THE PAJARITO PLATEAU:
A BIBLIOGRAPHY

FRANCES JOAN MATHIEN
CHARLIE R. STEEN
CRAIG D. ALLEN

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THE PAJARITO PLATEAU:
A BIBLIOGRAPHY

by

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Division of Anthropology
U.S. Department of the Interior
National Park Service

1993
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A BIBLIOGRAPHY
Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally-owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.
Dedication

To Charlie R. Steen

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Foreword

In 1916 Bandelier National Monument was established by proclamation of President Woodrow Wilson to protect and preserve for public enjoyment and education the large Anasazi pueblos and spectacular cave dwellings of the southern Pajarito Plateau. At the time, the monument and its archeological resources enjoyed considerable national prominence both in the public eye and within the profession of archeology, largely as a result of the pioneering explorations of Adolph Bandelier and the subsequent major excavations and dogged preservation efforts of Edgar L. Hewett. Since that time, however, Bandelier has ceded much of its prominence in southwestern prehistory, as extensive research projects have been conducted elsewhere. Although sporadic investigations have occurred over the last 75 years, the extent to which Bandelier has been forgotten is exemplified by the fact that in 1985 only 500 archeological sites had been identified in the monument's 51 square miles of territory. Knowledge of the majority of these was poor at best.

This bibliographic volume, painstakingly compiled by F. Joan Mathien, Charlie R. Steen, and Craig D. Allen, represents the first of several National Park Service contributions that will report the findings of the ongoing Bandelier Archeological Survey and, it is hoped, reestablish publicly and professionally the monument's rightful place in the development and florescence of late Anasazi prehistory. Begun in 1985, the ten-year Bandelier Survey has as its goals the recovery of both research and cultural resource management data, so that the Service may not only better understand and interpret the monument's archeology, but better preserve it. As of this date, a detailed architectural study of cavate pueblos has been completed and the field portions of sample inventory survey and test excavation programs have been brought to successful conclusion. The cavate study, directed by H. Wolcott Toll, and the survey, led by myself, were performed with National Park Service funding and staff. The excavation program, directed by Timothy A. Kohler, Associate Professor of Anthropology at Washington State University, was and continues to be supported by private grants. In an era when federal fiscal realities no longer allow comprehensive investigations on the order of a Mesa Verde or Chaco Project, it is only through collaborative efforts like this one with Washington State University that the type of thorough and careful research that has characterized past investigations of National Park Service areas will be able to continue.

It is in this collaborative spirit that Joan Mathien, Archeologist of the Branch of Cultural Research, Southwest Regional Office; the indomitable Charlie Steen, Consulting Archeologist of Los Alamos National Laboratory; and Craig D. Allen, Ecologist of Bandelier National Monument, have prepared what we believe will be a useful and important guide to the cultural and natural resources of the Pajarito Plateau.

Robert P. Powers, Director
Bandelier Archeological Survey
August 1992
CONTRIBUTIONS OF
THE BANDELIER ARCHEOLOGICAL SURVEY

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ACKNOWLEDGMENTS

Every project, no matter what its size, is the combined effort of many people. To compile a bibliography as large as this one was not an easy task, and the authors are indebted to many colleagues for their assistance. Among them are Claire Harrison, formerly with the National Park Service; Beverly M. Larson, Consulting Archeologist, Los Alamos National Laboratory; William Sweetland, Archeologist, Bandelier National Monument; Lou Haecker, Cultural Resource Specialist, Archaeological Resources Management System, State Historic Preservation Office; and Laura Holt, Librarian, Laboratory of Anthropology, Museum of New Mexico. We would also like to acknowledge those who reviewed the draft copies and made constructive comments: Dr. Milford Fletcher, Dr. Charles H. Lange, Curtis F. Schaaflma, and the staff of Bandelier National Monument and the Bandelier Survey Project. As in any endeavor of this kind, a number of references probably were missed, for which we accept all responsibility. We hope that the reader will use this document as a guide to the literature.
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Introduction

Frances Joan Mathien

Background

This bibliography is the result of two initially independent projects. As the consulting archeologist at Los Alamos National Laboratory (LANL), Charlie R. Steen collected entries at the suggestion of the staff of the Environmental Surveillance Group of the Health, Safety, and Environmental Division, HSE-8. The primary purpose was to aid the staff in evaluating cultural resources on LANL lands. In addition to works that related to the archeology and history of the area, Steen included notations of a few books and articles in other fields such as geology and natural history. It was hoped that they also would be of value to other organizations and to students of past human activities on the Pajarito Plateau.

