

Newsletter

New Mexico Archeological Council

Vol. 4, No. 1 & 2



R. LOOSE

(With all the excitement and finesse, the intrigue and suspense of "Raiders of the Lost Ark" - style archeology (the way we all knew it would be!) - we must not forget those gallant few who dwell and toil in the unlighted basements and milk sheds of the inner city. To these I suggest we raise our jelly glasses in salute.... "To Theory!" - ed.)

IN SEARCH OF THEORY

(Paper delivered at the 50th annual Pecos Conference [1975] under the title "The excavation of room two at Pendejo Pueblo")

It was a small site. It was located in a place very much like other places where small sites can be found. A mesa stood to one side of the site, and an arroyo flowed to the other, if sand can be said to flow.

The arroyo had a name, Hodido Wash. It seemed to fit.

The site was called Hodido Ruin. I was standing at the edge of the second room.

The wall foundations were made of rock. The rocks were small and uniform in size and shape. They were good rocks for making a wall, sandstone block which had been pecked to shape and mortared together by someone who cared. The walls made from those rocks should have stood for centuries. They were now a jumbled mass of rubble.

My job was to find out why.

I hadn't asked for the assignment. I was working late in my office, a small basement flat furnished with a desk, typewriter and intermittent running water during the summer months. It was a typical August night in the City, hot, dry and breezeless. I was making my own contribution toward improving the atmosphere by lighting another Camel when she walked in.

She was young, in her late twenties, blonde and in trouble. Her eyes were gray-green and I could tell from the way she walked that the trouble was big. She looked quickly around the room, spotted by client chair and started talking as she moved toward it.

"We've lost a theory. One of our top operatives reported it missing three days ago. I think I know where it is, but we need outside help."

She sat in the chair and waited for me to speak. Her skin was darkly tanned, and her hair held hints of red which only long exposure to direct sun could account for. The Marshalltown handle protruding from the right hip pocket of her Levis gave her away. She was an Archeologist.

"You've got the wrong man," I said. "I specialize in methodology. I don't find theories. I make them work."

My answer didn't phase her.

"I know that. That's why I've come to you. We need a methodological investigator for this job."

I knew the problem. I'd worked on theory cases before. They were elusive and didn't pay well. I was getting steady pay with office space doing methodology. I told her the obvious.

"I charge 50 dollars a day and expenses, 200 dollars in advance, if the theory is worth

it.

She reached inside her Penney's work shirt and placed two portraits of Benjamin Franklin on the desk beside my bottle of Old Crow.

"It's a simple theory. It helps explain the evolution of human behavior. I can't tell you any more than that. The dynamic underlying the theory is what is missing. Our operative has traced it to the Hodido Ruin. We can provide you with the location of the ruin and survey notes. Your job will be to find that dynamic."

(Continued on pg. 2)

NEW MEXICO ARCHEOLOGICAL COUNCIL

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NEWSLETTER EDITOR

Catherine Aves

All material will be published as submitted, albeit subject to editing for length and clarity.

I considered her proposition. The theory was obviously simple. The matter of the missing dynamic bothered me.

"Where is your operative now?" I asked.

Her face crumbled. I could tell my question was a good one. I poured a generous slug of Old Crow into my cleanest jelly glass and pushed it across the desk. She sipped at the glass with a tentative motion and put it down before she answered.

"He's dead. It looks like suicide. He left a note, but his files are missing."

There was little I could say. It seemed a clear case of theoretical frustration. I asked to see the note. She reached again within her Penney's work shirt. I would have been intrigued with her search some years ago.

The note read "In Hodido Lies Truth."

It was a cryptic statement. I decided to take the job.

The excavation was routine. Removing wall rubble, stripping exterior surfaces, screening, bagging, voluminous note taking, photography, samples of this and that for the usual.

The documentation was different. A dynamic was missing. Dynamics are subtle, unpredictable in form and occurrence. I knew they had a way of disguising their existence in seemingly obvious facts. There was only one way they could be isolated--through measurement.

I measured the interior wall lengths. The north wall measured 2.28 m. The south wall measured 2.15 m. The east wall measured 1.86 m. The west wall measured 1.92 m.

It was obviously a room no larger than the interior space of a pre-1973 Buick.

There was a circular, adobed rimmed firepit in the center of the room. It measured 21 cm in

diameter, 12 cm deep and was filled with fine white ash. There were no other interior features.

The critical measurements were beginning to add up.

The room faced southwest, its long axis bearing 290° - 110°. A floor level entrance was centered in the southern wall. The entrance was 23 cm wide at the base. Wall fall to the south indicated that the entrance was originally 32 cm high.

A quick perusal of my solar ephemeris shed light upon the missing dynamic. It was a winter habitation.

I rechecked a few other measurements of artifactual variability, paid off the crew and hitch-hiked to the nearest place where I could catch a bus to the City. It was after midnight when I arrived.

I called her from a payphone in the depot, bought a bottle of Old Crow on my walk to the office and tried to air out the musty smell by opening the casement window behind my desk. I was contemplating the significance of the hat on the crow when she gave a tentative knock on the open door and entered my office.

She was pale, and seemed more nervous than before. I nodded toward the bottle, but she ignored my invitation and carefully sat in my client chair. I'd tried about a dozen ways of saying it nicely to myself and hadn't come up with one that seemed to work, so I just said it.

"All I can do is lay out the facts. I measured the room. It was small. It had a small firepit in the center. The room had burned and the assemblage was intact. There were ollas, cooking jars, serving bowls, eating bowls, canteens and ladles. All the vessels were small."

I took my time lighting another Camel to

see how she should react. She didn't. I decided she had been trained well, to accept the apparent.

"I measured the stone tool assemblage. I counted 17 small siliceous stone tools inside the room. There were two manos lying underneath an overturned trough metate just outside the entranceway. The metate was small. The manos were small. There was a scatter of debitage 2.4 meters away from the entrance. It was a small scatter. The flakes and angular debris comprising the scatter were small. They had been detached from small cores by small hammerstones.

I took a final drag on my Camel and stubbed it out as I looked at her. She seemed to slump a little in the chair. I poured a generous slug of Old Crow in my client jelly glass and pushed it across the desk. She picked it up and downed it in a single movement. I decided I could give her the rest of it straight.

"I think you can see where its leading to. It was a good theory. Your operative traced it down to the final dynamic. He knew where the proof could be found, but couldn't deal with that reality once he understood it. That's why he committed suicide."

I looked at her carefully, perhaps more carefully than I usually look at a client. She was still taking it well, for a theoretical operative. In a few years she might have the makings of a methodologist.

"You mean . . . ?" she said.

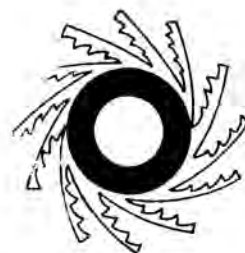
"Yes." I answered. There was only one way to say it.

"They were small people."

Richard C. Chapman

JOB ANNOUNCEMENTS

EDITOR: Experienced in archaeological, cultural resource management, architectural, and historic preservation texts, publications program design and coordination, book and report editing and design. B.L. Daniels-Swannack (Owl Editing), Box 2165, Albuquerque, NM 87103; (505) 242-6443.



MAY 22 WORKSHOP

RESEARCH RESOURCES, SANTA FE

Photograph Collections Museum of New Mexico

The Photograph Collections contain approximately 175,000 pictures, of which 100,000 are catalogued. The primary function of the Collection is preserving significant historical material, and these pictures are essentially for research rather than for general browsing. Images are filed alphabetically by subject, ranging from "Advertisement" to "Weddings." Since patrons are not usually allowed direct access to the files, requests for pictures need to be relatively specific and will be assisted by staff personnel. (As an example, it is necessary to ask for a subject like "Adobe Making" -- a subsection of "Industries" -- or views of a particular town instead of making a blanket inquiry about "Spanish Colonial Life.") A guide to subject categories is available.

Persons wishing to consult the picture files will be seated at table areas as available and given file folders of material of subjects requested. While there is no particular order of pictures within files folders, each picture belongs to a given folder and every effort should be made to keep it there unless an immediate order for prints is contemplated -- when pictures may be removed to accompany the order form to expedite processing. When file materials are being examined, they should be handled carefully since many are originals and may be old or fragile. None are to be marked in any way. Prints in glassine jackets are particularly delicate or damaged. Xerox copies in files indicate that rare or important items have been removed for research or preservation. Archive collections of such items, generally filed by photographer, are

not open to the public and may be examined only upon special request and in the presence of the Photographic Archivist or the Curator of Photographic History. No materials can be sold or loaned out of the files, but copy prints may be ordered for a fee. (See fee schedule for production costs and reproduction fees.)

In making reference notes patrons should take down not only the subject of a picture but how it is filed and its catalogue number. File information is noted in the upper left corner of the back of a print (such as "Towns/Santa Fe/Secular Buildings/Hotels.") or the upper left corner of the front of a Xerox copy. The catalogue number is in the upper right corner front or back. These pieces of information are needed in placing orders for prints. The additional note "film," "film in file," "glass," or "glass negative" below the file data should also be recorded since it indicates existence of an original or copy negative from which prints can be made faster than if a file print, must be copied.

Normal procedures require a minimum period of sixty days for processing an order. Orders paid in advance may be processed slightly ahead of orders which must be billed. Xerox copies for reference can be made at ten cents per page.

Index lists have been made of some major collections and of works by a number of photographers represented in the collection. These may be consulted on request. Catalogues with plates of photographers' work and an annotated directory of Territorial New Mexico photographers have been published and are available for purchase.

CONDITIONS FOR REPRODUCTION OR PUBLICATION

- Written permission to reproduce or publish photographs must be secured from the Photo Collections, Museum of New Mexico.
- Cropping or overprinting on any reproduction will not be approved without written permission of the Museum of New Mexico.
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PHOTO COLLECTIONS
Museum of New Mexico
Box 2087

Santa Fe, New Mexico 87503
(505) 827-2559

Hours: Monday: By Appointment
Tuesday-Friday: 9-12, 1-4:45

Richard Rudisell
Museum of New Mexico
Photo Archives

Museum of New Mexico History Library

Located at 110 Washington Ave. behind the Palace of the Governors is the Museum's History Library. The library has its roots in the Palace. In 1851, the United States government appropriated funding and passed a bill to create a Territorial Library of New Mexico. The location of this library was the far east room of the Palace of the Governors. In the 1880's the Territorial Library was divided into what is now the State Library and the Supreme Court Law Library with the remainder of the materials taken into the care of the Historical Society of New Mexico. Today the library is a research unit of

the Museum of New Mexico for on premise research. Our hours are, Tuesday through Friday from 9 a.m. to 4:45 p.m. and Saturdays from 9 a.m. until noon. We are closed on Mondays. The library remains open through noon weekdays, with only rare exceptions.

The collection is comprised of books, maps, journals, newspapers, manuscripts, city and business directories, verticle file materials and the W.P.A. folklore papers and city files.

The book collection makes up the largest segment of the holdings at apx. 10,600 volumes. The main subject areas are Spanish

Colonial history of the Southwest, the Mexican period, Territorial and Statehood history of New Mexico. There is also a substantial collection of books dealing with historical artifacts identification. The Library holds many seventeenth and eighteenth century chronicles describing the province of New Mexico. In addition to early accounts of New Spain are the fifteenth and sixteenth century laws of the Indies, the laws of the Mexican period as well as the Territorial laws. Exploration and travel are covered in all of the above periods. The publication *A Guide to the Museum of New Mexico History Library*, by

Jess Stone (1973), now out of print, breaks down the book holdings as well as the manuscript and newspaper collections. Copies of the guide are available at the library for further examination. Rather than giving these collections extensive attention here it may be better to deal with the materials and sources which are not well known but are very important in the contributions that they can make to research.

The map collection is the only catalogued collection of its type in the state. The maps are indexed on cards by subject, author and title. The collection is also chronologically listed. The holdings are of just over 3,000 catalogued maps. Many of the early maps are atlas sheets done by European cartographers. Often these maps show how little they actually knew of the area. The maps done from the mid-1800 forward begin to more accurately show the area. In the holdings are a complete set of the Wheeler maps of the Survey West of the 100th Meridian. This includes not only New Mexico but also Colorado, Utah, Arizona, Nevada and California. Also contained in the map collection are maps of cities and towns. The earliest map of Santa Fe is 1768. There are maps of counties showing highways, railroads, postal routes, energy and mineral resources of New Mexico.

A little used source of information is the *Report of the Governor of New Mexico made to the Secretary of the Interior*. We have reports from 1879 to 1910. These reports contain a wealth of information about the development of the state. Many of the reports contain agricultural and mineral statistics. Currently a subject index to these reports is being compiled and is near completion. This effort will make the use of these reports not only easy but a valuable research tool.

The city and business directories are yet another important source of information. The business directories date from 1882 to 1939. Prior to 1912, the directories are of scattered

dates, but from 1912 to 1939 are complete. These directories cover all of the Southwest and West by state and/or territories. The works include statistics on towns as well as biographical data on important political and business people of various towns, counties and states. Often in the listing of businesses, the proprietor is also given. The library has Santa Fe City Directories from 1928 to the present. Various other New Mexico cities are represented in our holdings of directories.

The W.P.A.'s (Works Progress Administration) Federal Writers Project of the 1930's is a little known collection of folklore and oral tradition of New Mexico. This type of project was done in every state. It was the CETA of the depression years. The New Mexico collection was deposited in large part at the library. For years it remained in boxes and file drawers. Now all of the items housed in our library are catalogued by subject, author and title. These stories recorded local legends, hero tales, witchcraft stories, New Mexico variations of fairy tales, accounts of fiestas and feast day celebrations. In addition to oral tradition the project wrote on points of interest, such as, the parks, monuments, the natural and archaeological attractions of New Mexico. The city files contain statistics and stories about towns all over the state. Some times the data is no more than a few lines and other times it may be several folders of information. Pamphlets, newspaper clippings and other various items have been added to the city files over the years, often providing leads to other sources or answering questions that have eluded answers in other places.

It is worth noting here that the work of the W.P.A. did not stop at recording oral history and data. The newspaper, magazine and necrology file on the library are indexes which all got their start resulting from the work of the W.P.A. The subject index to the newspaper collection goes back to the early 1860's for the *New Mexican* and continued to about 1915. Indexing was begun again in the

late 1950 and early 1960's and has once more ceased because of lack of staff. The card files even in their present incomplete state contain a vast amount of information that would take hours of searching if they did not exist.

The verticle file is another treasure of tidbits of information and leads. The bibliographies of various historical subjects expedite research when they are available. Biographical material makes up an important part of the file. Clippings about many prominent citizens as well as some not so well known today often provide missing bits of information to researchers.

The necrology file contains names of thousands of area people. The file directs the researcher to the newspaper source where details and biographical material can be found. Currently entries are made daily from the *New Mexican*. There is also an on going project of re-checking to see that all local (New Mexicans) deaths are indexed.

I should mention, before closing, the manuscript collection. There are many accounts and descriptions, in journals and letters, of the area prior to the turn of the century and also long into this century. The ledgers and accounts of business and diaries of the locals are primary sources which again may hold answers to many unanswered questions.

To me there is a large gray area between history and anthropology. Please don't be chased off by the sign over the door that says "History Library," we may have just what you've been looking for.

Sherry Smith-Gonzales
Librarian



School of American Research Contract Archeology Program

The Contract Archaeology Division of the School of American Research has been in continuous operation since 1974. Providing archaeological and historic consulting services to private individuals, companies and Federal and State agencies is the primary activity of the Division. In addition, SAR provides expertise in cultural resource interpretation and management, and planning for visitor facilities and maintains a capable liaison staff for assisting clients in compliance activities with Federal and State agencies. All SAR contracted activities are guided by an institutional concern for the conservation of cultural resources and resource information. All field activities and report recommendations are tailored toward the best interests of the resources to be impacted, which are our primary concern.

A full range of survey, assessment and mitigation capabilities is maintained through a full time staff and all requisite permits for the

State of New Mexico. The Contract Archaeology Division also conducts selected projects in Northern Arizona and Southeastern Utah on request. Main offices and laboratory/curation facilities are located in Santa Fe, New Mexico. The laboratory includes ceramic, lithic, bone and textile analysis facilities. Existing subcontract arrangements are available for palynological, paleobotanical, archaeomagnetic, radiocarbon, obsidian hydration, and fission track analysis. Recent emphasis has been placed upon developing historical and ethnohistorical archival and informant based research capabilities as well as developing a limited expertise in early 20th century town site planning and preservation.

Both publication and curation/conservation capabilities are available to clients. New construction for collection storage is currently under way while existing collections are monitored by conservators

associated with the Indian Art Research Center. Publication of cultural resource related manuscripts is facilitated through inhouse editing, drafting and photography capabilities. The majority of contract reports produced through SAR are reproduced in relatively low numbers of xerography. Selected manuscripts, three (3) in the past year, have been chosen for limited run publication (off set and camera ready).

In the course of more than 250 separate archaeological investigations in the State of New Mexico, SAR has focused upon several research interests. These interests provide a thread of cohesiveness between the small projects we conduct and are summarized in general fashion below:

1. Development of site predictive models based upon physiography.
2. Nature of man/land relationships through time.
3. Historic Navajo acculturation, 1870-1930.
4. Anasazi gathering and farming in marginal areas.
5. Lithic site cultural and temporal affinity determinations under survey conditions.
6. Indices of social cohesiveness and interaction as variously indicated by Archaic lithic sites, non-architectural Pueblo sites and historic mining towns.

Current studies are oriented toward the

development of an occupational history of the southeast San Juan Basin from prehistoric through historic times.

The School of American Research maintains both material culture and archival resources developed as a result of Contract Archaeology Division projects. All collections are maintained on the grounds of the School and are available to interested professionals on request.

John D. Beal

Director

Cherie L. Scheick

Administrative Assistant



Bureau of Land Management New Mexico State Office

Aerial Photographs

BLM has aerial photographs of almost the entire state. Perhaps the most useful set is the natural color photography taken in 1973. These photos were flown to produce a scale of 1:31,680, about equal to the map scale of the U.S.G.S. topographic maps. An index of the aerial photography projects flown for BLM-New Mexico is available. Some BLM offices have the photography on-hand and may allow you to use them in the office. Copies of the photography and indices of the flight lines can be ordered from the BLM, Denver Service Center:

Office of Special Mapping Service
(Stop D-130)
Attention: Wallace A. Crisco
BLM, Bldg. 50
Denver Federal Center
Denver, Colorado 80225
Telephone: FTS and Commercial
(303) 234-6036

General Land Office Records (GLO)

To insure the orderly disposal of public lands the federal government in 1812 established the General Land Office. It was made a part of the Department of the Interior when that department was formed in 1849. The GLO and the Grazing Service were combined in 1946 as the Bureau of Land Management. Today the GLO records are housed in two places, at the appropriate state office of BLM and in the National Archives.

The GLO records constitute a major source of information concerning the history of land use. They include the maps and fieldnotes of the meridian (township and range) surveys, the land grant boundary surveys, and the Indian reservation surveys. GLO records also contain homestead case files related to the disposal of public lands under various homestead acts, and files of acquisition records for lands reacquired by the federal government under certain public relief acts. Studies by Victor Westphal (*The Public Domain in New Mexico--1854-1891*: UNM

Press, 1965) and Vernon Carstensen (*The Public Lands*; University of Wisconsin, 1962) are the best guides to documentary sources related to historic studies of land-use. BLM has a brief manual explaining the basic files of the GLO records.

On file in the Santa Fe office of BLM are the Master Title Plats (MTP), Historical Index (HI), Serial Records (also called "O" cards) and land patents. Information from each of these files is needed to obtain complete homestead case files from the National Archives where homestead case files are kept in Record Group 49. A paper presented at the 13th annual meeting of the Society for Historical Archaeology by Levine, Knight and Wojcik (now in press in a volume of papers entitled *Forgotten Places and Things; Archaeological Perspectives on American History*, Albert E. Ward, editor, Center for Anthropological Studies), summarizes the types or data found in each file and compares the documentary data to on-site archaeological data. Appendix I of that paper is reproduced here to give some idea of the content of the files.

Planning Documents

As a land managing agency, the BLM employs a wide range of resource specialists having expertise in a variety of fields. These specialists are charged with developing an information base to support management decisions and the full complement of resource specialists exists as the State, District and sometimes Resource Area levels of internal organization. The information developed by these specialists constitutes a significant data source for the archaeological researcher.

What may be considered the standard data base is generated for each resource and maintained at the District or Resource Area offices. The three main components of this data base are: The resource records themselves, documents generated as a result of a planning effort, and documents generated as a result of an environmental impact assessment effort.

Cultural resource files available for inspection include both site and survey

information. Site forms are available for all sites located on public lands within the Districts, sites are marked on base maps. Most Districts also keep records, in some cases keyed to base maps, of all inventories completed within District boundaries. Generally the office will have copies of all the major and many of the more obscure documents relative to resources within the District boundaries. Similar "base data" files are kept by each resource specialist.

The first step in the BLM planning process involves the description of the resource which is being planned for. Under the "old" planning regulations, which have been in effect until just recently, every resource specialist attempted to complete inventory and evaluation procedures necessary to bring their resource information level up to what was considered a minimum necessary to make what is called an "informed" decision. Consequently rather detailed maps, narratives and mylar overlays (at a scale of 1/2" = 1 mile) containing information concerning soils, geology, topography, vegetation, slope, hydrology, climate, wildlife, etc., are generally available for all areas in which planning has been completed.

Documents prepared for the purpose of assessing the environmental impacts of a particular project (EA's or EIS's) can also be a valuable source of information. Often, even if the document itself is fairly general, there has been a more detailed "appendix" report prepared which is available upon request. Often, special inventories are completed for particular resources, depending on the nature of the proposed project and the type of impact.

APPENDIX I

1. Homestead Case File: Dept. of the Interior General Land Office:
Original copy of case file kept in National Archives, (R.G. 49) Wash. DC
 - A. Reports of agents of General Land Office during patent application process:
 - review of history of claimant's entry

- investigation of residency
 - list and description of improvements and their assessment
 - list of livestock and cultigens
 - history of agricultural and livestock grazing activities
- B. Final Proof: Testimony of Claimant**
- age of claimant
 - marital status and number of children
 - periods of residence and absence
 - acreage cultivated
 - history of cultivation
 - acreage planted by year
 - amount harvested by year
 - type of crop
 - types of livestock
 - inventory of improvements
 - cost of materials
 - cost of labor
 - former entries
- C. Final Proof: Testimony of Witness**
- period of time witness knew claimant
 - size of family of claimant
 - first hand knowledge of period of residency of claimant on entry
 - period of absence
 - history of cultivation
 - acreage planted by year
 - amount harvested by year
 - types of crop
 - types of livestock
 - inventory of improvements
 - cost of materials
 - cost of labor
- D. Application for Leave of Absence**
- size of family
 - list of improvements
 - history of cultivation by acreage by year
 - period of absence
 - reason for absence
- E. Application and Affidavit for Homestead Entry**
- legal description
 - marital status of claimant
 - status of mining on entry
 - status of available surface water
- F. Application for Second Entry**
- legal description of prior entry
 - history of cultivation and list improvements on prior entry
 - reason for abandonment of former entry
 - affidavit of witness supporting reason for abandonment as appendix
- 2. Acquisition File:**
- USDA: Bureau of Agricultural Economics
Division of Land Acquisition:
Original copy of file kept at Bureau of Land Management, Santa Fe, NM
- A. Tract Map**
- location of pasture and crop land
 - location of tanks and drainage courses
 - location of structure and facilities such as corrals
 - location of roads
- B. Appraisal Report**
- soil types and acreage, value, use and acreage level of erosion at time of report.
 - structure and facilities
 - land
 - age either old versus new or by # years
 - construction material
 - condition
 - value
- 3. Entry Card: Homestead**
- original copies for New Mexico kept in Denver, CO
 - Microfiche copies kept at Bureau of Land Management, Santa Fe, New Mexico
 - types of information
 - record of transactions (application, relinquishment or cancellation by dates) absences by period, and action taken by General Land Office pertaining to entry by date
 - mailing addresses used during period of entry
- 4. Patent:**
- original copies for New Mexico kept in Washington, D.C.
 - Microfiche copies kept at Bureau of Land Management, Santa Fe, NM
 - types of information
 - legal description and acreage
 - entry card number
- 5. Master Title Plat:**
- original kept at Bureau of Land Management, Santa Fe, NM
 - types of information
 - map of sections of a single township
 - boundaries of land never patented
 - boundaries of land still under ownership of private individuals or public agencies other than Bureau of Land Management
 - patent number indicated where applicable
 - title of public agency not necessarily designated on map
 - boundaries of land formerly but now under Federal ownership
 - acquisition file number
- 6. Historical Index of Entries, Patents, and Acquisitions Involving Federal Government:**
- original copy kept at Bureau of Land Management, Santa Fe, NM
 - accompanies Master Title Plat
 - types of data:
 - filed by township and range
 - legal description of entries and patents
 - entry, patent, and acquisition numbers with date of action and acreage
 - date of relinquishment or cancellation of entries
 - law, program, or Act of Congress under which action was taken
- 7. Field Notes of Surveyors of General Land Office:**
- original copy kept at Bureau of Land
- Management, Santa Fe, NM**
- names of occupants often given
 - section of township in which occupants resided
 - structures and watering tanks, roads barns sighted during survey
 - land use
 - inventory of surface water resources and location of section
- 8. Official Plat of Township based on Surveyor's Field Notes:**
- original copy kept at Bureau of Land Management, Santa Fe, NM
 - location of houses, tanks, springs, corrals, roads and agricultural fields
- 9. Sandoval County Records:**
- original kept at Sandoval County Court House, Bernalillo, NM
 - the following records were checked for references to pre-1920 settlers in the Chihuilla area and, specifically occupants of the Spearman and Cordova tracts
 - Marriage Certificate Record
 - Warranty Deed Record
 - Tax Deed Record
 - Mortgage Deed Record
 - Chattel Mortgage Record
 - Quit Claim Record
 - Miscellaneous Record
 - Probate Record
 - General Index to Real Estate Grantor and Grantee
- 10. Budget Control Books for Sandoval County School District**
- original copies of various years kept at Bernalillo County School District Office in Bernalillo, NM
 - Receipts and disbursements of the Chihuilla School District, District No. 3, for the years 1926, 1927, 1933, 1934, 1935, and 1936
 - Amount of disbursements for salaries, supplies, etc., and individual or agency to whom disbursements were made
- 11. Bureau of Land Management Records, Albuquerque District, Rio Puerco Area:**
- records kept at Rio Puerco Area Office, Albuquerque, NM
- A. Chihuilla Allotment Project Listing**
- index of pipeling, well, retention dam projects
 - index of vegetation modification projects
- B. Schedules, General Provisions, Specifications, and Drainage of Chihuilla Well Pipeline Extension Projects.**

Frances Levine and
Chris Kincaid
Bureau of Land Management
State Office



Santa Fe National Forest, U.S. Forest Service

Sites by Evaluation Class
Sites by Elevation
Sites by Vegetational Association
Sites Classified by Room Numbers, SFNF
Acres Inventoried for Archeology, SFNF
Number of Sites Recorded by Fiscal Year, SFNF
Area Inventoried by District, SFNF
Inventoried Sites by Time Period, SFNF

(Editor's Note: These graphs were presented at the Workshop; however, space and reproducibility did not allow their inclusion here.)

Please feel free to contact Landon Smith for further information:

Address: Santa Fe National Forest
P.O. Box 1689
Santa Fe, New Mexico 87501
Phone: 988-6592

Landon Smith
Archeologist
Santa Fe National Forest

Since 1978, the Santa Fe National Forest has exerted a major effort on improving its records related to cultural resources. The Forest participates in the Region 3 automated data system and maintains files on both reports of archeological work of all kinds that occur on the Forest, and of all historic and archeological sites recorded on Forest system lands. Use of the information by any agency or institution who has supplied data is welcomed and encouraged.

The files as they now exist are the end product of several years work directed toward cleaning up the information. This has included resurvey and re-recording of past sites and checking locations to insure accuracy.

We also maintain current maps of all sites located and all areas inventoried. A book of

maps is kept for each Ranger District with mylar overlays for each USGS quad sheet showing areas examined and sites found.

The information in our automated site file is supplied to the Laboratory of Anthropology coded and formulated for placement on their computer system.

In addition to the cultural resources, the Forest also has extensive information on other resources, such as soil inventory maps and range and timber vegetational maps. While these are not for sale to the general public, arrangements could be made for their use by legitimate researchers.

Some of the information available includes:

Acres Surveyed by Group, 1979-1981
Inventoried Sites Classes by Impact
Forest Acreage by Inventory Level

LOS ESTEROS REPORTS

New Mexico Archeological Council

On March 27, 1981, the New Mexico Archeological Council held a meeting at which the main topic of discussion was the report from the ethics committee on the excavations conducted at Los Esteros. The purpose of the discussion was not a formal inquiry in any sense but rather an open forum at which the membership was invited to express its views. It was not intended that the discussion resolve any of the issues involved. We sought only to bring the problem into focus and to determine a future course of action. The main elements of the discussion were as follows:

- 1) Mr. Paul Grigg presented a slide show which documented the questions he has raised concerning the excavations at Los Esteros.
- 2) Mr. Joseph Tainter, past president of NMAC, presented a chronology of the events in the inquiry.
- 3) Mr. Dee Green discussed the nature of the inquiry and the difficulties which the ethics committee had encountered in conducting it. He pointed out that, although the inquiry had been handed to the

ethics committee by Mr. Tainter, it was not an ethics investigation under the NMAC bylaws. Further, since the membership had not requested the ethics committee report, it was not being submitted to the membership for acceptance or rejection.

- 4) Numerous members of NMAC expressed their views and recounted other aspects of the Los Esteros excavations. Although there was interest in broadening the discussion, the Chair confined it to the matters in the ethics committee report and raised by Mr. Grigg.

After considerable discussion, Mr. Richard Loose introduced a motion that the final four points in the ethics committee report should form the basis for future action by NMAC. That motion carried without dissent, after brief discussions. The four points are these:

- 1) NMAC should formally urge the Corps of Engineers to take whatever steps remain to see that a site report on Los Esteros Site 48 is prepared and published. Until those data are available

any conclusions regarding interpretations of the site are premature.

- 2) When issues are presented before NMAC which need inquiry but do not involve charges of ethical misconduct, an independent committee should be established. Members of the ethics committee could serve on such a committee but need not be identified as such.
- 3) NMAC needs to address the question of how they choose to deal with situations in which Federal or state agencies operating within law and regulation do less archeologically than what NMAC would like. Are we as a society prepared to undertake tasks which an agency cannot or will not assume?
- 4) It needs to be strongly emphasized to the membership of NMAC that when one member has a disagreement with another member, professional behavior consists of attempting to work things out with one's colleague prior to pursuing other avenues of resolution.

The meeting was adjourned at that time.

Mark Harlan
Vice-President

Society of Professional Archeologists

26 May 1981

Colonel Bernard J. Roth
District Engineer
U.S. Army Corps of Engineers
Albuquerque District
P.O. Box 1580
Albuquerque, NM 87103

Dear Colonel Roth:

In response to a request from a member of the Society of Professional Archeologists, SOPA has looked into the controversy concerning Site 48 of the Los Esteros Reservoir. The reasons for SOPA's involvement were that charges of professional misconduct had been made. Inasmuch as SOPA was formed to establish and monitor standards and ethics of professional conduct we felt it was essential to become informed about the Site 48 controversy.

The question was not specifically whether the investigator or his critics were proven correct, or whether the Corps had acted appropriately. Our concern was whether there was a way to review the evidence in order to bring an end to the continuing controversy, while at the same time insuring that professional ethics and standards were being applied.

Following is a draft of a "news" item prepared for a forthcoming issue of the SOPA Newsletter. In it, we suggest several lines of enquiry which should bring the controversy to a close. SOPA hopes that the Corp will consider funding additional research at the site to pursue the lines of enquiry suggested in the attached report.

It is and has been the objective of SOPA to bring an amicable end to this controversy in a way that is supportive of professional standards in archeology. It is hoped that those involved in this controversy will respond with the same intent in which our suggestions are offered, which is to lay to rest a public controversy through the use of a scientific methodology.

s/Jerald T. Milanich, President
Society of Professional Archeologists

The Site 48 Controversy

At the SOPA Board of Directors' meeting held in Washington, D.C., on December 6, 1980, the Board passed a motion asking then President James Hester to "have prepared a brief review of the Los Esteros Reservoir (Site 48) situation, without any judgement, for a report to the membership." On behalf of SOPA, President Hester has prepared such a report which is presented in abbreviated form below.

The Site:

The Los Esteros Reservoir in New Mexico, constructed by the Corps of Engineers, has resulted in the inundation of the highly controversial Site 48. The site contains a 19th century component—a three room slab-and-adobe structure and associated midden—which was found by the original Southern

Methodist University survey team. Later the data recovery project under the direction of Albert Ward (Director, Center for Anthropological Studies, Albuquerque) encountered and excavated the disputed earlier component, which has been dated by archaeomagnetism between 1780-1920 interpreted as a Spanish or Comanchero trading settlement. Fourteen structures were identified consisting of over 250 rooms for the components recognized.

The Charges:

The controversy involves the veracity of this earlier component. Some workmen who had previously been fired by Ward suggested as early as 1978 that the entire adobe complex was a fabrication, and that they were being asked to carve out with shovel and trowel the adobe walls, hornos and other site features. Similar concerns were raised in 1980 by

bricks; adobe walls extending across pits of the earlier component, etc. Gumerman later inspected the site and conducted test excavations in and on the adobe features, concluding that "the integrity of the site exists beyond a shadow of a doubt," but acknowledged that the excavators had made some mistakes and had misinterpreted some features. Bank's opinions closely follow those of Gumerman.

In April and May of 1980 additional consultants visited the site, one group organized by the State Historic Preservation Officer, Tom Merlan. These investigators, including a pedologist (Alan Kosse of SCS), COE personnel (Jim White and Donna Roxey), and Advisory Council on Historic Preservation representative (Jane King), four archeologists representing NMAC (Dee Green, Michael Marshall, Rory Gauthier and Richard Lang) conducted additional 25 tests on the soils and features which by this time had been exposed from six months to three years. Again, the resultant report (by Merlan) supports the presence of the site but expresses disagreement with some of Ward's procedures and interpretations.

Submission of a final report by the NMAC committee of January 19, 1981 contains the following evaluative summary of the various tests:

TABLE 1. TEST RESULTS OF WALLS AND FEATURES AT LOS ESTEROS SITE 48

	Present	Absent	Don't Know	Total
1. G. Gumerman	4			
2. Colorado Group (D.D. Scott, S. Baker and S. Horvath)	4			5
3. P.G. McHenry	+			
4. A. Kosse				1
5. Corps of Engineers	2			2
6. T. Merlan	12	2	11	25
TOTALS	22	2	14	38

*No number is given since it is not clear from McHenry's report that he actually cut and tested a wall or feature.

archeologists Paul S. Grigg and Anita Klaenhammer and David McNeese (both of Preservation Systems, Inc.) after the features had weathered for four months. It should be noted that none of these individuals accused Ward of duplicity, but all expressed strong reservations concerning the authenticity of the adobe features. Also mentioned was the scarcity of artifacts associated with features of the early component; however, the accusers did not actually examine the artifacts or excavation notes, etc., available at the Center for Anthropological Studies. Their accusations were presented to the Corps of Engineers, the FBI, the GAO, the New Mexico Archaeological Council, the State Archeologist, the SHPO and one member of New Mexico congressional delegation. These concerns and photographs were released to the press, resulting in several sensational newspaper articles.

The Investigations:

The allegations have prompted several investigations of the adobe resources. The first was conducted in October of 1979 at the request of the Corps of Engineers, to be followed by a second in March of 1980. The first COE investigator was Rex Gerald; the second was George Gumerman accompanied by Larry Banks, archeologist with the COE. Gerald's visit involved only visual inspection of the adobe features exposed, and his report focuses on certain anomalous aspects of the architecture: the regularity of the height of exposed walls; later intrusive objects imbedded in contiguous adobe

The 38 tests constitute neither a systematic nor a statistically valid sample of the adobe walls and features of the site. In the tests no discrimination or interpretation is made concerning the relation of tested walls to earlier or later components of the site. Nevertheless, based on those tests which demonstrate that 22 of 38 of the areas cut show cultural features, it seems clear that adobe portions of the site do exist. The evidence does not suggest that every single wall is real as excavated, nor does it conclusively demonstrate that any wall is a fabrication.

SOPA's Suggestions for Resolving the Controversy:

The site, inundated following excavation, is now above the reservoir level and it is possible to use archeological methodologies to interpret the site, and perhaps, to resolve the controversy. Questions which can be approached through additional field and documentary research include: (1) Why is there evidence of horizontal soil strata within the walls? Is such evidence only on the surface of the bricks or does it continue through the bricks? (2) Can the presence of horizontal soil strata be explained through flooding of the site or through some other explanation? (3) Why is the historical documentation on the site so limited and ambiguous? (4) Is there a way to explain the intrusions of rocks, sticks, and other foreign objects in the bricks?

Given the nature of these scientific questions we would like to suggest that the

SOAP BOX

SOAP BOX 1

NMAC—

I am writing this letter as a concerned member of the Archaeological Community. It has come to my attention that Mr. Bob Moore of the BLM Farmington Resource Area Office has made a policy decision concerning the impact of seismic work on archaeological sites. He is of the opinion that unless seismic crews conduct drilling or dirt moving activities, archaeological sites suffer no impact from seismic work. Thus, the Farmington R.A. is not requiring archaeological surveys in conjunction with seismic work.

It has been my experience that seismic crews are willing to facilitate avoidance of archaeological resources and work cooperatively with the archaeologist. However, in the absence of avoidance planning, the impact to sites is direct. You are probably aware of seismic procedures. After a seismic line has been completed, the survey vehicles, the "juggies" who plant the geophones, the cable trucks, either the

vibrator, air gun or drilling rigs, and the recording unit or "Doghouse" have all traversed the same line. Although the BLM assumes that both the air gun and vibrator create impact "on the surface," the impact to subsurface deposits is real. The vibrator compacts the soil, while the air gun churns up the soil and leaves a 1 meter diameter ring of subsidence. This action is particularly disturbing to sites which lie on unconsolidated soils or are situated in areas where downslope erosion is imminent. Moreover, "surface" disturbance is of serious concern in the San Juan Basin where many sites are solely surface manifestations.

Furthermore, the ultimate result is that seismic lines create roads. In only a few instances have I observed successful reseeding which allows the surrounding vegetation to reclaim the area. In most cases, the seismic roads are reused by local inhabitants which, with the onset of the rainy season, often create entrenched road cuts. If a site lies within such an area, the impact to the site could create subsurface damage to a depth of one foot or more. The impact of continued vehicular traffic across a site should be obvious. If surveys are not conducted and if pre-seismic avoidance measures are not planned, the integrity of both surface and subsurface sites is, thereby, threatened.

It has also been my observation that, regardless of the pep talks that an archaeologist may give the crew members concerning protective legislation including the Antiquities Act of 1906 (PL-209), the Historic Preservation Act of 1966 (PL 89-665) the National Environmental Policy Act of 1969 (PL 91-852), the 1977 Executive Order No. 11593, the Archaeological and Historical Conservation Act of 1974 (PL 93-291), the Native American Religious Freedom Act of 1978, and the Archaeological Resources Protection Act of 1979, and their consequent penalties, crew members cannot resist taking a piece of Antiquity home with them. The fact is that large scale collection of "neat" and "pretty" artifacts is common. Moreover, it is my understanding that seismic activity is likely to double within the next two years. The implications are obvious: the absence of avoidance planning or protective measures threatens the existence of cultural remains.

To circumvent the above listed seven pieces of legislation the Farmington Resource Area Office cites Title 43, Code of Federal Regulations, Subpart 3045 Geophysical Explorations (Oil and Gas).

Subpart 3045-Geophysical Explorations (Oil and Gas)
3045.0-1 Purposes.

The purpose of the regulations in this subpart 3045 is to establish procedures to be followed in conducting exploration of the public land for oil and gas. For

exploratory operations for other leasable minerals, the lease or permit required by the appropriate regulations must be secured. The regulations in this subpart are not applicable to exploration operations conducted pursuant to oil and gas lease, and also are not applicable to the exploration of public domain lands for minerals subject to location under the U.S. mining laws.

3045.0-5 Definitions.

For the purpose of the regulations in this subpart: (a) "Oil and gas exploration" means any activity relating to the search for evidence of oil and gas which required physical presence upon the land and which may result in damage to public lands or resources thereon. It includes, but is not limited to, geophysical operations, construction of roads and trails, and cross-country transit by vehicle over public domain. It does not include the casual use of public lands for oil and gas exploration. It does not include core drilling for subsurface geologic information or drilling for oil and gas; these activities will only be authorized by the issuance of an oil and gas lease. The regulations in this subpart, however, are not intended to prevent drilling operations necessary for placing explosive charges for seismic exploration, nor do they affect the exclusive right to "drill" for oil and gas by a leased upon his leased premises.

(b) "Public lands" means lands owned by the United States and administered by the Bureau of Land Management. It does not include retained mineral interest in lands, title to which has passed from the United States.

(c) "Casual use" means activities that involve practices which do not ordinarily lead to any appreciable disturbance or damage to lands, resources, and improvements. For example, activities which do not involve use of heavy equipment or explosives and which do not involve vehicle movement except over established roads and trails are "casual use."

Do you see the Catch 22 in the interpretation of Casual Use? Apparently the BLM is considering seismic work to be "casual use" of the public lands for oil and gas explorations Section 3045.0-5 Definitions (a). However "casual use" is defined in Section 3045.0-5 (c) as activity which is restricted to existing roads and trails. Rarely is seismic activity confined to existing roads and trails.

Furthermore this policy is not consistent with the policy of other BLM area offices. For instance, in SE Utah, archaeologically sensitive areas require avoidance planning. The determination of archaeologically sensitive areas was based on a 10% stratified random sample of 40 acre parcels within the



Corps consider funding additional research at the site in these two areas, soil studies and historical studies. Such additional research is apparently necessary to aid in the interpretation of the data already collected. It is further suggested that if more field work is conducted, the New Mexico Archaeological Council and the State Archeologist be permitted to visit the site during those studies in order to resolve questions which, without field evidence to refer to, could be debated endlessly.

A copy of this report is being conveyed to the appropriate agencies and principals involved.

Jerald T. Milanich

Society of Professional Archeologists

Cisco Cultural Resource area. (Par Nickens: *Sample Inventories of Oil and Gas Fields in Eastern Utah 1978-1979*, Utah State Office Bureau of Land Management 1980). This policy was derived after consultation with archaeologists who agreed that in areas of negligible site density that the requirement of archaeological surveys was admittedly a waste of the contractors time and money. The decision to forego archaeological work was however based on 1) the results of a stratified random survey, 2) the consultation of the archaeological community and 3) low site density predictions.

To my knowledge, no random sample surveys conducted in the San Juan Basin have shown site densities to be less than 10 sites per square mile. These findings cannot be construed to conform to the definition of low site density. Moreover, the decision of the Farmington area office was made without the consultation of the archaeological community. This policy will have a direct impact on the survival of archaeological resources in New Mexico.

I think our best recourse is to write the BLM State Director or our Regional Advisor on Historic Preservation and request the chance for some input from the archaeological community on these policy decisions. Furthermore, I would like to see this issue addressed at the next NMAC meeting. If you are concerned, could you take the time to write a letter? Thank you for your attention.

Marilyn Swift

Division of Conservation Archeology



SOAP BOX 2

12 April 1981

Editor:

At the 7 November 1980 Workshop of the New Mexico Archeological Council I made several suggestions about relating the excellent papers given at this workshop to possible functions that the Archeological Council might support.

In retrospect, some of my suggestions are probably not practical areas for the council to be involved in. On the other hand, it seems to me that the Council could well spend more of its limited resources communicating progress and opportunities for progress in some of these areas of archeological activity in the State.

Suggestions I made (with some notes on responses I received) are given below:

1. **NMAC as an Archeological Personnel Registry.** NMAC could maintain a register of archeological personnel in the State, primarily for employment purposes. Dr. Kemrer noted the difficulty in getting the most qualified people to work on archeological projects with short notice. (Such a registry would be very feasibly maintained on a mini-computer. An entry fee could be charged to have a name placed in the registry and/or a fee could be charged to use the registry).

PRESIDENT'S SOAP BOX

On Becoming Advocates for Historic Preservation:

Preserving Our Ground in the Lean Years Ahead

As part of our obligation to the New Mexico Historic Preservation Bureau, under the grant NMAC received in March, NMAC offered to conduct peer reviews of archaeological manuscripts, published reports and environmental impact documents. Finding reviewers for professional publications has not been difficult. A greater difficulty has been finding manuscripts and published reports for review. Dee Green has offered the BLM-USFS overview series. No other publication has been sent to NMAC. Are we as a profession afraid of peer review? Perhaps, but let's give it a try. Remember that we are doing this to improve the quality and craft of our research.

The main emphasis of my soap box appeal concerns environmental impact statements. Finding reviewers for these documents has been almost impossible. I realize that this is because few people have the expertise or the time to devote to this often frustrating task. We are all concerned about what the years ahead will mean for historic preservation funding and for the goals we have fought so hard for in the cultural resources segment of the historic preservation community. Accelerated energy development, reduced federal spending for cultural resources management, and incentives for private industry could have a significant and negative effect on the cultural resource data base. Unless we become advocates for historic preservation we will lose ground. Becoming advocates means taking time to understand impact documents, to participate in public

meetings and to commit yourself to broad goals that may conflict with your own research time and interests. Some archaeologists have told me that they are reluctant to respond to public documents because they are potential contractors. I believe that such reservations are the product of a misconception. As far as I have been able to learn, there is no legal conflict of interest when an individual or organization responds to a request for comment or exercises its prerogative to comment, and then bids on a contract for work subsequent to the environmental review document. On the contrary, you have both prerogatives and should exercise both. Informed review of environmental documents will help to prevent inappropriate and insufficient agency requests for proposals. It is against your best interest, and that of the profession as a whole, to refrain from such criticism whenever it may be necessary.

Recently, Las Cruces District Office of the Bureau of Land Management distributed a pamphlet describing the management issues that they would address in their forthcoming Resource Management Plan (RMP). The RMP will guide long-term management on public land in the district. Cultural Resources was not identified as a management issue. The public response to this omission was overwhelming. As a result of written responses and testimony presented at public meetings, the BLM revised their list of management issues to include cultural resources (see the BLM "Public Land User

2. NMAC as an Archeological Organization Registry.

NMAC could maintain a register of organizations and agencies with archeological research and consulting interests in New Mexico. Such a list would be available to organizations needing archeological advice or consulting services. (Such a registry would be very feasibly maintained on a mini-computer. An entry fee could be charged to have a name placed in the registry and/or a fee could be charged to use the registry).

3. NMAC as an Archeological Report Registry.

NMAC could compile and maintain a register of archeological reports and investigations within the State. This might better be a function for the State Museum, which apparently is well on the way to accomplishing such a task. Perhaps NMAC could help provide moral (writing State Congressmen?) and financial support for this enterprise. A special donation fund could be attempted or perhaps a benefactor (Federal agency or private individual?).

4. NMAC as an Archeological Data Base Center.

NMAC could develop and fund the compilation of a "site" inventory data base. Again the Museum of New Mexico is well on the way to obtaining

this end. However, it is apparent that NMAC could formally support and encourage the Museum's efforts. We should try to report progress in the Museum's system in the Newsletter. It is also worth considering the potential of developing regional centers for site and project data storage and retrieval.

In short NMAC, in my view, needs to start taking on some formal functions of supporting and initiating substantive steps along the lines mentioned above. NMAC is a necessary element in a growing archeological community in this State. It's role as a communicator of information is unquestioned, especially through the Newsletter. I think we need to focus more on the positive steps we could make in facilitating access to the human and data resources on archeology in this State both for professionals and the conservationist public.

Mark Henderson



letter" in this issue of the NMAC Newsletter). Advocacy does work!

To assist NMAC members in becoming more effective advocates I have prepared a brief outline of questions that should be asked of any environmental review document. Letters written by NMAC reviewers are also included in this issue of the Newsletter. Rich Loose, Dave Snow, and Regge Wiseman have provided some excellent reviews. More reviewers are needed.

Frances Levine

President

New Mexico Archeological Council



The Historic Preservation Advocates Guide To The Review of Environmental Documents

The brief list of questions and suggestions listed below will not tell you everything you need to know about the environmental review process. A more comprehensive guide is that prepared by Neil Orloff, *The Environmental Impact Statement Process: A Guide to Citizen Action* (1978 Information Resources Press, 2100 M Street N.W., Washington, D.C. 20037). There are at least four steps involved in reviewing an environmental documents: first, understanding the proposed action, then evaluating the data presentation, preparing your response, and finally, following up on your response.

