-cost options might be selected over more expensive solutions. When all else failed, the final option was moving to a new area. This type of migration was costly because it required constructing new homes, clearing and cultivating new farmland, and establishing new alliance and exchange networks.

When farming features appear in a region, they indicate that less-costly solutions to stress on the food-production system were closed or were already being used and were no longer able to correct the problem. Throughout the eastern Anasazi region as well as the Taos District, the earliest types of farming features to appear were check dams and contour terraces. These devices were
built to halt or control active erosion and show that farmlands were deteriorating at the time of use.

Erosion is a complex process with many causes, including alteration of natural vegetation, weakening of soil structure, masking of soil and vegetation by sediments, increase in slope, and reduction of surface roughness (Cooke and Reeves 1976). While climatic change is often blamed for erosion, cultural activities can also be responsible. Cutting trees for building, field clearing, or firewood can be a major cause. Runoff from a forested tract is dramatically increased by removing more than 20 percent of the tree cover, and soil erosion accelerates when regrowth is prevented, as would occur in a densely populated area (Evans and Patric 1983). Removing the understory by clearing fields, using shrubs as fuel, and harvesting wild plants can also stimulate erosion. Experiments have shown that runoff from shallow slopes triples when vegetation is removed (Tadmor and Shanan 1969).

Clearing rocks from fields also contributes to the process by increasing runoff and sheetwash, leading to the formation of rills and gullies (Epstein et al. 1966; Lamb and Chapman 1943). Even the increased level of foot traffic around a village can stimulate erosion. Many soils form erosion-resistant crusts during rainfall (Finkel 1986); when these crusts are disturbed, erosion can begin.

Thus, the simple process of living in an area can cause the environment to deteriorate. Early farmers could counter this problem by moving when farmlands became gullied or the supply of easily accessible wood for building or fuel was exhausted. Later farmers could not solve these problems as simply. As the population grew and began to settle into more permanent villages, the ability to simply pick up and move when things got tough became increasingly difficult. Most of the best locations were already occupied or had been used at an earlier time and had not yet recovered. Unable to move in response to the deterioration of their fields, Anasazi farmers began building features designed to control erosion.

By the mid-1300s, the population of the Taos District was mostly concentrated in the areas now occupied by Taos and Picuris pueblos. Though contour terraces and check dams continued to be used, the most common type of farming feature built was the grid. Grids function much like ridges in modern farming; they help prevent wind erosion as well as the initiation of gullies (Moore 1992). By building grids, prehistoric farmers were attempting to prevent soil loss rather than reacting to active erosion.

CONCLUSIONS

These trends mirror events elsewhere in the eastern Anasazi region. In areas occupied before the large-scale population movements of the late thirteenth century, farming devices aimed at stopping or controlling active erosion predominated. These mostly seem to occur after A.D. 1100 when population densities were relatively high. When the Anasazi abandoned the Four Corners region and moved into areas such as the Chama and Rio Grande valleys, new types of farming features were built. Instead of waiting for erosion to begin, grids were built to prevent field damage caused by gullyling and wind erosion.

In terms of agricultural technology, the Taos District did not lag significantly behind the rest of the eastern Anasazi region. Though the building of erosion-control devices began at a slightly later date, this was related to occupational intensity rather than isolation. Before about A.D. 1200, the population den-
sity was low, and it was more economical to simply relocate rather than attempt to salvage deteriorating farmlands. Grids began to be built at about the same time as elsewhere in the eastern Anasazi region, and the same appears to apply to canals. There is no evidence for cultural conservatism or isolation in the development of farming technology in the Taos District. Rather, the data suggest close ties with other regions and a willingness to accept new ideas and innovations.

—Museum of New Mexico, Santa Fe, New Mexico

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THE LITHIC ASSEMBLAGE FROM A PUEBLO PETROGLYPH SITE
Roger A. Moore, Jr.

The lithic artifact assemblage from a Pueblo petroglyph site, LA 39114, in northwest New Mexico, was analyzed to determine the character of such a tool kit. While a review of the available pertinent literature provided scant information for comparison, a published lithic-tool replicative experiment aided in interpreting the results of this analysis along with a use-damage replicative experiment conducted by the author. Both replicative experiments contributed to the interpretation of the lithic assemblage and its relationship to the manufacture of the petroglyphs.