At the same time, the National Park Service (NPS) was planning a major survey of Bandelier National Monument (BNM). As part of this plan, the author was asked to prepare a background document that described research previously carried out in the area, including an annotated bibliography. Although the survey would be limited to the park boundaries, the larger Pajarito Plateau is a more logical study area from physiographic, environmental, and cultural perspectives; hence the focus was on this larger region. Mathien (1986) also included some references to natural resources studies, particularly those initiated by NPS within Bandelier National Monument.

Both bibliographies were made available to Colleen Olinger and Beverly Larson of the Health and Environmental Services Group at Los Alamos. They realized that while neither was complete, each included entries missing from the other. Larson suggested the two bibliographies be combined. (At this time, Craig Allen was studying the landscape of the Jemez Mountains [Allen 1984c, 1989]. His investigations included much detailed information on natural resource studies and were added in 1991 and 1992.)

To limit the scope of their work, Steen and Mathien had chosen their parameter: the Pajarito Plateau. Geographically, the Pajarito Plateau is described as the high tableland that lies between the Jemez Mountains on the west and the Rio Grande on the east. From north to south, it extends from the Chama Valley to La Cañada de
Figure 1. The Pajarito Plateau. Major land status boundaries.
Cochiti (Hewett 1906:14)(Figure 1). Because human activity rarely stops at such definite boundaries, major ethnographic studies of Tewa (San Ildefonso and Santa Clara) and Keres (Cochiti) linguistic groups are included. (Even though most of the historic pueblos occupied by the Tewa and Keres are not located on the Pajarito Plateau, oral traditions and archeological data suggest that these groups once occupied sites on the plateau.) Towa studies are not included because Steen believed Towa ancestors were not involved in major cultural developments of the Pajarito Plateau. In addition, a bibliography of the Jemez area (home of Towa people) has been prepared by Michael Elliott (1982) and included with his nomination of large Pueblo sites near Jemez Springs to the National Register of Historic Places that is on file at the Museum of New Mexico, Laboratory of Anthropology, in Santa Fe. Both Steen and Mathien included references to geographically and historically related material that does not focus on the Pajarito Plateau but, nonetheless, is important to understanding the area's archeology and physical environment, for example, lithic resources available from Cerro Pedernal or in the Sangre de Cristo Mountains.

The Bibliography

To assist the reader, two short chapters outline some of the studies that have been carried out during the past century. Craig Allen provides a sketch of the environmental background (soils, climate, vegetation, fauna) and lists some of the paleoecological studies that have been conducted. Mathien briefly describes the cultural studies from a historical perspective. Throughout her discussion, she uses familiar names or numbers for archeological sites; Appendix A lists the site names and their equivalent LA numbers—the official site numbers used in ARMS, the automated database management system used by the State of New Mexico Historic Preservation Office.

Bibliographic entries have been divided into three major categories: natural resources, cultural resources, and other general topics. The natural resources section encompasses geology, biology (both flora and fauna), pedology, mineralogy, and hydrology. Included under cultural resources are entries pertaining to archeology, history, ethnology, and ethnohistory. The last category, other references, includes a variety of unrelated topics, not necessarily vital to archeological research and environmental reconstruction of events on the Pajarito Plateau. Among these are entries that provide biographical material on the history, atmosphere, sense of place, and historical importance of the Pajarito Plateau.
The Setting

Craig D. Allen

Research during the past two decades has added considerably to our knowledge of the natural setting and resources of the Pajarito Plateau. This chapter reviews the most recent publications under the following headings: geology, landforms, and soils; climate; vegetation; fauna; and paleoenvironment.