I. Understanding the Environmental Review Document

A. Chapter I will present the proposed action. Read it carefully to determine the proposed action.

B. Determine whether the action will result in land disturbing activities, or whether the proposed action will result in a change in management policy. Both actions require a response, but you must clearly demonstrate in your correspondence or testimony that you understand the issue.

II. Evaluating the Data Presentation

A. Confine your evaluation to the data base in which you have the expertise, in this case, cultural resources.

B. Ask the following questions of the presentation:

1. Has the statement of effect been based on an adequate background search and ground survey of the project area?

2. Are the data accurate? Are the predictive statements reliable?

3. Are the inventory levels, mitigation strategies, and alternatives consistent with the policies and procedures of the historic preservation legislation? Look specifically at the requirements of 36 CFR Part 800 and any counterpart regulations issued by the authorizing agency.

4. Are the alternatives and mitigation strategies realistic? Is there time to do these things before the project is scheduled to begin? Is it feasible that money will be available to accomplish the level of mitigation required?

5. Is there an agreement with the SHPO and Advisory Council that spells out procedures for this specific type of action (usually addressed in a project specific or

programmatic memorandum of agreement)? Are the inventory levels, alternatives and mitigation strategies consistent with the agreement.

6. What does the state historic preservation plan identify as priorities for in-place preservation in the project area? Check with the SHPO and his staff for their position on the project.

7. What does the agency cultural resources specialist have to say about the project? Often his concerns may have been "edited" early in the process.

8. What is not being said about any of the above?

III. Writing Your Response

A. Succinctly summarize the inadequacies of the data presented identifying whenever possible legislative or agency procedures or policies that may have been omitted.

B. Suggest alternatives or additional studies that may be needed to more carefully evaluate the planned action, alternatives and proposed mitigation strategies.

C. Do not use the review as an excuse to write an academic treatise on the research topic of your choice. Confine yourself to issues that are related to the management responsibilities of the agency.

IV. Follow Up

A. Always mail your response by certified or registered mail. Keep a copy of the letter and receipt for future legal actions.

B. Always check to see that your letter is included in the final statement and check to see that the agency has responded to your concerns.

C. Send copies of your letter directly to the SHPO, and any other sympathetic group.



United States Department of the Interior
BUREAU OF LAND MANAGEMENT
DISTRICT OFFICE
P.O. Box 1420
Las Cruces, New Mexico 88004

June 16, 1981

Dear Public Land User:

As you will remember, a brown booklet was sent to you in April regarding a new planning process being instituted by the Las Cruces District of the Bureau of Land Management entitled, "*Las Cruces/Lordsburg Resource Management Plan*." In response to our request for suggestions on how we could improve or expand on the issues and criteria outlined in the booklet, we were pleased to receive comments from over 149 individuals and groups.

What people had to say ranged from general to specific; from emphasis on protection of resources to production. We heard from national clubs and local organizations, from corporations and small businesses. Federal agencies voiced their opinions as did units of State and local government. In addition, we received an overwhelming response from genuinely interested individuals.

To begin with, many voiced their concern that the information we presented was too bureaucratic and confusing. One item heard loud and clear was the lack of any attention being paid to the cultural resources of the area in relation to the various issues. In the same vein, many suggested protection of other site-specific areas.

Because of the personal interest you have

shown in the process, we felt you would like to see the summaries compiled regarding what the public had to say. Although the enclosure appears to be quite long, we hope you will read it in its entirety because of the extent of the information it contains.

As a result of what the public told us, we are in the process of publishing a new booklet in which we hope to clarify and correct some of the above problems. In the new booklet, protection of cultural resources will become another priority of our plan. We will consider how these resources may be affected by surface disturbances connected with any of the other issues. In addition, we have suggested another issue, "Areas of Special Public Interest," to deal with site-specific areas that do not normally come under any of the primary issues previously listed in booklet I. We are also attempting to be more positive in our wording and approach, such as in the management of wildlife habitat.

These are but a few of the changes that will be noted in the second booklet which is planned for completion in July. You, of course, will be receiving the second booklet, and again, we will appreciate hearing your views.

If you have any questions regarding the summaries, please let me know or contact our Public Information Officer, Diana "Punkie" Edwards at (505) 523-5571.

Sincerely yours,

s/William J. Harkenrider, Jr.
Area Manager
Las Cruces/Lordsburg
Resource Area



21 July 1981

L. Paul Applegate, District Manager
Bureau of Land Management
3550 Pan American Freeway NE
Albuquerque, NM 87107

Dear Mr. Applegate:

I have been asked to review the environmental assessment for the Ute Mountain Land Exchange on behalf of the New Mexico Archeological Council. I am a member of the Council and also a member of the Council's research committee.

There are several issues that concern me. Foremost is the timing of the NEPA document with requirements of the National Historic Preservation Act of 1966 as amended in 1980. Section 110 of this act states in part that....

Each Federal agency shall exercise caution to assure that any such property (i.e., that appears to qualify for inclusion in the National Register of Historic Places) is not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly.

This language closely parallels the wording of passages of the Executive Order 11593 promulgated in 1971 and still in effect. This order states that Federal agencies shall

....administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations...and initiate measures necessary to direct their policies, plans and programs in such a way that federally owned sites, structures, and objects of historical, architectural or archeological significance are preserved, restored and maintained for the inspiration

and benefit of the people...
The order also specifically states that the Secretary of the Interior shall...

expedite action upon nominations to the National Register of Historic Places concerning federally owned properties proposed for sale, transfer, demolition or substantial alteration.

It is my understanding that an Executive Order does carry the force of law, and the intent of Congress is clearly stated in the 1980 amendments to the previously quoted 1966 Historic Preservation Act. Why hasn't the eligibility of the 234 sites recorded on the PRLA's between 1976 and 1980 been considered, prior to issuance of the draft environmental assessment? Why hasn't inventory survey been initiated on Bisti exchange land not covered by the work listed in the Appendix E?

This lack of action is hard to understand in view of the existing Memorandum of Understanding between the State of New Mexico and the Bureau of Land Management (MOU #NMSO-96) signed in June of 1978 by the State Director of the BLM and the State Historic Preservation Officer. This agreement states in part that...

as soon as a project is identified, a determination is made of the Bureau as to whether or not a cultural resource survey is needed. A survey will generally be required for: a. All Bureau or non-Bureau initiated projects with surface disturbance potential which have not been completely surveyed. b. Existing projects with new actions having surface disturbance potential in an area not previously surveyed. c. Land disposal involving transfer of ownership or management jurisdiction to a private party.

Since previous surveys in the Bisti exchange lands were for purposes other than that of exchange, and only fortuitously fell on exchange lands, it would seem that all three criteria listed above would apply, especially since exchange negotiations began in 1974.

Again, let me stress that the main concern here is one of timing of NEPA requirements with those of Section 106 of the National Historic Preservation Act. Section 36 CFR 800.9 (specifically referenced in MOU #NMSO-96) as finally amended January 30, 1979, requires that draft environmental statements prepared under Section 102(2)(c) of NEPA...

shall, to the fullest extent possible, be prepared with and integrated with other environmental impact analyses and related surveys and studies required under other authorities - such as the National Historic Preservation Act and Executive Order 11593.

Further,...

It is normally intended that the Section 106/Executive Order commenting period run concurrently with the NEPA review process....To the maximum extent possible, agencies should reflect the status of compliance with Section 106, the Executive Order, and these regulations in all documents prepared under NEPA.

These regulations go on to say that...

In any event, this should occur no later than during the preparation of the draft environmental impact statement...The environmental assessment and the draft environmental impact statement should fully describe any National Register or eligible properties within the area of the

undertaking's potential environmental impact and the nature of the undertaking's effect on them.

Clearly these provisions have not been fully complied with in the Ute Mountain Exchange draft document, nor in the earlier statements on the Navajo Land Exchange and PRLA's which overlap some portions of the Ute Mountain Exchange.

Secondly, some exchange lands fall on existing PRLA's covered by a general programmatic memorandum of agreement among the Department of the Interior, Bureau of Land Management, Office of Surface Mining Reclamation and Enforcement, the U.S. Geological Survey, and the Advisory Council on Historic Preservation regarding the Federal Coal Management Program (final signature May 1980). This memorandum spells out very specific procedures to insure protection of cultural resources on coal lease lands. In the event of exchange, would these procedures still apply to exchange lands coincident with PRLA's defined in July, 1977? Finally, the 1979 Archeological Resources Protection Act has established that archeological sites can have monetary value assessed as part of their intrinsic research value, as well as a commercial market value for the artifacts they contain. Recently, a Chacoan Outlier was sold to private parties for a substantial amount of money. It is also known that Chacoan Outliers exist on or near Bisti exchange lands. Were the monetary values of archeological resources on both the Bisti and Ute Mountain Exchange lands considered as part of the real estate evaluation in the BLM sponsored feasibility study?

Thank you for the opportunity to comment.

Sincerely,

s/Richard W. Loose
Research Committee
New Mexico Archeological Council
cc: Thomas W. Merlan, SHPO
Charles W. Luscher,
BLM, State Director



17 July 1981

L. Paul Applegate, District Manager
Bureau of Land Management
3550 Pan American Freeway, NE
Albuquerque, NM 87107

Dear Mr. Applegate:

I have been asked to review the environmental assessment for Coal Preference Right Lease applications in New Mexico on behalf of the New Mexico Archeological Council. I am a member of the Council and also a member of the Council's Research Committee.

In general, I feel that this document adequately addresses the cultural resource issues, only if the steps outlined in the programmatic memorandum of agreement are followed (Appendix A-4), as well as the general provisions of 36 CFR 800.

I would take exception, however, to the comment on page 3-20 that "Typically, cultural resource inventories must be performed under very tight timeframes because of the large amounts of capital and

labor involved in energy development." Such large investments also require careful long term scoping and risk analyses prior to obtaining the huge loans necessary for capitalization.

The truth of the matter is that cultural resources are not well understood by managers, so decisions made by federal and private sector planners are frequently put off until an "11th hour" approach becomes necessary. Without sufficient lead time, a proper job cannot be done by the most competent archeologist. In fact, most archeologists would prefer to avoid such situations whenever possible. Timely decisions to act on Class II, and especially Class III level surveys and subsequent mitigation programs must be made by responsible managers well in advance of project start-up (often 24 to 36 months are required between survey and completion of a mitigation program).

Specifically, the Class II survey conducted on the PRLA's was barely finished before the draft environmental statement was issued to the public. This will not allow time for proper determination of eligibility or agreement on specific mitigation programs prior to the issuance of the final environmental statement.

This particular timing is hard to understand in view of the fact that holders of Preference Right Lease Applications were required to prepare an initial showing of evidence of commercial quantities of coal by July of 1977, and submit abstracts of any mining claims in their areas of application by March of 1978. The basic procedures under 36 CFR 800 were well established by 1978. Why weren't applicants required to initiate survey proceedings at that time -- if so, the mitigation could be nearly complete on the PRLA's.

Included are the proceedings from two recent symposiums on cultural resource management with contributions by federal, state, and industrial planners often confronted with these issues. Ron Corbyn's articles are especially pertinent to the federal managers responsible for cultural resources. Please take a couple of evenings to read through these and pass them on to your upper level management. Many avenues (mostly timely planning) to solve cultural resource management problems are suggested in these papers.

Sincerely,

s/Richard W. Loose
New Mexico Archeological Council

cc: Thomas W. Merlan, SHPO
(without enclosures)
Charles E. Luscher,
State Director, BLM



21 July 1981

Mr. Daniel C. B. Rathbun
District Manager
Las Cruces District
Bureau of Land Management
PO Box 1420
Las Cruces, New Mexico 88001
Dear Mr. Rathbun:

I have reviewed the pertinent sections and discussions of the *Draft Grazing Environmental Impact Statement, Southern*

Rio Grande Planning Area (May 1981), issued by the Las Cruces District, Bureau of Land Management. The following comments are directed to those statements concerning the PA on cultural resources within the Southern Rio Grande Planning Area.

First, I am concerned that there is no discussion of alternatives to the lack of Class II surveys for the planning area. The statement in Mr. Rathbun's letter to Mr. Merlan of Feb. 1981 (H-1) that the Las Cruces District has requested funding for better than ½ million acres, which "would give the Las Cruces District Class II coverage of all its lands," is misleading. Class II survey is a sampling strategy which allows prediction of site density and distribution; it does not provide "coverage" of the lands involved, which is the purpose of Class III survey prior to the initiation of land-disturbing activities. The possibility that funding may not be allocated for such an undertaking (Class II survey) is very real under present government funding cutbacks. If such funds are not available prior to implementation of the PA ("following filing of the final EIS," in September 1981), the only alternative implied, other than No Action alternative, is Class III survey.

Even if such monies were allocated, there is no time between their availability and initiation of the action to carry out such a sample survey. As a consequence, the cultural resource data base must, once again, be accumulated piecemeal as a result of Class III, project specific surveys. Such an approach precludes meaningful CRM planning and implementation. I concur with Mr. Merlan's concern (pp. H-3, 4) for a regional framework from which CRM planning and implementation are most effectively handled. Regional planning is an effort to insure that cultural resources are not casually destroyed, as well as an effort to avoid protecting resources that may be expendable. If the former occurs, our relevant data base is destroyed forever; if the latter, archeologists will have their right to make decisions about what is significant in terms of cultural resources taken out of their hands.

If we are to insure that the data base is not casually destroyed, and that expendable portions of that data base are known, a regional research approach must guide CRM planning and implementation. Cultural resources located as a result of project specific surveys at the Class III level will not allow meaningful determination of significance, since sites are not significant except as an aspect of a larger pattern of socio-cultural process through time and space. Such patterns are relevant to changing goals and directions of both academically-oriented and CRM research needs.

Failure of the Draft EIS to discuss viable alternatives to the lack of Class II survey, the explicit dependence of such survey on funding from a fiscally conservative administration, and the consequent limited focus on the potential data base in the Southern Rio Grande PA resulting from project specific Class III survey, are serious problems that need to be addressed and resolved in the final EIS.

It is recommended that a modified Class II sample survey procedure be undertaken prior to implementation of range improvement activities as listed in Table 3-18 (p.3-62). Drawing on the data presented in Table 2-15, which correlates known sites in the PA with vegetation types, any number of commonly employed sample strategies could produce

adequate data bases from arbitrarily imposed population units containing areas to be affected by rangeland improvements. The amount of acreage estimated in Table 3-18 (10,888), as opposed to ½ million, would considerably reduce the costs of implementing Class II surveys at this late stage. It seems unnecessary to anticipate funding for better than ½ million acres to be subjected to Class II survey, when an estimated 10,888 acres are scheduled for potential adverse impact on cultural resources.

Sincerely,

s/**David H. Snow**

Supervisor

Research Section

Laboratory of Anthropology



April 8, 1981

Mr. R.E. Bass
Brantley Project
Water and Power Resources Service
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Amarillo, Texas 79101

Dear Mr. Bass:

A committee of members of the New Mexico Archaeological Council has reviewed the Draft Supplement to the Final Environmental Impact Statement for the Brantley Project, Eddy County, New Mexico. Our comments and concerns have been discussed with Thomas W. Merlan, the New Mexico Historic Preservation Officer.

After reviewing the public documents and archaeological reports for the Brantley Project, we question the finding of no significance for the prehistoric and historic archaeological resources. The supplement to the Draft Statement does not make explicit the means by which the sites were found ineligible to the National Register of Historic Places. It appears that the determination of eligibility may have been made without benefit of the results of the testing and evaluation studies performed by Southern Methodist University and report by Joseph G. Gallagher and Susan E. Bearden (SMU, Archaeology Research Program Report 120, 1980). That report, which has been accepted by the contracting agency pending minor revisions, clearly spells out the potential for constructing a human history of the Brantley area, a portion of New Mexico that has seen little professional excavation and few controlled surface studies of prehistoric and historic sites. Significant questions of chronology, site function and changes in land-use and settlement patterns can certainly be answered through study of sites in the Brantley inventory.

The reconsideration of the Mescalero subsistence model offered by Gallagher and Bearden raises some question about the sampling scheme used in choosing sites for the testing phase. Were these sites selected for testing representative of the full range of sites located by the survey? Does the testing program constitute the full mitigation program for the Brantley Project?

It does not seem that WPRS could fully interpret and preserve the history of the Carlsbad Reclamation Project, a National Historic Landmark, without reference to the

settlers who relied on the irrigation development. The remains of the town site of Seven Rivers and outlying domestic sites contain important information concerning this New Mexico Frontier town. Although public records may exist which trace part of that history, the Brantley Project could significantly add to our knowledge of this area through the combination of an archaeological and documentary study of the historic sites.

In view of the information presented in the testing and evaluation report concerning the potential these sites have for answering questions important in pre-history and history, we believe that the determination of eligibility should be reviewed and reconsidered.

Have sites in areas of indirect impact been considered for determination of eligibility to the National Register of Historic Places? Will the sites found in the 600 acres proposed for the realignment of Brantley Dam be investigated as part of the final mitigation of project effects? If sites are found in these 600 acres, how will significance be determined? What questions will be asked to determine the potential significance of the sites?

We appreciate the opportunity to review the supplement to the Draft Statement, and would like to be appraised of any future developments in the Brantley Project.

Sincerely yours,

s/**Frances Levine, PhD.**

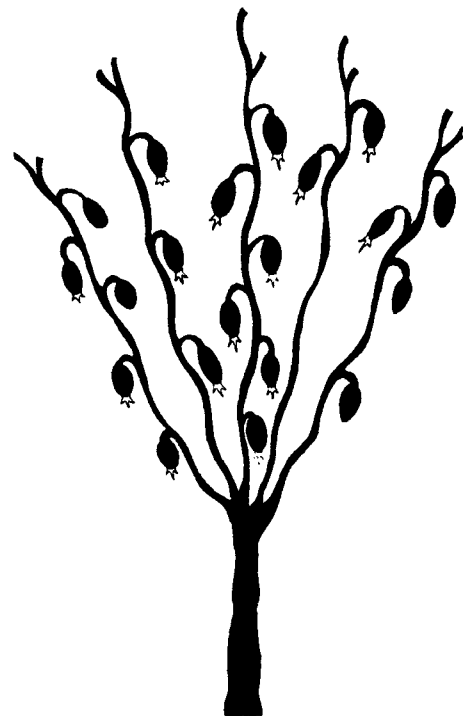
President, NMAC

cc: Thomas Merlan, SHPO

Pat Beckett, CPRC

Lou Wall, Advisory Council

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LEG'S & REG'S VIEWPOINTS

Three Out of Four Ain't Bad:

Another Case of Cops 'n' Grave Robbers Entailing Assorted Comments

On November 3, 1979, three days after the Archaeological Resources Protection Act (ARPA) was signed into law, four people were apprehended leaving the scene of fresh disturbances at Dix Creek Pueblo.

The site, located on the Clifton Ranger District, Apache-Sitgreaves National Forests, Arizona, was occupied about AD 950-1100 by the Mimbres people. (In the current southwestern antiquities market, Mimbres pottery reportedly commands some of the higher prices). It is an L-shaped pueblo containing ca. 30 rooms and overlies an indeterminate number of pithouses. The site lies on the western periphery of the Mimbres culture area.

The case was brought to trial in Tucson Federal District Court where, on December 9, 1980, Mark Anthony Brady, 24 and Lavoy Doyle Hancock, 41, pleaded guilty to felony charges of excavating, removing and damaging archaeological resources. Delletta Trevillyan Brady, 25, pleaded guilty to misdemeanor charges under ARPA. In exchange for guilty pleas, charges against the three of destruction of government property were dropped. Charges of removing archaeological resources and of aiding and abetting the commission of a felony against Randall Doyle Morris, 23, were dismissed upon the Court's finding of insufficient evidence.

Hancock and Mark Brady each were placed on 3 years probation. Brady also received a six months suspended sentence. Delletta Brady received two years probation.

Assistant U.S. Attorney, Roslyn O. Moore commented that the defendant's sought to plea-bargain after it was established that ARPA has a general intent provisions rather than specific intent. She explained that with specific intent the prosecution would have to prove that the defendants knew they were digging on protected lands (willful behavior), but that with general intent it is merely a question of proving that the digging (knowing behavior) occurred on public lands. Moore added that this should ease the prosecution of future cases.

Specific charges against the four individuals involved structures (masonry and jacal rooms), pithouses, pottery, stone tools including a weapons projectile, graves and human skeletal remains. Two bags containing sherds were seized from Hancock's vehicle at the time of the arrest. Forest Service archaeologists reconstructed five nearly whole, and three partial vessels from the seized pottery. Fresh breaks on all

vessels indicate that they were probably broken during excavation. After sorting through more than 1,000 sherds collected from fresh disturbance areas, the archaeologists were able to match five sherds from the site with the seized materials. Damages to all resources were estimated to exceed \$38,500.

The reasons behind the varying charges against the different individuals are too complex to go into here. Suffice it to say that we are not greatly disappointed with the outcome of the proceedings. In this case three out of four ain't bad at all.

COMMENTARY

Beyond the facts presented above, we feel that this case raises a number of important points.

1. Prosecution under ARPA without the attendant regulations is not impossible, but is more difficult that it should be. The latest word we have from Washington is that the regulations should be published in draft form in the very near future. We urge every archaeologist to study and comment on the draft. Two considerations should be kept in mind: (a) Are there important omissions of particular "archaeological resources" such as context, midden, feature, jewelry, ceremonial items, etc., which the law does not list? (b) Are concepts, such as archaeological value, defined in such a manner that they reflect common usage in the profession and could be easily presented to a jury? (See "Response" below.)

2. Close coordination between archaeologist and law enforcement agents is essential. Archaeologists should be called to the scene as soon as possible to collect evidence and to assess damages. Avoidable delays can fatally prejudice a case. Collection of archaeological evidence is something we all are trained to do and we can be most effective when our training is followed, i.e., take detailed notes of activities and make sure that records are kept on what was collected from where, by whom and when.

3. Cooperation between agencies and institutions may be very important since not all agency archaeologists are experienced in estimating damages. In the Hancock, et. al. case, Lynn Teague, Head of the Cultural Resource Management Section, Arizona State Museum and Glen Rice, Head of the Office of Cultural Resource Management, Arizona State University provided timely and invaluable assistance in this regard. We wish to acknowledge the support and cooperation of these individuals and their institutions.

RESPONSE TO GREEN

With regard to our first comment above, we note Dee Green's article in the October, 1980 *ASCA Newsletter* (7[5]: 29-32), especially the section on "Defining Value." While we find his underlying objective — "to allow maximum flexibility in using the value provisions of the Act" — to be laudatory, we also feel that he has lost sight of ARPA's objective in regarding "archaeological value," which lead him to distort the common, professional usage of "restoration." We therefore offer a critique of Green and an alternative approach.

1. Our basic premise relies on the fact that ARPA is a criminal statute. Therefore, the phrase "archaeological value of the archaeological resources involved" (16 USC 470ee) would appear to pertain to those particular resources directly "involved" (or damaged, excavated, etc.) by prohibited acts. Green's definition focuses on the site as a whole. While it is true, in a sense, that even minimal pot hunting damages the site as a whole, it would be extremely difficult to convince a jury that the value of the prohibited disturbance is equivalent to the cost of scientifically excavating the entire site (unless the entire site were involved). It would be tantamount to arguing that stealing a hubcap is the same as stealing the car. In the case of Dix Creek Pueblo, one would testify that damages were not a paltry \$38,000 or so, rather that they exceeded one-half million dollars, in which event defense counsel would demand to know how four people, working with hand tools, could have wrought such havoc in the period of a couple of days.

Our approach to archaeological value in the Hancock et al. case was to posit that (1) that which makes an archaeological resource a resource is its potential to yield information; (2) information potential resides not just in objects, but in the context from which the objects were removed; (3) since the context has been destroyed, it would be impossible to determine the extent of the information which has been lost; and (4) since information is priceless (incalculable) in any case, the only way to make an appraisal of the loss is to estimate the cost of scientific data recovery from just those areas dug by the defendants. In brief, the archaeological value is a measure of that which has been lost.

2. Green's definition of commercial value and its computation is straightforward and acceptable. However, Hancock et al. presented us with a problem. The pot hunters rapid digging apparently smashed whole pots, not all pieces of which were recovered. Estimates of commercial value were therefore made on the basis of "as is" condition (i.e., reconstructed but with pieces missing), wholly reconstructed condition, and pristine condition. The first is an estimate of the money the pot hunters would have received had they not been arrested; the second estimates receipts in the event they had been more careful; the third estimates receipts in

the event they had been more prudent. Since commercial value never became a factor in the case, the problem of which is the "true" value was never resolved.

3. When it comes to appraising "the cost of restoration and repair of such resources" (16 USC 470ee), any debate on the intent behind the wording would likely degenerate into etymological nit-picking—an exercise we prefer to leave to defense attorneys. Green is correct in stating "restoration and repair are not defined as synonymous" in ARPA (the connective used is "and," not "or"). His definition of repair ("reconditioning the resource") is non-problematic, but in striving to avoid synonymy, he uses restoration in the sense of restitution: "Restoration is the act of returning to the American people whatever value can be returned given the condition of the resource." Our difficulty is not so much definitional (restitution is an acceptable dictionary synonym for restoration—as is repair) as it is conceptual and logical.

Conceptually, we feel that practically any person who would qualify as an expert witness in site stabilization or museum curation, when placed on the stand, would testify that in common, professional usage, restoration is virtually synonymous with repair. While it is not inappropriate to argue before a jury that an everyday word may take on a special meaning when used as a technical term, it should also be demonstrable that that word, used in that fashion, has general currency within the particular technical realm. It would appear that Green has coined a new usage of restoration for archaeology.

Since Green's suggested method for computing restoration costs is quite similar to that which we use to estimate archaeological value, we can assume a rough equivalence between the two concepts. And herein lies the logical difficulty. Our archaeological value is a measure of what has been lost. Green's restoration involves "dealing with the disturbed portion of the site, plus a small sample of undisturbed for comparative purposes." We could quibble and ask, "Comparative to what?" More pertinent, however, is the observation that Green would have us "restore" irretrievable resources and empty potholes. What, then, is there to return to the American people? Where is the "restitution?"

Admittedly, in trial preparation we made no great effort to distinguish restoration from repair. Indeed, our definitions obviously overlap as they pertain to "reconditioning the resource." Restoration we considered to be measures taken to bring back resources to their predisturbance state insofar as possible and feasible. Such measures might involve rebuilding damaged walls of structures or reconstructing broken pots. Repair we considered to be preventative measures taken to ensure that no further damage occur to disturbed resources, i.e., keeping the resources in "good repair." Such measures might involve backfilling, construction of erosion control devices, stabilization of freshly exposed walls or the proper curation of perishables. Where repair stops and restoration begins is a moot point. (Shouldn't rebuilt walls be stabilized? Shouldn't reconstructed artifacts be properly curated?) but even so we also consider it to be a relatively unimportant point.

In all cases, our definitions and usage closely correspond to the most recent draft of the proposed ARPA regulations. We see the essential differences between our proposals

and Green's as involving a usable concept of archaeological value on the one hand and a less useful, but sincere attempt to distinguish restoration from repair, on the other. Which brings us to the real issue we wish to illustrate.

Our intent with the above was not to denigrate Green's work — his publications and interagency workshops on pot hunting problems are widely known and appreciated—but to point out the kinds of differences which must be resolved in the lawmaking process. We now have a law which, by providing stiff penalties mean to deter commercial pot hunters, affords protection for most cultural resources on public lands. This law, however, will not be fully effective until various implementing regulations are promulgated, and it will never be fully effective if those regulations do not adequately reflect the varying kinds of resources and varying conditions found in the disparate parts of the country. The achievement of a useful and usable law calls

for the conscientious and well considered participation in the comment process by many individual archaeologists, the kind of participation which brought the basic statute into being.

Bruce Donaldson

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Three Out of Four Ain't Bad: But Four out of Four is Better:

Reply to Donaldson, Goddard and McAllister

I'm amused by the thrust of the Donaldson, Goddard and McAllister (ref.) critique of my ASCA Newsletter article. But then, holding tightly to the past and traditional way of viewing things, is a reasonable position for archeologists to take. That, however, does not excuse their misunderstandings and distortions of my paper, particularly when the expanded version (Green 1980a) as well as extended personal discussions were available to them prior to submission of their article. For those who have only my ASCA article available, I can see how its brevity could contribute to some misunderstandings. Therefore I'll try to provide some information which will help clarify the situation.

The Archaeological Resources Protection Act of 1979 (ARPA) provides stiffer penalties for those who damage archeological resources whose dollar value exceeds \$5,000. Four terms are listed in the Act as the basis for computing the dollar values, these are: 1) archeological value; 2) commercial value; 3) cost of restoration; and 4) cost of repair. During the Shumway case (Green 1980a, 1980b), I provided the court with a definition for each of the four items. During the Morris trial (Donaldson, Goddard and McAllister 1981), only three of those definitions were

used.

Construction of four, rather than three, definitions had nothing to do with my losing "sight of ARPA's objectives," or a distortion of "restoration." Rather, I constructed four definitions because that was what the United States Attorney wanted. I was fully aware that my definition of "restoration" was not "common professional usage" and I knew that those writing ARPA regulations were not inclined toward the four definition view. But the intent of writers of regulations and "common professional usage" are not necessarily either good or sufficient reasons for pursuing a court case in a particular fashion. For example, what might happen when a sharp defense lawyer cross-examines the archeologist who can only define three of the four areas, or defines two of them synonymously? If the lawyer can create enough confusion in the minds of the jury it could undermine the basis for the establishment of the \$5,000 penalty threshold. Once the regulations are in effect, we will necessarily live with however many definitions there are. However, I reject the Donaldson, Goddard, McAllister appeal to that authority, at this stage, since there is no convincing evidence that the regulations are

being written by anyone who has criminal prosecution experience.

Based on only the ASCA article, one could assume that my definition and references to "archeological value" were meant to refer to the entire site rather than to that portion which had been disturbed by a particular defendant. However, in my more detailed, earlier discussion under "archeological value" I clearly stated that "...only that portion of the site which has been disturbed should figure in the cost computations" (Green 1980a:14). Thus Donaldson, Goddard and McAllister begin with an erroneous assumption of my position. They add to that a false assumption of their own, that is, that no value can be recovered from a disturbed context. I doubt that they believe it but it has caused a problem with their logic.

There are two problems at issue: 1) the value of the disturbed portions of the site prior to the disturbance; and 2) the value of the disturbed portions of the site since the disturbance. Donaldson, Goddard and McAllister appear to have rejected the second issue. This is not made clear because they have missed the first issue and argue from the false assumption that I want to bill the

defendant for salvage of the total site. I can understand that archeologists are reluctant to own up to the possibility that information can be recovered from a pothole and its immediate surroundings. But I think that doing so in a courtroom situation gives us important advantages. Such a position has psychological advantages with judge and jury. It allows us to explain that **most** of the value has been destroyed, a fact which reflects badly on the defendant. It also generates a more reasonable cost figure. That is, costs for salvage of the damaged portion will usually be less than for the site in undamaged condition.

It seems more reasonable to compute the costs on the damage done to begin with. The missionary zeal of archeologists come through to judge and jury, often to our detriment. We tend to assume guilt of pothunters until proven innocent. Juries are clearly instructed to assume the opposite and a witch-hunt atmosphere by archeologists in the courtroom could hurt a case severely. Thus, I prefer the more moderate approach based on whatever values can be recovered given the damage.

Neither of the court cases discussed here

hinged on the issues raised in discussion. At this writing, the ARPA regulations may or may not be effected by the Reagan Administration. Once in final form, I would guess that only three definitions will appear. I have no experience that leads me to believe that Washington regulation writers listen to field people and, in this case, especially to those who have done the prosecuting. Nevertheless, I still think four out of four is better.

Dee F. Green

References

Donaldson, Bruce, Dorothy Goddard and Martin McAllister, 1981, *Three Out of Four Ain't Bad: Another Case of Cops 'n' Robbers Entailing Assorted Comments*.

Green, Dee F., 1980A, *Prosecuting Under ARPA: What to do Until the Regulations Arrive*. Cultural Resources Report No. 32, USDA Forest Service, Southwestern Region, Albuquerque, July.

1980b *A Summary of the First Court Cases under ARPA*. ASCA Newsletter, Vol. 7, No. 5, pp. 29-32 October.

1981 NMAC Membership List

These are the paid members of NMAC for 1981. These are the same people who can be nominated to and hold office (although I still have blank receipts for any ambitious would-like-to-be-new-members). In preparation for electing officers and committee members for next year, we are going to try nominations both by mail (in late September or early October) and at the November 19-20 meeting. All nominations will be presented at the November meeting. Keep this list. It will be the reference list for nominations.

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(list concluded on pg. 19)

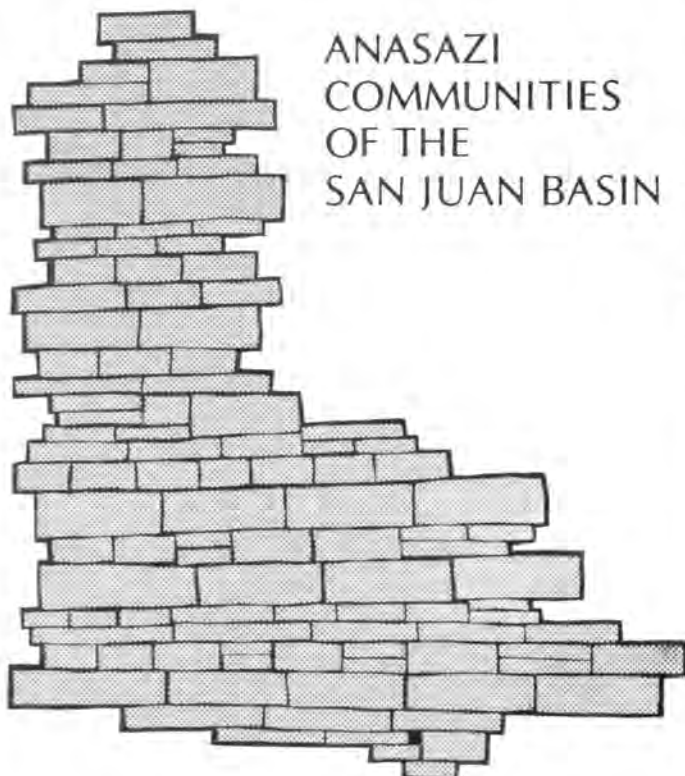
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Prehistoric New Mexico

Now available, this 459-page volume reviews the state of knowledge of the prehistory of New Mexico in substantial detail, by region (e.g. the San Juan Basin, the Northwest Plains, etc.). It discusses a theory of culture change and applies this explanation to the prehistory of each region in order to demonstrate the use of research designs in public archeology. It reviews the state of cultural resource survey by region and makes specific recommendations for future identification and evaluation of resources, lists and describes all archeological sites on either the State or National Register in New Mexico, and deals with site significance theoretically and practically. It also embodies discussions of field methodology and

contemporary effects on cultural resources. It may be regarded as the first segment of a comprehensive archeological resource protection plan for New Mexico.

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CALL FOR PAPERS

November NMAC Workshop

Archaeological Research and Cultural Resources Management on the Rio Grande

On November 19 and 20 NMAC will sponsor a workshop in Socorro in which we hope to bring together researchers working on a variety of archaeological and historical projects along the Rio Grande in New Mexico.

Depending upon the number of papers received, the first day will be scheduled for presentation of papers, and at least part of the second day will be scheduled for visits to sites near Socorro. Please send abstracts to Fran Levine **before** October 1, 1981:

1677 Cerro Gordo Road
Santa Fe, New Mexico 87501

Abstracts will be published in the NMAC *Newsletter*. If enough of the presentations are written, we will try to publish a volume with the workshop papers.

Please call Fran (505-988-6227) by September 15 to reserve space for your presentation, or if you are willing to take a tour to sites near Socorro.

If you have suggestions or would like to help with the logistics for this workshop, please call Fran as soon as possible.

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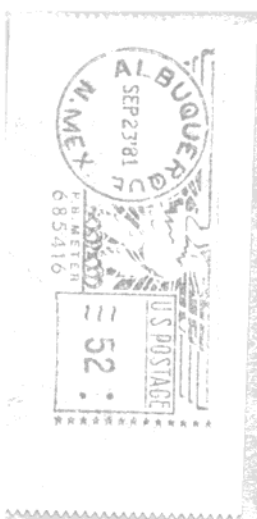
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FIRST CLASS

Newsletter

New Mexico Archeological Council

Vol. 4, No. 3 & 4



M.P. Marshall

The Early Coalition Citadel of El Nido De Las Piedras (The Nest of Rocks) located upon the summit of a cobble bench knob in the south central area of the Rio Abajo District. (Illustration by Charlotte Ann Hollis.)

RIO GRANDE ARCHEOLOGY WORKSHOP

SUMMARY

Regge N. Wiseman

NMAC's Rio Grande Workshop, held November 19 and 20, 1981, at the New Mexico School of Mining Technology in Socorro, was another outstanding success. Local arrangements were made by Mark Henderson and his staff of Socorro BLM.

On the first day participants heard papers on the excavation of Chamisal Pueblo (Kit Sargeant), a "roundup" project of Tonque Pueblo data (Dick Bice), the use of photogrammetry in recording rock art (Perry Borchers), a reassessment of the

archeological clearance procedures and expectations for BLM's Rio Grande Occupancy Resolution Program (Mark Henderson and Pat Sallani), the Piro Project (Mike Marshall), and sandstone discs from the Jumano area (Pat Beckett).

The second day featured a well attended field trip to Sevilleta Shelter and nearby fieldhouse and granery sites (guided by Joe Winter), a group of late prehistoric and early historic sites near San Acacia (Mike Marshall), the Arroyo del Tajo Pictograph Site (Mark Henderson), and the historic Piro pueblo of Teypama (Amy Earle). The setting sun precluded a visit to Fort Craig.

NEW MEXICO ARCHEOLOGICAL COUNCIL

Vol. 4, No. 3 & 4
Winter, 1981, Spring 1982

NEWSLETTER EDITOR

Catherine Aves

All material will be published as submitted, albeit subject to editing for length and clarity.

This publication is financed by a Grant from the Federal Historic Preservation Fund, awarded to the New Mexico Archeological Council by the State Historic Preservation Program.

PAPERS PRESENTED AT THE RIO GRANDE ARCHEOLOGY WORKSHOP

November 19, 1981

New Mexico Historic Preservation Archeological Investigations in Rio Abajo

The New Mexico Cultural Properties Review Committee, in response to a 1980 proposal, authorized matching funds necessary to conduct archeological investigations in a portion of the Rio Grande Valley. The New Mexico Historic Preservation Bureau, henceforth, contracted a group of concerned people and initiated these investigations. These actions were taken with the recognition that the cultural properties of the Rio Grande district remain among the most significant yet substantially unexplored in the American Southwest.

The archeological remains which are located marginal to the Rio Grande have not significantly benefited from recent legislation directing federal agencies to conduct archeological evaluations. This is because most of the lands marginal to the river are privately owned. Furthermore, Rio Grande archeology has not received the recent stimulus created elsewhere by energy-related development. The substantial and accelerating private and commercial developments in the Rio Grande region have and continue to adversely impact the cultural resources. Now is a most auspicious time to initiate measures for the preservation of these properties. The magnitude of the "Rio Grande Problem" is explicit; and considerable energies are required to effectively accomplish the objectives of archeological inquiry and management. No single individual or institution can effect immediate results. Because of the magnitude of the problem, it was proposed that the Rio Grande be divided into a number of sub-areas for individual consideration. The Rio Abajo-Socorro Subarea was selected as the preliminary subject of this inquiry.

The Rio Abajo project endeavor is nearly completed and we are now beginning to present the results (Advance Notes #1 and #2). The focus of our attention has been the land forms directly marginal to the Rio Grande Valley for a distance of 75 miles from Fra Cristobal, on the south, to the village of Sabinal, on the north. This region was selected for study because it is believed to correspond to the Piro culture area as related in the Spanish Colonial records. The objectives of the project were, to locate and document all archeological properties adjacent to the river within the study area.

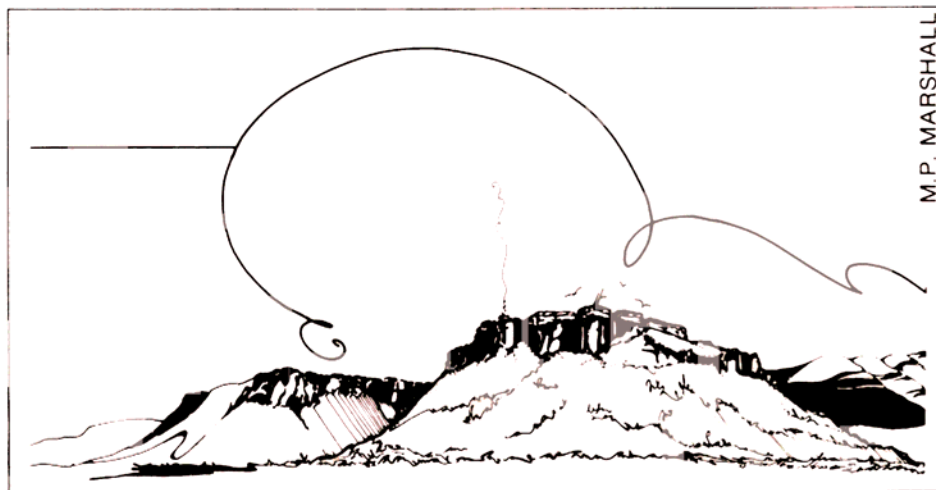
The survey methodology and research design were developed with a bias toward the large architectural sites of Pueblo and Hispanic affinity, since these properties decidedly cluster adjacent to the river. Our objective was to locate and document the cultural properties of the riverside area, evaluate their significance, and determine the adverse impacts to which they are subject. We are now in the process of formulating 30 National Register Nominations and informing various government agencies and private landowners of the impacts which affect certain properties. It is to preservation and management that we now direct our energies, or what shall become of our specimens for continued analysis. Nonetheless, as archeologists, our personal commitments lie in the realm of exploration, discovery, and interpretation.

The Rio Abajo story is one of incredible dimension and diversity. The exploration of the region and the archeological remains resembles an adventure which should be entitled, "There and Back Again." We have frequented the edge of that temporal dimension, peering into what windows we could find, and have returned with scribbled notes, drawings, and photographs. The story, yet to be told, is subject to our interpretation. We can assure you, however, that the

information we have gathered is based entirely upon empirical observation. It was not collected to prove a particular theory or model, nor to embellish a story. It should stand as an accurate record for various observations and interpretations. This information represents but a symbol of the physical structure, the artifactual remains of now extinct societies. This information is, however, of limited dimension, an abstraction often devoid of the human element. One must "identify" with the people of the time and touch the landscape of the region in order to fortify the imagination with the necessary supplies for a historical adventure.

A GEOGRAPHICAL SKETCH

The term "Rio Abajo", as it is used here, is of archaic pre-revolt vintage and applies specifically to the Pueblo and Hispanic Province of the Piro, believed to extend from the Paraje of Fra Cristobal, on the south, to the area of Sabinal village, on the north. In 1776 (nearly a century after the demise of Piro-Hispanic civilization), Fray Francisco Antanasio Dominguez noted that the Kingdom of New Mexico was divided into two sections: Rio Arriba and Rio Abajo (Dominguez 1776, edited and annotated by Adams and Chavez 1956:7). Rio Abajo was



The 13th Century Fortress Pueblo of San Pascualito upon the East Bank of the Rio Grande within the Bosque Del Apache. (Illustration by Charlotte Ann Hollis).

defined as that area from Cochiti Pueblo, on the north, to Isleta Pueblo, on the south. Since certain of our perspectives are pre-revolt, we have employed the archaic usage of the term "Rio Abajo".

Contrary to early Spanish belief, the source of the Rio Grande (formerly the Rio Guadalquivir, Nuestra Senora, Rio Bravo) is not the north pole but instead Spring Creek and South Fork in the Sierras of southern Colorado. Gathering its flow from the Alamosa and Conejos, it penetrates the basaltic crust of the earth, captures the waters of the Chama, Santa Fe, and Jemez and then flows out into the parched desert of Rio Abajo. It is these waters that fostered the development of an advanced civilization amid an arid desert landscape.

Rio Abajo is a composition of the river, bosque canopy and thicket, gravel paved benches, alluvial terraces and fans, sand dunes, alkali clay flats, rincones, lomas, escarpments, fertile fields, dusty cholla-filled lots, lava flows, and basaltic buttes. The settlements and events which shaped the prehistory and history of the region are upon this stage. To the west, rise the forested mountains of the Sierra Magdalena and the Sierra San Mateo, as well as the bare summits of the Ladrones and Polvaderas. To the east, within an empty expanse, are the limestone pinnacles of the Sierra de la Cruz, Alamillo, and the Milagro. Beyond these are the desert escarpments of the Sierra de los Pinos and the Sierra de las Canas. Boulder strewn washes incise canonicos across this eastern expanse and join the river valley with wide alluvial fans between steep gravel benches. The sediment of the Rio Abo, Rio Puerco, Rio Salado, and numerous unnamed arroyos fill the valley with incredible quantities of silt, which, for the moment, the river cannot discharge.

North of the great double meander of San Acacia, the river flows into the Lomas Parda Narrows, below the village of La Joya. Here the sculpted landscape of Los Canonicos forms the eastern wall; and the dune-invaded uplift of the north Rio Salado confluence forms the western edge. Below, the river enters the Angostura San Acacia, a narrow gateway between two massive basaltic buttes. Upon and about these buttes is a dense constellation of prehistoric and historic cultural remains which are apparently related to the fertility of the San Acacia meander and to the protection afforded by the elevated rock mass.

In the central Rio Abajo district, the entire margin of the river valley is flanked by elevated cobble benches covered with khaki green forests of creosote. It is upon the edges of these benches where most of the prehistoric settlements of the region are located. From the east, in this area, enter the arroyo tributaries of the Alamillo, Veranito, Parida, Los Pinos, Tio Bartolo, Presilla, Tajo, Las Canas, and others. Upon the southermost elevated bench of the east-central Rio Abajo district lie the ruins of El Nido de las Piedras (The Nest of Rocks). From this fortified knob, a great vista of sand and mesquite, characterizing the Southern Rio Abajo region, can be seen; while in the distance is the pale blue pyramid of the Sierra San Pascual.

In the southern district are the Sierra Chupaderos of the west and the Sierra San Pascual of the east, which flank the nesting ground of innumerable waterfowl. Adjacent to the east riverbank in this area, is a red-brown rocky crag upon which is perched the 14th century settlement of San Pascualito. The

view from this location is of staggering dimension and still the valley of Rio Abajo twists into the distance across the desert floor to the south. The massive tableland of Mesa Guinea (Black Mesa) can be seen in the distance beyond the mesquite peppered plains of Valverde. A sea of dusty-red tamarisk below Black Mesa seals over the buried village of San Marcial some 26 feet down in the mud. From Black Mesa, the southern limits of the Rio Abajo Province come into view. Across the jumbled lava flow of the eastern valley edge is the rock mass of Sierra Fra Cristobal, entrance to the dreaded Jornada del Muerto, once the ominous doorway to the Kingdom of Nueva Viscaya and later the Department of Chihuahua.

A CULTURAL-HISTORICAL SUMMARY

The Pre-Formative Era

A defined riverine focus of the most ancient Paleo-Indian and Archaic Horizons has not been recognized in the Rio Abajo area, although occasional pre-ceramic sites have been located. It is quite probable that many of the most ancient archeological remains in the region have been destroyed by later erosion or are concealed by alluviation. We can, however, be certain that the stable gravel bench-top formations and the basaltic bedrock locations were not frequented by Paleo or Archaic peoples. The Rio Abajo Project work has yielded little information pertinent to these ancient cultural remains, although a few observations concerning the subject can be made.

Evidence of pre-ceramic cultural remains has been found adjacent to the river margin in ten locations of the Fra Cristobal-Paraje area; one location near Fort Craig, two locations at Elmendorf, and one located near San Acacia. All of these sites exhibit hearth structures with associated slab-basin metates and one-handed manos. Diagnostic projectile points are absent and the identity of these sites with a particular Archaic culture or horizon is presently unknown. The lithic assemblages from these sites exhibit considerable diversity and appear to represent various cultural expressions and functional activities. The high density of such cultural remains in the Paraje-Cristobal region may be related to the close proximity of the Fra Cristobal range to the valley floor. Indeed, this is the only location in the Rio Abajo region where a desert mountain range exists in direct proximity to the river. It is most probable that the Archaic occupation of the region had a direct association with the diverse and robust Chihuahuan desert flora which exists in the limestone uplifts of the southern district. The low vegetative diversity and absence of certain Chihuahuan flora in the Mexican Highlands to the north and in the forested environments of the upland areas in the west, probably curtailed substantial population by Archaic peoples. It is also most probable that the earliest experimentations with horticulture began about the seeps and springs of the desert mountains to the south (ie. Fra Cristobal, Caballos, San Andres, Sacramentos, and so on into the Basin Range Province of Northern Mexico).