INTRODUCTION

Site LA 39114 (NM-01-30540) is one of many petroglyph sites in the San Juan Basin of northwest New Mexico; however, it is one of the few with an associated lithic tool kit that may have been used to manufacture the rock art. The site was discovered by the Bureau of Land Management during an inspection of a proposed coal lease in the La Plata Valley, just south of the Colorado border. The panel is on a horizontal sandstone slab that is about 6 m in diameter; the slab is on the west edge of a mesa above a steep, sandstone clast- and shale-covered talus slope within a sparse piñon-juniper woodland.

The site consists of the rock-art panel and an artifact scatter just below the panel on the talus slope. The 31 ceramic sherds recovered from the talus slope immediately beneath the panel represent 15 Mancos Black-on-white and Mancos Corrugated vessels consisting of three white ware jars, six white ware bowls, two white ware ladles, and four utility ware jars. The ware types date the site to the Pueblo II period (A.D. 900–1150). A broad corner-notched projectile point found on the talus slope was dated to the Basketmaker III–Pueblo I periods (A.D. 500–900).

The petroglyph panel consists of 41 pecked abstract designs and stylized motifs (Figure 1). While all the images were formed by pecking, some were partly or completely abraded in the final manufacturing stage. The images include two multirayed sun symbols, three circular depressions, four circles, one left-hand outline, one rectangular metate surface depression, two snake motifs, one pair of sandal outlines, six turkey tracks, one swastika, two plus marks, seven animal tracks, one
male anthropomorphic motif, two V shapes, an oblong outline, an ovoid outline, a shallow depression, a rectangular outline, and two amorphous designs. The petroglyph style depicted here is similar to that attributed to the late Pueblo II and Pueblo III (A.D. 1150–1300) periods, especially the Kayenta Representational style (Schaafsma 1980:134–153). Based on the ceramics and rock art style, it appears the petroglyphs and the artifact assemblage are contemporaneous and are attributed to the Pueblo II–III period. The Basketmaker III to Pueblo I projectile point may have been a curated artifact.

Site LA 39114 has special research significance for two reasons: the petroglyphs were pecked into a horizontal surface, and there is a lithic and ceramic artifact assemblage on the talus slope just below the petroglyph panel. Both of these attributes warrant further investigation; however, I have chosen to limit this discussion to the lithic assemblage.

My discussion includes a detailed discussion of the lithic assemblage, along with a use-damage replicative experiment. The significance of this assemblage is based on published records of rock art sites.

THE LITHIC ASSEMBLAGE

The 83 lithic artifacts are represented by 16 artifact classes and 18 material types (Table 1), with an average of 4.6 artifacts per material type. When the materials are grouped, there are 8.4 percent cherts, 68.7 percent siltstones, 15.7 percent basalt, and 7.2 percent fine-grained quartzite. Of the 16 cobble tools (hammerstones, choppers, etc.), 75 percent are made from siltstone, 12.5 percent from quartzite, and 12.5 percent from basalt. Compared to the nearby river terrace gravels, there is a selection in favor of siltstones, and to a lesser degree of basalts, over quartzites. There is also a greater proportion of cherts in the assemblage than in the river gravels.

Within the siltstone group and the quartzite group, the proportion of material types is similar to that found in the river gravels, selection is therefore not for a specific siltstone or quartzite type, but for siltstone and quartzite material groups in general.

Of the 24 tools, 19 (79 percent) are choppers, abraders, or pounders showing extensive stone-on-stone use damage (Table 2). The choppers are represented by four cobble tool forms, a biface, and a retouched flake. Chopper spalls make up 20 percent of the flake assemblage, indicating frequent resharpening of the cobble choppers. While 59 percent of the flakes were classified as resulting from core reduction, at least some of the flakes are believed to have been the result of chopper manufacture prior to the first use episodes of the choppers.

Spatial Distribution

Most of the flakes and tools cluster on the top 10 to 23 m of the talus, downslope from the edge of the panel. In several instances, pieces of broken artifacts and flakes removed from specific artifacts were identified, and their locations were plotted on the site map. The distribution of these items indicates that the artifacts have moved on the slope since their deposition. Artifact weights were also plotted on the site map; however, this exercise showed no relation to downslope provenience.