Geology, Landforms, and Soils

The Pajarito Plateau is located on the east flank of the Jemez Mountains, north-central New Mexico. The Jemez landscape ranges in elevation from 1,590 m at the Rio Grande to 3,526 m at the summit of Tschicoma Peak, with a geologic boundary enclosing about 543,522 ha (Smith et al. 1976). The Jemez Mountains are the remnants of a large, collapsed volcano that underwent massive eruptions 1.4 and 1.1 million years ago. Prominent landforms include two central calderas, secondary domes within the calderas, the mountainous remnants of the precollapse volcanic piles that rim the calderas, an encircling skirt of canyon-dissected tuff plateaus (including the Pajarito Plateau), White Rock Canyon, and the basaltic cones of the Cerros del Rio (Burton 1982). The central Toledo and Valles calderas are 12 and 24 km in diameter, respectively. The caldera rim peaks are known as the Sierra de los Valles. An immense amount of geological research has been conducted in the Jemez Mountains (see Mills et al. 1989).

The Pajarito Plateau is composed of up to 300 m of consolidated ash tuff that was deposited during the big eruptions. Subsequent erosion has created landforms dominated by abrupt, deep canyons that separate long, narrow, upland mesas. The townsit of Los Alamos is situated on the upper end of the Pajarito Plateau, at the base of the Sierra de los Valles. The Rio Grande flows through White Rock Canyon, a gorge 300 m deep that separates the Pajarito Plateau from the Cerros del Rio to the southeast.

Climate

Overall the Jemez Mountains experience a semiarid continental mountain climate (Bowen 1990; U.S. Department of Energy 1979), but this designation masks a great deal of variability associated with elevational gradients and topography. For example, annual precipitation ranges from 30 cm at the lowest elevations to about 90 cm at the caldera rim; mean annual precipitation at Bandelier's weather station (1,990 m elevation) is 40.7 cm (Bandelier National Monument, records on file). There is typically a dry period from late April through the end of June, terminated by the onset of the summer "monsoon." Sixty percent of the annual precipitation falls between June and September, with thunderstorms reported for 58 percent of the days in July and August (U.S. Department of Energy 1979). These convectional thunderstorms, frequently accompanied by hail, bring 40 percent of the total annual precipitation in July and August. Cyclonic storms in winter bring snow to all elevations. Los Alamos has a five-month growing season (May 6-October 16), with perhaps a 100-day growing season found at the highest elevations or in canyon bottoms with cold air drainage. July is the warmest month at Los Alamos (mean temperature = +20 °C), and January the coldest month (mean temperature = -1.6 °C). Bowen (1990) provides extraordinary detail on the climate of the Pajarito Plateau.

Local climate is also temporally variable, with wide fluctuations in annual precipitation common. Cyclic El Niño climate events bring increased spring and summer precipitation to this area about every four years (Andrade and Sellers 1988). Dendroclimatological work documents irregular occurrences of dry and wet periods extending back to A.D. 598 in the Jemez Mountains (Dean and Robinson 1977, 1978). Weather records at Los Alamos and the Bandelier headquarters begin in 1911 and 1925, respectively, with data missing from some early years (Bowen 1990; Bandelier National Monument, records on file).