There are two known sites of apparent great antiquity which have been recognized in the occasional exploration of the Los Pinos slope. Both are situated about springs some distance from the river. One location is at Cibola Springs in an upper tributary of Palo Duro Canyon, and the other is located at Ojo

Parida. Both sites are characterized by the high incidence of Plano-Convex end scrapers and the absence of ground stone. The Ojo Parida location contains numerous bifacially flaked preforms. Very little diversity is noted in either assemblage suggesting that a specific activity as carried out and, this, probably on a seasonal basis. Careful examination of both locations failed to reveal projectiles or debris associated with the manufacture of projectiles. Analysis of the Archaic materials observed in the Rio Abajo survey is continuing along with the examination of local projectile point collections.

The Tajo Phase

If, indeed, the earliest horticulturalists inhabited the desert canyonlands in the regions which supported Chihuahuan flora, it is here also that the very beginnings of formative sedentary life and the adoption of the ceramic industry must be sought. Occupation upon the river margin during the early Formative Horizons (ie. BMIII Period) is extremely limited. The only known BMIII sites are the few small hamlets of the San Marcial Phase in the Tiffany-Cristobal area, precisely in the location of the highest known density of riverside Archaic remains. Early formative settlement still appears to cling to the upland lateral drainages beyond the limits of the study area. In the north, within the western drainage of the Rio Salado, there is a high density of what appear to be both Mogollon and Anasazi BMIII components (Wimberly and Eidenbach 1980). Considerable colonization of the riverside area of Rio Abajo did not begin until sometime during the Pueblo I period (ca. AD 800 or 900). This era of colonization corresponds with a general trend toward the population of lowland environments throughout much of the pueblo province and to the development of "The Basin Classic Era" as defined by Stuart and Gauthier (1981:411). The factors which caused the colonization of the Rio Abajo riverside environment in the Pueblo I Period are undetermined. Perhaps it was the result of population pressures and the depletion of natural resources in the adjacent uplands. Climate changes with respect to effective temperature and moisture values may have adversely affected highland horticultural production. The lowland riverside settlement could have also been encouraged by certain technical or social developments in water control as applied to the fickle waters of the Rio Grande. In any event, the first substantial Pueblo I occupation of the region appeared in the north while marginal utilization of the San Marcial area continued. This Pueblo I occupation has been termed the Tajo Phase. Tajo settlements tend to cluster upon the eastern benches on the La Joya and the San Acacia areas but occasional components of the Tajo Phase extend south to the Carthage Arroyo. It is interesting that the principal constellations of the Tajo Phase occupation appear on the river margin near the Rio Salado confluence close to the ancestral and contemporary pueblo populations of the upland region. A number of small Tajo Phase components often appear to cluster within an area, which may be loosely described as a community. The sites consist of small unit pueblos with occasional pitrooms. Surface structures are defined by single-tier cobble alignments without significant quantities of rubble, suggesting cobble-based jacal constructions. Ceramic materials consist primarily of plain and banded brownwares. Red Mesa Black-on-White is frequent but is of

intrusive character. There appears to be no native white ware industry. The ceramic assemblage of the Tajo Expression differs from contemporary sites in the Rio Salado in that only traces of Cibola Gray Ware are present, contrasting to the frequent but not necessarily predominant frequency of Gray Wares in the Rio Salado sites. Great kiva community buildings, which are common in the Pueblo I Period throughout the Eastern Anasazi Province, have not been observed in the Rio Salado or Rio Abajo communities. There is, however, what may be termed a great enclosure of Pueblo I affinity which exists upon a basaltic summit above the San Acacia Tajo community. This enclosure (Cerro Negro), which may represent a public building or fortified component of the community, consists of a masonry wall two meters in height surrounding an area 43 x 28 meters in size. Within the enclosure are 6 to 7 rooms and a light scatter of Pueblo I ceramics.

The Elmdorf Phase

With the emergence of the PII Period (ca. AD 950-1000), the location, density, and character of pueblo settlement in the Rio Abajo region underwent considerable change and development. Sites of this period represent a local cultural expression which has been termed the Elmdorf Phase. The numerous sites of this period appear to be nucleated upon the eastern benches of the north and central Rio Abajo district. The density and size of the sites greatly exceed that of the former Tajo Phase. Cobble-based jacal and occasional pitroom constructions are still the prevalent form of architecture, but defined villages of rather closely spaced units-pueblos are often present. Individual units usually range from two to ten rooms, but a site complex may include up to 100 rooms. Some masonry construction is also present but low rubble mound elevations suggest that masonry was used as foundational structures for adobe or perhaps jacal superstructures.

Pueblos of the Elmdorf Phase are most often located on elevated benches which are marginal to the river valley and adjacent to major arroyo confluences. An area of hearth and midden debris often appears adjacent to the village, in a dune formation or upon an alluvial terrace. These locations appear to represent processing centers associated with the village occupations. Such a pattern of contiguous processing areas continues into the PII and PIV occupations of the regions. The beginning of the Elmdorf Phase is recognized by the early development of a local white ware ceramic industry. Both mineral and carbon painted varieties of the Elmdorf White Ware Series are recognized. The material clearly represents a White Ware industry of local manufacture that can be distinguished from the Chupadero, Socorro, Reserve, and Chacoan Forms. With the development of the Elmdorf industry, intrusives from the adjacent Anasazi populations sharply decline. Plain Brownware material is still predominant but the frequencies of textured styles increase through time. An occasional sherd of Socorro Black-on-White may appear but sites of the Socorro Phase do not appear in the Rio Abajo area. The southernmost distribution of known Socorro Phase sites is in the Rio Salado (Wimberly and Eidenbach 1980).

The Coalition Era

The events and processes which shaped the development of Ancestral Piro PIV culture

in the Rio Abajo may best be termed the Coalition Era. This development began in the Late Elmdorf Phase of the PIII horizon and reached fruition in the Glaze A pueblos. Settlement in the Rio Abajo region still appears to be principally nucleated about the benches of the east central district. There is a decided coalition of the puebloan populace into large and contiguous-room pueblos. This process probably first began in the late 13th century with continuing intensity into the 14th century. Villages composed of scattered domiciliary aggregates eventually gave way to settlements which consisted of a single building constructed around an open or closed plaza. The population of the region did not noticeably increase, but the distribution of the population within nucleated aggregates is distinctive. Masonry and puddled adobe construction become prevalent, although jacal screens, pens, and other constructions remained common.

It is quite probable that the coalition of the Rio Abajo populace was stimulated by unrest, fear, and predatory activities. This was, no doubt, related to the unstable character of the social order evident in the Eastern Jornada region and in the adjacent Northwestern Plateau during this period. Ultimately, numerous fortified settlements were built in the Rio Abajo Valley and along its western tributaries. Among the earliest to be erected in the late PIII Period was the limestone fortress of El Nido de Las Piedras (The Nest of Rocks) and the basaltic citadel of Piedras Negras (Black Rocks).

El Nido is perched upon a gravel knob elevated some 30 meters above the valley floor. The El Nido edifice is a massive masonry polygon, 32 by 24 meters in size, with masonry walls providing a vertical extension to the steep gravel-strewn slopes. El Nido is situated within a constellation of Late Elmdorf Phase sites and probably represents a fortress structure erected and utilized by the community either in conjunction with the open community occupation or as a focus of the integrated population during a period of strife.

Piedras Negras, also of late PIII origin, but without a continuous community, is located upon the barren summit of the basaltic mass that forms the southern wall of Angostura San Acacia. The pueblo occupies the level summit area 60 meters above the valley floor. It is surrounded by cliff faces and a sinuous defensive wall. This pueblo is a labyrinth of rubble-lined cells with a dimension of 120 by 100 meters. Piedras Negras is the largest pueblo of PIII affinity known in the Rio Abajo region. It contains an estimated 150 rooms of various sizes and forms, but has only a single kiva.

Fortified structures of equally impressive character continued to be constructed during the Glaze A Period. Cerro Indio, San Pasqualito, La Jara Peak, and Hidden Mountain are all fortified pueblos typical of this time period. Many of these Glaze A fortified pueblos appear to be located adjacent to contemporaneous settlements upon the valley floor. Eventually, the need for such elevated and fortified positions was negated and Pueblo IV buildings were constructed in open and non-elevated valley floor positions.

The Ancestral Piro Era

(Pueblo IV Glaze A-D Horizons, ca. AD 1300-1540)

Settlements of the Early PIV Period, occupied during the Glaze A through D Horizons, have been termed Ancestral Piro since no hiatus or major cultural revolutions

are seen in the occupation as it extends into the Historic Piro Period. The cessation of the hostilities which characterized the Coalition Era, brought forth a renaissance in the Rio Abajo Pueblo culture. The largest pueblos ever to be constructed in the region were built during this period. Undoubtedly, substantial developments in the arts, industry, and religion also were made. However these, for the most part, remain undocumented. The architecture of the period is characterized by the construction of multi-storied and terraced pueblos built of adobe and adobe-cobbles. These buildings ranged from moderate constructions around a single plaza, to a massive edifice of nearly a thousand rooms surrounding 6 plaza areas. The aboriginal population of the population of the Rio Abajo region reached its apex during this period, while Spanish Galleons were upon the seas searching them out. The nucleated constellation of the eastern central benchland was maintained, but settlements were extended to the lower terraces in that area, to western valley locations, and of particular importance into the southern desert river margin of the Bosque del Apache, San Marcial, and Milligan Gulch areas. It is quite probable that this massive colonization of the Southern Province was related to certain social and technical developments in the control of irrigation water.

The Piro-Hispanic Era

(Glaze E through F, ca. AD 1541 to 1680)

Most of the Ancestral Piro pueblos were inhabited into the Colonial Period. Ceramic stratifications from various roomblock areas within many of these settlements indicate, however, that only a portion of the Ancestral Pueblo was inhabited into the Colonial Period. A comparison in the number and estimated size of Ancestral and Colonial Period Piro settlements, indicates a decline in population. This decline is probably related to the introduction of European diseases. It is also evident that Piro villages were, on the whole, smaller than the Tigua-Tiquex villages to the north even prior to contact. A review of Martin de Pedrosa's List of the Pueblos, made in 1581 (Hammond and Rey 1966:115), reveals a range from 14 to 123 rooms in the list of 16 Piro villages. The mean number of rooms within Pedrosa's list for the Piro is 47 units. A comparison with the 15 pueblos directly to the north within the Tigua Province shows that these pueblos average 95 rooms in size and, therefore, are nearly twice the mean size of Piro settlements.

Piro Pueblos of the Colonial Era exhibit either traditional or Hispanic architectural characteristics. These characteristics, from superficial observation appear, for the most part, to be mutually exclusive. In general terms, the traditional form of village architecture consists of multi-storied and terraced, adobe and adobe-cobbled buildings, arranged about a plaza area. Room sizes are usually small in size, 2 x 3 meters. Settlements of the traditional style are also clearly the largest villages in the region. The villages which exhibit Colonial Hispanic architectural characteristics are often small (except Sevilleta, LA 774). Room sizes are much larger than those of the traditional style with units of 4 by 5 meters in normal size. The rooms are laid out in a regular contiguous or grid-like pattern. The plaza type layout is infrequent. Instead, rectangular roomblocks are built which may include small courtyards. The appearance of these buildings suggests that they had portals. In roomblock 9 at

Sevilleta Pueblo, a low compound wall was appended to a house built around a courtyard. The construction mode, in contrast to the traditional form, is masonry or masonry-base adobe (probably adobe block). The buildings which exhibit these Hispanic characteristics are also those which have ceramic assemblages containing Majolica, ring base vessels, and trace intrusives from the Tewa and Jumano Provinces. The Mission structure of San Luis Obispo at Sevilleta (Roomblock 8) has been located and, also, a possible chapel near San Acacia is known (ie. Prov. 3 of LA 286). Unfortunately, the village of Senecu and the Mission-Convento establishment of San Antonio de Padua remain, for the moment, unidentified and probably lost below a layer of silt. Presumably, the mission of Nuestra Señora de Socorro provides the foundation for San Jiguel in Socorro, but the village of Pilabo has not been located.

THE PIRO-HISPANIC ARCHIVES

The Ethnohistory of Piro culture, as so vividly described in the Spanish records, brings real people and events onto the Rio Abajo stage. It is a rich archive but of limited dimension. From the pages of books written three to four centuries ago, come brief descriptions of Piro culture and those events which shaped the era. I cannot, in summary, do justice to the character of these records nor relate their significance to the archaeological record.

The documents regarding the Piro culture span the period from 1541 to 1693. They describe the florescence and subsequent death of the Piro world. A brief listing of the principal documents regarding the Piro are presented below. There is, first, the tantalizing discovery of the Province of Tutahaco by Coronado in 1541 (Bolton 1949:197) but the records contain little information regarding the region or culture. The records of the Chamuscado-Rodriguez expedition of 1581 describe the ceremony of ossession at San Felipe (La Cabeza de las Provincias) and a detailed account of the Piro villages and lifeways (Hammond and Rey 1966, Translations and Annotations). Then, perhaps the most extensive and vivid descriptions are provided in Luxon's and Espejo's account of the 1583 expedition. There are the documents of the Onate Colonization of 1598 which outline the crossing of the Jornada del Muerto and the welcome sight of the Piro villages (Hammond and Rey 1953). Fray Alonso de Benavides relates the conversion and missionization of the Piro "attendant with dangers, hardships and suffering of anxieties" (The Revised Memorial of Benavides 1634). Then, in the dawn of January 23, 1675, the mission bell of San Antonio in the southernmost Piro village of Senecu sounded the alarm which signaled the ultimate death of the Piro world at the hands of the Apache. In September of 1680, Governor Otemin and his tattered band of Hispanic refugees from the Pueblo Rebellion fled past the abandoned and burned villages of Sevilleta, Alamillo, Pilabo, Qualacu, San Pascual, and Senecu (Hackett and Shelby 1942). The subsequent records of Otemin's attempted reconquest and Diego De Vargas' conquest (Espinosa 1942) allude to the vestiges of the once prosperous, but now burned shell of the Piro world. Remnants of the Piro tribe sought refuge with the Spanish in Senecu del Sur near El Paso del Norte.

They were eventually absorbed by Spanish culture. The language and culture is extinct.

CONCLUSION

The reoccupation of the Rio Abajo in the late 18th-early 19th century by Hispanic populations and the subsequent events of the Mexican Period and the American Territorial Period is a drama of such color and variety that I hesitate to begin such a brief summation. Indeed, this chapter of the story I shall postpone to a later date when the full dimension of the period and the archeological remains can be given due consideration. At present, I will only allude to the subsequent evolution of a series of fortifications, villages, and industries in this river province.

Today, an old man may return to the home of his Rio Abajo childhood and find a melted mass of adobe returning to the earth and a lonely graveyard with the tilted monument of his mother's resting place. Villages that once resounded with the rattle of a Model T, are now swallowed up in the silt or enveloped by the relentless sands. The remnant structures of yesterday are fading upon the negative of a photograph with the images of La Joyita, San Acacia, Luis Lopez, Bosquecito, San Antonio, Bowling Green, Parida, Sabino, San Francisco, San Jose, San Marcial, La Mesa, Valverde, Contradero, San Pedro, Jaral Largo, Tajo, Guadalajara, Fort Conrad, Fort Craig, Carthage, Toque. . . .

The red dust blows up out of the Jornada Del Muerto and the screech of a windmill, attendant with the unnerving flap of a piece of tin, measure out yet another springtime. Down in the earth there is the distant rumble of an earthquake. Visions of foaming waters carry cottonwood debris away in the darkness and waters lap up to the village steps. There is the echo of the train with one eye peering through the bosque along the river. The cannons of Valverde reverberate off the walls of Black Mesa. The muffled voice of a hard-rock miner calls, "Fire in the Hole!" The lonely whistle and "get up there" of some cowboy is absorbed in the wind.

Reclamation—Missiles—The Rio Abajo Epic.

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Michael P. Marshall



Abstract: The Chamisal Pueblo Site — An Example of Suburban Archeology in the North Valley of Albuquerque

Spanish archives record as many as 17 large Tiwa pueblos located in the Middle Rio Grande (Rio Abajo) area between present-day Bernalillo and Isleta. The Chamisal Site (LA 22765), located in the North Valley of Albuquerque, is a Classic Period pueblo (1300 - 1650 AD) of the Tiwa Province. In 1976 my husband, Arnold, and I acquired the property containing the site and presently live in a house which partly covers it. The most prominent feature of the site is a large mound, 900 m² in area, which rises 2 meters above the modern floodplain surface. Surface sherd and lithic scatters indicate that the boundaries may extend ¼ mile westward. Testing of the site took place in June 1979, before we began construction of a building on the property, and revealed a deeply stratified site. This led to an excavation project which began in April 1980 and has continued for 17 months. The principal excavation has been on the south side of the mound and comprises an area of slightly over 100 m². This section contains a succession of eight village occupations, the earliest dating to 1300 AD and the last circa 1450 AD. A later component dating to the early 1600s lies southwest of the main excavation where testing reveals pueblo walls lying just 15 cm. below the surface. One pre-Pueblo occupation has been excavated. This appears to be a campsite with an jacal structure associated with a former river bank. Above this occupation the river deposited a deep layer of clay. The first Pueblo inhabitants apparently used the clay for the village construction since shallow pits containing clay and sand rubble together with channels for water control are found at this level. This space was later used as a plaza and buried by fill and later occupations to a depth of 3.5 m.

Kathryn Sargeant

Abstract: Photogrammetric Recording of the Arroyo del Tajo Pictograph Site

Large pictographs have routinely been included in our overall photogrammetric recording of cliff dwellings in the national monuments in Arizona.

The photogrammetric recording of the Arroyo del Tajo pictograph site in New Mexico for the Bureau of Land Management, U.S. Department of the Interior, differed from these earlier recordings in the small scale and profusion of rock paintings in a natural site.

Two major means of recording were employed with the following major purposes:

- (1) Color stereophotography, to simultaneously record the paintings and the projection and recession of the surfaces on which the paintings occur, to express stereoscopically the effect

these natural features may have had for the artists' conception and meaning.

- (2) Terrestrial photogrammetry, to record and draw the cliff site and the rock paintings to scale, recording lost portions of surface and painting and the spaces existing between individual figures and groups of figures so that there are measurable limits for conjectural restoration and interpretation.

The scales chosen, both for stereophotography and photogrammetric drawing, determine the clarity and success of the photogrammetric recording.

Perry & Myra Borchers
with the Ohio State University

changing the use of the land from grazing to home development. With their permission and encouragement, Franklin and Joan Barnett undertook some excavation. They were soon joined by Richard and Margaret Bice. By the mid-1960's, 144 rooms were completed and a report by Barnett was published in 1969. This report is devoted primarily to the work done by the Barnetts with an Addendum by Bice (1969, pp. 207-232) covering some supplementary data. Other information is contained in field notes (Bice and Bice, 1963-1965). In addition, excavations were undertaken by Richard and Kitty Renwick (1963-1975) and by Frank and Francis Vernon (1966-1967) who have been kind enough to make their field notes available to the author.

Thus a wealth of data, much of it unpublished, are on hand containing architectural and artifactual notes from a total of 443 rooms: Nelson - 240 rooms, Barnetts - 91 rooms, Bice - 50 rooms, Renwicks - 42 rooms, and Vernons - 20 rooms. That these data are worthy of re-examination and analysis is supported by the importance of this pueblo and the likelihood of developing further interpretive insights concerning its cultural life and its economic base.

Because of the diverse sources of the data, they lack the homogeneity of data obtained in response to a modern research design. Nevertheless, it should be possible to invert the process and to establish a research or

Tonque Pueblo — Preliminary Insights From Old Data

Tonque Pueblo is an important and very large site in the middle Rio Grande basin. It is believed to have been a major manufacturing center for glaze-decorated pottery during portions of the fifteenth and sixteenth centuries (Warren, 1969). Located about halfway between Albuquerque and Santa Fe, a few miles east of the river, it is on one of the natural routes between the river pueblos and the pueblos of the Galisteo Basin and Pecos.

Although it seldom appears by name in the Spanish chronicles, Nelson (1914, p. 19) states the probability that it was one of the pueblos visited by Coronado when travelling from Tiguex near Bernalillo to Pecos (Cicuye). Other Spanish entradas such as the Chamuscado expedition in 1581 and the expedition under Castano de Sosa in 1590-91 may also have passed this way. (Schroeder and Matson 1968, p. 160-162). The Castano records note a pueblo (possibly Tonque) that had been deserted a few days before the expedition arrived and displayed signs of many deaths.

The Tonque (Tungue, Tungee) ruins seem to have come to archaeological attention first when mentioned by Bandelier in his journal entry of December 16, 1882 (Lange and Riley, 1966, pp. 379-380). However, the first organized excavation activities at the site were of a commercial, not an archaeological, nature. The high quality of Tonque clay attracted the "Tonque Pressed Brick, Tile and Improvement Company" to the site in 1912 (Barnett 1969, p. 27). In 1914, the first formal archaeological work was done by N.C. Nelson of the American Museum of Natural History. No report was made on this work, but the field records are available at the Laboratory of Anthropology in Santa Fe (Nelson 1914, Notes).

In 1933, Tonque's one kiva, measuring about 50 feet in diameter, was excavated by the Albuquerque High School Archaeological Society under the direction of Sarah Goddard (1933, p. 193-196). In the early 1960's, the then owners of the property were considering



FIGURE 1. Reconstructed Plan View of Tonque Pueblo.

analysis design based on taking maximum advantage of the data on hand. To this end, an attempt has been made to define achievable objectives:

1. Prepare representative maps of the site.
2. Define the nature and sizes of the living quarters occupied by families or extended families.
3. Define architectural and artifactual attributes of the two distinct cultural co-occupants of the site-Tonquians and Pajaritans.
4. Develop further information concerning the pottery sequences and ceramic industry at Tonque.
5. Develop further insight on the temporal sequences of Tonque.

In fulfilling the first objective, the author prepared a series of maps of the site using information from the following sources: A field sketch of the site by Nelson (1914 Field Notes) which shows the relative locations of room blocks and the sections of rooms that he dug; high altitude aerial photographs obtained from the U. S. Soil Conservation Service; low altitude aerial photographs in possession of the author and taken ca. mid-1960's; the USGS Hagen, New Mexico quadrangle map; a room locations map by Barnett (1969, p.33); Renwick maps (1962-1975); a site sketch by Bandelier (1885); and on-site measurements made by the author.

One of the maps developed from the above information is shown in Figure 1. It illustrates the positions of the house blocks on the site. The rooms represented by excavation data could, in almost all cases, be located within the house blocks. In unexcavated areas, the widths of house blocks were estimated from the nearest file sections excavated by Nelson. This makes it probable that the outlines of some of the house blocks were not as regular as is shown on the map. Nevertheless, it is believed that the overall scope of the ruin and the positions of the excavated rooms are known with sufficient accuracy to serve the purposes of this study.

From the maps, it is estimated that the site contained approximately 1850 ground floor rooms. This number should be close to the total of all rooms since the archaeological evidence indicates that very few upper story quarters existed.

Significant progress has been made on the objective of defining living units or apartments. The study of the locations of firehearths, the locations of pasageways between rooms, and the number of rooms in file sections across house blocks have led to preliminary concepts of apartment sizes and designs. In addition, firehearth designs, when coupled with artifactual evidence, provide a good diagnostic tool for determining the Pajaritan and Tonquian occupation areas of the site. Among other items to be considered that may relate to differing cultural traits are storage elements, artifact contents of rooms and comparisons with other prehistoric and trans-historic sites.

Only very preliminary consideration has been given to the remaining objectives of pottery and temporal analysis. The pottery study undoubtedly would have been aided by sampling the deep refuse areas that once existed. However, these were destroyed by the brickyard subsequent to Nelson's work at the site. Other means are therefore being explored. Some sherds from excavated rooms are available for study and it is hoped that it will be possible to decode the Nelson pottery descriptions. Although these were

written before today's definitions of Rio Grande Glaze pottery were adopted, they hold promise of furnishing significant information.

In any event, the overall project now underway provides intriguing challenges. The wealth of accumulated data should give new insights to the life styles of the inhabitants of Tonque and to the relationships of the site to the surrounding region.

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Richard A. Bice

An Alternate Hypothesis to the Mystery Disks of the Tompiro

INTRODUCTION

During the late 16th and early 17th centuries, the early Spanish entradas described the Tompiro homeland. Later, the Tompiro were exploited by the Franciscan Missions and the Spanish encomienda systems. Traditionally, the pueblos of Abo, Tenabo, Gran Quivira, Tabira, and Pueblo Pardo have been identified as Tompiro; however, Schroeder (1964:237) adds the pueblos of Chilili, LA 372, Tajique, and Quarai to the Tompiro grouping.

All of these Pueblos lie east or southeast of the Manzano Mountains in central New Mexico, and are sometimes referred to as the Saline or Salinas Pueblos due to their exploitation of the natural salt lakes found in the region. They abandoned their homeland in the 1670's due to increasing Apache raids, Spanish and Mission labor requirements, drought and pestilence. By the time of the Great Pueblo Revolt of 1680, these former inhabitants of the Salinas Province were heading south with their Piro and southern Tiwa neighbors with whom they had previously taken refuge.

DESCRIPTION

These circular flaked rocks are by far the most abundant lithic artifacts found within the sites of this area. They have been referred to in the literature as discoidals, disks, plano-convex disks, choppers, scrapers, gaming pieces, tejas, and quoits.

The majority of these plano-convex disks are roughly circular in form. Some are bifacially flaked around the circumference; however, most are unifacially flaked from the plan surface, generally in order to improve the plane surface. Van Valkenburgh (194:132) states that "the idea seems to have been to obtain a flattish undersurface and rounded perimeter, rather than a cutting edge. When the flat surface does meet the rounded surface with a sharp line, the flat surface shows natural cleavage planes, rather than retouching."

The lithic material of the disks seems to be directly related to local sources of sedimentary rocks. Abo and Tenabo disks are largely made out of the local sandstone, while those at Gran Quivira and Pueblo Pardo are largely made from the local limestones. The abundance of these disks is very conspicuous in the Tompiro area and it is equally surprising that they do not turn up at other eastern Pueblos, for example at Pecos (Kidder 1932) and Paako (Lambert 1954)

LITERATURE REVIEW

Toulouse (1949:22) in his excavations at Abo states: "Disks: Of the chipped stone tools, simple disks predominate over all others. They were shaped largely of sandstone, with some of shale, quartzite, and limestone. Ordinarily they had two flat surfaces; occasionally there was but one smooth surface the other being chipped all over. Disks varied in size from 3 inches in

diameter to approximately 7.5 inches, and from 0.5 inch in thickness to 2.0 inches. Their use is problematical."

Toulouse and Stephenson (1960:30) on their excavations at Pueblo Pardo state: "Stone disks (a) Roughly chipped, limestone and sandstone disks of 2.5 inches to 4.0 inches diameter and 0.5 inches to 1.0 inch thickness (18 specimens) have broad, vertical edges with no evidence of a cutting or scraping edge."

Vivian (1964:132-135) recovered thirty-six plano-convex disks in his excavations at Gran Quivira, thirty-three (92 percent) were made of limestone.

Young (1981:127) states: "Disks are an enigma. They are absolutely ubiquitous at Mound 7, constituting the only distinctive class of stone artifacts produced there. But, their form varies and their function can only be surmised. For every one of the 1,350 disks brought into the laboratory for analysis, three were left in the field."

Beckett, on a recent visit to Tenabo, and later to Abo, with Thomas Carroll, superintendent of the Salinas National Monument, observed a number of discoidal disks made out of the local sandstone. No measurements were taken.

THE GAMING PIECE HYPOTHESIS

Van Valkenburgh and Young both suggest that they might be quoits or Tejas (gaming pieces) where you throw the disks at a hole in the ground. This is very similar to the modern game of Washas (washers used in southern New Mexico by the local Mexican/American population where large washers are thrown at a small hole. The game is somewhat similar to horseshoes.) If their hypothesis is correct, then this game must have dominated much of their time judging by the great number of disks found. If the disks were used to any great extent, the edges should show a lot of bruising but most do not exhibit any wear patterns or bruising. Young (1981:127) did experiment by throwing some discarded disks and obtained favorable results that seemed to duplicate the wear patterns found on some collected disks.

DISCUSSION

Out of the eighteen limestone discoidal disks recorded during the archaeological survey of Gran Quivira, seven were not in close association with any artifacts, sherd or features. Eight were in association with Chupadero Black-on-white jar sherds, one with a hearth, one with a glaze bowl sherd, and one with a Jornada Brown jar sherd. Thus, nine out of eighteen (50 percent) were in association with jar sherds. The average diameter of these discoidals is 73.44 mm. Hayes (1981:70) measured the necks of ten Chupadero Black-on-white jars and they had inside diameters of 63 to 90 mm. with an average of 77 mm. The 1,350 analyzed disks have a mean of 77 by 72 by 29 mm. (Young 1981:127); thus, the Mound 7 disks and Chupadero Black-on-white jars openings have essentially the same diameters (Figures 1 and 2).

The limestone disks examined during the field survey did not show any sign of battering or wear. If these disks were used as jar lids, wear would be minimal. The large number of disks present in Mound 7 (1,350 collected) which were only about one-third of the total excavated (Young 1981:127), suggests other uses than gaming pieces. Mound 7 probably represents 10 percent of the total mound areas. If we assume that Mound 7 contained

4,050 disks, then there could be approximately 40,500 disks at Gran Quivira alone.

Why jar lids of stone rather than ceramic lids or large broken sherds? Several hypothesis can be given: (1) If jars are kept on the roofs of the Pueblos, stone lids would not be as liable to blow off as would lighter ceramic lids; (2) If stored inside or outside, rodents would be less likely to move the lids of storage vessels; (3) Limestone is abundant at Gran Quivira, and Pueblo Pardo. A disk could be knapped fairly easily, more so than producing a ceramic lid for the same purpose.

The association of disks with Chupadero Black-on-white is interesting. Hayes (1981:70) states: "A jar this size (Chupadero Black-on-white) could contain almost 15 quarts." These jars are ideal sizes for liquid or grain storage. Water was a problem at Gran Quivira during historic times and lids on storage vessels would help to keep down evaporation loss and the edges could be sealed with mud for long-term grain storage.

Due to the size of the disks, they could also be readily utilized as throwing stones (they fit the hand well), for hunting, or defense, and some could have been utilized as gaming stones as suggested by others (Van Valkenburgh 1964:133-134; Young 1981:127) as they were already abundant in the Pueblo. This would explain why only a few of them show signs of battering or bruising.

SUMMARY

It is suggested that the stone disks found in the Tompiro Pueblos are mainly jar lids, contrary to popular belief that they are gaming stones. Those located during the Gran Quivira survey were found in association with jar sherds (50 percent) or else by themselves (50 percent). The diameter of the disks found during the Mound 7 excavations matches the average inside opening of the Chupadero Black-on-white jars (77 mm) measured by Hayes and closely parallels the average disk diameter (73.44 mm) of those recorded on the Gran Quivira survey by Beckett (1981).

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Patrick H. Beckett



These guys have sent in their abstracts—Where's yours?

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Regge Wiseman

President's Message

As the new president of the NMAC, I would like to thank the membership for the vote of confidence which I received. Since I ran unopposed, one of the first orders of business I would like to address is a modification of our nomination procedures. We now have members in such a large area that many of them cannot participate in the nomination process as it now stands. To ensure even representation for all members, I would like to initiate a first cut of nominees by mail; this, of course, would still require a formal nomination at a regular business meeting, but would help prevent off-the-cuff

nominations, party politics, and potential "railroading".

We are looking forward to an interesting year. Many of us have personally felt the current economic crunch and uncertain regulatory and budgetary climate. With these factors in mind, I think it is important to follow Past-President Levine's advice on becoming advocates for historic preservation. I will attempt to ensure that a representative of NMAC will attend all pertinent public meetings in New Mexico. We will continue to review federal environmental reports and will host at least two workshops which will stress management problems and solutions in cultural resource management.

Some of the specific issues I would like to see addressed at these workshops would include current research questions and

methodologies, reporting standards, and future research directions in the areas of the state where the most severe surface disturbances are taking place. Industry-related development is probably most intense in the San Juan Basin, and in southeastern New Mexico in the Permian Basin. The expansion of Albuquerque and Santa Fe are causing the often unidentified loss of cultural resources in the Rio Grande Valley.

Finally, we need to address issues related to problems that the ethics committee has encountered in the past and may experience in the future. Paul Grigg had some pertinent suggestions, which were published in a previous Newsletter, and Bruce Anderson has some good ideas published in this issue.

Richard W. Loose

NMAC Workshop Announcement & Call for Papers May 20-21, 1982

The first NMAC Workshop in the 1982 Series will be held in Chaco Canyon, as part of the celebration of the Canyon's 75th Anniversary. The subject of this workshop is Critical Cultural Resource Management Concerns in the San Juan Basin.

More detailed information regarding arrangements will be sent out separately.

Early registration would be appreciated. A registration form is included in this issue (a copy will do). You do not have to be a member of NMAC to attend the Workshop.

If you are interested in presenting a paper, please send Abstracts to Richard Loose by May 1 (c/o P.O. Box 4301, Albuquerque, NM 87196). We look forward to hearing from authors soon (whether budding or in full leaf).

NMAC Workshop

REGISTRATION FORM

Workshop—Critical Cultural Resource Management Concerns in the San Juan Basin

Enclosed is my registration fee of \$5.00 for the May Workshop. \$ _____

I will be presenting a paper entitled _____

Name _____ Phone _____

Address _____



Native American Handbook Progress Report

(taken from letter dated 12/22/81)

Dear Committee Members:

I am writing to report on progress-to-date on the handbook.

A meeting was held on 11/02/81 in Albuquerque. This was the meeting to which representatives of New Mexican Tribes were invited. Two efforts were made to inform the Indians about this meeting. First, a letter was mailed to all the Governors of New Mexican Pueblos and/or Tribes. Second, Bruce Harrill and Barbara Holmes met with Harold Sando of the All Indian Pueblo Council (AIPC). Mr. Sando expressed two major concerns with our handbook: (1) would the handbook be designed to educate Indians, as well as Anglos, about their rights and responsibilities; and (2) would the handbook address the problems Indians face about the treatment of ancestral sites which are located outside of reservation boundaries? Our answer was yes and no to both. With respect to the first question; No, the handbook was not designed to inform Indians, but, Yes, we can change the emphasis of certain portions for that purpose. With respect to the second question; Yes, we will state this as a special concern, but, No, we cannot deal with it except as the various federal laws already apply.

Despite these efforts, which included letters to the AIPC and the State of New Mexico, no non-committee representatives attended this meeting except Bill Fields in his role as head of Indian Assistance for the National Park Service. Participants at this meeting: Fran Levine, T.J. Ferguson, Roger Anyon, J. R. Gomalak, Klara Kelley, Barbara

Holmes, and Bill Fields. Roger Anyon has joined the committee as the official Zuni representative; and Klara Kelley has joined as Dave Doyel's delegate.

The meeting was limited to a review of what the Navajo, Jicarilla, and Zuni tribal representatives have produced. Roger had collected appropriate tribal resolutions. J.R. had prepared a short statement summarizing the tribal position with respect to historic preservation, and Klara had prepared an extensive outline covering tribal policies with respect to both historic preservation and religious freedom. J.R. was asked to produce an additional statement regarding the work his office is doing as well as copies of the appropriate tribal resolutions, and Roger was asked to find an already existing program description. It is recognized that the contributions of all three will be severely restricted because of multiple demands on their time.

It was further recognized by all participants that additional efforts were necessary to elicit additional tribal responses to the handbook. T.J. offered to personally contact several tribes in an effort to meet with the Tribal Councils. To date, T.J. has contacted several and received favorable responses, but has not met with any. I was contacted by the Governor of Santa Ana and I responded with a brief visit, but so far the Pueblo has not set a meeting. Considering the lateness of the year, I think that both T.J. and I will be very lucky to meet with any of the present incumbents.

Barbara Holmes



Letter to Secretary Watt

January 28, 1982
Honorable James G. Watt, Secretary
Department of the Interior
Washington, D.C. 20240

Dear Mr. Secretary,

I have recently been informed that the Santa Fe Pacific Railroad Company has proposed an exchange of privately held mineral estates in the newly designated Chaco Culture National Historical Park for federal mineral estates in the southern San Juan Basin. If such an exchange were carried out in a timely and cost-effective manner, I believe it would be in the public interest for two reasons. First, the rich cultural heritage around Chaco Canyon, New Mexico has been recognized by laymen, scientists, and legislators since the beginning of this century. Mineral development is not practical or compatible with a National Historical Park.

Second, the energy needs of our society are clear and new development must take place. The proposed exchange would help bring about development that is more acceptable in terms of monetary, environmental, and cultural resource costs.

Since the next meeting of the New Mexico Archeological Council is several weeks away, I have not had the opportunity to ask for a formal resolution on this issue. I am confident, however, that a majority of our members would endorse this exchange. It is clearly in the best interest of both energy development and effective cultural resource management.

Sincerely,

Richard W. Loose
President
N.M.A.C.

Memo to Ethics Committee

To: Members of the Ethics Committee of NMAC and the General Membership

From: Bruce A. Anderson

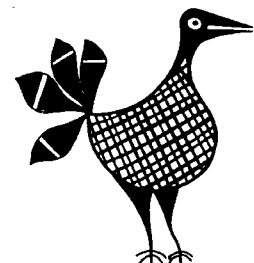
Subject: Inquiry as to Ethics Committee Functions

First of all, let me preface this inquiry, by stating that I am not trying to prejudge anyone of the committee or of NMAC; I'm not trying to assume chairmanship of the committee; nor am I trying to steer or direct the actions of any member. What I am attempting, however, is to address some questions that I feel we should be concerned with as active committee members if we are to fulfill a viable function of the New Mexico Archeological Council. In part, the reason for this inquiry is also due to my concern of being in-active and non-participating with other committee members, and the need to assume a positive role within the committee. With this preface in mind, let me now address my inquiry.

My questions all focus around the role we should assume as committee members, should in fact have an ethics committee. These are:

1. What are our professional responsibilities as members of the ethics committee of NMAC?
2. What are the legal ramifications of being a member of the ethics committee?
3. What sort of ethical questions does the committee deal with? (This is assuming that we as a committee have some standards or rules which govern our involvement.)
4. Are we serving as a committee to be policy making, regulatory, or what?
5. Is this committee a viable need or part of the New Mexico Archeological Council responsibilities, or has it become ineffective and not needed?
6. And finally, how do we address the previous questions; as a committee, in front of the full council, or what?

I would appreciate all of your comments, advice, ideas, and thoughts which deal with the above questions. I feel that there is a need to pursue some answers for the above questions if we are to continue as a committee, or if others are to assume the role of committee members for an Ethics Committee of the New Mexico Archeological Council.





REVIEWS

October 15, 1981

Mike Pool, EIS Team Leader
Bureau of Land Management
P.O. Box 1219
Socorro, NM 87801

Dear Mr. Pool:

I am writing as a member of the Research Committee of the New Mexico Archeological Council to offer comments on your "Draft Environmental Impact Statement and Wilderness Study Report: El Malpais Proposed Wilderness Area."

This volume discusses the effect of

wilderness designation on the management of cultural resources. The major impact on the cultural resources of the region has been, and will continue to be, vandalism and pothunting. Wilderness designation may reduce some of this activity by eliminating vehicular access, but such reduced access will also limit the ability of BLM personnel to monitor the area's cultural resources. Management steps to counteract this problem will include BLM patrols and routing visitors away from archeological and historical sites.

This volume could have been more useful to reviewers if some estimate had been given

of the kind of cultural resources the area might contain. This would allow better assessment of potential impacts to the resource. I would strongly recommend that regular aerial patrols be instituted to control human disturbance of cultural resources in the region. Furthermore, the proposed 100% survey of the region, to be completed within five years (page A-17), should be accorded high priority.

Thank you for the opportunity to comment.

Sincerely,
Joseph A. Tainter, Ph.D.



MISCELLANEA

Summary: The Navajos and the BIA

A Study of Government School Building on the Navajo Reservation

SUMMARY: The Navajos and the BIA: A study of government school buildings on the Navajo Reservation by Ellen Threinen (Architectural Research Consultants, Inc.) (As consultant to American Indian Engineering, Inc.; Funds provided by: Navajo Area Office, Bureau of Indian Affairs; Dr. H. Barry Holt, C.O.R.)

(From Navajo Area Director, Navajo Area Office, Window Rock AZ.

Dated: December 15, 1981.

All Federal agencies are required by Federal statutes and regulations to assure that significant historical properties are given due consideration during agency operations. Federal land managing agencies have the additional responsibility of identifying any such properties on lands under their jurisdiction. Section 110(a) (2); P.L. 89-665, National Historic Preservation Act of 1966, as amended, states:

"With the advice of the Secretary and in cooperation with the state Historic Preservation Officer for the State Involved, each Federal agency shall establish a program to locate, inventory, and nominate to the Secretary all properties under the agency's ownership or control by the agency, that appear to qualify for inclusion on the National Register..."

In complying with this mandate, the Navajo Area Office of the Bureau of Indian Affairs has initiated and completed an archeological

and historical survey of the approximately 500 structures owned by the BIA which were constructed prior to 1946. Historical research about the Navajo people and U.S. Government Indian policy as it relates to these structures was undertaken as a part of this survey. This report details the relationship of the BIA structures judged significant because of their architectural integrity, association with important historical events, or which display distinctive architectural character be nominated for inclusion in the National Register of Historic Places. I feel, as Navajo Area Director, that this effort will contribute much to our understanding of this aspect of the heritage of the Navajo Nation and aid in its preservation.)

The Navajos and the BIA: A Study of Government School Buildings on the Navajo Reservation addresses the architecture and history of Bureau of Indian Affairs (BIA) owned buildings in the Navajo Area. The report is one part of a project to evaluate the architectural and historical significance of 500 pre-1945 BIA buildings. The project was undertaken by American Indian Engineering and Architectural Research Consultants. It was funded by the BIA Navajo Area Office. The project involved architectural survey and evaluation of about 500 pre-1945 buildings in the Navajo Area. Each of these buildings was surveyed and evaluated for its architectural and historical significance. About 100 buildings were rated as significant or as contributing to a historic district and these will be nominated to the National Register of

Historic Places. This report is an effort to provide architectural and historical background for the entire group of structures and an architectural history of the BIA-owned structures.

The BIA-owned structures are the result of the interaction of two groups: the Navajos and the Bureau of Indian Affairs. Therefore, the report is divided into three sections. The first is a history of the Navajo Tribe, the second a history of the BIA and the U.S. government's Indian policies, and the third section discusses the relationship of the BIA and the Navajos and the architecture that resulted.

According to archeologists, the Navajos entered the Southwest between 1300 and 1500. The Navajos, or Diné as they call themselves, had an economy based on hunting, gathering, and agriculture. The earliest Spanish contact with the Navajos was in 1630 when Fray Alonso de Benevides wrote back to Spain about the *Apaches de Nabahu* meaning "Strangers of the Cultivated Fields." Fray Alonso described the Navajos as being good farmers.

Late in the 17th century, the Navajo culture and the economy began to shift. This shift was due to contact with the Pueblo Indians and increased contact with the Spanish. In 1680 the Pueblos revolted against the Spanish. After the Spanish reconquest of 1692 many of the Pueblos fled their homes for fear of retaliation from the Spanish. People from Jemez Pueblo went to live with the Navajos. The Jemez people were absorbed into the Navajos through intermarriage.

However, the Navajos learned many skills from them, including stone masonry construction, pottery-making and weaving. Also the Navajos began to graze more sheep and livestock which was obtained from the Spanish. During the first half of the 18th century, the Navajos' economy shifted away from hunting, gathering, and agriculture to agriculture and livestock raising.

From the time of their arrival in the Southwest until the mid-18th century, the Navajos lived in Dinétah, an area just southeast of Farmington. During the last half of that century, the Navajos moved to the south and west, to the approximate area of their present reservation. In this new location sheep herding became even more important. Once established in the area, the Navajos began to trade with and raid nearby Pueblos and other settlements, first Spanish and later Mexican and American. This established a good deal of animosity between the Navajos and other groups.

In 1846, the U.S. Army conquered New Mexico, and what is now New Mexico, Arizona, and California became United States territories. Because of the Navajos' penchant for raiding, the U.S. had to immediately take measures to protect the new territory from these raids. From the start there were misunderstandings between the two groups. The U.S. government sought a treaty, but did not understand the loose political organization of the Navajos. Therefore, treaties were negotiated with small groups, but never with the whole tribe. A more serious and long lasting problem was the failure of the scientific, logically oriented Anglo-Americans to understand the more spiritual, Eastern thought of the Navajos. This misunderstanding was to plague the two groups throughout their contact.

In 1863 and 1864, the U.S. Army rounded up all the Navajos and they were taken to Bosque Redondo in eastern New Mexico. There the Navajos were to learn to be a stationary, agriculturally-based people. After four painful years at Bosque Redondo, the United States and the Navajos signed a treaty which created a reservation in northwestern New Mexico and northeastern Arizona. In 1868 the Navajos returned to their homeland and to their sheep-based economy.

From its inception in 1776, the U.S. government had a policy of placing Indians on reservations and providing education to integrate them into white society. To carry out Indian administration, the post of Indian Commissioner was created in 1832. Subduing of Indians and placing them on reservations was a major government activity from 1830 through ca. 1870. Beginning in 1868, the Assimilation Policy, the main intent of which was to integrate Indians into Anglo-American society as quickly as possible, held sway. The two tactics the government used for accomplishing assimilation were placement of Indians on reservations and education. Indian children were to be educated in an environment physically and culturally isolated from their own. They were to learn industrial skills which would allow them to get jobs off the reservation.

The Assimilation Policy was never successful. Conditions at the Indian schools were horrible. Sanitation was poor, trachoma and tuberculosis were epidemic, and overcrowding was frequent. Indians who attended school became isolated from their own people, but were left with no marketable skills. In addition, under the Assimilation Policy, 67% of Indian land was lost to whites, and Indians were left with less land and in

worse economic straits than before.

Conditions in the schools and on the reservations became so serious that in 1926 Congress authorized the Institute for Government Research to do a study, *The Problem of Indian Administration*. The study, called the Meriam Report, was released in 1928. It condemned conditions on the reservations and in the Indian schools and called for many reforms. The Hoover administration initiated many of the needed reforms, but there were insufficient funds to carry them out.

In 1933, John Collier was appointed Commissioner of Indian Affairs under President Roosevelt. Using New Deal programs, particularly the Public Works Administration (PWA) and Civilian Conservation Corps (CCC), Collier was able to initiate many of the reforms recommended by the Meriam Report. Among these were day schools to replace boarding schools, land reclamation, and increased political self-determination. Collier spent the 12 years of his term trying to carry out programs to accomplish these goals for the Navajos and other tribes.

The third section of *The Navajos and the BIA* addresses BIA-Navajo interaction and the architecture that resulted. In mid-19th century, when the Americans and the Navajos had their first contacts, government buildings in the west tended to be military forts constructed of locally available materials. Fort Defiance, which was used as a fort from its establishment in 1851 to 1864 and as Navajo Agency headquarters from 1868 to 1903, is an example. At this same time Navajo architecture consisted almost entirely of hogans. Winter hogans were dome-shaped structures constructed of logs or stone masonry. Summer hogans were brush ramadas. These structures were a constant in Navajo architecture for about 350 years.

In 1880, the BIA began construction of a substantial boarding school building at Fort Defiance. Following 1900, many boarding school buildings at a number of locations were constructed. All these buildings reflected Anglo-American architectural styles, Late Victorian, Neo-Classical Revival, and Collegiate Gothic. These were styles which were popular at the time and which were used for school buildings across the country. While use of these styles had to do with insensitivity on the part of the BIA and an effort to educate Indian children in an environment entirely removed from their own.

Just as the period 1928 to 1933 was a turning point for Indian administration, so was it for government architecture at the Indian schools. In 1938, Collier initiated his program of replacing boarding schools with day schools. PWA funds were obtained to build 100 day schools, nearly half of them on the Navajo Reservation. Collier directed architects Mayers, Murray, and Phillip to design buildings which used local materials, locally understood construction systems, and result was buildings constructed of locally-quarried sandstone set in mud mortar with viga-supported flat roofs. The simple Pueblo Revival style buildings were constructed by Navajo crews. While most of the buildings were in the regionally-based Pueblo Revival Style, some buildings were hogan-shaped with corbelled roofs, reflecting the Navajo's architectural heritage. In all, 46 day schools were constructed on the Navajo Reservation between 1933 and 1938. This group of structures represents an important era in the administration of an the

architecture of the BIA.

In addition to the day schools, a new Navajo tribal capital, Window Rock, was constructed in 1934 and 1935. Also designed by Mayers, Murray and Phillip, the administration buildings and houses were of sandstone and were in the Pueblo Revival Style. The most impressive of the buildings was the Council House, built to symbolize tribal self-determination. It is two-stories high, octagonal in shape, and has large vigas radiating out from the center. This monumental hogan was the meeting place for the Tribal Assembly, the democratically elected tribal government. Both Window Rock and the day Schools are important because they reflect a genuine effort on the part of the BIA to provide education and administration in an architectural environment that the Navajos would recognize as being based on their own.