Tools

For this analysis, tools consist of utilized flake abraders and pounders, choppers,
Figure 1. Horizontal petroglyph panel.
Table 1. Cross-tabulation of Artifact Class with Material Type.

<table>
<thead>
<tr>
<th>Material Types</th>
<th>Angular Debris</th>
<th>Core</th>
<th>Flake</th>
<th>Utilized Flake</th>
<th>Retouched Flake</th>
<th>Biface</th>
<th>Cobble tool</th>
<th>Hammerstone</th>
<th>Core-chopper</th>
<th>Cobble uniface</th>
<th>Cobble biface</th>
<th>TOTAL No.</th>
<th>TOTAL Percent</th>
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<td>46</td>
<td>4</td>
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<td>5</td>
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<td>2</td>
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Material codes are from Warren (1979): 1000s are cherts, 1100s are silicified woods, 1200s and 1300s are chalcedonies, 2250s and 2260s are siltstones, 3400s are basalts, 4060s are very-fine to fine-grained quartzites.
Table 2. Cross-tabulation of Artifact Class with Artifact Type.

<table>
<thead>
<tr>
<th>Artifact Type</th>
<th>ARTIFACT CLASS</th>
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<th>TOTAL Percent</th>
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<td></td>
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<td>Retouched Flake</td>
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<td>Biface</td>
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</tr>
<tr>
<td></td>
<td>Cobble uniface</td>
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<td></td>
<td>Cobble biface</td>
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<tr>
<td></td>
<td>TOTAL No.</td>
<td>88</td>
<td>100.2</td>
</tr>
</tbody>
</table>

Key: Hamstn. = Hammerstone; A.D. = Angular Debris; Unk. = Unknown; manufac. = manufacturing

Note: Several artifacts had more than one "tool" on them, resulting in a total "tool" count of 88.
chopper spalls, whole flakes, hammerstones, and projectile points.

Utilized Flake Abraders and Pounders. Of the three whole siltstone artifacts, two are abraders/pounders (Figure 2) and one is an abrader (Figure 3). These tools are all on large, very thick flakes (Table 3); however they are small for pounding tools.

All of the convex plane view edges are straight in edge view. Use damage consists of some microspalling and extensive mass attrition, resulting in rounding and flattening of formerly sharp edges. The resulting edges are relatively smooth, with microscopic short linear striations parallel to the edges and microscopic pitting of the rounded edges. Tool edges are 1.8 to 4 cm long. This type of use damage is caused by use against a hard material such as dried bone or stone (Dodd 1979).

Choppers. Choppers are the largest tool category on the site (Figures 4–6). There are 12 chopping tools, 10 made on cobbles and 2 on large flakes. Seven are made from

<table>
<thead>
<tr>
<th>Table 3. Utilized Flake Abrader and Pounder Summary Data.</th>
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</thead>
<tbody>
<tr>
<td>Count</td>
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</tr>
<tr>
<td>Length</td>
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<tr>
<td>Width</td>
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<tr>
<td>Thickness</td>
</tr>
<tr>
<td>Weight (gr.)</td>
</tr>
<tr>
<td>Area</td>
</tr>
<tr>
<td>Volume</td>
</tr>
<tr>
<td>Tool Edge Angle</td>
</tr>
<tr>
<td>Cortex%</td>
</tr>
<tr>
<td>Platform Cortex</td>
</tr>
<tr>
<td>Platform Angle</td>
</tr>
</tbody>
</table>

Tool Edge Shapes
Plan view:
Straight 3 43%
Convex 4 57% – all have straight edge view

Edge view:
Straight 6 86%
Curved 1 14%

ASNM 20. Artifacts, Shrines, and Pueblos
Figure 2. Pounder/abrader on a utilized flake.

Figure 3. Cobble abrader with use damage on arris.
Figure 4. Biface chopper.