Vegetation

The Jemez Mountains are in the southernmost extension of Bailey's (1980) Rocky Mountain Forest Province, with vegetation communities similar to those found throughout the southern Rocky Mountains. The general conceptualization of the vegetation pattern in this area is a zonation of communities based on elevation and slope exposure. Upward along the 1,900 m elevational gradient from the Rio Grande to the Jemez peaks, one passes through juniper grasslands (Juniperus monosperma, Bouteloua sp.) from about 1,600 to 1,900 m; pinyon-juniper woodlands (Pinus edulis) at 1,900 to 2,100 m; ponderosa pine forests (Pinus ponderosa) at 2,100 to 2,300 m; mixed conifer forests of ponderosa pine, Douglas-fir (Pseudotsuga menziesii), white fir (Abies concolor), aspen (Populus tremuloides), and limber pine (Pinus flexilis) at 2,300 to 2,900 m; and finally spruce-fir forests of Engelmann spruce (Picea engelmanni) and corkbark fir (Abies lasiocarpa var. arizonica) on the north slopes of the highest peaks above 2,900 m. High-elevation grasslands (Festuca thurberi, Danthonia parryi) occur as large breaks in the mixed conifer forests on upper south-facing slopes (Allen 1984a), and large moist meadows occupy the "valles of the caldera" basins. A similar pattern of vegetation zones is used by several authors (Allen 1989; Nyhan et al. 1978; Osborn 1966; U.S. Department of Energy 1979, 1980). Although other authors explicitly recognize more categories (e.g., Moir and Ludwig 1979; Potter and Foxx 1981; U.S.D.A. Forest Service 1987a), their specific vegetation types are generally consistent with this broad zonal framework. The current vegetation of the Jemez Mountains reflects the underlying diversity of landforms, soils, climate, and site
The wide variety of available habitats in this landscape. Bandelier National Monument has inventory information for most vertebrate faunal species. Recent park surveys indicate the presence of approximately 1,200 arthropod species (including 10 likely new to science) (Pippin and Pippin 1984b), 5 amphibians and 14 reptiles (Degenhardt 1975; Fleisher 1978), and 44 terrestrial mammals and 12 bats (Guthrie and Lare 1980). About 115 breeding birds (Travis 1992) and 90 species of ants (Mackay et al. 1988) have been recorded in Los Alamos County. The endemic Jemez Mountains salamander (Plethodon neomexicanus) merits specific mention, as this state-listed endangered species is currently a Category I federal notice-of-review species. Other threatened or endangered species found on the Pajarito Plateau include the bald eagle (Haliaeetus leucocephalus), peregrine falcon (Falco peregrinus), and spotted owl (Strix occidentalis).


Sources of environmental information available in-house at Bandelier National Monument are summarized in Allen (1989, 1992). Increasingly large amounts of environmental information will be available from Los Alamos National Laboratory as its "environmental

Fauna

The Pajarito Plateau harbors a diversity of animal species and communities, reflecting


The vascular plant flora of Bandelier National Monument includes collections of 720 species in 347 genera representing 86 families (Jacobs 1989a). Rare and endangered plant species found locally include the yellow lady’s slipper (Cypripedium calceolus), rattlesnake fern (Botrychium virginianum), and grama grass cactus (Pediocactus papyracanthus) (Jacobs and Jacobs 1988). Jarmie and Rogers (1992) are conducting a fungal inventory of the Pajarito Plateau; to date, they have collected 133 species in 95 genera.
restoration" program generates compliance (Raymer 1992).

**Paleoenvironment**

While much paleoenvironmental research has been conducted in the American Southwest, the Pajarito Plateau area has received relatively little attention (see Spaulding 1992).

Climatic reconstructions in the Southwest, including sites in and around the Jemez Mountains, indicate that recurring episodes of dry and wet conditions characterize the Southwest over the past 2,000 years (Dean and Robinson 1977; Euler et al. 1979; Petersen 1988; Rose et al. 1981; Stearns 1981). Historic changes in the environment of the Pajarito Plateau area are reviewed by Allen (1989) and Rothman (1992). Ongoing research by McCord (1991), Reneau (1991), Spaulding (1992), and Touchan and Swetnam (1991b, 1992) will shed more light on paleoenvironments of the Pajarito Plateau area.
Anthropological Investigations

Frances Joan Mathien

The Pajarito Plateau has been visited by anthropologists for more than a century. With the acquisition of the Territory of New Mexico in 1846, investigators from the eastern United States entered the American Southwest, taking note of its topography, natural resources, inhabitants, and cultural differences. This chapter reviews the major investigations that have occurred; Tables 1 and 2 provide a summary of the surveys and excavations.

Early Reconnaissance and Discovery

Between 1880 and 1885 James Stevenson and J. W. Powell of the Bureau of American Ethnology (BAE) traveled through New Mexico and Arizona collecting prehistoric and modern Pueblo materials housed in the U.S. National Museum, Smithsonian Institution, in Washington, D.C. (Powell 1881, 1883). Stevenson (1883a, 1883b, 1886) published a description of his visits to areas on the Pajarito Plateau and a catalog of items collected during his expeditions to the Southwest.