Ellen Threinen

Memo to Fledgling Government Archeologists

Seventeen years ago, when I first took up the formal study of archaeology, it was rare that a fellow student would admit government employment as a career goal. At that time government employment was, for archaeology students, practically limited to the National Park Service, and NPS positions in research were strictly limited. For a student to say he or she meant to seek government employment was tantamount to saying that he or she was not serious about true professionalism—i.e., teaching or research. As such things happen, the employment climate changed rapidly, so that by 1968 I found myself, B.A. fresh from the press, investigating the rumor of a temporary position as archaeologist in the Albuquerque office of the Bureau of Land Management (I was, incidentally, told the position had been converted to an agronomist).

One did not take such positions seriously in terms of career. One reason was undoubtedly the hubris of youth, but the other was that such positions were usually temporary or sporadic. However, the employment situation was in fact rapidly changing, so that in 1973 I found myself in a seminar on "public archaeology", which the next year was re-titled to include the term "cultural resource management". By that time, serious students were talking about working for the government as archaeologists. As a sign of the times that particular department soon announced a program leading to a Ph.D. in cultural resources management, its first graduate the late Mark Grady. Eventually, the winds of change caught me up, so that by 1975 I found myself involved in cultural resources management as an archaeologist. At that time, New Mexico saw a vast increase

in the number of archaeologists in government, part of a general, national trend starting about 1974 (Rogge 1980:32-33).

Anecdote and observations on a changing employment situation in the last decade and a half has led me to the conclusion that students of archaeology are seldom prepared for the experience of government, either by inclination or training; although aspiring to it has become a commonplace. The reasons are several: teachers without government experience, academic bias against the pragmatics of government, complexity of bureaucratic behaviors, self-selection, and so on. The result is that fledgling government archaeologists earnestly make their applications without an informed notion of what to expect. Goaded by (usually) economic motivation, they too often find themselves attempting to enter government without consideration of salient facts about bureaucracies, government archaeology, or the politics of cultural resource management.

I shall present five postulates characterizing government bureaucracies that in a perfect world would be self-evident, but most frequently are largely experiential. From the flirtations we have had with the philosophy of science (v. Shiffer 1981:899-908) we archaeologists realize that postulates are self-evident. For students who wish to pursue the subject, most universities, like the University of New Mexico, offer courses in public administration. It might be to personal if not to professional advantage for students to acquire a grounding in basic public administration before embarking upon a government career.

My five postulates are:

Foremost, *the social environment in which a bureaucrat operates may in practice be unrelated to a reality external to the organization.*

Second, *the organizational values under which a bureaucrat operates are always implicit.*

Third, *in the United States civil service, the Peter Principle is institutionalized.*

Fourth, *in government bureaucracies, stylized verbal behaviors are valued over action.*

Lastly, *values held by government bureaucracies serve, as a basic purpose, self-perpetuation of the organization.*

1. In considering the first postulate, that a bureaucracy need not receive external stimuli in order to exist, it should be borne in mind that an organization may not desire certain stimuli and be therefore selective in its attention. That is Kafkaesque, showing that art reflects reality. A bureaucracy, to perpetuate, need justify its existence by catering to as few as one client to remain viable. The naive assumption often encountered, that a given government agency functions to fulfill a legislative mandate or execute a formal mission, has little currency within its structure. In some instances it may be seen that it is in the interest of the organization to do nothing rather than antagonize a powerful client or patron; as example letting cultural resources go hang, or by implementing only selected portions of a mandate. By selectively disregarding external conditions the internal affairs of the organization can proceed without disruption. A typical example of such disregard of the external reality of cultural resources is found in the position that since

no inventory is available, evaluation of cultural resources will take place either at some unspecified time in the future or a priori categories are invented for treatment as though they were real.

2. Implicit values that govern an organization tend to define both individual and collective modal behaviors. Success—capture of Power—for members of an organization is essential if they are, as individuals, to function. Success necessitates that the individual learn the grammar of the values system operating in the organization, and furthermore, demonstrate a certain virtuosity. Being implicit, the values require a sufficient amount of time to absorb and to demonstrate competency. Failure to make such demonstrations results in negative sanctions, shunting from promotion paths, and eventual isolation. A sequence of tangible rewards for demonstrating ability normally involves eventual promotion from the ranks of the staff to a supervisory position and from there to a line management position. There is, of course, a crucial difference between the use of the term, management, in a structural sense, and its use in cultural resource management.

3. The rise of an individual from specialist or technician status to supervisory or management positions embodies the popular concept of the Peter Principle, in which a competent person is promoted until he or she exhibits incompetency. Rather than being demoted, the person is retained at his or her highest level of incompetency. To use a practical example, suppose that a fledgling government archaeologist is a marvel at excavation and consequently is promoted to a staff slot. There, technical competency results in promotion to a CRM section chief, then a division head, and, eventually, becomes a regional director. As the principle operates, originally rewarded for technical competency, he or she eventually would be put in a position unrelated to the competency earlier exhibited. A glance at the position classification list of the Office of Personnel Management will fail to disclose any such profession as "civil servant", but will reveal hundreds of technical titles, like *Archeologist* (series 193). From the specialties, forestry, range conservation, archaeology, geology, and the like, will come the management for government bureaucracies, and thus is the Peter Principle institutionalized. Each government agency has a range of specialties from which it traditionally recruits its managers.

4. A basic bureaucratic value is that stylized verbal behavior is safer than action, and therefore preferable. This postulate emphasizes that bureaucrats are prone to a kind of Orwellian double-think in which talking is equated with work, and that they must participate in endless rounds of meetings in which nothing is overtly decided. Functionally, verbalization in cliché and use of special definitions satisfies the passion for anonymity that is essential for bureaucratic success. By verbalizing, preferably in committee, the decision process can be made amorphous. Given time and sufficient talking, even the persons directly involved can have difficulty tracing the histories of decisions, and the process is sometimes intentionally obscured. The latter feature is a frequent source of frustration when private citizens employ the Freedom of Information Act on decision histories.

5. Lastly, the basic function of the organization is to assure its survival, its self-perpetuation. Courses of action, when they must be taken, are taken on the basis of what is good for the organization. While it may have happened that government organizations have declared themselves dysfunctional and requested abolishment, it seems unusual to do so. The common case is the contrary: they tend to hold on to their organizational integrity until they are abolished for political purposes. One unfortunate consequence is that there are government organizations that, from a management analysis perspective, should be disassembled, modified, or abolished, but which continue from generation to generation, perhaps changing names or structure to give the illusion of change. Internally, what is good for the organization is valued as good regardless of other, external, considerations.

Such things may or may not be discussed in anthropology departments: I think not. At least in the recent past the distance between government archaeologists and archaeologists at large was illustrated by the amount of time devoted to professionalism Science during early meetings of NMAC, to no conclusion. It is important to think about such things before entering the government as an archaeologist, for in the main, except for the few research positions, the student will be caught in a double role as archaeologist-as-bureaucrat or bureaucrat-as-an archaeologist; for in the main, except values if not ethics. Falling willy-nilly into government service without adequate consideration of the implications is a common mistake. In retrospect it appears to have affected my cohort (1975 plus or minus three years). But hardly any of my cohort expected government careers. In terms of basic values we were more archaeologists than bureaucrats, more scholarly than ambitious, and those organizations lacking experience with archaeologists no doubt found our values incomprehensible. My impression is that there tended to be a high resignation rate among my cohorts after a time, and that the first wave (in New Mexico) of essentially mis-placed academic personalities has thinned considerably. We are being replaced, I perceive, by persons who are more comfortable in bureaucratic environments, and who in many cases originally intended to pursue a career in government.

Implications for the future include a basic change in the kind of person who becomes a government archaeologist or cultural resources management specialist or bureaucrat as what can be called the second generation takes over vacated and new positions. In terms of what bureaucrats call a "career ladder", for instance, the second generation will be accepting that one cannot remain a practicing archaeologist and advance through promotion to higher grades, or advance in grade while remaining in a geographic area of special knowledge. While it is true that the NPS has advertised a position that could theoretically have a salary over \$50,000, it is also true that the probability of a given archaeologist reaching Senior Executive Service is poor. It will also be accepted that the title *Archeologist* does not necessarily carry with it the exercise of archaeology in the sense of carrying out research on remains of past cultures. The second generation will have less rigidly held

values, allowing flexibility in accomodating to organizational values. And, if he or she is to be successful, it will be able to eventually relinquish the title of *Archeologist* in the interests of advancement in the organization. Finally, ultimate advancement will be found to go to the more politically adroit rather than to the more archaeologically accomplished.

It is not my intent to disparage bureaucrats or discourage archaeology students from entering government service. The contrary, for certain personalities life in a large, ranked organization is secure, comfortable, and can entail a sense of personal service to the people of the United States. It is my intent to encourage fledgling government archaeologists to make a clear-eyed assessment of their needs and of the character of organizations which might employ them before committing themselves to a career. It is in one's interest to spend

considerable effort to learn at least as much about government and public administration as they learn of anthropology and archaeology, if they are seeking government careers. Particularly it is important to know the political character of the organization and have a feel for its values system, for, "There is always a gap between values and behavior, between ideals and performance. Even though values always influence the behavior of cultural organisms, that is, of men, they never control it exclusively. Hence the student of culture needs to distinguish, but also to compare, ideal values and achieved behavior, as complementary to each other." (Kroeber 1960:620).

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Randolph Gilmore



OTHER ORGANIZATIONS

Archaeological Society of NM

1982 Annual Spring Meeting and Call for Papers

The Albuquerque Archaeological Society will be host for the 1982 Annual Meeting of the Archaeological Society of New Mexico.

April 30, May 1, and 2, 1982
Ramada Inn
25 Hotel Circle NE
Albuquerque, New Mexico

Friday, April 30: 7:00-9:00pm Registration
7:00- Hospitality Room
Come & renew old friendships and relax.

Saturday, May 18: 15-9:00am Registration
9:00-4:30pm Presentation of papers
7:00pm Banquet and Bandelier

Saturday May 22, Col. James Bain to rock art sites.

During the special evening program on Saturday, our honored Bandelier lecturer will be Dr. Joe Ben Wheat, who will talk on "The Archaeology of the Yellow Jacket Area." Dr. Wheat has worked in the Southwestern United States for over 30 years and is a leading expert on the prehistoric peoples who lived here centuries ago. In addition, students who received fall and spring scholarships will be introduced, Amateur Archaeologist of the Year Award will be made, and certificates will be awarded to members who have achieved increments in the Certification Program. All those interested in archaeology are welcome to

come and learn more about the opportunities available to those who participate in the Archaeological Society of New Mexico and its affiliated local societies.

Hotel reservations can be made by contacting the Ramada Inn directly, and state that you will be attending the Archaeological Society of New Mexico Meeting. Local phone: 505-296-5472; Toll free: 800-228-2344. Current rates: Singles, \$31.00; Doubles, \$37.00.

Pre-Registration:

You are strongly urged to register in advance. Send your name, number in your party, and fees (Registration fee=\$8.50/person,

Banquet fee=\$10.00/person) to:
1982 ASNM - Registration
Albuquerque Archaeological Society
P.O. Box 4029
Albuquerque, NM 87196



New Mexico Committee for the Promotion of History

About a year ago I decided to attend the annual conference of the Society for Historical Archaeology. I had always wanted to attend a meeting of this group, but since I am an historian, not an archaeologist, I could never justify the expense. But this time it was meeting in New Orleans, on the way home from Washington, D.C., where I had attended the American Historical Association meeting, so I really could not pass up the opportunity. I

listened with fascination to several papers treating archaeology in the Spanish Borderlands, a region whose history has interested me for several years. During the discussion that followed, I naively asked one of the presentors if she had found that documentary material from Spanish Mexican and U.S. archives served to compliment the ceramic and lithic material that she had excavated. She replied that, of

course, there was nothing in the archives that could possibly be of any use to her. "Besides," she continued, "I don't read Spanish."

My disappointment deepened during the course of extended discussions with other archaeologists after the session. After hearing such stereotypical comments as, "We can't talk to you *historians*," and, "You don't speak *our* language," and, "All that you *historians* are interested in are great political ebbs and flows," I began to feel like a persecuted racial minority.

When I returned home to New Mexico and discussed my recent trauma with other historians, I found that my colleagues were just as ignorant of archaeological work as the archaeologists were of historical research tools and scholarship! It became apparent that something had to be done to bridge the communications barrier that existed between the two disciplines. Informal gripe sessions evolved into larger, more structured discussions about the problems facing the history profession. The consensus was that there existed a need to establish some kind of organization to address these problems. As a result, the group decided to create the New Mexico Committee for the Promotion of History, a loose umbrella organization

representing the historians and historical organizations throughout the state, reflecting their concerns as well as those of other disciplines who utilize the services of professional historians.

The Committee seeks:

1. to promote greater awareness of, and appreciation for history in the community at large;
2. to develop channels of communications between historians and persons in archaeology and other disciplines, between professional and amateur historians, and between historians inside and outside the university community.
3. to serve as a forum for historians who are not affiliated with academic or historical institutions;
4. to serve as an advocate to protect historical resources in New Mexico;
5. to advance the professional development and promote career opportunities of historians in the state.

In pursuit of goal number 2, I have written to many of you soliciting your ideas. The response has been extremely encouraging, indicating that many of you are eager to

establish a closer working relationship with your colleagues in history. At your kind invitation, I will be visiting you at the next business meeting of the New Mexico Archeological Council in March. I look forward to talking with you further and to exchanging ideas concerning future cooperative projects.

One such project, to be undertaken in coordination with the New Mexico Records Center and Archives, is the compilation of a Directory of Historians and Historical Organizations active in New Mexico. Each contributor will list major fields of expertise, special qualifications, and a summary of previous experience. This Directory will be made available to parties interested in utilizing the skills and services of historians, and will be especially useful to contract archaeologists.

If you would like more information about the New Mexico Committee for the Promotion of History, please feel free to contact me at 404 Montezuma, Santa Fe, NM 87503, or call me at 827-2321.

Stanley M. Hordes, Ph. D.

State Historian,
NM Records Center and Archives

Society for American Archaeology Committee on Public Archeology

I am deeply apologetic about not having gotten a *COPA Communication* out to you and the network for the past several months, and hope to have on in the mail by the end of this month. I have found myself in the classic timebind that many of us do, and when faced with a choice of how to spend my few SAA-allocated hours have spent them with direct federal administrative and Congressional action rather than writing a newsletter. That is a difficult choice, but a necessary one. My present overcommitment is not going to end soon, either, and therefore I am faced with the next difficult choice—to step down as the COPA Chairperson, and as the SAA Legislative Coordinator. I am doing this effective the end of this June, and I and the SAA Executive Committee are searching for people and/or alternative means of keeping our public information networks functioning. If you have any suggestions, or would like to volunteer your services, please talk with Richard Adams, SAA President (Center for Archaeological Research, University of Texas, San Antonio, TX 78285; ph. 512-691-4375), or with George Frison, President-Elect (Department of Anthropology, University of Wyoming, Laramie, WY 82070; ph. 307-766-5136).

In the meantime, I am sending out the accompanying ALERT for your consideration and distribution. More details will follow in a *Communication* soon, or give me a call.

There will be a meeting of the *Committee on Public Archaeology* during the Society for American Archaeology annual meeting in Minneapolis April 14-17, 1982. Please check the meeting schedule for time and place, and bring ideas and friends.

Despite some of the negative aspects of the current political climate, as they affect American archaeology, there are many positive things going on. Archaeological

considerations have more priority within the U.S. Department of the Interior than they have for some time, and there is a task force presently working on some federal guidelines for archaeology. A federal job description for archaeologists is in the works. There is significant tightening of budgets and projects involving federal lands, but they are continuing. There is strong Congressional support for basic support for archaeological resource management. But it all takes a lot of public involvement to keep that support base, and you are the essential link in the network. Thanks for all your help to me over the past three years, and let's respond to the present budget discussions like we did last year!

ALERT!

The Reagan Administration's proposed FY83 FEDERAL APPROPRIATIONS allocation includes the following items:

No support for the *Historic Preservation Fund*, either for the state matching grants program (which supports State Historic Preservation offices) or for the National Trust for Historic Preservation

Support for the *National Park Service*, including both in-park programs and external programs such as *Interagency Archeological Services* and the *National Register of Historic Places*, at essentially the same level as FY82.

A significant cut in support for the *Advisory Council on Historic Preservation*, from FY82 levels

of \$1.6 million and 45 staff positions to FY83 proposed levels of \$1 million and 25 staff positions

No support for the *Institute of Museum Services*

Support for cultural resource management programs of the *Bureau of Land Management* at essentially the same level as FY82

Less support for cultural resource management programs of the *U.S. Forest Service*, with estimated cuts ranging from 5% to 40%

I have not yet tracked down information about the Anthropology Program support within the National Science Foundation, or some other specific cultural resource management programs. In the meantime, if you think that programs recommended for cuts or "zeroing out" should be maintained, let your Congressional representatives know. I suggest that we need all the above-listed programs supported at levels commensurate with FY82 expenditures, to maintain a cost-effective management program and protect a long-term research base. I believe we need to (1) express our dismay over these proposed program dissolutions immediately, and (2) be prepared to react with a second or even third round of comments in April-May or later in the year. There are two probable courses of Congressional action on the FY83 proposals: action within 90 days, to resolve the issues well before the fall elections, or else letting everything muddle on for months and operate under a continuing resolution until after the election. In the meantime, we need strong immediate comments on these

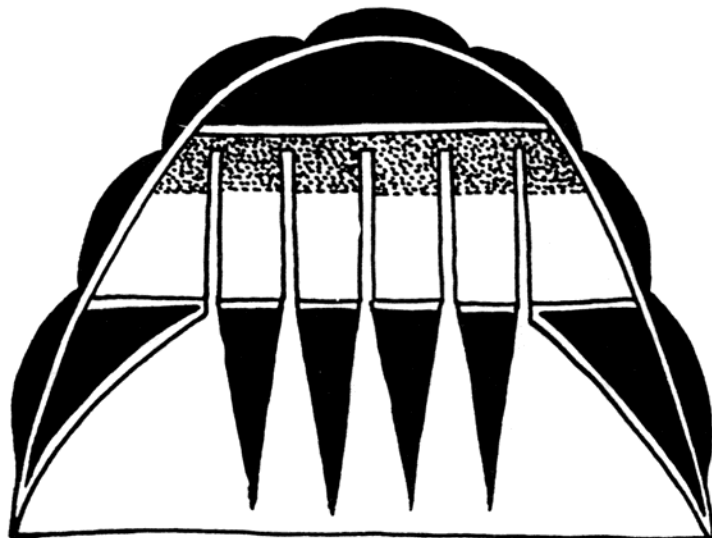
proposed cuts, without necessarily a lot of detail, to:

Your Senators and Congress-people

Representative Siodney Yates,
Chairman, House Appropriations Interior Subcommittee,
Rayburn House Office Building,
Washington, DC 20515

Senator James McClure,
Chairman, Senate Appropriations Interior Subcommittee,
Dirksen Senate Office Building,
Washington, DC 20510

Ruthann Krudson



American Committee for the Preservation of Archeological Collections

10 November 1981

Responding to pressure from Indian spokesmen, the California Department of Parks and Recreation has ordered the destruction (through reburial) of large and important collections of archaeological material. The first phase of this destruction of public collections has already taken place: a series of cremations in pottery jars as they were found in the 1930's was secretly re-interred in Cuyamaca State Park in October. It has been publicly stated by Indian spokesmen that the destruction of the 870 burials in the state collections (along with the 10,000 artifacts associated with them) is only the first step and it is their intention to also obtain and destroy other collections held by museums and universities.

The Central California Archaeological Foundation attempted to secure a court order blocking the destruction of publicly-owned collections of archaeological materials. Their case was rejected on the grounds that there was no broad base of support and that their complaint did not represent public concern. This committee was then formed to demonstrate that there is indeed wide public concern over the destruction of archaeological collections. At its organizational meeting November 4, 1981, the organizational committee adopted the enclosed resolution, re-affirming well-known scholarly ethics regarding the preservation of data and the necessity for keeping intact archaeological evidence for analysis and review by present and future scholars. All conclusions about archaeology, and about Indian history prior to the Mission period, are based on the evidence of archaeological collections—elimination of these collections

is the elimination of the evidence necessary for an important part of America's cultural heritage.

We urge you to review the enclosed documents, and we ask for your support (and if possible the support of your organization) for our resolution. In order to re-open legal action against the Director of the Department of Parks and Recreation, we must be able to show that public opinion is in favor of *preserving* our existing museum collections.

(This committee is a private group and our solicitation for support is not prepared or mailed at the taxpayers' expense)

Sincerely yours,
S/Clement W. Meighan
Committee Chairman

November 27, 1981

Three weeks ago, a hastily assembled group of concerned archaeologists and physical anthropologists met to discuss the portent of the State Parks and Rec's reburial action. From that initial meeting, the American Committee for the Preservation of Archaeological Collections (ACPAC) was born. I am enclosing background material for your information.

For those of you outside of California who may not be aware of the situation, the Director of the California Dept. of Parks and Rec. decreed that all human remains (871) and associated artifacts (in excess of 10,000) be given to Indians for reburial. Thus far, material from San Diego has been buried in Cuyamaca State Park. This collection, which came from sixteen different locations, included cremations in ollas and at least seven pendants made from human bone.

The material from Patrick's Point in Humboldt County was turned over to the Indians on the weekend of November 21-22 and the large Central Valley collections are next. The stated time frame of 18 months for reburial has been telescoped into "as much as possible by the end of the year." No money has been allocated for the study of artifacts and the examination of the skeletal material has been expressly forbidden.

The avowed goal of the Indians involved in pushing for reinterment is: **all** skeletal material and associated artifacts regardless of age, ownership, or storage location. (Del Mar material has been specifically included.)

If you are in agreement with the ACPAC position ie. that prehistoric archaeological collections must be preserved, please join the Committee by:

1. signing the endoresement
2. allowing your name to be listed as a member
3. securing the support of others - individuals and groups
4. noting the percentage of your Indian ancestry - if any - on the endorsement sheet
5. sending a contribution, if you are able to support litigation

All of the above may be mailed to the ACPAC address.

Constance Cameron, Coordinator
Archaeological Clearinghouse
County of Orange
Suite 111
12942-A Magnolia St.
Garden Gove, CA 92641

Resolution of the American Committee for Preservation of Archeological Collections

WHEREAS, archaeological collections are considered to be part of the historical and cultural heritage of the nation and the property of all the citizens, and

WHEREAS, this position is made explicit in all federal legislation dealing with preservation of antiquities, including PL 96-515 (1980) and the Archaeological Resources Protection Act of 1979 (36 CFR Part 1215), and

WHEREAS, it is required that applicants for a permit to perform archaeological research on federal land submit evidence that "... the university, museum, or other scientific or educational institution proposed in the application as the repository (of archaeological collections) possesses adequate curatorial capability for *safeguarding and preserving* the archaeological resources and all associated records ..." and

WHEREAS, these well-established principles are the basis for the establishment and support of archaeological museum collections, and

WHEREAS, these same principles are the basis for requiring Environmental Impact Reports and associated archaeological excavations,

IT IS THEREFORE RESOLVED BY THE UNDERSIGNED COMMITTEE:

1. We re-confirm the professional and ethical duty of scholars in archaeology to observe their responsibility to *preserve* and maintain for study by qualified scholars all

archaeological collections obtained in the course of field investigations. Archaeological collections are defined by scholars as including historic and prehistoric artifacts, skeletal remains, faunal and floral specimens, soil samples, and all other materials removed from archaeological sites for purposes of study and investigation.

2. We urge individual archaeologists to abstain from participation in any field project, contract, or other archaeological program in which individuals have reason to believe that the collections obtained from archaeological research will be given up for destruction.

3. We urge teachers of archaeology to instruct students that the duty of all professional scholars is to preserve their data and make it available for examination by other scholars, and recognition that the basic data of archaeology are site collections. The loss of such collections eliminates the evidence on which archaeological conclusions are based.

4. We urge scholarly organizations in archaeology to enforce their statements of ethics and to treat knowing acts of destruction of archaeological materials (or complicity in such acts) as grounds for expulsion from the profession of archaeology.

Endorsed by the Organizing Committee
November 4, 1981
Long Beach, California

Ed. Note: Use this format for endorsements.

Endorsement of the resolution of the American Committee for the Preservation of Archaeological Collections.

The undersigned express support of the American Committee resolution and register opposition to the deliberate destruction of archaeological collections: (Additional signatures can be given on the back of this form.

Signature _____ Date _____

Name (typed) _____

Address _____

Institutional or organizational affiliation:

This endorsement is: (please check)

- ☐ Personal & Individual
- ☐ Institutional (has approval of board of directors, executive committee, or other governing body)

Do you want to be listed as a member of the American Committee for the Preservation of Archaeological Collections? ☐ Yes ☐ No
(No obligation; if you elect committee membership it places you on the mailing list for future communications of the committee)

Please return to:
C. Meighan, Committee Chairman
Anthropology
University of California
Los Angeles, California 90024

FROM THE EDITOR

Our membership has more than tripled since Volume 1, Number 1 of the NMAC *Newsletter* was published. I have been receiving more and more requests for back issues of the *Newsletter*, many of which have been unavailable. All issues are now available (at the average cost or reproduction and postage). I am currently making indices for each volume, which will also be available. The order form located in this issue lists all copies of the *Newsletter* that have been published. Please use it, or a copy, when ordering.

Membership fees for Calendar Year 1982 are due. Please notice that the annual fees have been raised for Individuals (\$10). A new category has been added — Sponsors (\$15). Institutional membership remains the same (\$25). Please send your dues to Mark Henderson, Secretary/Treasurer, c/o: P.O. Box 10, Socorro, NM 87801.

NMAC Newsletter Back Issues

Order Form

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Send orders to Catherine Aves, Editor, c/o P.O. Box 4301, Albuquerque, NM 87196.

New Mexico Museum of Natural History

The New Mexico Museum of Natural History is off to a good start. It was established by the state legislature in 1980 with an appropriation of \$8,000,000 for the design and construction of a building to house its activities. The building design is well along toward completion but construction must await the raising of \$2,000,000 in matching funds from other than state sources. The program for soliciting funds from large donors and industry is headed by Aubrey Dunn, John Irick and Art Spiegel. The related People-to-People drive is under the leadership of Kate Rust. All are aiming toward early summer for completion of the drives.

The museum will be located on land donated by the City of Albuquerque near the Albuquerque Museum and north of Tiquex Park in Old Town. The museum's charter covers the full variety of natural science with principle emphasis on their manifestations within the state. New Mexico has a fascinating geological record. For instance, the Rio Grande rift and the Jemez caldera are unique

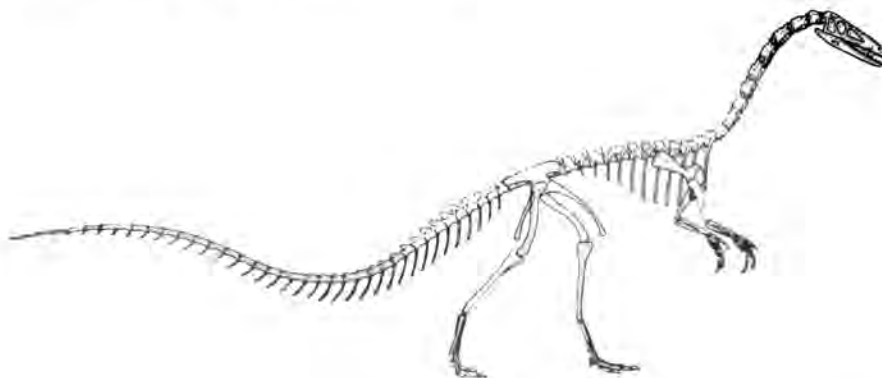
features in this part of the world. The state is rich in paleontological history ranging from the ancient Permian reefs in the southeastern sector to the overlapping dinosaur-early mammal records in the northwestern quadrant. Pleistocene mammal remains are found in many areas.

A wide variety of contemporary life zones is also represented within the state. They include regions of Sonoran desert, meadows, rolling plains and pinyon-juniper mesas. Each contains its diversity of animals and plants that remain interdependent for their existence. It is these life forms and land

features that will form the basis for the exhibits and scientific programs of the museum.

Cooperative endeavors with the schools and institutions of higher learning throughout the state will be an important part of the museum's future by contributing to the construction matching funds should call the museum at (505) 842-3006 or write to the Fund Raising Committee, P.O. Box 7010 Albuquerque, New Mexico 87194.

Richard A. Bice



Coelophysis—New Mexico State Fossil

PUBLICATION ANNOUNCEMENTS

KOSTER: An Artifact Analysis of Two Archaic Phases in Westcentral Illinois, by Thomas Genn Cook

KOSTER An Artifact Analysis of Two Archaic Phases in Westcentral Illinois Thomas Genn Cook



Northwestern Archeological Program
Prehistoric Records No. 1
Koster Research Report (S. No. 3)

This volume represents the first major research work to be produced on the Koster site in Greene County, Illinois. The author provides a detailed description and inventory of artifact classes in this extensively illustrated book which includes 44 life-size plates of the Koster material. Special attention is devoted to artifacts that can serve as culturally and chronologically diagnostic markers between the fourth and second millennia B.C. Cook develops a rigorous and generally applicable logic to build and test hypotheses about the pre-historic tasks that produced the tools and trash at the Koster site.

218 pp. 77 illus.

Clothbound \$18.00

Paperback \$12.00

Available from:

CENTER FOR AMERICAN ARCHEOLOGY
P. O. Box 1499
Evanston, Illinois 60204

HALIKSA'I: UNM Contributions to Anthropology

The UNM anthropology students, both graduate and undergraduate, have formed a society, the primary aim of which is to publish a student journal. In addition, this society has planned several colloquia and has a biweekly newsletter already in circulation. The most ambitious goal, however, is the annual spring publication of the journal, *HALIKSA'I: UNM Contributions to Anthropology* (*Haliksa'i* (Hopi) is an introductory indicating that a mythic or historical narrative follows).

While campus contributions of labor and funds will provide the foundation, the staggering cost of establishing a journal is such that additional aid is needed to insure that the first issue will be widely distributed, quality publication. The support of the larger anthropological community is being sought.

Donations of:

\$15.00 or more bring you the journal and recognition in its pages as a Contributor to the Society.

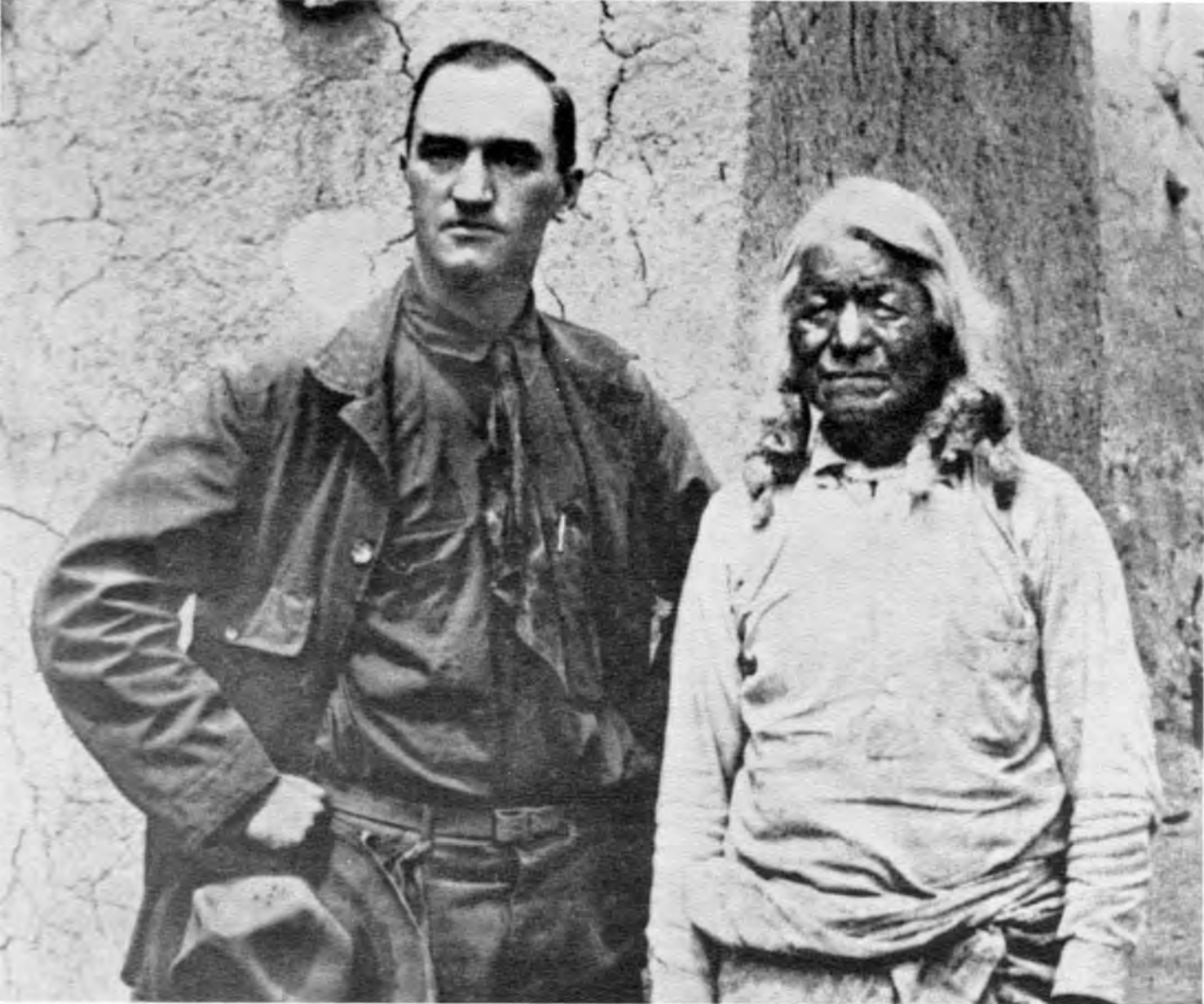
more than \$25.00 is recognized as that of a Friend of the Society.

All contributions of \$15.00 or more entitle the donor to an issue of *HALIKSA'I*.

Send your tax-deductible donation to:

HALIKSA'I
Department of Anthropology
University of New Mexico
Albuquerque, NM 87131





IT'S TIME TO RENEW YOUR MEMBERSHIP

NEW MEXICO ARCHEOLOGICAL COUNCIL, INC.

MEMBERSHIP APPLICATION CALENDAR YEAR 1982

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NMAC Members shall receive quarterly Newsletter, occational publication, and NMAC membership privileges. Cost per year: Individual Membership \$10.00, Sponsors \$15.00, Institutions and Organizations \$25.00.

PLEASE MAKE CHECKS AND MONEY ORDER PAYABLE TO THE NEW MEXICO ARCHEOLOGICAL COUNCIL.

Send membership inquiries and/or payment to the New Mexico Archeological Council, c/o Mark Henderson, Secretary/Treasurer, P.O. Box 10, Socorro, NM 87801.

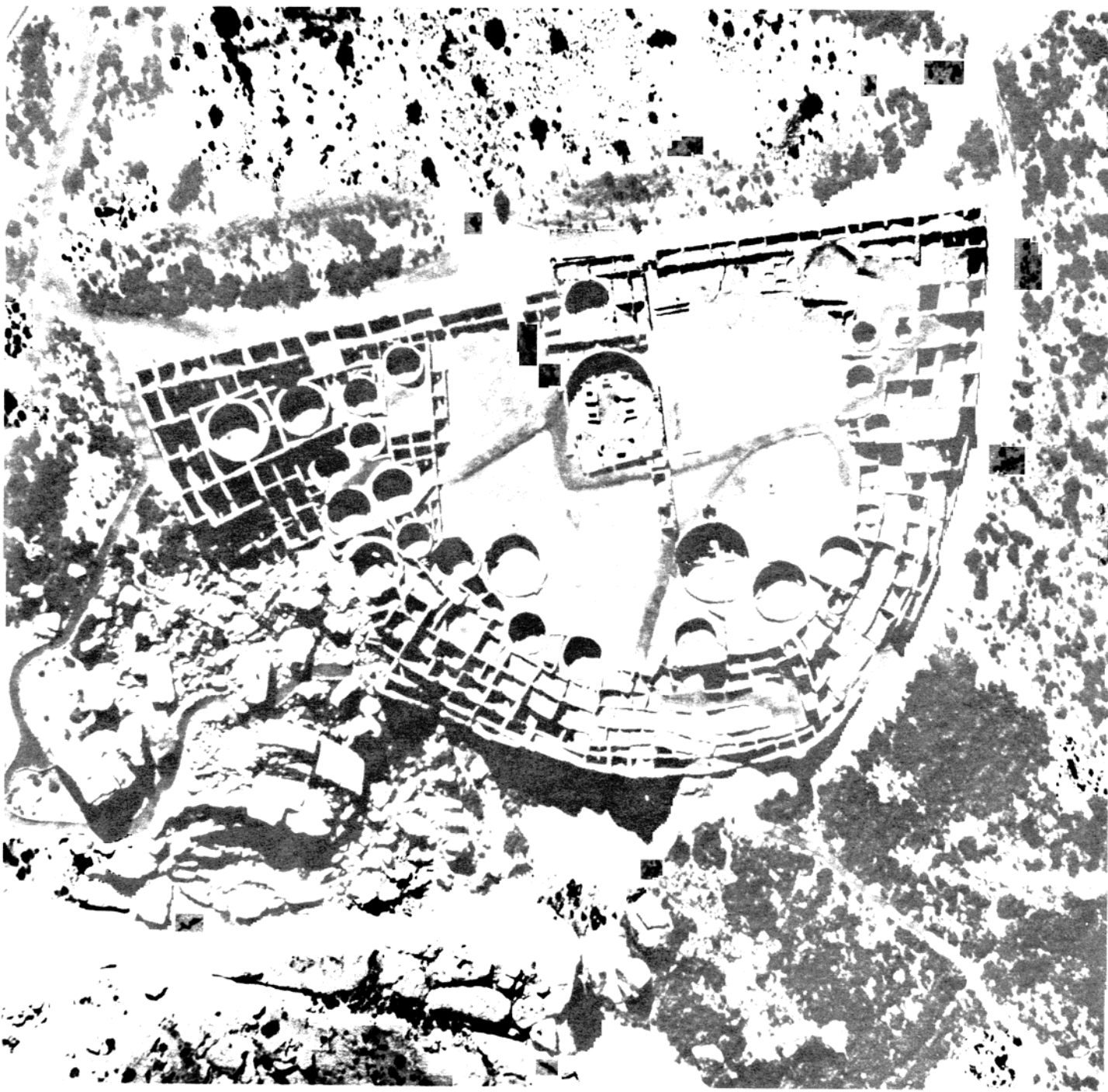


New Mexico Archeological Council
c/o Catherine Ann Aves
P.O. Box 4301
Albuquerque, NM 87106

Newsletter

New Mexico Archeological Council

Vol. 4, No. 5 & 6



COURTESY NATIONAL PARK SERVICE DIVISION OF CULTURAL RESEARCH

Fall & Winter
1982

Editorial Staff This Issue Jan V. Biella
Carol J. Condie
Catherine Aves

PAPERS PRESENTED AT THE WORKSHOP MAY 20-21, 1982

Site Predictive Models and Their Appropriate Use An Example from the San Juan Basin

A project recently completed by ESCA-Tech (Kemrer 1982) involved the development of a site frequency prediction model in the San Juan Basin for the Bureau of Land Management, Albuquerque District. This paper describes the methods used to produce the model, the evaluation of the model, and its applicability. It also discusses the appropriate use of predictive models for management and planning, in the context of a recent programmatic Memorandum of Agreement (PMOA) for the Federal Coal Management Program regarding cultural resources management on affected lands, as proposed by the Advisory Council on Historic Preservation.

The Bureau of Land Management requested that the project define formal relationships between environmental variability and site and site type frequency variability, and, on the basis of these relationships, develop a model which would predict the results of these relationships within 75,000 acres of Preference Right Coal Lease Areas (PRLA's) which extend from the site of the Bisti Trading Post to Star Lake in the San Juan Basin of New Mexico.

The scope of work called for a Class II sample survey of approximately 11,320 acres within the PRLA study area.

Two data bases were developed: an archaeological data base and an environmental data base. Six surveys located within and immediately adjacent to the PRLA study area were selected to contribute to the archaeological data base on the basis of their data comparability (i.e., how sites were defined). They are:

1. The Bisti-Star Lake Class II sample survey of lands for proposed coal development which surround the PRLA study area. A total of 37,610 acres of land were surveyed and reported in Huse, et al. (1978).
2. The Alamito Coal Company Survey of 26 contiguous sections (approximately 16,640 acres) of land adjacent to the central portion of the PRLA areas and immediately east of Chaco Canyon (Wilson 1979).
3. The El Paso Coal Company Survey of a contiguous parcel of 15,273 acres of land (23.9 square miles) immediately west of the northernmost PRLA's (Sessions 1979).
4. The survey, sponsored by the Public Service Company of New Mexico (PNM), of the New Mexico Generating Station site, approximately 2,400 acres of land within the northernmost PRLA's (Powers 1979).

5. A survey of the Western Coal federal lease, a PRLA of 2,160 acres in the northern portion of the study area (Ganas 1980).

6. A survey of the Western Coal state lease, 320 acres of state land which is now the site of the De-na-zin mine, which abuts PRLA's in the northern area (Ganas 1979).

Data from a total of 1,174 site components were coded and compiled on magnetic tape. Sufficient data for modeling purposes were available to define eight major site types, each of which served as an archaeological variable:

lithic sites	total Navajo sites
Anasazi sites	Spanish/Anglo sites
pre-1933 Navajo sites	unknown historic sites
post-1933 Navajo sites	total sites

Soils and major washes were selected as environmental variables for two reasons:

The spatial distribution of soils and washes are the least altered aspects of regional environment from the prehistoric era to the present.

Soils and major drainages are important regulators of regional biotic potential, and hence the locations of human subsistence activities.

The soil types used as variables were six Soil Conservation Service (SCS) mapping units for San Juan County (Keetch 1980). They were selected on the basis of geographic extent and their representative roles within and adjacency to the PRLA study area. Of the soil types represented on each fifty-square-mile soil map within and adjacent to the PRLA study area, the selected soil types average 63% of the area (ranging from 41 to 76%). The selected soil types are:

Blancot-Notal association (BT)
Huerfano-Muff-Uffens complex (AU)
Doak-Sheppard-Shiprock association (DS)
Avalon-Sheppard-Shiprock association (AZ)
Stumble-Notal complex (SX)
Doak-Avalon association (DN)

The major washes included, for example, Escavada, Chaco River, De-na-zin, and Coal Creek.

LANDSAT multi-spectral reflectance values were utilized to collect and identify the soil and wash variables. The score was collected by the satellite's orbital passage over the study area on 15 October 1977, a season when cloud cover is minimal, wind velocities are low, and the annual vegetation

is dead. This allows good visibility of, or in this case, reflectance from, the ground surface. The LANDSAT units of observation are called pixels. Light reflectance from the earth's surface is collected in four wavelengths over land units measuring roughly 50 by 70 meters.

The reasons for using this approach were:

1. The study area is very large, particularly considering the locations of the archaeological data — thus the area can be classified in considerably shorter time and at less expense than, for example, by digitizing the environmental data.
2. The PRLA's and a considerable quantity of the archaeological data fell outside the areas mapped by SCS — namely, portions of the Navajo Reservation and McKinley County. Therefore, some method was required for extrapolating the occurrence of these environmental variables into these unclassified areas.
3. The LANDSAT data are in numerical form, facilitating classification based upon mathematical argument; and also in quantitative form, for use as variables.

The method for identifying and classifying the environmental variables was to utilize the Soil Conservation Service (SCS) maps (which show the SCS soil types superimposed on aerial photos) as a guide for locating areas of each of the various soil and wash variables on the LANDSAT images. Two to four of these training samples were collected for each of the seven variables. The spectral values for each variable were then analyzed to derive its **signature** (unique spectral characteristics), using discriminate function analysis. One class, the Doak-Avalon association, exhibited two spectral signatures, and therefore was separated into two classes. Thus eight spectrally classified environmental variables were defined. As a test of classification reliability, the reflectance based classified pixels were reclassified against the SCS classified zones from which they were derived. The agreement between the two classifications ranged between 68 and 100%, with most ranging between 77 and 92%. The entire study area was then classified by the occurrence of the eight environmental variables.

In order to interact the archaeological and environmental data, units of observation were created by superimposing a 2x2 kilometer grid system over the entire study area. This grid system included 1,620 units. The 2x2 kilometer unit was selected for two reasons:

1. The area is sufficiently large to capture on-site and extra-site environmental relationships. Baker and Sessions (1979), who utilized this approach in the EPCC study, found that 1x1 kilometer units produced significant, but relatively low, correlations.

2. By selecting units of uniform size, correlations would not be biased by spatial differences.

The grid unit also served in generating values for the archaeological and environmental variables. For each site type category, values were defined as observed site frequencies per grid unit. For each environmental class, actual and proportional classified pixel frequencies per grid unit were used as values. In addition to these sixteen environmental variables, all unique two-way combinations of the soil and wash classes were also used as variables in order to assess or model more complex site locational strategies accounting for environment with the archaeological variables.

The method used to correlate the two sets of variables was backward stepwise multiple regression. Initially, all environmental variables enter the regression equation, and those variables which fail to correlate with site frequencies at the 0.1 level of significance are eliminated until only those which account significantly (at 90% probability) for site frequency variability remain in the equation.

Several runs were made to screen out unimportant environmental variables; these will not be discussed here.

The regression analyses with the original archaeological data base produced the following results: the explained variance (R^2), expressed as a percentage for each archaeological class, was:

site type	R^2
lithic sites	75%
Anasazi sites	62%
pre-1933 Navajo sites	86%
post-1933 Navajo sites	71%
Anglo/Spanish sites	64%
unknown historic sites	52%
total Navajo sites	75%
total sites	79%

The regression equations were used to predict frequencies for each site type within the grid units containing environmentally classified data throughout the PRLA study area. These initial predictions were important ingredients for selecting sample units for the Class II survey. A total of eighteen sample units were surveyed, the data were compiled into the archaeological data base, and another set of regressions was developed. The results of these analyses were:

site type	R^2
lithic sites	64%
Anasazi sites	65%
pre-1933 Navajo sites	68%
post-1933 Navajo sites	46%
Anglo/Spanish sites	53%
total Navajo sites	57%
unknown historic sites	52%
total sites	60%

The R^2 values are generally lower for this model. There are reasons for accepting the second model as a more reliable estimator of site frequency variation:

1. The Class II survey data added 22% more observations for modelling purposes, and thus the second model probably takes more archaeological frequency variability into account.
2. For approximately half the equations, fewer environmental variables are included, which indicates that some variables had probably

3. The prediction error within the PRLA sample units is sharply lower for the second set of regressions, indicating that the second model is a better estimator of site frequency variation, particularly for the PRLA study area.

In summary, the second set of regressions is a more conservative model, but the descriptive statistics show that this model is probably a more reasonable estimate of the degree to which site frequency variation can be predicted from environmental variability.

Using the standard error of estimate and setting confidence limits at 95%, the predicted site frequencies are accurate within:

site type	accuracy
lithic sites	±4 sites
Anasazi sites	±3.6 sites
pre-1933 Navajo sites	±2 sites
post-1933 Navajo sites	±4 sites
Anglo/Spanish site	±1 site
unknown historic sites	±1 site
total Navajo sites	±4.6 sites
total sites	±7 sites

An interesting example of a limitation in this model caused by not taking into account non-environmental variables emerged from our analyses. Two crews performed the Class II survey. One crew surveyed several parcels which fell on the Anasazi Great North Road, and consequently recorded fairly large numbers of road-associated sites. Two sets of regressions were run against all site categories; one including the data generated by the crew which did not survey the Great North Road, and the other including the data from the crew which did survey the road. The R^2 values for all site categories differed by 0-4%, except for Anasazi sites, where the difference was 9% lower for the crew which surveyed the Great North Road. This predictive model has utility in meeting a number of cultural resources management needs.

1. It can serve to apprise managers of the archaeological content and variability within a large area of potential development, and thus assist in identifying future planning and management needs.
2. It can be a useful tool in compliance management and the assessment of survey adequacy.
3. It can be of utility to archaeological consultants in budgeting time and money for 100% surveys and assessments.

However, this or any model cannot serve the purposes advocated by the Advisory Council on Historic Preservation in their proposed amendments to the PMOA regarding federal coal development (Advisory Council 1982).