Figure 5. Biface chopper on a cobble.
siltstone (58 percent), 3 from basalt (25 percent), and 3 from fine-grained quartzite (17 percent). The summary data on the eight whole choppers (Table 4) indicate that these tools are roughly fist size or slightly smaller. There is a wide variety of tool edge shapes (Table 5); however, this variety can be condensed into two general groups. The larger group, representing 67 percent of the edges, are characterized as straight, slightly curved, or sinuous in edge view and straight to convex in plane view. Tool edges ranged in length from 1.0 to 5.0 cm (mean = 3.2, S.D. = 12.268). All of the edges have rounding attrition and most have steep, short-hinge fractures near one or both sides of the tool edges and some pitting of the rounded or occasionally flattened edges. Only the two quartzite tools showed evidence of edge crushing rather than deep hinge-fracture spalling; one tool had striae on a flattened area running perpendicular to the utilized edge. Through use, the tool edges had widened from 2 to 7 mm, with the edge damage indicative of both hard and moderate energy striking on dense materials, such as dried bone or stone. Several edges showed evidence of having been resharpened or reused.

Chopper Spalls. Chopper spalls are flakes with evidence, usually on the platform, of having been detached from a chopping tool in the process of resharpening the tool. These are relatively large flakes (Table 6) with broad platforms; all chopper spalls are secondary (1–99 percent dorsal cortex) or tertiary (no dorsal cortex) decortication flakes. There are 5 siltstone (56 percent), 2 basalt (22 percent), and 2
quartzite (22 percent) flakes; this proportion is about the same material ratio noted for the choppers. This correlation indicates that choppers are being refurbished at a relatively uniform rate regardless of material type.

**Whole Flakes.** Summary data on all whole flakes is provided as a point of reference for the chopper spall data (Table 7). The single uniface manufacturing flake is a primary reduction flake (100 percent dorsal cortex) of siltstone; it is 18 mm long, 23 mm wide, and 3 mm thick, and weighs 1.6 g. The five tool-manufacturing flakes represent all stages of cobble tool manufacturing from primary to tertiary (no dorsal cortex) reduction. The remaining flakes are early-stage cobble shaping flakes.

**Hammerstones.** All three hammerstones are broken. One has extensive use on a broad, unmodified cortical arris (an edge formed by convergence of two or more surfaces) covering an area 4.5 by 1.5 cm. It appears to have broken along internal fracture planes as a result of heavy blows; use is evident by heavy battering and pitting. The second hammerstone has a few scattered peck marks along arрисes and heavy battering on a point where three arрисes of the broken cobble come together. The third hammerstone is a pounder on a cobble fragment; the used arрис has such extensive damage over a 5.0-by-1.7-cm area that all the cortex is gone. Use damage consists of battering and pitting, rincons (cone-shaped surface fractures), and random deep hinge-fractured spalls/rincon segments. In other words, this tool broke during use and was used for a short time after breaking.

**Projectile Point.** One complete projectile point made from variegated black and clear chalcedony was found on the slope. The tip of the blade may be broken. The point weighs 1.7 g and has the following dimensions: 23 mm total length, 15 mm blade length, 17 mm blade width, 4 mm blade thickness, 8 mm neck width, 5 mm notch depth, 4 mm notch width, 13 mm stem width at base, and 4 mm stem thickness. This point is deeply corner notched with a broad, straight base. While it appears to be a late Basketmaker III style arrow point, this style is known to persist well into the Pueblo I period (Moore 1981:27–30; Thoms 1977:150). The projectile point predates the petroglyphs and the ceramic assemblage by at least 100 years. It is the only artifact made at least in part by pressure flaking, and none of the flakes or angular debris is made from the same material as the point. This information may indicate that this artifact was not related to the rest of the lithic artifact assemblage and that it was a curated artifact.

**REPLICATIVE EXPERIMENT**

The artifacts from this site are a specialized assemblage geared toward the accomplishment of a specific task. The tools are 75 percent choppers, hammerstones, abraders, and/or pounders. Use damage is usually extensive, with evidence of periodic reworking of tool edges. Over 90 percent of the use damage is attributable to the striking or abrading of a hard material such as stone or possibly bone. The presence of this assemblage on a talus slope just below a large petroglyph panel indicates that these tools were likely the cast-off debris from the manufacture of these petroglyphs. To test this theory I collected eight cobbles of fine-grained quartzite, siltstone, and basalt from the La Plata Valley. I removed a series of flakes from the cobbles to form unifacial and bifacial edges with 60–to 100–degree angles. These cobble tools were then used to peck a large chunk of Nacimiento sandstone measuring 60 by 40 by 40 cm and set firmly on the ground. Tool edges were examined with a 70X micro
Table 4. Whole Chopper Summary Data.