Beginning in 1880, Adolph F. Bandelier, a self-trained ethnographer and historian, made several visits to the Pajarito Plateau. In 1890 he was accompanied by Charles F. Lummis, a writer/editor who walked across the country in 1884-85, taking photographs and writing short stories for newspapers along the way. Both Bandelier and Lummis are key figures who did much to popularize the Indian ruins they discovered.

Bandelier’s scientific work was part of a program sponsored by the Archaeological Institute of America (AIA) (Bandelier 1883, 1890, 1892, 1910, 1929). Bandelier conducted informal reconnaissance surveys, made sketch maps of sites, and collected some material from the surface of several of the large pueblos on the Pajarito Plateau. Among the sites he visited were Shufinne, Puye, Tsirege, Tsankawi, Potsi’i (Otowi), Tyuonyi, Yapashi, the Stone Lions shrine, Cueva Pintada, the Stone Lions in the Potrero de los Idolos, Kuapa, Old Cochiti, and numerous cave sites, as well as others in the Rio Grande Valley. Bandelier consulted with the Native American population and attempted to trace particular Keresan and Tewa Pueblo traditions and migration tales to specific archeological sites (Bandelier 1892). In addition, he documented the effects of the Spanish on the Pueblos (Bandelier 1910, 1929) and wrote a
Table 1. Summary of archeological site surveys on the Pajarito Plateau.

<table>
<thead>
<tr>
<th>Survey Area/Surveyor(s)</th>
<th>Year(s)</th>
<th>Institution(s)*</th>
<th>Comments and References</th>
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<tr>
<td>Pajarito Plateau - generalb</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J. Stevenson</td>
<td>1880s</td>
<td>BAE</td>
<td>Stevenson (1883a, 1883b, 1886)</td>
</tr>
<tr>
<td>J. W. Powell</td>
<td>1885</td>
<td>BAE</td>
<td></td>
</tr>
<tr>
<td>Adolph F. Bandelier</td>
<td>1880-1890</td>
<td>AIA</td>
<td>Five visits to the Bandelier area, once accompanied by Charles F. Lummis. Photographs at Southwest Museum in Los Angeles; Maxwell Museum of Anthropology, UNM. Bandelier (1883, 1892); Lange et al. (1975, 1984); Lange and Riley (1966); Lange and Riley with the assistance of Lange (1970)</td>
</tr>
<tr>
<td>Edgar L. Hewett</td>
<td>1987-early 1900s</td>
<td>New Mexico State Normal School;¹ New Mexico Normal School;² BAE; SAR</td>
<td>Hewett (1904, 1906, 1908b, 1938a)</td>
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<tr>
<td>Reginald Fisher</td>
<td>1929-1931</td>
<td>SAR and UNM</td>
<td>Fisher (1931)</td>
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<tr>
<td>Harry P. Mera</td>
<td>1920s-1930s</td>
<td>LA</td>
<td>Mera (1932, 1933, 1934, 1935, 1940)</td>
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<tr>
<td>U.S.G.S. surveyors</td>
<td>1940s-1950s</td>
<td>USGS</td>
<td>Survey for development of quad maps of area. No reports, but sites located on quad sheets.</td>
</tr>
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<td>Institution(s)*</td>
<td>Comments and References</td>
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<tr>
<td>Ramon Vigil Grant/</td>
<td>1935</td>
<td>NPS</td>
<td>Map, field notebook at BNM; some ceramic collections made (Worman 1959, 1967).</td>
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<td>Los Alamos Scientific Park</td>
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<tr>
<td>Frederick C. V. Worman</td>
<td>1950-1971</td>
<td>LANL</td>
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<tr>
<td>David H. Snow</td>