Two proposed modifications to the PMOA are made:

1. To extend the provisions of the PMOA "to the management of coal mining on Indian lands and on federal lands the surface of which are administered by agencies other than BLM."
2. Provision of an alternative to the means established in the PMOA for compliance with section 106. The alternative employs comprehensive planning based on predictions of the locations and significance of historic and cultural properties, allowing the completion of procedural requirements earlier than would otherwise occur. The benefit of this approach is that it lessens the likelihood of delays during the operation of a coal mine. Another benefit is that comprehensive planning provides a context and guidelines for all identification, evaluation, and treatment activities, improving the quality and productiveness of these activities without raising, or even while lowering, their cost.

An implementation mechanism for the proposed alternative would include:

Preleasing

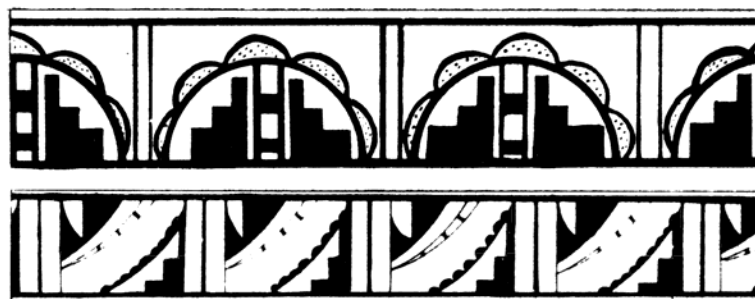
In preleasing stages, agencies would consult with the State Historic Preservation Officer within whose state the prelease area is located and conduct an overview (Class I survey, defined in BLM manual § 8111) of historic and archaeological properties. This overview would synthesize existing knowledge about historic properties to provide tentative information about the locations and types of historic properties present. Copies of the overview would be distributed to the surface management agency, the Office of Surface Mining (OSM), and the SHPO.

Mine Plan Submission, Review and Approval

As part of a mine plan submission, OSM would require submission of a Preservation Plan for the identification, evaluation, protection, and treatment of cultural and historic properties that might be affected by coal mining operations proposed in the mine plan. Prior to taking action on a mine plan submission, OSM would review, modify and approve the preservation plan in consultation with the SHPO, the surface management agency, and, if necessary, the Council. Preservation plans would be developed in accordance with and meet the following objectives and standards.

Preservation Plan Objectives

- Set forth what is known about the history and prehistory of an area.
- Describe and evaluate the quality of historical, archaeological, and other surveys and studies in the area, upon which knowledge of the area's history, prehistory, and historic properties is based.



- Identify organizations, professions, local governments, social or ethnic groups, and others with interests in or concerns about historic properties in the area. Set forth appropriate methods, where needed, for obtaining the views of and consulting with such groups.
- Classify, describe and determine the locations of known historic properties, including those in or determined to be eligible for the National Register of Historic Places, and those recorded in state and local inventories, publications, and other data sources which might be eligible for the National Register.
- Identify subareas within the area where historical, ethnographic, geographic, geologic, environmental, remote sensing, or other pertinent data indicate that undiscovered historic properties are likely to exist.
- Classify known historic properties, and properties likely to exist, according to types based on their potential value for archaeological research, their potential or known sociocultural value, their potential for public interpretation, and their potential for continuing use or adaptive reuse.
- Propose appropriate specifications for locating predicted types of properties, taking into account the nature of the predicted types and the conditions of the ground surface.
- Assess the significance of known and predicted properties and property types, using the National Register's "Criteria for Evaluation" (36 CFR § 60.6), pertinent State Historic Preservation Plans, and relevant professional literature to provide general guidelines.
- Propose appropriate specifications for the management or treatment of such properties and predicted types of properties.

Preservation Plan Standards

A preservation plan is conducted in accordance with the techniques and methods generally expected by the historic preservation profession and pertinent to the area under study, by or under the supervision of a professional meeting qualification standards set forth in "Appendix C — Professional Qualifications" 42 Federal Register 5382, 28 January 1977.

A preservation plan is based on a thorough review of pertinent historical, ethnographic, sociological, geological and other sources, as well as relevant state, regional and local plans and inventories, and the National Register of Historic Places.

A preservation plan is founded on the principles and policies set forth in:

Guidelines for Local Surveys: A Basis for Preservation Planning (NPS 1978)

The Archeological Survey: Methods and Uses (NPS 1978)

The Resource Protection Planning Process (NPS 1980)

The Secretary of the Interior's Standards for Rehabilitation

Treatment of Archeological Properties (ACHP 1980)

Area Encompassed

The Plan's specifications for identification, evaluation, protection, and treatment of

historic properties will cover all areas affected by the proposed mine plan. The study from which these specifications are derived will not be limited to the mine plan area and should encompass all relevant areas in the mine vicinity with similar historic, archaeological, or cultural properties or similar environmental characteristics.

Classification

A preservation plan classifies known and predicted historic properties into types based on their known or potential value for research into history or prehistory, socio-cultural uses, interpretation to the public, and continuing or adaptive re-use, and on the nature of the activities that created the property type. The classification will be designed to facilitate general characterizations about the location and significance of each type.

Identification

For each property type, and using available information including but not limited to data on topography, hydrology, soils and geology, a preservation plan describes the characteristics of or identifies those subareas within the mine plan area that are likely to contain each type of property. It provides specifications for:

- Intensive survey of subareas where historic properties are likely, designed to identify all such properties, taking into account the characteristics of each type and the surface conditions of the land.
- Sample survey in those subareas where historic properties are not likely, adequate to test the prediction that no such properties are present.
- Reconnaissance survey in those subareas for which too little information is available to make reliable predictions about the likelihood of properties, so that predictions can be made and adequate identification methods can be specified.
- Methods to identify cultural or religious areas of significance to Native Americans or other ethnic groups, which will include reviewing existing data and which may include conducting ethnographic studies.
- Mechanisms for modifying predictions and survey strategies as needed, based on tests of predictions and other field work.

The levels and types of professional expertise necessary to adequately carry out the identification activities.

Evaluation

For each property type, a preservation plan describes the attributes that give significance and the conditions of integrity necessary for these attributes to be present. It takes into account the eligibility criteria of the National Register of Historic Places and the likelihood that study of the property type will contribute important new or corroborative information to the understanding of history or prehistory. It describes the significance of each type, considering potential value for public interpretation, potential for continuing or adaptive re-use, and cultural or religious

values to Native Americans or other ethnic groups. It provides specifications for making evaluations during field work, and for the level and type of professional expertise necessary to make such evaluations.

Treatment

For each property type, a preservation plan describes treatments to mitigate adverse effects, responding to the significance of the property type and taking into account the number of properties of each type that are likely to be affected and the extent of effect. Treatment may include, but need not be limited to: avoidance and preservation of a property in place, or recording and relocating a property.

As shown in these guidelines, archaeologists would be required to utilize the predictive model to assess the significance of known **and predicted** sites. This procedure would necessarily entail the following methodological (and legal) problem. All criteria for significance would have to be included within the cultural resource categories utilized in the predictive model. However, since National Register of Historic Places eligibility criteria include (and in fact emphasize) the identification of **unique** scientific, heritage and educational values, the number of criteria required to adequately characterize and assess predicted sites would necessarily have to be infinitely large. In other words, it is virtually impossible to adequately assess predicted sites.

It should also be kept in mind that the accuracy and precision of any predictive model will vary directly with the number of sites within any given category (cf. Judge, et al. 1975). This statistical fact underlies the reason that ESCA-Tech utilized extremely broad site type categories for the Bisti-Star Lake predictive model. Unless the archaeological data base developed for any given area contains an infinitely large number of sites, such that predictions could be made for resources that were categorized by (according to Advisory Council guidelines) culture, time period, site type, and an infinitely large number of criteria bearing upon resource significance, it is virtually impossible to predict site locations and densities with any reliable degree of accuracy or precision.

As a third major criticism of these procedures, it is highly unlikely that this approach to cultural resource inventory and assessment would be either efficient or cost beneficial to coal developers, for the following reasons:

Unless all areas were inventoried and assessed at the 100% level of intensity or unless the predictive models were 100% accurate and precise, coal developers would be required to accept unnecessary risk exposure to prosecution under the Archeological Resource Protection Act and/or the American Indian Religious Freedom Act because of the likelihood of disturbing significant resources in areas where no sites were predicted to occur.

In order to avoid prosecution, appropriate mitigative action(s) would be required for unpredicted significant resources. Since these activities would be conducted on a case-by-case basis, the archaeological costs would be inordinately high compared to lease-wide mitigative programs. Moreover, it is likely that such incidents would occur during the mining phase, and this

would likely involve equipment or mine shut-downs — an extremely costly situation for coal developers.

In summary, cultural resource predictive models are useful tools for meeting various planning and management needs, but are not appropriate for use as a substitute for cultural resources inventory and assessment.

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Lessons from the Chacoan Survey

The Pattern of Chacoan Trash Disposal

Some results and conclusions of the 1970 s
inventory survey of Chaco Canyon are
unreliable due, in part, to a poor under-
standing of trash disposal and site formation
processes. This paper examines some of the
problems of that survey and discusses a
pattern of trash disposal that can be archae-
ologically identified during field survey. This
pattern is illustrated for Chacoan Pueblo II
and Pueblo III sites by data gathered from
three Chacoan outliers and a small house
site.

Recent efforts by the staff of the Chaco
Center to revise and upgrade the inventory
survey data primarily for the San Juan Basin
Regional Uranium Study (SJBURUS) files
(Mathien et al. 1982) have necessitated a
closer examination of the methods and
results of the initial survey conducted in the
early 1970s that have been recently published
(Hayes 1981; Judge 1981). It has only been
since the early 1970s that survey techniques
have been closely scrutinized and reliable
sampling emphasized (ie., Binford 1964;
Euler and Gummerman 1978; Mueller 1974,
1975; S. Plog 1976; Schiffer and Gummerman
1977). The primary emphasis, however, has
been on an adequate and representative areal
sample of sites and not with the site artifact
data. There have been some notable
exceptions (ie., Binford et al. 1970; Lipe and
Matson 1971; Matson and Lipe 1977; Flannery
1976; S. Plog 1980; Redman and Watson
1970) but few projects are willing to commit
much time and effort to such a costly
procedure for survey or testing (ie., see
Dickson 1979:21; McKenna 1976:ii). Despite
the emphasis most surveys place upon "site
dating" and chronological control, which are
invaluable to many levels of analysis and in
examining cultural change, we often know
little of the site formation processes in an area

until long after the survey has been
completed.

The Chaco situation is little different. Areal
sampling was of little concern during the
1972 survey because it was a total inventory
survey. The discrepancies between it and the
previous transect survey of 1971 have been
aptly covered by Judge (1981). Surface
collections during both, however, were
thought to be adequate via "grab" or
judgment sampling (Hayes 1981:15, Judge
1981:119). Now, after a decade of work in and
around Chaco Canyon it is clear that Pueblo
II and Pueblo III sites, in particular, are often
complex and defy easy assessment of the
duration and intensity of occupation not only
superficially but even when excavated. Con-
trary to recent views that Anasazi sites
are typically short-lived, usually less than 50
years (Cordell 1981:127; F. Plog 1979:112; S.
Plog 1980:16, 1982:24), Chacoan sites were
often occupied for a century or more
(although not necessarily continually). Ap-
parently, this behavior is also common
north of the San Juan River in the Mesa Verde
Region (Cordell 1981; Hayes 1964) and may
be correlated with ideal locations close to
high yield arable land (Cordell 1981:129).

For the vast majority of sites, ceramics
provide the best means for deriving temporal
estimates of site occupation, keeping in mind
the limitations imposed by surface materials.
Dated ceramics from Chacoan sites,
however, seldom allow the same optimism
voiced by Dean and others (1978:29) from
their work in the Long House Valley, Arizona,
that "the quality of the temporal control on
this ceramic tradition permits dating to within
50 years in the period A.D. 550 to 1000 and to
within 25 years between 1000 and 1300." Al-
though we are getting a better under-
standing of Chacoan Cibola ceramics (Toll

1981; Toll and McKenna 1981, 1982; Toll et al.
1980; Windes 1981), we still have much to
learn.

Our initial grab samples of ceramics during
the Chaco survey afforded no reliable
estimate of the occupational intensity and
duration based on proportions of ceramic
types. The collections averaged about 93
sherds per habitation site but with
considerable variation in frequency
(McKenna 1981b). Given the variety and
number of types present and the length of
occupation it was not enough, although the
collections were not quantitatively different
from many other southwestern surveys (cf.
Hayes 1964; Rohn 1977; Windes 1977). It is
clear that the present collections are
inadequate for reliably delineating major
epochs of the roughly 250 year Bonito Phase
(A.D. 920-ca. 1150) which cover the Pueblo II
and III periods in Chaco Canyon.

Often habitation sites are surface sampled
solely in the areas of highest artifact density
— usually on the extramural midden. The low
density of artifacts on house mounds and the
time required to secure adequate samples
from them has often discouraged archae-
ologists from sampling beyond the midden
areas and thus obtaining a clearer picture of
site occupancy. Numerically, samples may
be adequate if collected proportionally to the
estimated surface artifact totals but inter-
pretations can still be misleading if the house
mound or other areas of low artifact density
are not examined.

In Chaco, for instance, excavational
experience has taught us that often the mere
presence of some ceramic types may indicate
a later occupation than would seem justified
based solely on the architecture and the over-
whelming numerical superiority of earlier
ceramics. Trace quantities of Mesa Verde

Black-on-white and/or White Mountain Redwares, in particular, often serve as clues of late use (post A.D. 1200 and 1100, respectively) of a site that might otherwise exhibit no such evidence.

Trash disposition patterns at Chacoan sites

Few southwestern survey and excavation reports mention, much less discuss in detail, midden characteristics. Nevertheless, there is probably a basic pattern of trash disposal common to any long-occupied site. It appears that formal space is first commonly allocated for trash disposition during the late Pueblo I/early Pueblo II period (Brew 1946:227). Hayes (1964:91, 94) notes that extramural middens (not sheet trash) were typical in the Pueblo II period (Ackmen and Mancos Phases) on Wetherill Mesa. Hayes does not mention middens as typical for succeeding periods.

Probably a number of factors were responsible for the rise of extramural middens. Intensity of site occupation must be considered the primary cause of trash accumulation simply because material use and discard is concentrated in a single locality over a period of time. The loci for trash may change, though, if there is a change in seasonality or permanence of the site occupation (cf. Graham et al. 1982; Hard 1982). The rise of surface multi-unit dwellings and increasing formalization of space may have prompted the midden concept to free the work areas from litter and unhygienic garbage. Not only would trash be a nuisance underfoot but it may have attracted snakes (Hard 1982), insects, rodents and squabbling domestic animals. Practicality aside, middens have also been associated historically with religious behavior (Ellis 1966:806). Middens undoubtedly got bigger as long as the house and its population grew (assuming that architecture and the space it enclosed was valuable enough not to be allowed to fall into disrepair). When house occupation stabilized or declined and structures were abandoned, then the house structures became receptacles for trash (Schiffer 1976:155) and use of the extramural midden area diminished and then ceased. Why structures become loci for trash is uncertain. They may simply serve as convenient containers. More complex causes may be responsible, however, such as social or cultural change.

In Chaco Canyon, trash at Pueblo II and Pueblo III habitation sites seems to follow a standard pattern. Initial refuse often accumulates to the east or southeast beyond work areas and pitstructures only to be covered by the plaza or architecture as the site (and population) expands. The height of occupation at the site is then marked by trash piled beyond the maximum expansion of the living and work areas. This trash is commonly visible on the surface while earlier deposits are not. Finally, the terminal occupation may leave little or no evidence of its presence in the midden area, but instead some trace of it is often evident on the surface of the collapsed house. This pattern is hardly a novel observation but its relevance to archaeological surveys in the San Juan Basin seems to be underestimated. Its impact on data collection is doubly important in Chaco and in many outlying communities because of the

high frequency of multi-component sites (over 85% in the early Pueblo II through the Pueblo III period — Hayes 1981:27-33), excluding Navajo reuse. Failure to take account of this pattern has led to erroneous interpretations of site occupancy and settlement patterns.

The sequence of trash discard through time is probably better known for the Chacoan greathouses than the small sites. Early Pueblo II greathouses, like the majority of small dwellings, may all have had extramural middens although only at Penasco Blanco is one still evident. Plaza tests conducted by Roberts (1927) at Pueblo Bonito suggest an early Pueblo II midden there (Windes 1980) was engulfed by the expanding pueblo.

In Chaco the bulk of the greathouse middens now visible were deposited during the use of ceramic assemblages dominated by Gallup Black-on-white and indented corrugated vessels, or from about A.D. 1050 to 1100 (Table 1). Except at Penasco Blanco, the largest greathouse middens in Chaco occur during that period no matter how long the site was occupied. The overwhelming midden volume of the late A.D. 1000s apparently coincides with an equally impressive period of greathouse remodeling and construction (Lekson 1981) which has often provoked speculation as to the size of the responsible population in residence. Several greathouse sites, however, have no extramural middens.

Table 1. Summary data on greathouse extramural middens in Chaco Culture National Historic Park.

Greathouse	Dimensions L x W x Depth (m)	Planimeter Area (plan view) (m ²)	Estimated Volume (m ³)	Dominant B/w type	Midden Type
Casa Chiquita	none evident				
Chetro Kett					
Trash Mound	63 x 37 x 6.1	1586	6200 — 7800	Gallup	refuse
Mounds to S(2) ¹	?	?	?	?	?
Hungo Pavi					
Mound to S ²					
Penasco Blanco					
East Mound	42 x 27 x 3.7	1045	1430 — 1840	Red Mesa	refuse
NE Mound	est. 46 x 12 x 1.5?	360	?	Chaco-McElmo, Gallup	refuse/spall
Pueblo Alto					
Trash Mound	58 x 30 x 3.7	1344	2700 — 2900	Gallup	refuse
Pueblo Bonito					
East Mound	70 x 34 x 3.0	2029	3100	Gallup	refuse
West Mound	75 x 43 x 4.9+	2497	7660 — 9100	Gallup	refuse
Midden in plaza	?	?	?	Red Mesa	refuse
Pueblo del Arroyo					
Midden in wash ³	?	?		?	
Midden in parking lot ⁴	?	?		Chaco-McElmo, Gallup	refuse
Pueblo Pintado					
Midden #1	21 x 14 x 0.37	141	44	Red Mesa, Gallup	refuse
Midden #2	23 x 13 x 0.3	234	70	Red Mesa	refuse
Midden #3	40 x 14 x 1.3	428	440	Red Mesa	refuse/spall
Midden #4	25 x 17 x 1.2	355	300	Gallup	refuse/spall
Midden #5	16 x 10 x 0.52	115	42	Red Mesa?	refuse/spall
Kin Bineola					
Midden #1	23 x 12 x 1.0	204	180	Chaco-McElmo, Gallup, Puerco	spall
Midden #2	19 x 16 x 0.5	226	113	Red Mesa	spall
Midden #3	24 x 18 x 0.3	283	85	Red Mesa	spall
Midden #4	18 x 16 x 0.25	173	43	Red Mesa	spall
Midden #5	15 x 10 x 0.3	106	32	Red Mesa	spall
Midden #6	8 x 5 x 0.25	28	7	Red Mesa?	spall
Midden #7	5 x 4 x 0.25	15	4	Red Mesa?	spall
Midden #8	12 x 5 x 0.25	57	14	Red Mesa?	spall
Midden #9	4 x 4 x 0.25	13	3	Red Mesa?	spall
Midden #10	14 x 7 x 0.25	62	16	Red Mesa?	spall
Midden #11	11 x 5 x 0.25	49	13	Red Mesa?	spall
Midden #12	8 x 8 x 0.25	53	13	Red Mesa?	spall
Midden #13	4 x 4 x 0.25	14	4	Red Mesa?	spall
Kin Kletso ⁵	none evident				
Kin Klizhin	none evident				
Kin Ya'a					
Midden #1	45 x 22 x 1.4	837	950	Gallup	refuse
Midden #2 ⁶	37 x 19 x 0.75	574	290	Red Mesa, Gallup	refuse
Midden #3	16 x 13 x 0.24	122	29	Chaco-McElmo?	spall
Midden #4	17 x 12 x 0.37	236	55	Red Mesa, Puerco, Gallup	refuse
New Alto	none evident				
Tsin Kletzin					
Trash Mound to S	20 x 10 x 0.4	149	30	Puerco, Gallup	light refuse
Midden to SE	est. 3 x 3 x 0.3	7	2	?	spall
Una Vida	none evident				
Wijiji	none evident				

Notes: 1 — Illustrated in Jackson (1878:Plate 57). 4 — Exposed by N.P.S. in 1979.
2 — Noted by Jackson (1878:438). 5 — One might have been destroyed by the Chaco Wash.
3 — Suggested in Jackson (1878:443-444). 6 — Probably part of 29Mc 111.



After A.D. 1100, many new greathouses were built (Casa Chiquita, Kin Kletso, New Alto, Tsin Kletzin and Wijiji — Lekson 1981) but none now exhibit an extramural midden of refuse deposited except for a very small one south of Tsin Kletzin (Windes 1980). Therefore, few greathouses built after A.D. 1100 are expected to yield extramural trash middens (aside from sheet trash). For example, Greenlee Ruin, situated just south of the Canyon and built after about A.D. 1100, exhibits just a small spall concentration and no refuse midden (Windes and Cameron 1981). Further to the west in the Indian Creek area, Casa Cielo, of similar age, also lacks a formal midden (Marshall et al. 1979:47).

Despite occupation into the twelfth century at many or all of the older greathouses in Chaco, only Pueblo del Arroyo exhibits extramural refuse deposited during that period. Unfortunately, the character and extent of this late trash at Pueblo del Arroyo is unknown. In all other cases where there has been extensive excavation (at Chetro Keti, Kin Kletso, Pueblo Alto, Pueblo Bonito and Una Vida, as well as at Kutz Canyon (Twin Angels) Pueblo, and Salmon Ruin north of Chaco) post A.D. 1100 ceramic assemblages have been found within the house, not exterior to it. Occupation during the A.D. 1100s, however, is still relatively tidy with trash limited primarily to roofs (presumably left at abandonment) and pitstructures. Rooms are usually devoid of trash. A.D. 1200s (Mesa Verdean) occupation in the same houses, by contrast, is notoriously messy with voluminous refuse scattered everywhere except in formal piles to the site exterior.

The propensity for leaving trash inside houses in the Pueblo III period in Chaco may simply reflect near termination of length occupation, although this practice occurs even in houses of short occupation. At least at the greathouses this pattern may mark, instead, a decreasing stability of the society and the Chacoan system (Toll et al. 1980:114) and may not be directly related to the occupational length.

Exceptions to the pattern are many although the basic trends of where trash is disposed at greathouses seems consistent. Additional middens may once have existed at Chetro Keti, Hongo Pavi, Pueblo del Arroyo and Kin Kletso. The proximity of the latter two to the Chaco Wash would likely have eradicated any evidence of middens. However, Jackson (1878) identifies middens or refuse to the south of the former three sites during his reconnaissance in 1877.

The close spatial arrangement of small houses and their associated middens would seem to make mixing of early and late ceramics a common problem. To a certain extent this is true, although the pattern discussed for

great-house appears common to many small sites in the Canyon as well. The three Pueblo II - III small sites we have excavated all reveal parallels to the greathouse pattern. Early trash (A.D. 800s or earlier) was found in the extramural midden at 29SJ1360, in an early pitthouse in the plaza at 29SJ627, and under the rooms at 29SJ629 (McKenna 1981a; Truell 1981; Windes 1978). Trash from the main occupation at the sites (A.D. 900s and early 1000s) was initially deposited in the external middens now visible and terminated in plaza pitstructures and some rooms. The last occupants (in the late A.D. 1000s and early 1100s) at 627 and 629 tossed out trash into the pitstructures, plaza and rooms.

On the surface of Chacoan small house sites, early Pueblo II middens covered with sherds dominated by Red Mesa Black-on-white and neck-decorated culinary seem widespread (Windes 1982a). Many sites yield midden assemblages with a mixed dominance of Red Mesa and Gallup Black-on-whites. These, then, suggest last midden use at about A.D. 1040/1050 (during the transition from a Red Mesa to a Gallup design style). It is during the period A.D. 1050-1100 when ceramics dominated by Gallup Black-on-white (without Chaco-McElmo and McElmo Black-on-whites and White Mountain Redware) are prominent at greathouses that similar assemblages appear much reduced at small sites. This has led me to speculate that small site occupation had decreased then (Windes 1982a). Post A.D. 1100 occupation at small houses, however, seems widespread. Spot checking in the Canyon reveals that ceramic assemblages attributed to the latter period are often restricted to the housemounds and are rarely found on middens. Surface refuse on housemounds probably derives from natural deterioration and collapse of the roof where trash from the terminal occupation was left. This situation was commonly observed during our work at Pueblo Alto. The high visibility of the early Pueblo III occupation may be due to it being the primary terminal occupation and not from a large number of people.

The late Pueblo III (A.D. 1200s) occupation in small sites is even more difficult to discern from surface collections. An example of this problem is provided from the excavation at 29SJ633 (Truell 1979). Intensive transect sampling of the midden surface yielded 2725 sherds but just 7 were identified as Mesa Verde Black-on-white. The latter proportionally are hardly indicative of a major late occupation at the site. Upon excavation in two rooms, however, a clear (re)occupation of the site was manifest in both Mesa Verde Black-on-white ceramics and grave goods.

To reiterate, trash discard seems to follow a predictable sequence from the early Pueblo II through the Pueblo III periods. Trash discard from initial Pueblo II occupancy may be placed beyond the house, plaza and pitstructure area or be scattered closer by. This may be buried if the house is enlarged. The exposed extramural middens may mark the maximum Pueblo II occupancy. Pueblo III occupants prefer leaving their trash within the house so that evidence of site use is primarily restricted to surface ceramics found on the house mound. Unfortunately, until a more valid field appraisal is conducted, this pattern will remain essentially unverified for small sites.

A reexamination of some Chacoan sites

I have chosen four examples to illustrate trash disposal at Chacoan sites and the futility of sampling a few or the highest areas of ceramic density. Because of the theme of this conference, three of these selected (Kin Bineola, Kin Ya'a and Pueblo Pintado) are greathouse Chacoan outliers. The fourth is a small Chacoan house. The surface material evident at them is diverse and widespread and allows fuller interpretation than has traditionally been the case. The outliers have yielded tree-ring dates which provide some measure of comparison to the ceramic assemblages. It often seems, however, that the tree-ring dates have been interpreted with little regard to additional information that might be gleaned from the surface artifacts.

All the sites were surveyed and artifacts collected during the 1972 inventory survey (Hayes 1981). In these cases, the paltry collections added little to what was already known from tree-ring dates and Hayes assigned the periods of occupancy accordingly. More recently, Marshall and Stein reexamined the sites and collected more reliable data although there was no temporal interpretation of the midden data (Marshall et al. 1979). Finally, Cathy Cameron, Kelly Cooper and myself again examined the middens for ceramics and lithics, in conjunction with our study of Chaco greathouse middens (Windes 1980) to compare with material from Pueblo Alto. All large greathouse middens in Chaco Culture National Historic Park were examined to maintain compatibility. However, several had not been sampled previously and these provided additional information on the occupations. Results from these generally agree with Marshall and Stein's except that the samples are much larger and, therefore, presumably more reliable.

KIN BINEOLA (29SJ 1580; LA 18705)

Kin Bineola, located approximately 16km southwest of Chaco Canyon, contains at least 10 kivas and 197 rooms built in three stories. Tree-ring dates confidently mark at least two periods of construction at the site: A.D. 942-943 and A.D. 1111-1120 (Bannister et al. 1970:21). Hayes (field survey form) assigned the site to the Pueblo I through the Pueblo III periods, probably based mostly on the dates, although he believed that its transformation to greathouse status occurred during the second period of construction (Hayes 1981:Figure 37, Table 2). The earlier occupation, Hayes (personal communication 1979) feels, was typical of small sites despite the great size of the structure.

Based on the tree-ring dates, one might assume that occupancy at Kin Bineola spanned at least 150 years. However, none of Bineola's numerous middens (at least 13 of various sizes, mostly small) can be attributed to daily domestic trash discard — at least on the surface (Figure 1). Numerically and by weight it appears that the dominant material (aside from sand) in all cases is sandstone spalls (this has not been quantified). In addition, the few sandstone hammerstone/abraders found in association suggest that these stones, like those at Pueblo Alto, derive from construction activities. It is reasonable

Table 2. Ceramic tabulations from midden transects at Kin Bineola.

	Lino Gray	Lino Gray w/ fug. red*	plain gray	wide neckbanded	narrow neckbanded	neck indented corrugated	unc1 indented corrugated	P11 indented corr rim	P11-111 indented corr rim	La Plata B/W	BMI11-PI mineral polishes	BMI11-PI mineral unpols.	white mound B/W	early Red Mesa B/W	Red Mesa B/W	Puerto B/W	Gallup B/W	Chaco B/W	Chaco-McElmo B/W	unc1 Cibola mineral	plain whiteware	Crozier B/W	Pena B/W*	Tunicha B/W	Newcomb B/W*	Burnham B/W	unc1 Chuska carbon	Kana'a B/W	Black Mesa/Sos1 B/W	unc1 Tusayan whiteware	Hotbrook B/W	Forestale Smudged	Puerto B/W*	Built B/W	unc1 San Juan redware	Senostee B/W	TOTAL
HIDDEN 1	10			9	2	147	3	1						4	6	6	1	9	31	39			1	3							2					276	
\$	45			35	15	535	15	T						15	25	25	T	35	115	145			T	15							15					975	
Form:																																					
bowl																																					
jar	10			9	2	147	3	1						2	3	2	1	4	10	10			1									2					
ladle														2	3	4		4	21	29					3												
Chuskan	2			5	1	47	0	1																													
culinary	205			565	505	325		1005																													
Ware \$				625										215						145			15								15						995
Chuskan culinary				culinary										Cibola						unk			Chuska									sauc					
				335																																	
HIDDEN 5	85	11	32	6	47			1						2	7	13	2	2	1	38	56		1*2	1*	3	2	6					1	1*	1			320
\$	275	35	105	25	135			T						15	25	45	15	15	T	125	185		T	15	T	15	15	25			T	T	T				1005
HIDDEN 2	2	113	14	37	6	44	1							3	32	1	3			53	61		1	5	3	6	2	1			1	2	4			395	
\$	15	295	45	95	25	115	T							15	85	T	15			135	155		T	15		15	25	15	T		T	15	15			1015	
HIDDEN 3	2*4	114	14	19	1	15				T	2*	3	1	10	2	1			1	24	48		2	1	3	1	1	1				1				272	
\$	25	425	55	75	T	65				T	15	15	T	45	15	T			T	95	185		15	T	15	T	T	T								985	
HIDDEN 4	8	205	10	19	1	1					6*1	3	1	7						15	24		1	2	1	1	2							5	2		515
\$	35	655	35	65	T	T					25	15	T	25						55	85		T	15		T	T	15						25	15		1005
TOTAL	2*14	517	49	107	14	107	1	1		1	8*1	8	12	65	5	6		2	130	189		4	11	1	10	10	5	9	1		2	1*3	10	2			1302
\$	T	15	405	45	85	15	85	T	T	T	15	15	15	55	T	T		T	105	155		T	15	T	15	15	T	15	T		1	T	15	1			1005
Form:																																					
bowl	2									1	7	5	5	26	1	1		1	47	59		1	4		4	4	3	4	1		2	1*2	10	2			
jar	2	12	517	49	107	14	107	1	1		2	3	7	36	4	5		1	82	129		3	7	1	6	6	5										
ladle																																					
Chuskan 0	2	67	18	28	6	13	0	0																													
culinary	175	175	375	265	435	125																															
Ware \$				625										185						155			25								T			15			1005
Chuskan culinary				culinary										Cibola						unk			Chuska									sauc					
				195																																	

Table 3. Ceramics recovered by Ruins Stabilization Unit work at Kin Bineola and Pueblo Pintado.

[illegible]

to infer, that at least some of the middens (and the sherds and lithics), may be related to the dated roofing timbers assuming that wall and roof construction are roughly coeval events. Midden 1 may be assigned to the early A.D. 1100s and Middens 3? and 4 to the A.D. 940s (Table 2). Middens 2 and 5 suggest additional periods of construction in the late 900s or early 1000s that are not marked by dated tree-rings. Although extramural tenth and eleventh century trash is unexpectedly absent, that from the twelfth century has been found on the surface within the building during Ruins Stabilization Unit (R.S.U.) work suggesting some occupation after A.D. 1100 (Table 3).

The paucity of extramural trash suggests that occupancy or non-construction activities at the site may have been of short duration or very limited — if at all. Trash buried by alluvium can not be dismissed although it seems unlikely that large hidden middens exist now that the midden area is deflating.

The spall midden with the latest ceramic assemblage may overlay 15 decades of trash but if so its volume is so small (less than 200m³, providing more of it is not buried) that only a small occupation could have produced it. For its size (197 rooms) and length of existence, Bineola should have had a large midden, particularly during the A.D. 900s and 1000s, if there had been a large population or extensive use of the site. Pueblo Alto, for instance, is smaller (with about 130 rooms) and was built nearly a century later, yet its midden is nearly five times larger than all of Bineola's. Furthermore, the architecture and masonry at Bineola appears to have undergone far less remodeling and renovation as might be expected for a 150-year occupancy, although the source of stone used may not have allowed the range of variation evident in so many Canyon greathouses. The amount of construction debris from all Bineola middens (total: 527m³) is about half of the estimated debris (1204m³) in the Pueblo Alto mound (Windes 1982b).

An extramural greathouse refuse midden may not, however, be directly correlated with the size of the resident population that supposedly created it. Periodic events at the site attracting non-residents may, in part, be responsible for the great middens (Toll 1978; Windes 1982a, 1982b). Nevertheless, whatever the explanation, it seems likely that the function of Bineola, without a large surrounding small site community within 1km, differed from many other contemporary greathouses of similar size. The lack of trash may be a strong indicator that permanent or intermittent aggregations of people at the site, whether by residents or non-residents, was uncommon. That is not to say Kin Bineola remained vacant for 150 years. Its proximity to good arable land, at least historically (Judd 1954:55-57), and to prehistoric irrigation canals suggests that food storage may have been the primary role for the site. If food was stored at Bineola, it may have been destined for outside the community, such as Chaco Canyon.

to infer, that at least some of the middens (and the sherds and lithics), may be related to the dated roofing timbers assuming that wall and roof construction are roughly coeval events. Midden 1 may be assigned to the early A.D. 1100s and Middens 3? and 4 to the A.D. 940s (Table 2). Middens 2 and 5 suggest additional periods of construction in the late 900s or early 1000s that are not marked by dated tree-rings. Although extramural tenth and eleventh century trash is unexpectedly absent, that from the twelfth century has been found on the surface within the building during Ruins Stabilization Unit (R.S.U.) work suggesting some occupation after A.D. 1100 (Table 3).

KIN YA'A (29Mc 108; LA 8978)

Kin Ya'a, near Crownpoint, New Mexico, contains perhaps as many as 40 rooms in three stories and 2-3 kivas as well as a four-story tower kiva. Tree-ring dates collected in 1932 and 1956 indicate construction of the tower kiva and some adjoining rooms in A.D. 1106 (Bannister et al. 1970:25). Room 1, adjoining the tower kiva to the southwest, was potted in 1975 revealing burned roofing. Specimens collected by W. James Judge and later by James Trott yielded numerous cutting dates at A.D. 1087-1088 (Table 4) suggesting an earlier period of construction at the site. From personal inspection of Kin Ya'a and knowledge of the dates, Hayes placed the site in the Pueblo II-III period (field survey form).

Four middens exist within the fenced perimeter of the site and the position of three (Middens 1, 3-4) suggest they were derived from activities at Kin Ya'a (Figure 2). Midden 3 is a scattering of spalls 35m north of the house and may relate to construction activities. It has not been surveyed for ceramics and might be late (after A.D. 1100). Marshall and Stein (Marshall et al. 1979:205) and later Cooper and Windes (Table 5) examined the remaining three middens for ceramics. The two to the southeast (Middens 1 and 4) yielded ceramics dating to the late A.D. 1000s suggesting contemporaneity with the 1088 dates. However, the ceramics may also derive from a slightly earlier occupation at the site for which we have no tree-ring dates. Apparently no one has looked for later ceramics on the house mound (there may be none left) but some should exist there that post-date the A.D. 1106 construction. This possibility is substantiated by the finding of a San Juan McElmo Black-on-white bowl with a burial by stabilization crews working in the west corner of Room 3.

Midden 2, 60m northeast of the house, is extensive and ceramically dates to about A.D. 1040-1050. It is southeast of a small rectilinear masonry house (29Mc111) which has a few late and early ceramics amongst the rubble. A road, thought to be prehistoric, separates 29Mc111 and Kin Ya'a from Middens 1-2 and 4. Midden 2 is clearly too early for the small house that is now visible and the midden may have been abandoned by the time the present small site and road were built. Two origins for the midden are suggested. Probably an earlier "Red Mesa" house exists under 29Mc111. If, however, the midden's position is anomalous, then the materials in it might have come from nearby Kin Ya'a.

Given the long occupation evident in many of the nearby community sites from A.D. 950 on (Hooten 1979:11; Marshall et al. 1979:206) it is probable that Kin Ya'a experienced construction prior to the tree-ring dates we

now possess and that occupation lasted well into the A.D. 1100s if not later.

Table 4. New tree-ring dates from Kin Ya'a, Room 1 pothole.

Tree-ring Lab #	Species	Function*	Dates
CNM-606	PP	secondary roofing	1022p - 1084+v
CNM-596	PP	secondary roofing	1029fp - 1084+rB
CNM-600	PP	secondary roofing	1032 - 1086+r
CNM-602	PP	secondary roofing	1043fp - 1087vv
CNM-599	PP	secondary roofing	1024 - 1087v
CNM-605	PP	secondary roofing	1024p - 1087v
CNM-683	PP	secondary roofing	0998p - 1087r
CNM-597	PP	secondary roofing	1017p - 1087r
CNM-598	PP	secondary roofing	1029p - 1087r
CNM-604	PP	secondary roofing	1033p - 1087r
CNM-603	PP	secondary roofing	1053 - 1088v
CNM-601	PP	secondary roofing	1063fp - 1088r

*Most pieces estimated at less than 10cm in diameter. All were burned to charcoal.



PUEBLO PINTADO (29Mc 166; LA 574)

Near the head of Chaco Canyon about 25 km up-canyon from Pueblo Bonito lies Pueblo Pintado containing about 123-135 rooms built to three stories. There are 3 kivas visible among the rooms and numerous others along with a later houseblock built in the plaza area. Our ceramic collections from the inventory survey were too small and mixed to confidently determine the various assemblages (and occupations) present. Hayes (field survey notes) assigned the site to the Pueblo II and III periods (and historic). Again we are fortunate that tree-ring dates have been obtained. "The available dates suggests clearly that most of the construction occurred in A.D. 1060" (Bannister et al. 1970:55). There were no later dates.

Five middens exist in an arc from the east and south around to the southwest of the site (Figure 3). The most prominent, Midden 4, is to the east, although the next closest, Midden 3, has the greater volume. Marshall et al. (1979:83-84) believe that both these middens represent refuse-filled houses that flank a great kiva. Both these possibilities appear improbable to the author, although spalls are common on both middens. The Pintado plaza is filled with "a bewildering series of depressions and mounds" which represent an intrusive house mound and kivas (Marshall et al. 1979:82).

The earliest surface ceramic assemblages are found exterior to the house (Table 6). Ceramics from four of the five middens (Middens 1-3, 5) suggest deposition at about A.D. 1040-1050, perhaps coeval with the A.D. 1060 roof timbers if not slightly earlier. Midden 4, neglected on earlier surveys, was covered with ceramics characteristic of the A.D. 1050-1100 period. Post A.D. 1100 ceramics are but a trace on the middens.

Inside Pintado's walls, however, post A.D. 1100 ceramics are common. Marshall and Stein found a profusion of McElmo Black-on-



Figure 1. Kin Bineola and the associated middens.

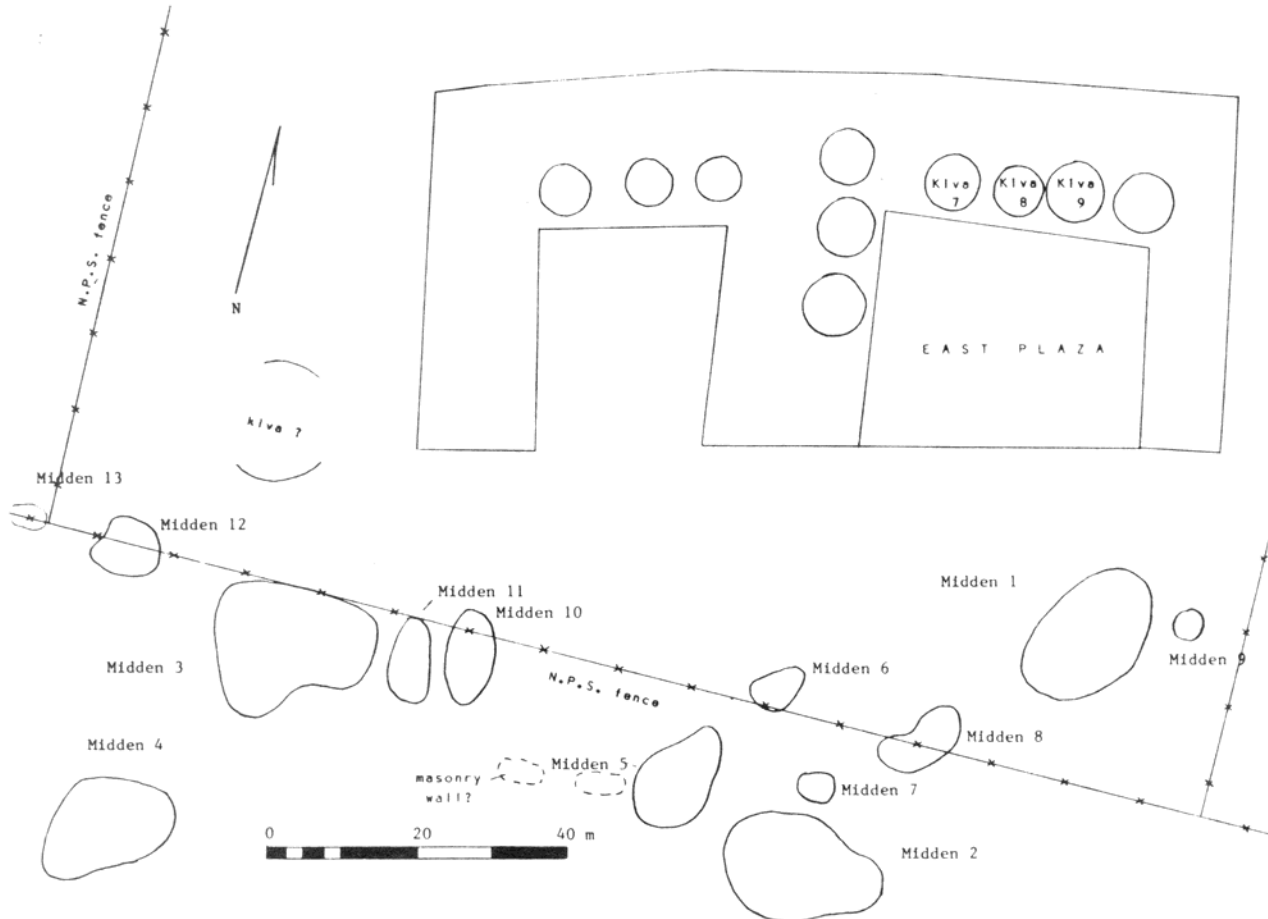


Figure 2. Kin Ya'a and the associated middens.

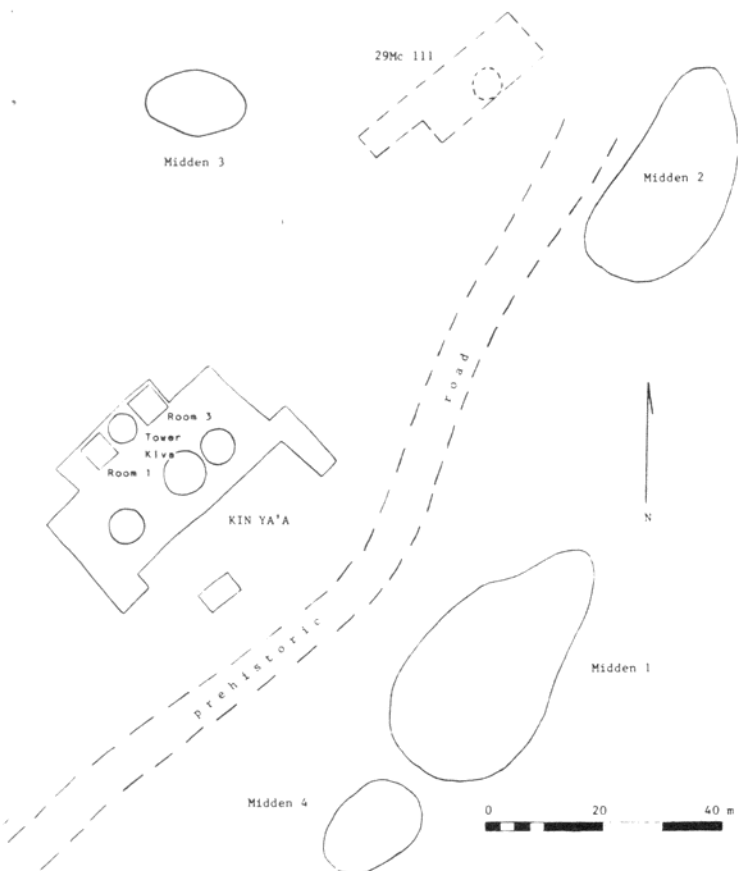


Figure 3. Pueblo Pintado and associated trash middens.

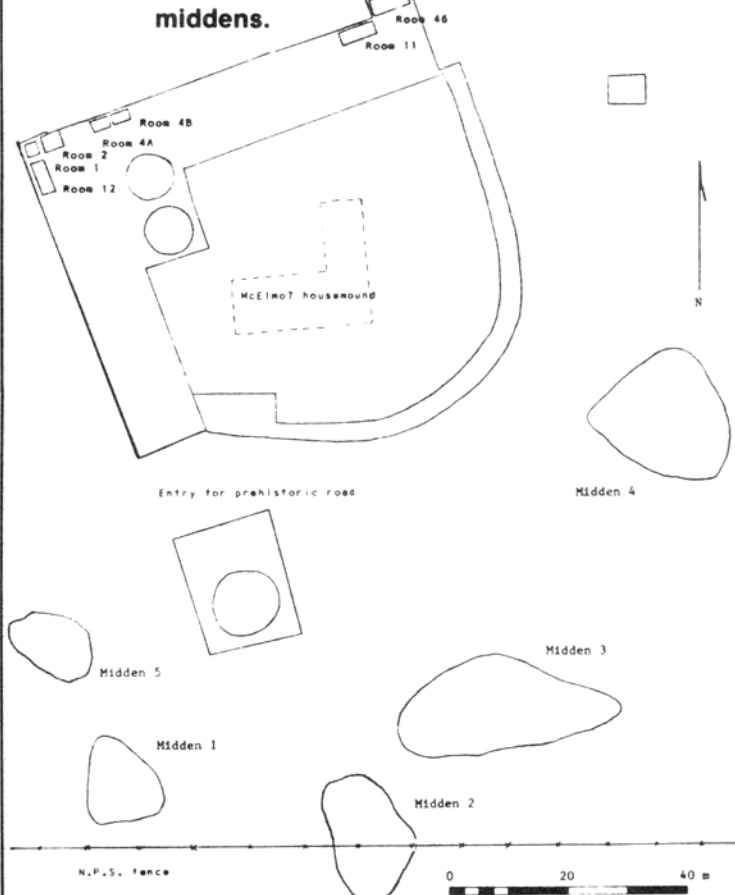


Table 5. Ceramic tabulations from midden transects at Kin Ya'a.

	plain gray	wide neckbanded	narrow neckbanded	neck indented corrug	uncol indented corrug	Pit-III indented corr rim	Pit-III indented corr r	Pit-III indented corr rim	early Red Mesa B/W	Red Mesa B/W	Escavada B/W	Puerco B/W	Gallup B/W	Chaco B/W	Chaco-McElmo B/W	uncol Cibola mineral	plain whiteware		Kana'a B/W		McElmo B/W	Mesa Verde B/W	Forestdale Smudged	uncol white Mt redware	TOTAL
MIDDEN 1	50	2	15	2	157	2	2	1	4	6	18	1			26		67			1			1		355
\$	14%	1%	4%	1%	44%	1%	1%	1%	1%	2%	3%	1%			7%		19%			T			T		100%
MIDDEN 4	9	5	6		97	2			3	1	6	6			1	13	35						1		185
\$	3%	3%	3%		32%	1%			2%	1%	3%	3%			1%	7%	19%						T		100%
Total	59	7	21	2	254	4	2	1	7	7	24	7		1	27	13	102			1			2		---
\$	10%	1%	4%	1%	47%	1%	1%	1%	1%	2%	4%	1%		1%	7%	19%				T			T		---
Form:																									
bowl									1	1	6	3			1	15	26						2		
jar	59	7	21	2	254	4	2	1	6		6	21	1			22	76			1					
ladle																2									
Chusken	0	0	0	0	2	0	0	0																	
culinary					1%																T			T	100%
Ware \$					65%												19%								
Chusken culinary					T												unknown								
MIDDEN 2																									
E transect	65	9	25	2	132	8			15	5	20				47		90				1		3		424
\$	19%	2%	6%	1%	31%	2%			4%	1%	5%				11%		21%				T		1%		99%
W transect	123	14	47	3	41	2			3	33	2	22	1		58		70			1	1		1		423
\$	29%	3%	11%	1%	10%	1%			1%	8%	1%	5%	1%		14%		17%			T	T		T		99%
Total	188	23	72	5	173	10			18	38	7	42	1		105		160			1	1	1	4		---
\$	22%	3%	9%	1%	20%	1%			1%	6%	1%	5%	1%		12%		19%			T	T	T	T		---
Form:																									
bowl									1	21		11			38		30				1	1	4		
jar	188	23	72	5	173	10	1		2	25	7	31	1		65		127			1					
ladle										2					2		3								
Chusken	2	0	0	0	4	0	0																		
culinary	1%				2%																				
Ware \$					56%												19%								
Chusken culinary					1%												unknown				T		T		100%

Table 6. Ceramic tabulations from transects at Pueblo Pintado.