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<th>Count</th>
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<th>Standard Deviation</th>
<th>Maximum</th>
<th>Minimum</th>
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Table 5. Tool Edge Morphology of All Chopper Tools: Edge Plan View With Edge-View Outline.

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<th>Sinuous</th>
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<td>19.1%</td>
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Use damage began as a slight rounding and dulling of the tool edges with some microspalling. By the end of the experiment some edges were rounded and pitted with occasional larger spalls. While the damage was indistinguishable from damage on the LA 39114 artifacts, the amount and extent of the use damage was much greater on the chopping tools from the site than on the experimental tools in the test assemblage.

**COMPARISON TO THE LITERATURE**

A search of rock-art reports in North America was made, primarily with the aid of Mead (1968) and William (1978, 1979). Using these bibliographic references and a
Table 6. Whole Chopper Spall Summary Data.

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<td>4</td>
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<td>12.164</td>
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<tr>
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<td>80%</td>
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<tr>
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<tr>
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<td>15.092</td>
<td>100°</td>
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review of publications such as The Artifact, which frequently publish rock-art reports, I reviewed over 1,800 articles and books. The focus of most reports was, understandably, the rock art rather than the means of production. Sixteen reports were found that deal with techniques of rock-art manufacture, and of these, six deal with paints and paint-application techniques and tools for making petroglyphs.

Most of the discussions of petroglyph-manufacturing techniques (Grant 1967:12; Schaalma 1980:28; Turner 1963:2) were general statements that the techniques used were pecking, incising, scratching, or abrading. These investigators inferred that hammerstones were used for pecking, and for more control a hammerstone and chisel were used. Incising and scratching was attributed to use of a sharp-edged stone tool. While these researchers were making statements based on observation of tools occasionally found during rock-art recording, no detailed information was provided about types of use damage or tool shaping, nor was any reference made to assemblages from which these references were derived.

Four reports made some attempt at discovering a petroglyph tool-manufacturing assemblage associated with the sites being discussed, primarily because some tools were actually found in association with the art. Seventeen petroglyph sites from the Orme Reservoir in Arizona contained cultural remains—"Lithic debris, including a number of battered hammerstones" (Kearns et al. 1975:325) are common; ceramic sherds were found at 10 of these sites. While more detailed artifact descriptions were recorded, no other information was published (Kearns, 1987 personal communication).

A summary of petroglyphs in Western Colorado indicated that petroglyphs were
Table 7. Whole Flake Summary Data.

<table>
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<th></th>
<th>Count</th>
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<th>Standard Deviation</th>
<th>Maximum</th>
<th>Minimum</th>
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<td>40°</td>
</tr>
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made by pecking, drilling, scratching, and grooving; however, McKern (1978:6, 7, 51) did not notice any definitely shaped implements at the sites he visited. McKern (1978:51) suggested that eoliths (fortuitously or crudely shaped natural stones) may therefore have been used; however, he did not notice any eoliths with use damage.

From the Dolores Archaeological Project in southwestern Colorado, 18 of 25 rock-art sites were accompanied by lithic artifacts (Ives 1986:240–241). These artifacts were described in a table but not in the text. Ives' summary table shows the number of flaked lithic tools, ground stones, angular debris, and flakes (by material grain size). While artifact counts were generally small, three sites had a significant number of flaked stone tools: 12 on 5MT4619, 20 on 5MT4777, and 43 on 5MT4779. No other description was provided.

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Carrico (1983:81) in his discussion of petroglyph sites in Cerro Calera, Sonora, indicates that petroglyphs were associated with small base camps or temporary camps with a lot of sherds, flakes, some flaked tools, and hammerstones. Beyond this statement there is no description of the lithic assemblages or their relationship to manufacturing of the petroglyphs.