<td>1983-1986</td>
<td>LANL</td>
<td>Many small surveys (Snow 1982a)</td>
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<td>Bandelier National Monument/ Tsankawi (Otowi) Section</td>
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<td>NPS</td>
<td></td>
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<td>Ralph Lassiter, Carl Alleman, James M. Eden, Dale S. King, and Walter W. Taylor</td>
<td>1946</td>
<td>NPS</td>
<td>Collections at WACC; Turney (1955)</td>
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<td>Erik K. Reed</td>
<td>1948</td>
<td>NPS</td>
<td>Powers (1988); see below</td>
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<td>John F. Turney</td>
<td>1952</td>
<td>NPS</td>
<td>Collections at SIU, NPS-SWRO. Map (NPS BAND/3855)</td>
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<td>Robert P. Powers</td>
<td>1980s</td>
<td>NPS</td>
<td>Collections at NPS. Hubbell and Traylor (1982); Traylor et al. (1990)</td>
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<td>Year(s)</td>
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<td>-------------------------------------------------</td>
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<tr>
<td>Cochiti Dam Flood Pool</td>
<td></td>
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<tr>
<td>Natt Dodge and Zorro Bradley</td>
<td>1959</td>
<td>NPS</td>
<td>Hubbell and Traylor (1982)</td>
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<td>Ron Ice, Don Fiero, and Dan Lenihan</td>
<td>1973</td>
<td>NPS</td>
<td>Hubbell and Traylor (1982)</td>
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<tr>
<td>Lyndi Hubbell and Diane Traylor</td>
<td>1974-77</td>
<td>NPS</td>
<td>Maps, field notes, and collections at NPS-SWRO. Hubbell and Traylor (1982)</td>
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<td>Charles H. Lange</td>
<td>1962-1965</td>
<td>SIU</td>
<td>Survey done through contract with MNM. Lange (1968a, 1968b); Peckham and Wells (1967)</td>
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<td>Cañada de Cochiti/ James Webb Young Ranch</td>
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<td>Charles H. Lange</td>
<td>1956-1959</td>
<td>SIU</td>
<td>Moore (1979)</td>
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<tr>
<td>Leo Flynn and W. James Judge</td>
<td>1973</td>
<td>UNM</td>
<td>Collections and notes at MMA; map and report by Flynn and Judge (1973)</td>
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<tr>
<td><strong>Rock Art Surveys</strong></td>
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<td></td>
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<tr>
<td>Richard H. Powell</td>
<td>1899-1901</td>
<td>New Mexico Normal School</td>
<td>English professor who worked with Hewett. See Hewett (1938a:114-115); his work is incorporated into Chapman’s reports (see below)</td>
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<tr>
<td>Kenneth M. Chapman</td>
<td>1909-1920</td>
<td>SAR</td>
<td>Chapman (1916, 1917a, 1917b, 1927a, 1938a)</td>
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<td>Arthur Rohn</td>
<td>1980s</td>
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<td>Loy C. Neff</td>
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<td>Neff (1990)</td>
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<td>Nancy Olsen</td>
<td>1988-91</td>
<td>NPS</td>
<td>Part of NPS Bandelier Survey Project</td>
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* Abbreviations:

AIA Archaeological Institute of America.
AMNH American Museum of Natural History, New York.
BAE Bureau of American Ethnology, Washington, D.C.
BNM Bandelier National Monument.
LA Laboratory of Anthropology (now part of Museum of New Mexico), Santa Fe.
LANL Los Alamos National Laboratory.
MMA Maxwell Museum of Anthropology, University of New Mexico, Albuquerque.
MNM Museum of New Mexico, Santa Fe.
NPS National Park Service; Southwest Regional Office (SWRO), Santa Fe.
OCA Office of Contract Archaeology, University of New Mexico, Albuquerque.
SAR School of American Archaeology, later School of American Research, Santa Fe.
SIU Southern Illinois University, Carbondale.
SFNF Santa Fe National Forest, Santa Fe.
UCLA University of California at Los Angeles.
UNM University of New Mexico, Albuquerque.
WACC Western Archeological and Conservation Center, Tucson.

* Covers broad area as well as subdivisions listed below.
* Now University of Northern Colorado, Greeley.
* Now Highlands University, Las Vegas.
### Table 2. Excavated sites on the Pajarito Plateau.\(^a\)

<table>
<thead>
<tr>
<th>LA No.</th>
<th>Site Name</th>
<th>Year Excavated/Primary Excavator(s)</th>
<th>Collections(^b)</th>
<th>References</th>
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<td>Los Aguajes PARP 031A, 032B</td>
<td>1915 Nels C. Nelson</td>
<td>AMNH</td>
<td>Anonymous (1915)</td>
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<td>32</td>
<td>Little Otowi SIU 59,240 LA 2774, 2775</td>
<td>1915-1917 Lucy L. W. Wilson</td>
<td>MNM</td>
<td>Nelson (n.d.b)</td>
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<tr>
<td>77722</td>
<td>Large kiva east of Tyuonyi</td>
<td>1908 Edgar L. Hewett</td>
<td>SAA</td>
<td>Hewett (1909a) Hendron (1937c, 1937g) Onstott (1948c) Turney (1950)</td>
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<td>?</td>
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<tr>
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<td>Potsui'i I</td>
<td>1943 Jerome W. Hendron</td>
<td>WACC</td>
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<tr>
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<tr>
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<td>Airport No. 2</td>
<td>1951 Frederick C. V. Worman</td>
<td>MNM</td>
<td>Steen (1977)</td>
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Table 2. (continued)

* Listed by LA numbers.

Abbreviations:

<table>
<thead>
<tr>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>AMNH</td>
<td>American Museum of Natural History, New York.</td>
</tr>
<tr>
<td>ASM</td>
<td>Arizona State Museum, Tucson.</td>
</tr>
<tr>
<td>ASC</td>
<td>Adams State College, Alamosa.</td>
</tr>
<tr>
<td>BNM</td>
<td>Bandelier National Monument.</td>
</tr>
<tr>
<td>DCA</td>
<td>Division of Conservation Archaeology, San Juan Museum, Farmington.</td>
</tr>
<tr>
<td>LAHS</td>
<td>Los Alamos Historical Society.</td>
</tr>
<tr>
<td>MAI</td>
<td>Museum of the American Indian, New York.</td>
</tr>
<tr>
<td>MMA</td>
<td>Maxwell Museum of Anthropology, University of New Mexico, Albuquerque.</td>
</tr>
<tr>
<td>MNM</td>
<td>Museum of New Mexico, Santa Fe.</td>
</tr>
<tr>
<td>NPS</td>
<td>National Park Service, Southwest Regional Office (SWRO), Santa Fe.</td>
</tr>
<tr>
<td>OCA</td>
<td>Office of Contract Archeology, University of New Mexico, Albuquerque.</td>
</tr>
<tr>
<td>PCC</td>
<td>Philadelphia Civic Center.</td>
</tr>
<tr>
<td>PM</td>
<td>Peabody Museum, Cambridge.</td>
</tr>
<tr>
<td>ROM</td>
<td>Royal Ontario Museum, Toronto.</td>
</tr>
<tr>
<td>SAA</td>
<td>School of American Archaeology (now at MNM).</td>
</tr>
<tr>
<td>SAC</td>
<td>Southwest Archaeological Consultants, Santa Fe.</td>
</tr>
<tr>
<td>SDMM</td>
<td>San Diego Museum of Man, San Diego.</td>
</tr>
<tr>
<td>SFNF</td>
<td>Santa Fe National Forest, Santa Fe.</td>
</tr>
<tr>
<td>SIU</td>
<td>Southern Illinois University, Carbondale.</td>
</tr>
<tr>
<td>UCLA</td>
<td>University of California at Los Angeles.</td>
</tr>
<tr>
<td>WACC</td>
<td>Western Archeological and Conservation Center, Tucson.</td>
</tr>
</tbody>
</table>
popular novel (Bandelier 1890). His detailed notes have been edited in four volumes by Lange et al. (1975, 1984), Lange and Riley (1966), and Lange and Riley with the assistance of Lange (1970).

Lummis's interest in the Pueblo Indians blossomed in 1888-89 when he was living in New Mexico while recuperating from a stroke; for part of this time, he lived at the Pueblo of Isleta. In 1890 he met Bandelier and accompanied him to the Pajarito Plateau. In 1904 Lummis helped found the Southwest Society (AIA), and he later served as a member of the AIA Board and its School of American Archaeology (later the School of American Research), which was founded in 1907. As editor of a popular magazine, Land of Sunshine (1893; which became Out West after 1902), Lummis provided an outlet for brief reports written by travelers or other archeologists who came to the Pajarito Plateau with the School of American Archaeology (Hewett 1909a; Morley 1910c; Wallace 1900). Chapters in Lummis's popular books (Some Strange Corners of Our Country, 1915; Land of Poco Tiempo, 1925; Mesa, Canyon and Pueblo, 1925) were widely read by the American public, some of whom traveled to the Pajarito Plateau or became affiliated with the AIA field schools after 1907.