	Lino Gray* plain gray	wide neckbanded	narrow neckbanded	uncol indented corrugated	Pit-III indented corrug rim	Kiafuthlana B/W	Red Mesa B/W	Escavada B/W	Puerco B/W	Gallup B/W	Chaco B/W	Chaco-McElmo B/W	uncol Cibola mineral	plain whiteware	uncol Chuska mineral	Brialhall B/W	Chuska B/W	Toedlene B/W	uncol Chuska carbon	Kana'a B/W	Black Mesa/Sosol B/W	Mancos B/W	McElmo/M.V. B/W	uncol M.V. whiteware	Forestdale Smudged	Puerco B/R	TOTAL
MIDDEN 1	60	8	16	20	1	14	2	10				21							1			1		1			201
\$	30%	4%	8%	10%	1%	7%	1%	5%				10%							T			T		T			98%
MIDDEN 2	43	6	12	15	2	17	1	6				29				1%			2			1					172
\$	25%	3%	7%	9%	1%	10%	1%	3%				17%							1%			1%					101%
MIDDEN 3	169	5	29	65	1	16	7	7	1			31						1	1	1		1	4		1		327
\$	21%	2%	9%	20%	1%	5%	2%	2%	1%			9%						T	T	T		T	1%		T		97%
TOTALS	173	19	57	100	4	47	3	23	1			81		169	1		1	4				2	1	4	1	1	700
\$	25%	3%	8%	14%	1%	7%	1%	3%	1%			12%		24%	T		T	1%				T	T	1%	T	T	100%
Form:																											
bowl						26	1	2	5			21	36					1	4			1	1	1	1	1	
jar	173	19	57	100	4	20	2	5	17	1		59	132		1							1	3				
ladle						1						1															
Chusken	2	0	1	5	0																						
culinary	1%		2%	5%																							
Ware \$																											
Chusken culinary																											
MIDDEN 4	23	2	14	7	3									57		1	1	5			2	1		3	1		433
\$	5%	1%	3%	2%	1%									13%		T	T	1%			T	T		1%	T		98%
Form:																											
bowl														12			1	2			2	1		3	1		
jar	23	2	14	221	7									44		1		3									
ladle														1													
Chusken	0	0	1	44	2																						
culinary				7%	20%	29%																					
Ware \$																											
Chusken culinary																											

believe, no doubt correctly, that late structures had been built there (Marshall et al. 1979:84-85). Even later ceramics of Mesa Verde and classic San Juan McElmo Black-on-whites were recovered from the rooms during wall stabilization in 1967 by Martin Mayer (Table 3). These suggest occupation at Pintado in the A.D. 1200s although it is not known if residence was continuous from the time of earliest construction (A.D. 1060?). The R.S.U. work also recovered historic materials that may have derived from trading post activities at the site around the beginning of the twentieth century (Brugge 1977:112-113; Holsinger 1901:57).

In summary, surface artifacts reveal much of the site occupation, but all middens and the house itself must be examined before the most complete picture can be assembled. Pueblo Pintado conforms to the general trash disposal pattern with superficially the earliest and main occupational debris being placed to the exterior and later trash allowed to collect within the house.

29SJ 839 (LA 40839)

Small sites in Chaco seldom yield the desirable tree-ring specimens and, therefore, ceramics became the principal means of assessing the duration of occupation. Site 29 SJ 839, south of Casa Chiquita in Chaco Canyon, portrays the greathouse refuse disposal pattern. A large midden is associated with the site, like many in the canyon area, with perhaps as many as 10,000 sherds on the surface. Refuse also covers the mounded house, although in far lesser quantity. The inventory survey yielded a mere

18 sherds which cannot be considered reliable to delineate the period(s) of occupancy (Table 7).

A reappraisal of the ceramics at the site indicates the presence of at least two assemblages (Table 7). The midden appears ceramically homogeneous and a meter wide transect across it yielded a collection dominated by Gallup Black-on-white, without later sherds decorated in carbon paint, dating to the A.D. 1050-1100 period. The few White Mountain Redware sherds in association are probably intrusive from the house trash.

A transect at the base of the house mound yielded a later group of ceramics (n=335) with high relative frequencies of Chaco-McElmo (6%) and White Mountain Redware (5%), probably dating occupation between about A.D. 1100 and 1120. Note, however, that Gallup Black-on-white is still the premier painted type (7%), which is not anomalous with moderate frequencies of Chaco-McElmo Black-on-white. There is also a marked reduction in the Chuskan Wares from the midden assemblage which is consistent with findings elsewhere in the Canyon.

As an aside, lithics may also prove useful in providing independent confirmation of a site's occupancy. Washington Pass chert, in particular, correlates highly with ceramic collections dominated by Gallup Black-on-white without accompanying Chaco-McElmo and McElmo Black-on-white sherds (Cameron 1982). It generally exceeds 10%-20% of the total chipped stone inventory in these collections. The high relative frequency of Washington Pass chert associated with the midden transect (15% of 125 pieces) at 29SJ839 is consistent with Cameron's

findings and with the period of deposition suggested by the ceramics. On the house mound, Washington Pass chert is prevalent (11% of /33 pieces) but obsidian, which is common (ie., 1-5%) in slightly later collections containing relatively high frequencies of McElmo Black-on-white (Cameron 1982) is absent here. The high frequencies of Washington Pass chert in both collections suggest a continuity in material use and discard that spans the period around A.D. 1100.

Summary and Conclusions

Whether the pattern of refuse disposal discussed above is prevalent at small sites in Chaco as well as in outlier communities is unknown. Spot checks throughout the canyon, though, seem to indicate the commonality of the pattern although the exact sequencing of it may vary between large and small sites. Other investigators have voiced similar opinions (John Stein and Michael Marshall, personal communication 1982).

Clearly, representative samples are needed from all areas of refuse. Furthermore, because of low density, large samples need to be drawn from the house mound. Even a total inventory of the house mound may be inadequate for statistical interpretation. Nevertheless, sometimes the mere presence of some ceramic types on the house mound may be reliable indicators of a late or the last occupation. Whether the refuse disposal pattern in Chaco is confirmed or not, investigators need to be cognizant that strict adherence to either judgmental or statistical sampling may not yield the most complete

Table 7. Ceramic tabulations from transects at 29SJ 839 in Chaco Canyon.

	plain gray	wide neckbanded	neckbanded	neck indented corrugated	uncI indented corrugated	P11 indented corrug rim	P11-111 indented corr rim	Red Mesa B/W	Escavada B/W	Puerco B/W	Gallup B/W	Chaco B/W	Chaco-McElmo B/W	uncI Cibola mineral	plain whiteware	Tunicha B/W	Norcomb B/W	Chuska B/W	Toadlena B/W	Nave B/W	uncI Chuska carbon	Black Mesa/Sosil B/W	uncI Tusayan whiteware	Holbrook B/W	Mancos B/W	McElmo B/W	Forestdale? Snudged	Puerco B/R	Mingate B/R	Mingate Polychrome	uncI White Mt redware	uncI Tsagi orangeware	TOTAL
1972 Survey				2				4		7			2												1							1	18*
\$	6%			11%				22%		39%			1%												6%						6%	101%	
Mere \$			17%																						6%						6%	101%	
			culinary																						M.Y.								

Midden	21	6	20	1	233	13	3	18	1	18	94	5	2	115																			685
\$	3%	1%	3%	T	34%	2%	T	3%	T	3%	14%	1%	T	17%																			97%
Form:																																	
bowl								7	1	12	24	2		46																			
jar	21	6	20	1	233	13	3	11		6	69	3	2	69																			
ladle																																	
Chuskan	7	2	6	0	96	4	2																										
culinary	33%	33%	30%		41%	33%	67%																										
Mere \$					43%						37%				14%			3%				1%											100%
					culinary						Cibola				unk			Chuska															
Chuskan culinary					39%																												

House	5	1	1		142	2	1	5	9	25	2	19	25	62		1	1	1	2						4	4	1	6	2	3	5	1	335	
\$	1%	T	T		42%	1%	T	1%	3%	7%	1%	7%	7%	19%		T	T	T	1%						1%	1%	T	2%	1%	1%	1%	T	98%	
Form:																																		
bowl								1	5	13	7	5	18																					
jar	5	1	1		142	2	1	4	4	12	2	9	19	43												3	4	1	6	2	3	4	1	
ladle													3	1																				
Chuskan	1	0	0		41	1	0																											
culinary	20%				29%	50%																												
Mere \$					43%						25%				19%			1%				1%				2%		T		3%		T	98%	
					culinary						Cibola				unk			Chuska																
Chuskan culinary					28%																													

*Survey types fit for categories in this table.

of site occupancy possible from the surface materials. In addition, information as to the type of middens being sampled (i.e., refuse versus construction debris) will aid interpretation of the midden data. Identification of spall middens, for example, should help explicate periods of site construction and remodeling. All this is no startling revelation but unless we sample to include the dichotomy of refuse disposal at sites, we are presenting an inaccurate picture of Chacoan settlement patterns which will affect interpretation of the Chacoan phenomenon.

Furthermore, for regional compatibility, it is urged that survey work in the San Juan Basin be conducted by personnel familiar with the archaeology. For temporal considerations, field analyses should be carried out by those familiar with the local ceramics and lithics. Unless research designs require analyses of materials and the sites are in danger from the blade of progress, artifacts should be left *in situ* (cf. Lipe 1974), particularly in National Parks and remote areas. A multistage research design for survey, like that offered by Judge (1980), offers the advantage of being less destructive to the resource than the rote field collection urged by others (i.e., Butler 1979; Redman 1973). Our work, I believe, demonstrates that a broader spectrum of site occupation and occasionally periods of construction and remodeling can be identified in the field by a thorough examination of the site artifact scatter.

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This paper is inventoried as Contribution No. 37 of the Chaco Center, National Park Service and the University of New Mexico, for purposes of bibliographic control of research relating to Chaco Canyon.

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Appendix A

Notes on the acquisition of greathouse trash midden measurements

The length and width measurements were secured primarily from aerial photos (1"=50') at the Division of Remote Sensing, National Park Service. Thus, measurements will reflect the plan view and not mounded surface dimensions. Depth (height) was derived from three methods. The largest middens (at Penasco Blanco, Pueblo Alto, Pueblo Bonito and Chetro Ketl) have been trenched to sterile and thus their maximum depths are known. Others were calculated from one foot contour maps made of the sites by Remote Sensing (Koogle and Pouls photogrammetry). Buried portions of these, of course, cannot be estimated but are

presumed to be minimal. Finally, several middens (primarily those at Kin Bineola) were less than a foot in elevation and heights from these were estimated in the field by Marshall et al. (1979) or by myself.

Volumes were then calculated by measuring areas using a digital Numonics 1224 planimeter and then multiplying by the height. Middens with relief greater than a foot were measured in layer cake fashion by calculating each one-foot contour area and then totalling them and converting to a metric scale. The maximum area of middens less than one foot elevation was calculated and then multiplied by the estimated height. The latter are essentially flat, not mounded, so that calculations are considered reliable. The perimeters of all middens were field checked because these cannot be reliably discerned strictly from air photos or contour maps.



Linear regression equations may prove to be useful in calculating midden volumes situated on flat terrain. When the height was regressed against the plan area for 14 middens at the three outliers discussed in the paper and Tsin Kletsin, the resultant equation with the maximum R-value was significant beyond the .01 level of rejection ($n=14$, $r=.796$, $p<.001$; $Y=A\exp(BX)$ where $A=115.55$, $B=1.03$, $X=\text{depth}$ and $Y=\text{height}$). Not unexpectedly, the equation suggests that the midden surface area increases more rapidly (exponentially) than the height. A simple regression using all 27 middens in the study (Table 1) suggests that depth, rather than area, is a slightly better indicator of volume ($Y=AX^B$ where $Y=\text{volume}$, $A=242.85$, $X=\text{depth}$ and $B=1554.58$, $n=27$, $r=.93$, $p<.001$). However, area can also be used to obtain the volume ($Y=A+BX$ where $Y=\text{volume}$, $A=392.96$, $B=2.90$ and $X=\text{area}$; $n=27$, $r=.91$, $p<.001$). None of these formulas, however, appear as accurate as calculating the volume from large-scale topo-maps.

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The Development of Social Complexity in Chaco Canyon

Annual weeds are adapted to tillage and flood plain herbs to spring flooding. Giant Sequoia has the characteristics of an early successional species, despite the great age of remaining stands. Several of the famous groves are on the margins and outwash of mountain glaciers of the past. I enjoy the fantasy of a venerable Sequoia biding its time in anticipation of the next local ice age (Horn 1976:199-200).

Between 1971 and 1978 the Chaco Project conducted intensive survey and excavation in Chaco Canyon, New Mexico. Analysis and write-up are still in progress. In 1981 the Project held two symposia at the 46th annual Society for American Archaeology meetings in San Diego. Several papers (Akins and Schelberg 1981; Schelberg 1981) were particularly concerned with the complexity of the system during its maximum regional extent. This paper addresses the environmental context and the development of that complexity. There was no major change in the environment which initiated social change; the environmental parameters were similar throughout the Anasazi occupation. The social organization was a response to a stressed ecosystem of low production and low predictability. It will be argued that the complexity of the system began in Basketmaker III and subsequent developments were quantitative rather than qualitative.

Several common themes unite many of the proposed explanations of the Chaco phenomenon including the meaning of the great house — village dichotomy; the fact that the development of Basketmaker and Pueblo I was "normal" with respect to the Southwest (the dichotomy of normal and not normal); and that what must be explained began in Early Pueblo II.

One of the effects of thinking in dichotomies is to divert attention from the overall development and to focus the brunt of a proposed explanation on a portion of a sequence to the general exclusion of what preceded and followed — each of which must then be explained. In attempting to account for an either-or situation any number of reasonable propositions and scenarios may be offered but the result may be the expenditure of a great deal of energy attempting to account for a situation which is complexly interconnected and not a simple dichotomy. Over seventy years were spent trying to account for the great house/village dichotomy. Once a different question was

asked, the relationship took on a very different character. Questions concerning social complexity suggest several levels of social status and their accompanying material correlates. This removed the archaeology of the area from its somewhat unique status of being the result of factional egalitarians who were attributed with essentially the same characteristics as their modern descendants. This belief was held in spite of the fact that the conditions to which the Chacoans and the Pueblo Indians were adapted had a number of important dissimilarities.

We are concerned with two interconnected systems — the environmental and the social. A characteristic of systems is that their past state influences their future state and the method by which they attain that state. As such, certain principles which apply to one must apply to the other.

Many ecologists study the processing of energy through a complete ecosystem; they may focus on several species but they attempt to keep in mind the complete set of interactions. There is a finite quantity of energy available; those species (as units and not as a collection of individuals) who most effectively process a portion of that energy survive and prosper. Those that do not no longer "remain in the game" (cf. Slobodkin 1960). It is important to consider this with respect to the Chaco phenomenon. Questions posed which unnecessarily emphasize special characteristics may divert attention from productive avenues of investigation. The development may be special with respect to the Southwest but may look entirely normal when compared to another part of the world.

The San Juan Basin is a stressed, sharply seasonal, semiarid environment of low productivity and low predictability. The amount of over-all annual production is a direct function of the rainfall; the length of the growing season is crucial for domesticates. These two factors are major contributors to the overall stress of the area and will be discussed in some detail. Several other factors will also be noted.

Rainfall

The environment poses a series of energy availabilities, harvesting possibilities and physical conditions and, no matter what mode of human adaptation is employed, both long- and short-term effects on the harvester and the environment will result. The environment is strongly selective for the events which took place. By the time of the Anasazi the area was essentially as dry as it is today; the 400 year mean-annual rainfall for the Northwest Plateau between A.D. 900 and 1300 was 8.69

inches which is very close to the historically recorded mean of 8.4 inches (22 cm). Climatic reconstructions of annual, summer and spring precipitation for this period (Rose 1979) indicate a great deal of variation from year to year and longer sequences of years either above or below the mean. In the 100 years between A.D. 920 and 1020 there were 54 (54%) above the mean; in the 83 years between A.D. 1040 and 1123 there were 60 (72%) above the mean and in the 55 years between A.D. 1123 and 1178 there were only 11 (20%) above the mean. There is no evidence of a dramatic shift in moisture patterns from winter dominant to summer dominant as has frequently been suggested (Gillespie in prep.).

The soil moisture is usually sufficient to germinate seeds in May and June. The period in which crops are particularly moisture-dependent is July and August. Forty percent of the mean annual rainfall in the Chaco area arrives in July, August and September. Between 1933 and 1973 the mean rainfall for July and August was 2.56 inches. The driest two-month period was .67 inches in 1942 and the wettest was 4.66 inches in 1967. For the 45 years in which July-August records are available (1909-1974) there were 21 years with less than two inches of rain during this critical period, 12 years between two and three inches and nine years of over four inches (Vivian and Mathews 1965; National Oceanic and Atmospheric Administration 1976). To put these figures into some perspective, Hack (1942) suggests that if the Hopi relied only on rainfall, approximately 16 inches would be necessary for the production of corn in that area. Not only is this almost twice the average for Chaco but 40% of the prior summer rain would be 6.4 inches — far above that which is recorded for Chaco.

Based on Martin Rose's (1979) dendroclimatic reconstructions of prior summer (July to September) rainfall, the hundred year statistics were calculated (Table 1) and the deviations from the mean are presented in ten year intervals — Table 2. Each year is then graphed in standard deviations from the mean in Figure 1. The average (or 0 point) is the range between the mean and the first positive standard deviation. The reason for doing this is to simplify and standardize. If it can be suggested that the type of corn grown was adapted for the normal amount of precipitation it is not hard to imagine that anything above the average would assure a fair crop and possibly even surplus. Conversely, when the summer precipitation fell to minus two deviations it could be disastrous especially if several were to follow in succession.

While much has been made of the Chacoan's runoff-diversion irrigation system

(Vivian 1970, 1974; Grebinger 1973, 1978; Altschul 1978; Gledhill 1978) it should be pointed out that there are many daily rain events which do not produce runoff. This is not reflected in summary data (Vivian 1974). Rainfall was so low during two of the historically recorded years that there was essentially no runoff during the entire year. Clearly there would be little agricultural production and very little natural production during such a period.

Colwell (1974), concerned by the vague use of such terms as predictability, devised a method to describe periodic phenomena such as rainfall. He discusses three parameters, which vary from zero to one: predictability — a measure of the variation among successive portions in the pattern of a periodic phenomenon; constancy — a measure of variation through time; and contingency — the degree that the state of variables at one time is correlated with its state at another time. Table 3 indicates these values for stations in the San Juan Basin of New Mexico and several areas in Arizona. At no location in New Mexico is predictability greater than .40. Constancy is remarkably low and indicates much season variation through time. With one exception, contingency is never greater than .31 indicating a great deal of temporal variation (Gillespie in prep.). The Brazilian location in

the Amazon backs up the generalization that events in the tropics are more predictable than elsewhere.

With respect to predictability there is rarely more than 12% variation between any of the San Juan Basin locations, indicating essentially the same degree of uncertainty throughout the Basin. From the point of view of the Anasazi, no area was predictably better than any other area. This is clearly important when considering questions of local self-sufficiency and the scope and character of the regional interaction.

The Growing Season

The most frequently cited range for the length of the frost-free period in Chaco Canyon is between 150 and 160 days (Vivian and Mathews 1965; Cordell 1979, Hayes 1981). However environmental research (Gillespie in prep.) indicates that this figure, which was originally derived from a restricted sample for a warmer period, is substantially in error. A more realistic average is 110 to 115 days. Between 1950 and 1979 the range was from 74 to 179 days. Since 1961 the mean length was only 103 days (sd=20 o.r.=74-143) and in 11 of these 19 years (58%) the frost-free period was less than or equal to 100 days. Between 1970 and 1978 there was a particularly poor sequence of 97, 89, 129, 74,

103, 91, 96, 100 and 94 days respectively. From 1961 to 1977 the average last spring frost in the Canyon was June 9 (sd=14 days, o.r.=May 16 to June 27) and the average first fall frost was September 20 (sd=15 days, o.r.=August 21 to October 14).

In the past 20 years Chaco Canyon (elevation 1859 m or 6100 feet) had the shortest frost-free period of any recording station in the San Juan Basin. Higher locations, such as Crownpoint (2135 m or 7000 feet), have considerably less problem with frost. Between 1951 and 1969 the mean was 165 days (sd=18, o.r.=135-194) with the average last spring freeze on May 6 and the first fall freeze on October 16 (sd=10, o.r.=October 1 to November 8) (Gillespie in prep.). At Mesa Verde, in southwestern Colorado, at an elevation of 2164 m (7100 feet) the average frost-free period is 158 days and the shortest was 134 days (n=35) (Hayes and Lancaster 1975).

Chaco's relatively short frost-free period is even more remarkable when compared to other New Mexico locations — Zuni (2024 m), Santa Fe (2195 m) and Taos (2117 m) are all higher in elevation than Chaco, have higher annual precipitation and all have consistently longer frost-free seasons. Since 1961, Zuni averaged 151 days (n=14, sd=16, o.r.=107-176); Santa Fe 150 days (n=17, sd=23, o.r.=113-186) and Taos 126 days (n=17, sd=11,

Table 1. One Hundred Year Statistics for the Northwest Plateau in Tenths of Inches

Interval (A.D.)	mean	st. dev.	var.	min.	max.
900- 999	31.38	6.73	45.31	18	47
1000-1099	32.00	6.27	39.27	19	47
1100-1199	31.30	7.21	52.05	18	49
1200-1299	31.48	5.30	28.13	21	45

Table 2. Summary of Projected Rainfall by the Standard Deviation from the Hundred Year Mean

10 yr period (A.D.)	-3 sd	-2 sd	-1 sd	0-1 sd	+2 sd	+3 sd
900-909			4	5		1
910-919			1	5	4	
920-929		2	4	2		
930-939		3	4	1	2	
940-949		2	2	5	1	
950-959		1	3	3	3	
960-969			4	6		
970-979			2	2	5	1
980-989		1	3	5	1	
990-999		5	1	4		
1000-1009		1	7		2	
1010-1019		2	5	3		
1020-1029		1		8	1	
1030-1039		2	5	3		
1040-1049		2	3	5		
1050-1059			2	4	4	
1060-1069		1	3	2	2	2
1070-1079			2	6	2	
1080-1089		3	2	4		1
1090-1099		3	4	3		
1100-1109		1	2	5	2	
1110-1119			1	6	3	
1120-1129		1	1	5	3	
1130-1139		2	4	3	1	
1140-1149		2	6	2		
1150-1159		1	7	2		
1160-1169		3	4	3		
1170-1179		5	5			
1180-1189			2	4	3	1
1190-1199			2	3	4	1
1200-1299		1	2	4	1	2
1210-1219		1	4	5		
1220-1229		1	3	5	1	
1230-1239	1	1	4	3	1	
1240-1249		1	4	4		1
1250-1259		1	2	7		
1260-1269			3	3	4	

Based on Rose 1977 Northwest Plateau summer

Table 3. Predictability, Constancy and Contingency

	Pred.	Const	Cont
1911-1920 (Gillespie in prep)			
Fruitland	.30	.13	.17
1921-1930			
Zuni	.30	.07	.23
Crownpoint	.22	.05	.17
Bloomfield	.27	.08	.19
Farmington	.20	.05	.14
1931-1940			
Zuni	.24	.07	.17
Crownpoint	.30	.14	.17
Shiprock	.35	.10	.26
Bloomfield	.33	.07	.26
Aztec	.28	.02	.26
Farmington	.36	.15	.20
Kayenta, Arizona	.30	.14	.15
Jeddito, Arizona	.27	.04	.24
1941-1950			
Zuni	.32	.10	.22
Crownpoint	.20	.05	.16
Ft. Wingate	.27	.09	.18
Chaco	.32	.11	.21
Bloomfield	.22	.09	.13
Aztec	.22	.07	.15
Farmington	.28	.12	.17
Jedito, Arizona	.18	.05	.13
Canyon de Chelly, Az.	.27	.05	.21
1951-1960			
Chaco	.31	.08	.23
Bloomfield	.31	.19	.12
Crownpoint	.23	.03	.20
Zuni	.35	.04	.31
Gallup	.35	.08	.28
Kayenta, Arizona	.26	.08	.18
Canyon de Chelly, Az.	.34	.06	.28
1961-1970			
Chaco	.37	.21	.17
Bloomfield	.24	.09	.15
Crownpoint	.25	.05	.20
Starlake	.40	.16	.24
Zuni	.34	.07	.28
Kayenta, Arizona	.38	.12	.25
Canyon de Chelly, Az.	.32	.10	.17
1951-1960 (Colwell 1974)			
Uaupes, Brazil	.75	.66	.09
Acapulco, Mexico	.54	.13	.41
Bella Coola, B.C.	.58	.34	.24
Miami, Florida	.46	.23	.23

Note: The San Juan Basin figures for 4 summer months and Colwell's examples are for 12-month periods.

r.=103-154). Even though Taos is shorter than the other two the minimum is equal to the mean number of days at Chaco (Gillespie in prep.).

In Chaco, the probability of the last spring freeze occurring in May or later is 98%, on or after May 20 is 80%, in June it is 55% and on or after June 10 it is 36%. On the night of June 21 (summer solstice) 1973, the low temperature was 19°F. This would have severely damaged any agricultural domesticates. For the Chaco the probability of a frost-free season of less than or equal to 140 days is 85%, less than or equal to 120 days is 60%, less than or equal to 110 days is 45% and less than or equal to 100 days is 30% (Gillespie in prep.).

Many Southwesterners consider a 120 day frost-free period as necessary for corn (e.g. Adams 1979, Cordell 1979, Hack 1942, IWoosley 1980). This is probably representative of both modern hybrids and Hopi traditional varieties. Bradfield (1971) suggested a range of 115 to 130 days for Hopi corn and noted that a severe frost (between 28 and 30°F) in the spring or early fall can kill young plants or seriously retard growth.

Clearly Chaco Canyon is a marginal environment with respect to length of the growing season. A slight miscalculation in planting time or a "normal" event (i.e. a hard freeze in late June) would have disastrous consequences; several sequential disasters would render an area uninhabitable — if the population were restricted to that area without access to another.

Other Factors

There are other factors which contribute to the agricultural marginality of Chaco Canyon. These include strongly saline soils (Judd 1954, Bradfield 1971) and areas of very high clay content which decreases the moisture permeability. With one exception Bradfield's single sample from Chaco was 37 times more saline than the worst of the twelve samples from Hopi fields (it was only five times more saline than the exception). The maximum amount of arable land within the boundaries of the Park is approximately 1451 ha. Expansion of fields beyond the boundaries is possible but doing so incorporates additional sites and increases the population dependent on the resources. The population of the Canyon is subject of much debate (Drager 1976, Hayes 1981, Windes 1982). Only by assuming a very low population (2000 to 4000) is it possible for the immediate area to be locally self-sufficient — if adequate moisture and the length of the growing season coincide and if we assume that all of the land is in continuous production. The latter is untenable as a certain percentage must be in fallow (Schelberg, in prep.).

Social and Developmental Considerations

Recent attempts to explain the development of the Chacoan phenomenon have isolated either Early Pueblo II or Pueblo III as the beginning. The latter is generally suggested by those whose knowledge of the area is restricted to the published literature which is inadequate for addressing questions of a regional nature (i.e., Grebinger 1973, Altschul 1978). Early Pueblo II generally corresponds with the earliest construction of such great houses as Pueblo Bonito, Penasco Blanco, Una Vida and Kin Bineola.

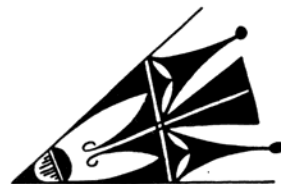
It has been stated that the developments which preceded this were normal with respect to the rest of the Southwest (Judge et al. 1981). This equation of normality is a projection based on the presence of pithouse villages and pithouse-surface room villages. It is similar to a recent analysis of the Basketmakers of Southern Colorado which concluded that all of the Basketmakers of the Southwest were bands which "settled-down" and remained bands because of similar population sizes and nuclear family households constituting the principle residence (Birkedal 1976).

It is not wise to assume that organizational and integrative characteristics will remain unchanged when many of the conditions for which they were adaptive no longer exist. Assuming that Basketmaker villages are the residences of nuclear families with apparently similar population sizes as bands and, therefore, their society was comparably organized and integrated is to completely misunderstand the function of social organization.

Bands are characterized by mechanisms to facilitate mobility, households operate in a parallel but uncoordinated manner, a surplus of food is generally not produced, territorial boundaries fluctuate and are not enforced, and there is no sense of ownership. The purpose of a band is to provide access to resources within the context of a group of related families interacting on a reciprocal basis. Southern Colorado has a seasonal climate which requires sufficient surplus to see the population through the non-productive season; a pithouse is a permanent facility which required the expenditure of a reasonable amount of energy and is not something that would be abandoned without good reason. A major percentage of the Basketmaker food energy was derived from agriculture. This implies fields in productive locations but because only a few locations had the necessary criteria for farming it may have been necessary to exclude others from the fields. This is not a function of bands.

If we set aside the controversy surrounding the existence of a tribe for the moment, then Whalen's (1981) suggestion that the Mogollon Basketmakers of Western Texas were tribally organized is more reasonable. This level of society is characterized by corporate ownership of land, greater population densities, and a reliance on agriculture for a major portion of the food supply. Membership in a tribe essentially ensures individual use rights to a portion of the land held by that group. There are mechanisms to exclude non-members from the land and to ensure members have the primary access to the harvest. This is not to say that there will not be sharing. The mechanisms give the local group members the first access which allows them to assess their needs and to determine how much they may be able to give to others when and if the need should arise — be it crisis or ceremonial.

Not only must the tribe be able to restrict access to nonmembers but it must also be



able to interact with those nonmembers on both an annual and an irregular (crisis) basis. Tribes have no centralized authority so there is no facile method to adjudicate disputes. This may be a selective context for the creation of larger groups (descent groups, lineages, clans, pan-tribal sodalities, etc.). A large corporate body will be able to deal more effectively with other similar bodies which may be interested in the agricultural products of the local territory. The underlying difference between bands and tribes is the fact that tribes are dependent on a differing resource base.

All social theorists discussed the land holding character of this segment of society. Fried (1967) noted that rank societies are generally agricultural and states that a "domesticated food supply" was the foundation of rank society. This can apply to other conditions as well (e.g. herd animals or anadromous fish) but the important point is the ability to increase the yield of the resource base by spending time and energy.

Reliance on agriculture is an attempt to even out the fluctuations in the resource base and decrease the search and pursuit time by providing an aggregated resource where energy availability (with respect to time and amount) can be reasonably anticipated if there is not a disaster. This is a very different set of conditions than those adapted to by bands; a smaller area can sustain a relatively much larger population density on a permanent basis. Bands develop mechanisms to facilitate movement of families throughout the region; tribes develop mechanisms to establish use rights for their members and mechanisms to deal with other tribes in the region. It is clear that a band cannot "settle down", be dependent on agriculture and remain a band.

The character of the environment now becomes very important. As territories develop and as population increases in a region the size of each territory decreases; therefore, there is no guarantee that sufficient resources will be found in each respective area. This condition is aggravated by the local pattern of resource distribution. Any other condition such as seasonality, aridity, equitability, productivity, periodicity or predictability imposes additional constraints on the harvesting of energy. As many of these factors act simultaneously and are mutually interconnected an attempt to overcome one or several will affect all portions of the ecosystem. Not only are all resources not likely to be found within the territory but if there are unpredictable portions of the ecosystem (e.g. the amount of summer rainfall in a semiarid environment) then there are resources which may not become available in any given year. The latter condition is most critical for agricultural domesticates and naturally occurring flora. The former condition (size of territory) may be critical with respect to fauna and to such items as trees for construction or silicious rock for tools.



Given the character of the environment and ecological principles a reasonable question is the extent that the Anasazi of the Basin resembled the common notion of a tribally based society. Fried (1968) dismisses the notion of a tribe as formulated by Service and others. He points out their inability to arbitrate disputes and their many similarities to bands. He stresses that chiefdoms merit special analysis because they bridge the gap between egalitarians and the state. Rather than argue a name for this level of complexity a more useful approach would be to consider the extent to which reciprocity would be a viable option for coping with the local environment. This is a frequently cited characteristic of bands and tribes and has been proposed as the primary interaction in Chaco Canyon prior to the initiation of the Chaco phenomenon (Judge et al. 1981).

Reciprocity is a means to overcome environmental vagaries through the exchange of foodstuff and other items; however, as a **primary** economic mode it is characteristic of **bands**. In more complexly organized societies reciprocity is a characteristic of **family** interactions while simultaneously redistribution and the market place are characteristic of the **societal** interactions (Sahlins 1972:185-275). Fried (1967) notes that redistribution was increasingly important for rank society. Ford (1972) discusses redistribution in egalitarian Pueblo villages.

The long term effect is to balance the benefits to the participant. Reciprocity could cope with local problems which were differentially distributed (e.g. the loss of a field or the loss of some of the stored food). However, if there were a major period of underproduction the effects are going to be felt over a large area. A poor year in the San Juan Basin will effect the entire area but the effect would be more devastating for the Canyon as a unit than it would for the margins of the Basin. With differential local group size and productive capacities of the land some groups will have more than others in storage and could perhaps buffer all of the inhabitants for several years. The problem was to overcome the prolonged periods which are greater than a year and less than a total failure.

The distance from Chaco to the margins of the Basin is reasonably great but that is the distance that would have to be overcome if reciprocity were to be a viable option to cope with major problems. Poor environmental conditions not only effect the agriculture but also effect the natural habitat. Since the overall productivity is normally low, hunting and gathering would not be a viable option in the immediate vicinity for all but a small segment of the residential agriculturists. Once one leaves the local heterogeneity of the Canyon, the Basin is a relatively homogeneous unit until one reaches the mountainous margins. It is not clear that reciprocal relations could overcome these distances — as reciprocity is defined. It is clear that the inhabitants of the Canyon were not bands which "settled down"; therefore, by definition reciprocity could not have been the primary economic interaction for the society. It would have been difficult for reciprocal relations to have sustained the population of the Canyon through a prolonged drought because of the limitations imposed by family-based interactions over great distances.

It is frequently stated that reciprocity leads



to redistribution but it should be remembered that these frequently occur simultaneously. Polanyi never implied any change from one to another; he used the terms as static descriptions (Dalton 1975).

Without putting a label on it I would suggest that more than simple reciprocal exchange characterized the economic interaction even during Basketmaker and Pueblo I times. Redistribution, defined as simple movement into a center and out again was probably involved and the society was not simply interacting egalitarians but was a low level hierarchy. If there were a situation of egalitarians it would have been the Archaic bands.

Unfortunately the evidence for a hierarchical society during Basketmaker times is meager at best. Peebles and Kus (1977), whose interests are information flow and regulatory decision making, have suggested several archaeological correlates for recognizing stratified societies. These provide some insight.

1. **Ascribed Ranking.** Of the few Basketmaker sites excavated in Chaco only one resulted in a burial population (Roberts 1929). The burials at Shabikeshchee Village were shallow and in poor condition. The results are reported as traits and not as attributes of individual burials. One is tantalizing because it is buried in the same position as later status burials from the Canyon. Turquoise and pottery were recovered from the burials but we do not know from which one(s).

2. **Settlement Hierarchy.** Site hierarchies are difficult to evaluate because most of the information is in the form of survey data and many areas are so alluviated that accurate estimates of pithouses are not available (Hayes 1981). Rank size analysis using reasonably estimated site sizes and excluding heavily alluviated areas is inconclusive (Schelberg in prep.). The presence of Basketmaker III great kivas is at least suggestive. Shabikeshchee Village is located on a mesa at the eastern edge of the Park and 29SJ423 (Winds 1975) is located on the western-most mesa in the Park. In addition, two sites were surveyed as possibly having Basketmaker great kivas. Three of these are in areas of relatively dense Basketmaker occupations.

There are both qualitative and quantitative distinctions between the Basketmaker great kivas and contemporary pithouses (Truell n.d.). Great kivas are round, have fully encircling benches, no antechamber or entry way, and few floor features. Pithouses are square or D shaped with wingwalls and many floor features. Table 4 gives comparisons of the floor area between pithouses and great kivas. The latter are significantly larger suggesting at least a communal function.

The argument has been made by Southwestern archaeologists (Martin and Plog 1973) that great kivas were mechanisms to integrate major segments of the society (if not the entire society) through religious ritual and that they could have been the loci for the redistribution of products. Assuming that these arguments are true (they are logically reasonable but difficult to demonstrate) there is no reason that they would not apply to great kivas of all times especially when the environmental conditions were essentially the same. Their presence argues for society wide interaction during which products could be redistributed or exchanged.

This situation is not unique to Chaco. There are other areas of the Southwest which have large Basketmaker III and Pueblo I villages associated with great kivas. These include Broken Flute Cave and Juniper Cove in western Arizona; Site 13 at Alkali Ridge in Southeastern Utah; and a number of sites in southwestern Colorado including Blue Mesa, Morfield Canyon, Mesa Verde and the Dolores River Valley (Truell in prep., Vivian and Reiter 1965). This suggests that these early Anasazi were more complexly organized than previously believed, but the specific criteria of each area needs to be evaluated.

3. **Local Self-sufficiency.** The question of local self-sufficiency is not as tenuous as it was for later time periods. The population density was less but agriculture would not have been as technologically advanced and therefore less productive.

4. **Productive Activities.** There is some evidence for intersocietal trade. There was movement of pottery into the Canyon from Basketmaker III times on. At least 20% of the bowls recovered from recent excavations at Shabikeshchee were definitely imported. The temper of other bowls and jars at Shabikeshchee Village and 29SJ423 (over 50%) was coarse grained sandstone. A very small amount is found within the Canyon but it is frequently found within 10 to 20 km of the Canyon and is scattered throughout the Basin. Whether this is local or not is semantic (McKenna and Toll in prep.).

The other evidence for intersocietal trade is the presence of turquoise, schist, serpentine, malachite and shell ornaments in Basketmaker sites (Mathien in prep.). Non-local lithic materials were also present in these early sites (Tables 5 and 6) (Cameron 1982).

While the evidence is scant, I would say that rather than being simple egalitarians the Basketmaker-Pueblo I occupation of the Canyon was a low-level hierarchical society. This is offered because of the presence of three or four great kivas spaced throughout the Canyon, in the context of the argument concerning ceremony and exchange, and the general environmental conditions characteristic of this semiarid environment. Peebles and Kus (1977:443) similarly argue that during the Mississippian period the risks associated with agriculture were minimized by society-wide monitoring and regulation. The argument is relative to the risk factor and productivity of the local environment. This is not a new revelation in that it follows from Fried and Sahlins but it is a new suggestion with respect to Chaco Canyon.

Simon noted that complexity frequently takes the form of a hierarchy and that hierarchic systems have common properties which are independent of their specific

context. One of these is the non-simple (i.e. non-additive) manner in which the inter-connected parts function. The time required for the evolution of a complex form from a simple form critically depends on the number and the distribution of stable intermediate forms. The equilibrium of the intermediate stages need only local stability and not global stability. They may only be stable in a steady state where there is an external source of free energy that may be utilized. When considering energetically open systems, it is impossible to deduce either the direction or the rate of evolution from classic thermodynamic considerations. The effect of the existence of stable intermediate forms in the evolution of complexity is analogous to the effect of a catalyst on a chemical reaction rate (Simon 1969:84-95).

Following Simon, the Basketmakers could be conceptualized as a stable intermediate form and not something different, though ancestral, to subsequent events. Already in existence was trade of pottery and a variety of non-local minerals, the great kivas and perhaps redistribution to overcome environmental vagaries. The Chaco phenomenon had this as an existing base on which to build. Not only are there Basketmaker sites in the Canyon but they are scattered throughout the region and I would expect that those outlying communities which indicate *in situ* development would also have Basketmaker components. When outlying Chacoan communities are surveyed few of these will be located below the great houses or the villages. These should be located in those areas conducive to the Basketmaker adaptation which may or may not be directly coterminous with subsequent developments. This possibility has been demonstrated for Chaco Canyon. The only major shift in settlement location through

time occurred between the Basketmaker and the Pueblo I sites and suggests a movement from the mesas to the canyon bottom (Hayes 1981).

With this base on which to build, the subsequent developments are not that unusual or rapid in appearance. The physical remains of the later sites are different because of the increased emphasis and reliance on the storage of energy (Odum 1971, Odum and Odum 1976, Barth 1967). As more people in the Canyon and in the Basin were incorporated into the system, a higher volume of trade and an expanded scope of the networks resulted. Status differences became increasingly important and these are manifest in a variety of ways including status goods and living arrangements.

This society developed in an attempt to efficiently and effectively cope with an unstable and stressed semiarid environment of low productivity and low predictability. The Chacoan adaptation to this ecosystem resulted in a low-level hierarchical society in Basketmaker III — Pueblo I times. The complexity increased through time and it was this increasing complexity, in an area which could sustain it only on a short-term basis, that led to abandonment and regional reorganization. In order to understand the archaeological remains of the San Juan Basin it is necessary to understand the social and ecological environments. The economic interactions which united the region provide the social means to cope with the problems presented by the environment.



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Table 4. Comparison of Floor Area for Basketmaker III—Pueblo I Excavated Pithouses and Great Kivas (m²)

	#	mean	sd	max	min
Pithouses:					
29SJ299	2	14.05	4.60	17.3	10.8
29SJ423	4	17.63	7.35	25.7	8.5
29SJ628	6	19.45	12.22	43.4	8.6
29SJ721	2	8.70	.71	9.2	8.2
29SJ724	1	22.10			
Shabikeshchee	21	16.35	7.59	37.8	7.1
Great Kivas:					
29SJ423	1	74.00			
Shabikeshchee	1	87.60			

*Antechamber floor area not included

Table 5. Local and Non-Local Lithic Materials by Time Period*

Time (A.D.)	Local		Non-local	
	no.	%	no.	%
500s	2675	94.7	146	5.2
600s	259	89.9	29	10.0
700-820	1288	97.8	38	2.9
820-920	667	97.4	17	2.4
920-1020	9773	96.2	382	3.7
		70.6	2221	29.5
1120-1220	1526	67.0	750	32.9
1220-1320	395	87.5	55	12.2

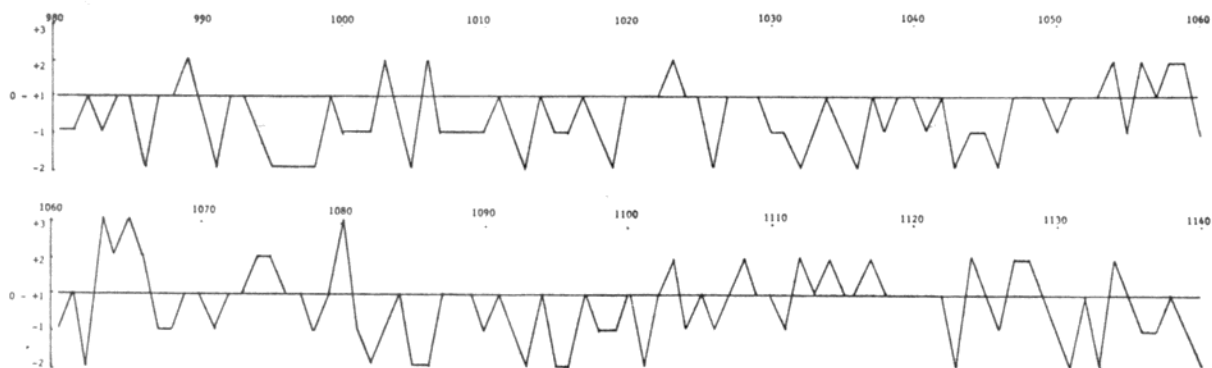
*After Cameron 1982

Table 6. Grams per Family per Year and Projected Site Totals*

Site	Total lithics		Washington Pass chert	
	g/family/yr	projected kg	g/family/yr	projected kg
Basketmaker III — Pueblo I				
29SJ628	26.2	10.5	.055	.020
29SJ724			.065	.003
Pueblo II				
29SJ629	166.2	43.2	1.010	.260
Pueblo II — Pueblo III				
29SJ627	161.3	108.8	3.200	2.600
Pueblo Alto	922.0	922.0	116.500	116.500
Pueblo III				
29SJ633	228.8	20.0	8.400	.760
29SJ627	67.8	10.2	3.180	.500

*After Cameron 1982

Figure 1. Prior Summer Rainfall in Deviations from the Hundred Year Mean.



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Labor Investment in Chacoan Building

Several months ago, I made a brief presentation to my colleagues at the Chaco Center. I suggested that the construction of the large buildings of Chaco Canyon could have been accomplished by a group slightly smaller than the maximum canyon population indicated by NPS survey (Hayes 1981) with no more complex an organization of labor than the yearly ditch clearing at San Juan Pueblo (Ford 1968). The reaction of my colleagues at the Chaco Center was almost unanimously negative. They were, as always, very polite; but they obviously did not care for the argument.

In part, my colleagues were justifiably piqued because I have reversed my earlier (thankfully unpublished) assessment of labor organization in Chacoan building. But in larger part, I believe they were taken aback at my apparently heretical attack on Complexity in the San Juan Basin. I am **not** suggesting that the Chacoan Basin was a simple place. Since this is something of a red herring, let me state now that there is evidence for nearly urban architectural complexity in the Canyon during the later 11th and early 12th centuries. I am suggesting only that labor organization and labor investment in construction probably was not a major factor in the development of socio-political complexity in the Basin.

Now when a position such as mine runs into difficulties with an open minded and sympathetic group such as the Chaco Center staff, it is obvious that this position faces a disagreeable future out in the real world. I am presenting it here not as a full argument (which will be presented in a Chaco Center report), but as a preview for interested parties, and as a review of where and why I feel it may come to grief.

I see three potential audiences for my notions and theories, and I see them all as potentially hostile. First, there are the old school Southwesternists who believe that Anasazi Chaco could never have been more complex than the ethnographic Pueblos. For this most conservative group, complexity at Chaco is either a misinterpretation, or — if real — complexity was the result of fleeting Mexican intervention. Puebloan purists might appreciate my present position on architectural labor, but would abhor my views on overall architectural complexity. Mexican enthusiasts will probably not care for either.

The second group consists of younger scholars who believe in the evolution of complexity in the San Juan Basin. They look at outliers, roads, large scale trade and movement of goods, status burials — everything, in short, that has been subsumed under the rubric Chaco Phenomenon (with the possible exception of solstice markers) and conclude that something was going on in the Basin that is not directly analogous to

Cushing's Zuni. The potential problem here is in an all-or-nothing view of complexity. Since this group is primarily arguing with the Puebloan purists, the diminution of some part of the projected complexity is upsetting. But there is no logical requirement that complexity in the organization of architectural labor be commensurate with socio-political complexity. I feel that our use of Anasazi architecture as an index of complexity has been largely uncritical.

The third group are archaeologists (largely not Southwesternists) who hold views even more radical than mine. After my contretemps with the Chaco Center staff, I sought the consolation of philosophy, and approached an eminent archaeological theoretician at a local center of learning. Before I could state my case, I was informed that three good masons could build everything in Chaco in a matter of months (materials and hod carriers supplied). I retired in confusion; but I see grave danger developing on the left. We should debunk ourselves lest we be debunked by others.