This review indicates that most archaeologists writing about petroglyph sites are either not finding associated lithic tool kits, are not noticing lithic tool kits when they occur, or are not recording or describing the lithic tool kits because the main focus of their research is on the rock art itself. Based on this review and my own rock art recording experience, it is clear that lithic tool kits directly associated with these sites are relatively rare. I could not find a petroglyph lithic tool kit assemblage in the rock-art literature to compare to the assemblage from Site LA 39114.
Because of the shortcomings of the rock-art review, I focused a second review on reports of use damage and lithic experimental replications of use damage. A search aided by Honea's (1983) bibliographic reference turned up only one obviously related report. Dodd (1979) performed a use-wear experiment to help him interpret a lithic tool assemblage from Armijo Rockshelter, New Mexico. The Armijo Rockshelter assemblage contained numerous battered choppers and hammer-stones similar in morphology and use damage to the tools from Site LA 39114. Dodd hypothesized that a use-damage experiment would confirm the biotic data from the site data, which indicated a wild plant food subsistence base supplemented by some small game animals and maize (Dodd 1979:232). The battered use wear proved, however, to result from striking a support stone or anvil stone used as a chopping block for processing plant material (Dodd 1979:233). Stone-on-stone striking with tool edges resulted in loss of weight (caused by spalling and crushing), decrease in size, and decrease in spine-angle (angle formed by the tool edge or arris), and made tools more ovoid, subrounded, or discoidal in shape. Use wear from battering consisted of "extensive, overlapping hinge/step terminations, interspersed with occasional cracks and pitting depressions....Resultant edges were truncated, appearing either convex or faceted in cross section" (Dodd 1979:234). Dodd then cited several references that support the hypothesis that sharp edges or angular stone tools are good for cutting or shaping other stone. He concluded that the Armijo Rockshelter assemblage was primarily used to shape and refurbish manos and metates, and the more rounded tool edges were used for plant-food processing (Dodd 1979:239).

The use-wear damage that Dodd noted in his stone-on-stone striking experiments coincides very favorably with both the Site LA 39114 tool use wear analysis and the replicative use-damage experiment conducted for this report. In both my use-damage experiment and Dodd's experiment, the prehistoric tool assemblages exhibited a much greater degree of tool-edge attrition than did the edges on the experimental tools. This observation indicates that these stone tools were used for a long period of time before they were replaced or resharpened.

**SUMMARY**

The lithic assemblage at Site LA 39114 is probably the result of several related episodes of rock-art production. The assemblage is relatively homogenous in character, both in terms of tool types and use damage, and also in material selection. It appears that the cobbles used here were brought to the site from the nearby gravel terraces, either unaltered or minimally altered. The chopper tools were then manufactured, used, resharpened, and reused. Use damage indicates that individual tools were used extensively and were sometimes refurbished. Some of the larger flakes removed from cobbles to make cobble tools were themselves used as tools for the production of the rock-art panel. The preferred material for making cobble tools was siltstone. The few flakes used as cutting and scraping tools may have been used for secondary or support activities; these activities may include processing plants or preparing perishable materials used to haft tools or to cushion the hand for hand-held tools. Based on my use-damage experiment and that of Dodd (1979), most of the chopper-pounder tools were used for upwards of 1,000–5,000 strikes against the sandstone on which the rock art was made.

To my knowledge only two other rock-art sites with lithic assemblages
approaching this size have been found or recorded in the Four Corners Region—and only the Site LA 39114 assemblage has been described in any detail. This assemblage and associated rock art makes it a valuable research resource. The tools provide an opportunity to see just what artifacts were used to make petroglyphs during the Pueblo II—III period. The artifacts provide a starting point to begin comparing the technology of making rock art for this culture period throughout the region. This site may also be used as a reference point for the comparison of technologies for other culture periods in the Southwest. Perhaps the time has arrived to quantify the general observations of rock-art manufacturing techniques alluded to by Grant (1967), Schaafsma (1980), Turner (1963), McKern (1978), and others. Rock-art recording specialists have undertaken a tremendous task in recording, cataloging, and interpreting the many and intricate rock-art sites. Lithic specialists may now follow their lead by evaluating and defining the lithic assemblages used to manufacture the rock art in the various cultures and periods of the Southwest.

ACKNOWLEDGMENTS

The fieldwork and laboratory time for this project were financed by the La Plata Mine as part of a larger mitigation program, undertaken by the Division of Conservation Archaeology (DCA). Alan Reed assisted with the fieldwork and preparation of the mitigation report, of which this paper is a part. Patricia Hancock analyzed the ceramic artifacts.

I would also like to thank the following people for reviewing and commenting on this report: Peggy Powers, Alan Reed, Tim Kearns (all then affiliated with DCA), and Jerry Nix of San Juan College.

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