The problem is one of scale. The architectural area, density and differentiation of the central canyon are comparable to the architectural scale, density and differentiation of many early Old World cities. If we use minimal criteria of architectural complexity, Chaco — as it is now understood — can stand with the least pretentious archaic Greek or Near Eastern cities. Of course, architecture alone does not make a settlement urban. From this limited view point, Chaco looks suspiciously more complex than many of us would easily admit.

On the other hand, neither Pueblo Bonito nor Casa Rinconada are the Pyramids, or even effigy mounds. They are simply relatively large buildings. An adequate sense of scale is **crucial** to our understanding of just what should be expected of Chacoan building. On the one hand we have people who think of Chaco as a quaint and antique form of modern Pueblo, while on the other hand we have people who profess to be staggered by the labor expended on these buildings. The views on labor are polar, and neither are supported by any quantified estimates. Obviously, we need to establish at least the order of magnitude of labor expenditure before any of these viewpoints can be assessed.

I have estimated the total labor represented by every construction stage at every large site at Chaco. This exercise has produced a large array of man-hour figures, and I have wiled away many a happy hour averaging and graphing and fitting curves based on these figures. But of course, the graphs and curves are no better than the rates of work upon which the labor estimates are based. And estimating rates of work is a notoriously difficult enterprise.

I will not go into details here of the conventions and assumptions and sources I used in developing these rates. I flatter myself that the rates are inclusive and thorough: I have tried to assess the labor in man-hours required for procurement, processing and construction of every major architectural element at Chaco. More important is the **type** of estimates I was attempting to make. I originally hoped to arrive at maximum and minimum values, to bracket the labor invested in Chacoan building. A little reflection will show that maxima and minima are less useful than they might appear. Some absolute minimum value might be reached, using world's records for brick laying, or world's records for weight lifting; but it is difficult to envision complementary maximum values: how slowly can one person lay masonry? or how little can one person lift or carry? The practical difficulties of establishing maxima fatally undermined the minimum-maximum scheme, and the alternative I adopted was the estimation of **reasonable** or **plausible** rates. For that reason, I did not indulge in replicative studies. I did not need the labor rates of a bumbling tyro archeologist-turned-stone mason (a brief fling at ruins stabilization suggested that any rates taken from my own work would be unrealistically slow); I wanted labor rates for an established and productive craftsman. Thus when skills and processes now extinct were called for, I took rates from the closest modern analogue, rather than replicate the operation.

Plausible arguments are not strong arguments; but in this case, when the goal is defining a realistic **scale** for the problem, plausible rates are not only Hobson's choice, they are actually appropriate. The rates I used are not the correct rates, but they are broadly relevant to the scale and type of building at Chaco, and that is precisely the problem we have been failing to address for so long in our estimates of Chacoan construction.

Pueblo Bonito VIB (Judd's Type IV East Wing) is the largest single construction event in the Chaco sequence, and to illustrate the labor correlates of Chacoan building, I will analyze construction of Pueblo Bonito VIB in terms of a hypothetical labor scheduling.

Construction labor can be divided into four general types representing an approximate sequence: cutting and processing **beams**, transporting beams, quarrying stone and procuring other masonry materials, and actual building. We have no method for establishing the actual span of the Pueblo Bonito VIB construction event (which probably occurred between 1075 and 1085). The only hints at this type of information come from other sites, and these are only suggestions: Most or all of the wood **used** in one well-sampled room at Chetro Ketl was cut over a very short period of time, perhaps a

matter of weeks (Bannister and Robinson 1978). And the **minimum** number of years for construction of the north or central wing of Pueblo Alto was perhaps 3, with activities mainly in the spring, as suggested by faunal remains with construction debris in the Pueblo Alto trash mound (Akins pers. comm.).

Pueblo Bonito VIB required about 193,000 MH. Only half of this total represents actual construction (laying and shaping stone, mixing and carrying mortar, installing roofs) and only a small part of that half requires skilled labor. The other half includes tree cutting and transport, and masonry material procurement.

For a hypothetical reconstruction of the sequencing of this labor, I have assumed a 10-hour work day and a 30-day work month. I have further assumed that construction events occurred in a ten-year period (the probable interval between largest scale Chacoan building was 7-10 years).

I noted above that evidence from Chetro Ketl suggests that wood cutting took place over a matter of weeks. If all timber for Pueblo Bonito VIB was cut and processed (bark stripped) in a period of one month, this would require about 30 men, or 30 man/months. I will use 30 man/months as a basic unit for all other activities. In terms of 30 man/month units, these activities had the following requirements:

Cutting trees	1.0
Transporting beams	6.0
Quarrying etc.	3.0
Construction	10.8

Given a ten year total span and a three year length of construction, these labor requirements can be apportioned as follows:

	1	2	3	4	5	6	7	8	9	10
Cutting	1									
Transport		1.2	1.2	1.2	1.2	1.2				
Quarry							3			
Construct								3.6	3.6	3.6

In words, a 30 man crew could cut and transport beams for one month a year over a 6 year period, and quarry and construct for 3 to 4 months a year over a 4 year period, and build the single largest construction event in the Chacoan record. While this reconstruction includes certain elements suggested by other analyses (short duration of wood cutting, three year single season construction, and ten-year total span of building activities) it should be considered completely hypothetical. Alternately, if labor were evenly apportioned over a ten-year span, this same construction would require a 30-man crew for about 3 months a year or 90 men for 1 month a year.

Obviously, permutations of total labor in a hypothetical temporal framework mean little in terms of what actually happened in Chaco. But the scenario presented above should illustrate that even the largest building project could have been accomplished by relatively few men working for a relatively few men working for a relatively short time annually. But construction was going on at more than one site at a time. What do simultaneous construction events suggest for Chacoan labor organization?

Labor for all construction events was summed and apportioned in five year segments. The five-year interval with the highest MH figure was 1095-1100, with an average of 55,645 MH/year — about three

times the yearly levels for Pueblo Bonito VIB. What does 55,645 MH/year — for convenience, 56,000 MH/year — mean?

56,000 MH is 5,600 10-hour man days; if Chacoan builders worked a 365 day year, 5,600 man/days could have been generated by a labor force as small as 16. Of course, this intensity of labor is extremely unlikely; it illustrates the **reductio ad absurdum** possible in the analysis of labor estimates divorced from cultural context. Ford (1968) estimated the yearly labor requirements of San Juan Pueblo ca. 1890. Although San Juan Pueblo is far removed from Chaco, the budget of labor at San Juan is instructive in creating a scale for the evaluation of Chacoan building. Ford assumed a total population of 400, and a work force of 212. 212 workers represent a total of 1,857,120 hours per year ($212 \times 24 \times 365$); Ford details the number of hours spent sleeping, sitting, working (subsistence, crafts, housework, etc.) and participating in ceremonies. The largest organized labor event at San Juan was the annual cleaning of the irrigation ditches; this required over 100 workers for 4 long (10 hour) days, or about 0.23% of the work force's total time. At a 0.23% rate, 56,000 MH/year represents a population of workers of about 2762. Given a ratio of 212 workers in a total population of 400 at San Juan, this suggests a total population of about 5211 at Chaco. This is not to suggest that the population of Chaco Canyon during this period actually was 5211; it is impossible to establish population figures from labor requirements of large scale building alone. However, 5211 is alarmingly close to Hayes' (1981:51) peak population estimate for Chaco of 5652. This near agreement should not be taken too seriously; for one thing, many of the rooms and buildings figuring in Hayes' peak population calculations were not yet built at 1100. Recent analyses suggest somewhat lower population levels than those calculated by Hayes; however, lower population figures do not suggest a substantially more organized labor force. A population half the size of Hayes' maximum would require 8, rather than 4, days of work in the same framework of San Juan ditch cleaning.

It is very unlikely that Chacoan building was organized as San Juan ditch clearing was organized. The key point here is that Chacoan building obviously does not require specialization of appreciable segments of the population, or corvée of labor from outlier communities, or support in food from beyond the canyon, or any of the other misguided

things that I myself have said in the past (never in print, fortunately), and which I have heard from other architectural enthusiasts. We can quibble over my precise rate of work estimates, and argue about my datings of various construction stages, and in the end we can take what I see as reasonable, plausible estimates and double, triple, or even quadruple them. There would **still** not be any rational cause to consider Chacoan building a major drain on Chacoan labor.

Now there is relatively more labor invested in the larger buildings than in the smaller buildings; and the forms that are built are fascinating in what they indicate about Chacoan socio-political complexity. These are questions which I do not address here. But the scale of labor investment was not staggering, nor stupendous, nor phenomenal. And it is important that we realistically assess this scale before we build arguments which incorporate architectural labor in the evolution of Chacoan complexity.

This paper is inventoried as Contribution No. 38 of the Chaco Center, National Park Service and the University of New Mexico, for purposes of bibliographic control of research relating to Chaco Canyon.

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Perspectives on Faunal Resource Utilization, Chaco Canyon, New Mexico

Human societies have in fact grown throughout their history and have encroached progressively on their resources to the extent that continuous development of new adaptive strategies and continuous redistribution of ecological relationships were necessary.

(Cohen 1977:16)

Chaco Canyon was not an ideal place to live. It is located in a semiarid region where rainfall is spatially and temporally variable, where the growing season has a 50% chance of being less than 100 days and temperatures of -20° F occur in many winters. It is a stressed and unstable area of low predictability and low productivity. As a result it was marginal at best in its ability to support much of a population either agriculturally (Schelberg 1982) or in terms of natural resources. With qualifications, the context in which the faunal remains will be examined is one of resource stress. This is not unreasonable given the local environment of Chaco and the level of population that could be supported by the local faunal resources.

Assuming that resources were under stress as the result of a growing population in and around Chaco we can ask how this would be manifest in the archeological record and how we can begin to evaluate the faunal resources within this context. Colson (1979) has noted five "devices" which are commonly adopted to lessen vulnerability to such risks. These include: the diversification of activities with respect to plant and animal utilization; storage of foodstuffs; storage and transmission of information on famine foods; conversion of surplus food into durable values that can be stored and traded for food in an emergency; and the cultivation of social relationships which allow the utilization of food resources in other regions.

Similarly Cohen (1977) has proposed a number of archeological observations that would suggest demographic pressure. Those that are most applicable here are: an increase in travel from the base camp for food resources; utilization of parts of the environment that had been previously ignored; reduced selectivity in the foods eaten; and a shift from eating large land mammals to smaller mammals and birds (pp. 78-83).

With these observations and propositions in mind it is then possible to suggest a number of events that may have occurred in Chaco Canyon which would suggest if and when resource stress took place. This in turn may help us to better understand the development of the system as well as how the

system determined the developments in the Canyon.

To do this we must recognize that subsistence is only part of an economic system and as Colson's devices point out, the responses may be social and, therefore, not directly related to the archeologically recovered subsistence remains. Since the population under consideration subsisted primarily on maize agriculture and a very low percentage of the diet was meat we must also remember that the faunal remains are providing information on a very small portion of the subsistence system. These "devices" or "propositions" could involve the interplay between all kinds of subsistence remains, the economic system as a whole and how the society has adapted to the local environment.

The responses which can be evaluated through the faunal remains would include: increased mobility in search of resources; utilization of species within the local environment that were previously ignored (i.e., reduced selectivity); a shift from eating large mammals to smaller mammals and birds; and in conjunction with all of these, the increased cultivation of ties with other areas.

Before preceding with faunal indicators of resource stress some additional comments can be made. Given that Chaco is not the best location for agriculture it might be supposed that Chaco might not have been settled until other areas in the Basin with more potential had been filled. Residential mobility would have remained a viable option only until no better locations were available for habitation. If Chaco was as bad a place to live as we believe then it would follow that the Basin had reached its capacity at the level of technology available or that an alternative solution had been reached (i.e. a complex system of environmental monitoring and redistribution) which allowed habitation in Chaco and other "marginal" areas of the Basin.

In order to evaluate the level of population that could have been supported locally, in terms of faunal resources, a series of estimates were derived. From archeological excavations in Chaco it is known that approximately 60 to 65% of the animal diet represented by the faunal remains was derived from the most abundant artiodactyl

and two species of rabbit. Table 1 uses the recently analyzed sites with relatively reliable sample sizes to arrive at the average use of the three taxa. These are percentages of the estimated maximum meat consumed from the entire site, except for Pueblo Alto where the samples from the three ceramic associations were used (Red Mesa, Gallup, and Late Mix). The percent of the unknown artiodactyl attributable to the most utilized of the three common artiodactyls was calculated by figuring the percent of the known artiodactyls represented by the primary artiodactyl and taking that percent of the grams of meat consumed for the unknown artiodactyl.

These percentages are used as a standard to compare the reconstructed availability. It assumes that animals were taken in the relative proportion that they occurred in the area, which may not be a valid assumption. *O. hemionus* (deer) has been used as the primary artiodactyl to calculate the potential availability even though *A. americana* (pronghorn) was the more utilized species for most of the time span under consideration. *A. americana* densities and distributions are more difficult to predict because they are a wide-ranging herd animal whose present densities may not be applicable to the past.

O. hemionus densities for desert scrub environments of the San Juan Basin are currently estimated at about .11/ha. This was extrapolated from Bureau of Reclamation figures (1976) that indicate six animal-units could be supported per 1000 acres per year. This translates to 11 deer per km² — assuming that a deer is approximately equal to a sheep in forage requirements. Needless to say, there may be problems involved with extrapolating from modern forage availability to potential deer densities but at present these are the only figures available for this area. Hastorf (1980) estimates that .048 mule deer per ha would have been available for cropping in the Mimbres area. This is a more diverse habitat and would have supported a larger deer population but does suggest that a cropping population of .03/ha for the Chaco area is not unreasonable.

No studies of rabbit densities for the Basin were found so Bailey's (1939) estimate of one

Table 1. Average Percentages of Estimated Meat Consumed*

sites	423	628	1360	627	Alto-1	Alto-2	Alto-3	average
# elements	1964	4997	708	6752	916	4514	2688	
<i>Sylvilagus</i>	14.3	16.5	5.2	6.7	5.9	8.8	6.8	9.1
<i>Lepus californicus</i>	18.1	23.5	18.3	17.0	17.0	21.3	19.6	19.2
primary artiodactyl	13.7	14.8	27.1	23.1	18.1	30.0	32.6	
unk. artiodactyl	16.1	5.7	14.1	13.4	27.7	4.1	5.6	+35.1
total	62.2	60.5	64.7	60.2	68.1	64.2	64.6	63.4

Sources: Akins 1981d, e, f, g and 1982a.

L. californicus (jack rabbit) per two acres for New Mexico in general was used. Other figures in the literature were for much different environments and are generally much lower — for example .022 per acre for moderately grazed pasture in northeastern Colorado (Flinders and Hansen 1975). Bailey also estimated that *Sylvilagus* (cottontail) was about as dense as *L. californicus*. While this ratio could be true for the Chaco area as a whole, the impression of this observer and the archeological record suggest that *Sylvilagus* outnumbered *L. californicus*. While this could be a function of selective hunting practices it is more likely that agricultural fields allowed for some increase in the population of both species of rabbits depending on the location of the agricultural fields in relation to the natural habitat of each. This may have favored more of an increase in number for *Sylvilagus* than *L. californicus*.

These densities give percentages close to those found in the archeological record. Table 2 indicates the densities and, based on the assumptions that the average Chacoan consumed 2000 calories of food per day, that 10% of this was meat, and that cropping of animal resources was done at a rate of 40% for the rabbits and 30% for artiodactyls, estimates the number of persons that could be supported by the local faunal resources. The areas used for comparison are 116.5 km² which is approximately the area surveyed by the National Park Service and an area of 450 km² which is based on a squared-off version of the Park and a five km band around this which an agricultural population might be expected to regularly exploit (Dennell 1980). If we add 40% to compensate for the animal resources that are not accounted for by these three taxa then the 116.5 km² area would support 700 persons and the 450 km² area would support 2727 persons.

Hayes (1981) estimated the population of the Monument area using survey data. He took into account the number of years involved in each period, the visibility of the site type, differing use lengths for various kinds of construction and an estimated 4.5 persons per suite of three rooms. Table 3 gives the basic figures from which his population estimates were derived. Much of it was intuitive with errors on the "generous side to make my low estimates more acceptable" (1981:50).

Table 2. Estimated Animal Resource Availability

Minimum: 116.5 km² 45 miles² 28800 acres 11655 ha

	<i>O. hemi.</i>	<i>L. calif.</i>	<i>Sylvil.</i>
density	.03/ha*	5/acre	1/acre
# for cropping	350	5760	11520
g/individual	39750	1100	383
total g available	13912500	6336000	4400640
calories/100g@	126	125	125
total calories			
available	17390625	7920000	5500800
total man days	86953	39600	27504
total man years	238	108	75
%	56.5	26.5	17.8

Maximum local: 450 km² 173.7 miles² 111168 acres 45007 ha

	1350	22234	44467
# for cropping			
total g available	53662500	24457400	16986394
total calories			
available	67614750	30571750	21232993
total man days	338074	152859	106165
total man years	926	419	291
%	56.6	25.6	17.7

*This is the cropping density.

@Watt and Merrill 1963

Table 3. Hayes's Population Information*

	BM III	P I	P II	Early P III	great hse.	Late P III
# sites surveyed	156	373	417	village 254	2748 rms	172
adjustment for visibility	312	496	480	272		2021 rms
average # of rooms	6	9	9	10		10
length of time period (yrs)	200	200	150	125	125	125
% of sites contemp.	12.5	25	50	66.7	66.7	66.7
use length for structures	25	50	75	83	125	125
estimated population	1053	1674	3240	2889	2763	1022
Total					5652	

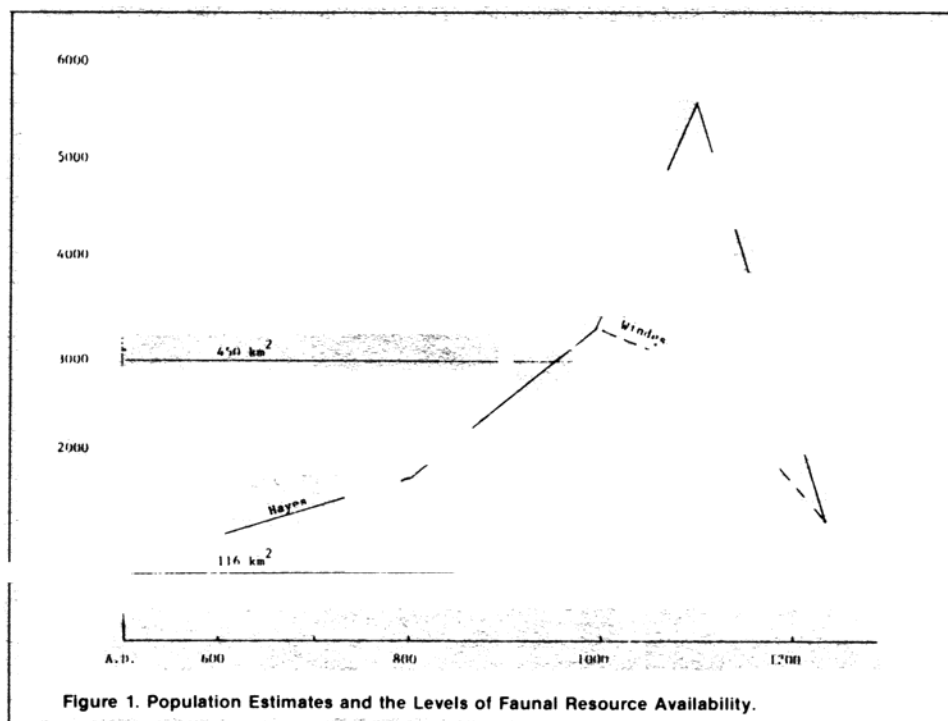
*Source: Hayes 1981

Figure 1 takes these population estimates and overlays the levels of faunal resource availability. Windes (1981) has estimated a lower population for the great house sites — based on an assumption that firepits are a better indicator of family units than are rooms. The effect of a smaller great house population for the Early P III period has also been put on this figure. The graph suggests that if my estimates are reasonably correct and the population figures are reasonably correct there was no time when the population could have been supported within the 116.5 km of the Park. However, there are qualifications to this. First, the Basketmakers and P I Anasazi may not have been as reliant on agriculture as those who followed. Assuming a higher dependency on animal resources — even 20.0% — would have made subsistence in the area more difficult. Since these people were probably more mobile this may have balanced the increase in dependency. It should also be remembered that when an area larger than the 116.5 km² survey area is considered, the human population would also have to be increased and this is not reflected in the human population curve. From this exercise we can conclude that, given even a near approximation to reality, from at least about A.D. 800-900 the Chacoans would not have been able to provide themselves with faunal resources within a five mile radius around the Park area.

Now that the likelihood of animal resource stress has been suggested we can turn to testing the propositions. First, the possibilities of increased mobility in search of resources and the utilization of species within the local environment that had been previously ignored will be evaluated. For either of these to be true there should be an increase in the number of species exploited over time — presumably this would be most noted for the period beginning around A.D. 800 to 900. The increase would be in non-local species for the first and local, previously nonutilized for the second.

Again there are problems that should be recognized. The species that are most frequently utilized are generally ubiquitous in space and it is not possible to tell whether or not they were procured locally. Thus we cannot, for the most part, tell if mobility or range has increased if the extension did not include new species. Also it may be possible that intensification and increases in range are more applicable to plant species or would effect the relative mixes between the three strategies: agriculture, gathering and hunting.

Linear regressions were calculated on the number of animal species represented and the total number of elements for eight sites with ten components (Table 4). Except for Pueblo Alto, these are site totals. The entire sample from each time period at Pueblo Alto



was used to insure that all kinds of deposits were represented. These suggest that although there was an overall increase in the total number of species utilized over time, for these sites the number of species is largely a function of the bone sample size ($r^2=.902$). When species that might have been used for buffers and could be indicators of intensification (rodents, squirrels and birds) were regressed against the sample sizes, this too was linear ($r^2=.823$). The carnivore-raptor total regressed against the sample size was not linear and suggest a leveling-off point. The same would have been true of the main economic species since, by definition, so few species are involved. Regressing the total number of non-local mammal species (i.e. elk and tassel-eared squirrels) and non-local economic mammal species against the sample size also produced linear relationships ($r^2=.768$ and $.842$). Unfortunately, this does not tell us whether or not intensification had taken place, only that the number of species at a site is largely due to the sample size. It does suggest that if intensification took place it was within the range of species already exploited and that large numbers of new species were not added.

If intensification had occurred during this time segment, we might also expect that the percentage of the total MNI for a site composed of "buffers" might increase. This idea was tested on the same data by regressing the MNI for the buffers at each site against the total MNI for that site. This too had a strong linear relationship ($r^2=.802$) so again we cannot verify that intensification had occurred.

All of this suggests that either this methodology is inappropriate for identifying intensification and increase in range or, the answer preferred here, that any intensification and extension of the range of resources utilized had already occurred before Basketmaker III. Investigation of this possibility will involve the evaluation of another of the propositions — there should have been cultivation of social ties with other areas.

The faunal remains suggest contact, either through trade or use of the territories of other groups, with the margins of the San Juan Basin. Elk, bear and wolf remains have been found in the earliest Basketmaker III site excavated in the Canyon. This is not surprising since recent studies of non-local ceramics, minerals and lithics also support the existence of these social ties (Cameron 1982, Mathien 1981, Toll 1981) back into Basketmaker III times. It is the magnitude of this exchange as it relates to faunal subsistence that is surprising. The idea that dried meat was used as a staple as well as a buffer and left little archeological evidence will not be considered.

One of the methodologies routinely used in the analysis of the faunal assemblage from each Chacoan site (Gillespie 1981a) allows for a more accurate assessment of the amount of meat consumed at a site. Rather than assuming that the entire animal was consumed in the case of the artiodactyls, only the parts of the body represented by faunal elements are assumed to have been used. While this too leads to some over-estimation depending on how the proveniences within a site are divided, it is of a lesser magnitude. Given the grams of meat represented at a site these can then be translated into calories and

Table 4. Number of Elements, MNIs and Species for Chacoan Sites*

	main economic			buffers			carnivores			total		s.s.
	n=	MNI	spec.	n=	MNI	spec.	n=	MNI	spec.	MNI	spec.	
29SJ423	712	49	7	14	11	4	30	16	7	76	18	1964
29SJ1659	181	31	6	27	11	6	11	6	3	48	15	339
29SJ628	4404	91	7	96	31	10	200	20	8	142	25	4997
29SJ299	172	27	5	25	14	6	6	5	3	46	14	318
29SJ724	331	27	4	11	7	5	37	10	7	44	16	470
29SJ1360	281	43	6	24	11	4	30	10	4	64	14	708
29SJ627	3059	307	7	100	46	9	121	41	8	428	24	6752
Alto-1	1982	209	6	56	31	14	351	52	9	292	29	4864
Alto-2	7119	571	7	225	107	23	48	22	9	700	39	15037
Alto-3	4564	402	6	1101	151	24	31	16	7	569	37	9666

Non-local Mammals

site	total	economic only
423	2	1
1659	1	0
628	3	1
299	0	0
724	0	0
1360	0	0
627	2	1
Alto-1	1	0
Alto-2	6	5 (4 small)
Alto-3	2	2 (2 small)

*Sources: Akins 1981a-g and 1982a

Table 5. Estimates of the Maximum Amount of Meat Represented at Chacoan Sites*

site	what excavated	house mound	trash	maximum available	maximum consumed	potential faunal contribution	est. length of occupation
29SJ423	shrine, 3 pithouses, great kiva, 3 cists	5-10%	<50%	414 md	239 md		200+ years
29SJ1659	1 pithouse	<1%	<1%	350 md	302 md		25 years
29SJ299	3 pithouses, 1 kiva	80%		193 md	136 md	9 persons for 6 days	150+ years
29SJ628	6 pithouses	70%		3.8 my	2.5 my	5 persons for .5 yrs	75 years
29SJ724	6 cists						
29SJ724	10 rooms, 1 pithouse, some trash	95%	5.9%	125 md	88 md	2 families - 9 persons for 13.8 days	30 years
29SJ1360	13 rooms, 1 kiva, 1 pithouse, ramada, trash	75%	10%	1419 md	756 md	20-25 persons for 70.95 days	50+ years
29SJ627	18 rooms, 3 pithouses, 1 pit structure, 3 kivas, ramada, trash	75%	10%	9.6 my	3.3 my	10-15 persons for .95 years	250 years
Alto	entire mound estimated from test	2.6%		6360 my	1800 my	100 persons for 63 years	70 years

md = man days

my = man years

*Sources: Akins 1981a-g and 1982a

using assumptions such as a 2000 calorie per day intake, of which 10% is meat we can estimate how many man days or years are represented by the faunal remains at a site. This was done for each village site analyzed and the trash mound at Pueblo Alto. Table 5 summarizes this information for the sites that I have analyzed. The estimates of how much of the house mound and trash was excavated at these sites was borrowed from Cameron (1982). The percent of the trash excavated applies only to midden materials. In these small sites the majority of the trash is found in abandoned structures so this estimate does not indicate how much actual trash was excavated in a site. The point of this table is that faunal resources are consistently under-represented at the village sites. This is not simply the result of seasonal or even

intermittent use and it is difficult to believe that local carnivores could have displaced or destroyed that much. Extensive excavation at some of the sites suggests that depositional practices could not account for this magnitude of difference. Bone preservation is generally good — even for small rodent remains — so this too must be overruled as the explanation. The fact is that the amount of meat represented at every village site examined so far is vastly underrepresentative of what the population might be expected to have consumed.

The picture becomes rather confused when Pueblo Alto is considered because meat does not appear to have been under-represented (see Table 5). If Windes' estimate of a maximum of 100 persons at Pueblo Alto and that the trash mound was deposited in

around 70 years then the amount of animal resources projected for the mound is more than adequate, especially considering that Gallup trash was found in other portions of the site. Several explanations for the difference between Pueblo Alto and the village sites can be offered.

1. Windes' estimate of the number of persons living at the site could be too low.
2. If the great houses, including Pueblo Alto, were acting as redistributive or ceremonial centers then we might expect some feasting to have occurred and thus an inordinate amount of faunal remains would be present.
3. The inhabitants of Pueblo Alto may have subsisted largely on fresh meat while the villagers may have been more reliant on dried stores.
4. A combination of these or still other factors may be involved.

The possibility that Windes' estimates are too low cannot be ruled out. Studies of the ceramic and lithic use rates compared between the villages and Pueblo Alto also suggests that standard usage rates derived for the village sites are not applicable to Pueblo Alto. Again, there is more of these materials than expected given a low population and the time span suggested by Windes. Along these same lines the actual trash densities can be compared. Table 6 uses figures provided by Windes. From the densities of ceramics, lithics and bone per m³ the ratio of materials have been calculated using sherds as the standard unit. There is a range of densities and the Pueblo Alto trash mound does not have the densest trash at the site.

the Pueblo Alto trash mound (Akins 1982a) which do have much burning (or the "firepit pattern"). This is not true of the Gallup layers of the mound. The burning pattern is that of heating pits — i.e., similar to the occupational fill of rooms. Nor is there any evidence of selectivity in species. When the principal component plot of selected proveniences from Pueblo Alto was examined the Gallup trash mound cases are intermixed with other Gallup and Red Mesa deposits; they are not segregated. However, the lower Red Mesa trash mound cases with the firepit pattern are separated and would be our best model for deposits resulting from communal eating.

If the great houses were residences of the "local elite" maybe we should expect larger quantities of these kinds of materials — sherds, lithics and bone. For this reason it would be nice to have samples from other great house sites. We simply cannot know, on the basis of Pueblo Alto, whether this is an Alto phenomenon or a characteristic of great houses. This does not necessarily suggest that they were that much better fed, only that they might have eaten a larger proportion of the local fauna as opposed to dried meat.

Thus it would appear that the social ties with other areas of the Basin were well established by Basketmaker III and these connections may have been supplying the residents of the Canyon with food items — presumably in the form of dried meat, as well as ceramics, lithics and minerals. The concept of dried meat is not unusual. Beaglehole (1936:7) notes for the Hopi that communally procured deer and pronghorn were largely sun-dried and preserved for later use.

The possibility that the residents of Chaco traveled to the edges of the Basin, procured the animals, dried the meat and then returned to the Canyon can be dismissed with an efficiency argument. White (1943) recalls that two weeks were spent just drying the meat

the three temporal units since these calculations were not done on the site as a whole. It is felt that these large trash deposits are representative of the time periods involved. **M. gallopavo** was included for only those sites at which it may have been eaten.

Table 7 and Figure 2 give the percentage of the estimated meat consumed for the economic taxa and a graphical representation for the small amounts. **L. californicus** is always the largest contributor because of its larger body size (1100 g of utilizable meat as opposed to 382 and 370 for **Sylvilagus** and **C. gunnisoni**). The relative positions of the four taxa is generally the same except for the Late Mix deposits at Pueblo Alto where **Sylvilagus** and **C. gunnisoni** (prairie dog) are reversed. This suggests that the overall pattern of exploitation for these species did not change radically over time. More interesting though is the decrease in use of both rabbit species in the sites dating around A.D. 1000.

Figure 3 graphs the estimated contributions of **O. hemionus** and **A. americana** to the diet for these same sites. It shows a complete reversal in the utilization of these two species and this too occurs about the same time as the reduction in rabbit use. If this actually reflects the relative use of these species a number of explanations are possible. A predominantly ecological perspective would suggest that the herds of **A. americana** could have been over-exploited by the growing population in the area or that, as Rose's (1979) rainfall reconstructions for the Northwest Plateau suggest, a period of poor moisture between about A.D. 980 and 1005 could have resulted in less standing water and poor vegetation. These are known to be factors in declining herd size for **A. americana** (Haley 1965). Either of these or a combination of the two could have resulted in a situation where it became more economical to exploit **O. hemionus**.

A suggestion based on the level of social complexity as well as the habits of the species can also be made. Since **A. americana** has extensive annual ranges, prefers open plains, and congregates in large groups, communal drives would have been a very effective strategy. **O. hemionus** on the other hand, is generally a solitary species which is best hunted in feeding areas or by stalking and is not susceptible to communal drives. (Linsky 1975). Although the decline in use of **A. americana** may not have been as sharp as suggested in the figure, a more gradual decline would have been expected if the causation were strictly ecological. The fact that it does occur at a time of reduced rabbit use and about the same time as the increased evidence of social complexity and large scale building projects associated with the 'Chaco Phenomenon' may suggest that the social mechanisms resulting in communal hunting patterns changed to one which involved an isolated and possibly specialist procurement strategy.

Cohen's (1977) final proposition is that with increasing population densities there would be an increase in the utilization of small mammals at the expense of large ones. He feels that this represents a sacrifice of quality for quantity which was most likely forced on a population and thereby would be an indicator of population pressure. Jochim (1976), while recognizing that this preference is characteristic of many groups, notes that large game are relatively very expensive to exploit and it

Table 6. Comparative Trash Densities in Number per Cubic Meter

	29SJ629		29SJ627			Pueblo Alto	
	trash midden	Pithouse 3	Pithouse C	Kiva E	Grid 8	trash mound	Kiva 10
sherds	298	339	295	1065	1319	513	702
lithics	64	61	24	97	352	74	116
bone	34	est. 30	80	93	2200	602	435
ratio S:L	1:20	1:18	1:08	1:09	1:26	1:14	1:16
ratio S:B	1:11	1:09	1:27	1:09	1:160	1:17	1:62

This table suggests the relationship between sherds and lithics is much more stable than that between sherds and bone and that proportionately more food remains were present at Pueblo Alto. This could result from either the inhabitants of Pueblo Alto utilizing more fresh meat or there is still the possibility that it was brought in for ceremonial occasions.

If feasting was responsible for the increase in the amount of bone we should see signs of communal cooking and possibly selection for species that could be hunted communally. Beaglehole (1936) notes that the Hopi often hunt rabbit in connection with ceremonies to provide meat for feasting or distribution to the villages. Communal cooking should resemble the lowest levels of

from an antelope hunt in which he participated. Combined with travel by foot the time involved in such an expedition would be costly for agriculturalists. According to Wing and Brown (1980) any distance over 10 km round trip would have been too costly so that trade is much more efficient.

If we assume that the majority of the faunal remains recovered from a site were locally procured (within a five km radius of the Park) we can observe change in this local strategy and make suggestions about changing ecological and social relations which may be related to these changes.

The estimated maximum amount of meat consumed was compared for the excavated sites with large enough samples to be reliable. Pueblo Alto was again divided into

may be more efficient and less risky to exploit small clustered resources — such as small mammals. Thus it can be seen as an efficiency response rather than a sacrifice.

In this instance the utilization of the small mammals may even have been a necessity. Beaglehole (1936) has also noted that communal rabbit hunts were frequently held in early summer and autumn when fields needed to be protected from "the depredations of the rabbit" (p. 11). A study by Fagerstone et al. (1980) records an increase in sightings of jackrabbits from .06 per km in range land environs to 35/km along field edges. Communal hunts and constant trapping near fields were undoubtedly important strategies in field protection and would also have provided a source of meat. However, this would have been true of all time periods and may have been related to the extent of these fields and thus the human population.

Table 8 gives the cumulative percentages of small and large mammal contributions to the diet and the ratio of large to small mammals using the same sites and percentages in Table 7. Figure 4 overlays this curve on the population curve. The importance of large mammals rises until around A.D. 1000 at the villages and shortly later at Pueblo Alto and then a continuing decrease is indicated. Again, it is unfortunate that we do not have contemporary deposits from other great houses or villages that could be compared in order to confirm this trend. If the change in utilization of body sizes did occur, it took place at about the same time as the change from *A. americana* to *O. hemionus*. Since it peaks at about the same time as Hayes' population curve it is tempting to conclude that it was a result of either the growing population or whatever allowed for a larger population — i.e. the social complexity.

It is interesting that *M. gallopavo* (turkeys) appears to have become a viable alternative as a food source only after the artiodactyl use has declined markedly. Although present throughout the time span it is generally found in very low frequencies (less than 2.0% of the elements) with little evidence of processing until near the end of the Anasazi occupation. At that time the element frequencies and estimated contribution to the diet jump to around 30.0%. This may suggest that sufficient artiodactyl was no longer available (for either ecological reasons or because the social networks were no longer reliable) and *M. gallopavo* finally became economically worthwhile as a food source. Up until this point no more than a few were kept at a site and those were probably utilized for their feathers.

By confirming that Basin-wide interaction was occurring from Basketmaker III times on, it is not unreasonable to also suppose that intensification and diversification of resource selection had also reached a near maximum by that time. There were years (Rose 1979) when sufficient moisture may have allowed for some accumulation of surplus even in Chaco. If the system were operating in an anticipatory and efficient manner this surplus would have been turned into durable values to store and trade for food in an emergency. While this may account for some of the lithic, ceramic and mineral exchange these interactions were also reinforcing ties that would be called on when local food resources were inadequate.

site:	423	628	1360	627	Alto-1	Alto-2	Alto-3	633
taxa								
<i>Sylvilagus</i>	14.3	16.5	5.2	6.7	5.9	8.8	6.8	16.6
<i>L. calif.</i>	18.1	23.5	18.3	17.0	17.0	21.3	19.6	19.9
<i>C. gunni.</i>	.5	3.2	3.9	3.7	1.9	4.5	15.2	6.9
ec. rodent	1.0	1.1		.4	1.2	1.1	15.0	1.1
<i>C. elaphus</i>	1.6	5.3		6.7				
<i>O. hemionus</i>	9.7	6.0	10.4	23.1	18.1	30.0	32.6	2.1
<i>A. americ.</i>	13.7	14.8	27.1	4.8	11.1	9.7	7.8	2.8
<i>O. canad.</i>	5.3	14.5	10.1	10.8		14.3	5.2	.2
artio.	35.7	15.0	24.8	26.4	44.7	7.4	7.8	2.3
<i>M. gallop.</i>						2.8	3.2	47.7

*Sources: Akins 1981d,e,f,g, 1982a and Gillespie 1981b.

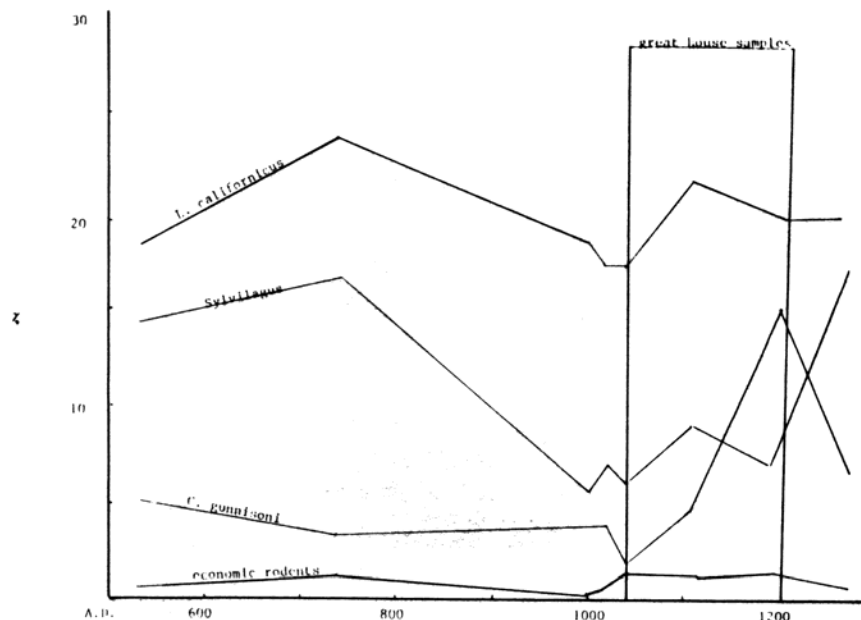


Figure 2. Percentages of the Estimated Meat Consumed for the Small Mammals.

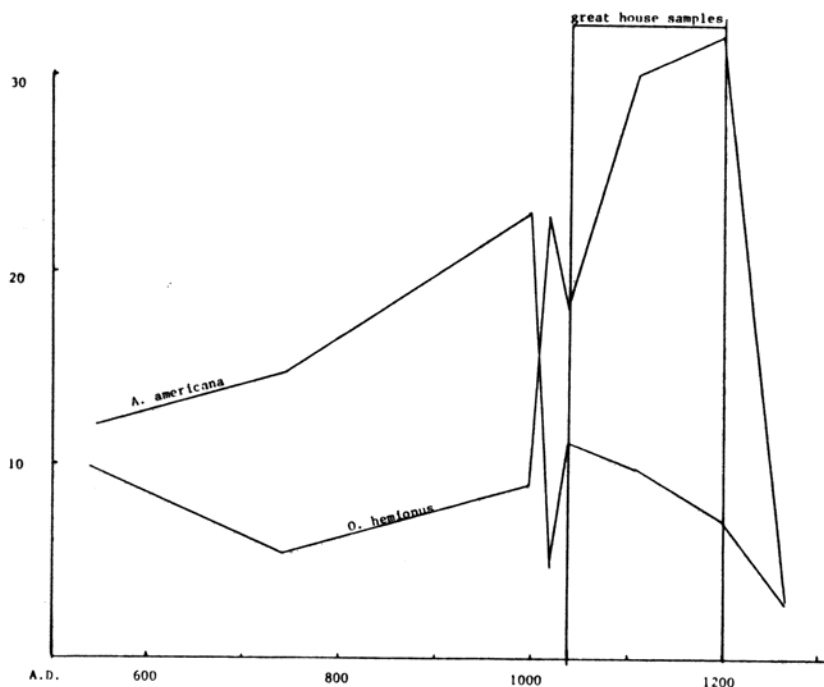


Figure 3. Percentages of the Estimated Meat Consumed for *O. hemionus* and *A. americana*.

**Table 8. Ratio of Large to Small Mammal
Estimated Meat Consumed***

site	% small	% large	ratio large:small
29SJ423	33.9	66.0	1.9
29SJ628	44.3	55.6	1.3
29SJ1360	27.4	72.4	2.6
29SJ627	27.9	71.8	2.6
Alto-1	26.0	73.9	2.8
Alto-2	35.7	61.4	1.7
Alto-3	43.1	53.4	1.2
29SJ633	83.3	14.2	.2

*Sources: Akins 1981d,e,f,g, 1982a and
Gillespie 1981b.

Thus the only device or proposition that can be seen operating within the time periods examined is possibly Cohen's suggestion of a change in the use of large to small bodies mammals and birds; and it may be that this is more applicable to hunter/gathers or to groups less dependent on agriculture or, more likely in this case, that it may have been an efficiency response that does not require demographic pressure as a stimulus.

While it is not possible to demonstrate resource stress or demographic pressure with this faunal data, the low level of resource availability does suggest that demographic pressure may have occurred before we have archeological deposits to evaluate. It is difficult to understand why a system as complex as the one that developed in Chaco would have come about if there were but a thinly spread low level of population in the Basin.

In summation, faunal assemblages can be used as a body of data to test our ideas concerning social processes. Tables of species abundance and a summary of how this changes over time are simply not enough. Faunal subsistence strategies did not operate in a vacuum and can be related to the broader economic system. They can also give us information that cannot be approached through more routinely analyzed archeological materials. Burning patterns, the presence and distribution of some species and element distributions can be useful but only if the faunal remains are systematically collected and recorded.

For the study of process and change in a system we need bodies of data from all components of that system. Although Pueblo Alto did give us a large sample we do not have sufficient samples from contemporary great house or village sites with which to compare it. As a result we cannot know if the patterns found are actually representative of the Canyon as a whole, great houses in general or Pueblo Alto.

This paper is inventoried as Contribution No. 41 of the Chaco Center, National Park Service and University of New Mexico, for purposes of bibliographic control of research relating to Chaco Canyon.

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National Park Service

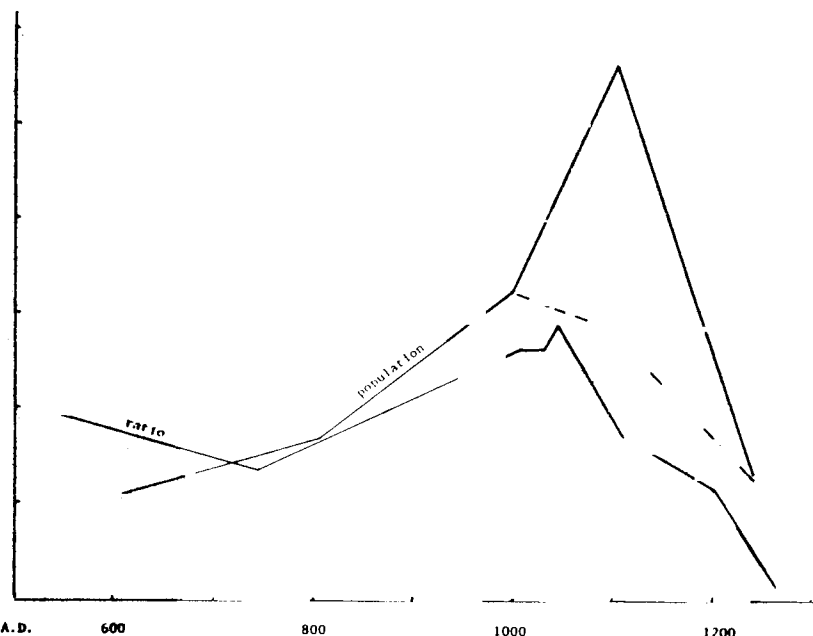


Figure 4. The Population and the Ratio of to Small Mammal Utilization

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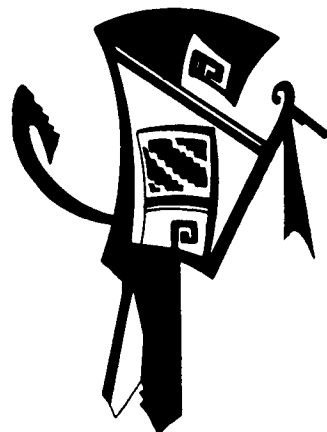
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Development of a Data Base Management System for Archeological Resource Conservation

ABSTRACT

As part of the research on Chaco Canyon, a computerized data base management system is being created. In addition to information on sites collected during survey and originally coded for the San Juan Basin Regional Uranium Study, environmental data (vegetation zones, soil types, and erosional channels) have been digitized so that these variables can be evaluated in conjunction with site attributes. Other relevant information is being collected and will be added to the data base in order to assist managers in the development and implementation of long-range cultural resource management conservation as it relates to research, interpretation, and development. The program should be flexible enough to permit continual adjustment of protection needs with these goals in Chaco Culture National Historical Park, and it is hoped that this project will serve as a model that could be used by other areas with similar cultural resource management needs.

Background

As we are all aware, Executive Order 11593 signed in 1971 stated that an inventory of all cultural resources on Federal lands must be undertaken. In some areas, such inventories have been successfully completed and the volume of data is staggering. This point was quite clear to those who participated in the archeological surveys of Chaco Culture

National Historical Park (formerly Chaco Canyon National Monument) (Hayes, Brugge, and Judge 1981) where approximately 2400 sites were located. Planned inventories of other National Park Service areas will no doubt result in equivalent amounts of data. To manage these cultural resources properly, much information must be recorded on each site; for example, its location, size, type, period of construction, significance, visibility, condition, preservation needs, etc. In addition, data on the natural environment (e.g. vegetation, soils, erosional conditions, etc.) must be recorded for the general site area. All of this information must be readily available to management to permit the development and implementation of a long-range, practical resource conservation program — a program designed to permit the continual adjustment of protective needs with those of scientific research, visitor interpretation, and park development. The only means by which such information can be compiled and processed efficiently, at management request, is through the use of a data base management system, developed specifically for archeological resource conservation.

Realizing this, W. James Judge proposed a pilot project designed to develop and implement such a system using the Chaco data base that resulted from the surveys conducted in 1971-1975 by the Division of Cultural Research (formerly the Chaco Center). It was proposed that implementation of this system would provide Chaco Canyon

management and Southwest Region planners with an immediately useful resource management program. It would also provide the National Park Service with a prototype for evaluation and possible adoption service-wide.

Funding for this project became available in FY 1979, and the work continues through the present. This paper includes a presentation of the manner in which the project has been carried out to date, what it has accomplished, current and future areas of emphasis, and an evaluation of the results of the project to date.

Basic Requirements

Information, equipment, and personnel were the three main requisites necessary to implement this project.

1. Information: Data on approximately 2400 archeological sites located during the Chaco Project surveys were computerized by the National Park Service during the San Juan Basin Regional Uranium Study (SJBRUS) (United States Department of Interior 1980). While the variables coded on the SJBRUS data base were chosen for management purposes and cover a wide spectrum (Wait 1977), it was realized that additional information on environment (soils, vegetation, geology, geomorphology, erosional features), site documentation (additional site names and numbers, bibliographic references), and preservation data (e.g. linear feet of wall space, estimated costs of stabilization), as

well as additional site attributes should be added/refined in order to provide sufficient data on which to base managerial, interpretive, and research decisions. The data would have to be gathered, converted into computer-usable form, and integrated into a separate file for the Chaco sites.

2. **Equipment:** During the planning stages of this project, it was realized that acquisition of a smart computer terminal would reduce expensive on-line costs because many everyday retrieval needs could be handled with its programming and storage capabilities. Full-time use of larger computer facilities would not be necessary; these could be accessed through NPS facilities in Washington, Kirtland Air Force Base, etc. An agreement was worked out whereby the Chaco Center would have access to a Data General Eclipse minicomputer housed in the Southwest Regional Office in Santa Fe and operated under the direction of the staff of the Branch of Indian Cultural Resources.

In order to manipulate data (including graphic display), a number of equipment items were purchased:

- a. Tektronix 4052 CRT terminal,
- b. Tektronix 4663 Interactive Digital Plotter,
- c. Data General Dasher 6040 terminal printer,
- d. Houston Complot copier,
- e. Tektronix 4952 Joystick,
- f. Ven-tel (300 baud) modem, and later a Bell 212 (1200 baud) modem was leased from the telephone company,
- g. T-Switch, and
- h. 50 MB disk drive.

Modifications to the SJBRUS software were made by Andrew Drager as new information was added to the Chaco data base. These will be discussed below.

3. **Personnel:** Jim Judge, the principal investigator on this project, was able to secure the assistance of Andrew Drager who had written the interactive program for the SJBRUS data base (Wait 1980); he was hired by the NPS to work half-time on this project. He provides the needed expertise in computer science, e.g. understanding of both the hardware and software requirements to implement the project goals in addition to his talents as a programmer. In addition, F. Joan Mathien was hired half-time to coordinate the gathering of data and its evaluation with regard to Chaco archeological sites, environment, and pertinent management variables.

Accomplishments to Date

Much of the first year of this project was spent acquiring the necessary computer hardware and getting it to work, reviewing existing software packages and acquiring some of those that would be useful to the project, and outlining what additional data would be needed to implement the program. As with any pilot project, several snags had to be ironed out.

Once the basic equipment had been installed, it became apparent that telephone communication between the Division of Cultural Research and the computer in Santa Fe was less than desirable. (It was nearly impossible!) A considerable amount of time was spent trying to locate the source of the problem. Two modems and two years later, we now communicate with the computer after

the installation of a dedicated line and a high-speed modem that eliminate line noises that, on certain occasions, were fatal during data manipulation.

Manipulation of Chacoan site data on the SJBRUS data base revealed that there were several coding inconsistencies among the variables recorded. This was anticipated to some extent since a number of people were involved during the initial coding phase of the SJBRUS data base in 1977. In addition, information for Chaco sites was taken from the original site survey forms. Continued research and analyses by the Chaco Center staff since the survey was completed in 1975 have led to refinement of existing data and addition of new information. Therefore, hard copies of the Chaco site files were obtained. These were reviewed and corrected information is being entered into the data base by John Schelberg and Joan Mathien. While this updating does not include the addition of new variables to the data base, it does improve the accuracy of the Chaco site data since a single individual who had prior archeological experience on the survey crew and a single set of concepts (or interpretive/definitions of variable attributes) reviewed the coding for each of the 2400 sites.

With regard to the collection of additional data for Chaco Canyon, initial efforts focused on variables that could best be recorded in the form of graphic overlays to the Chaco site survey point data. Therefore, the first step was to isolate the Chaco data from all other data in the SJBRUS file and read it into a separate program. Using the UTM coordinates (761580E, 4000800N for the northwest corner, and 245450E, 3984290N for the southeast corner) through which all data is located on SJBRUS, a new file called PARKMAN was created by Drager. Modifications to the interactive program were also made by Drager after it was transferred to the PARKMAN file; these included the elimination of solid lines on the graphic display that represent 2 km grids and replacement with small crosses where the grids intersect. Figure 1 shows the area included in the PARKMAN file, the total number of sites, and the present boundaries of Chaco Culture National Historical Park. A subroutine was written so that the user sitting at the computer terminal could choose to look at small Chaco

areas by manipulation of the joystick which causes the cursor on the screen to move in any direction. Using the cursor to pinpoint locations, it is now possible to zoom in on subsections of the area originally chosen, to measure distances between points, and to obtain site numbers for individual points.

Next a series of maps were digitized by the Technology Applications Center and tapes provided. These include:

1. Map of new boundaries of Chaco Culture National Historical Park prepared by Mathien using 7.5' quads for Kin Klizhin, Pueblo Bonito, and Sargent Ranch on which Robert Powers had marked the new boundaries that had been submitted to and approved by the Ninety-Sixth Congress of the United States (PL 96-550, December 1980).
2. Vegetation map of Chaco Canyon National Monument prepared in 1974 by Loren Potter and Ed Kelley (1980) of the University of New Mexico Biology Department.
3. Soils map of San Juan County, New Mexico, prepared by the U.S. Department of Agriculture.
4. Erosional channels (arroyos/washes) visible on color transparencies taken by Koogler and Pouls (1973 at 1:6000) were analyzed, information mapped and digitized by TAC. One constraint on this map was the lack of photography for the entire Park as these were flown prior to the Park boundary change.
5. Maps of historic and prehistoric roads, stairways, cairns, and visible and invisible recent historic structures prepared by Mathien using data from various sources.

To date, digitized maps for the new Park boundaries and soils have been incorporated into the PARKMAN file and are accessible for analytical purposes. Drager is currently writing and refining software which will allow the terminal user to access variables from digitized overlays in several ways, depending upon the particular question to be answered. Once he has solved all the mathematical equations and programming problems for the soils data overlay, the other digitized files will be added to the PARKMAN program.

Some non-digitized data have also been collected. In conjunction with the preparation of the Cultural Resources

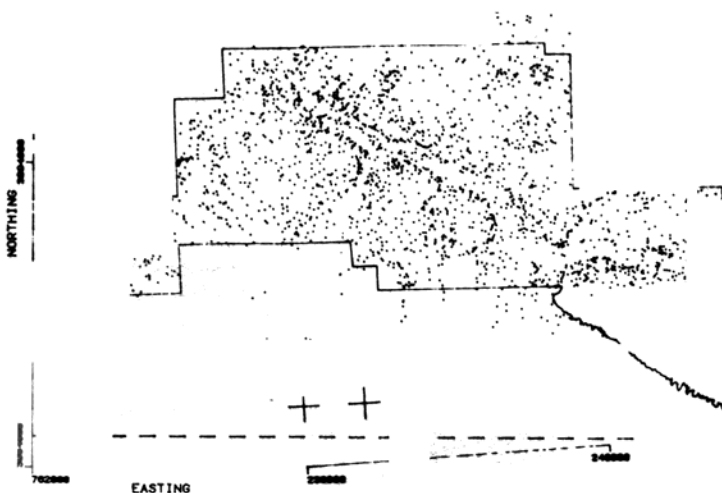


Figure 1. Chaco point data (2244 sites) included in PARKMAN file. Park boundaries super-imposed. Scale 1:125,000.

Management Plan prepared by Steve Adams (1981), estimated stabilization costs, linear feet of wall space, 10-237 requests for salary funds, and 10-238 primary program documents are available for all sites in the Canyon for which these variables are relevant.

In conjunction with entry of data from Chaco into other computerized systems (List of Classified Structures, SARG, Laboratory of Anthropology) and the updating of variables entered into the SJBRUS file, an up-to-date list of all names and site numbers is being prepared. While it will not be finished until the various institutions return a list of site numbers assigned in their system, this aspect of data collection is well underway. The relevance of this is easily seen when an investigator asks for the data on Pueblo Bonito. There is no way this data can be accessed on PARKMAN under that name; it is coded as SJ 387. In addition, Pueblo Bonito has other acronyms such as LA 226, LCS 10287, Bc 253, Fisher's Mound 8 and 2, Jackson's Pueblo 6, SARG Nos. 10,393-10,399.

Similarly, independent rock art surveys have been conducted in Chaco and collection of information on who, when and where additional data are stored is underway. A bibliography of stabilization reports on the various pueblo sites has also been obtained.

While none of these non-digitized variables have been incorporated into the PARKMAN file at this time, there are still a number of questions that can be answered by managers and researchers using the currently available data. Several examples follow.

1. Research application: Assuming the survey data accurately reflect the use of different soil zones through time, it is possible to plot the distribution of sites by major time periods. Figures 2 through 5 were prepared using the PARKMAN file; only habitation sites during Basketmaker III, Pueblo I, II, and III were plotted and soil zones superimposed. It is possible to observe differences in site distribution on these figures.

Using this information an investigator could attempt to explain the patterning observed. Hayes (1981) pointed out that there are problems with Basketmaker III site data; he suspects there are numerous undiscovered sites on the mesas and the alluvial floodplain which were not found. He cites three reasons:

- Windblown sand can easily conceal sites with low profiles.
- Later construction (Pueblo I-III) often covers evidence of earlier pithouses.
- There has been considerable fill in the floodplain area (e.g. he estimated 3.9 feet in 500 years between A.D. 500-1000). Evidence of Basketmaker III sites in the cutbanks of arroyos indicates there are probably numerous buried sites.

However, Hayes also pointed out that this last problem also affected Pueblo I sites. Therefore, the researcher could pursue the question further.

2. Management/Interpretation: Assuming that reports on excavated sites are available and that management wanted to update the visitor interpretation program by including more information on additional sites, it is possible to obtain a list of excavated sites. Table 1 was prepared from a list generated from PARKMAN. The

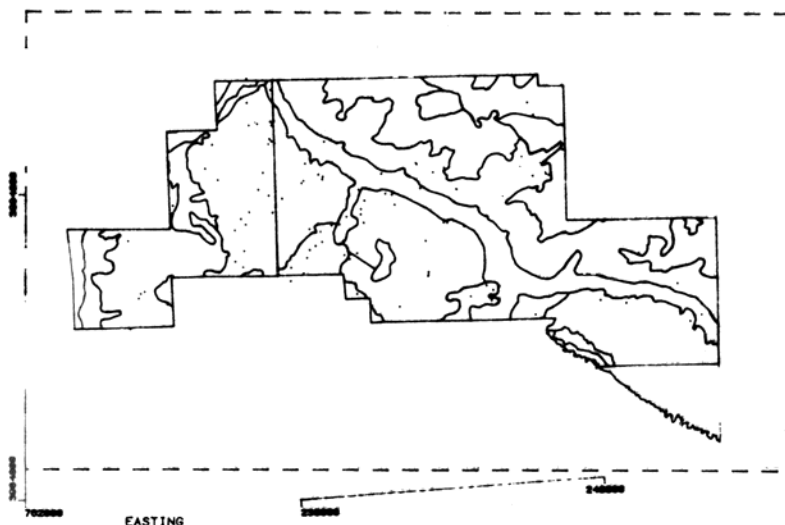


Figure 2. Basketmaker III habitation sites (133 total) with soil zones superimposed. Scale 1: 125,000.

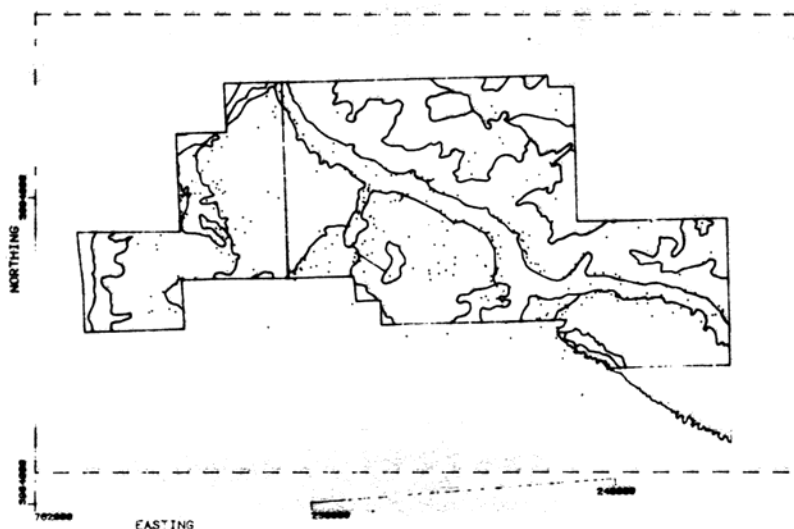


Figure 3. Pueblo I habitation sites (374 total) with soil zones superimposed. Scale 1:125,000.

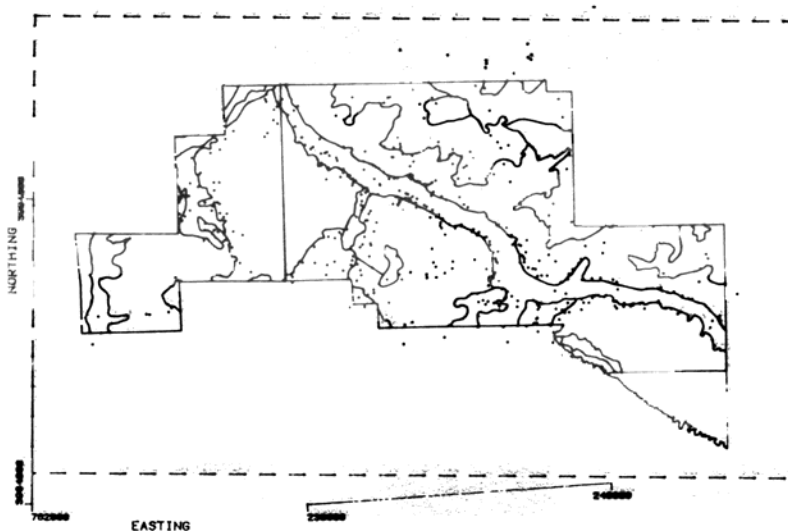


Figure 4. Pueblo II habitation sites (506 total) with soil zones superimposed. Scale 1: 125,000.

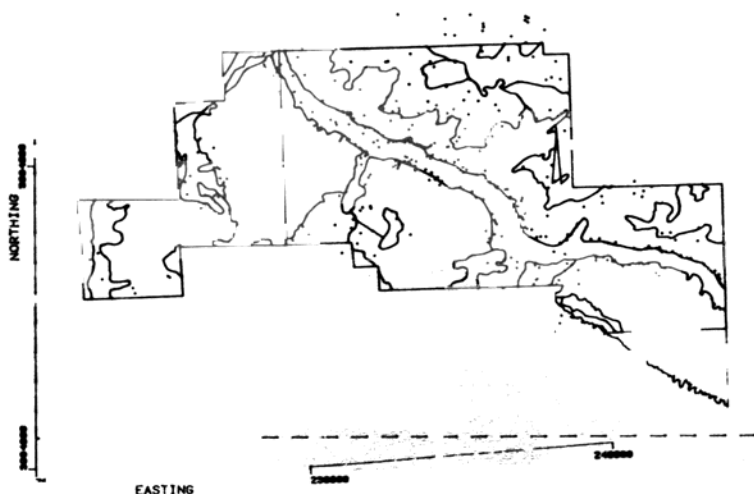


Figure 5. Pueblo III habitation sites (403 total) with soil zones superimposed. Scale 1: 125,000.

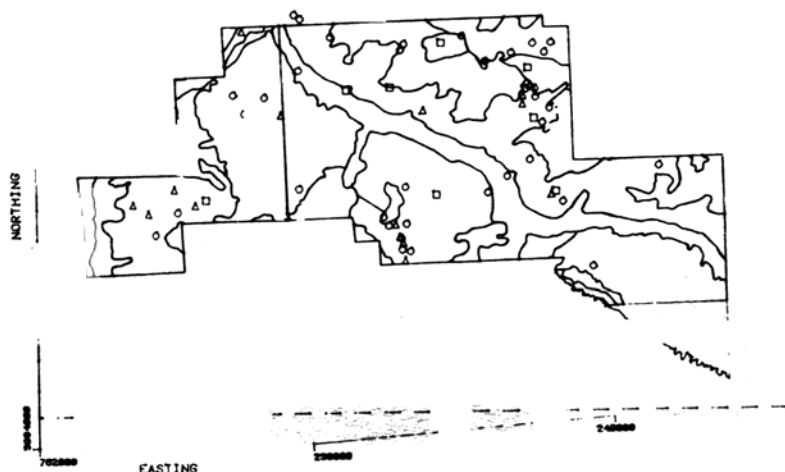


Figure 6. Unidentified lithic artifact scatters (38 Paleo ○; 16 Archaic △; and 8 unknown □) with soil zones superimposed. Scale 1: 125,000.

manager could then pull out information on these sites and select ones which would be useful in the interpretation program; other variables could also be considered.

3. Conservation: Assuming isolated lithic scatters attributed to either the Paleo-Archaic or unknown time periods might be disturbed by increased visitor traffic in the Park, it is possible to obtain a map indicating their locations with regard to soil zones (Figure 6), as well as print out a list of site numbers and more detailed information on each site. Using this information, it is possible to plan visitor trails that would avoid areas or soils zones in which there were significant sites. The fewer numbers of sites in a particular soil zone may raise their level of significance. (For a discussion of site significance, see below.)

Additional questions can be formulated and, hopefully, answered once the PARKMAN data base has been completed. At present, there is much to be added in order to achieve our goals.

Table 1.
EXCAVATED SITES — PARKMAN

SJ	415	SJ	1883
SJ	417	SJ	823
SJ	838	SJ	834
SJ	1769	SJ	387
SJ	1200	SJ	1118
SJ	1238	SJ	126
SJ	386	SJ	1976
SJ	399	SJ	628
SJ	398	SJ	627
SJ	394	SJ	1987
SJ	395	SJ	515
SJ	396	SJ	577
SJ	393	SJ	1659

Additional Work to be Carried Out

Hopefully, the following information will be added to our PARKMAN file:

1. Digitized Data:
 - a. Landforms/geomorphology: Work

carried out by the Division of Remote Sensing has provided a geomorphological map of Chaco Canyon National Monument (Ebert and Gutierrez 1981).

- b. Agriculture/water control features: William B. Gillespie has been collecting data on various environmental parameters in the Canyon and evaluating these with regard to prehistoric habitation of the area. When his studies are complete, a map of prehistoric water control features and agricultural lands should be available. In addition, aerial photographs and other documents will provide data on historic water control features as well as Navajo and modern field use (e.g. Judd 1954, Toll et al. 1979).

2. Other Variables: Either additions to or refinement of variables already on the data base are listed here. They include:

- a. Site visibility,
- b. Site dating (list all types),
- c. Site size (list each individually),
- d. Site condition,
- e. Non-visible site features,
- f. Survey artifacts collected,
- g. Site excavations/dates,
- h. Other disturbances to site,
- i. Stabilization history,
- j. Preservation status,
- k. Site interpretation,
- l. Historic Structures Report, and
- m. References (detailed bibliographic references for each site including unpublished manuscripts, field notes, etc.)

In addition to these new variables, a formula for the determination of site significance devised by Judge will be incorporated into the program once the necessary variables are available on the PARKMAN program. As previously stated (Judge 1980), the issue of site significance must include considerations based on an enduring approach and not simply current research interests no matter how broadly based they may be. It was proposed that site redundancy within the physical environment (e.g. combination of land form, soils, vegetation) and then stratification by chronological and functional units may allow this determination. "In other words, within each ecological zone, the significance of a site type (e.g. P-2 habitation sites) is simply inversely related to its redundancy. A ranking of all sites can easily be established based on the relative frequencies of a given site type to all sites within the zone, and sites can be managed accordingly" (Judge 1980:2).

With passage of PL 96-550, a number (33) of outlying Chaco sites were designated as Archeological Protection Sites. Since these are an integral part of the Chaco Phenomenon and will be managed under a Joint Management Plan currently being written, data on these areas will be gathered and entered into the data base management system. At this time, final nomination of these sites is still underway; Powers is currently working with other members of the Federal management team to determine which of the 75+ outlying sites truly merit inclusion as Archeological Protection Sites. While a list of 33 was provided earlier, this is subject to revision.

Evaluation of the Program

At present it is impossible to label this project either a success or a failure as much

of the information we hope to utilize is still not gathered and incorporated into the PARKMAN file. However, judging from the questions answered by the Chaco Center staff using information currently coded, it has increased efficiency when certain types of questions are asked. For example, it takes about 5-10 minutes to find out how many Pueblo II habitation sites with 25 or more rooms were located during survey, print out the site numbers and other information in the file, and obtain a map of the Park locating these sites by UTM coordinates. It would take many hours to simply read through the 2400 site files and cull this information, let alone map it without the computer. It is anticipated that when all additional variables are entered into the program, any manager who has no background in either archeology or computers will be able to interact with the data base to answer a multitude of questions relating to conservation, research or interpretive problems with a minimal amount of time and effort.

This report is also inventoried as Contribution No. 39 of the Chaco Center, National Park Service and the University of New Mexico, for purposes of bibliographic control of research relating to Chaco Canyon.

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W. James Judge, and
Andrew Drager*

Division of Cultural Research
National Park Service

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Regulations Pertaining to the Issuance of Permits to Conduct Archaeological Investigations

Effective: April 15, 1982 Rule 82-R1

STATUTORY AUTHORITY:

The following regulations are created pursuant to Sections 5, 9 and 11 of the Cultural Properties Act, as amended (18-6-5, 18-6-9, and 18-6-11 NMSA 1978).

Section 5.0 reads as follows:

0. (The Cultural Properties Review Committee) may issue with the concurrence of the state archaeologist, permits for excavation of sites and the collection or removal of objects of antiquity or general scientific interest, where such sites or objects are located on state lands, to institutions which the committee may deem to be properly qualified to conduct such examination, excavation or collection, subject to such rules and regulations as the committee may prescribe, provided that the examinations, excavations and collections are undertaken by reputable museums,

universities, colleges or other historical, scientific or educational institutions or societies approved by the committee, with a view toward disseminating knowledge about cultural properties; and provided that a summary report of such investigations, containing relevant maps, documents, drawings and photographs be submitted to the committee which shall in turn submit the report to the appropriate agency or make other appropriate disposition of the report; and provided further, that all specimens so collected by non-resident institutions shall be the property of New Mexico, and that prior arrangements be made for the disposition of specimens derived from such investigations in an appropriate institution of the state or for loan of such specimens to qualified institutions in or out of the state;

Section 9 B. 1 and 9 B. 2 read as follows:
B. It is a misdemeanor for any person or his

agent to:

- (1) appropriate, excavate, injure or destroy or cause to be appropriated, excavated, injured or destroyed any historic or prehistoric ruin or monument, or any object of historical, archaeological, architectural or scientific value situated on lands or in places owned or controlled by the state or its institutions without a valid permit issued by the committee pursuant to subsection 0 of Section 18-6-5 NMSA 1978 and approved by the commissioner of public lands where trust lands are involved; or
- (2) violate any condition or provision of a valid permit issued by the Committee to that person pursuant to Subsection 0 of Section 18-6-5 NMSA 1978.

Section 11 reads as follows:

A. It is unlawful for any person to excavate with the use of mechanical earth moving

equipment an archaeological site for the purpose of collecting or removing objects of antiquity when such archaeological site is located on private land in this state, unless such person has first obtained a permit issued pursuant to the provisions of this section for such excavation. As used in this section an "archaeological site" means a location where there exists material evidence of the past life and culture of human beings in this state and includes the sites of burial and habitats of human beings: Indian, Spanish, Mexican or other early inhabitants of this state.

B. Permits for such excavation may be issued by the committee upon approval by the state archaeologist when:

1. the applicant submits written authorization for such excavation from the owner of the land;
2. the applicant furnishes satisfactory evidence of being qualified to perform such archaeological excavation by experience, training and knowledge;
3. the applicant submits a satisfactory plan of excavation for the archaeological site and states therein the method by which such excavation will be undertaken; and
4. the applicant agrees in writing upon the completion of the excavation to submit a summary report to the committee of the excavation which shall contain relevant maps, documents, drawings and photographs, together with a description of the archaeological specimens removed as a result of such excavation. Failure to file such summary report shall be grounds for refusing issuance of a future permit to such person.

C. All archaeological specimens collected or removed from the archaeological site as a result of such excavation shall be the property of the person owning the land on which the site is located.

D. Nothing in this section shall be deemed to limit or prohibit the use of the land on which the archaeological site is located by the owner of such land, or to require such owner to obtain a permit for personal excavation on his own land, provided that no transfer of ownership is made with the intent of excavating archaeological sites as prohibited in this section.

E. Any person convicted of violating the provisions of this section is guilty of a misdemeanor and shall be punished by a fine not to exceed one thousand dollars (\$1,000) and in addition thereto shall forfeit to the state all equipment used in committing the violation for which such person is convicted.

SECTION 1: Purpose

The purpose of this regulation is to describe:

- (1) the procedures used in issuing the permit which is required to examine, survey, test, or excavate sites located on lands owned or controlled by the State of New Mexico, or to make collections of objects of antiquity from lands owned or controlled by the State of New Mexico;
- (2) the procedures used in issuing the permit which is required to employ mechanical earth-moving equipment in the excavation of a site located on privately owned lands; and

- (3) the requirements and stipulations to which the permittees are subject.

SECTION 2: Definitions

As used in this regulation:

(a) "Committee" means the Cultural Properties Review Committee, which consists of seven (7) members as follows:

1. the State Archaeologist,
2. the State Historian, and
3. five other professional persons appointed by the governor.

The appointed members must be persons professionally recognized in the fields of history, anthropology, architecture or art, but no more than two members shall be appointed from any one of these fields. Each appointed member shall have achieved recognition for accomplishment in his field in the American southwest, and each have specialized knowledge of New Mexico. The Committee was created in Section 4 of the Cultural Properties Act, as amended (18-6-4.A NMSA 1978).

(b) "State Archaeologist" means the Curator in Charge of the Laboratory of Anthropology of the Museum of New Mexico. The position of State Archaeologist was created in Section 15 of the Cultural Properties Act, as amended (18-6-15 NMSA 1978).

(c) "State Historian" means the State Historian at the State Records Center. The position of State Historian was created in Section 14 of the Cultural Properties Act, as amended (18-6-14 NMSA 1978).

(d) "State Historic Preservation Officer" means the state official who administers the Cultural Properties Act and coordinates all duties performed by public and private entities involved with cultural properties. The position of State Historic Preservation Officer, also referred to in this regulation as SHPO, was created in Section 8 of the Cultural Properties Act, as amended (18-6-8 NMSA 1978).

(e) "Permit" means a written authorization issued by the Committee to conduct archaeological investigations of a particular kind, within a particular geographic area, and for a particular period of time, all of which are specified in the written authorization.

(f) "Site" means any geographical location where there exists material evidence of repeated human activities including, but not limited to, the habitation and burial sites of Indian, Spanish, Mexican and other early inhabitants of the State of New Mexico. "Site" is also referred to in this regulation and other regulations of the Committee as "archaeological site".

(g) "Object of antiquity or general scientific interest" means any material remains of past human life or activities which are capable of being removed from, or existing apart from, a site, including, but not limited to:

1. naturally occurring objects or raw materials extracted for use in the production of human-made objects or for other uses by humans, when found

within a site, or other context from which intended or actual human use can be reasonably inferred;

2. items manufactured or modified by humans, including, but not limited to, whole or fragmentary tools, implements, containers, made of materials including, but not limited to, pottery and other ceramics, basketry, cordage, weavings, glassware, flaked stone, ground stone, pecked stone, worked bone, metal, wood, hide, feathers and pigments;
3. by-products, waste products and debris resulting from the manufacture or use of human-made items or from the human use of natural materials;
4. organic material deposited through human actions and organic material deposited through natural processes only when found within an archaeological site, including, but not limited to, vegetal and animal remains of coprolites;
5. human skeletal or mummified remains including, but not limited to bone, flesh, teeth, and the remains of cremations;
6. rock carvings, rock paintings and other works of artistic or symbolic representation;
7. paleontological remains only when found within an archaeological site.

"Object of antiquity or general scientific interest" is also referred to in this regulation and other regulations of the Committee as "artifact" or "artifactual material."

(h) "Qualified institution" means any public or private entity, including, but not limited to, corporations, partnerships, trusts, associations, educational institutions, foundations, and museums; or any Indian tribe, band or nation; or any agency of any of the 50 states, the District of Columbia, Puerto Rico, Guam and the Virgin Islands; or any agency of the Federal government or of any foreign government, whose staffs (permanent or temporary) include individuals who meet the following minimum professional standards:

1. a graduate degree in archaeology, anthropology, or closely related field, or equivalent training acceptable for accreditation purposes by the Society of Professional Archaeologists; and
2. demonstrated ability to carry research to completion, evidenced by timely completion of theses, research reports or similar documents; and



3. at least 16 months of professional experience and/or specialized training in archaeological field research, laboratory research, administration or management, including at least 1 year of experience or specialized training in the kind of activity the individual proposes to practice, and at least 6 months of field experience within the region where the project will be undertaken, or demonstrable competence based on analogous experience. Persons engaged to do archival or documentary research, as part of the permitted activity, should have either a graduate degree in history or ethnohistory or at least two years of graduate education in either of these fields, or equivalent professional experience including publications.

- (i) "Examination" means an inspection or review of an archaeological site during which information on the site is recorded and artifactual material may be taken from the site; or means limited testing within an archaeological site.
- (j) "Limited testing" means the placing of probes, coring devices, shovel tests or similar highly limited tests made with hand tools, or test pits not exceeding 1 by 2 by 1 meter such that the total surface disturbance resulting from the limited testing activities does not exceed 2 square meters per 40,000 square feet (3717.5 square meters).
- (l) "Collection" means the removal of one or more objects of antiquity, as defined above under (g), from any lands owned or controlled by the State of New Mexico, whether or not these objects are located within an archaeological site.
- (m) "Specimen" means any object of antiquity, as defined above under (g).
- (n) "Nonresident Institution" means any qualified institution, as defined above under (h), whose principal facility is located outside of the State of New Mexico.
- (o) "Isolated artifact" means any object of antiquity, as defined above under (g), which is located outside of a location in which repeated human activities occurred, that is, outside of an archaeological site.
- (p) "Survey" means examination, as defined above under (i), and the activity of locating sites and isolated artifacts. The latter involves traversing the land while looking for evidence of past human activities.
- (q) "Written and photographic records" means original or legible duplicate site data, such as site forms, artifact forms, notes, drawings, tables, maps, plans, charts and other written materials, prints, slides and other photographic records.
- (r) "Mechanical earth-moving equipment" means any motorized machine or device which is capable of displacing, disturbing or transporting earth, soil, dirt or other deposits or materials within an archaeological site from their current contexts in, or just above, the ground, including, but not limited to, trenchers, backhoes, graders, scrapers, bulldozers, and front-end loaders.

SECTION 3 Permitting Procedures and Requirements Pertaining to Archaeological Surveys and Excavations Authorized by the Cultural Properties Review Committee

A. Applicant Qualifications

1. All applicants for survey and excavation permits shall meet the requirements of "qualified institution" as defined in Section 2 (h). Applicants shall provide the SHPO with the **curricula vitae** of the principal investigator and staff members who will be acting or expected to act in a supervisory capacity during permitted investigations. These **vitae** should incorporate information on the individual's education, professional employment, field and research experience, and publications, including cultural resource management reports. These **vitae** will be reviewed by the Chairman of the Committee, the State Archaeologist and the State Historian. If found to meet the criteria for qualified institutions as defined above under Section 2 (h), the **vitae** shall be retained by the SHPO and the name of the institution entered on the list of contracting archaeological firms qualified to work within the State. **Vitae** need not be submitted with subsequent permit applications provided that the applicant insures that the information contained in this file is current and accurately reflects staff composition at the time of a permit application.

B. Permitting Procedures

1. It shall be the responsibility of the applicant to accurately determine the ownership of the land on which a proposed survey or excavation is to be conducted and to make the appropriate application in accordance with the requirements set forth in Sections 4, 5 and 6 below.
2. All requests for cancellations of permits or applications and requests for extensions of permit terms shall be submitted in writing to the SHPO. All such requests shall contain a statement of the reason for which the request is made.
3. Any applicant who has been denied a permit by the Committee shall have the right to appeal the decision to the Committee.
 - a. The Committee shall inform the applicant in writing that a permit has been denied and shall specify the reason for denial.
 - b. Any applicant wishing to appeal a permit denial shall write to the Chairman of the Committee requesting that the permit denial be included in the agenda of the Committee's next scheduled meeting. Requests for an appeal must be received at least two weeks in advance of a regularly scheduled Committee meeting to be heard at that meeting; otherwise the appeal will be heard at the next following meeting of the Committee. The Chairman of the

Committee will inform the applicant in writing of the date, time, and place of the meeting at which the appeal will be heard.

- c. All requests for an appeal shall include a statement of the applicant's reason for requesting an appeal and contain any additional information which the applicant believes will support the appeal.
- d. No requests for an appeal of a decision to deny a permit will be considered by the Committee if the denial is made by a State landholding agency or party to the permit other than the Committee.



C. Methodology

1. All applications for survey and excavation permits shall include information regarding the methods and techniques to be employed during the permitted activity.
 - a. All applications shall specify the reasons for the proposed investigation. For example, is the investigation being conducted under contract in advance of a construction project or is it being conducted as an independent research project? If an investigation is being conducted in advance of a construction project, a brief description of the project shall be included in the application.
 - b. All applications shall list the names of the principal investigator, persons acting in a supervisory capacity and any other specialists involved in the investigation.
 - c. Applications for survey shall specify the degree of coverage of the land surface and how this coverage is to be accomplished. For example, will the survey involve inventory or Class III coverage of the project area, that is, 100% of the ground surface, or Class II or reconnaissance methods? If a Class II or sample survey is to be done, the methods used in selecting the sample units and the estimated sampling fraction shall be discussed. For both Class II and Class III surveys, the estimated spacing of surveyors (or the range of spacing employed) shall be given.
 - d. Applications for excavations shall specify the site(s) to be excavated, the estimated amount of the site(s) to be excavated, and be

accompanied by a research design conforming with research design guidelines adopted by the Committee.

D. Permit Stipulations

1. Permits granted pursuant to authority granted by the Cultural Properties Act are not exclusive in character and there is hereby reserved unto the State landholding agency or other owner and the Committee the right to use said land or any part thereof for any purpose, including other archaeological permits, as is consistent with law.
2. All costs, which are incurred in the execution of the activities conducted under the permit (either survey or excavation), shall be borne by the permittee.
3. The permittee shall comply with all valid and equitable laws, rules, regulations, ordinances, and requirements in all matters and things affecting the premises and operations therein.
4. The State of New Mexico, including its bureaus and employees and landholding agencies, shall be held blameless for any and all events, deeds or mishaps resulting from the activities of the permittee, regardless of whether or not they arise from operations authorized under the permit.
5. All activities conducted under the permit shall be carried out so as to prevent erosion of the land, pollution of water resources and any other damage to the natural environment. Any sites or locations which are disturbed in the course of the archaeological investigations conducted under the survey or excavation permit shall be restored to their original condition insofar as

possible. The areas of limited testing and excavation shall be backfilled. All areas examined under the permit shall be left in a state which will not create a hazard to life nor endanger livestock or other property, nor contribute to the deterioration of the site or location or adjacent lands by natural forces, unless other provisions are specifically arranged in the permit application.

6. The permittee shall be subject to additional stipulations as set forth in Sections 4, 5, and 6 below and any special stipulations as may be required by the Chair of the Committee, the State Archaeologist, or the State landholding agency. These special stipulations shall be set out in writing on the permit.
7. Failure by a permittee to comply with these and any additional or special stipulations set forth in this regulation or on the permit itself shall be considered adequate reason for the Committee's denial of future permits to the permittee.

E. Report Requirements

1. All permittees are required to submit a final report following the conclusion of the fieldwork. These reports shall be reviewed by the State Archaeologist, the Chairman of the Committee, and when appropriate, as determined by the Chairman of the Committee and the State Archaeologist, by the State Historian or other members of the Committee. Upon acceptance of the final report, the SHPO shall send written notification to the permittee of the completion of the permit responsibilities. All reports submitted in fulfillment of permit requirements shall conform with report guidelines

adopted by the Committee.

2. Within 6 months of the completion of the fieldwork the permittee shall submit a copy of the final report on the investigations conducted under the permit to the State Archaeologist, with a second copy of this report going to the SHPO. If, due to unforeseen circumstances, the final report cannot be submitted within this period, the permittee shall submit an interim report to the State Archaeologist and the SHPO, in which an estimated completion date for the final report is included.
3. The permittee shall have first rights to publish any reports resulting from investigations covered by the permit (whether survey or excavation). If this right is not exercised within five years of the acceptance of the final report, the Committee or Museum of New Mexico may elect to publish the report.
4. If, due to unforeseen circumstances, a permitted survey or excavation is not undertaken, the permittee shall notify the SHPO in writing, and request a cancellation of the permit. This request, which shall contain a statement that no fieldwork was conducted and state the reason for the request, shall be accepted in lieu of the above required report, and the SHPO shall notify the permittee in writing of the cancellation.
5. If the permittee's contract to conduct the permitted survey is cancelled prior to the completion of the final report, the permittee shall notify the Chairman of the Committee and the State Archaeologist of the cancellation, and shall submit all extant survey or excavation data, as defined in 2 (g), to the Laboratory of Anthropology, Museum of New Mexico.
6. Failure by a permittee to submit the required reports in a timely manner or in conformance with current reporting guidelines shall be considered adequate reason for the Committee's denial of future permits to the permittee.



SECTION 4. Permitting Procedures and Requirements Pertaining to Archaeological Surveys and Excavations Conducted on State Trust Lands

1. Applications for an archaeological survey easement or an archaeological excavation easement, referred to below as permits, shall be filed with the SHPO. The application forms for survey and the application forms for excavation permits can be obtained from the SHPO. Two copies of the application form and two copies of all required attachments, as described in the Committee's guidelines on archaeological survey and excavation easement applications, and the appropriate application fee, shall be submitted to the SHPO.

2. The application form and all attachments shall be reviewed for completeness and accuracy by the SHPO. When requested by the SHPO, the applicant shall remedy any inaccuracies or inadequacies specified by the SHPO, before further review or processing of the permit application. The application shall be reviewed for approval or denial by the Chairman of the Committee and the State Archaeologist, and then forwarded to the Commissioner of Public Lands for approval or denial.
 3. When this review process has been completed, the SHPO will notify the applicant in writing of the approval or disapproval of the permit by the Chairman of the Committee, the State Archaeologist and the Commissioner of the Public Lands.
 4. The term of the archaeological survey permit shall be six months, and of the archaeological excavation permit shall be one year, from the date on which the approved permit application is filed with the State Land Office.
 5. Surveys or excavations which are being conducted for different firms each require a separate permit. In general, surveys or excavations which are conducted for the same firm, should be carried out under different permits, one permit for each project. Such investigations may, however, be conducted under one permit if they can be completed within the original permit period or within one extension period. Blanket permits for all State Trust Lands shall not be granted.
 6. If the survey or excavation is delayed as a result of unforeseen circumstances and cannot be completed within the permit period, the permittee shall contact the SHPO to request an extension. This request must reach the SHPO prior to the expiration date of the permit, in order to be considered.
 7. If the survey or excavation is discontinued and cannot be completed as a result of unforeseen circumstances, the permittee shall notify the SHPO to request a cancellation of the permit. Disposition of artifactual material collected during the survey or excavation conducted under the permit and copies of all written and photographic records resulting from said investigation is discussed below in Section 4 C.
 8. If the fieldwork is not begun within the permit period, or an extension has not been requested as described above, the permit shall become void at the end of the permit period.
 9. As noted above in Section 3, the permittee is required to submit a final report following the conclusion of the field work. These reports shall be reviewed by the State Archaeologist and the Chairman of the Committee, and when appropriate, as determined by the Chairman of the Committee and the State Archaeologist, by the State Historian or other members of the Committee. Upon acceptance of the final report, the SHPO shall send written notification to the permittee of the completion of his permit responsibilities.
- B. Permit Stipulations**
1. Each permit authorizes either survey or excavation within an area of State Trust Land, which is specified on the permit. Collection and limited testing may be conducted by the recipient of survey permit.
 2. Isolated artifacts located during a survey on State Trust Lands shall be collected in accordance with the Committee's guidelines on the collection of isolated artifacts.
 3. The survey and excavation permits are not exclusive in character. The State Land Office reserves the right to use the subject tracts of land, or any part thereof, for any purpose within the administrative and legal jurisdiction of the State Land Office. The Committee, in cooperation with the State Land Office, reserves the right to permit other archaeological investigations within the easement area.
 4. Title to any findings of mined or processed precious metals or other treasure trove in the area covered by the permit is held by the Commissioner of Public Lands, and shall not be disturbed or removed without specific written permission from the Committee and the State Land Office. Such graded removal shall be recorded and undertaken in the presence of the State Archaeologist or State Historian, or their designates.
 5. All of the permit requirements and/or stipulations, described above in Section 3 of this regulation, including minimum qualifications, standards for the execution of the field work and reporting requirements, pertain to the permits granted to conduct archaeological surveys and excavations on State Trust Lands.
 6. Within six months of the completion of the survey or excavation, the permittee shall submit to the Commissioner of Public Lands and the State Archaeologist a list of the items removed from the State Trust Lands investigated under the permit. The list should be specific in terms of class, quantity and condition of the items recovered, e.g., two lots of painted and utility potsherds, four whole projectile points, two fragmentary projectile points, one lot of lithic debris, one soil sample. If the permittee maintains a standard field specimen record form, legible copies of these forms may be used. The site from which each item was recovered should be specified, as well as the legal description, to the nearest 40 acre tract, of the site or location from which each item was taken.
 7. The permittee shall comply with all rules and regulations of the State Land Office relating to easements and rights-of-way. The permittee shall comply with any additional stipulations required by the Chairman of the Committee and the State Archaeologist. These additional stipulations shall be set out in writing on the permit.
 - 8a. If currently used sacred localities (locations of religious significance to the Native American groups) are encountered during an archaeological survey on State Trust Lands, the sacred locality may be recorded using the procedures normally employed by the permittee, with two exceptions: No collections of artifactual or other material at the sacred locality shall be made, and no photographs of the sacred locality shall be taken. The permittee shall not disturb the sacred



- locality in any way.
- 8b. Those cultural resources which contain perishable or recent ceremonial items, such as prayer sticks, shall be considered to be currently used sacred localities. Other cultural resources, which in the permittee's opinion may be currently used sacred localities, or for which there is ethnographic evidence indicating that they may be currently used sacred localities, shall be recorded using the above procedures.
 9. If human skeletal remains are discovered during limited testing activities or excavations conducted on State Trust lands, the remains shall be avoided and left undisturbed, if possible given the goals of the testing activities or of the excavations. If the human skeletal remains are excavated, such excavations shall be carried out in conformance with professional standards. The permittee's report shall discuss the possible cultural affiliation of the human skeletal remains. The State Archeologist shall report to the full committee, which shall consider any such possible relationship in determining the appropriate disposition of the human skeletal remains.

Curation of collections and Written and Photographic Records

Title to all objects of antiquity located on State Trust Lands is held by the Commissioner of Public Lands, in trust for the designated beneficiaries of the land. The Commissioner has designated the State Archeologist, as Director of the Laboratory of Anthropology, Museum of New Mexico, as the custodian of all objects of antiquity found on lands under the jurisdiction of the State Land Office.

The following applies to all artifactual material collected during the survey or excavations conducted under the permit, and written and photographic records resulting from the survey or excavations, regardless of whether or not the program of work specified in the permit was completed.

1. All artifactual material collected from State Trust Lands, and copies of all written and photographic records resulting from the archaeological investigations conducted under the permit shall be deposited at the Laboratory of Anthropology, Museum of New Mexico, within six months of the acceptance of the final report, unless the permittee enters into a formal agreement with the Museum of New Mexico to receive or retain some or all of these materials on temporary loan. The artifactual materials and written and photographic records so received by the Museum of New Mexico shall be handled in accordance with the policies, regulations and procedures of the Museum of New Mexico.
2. Artifactual material collected from State Trust Lands during the archaeological investigations conducted under the permit, and the written and photographic records resulting from the survey or the excavations shall be submitted to the Laboratory of Anthro-

pology, Museum of New Mexico, in conformance with the standards described in **Procedures for Submission of Collections to the State Archaeological Repository**, a document available from the Laboratory of Anthropology.

SECTION 5 Permitting Procedures and Requirements Pertaining to Archaeological Surveys and Excavations Conducted on Lands Under the Jurisdiction of State Agencies Other Than the State Land Office

A. Permitting Procedures

1. The process by which permits are granted to conduct archaeological investigations on State lands other than State Trust Lands are, in essence, identical to that employed for archaeological investigations on State Trust Lands. Different application forms, however, are used, and, of course, the State Land Office is replaced by the pertinent State agency in the review and processing of the permit application. For a step by step description of the permitting process, see Section 4 A above, replacing references to the State Land Office with the name of the appropriate State agency.

B. Permit Stipulations

1. The stipulations and conditions listed in Section 4 B, with the exception of #6, also apply to the permits issued to conduct surveys and excavations on State lands other than State Trust Lands.
2. In the case of State landholding agencies which have local land managers responsible for the management of subareas of the lands administered by that agency, e.g., the Department of Game and Fish, the permittee shall make contact with the local land manager, prior to the field work, to notify him of the permittee's investigations and to ascertain whether there are restrictions of entry or use currently in effect within the area covered by the permit. The permittee shall adhere to any restrictions in effect during the permit period.

C. Curation of Collections and Written and Photographic Records

1. Title to artifactual material recovered from State lands is held by the State of New Mexico. The Laboratory of Anthropology, Museum of New Mexico, has been designated custodian of artifactual material from State lands. Other State institutions, however, may be deemed the appropriate repository for the artifactual material recovered from State lands in certain cases. The curation of such artifactual material in a State institution, other than the Laboratory of Anthropology, Museum of New Mexico, shall be requested by the permittee at the time of the permit application. This request shall be reviewed by the Committee, and, if approved by the Committee, shall be specified in writing on the permit. If the

institution which has been designated the appropriate repository for artifactual material from certain specified State lands ceases to exist, the artifactual material from these State lands shall be delivered to the Laboratory of Anthropology, Museum of New Mexico for permanent curation.

2. All of the regulations on the curation of artifactual material recovered from State Trust Lands and the curation of the written and photographic records resulting from the archaeological investigations conducted under the permit, described above in Section 4 C, also pertain to the artifactual material recovered from other State lands, and to the written and photographic records resulting from these investigations.



SECTION 6 Permitting Procedures and Requirements Pertaining to the Use of Mechanical Earth-moving Equipment in the Excavation of Archaeological Sites Located on Private Lands Within the State of New Mexico.

A. Permitting Procedures.

1. A permit to use mechanical earth-moving equipment in the excavation of an archaeological site on private land by any individual other than the owner of the land on which the site is located shall be obtained prior to the excavation. This permit shall be applied for by submitting to the SHPO the following:
 - a. written authorization for such excavation by the owner of the land on which the site is located;
 - b. the *curricula vitae* of the individuals who will be conducting the excavation and of any supervisory personnel. These *vitae* should incorporate information on the individuals' education, their professional employment, their field and research experience, and publications, including cultural resource management reports;
 - c. a description of the proposed excavation, including a brief description of the site, the general objectives of the excavations and

- d. a written acknowledgement by the applicant that the permittee shall submit to the Committee a report on the results of the excavation.
2. The above listed items shall be submitted to the SHPO. They shall be reviewed for accuracy and completeness by the SHPO. When requested by the SHPO, the application shall remedy any inaccuracies or inadequacies specified by the SHPO, before further review or processing of the permit application. They shall then be forwarded to the State Archaeologist and the Chairman of the Committee for their review.
 3. When this review process has been completed, the Chairman of the Committee and the State Archaeologist shall jointly send a written notification of their approval or disapproval. This notification of approval shall serve as the permit.
 4. The term of the permit shall be one year from the date of the notification of the permit approval.
 5. If the excavation is delayed as a result of unforeseen circumstances and cannot be completed within the permit period, the permittee shall notify the SHPO to request an extension. The request for the extension shall be accompanied by an interim report summarizing the excavations completed at that date.
 6. Following the review and acceptance by the Chairman of the Committee and the State Archaeologist of the permittee's report, the SHPO shall send written notification to the permittee of the completion of his permit responsibilities.

B. Permit Stipulations

1. Within 60 days of the completion of the excavations, the permittee shall submit to the Committee one copy of an interim report on the results of the excavation, including relevant maps, drawings, photographs and other documents.
2. The permittee shall be subject to any stipulations, or requirements specified by the owner of the land on which the site is located.
3. All of the permit requirements and/or stipulations, described above in Section 3 of this regulation, including minimum qualifications, standards for the execution of the field work and reporting requirements, shall apply to the permits granted to use mechanical earth-moving equipment to excavate a site located on privately-owned land.

C. Curation

1. All artifactual material collected or removed from the site as a result of the excavations conducted under the permit shall be the property of the owner of the land on which the site is located, and, thus, the disposition of this artifactual material is solely at the discretion of the land owner. The permittee should, however, encourage the land owner to dispose of the artifactual material in such a way that the general public may benefit, for example, through the donation of the material to a public institution which curates such material.

Cultural Properties
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