**Edgar L. Hewett and the School of American Archaeology (AIA)**

Edgar L. Hewett entered the southwestern scene in 1896 when he began his investigations on the Pajarito Plateau. Hewett, an educator first at the Normal School (now University of Northern Colorado) in Greeley, Colorado, then in 1897 president of the New Mexico Normal School (now Highlands University) in Las Vegas, New Mexico, began the first major archeological program on the Pajarito Plateau. Initially, he explored the area to learn about human development from prehistoric ruins. In addition to archeological reconnaissance, Hewett conducted limited excavations in mounds at larger sites (Puye, Tsankawi) as well as several small sites in the area near Tsirege, located on the Ramon Vigil Grant (Hewett 1904a). After these summer explorations, he contacted other educators interested in anthropology throughout the country, bringing to their attention the importance of this area in prehistory (Hewett 1946). Two of Hewett's colleagues at the New Mexico Normal School, Kenneth Chapman and Richard Powell, were part of the summer expeditions (Hewett 1904:629). Powell conducted a rock art survey in 1899-1901 (Hewett 1938:114-115); his data are incorporated into Chapman's (1916, 1938) reports.

In 1903 Hewett left the New Mexico Normal School and went to the University of Geneva to obtain his Ph.D. in sociology. While working on his degree, he was hired by the BAE in 1904 to survey, map, and prepare a report on the Pajarito Plateau (Hewett 1906). He excavated mounds at Otowi and conducted some field work at Tsirege (Mathien 1990). Hewett's 1906 report contains much of the same information on the Pajarito Plateau as is found in his 1908 dissertation, which includes then-known prehistoric sites located in an area extending from southern Colorado down into the Chihuahua Basin of Mexico. Although he documented the different prehistoric groups of the American desert, he paid particular attention to the Rio Grande Valley and the Pajarito Plateau. Hewett examined social organization and commented on population distribution as derived from material culture remains.

While at the BAE, Hewett was in contact with numerous government officials as well as AIA members. He was interested in the protection of archeological sites, as well as the establishment of an archeological park on the Pajarito Plateau (Hewett 1903, 1916, 1929). Hewett worked closely with Congressman J. Lacey on a bill that in 1906 became the Antiquities Act. His work to secure passage of this act, as well as the refinement of the rules
and regulations that the Departments of War, Interior, and Agriculture issued, focused on developing regulations that were closely tied to AIA goals and philosophy. In 1905 Hewett had been appointed a fellow of the AIA, in 1906 Director of American Archaeology for AIA, and in 1907 head of the newly founded School of American Archaeology for AIA. As Director of American Archaeology, Hewett worked closely with AIA-affiliated societies. The School of American Archaeology was established in Santa Fe, and Hewett collaborated with Charles F. Lummis, Secretary of the Southwest Society (AIA), which financed the first year of major excavations at Puye in 1907 (Hewett 1908a).

The 1907 work at Puye included participation by summer students from Columbia and Harvard universities; Hewett's field-school approach later proved to be a magnet for students from many institutions over the years, and Hewett drew on many of them, plus his colleagues, as field assistants. In the years after 1907, excavations were conducted in the Rito de los Frijoles (particularly at Tyuonyi, but also at Long House, Talus House, two small ruins east of Tyuonyi, Big Kiva, Yapashi, Frijolito Ruin, and San Miguel). Additional work was conducted in the area around Ojo Caliente and in the Jemez Valley during the next several decades. The work is summarized in several publications by Hewett (1908a, 1909a-g, 1930, 1938a); Hewett et al. (1913); Hewett and Dutton (1945); and Hewett and Mauzy (1940), but no detailed site reports were published.

Among the students who studied and worked under Hewett on the Pajarito Plateau were Sylvanus G. Morley and Alfred V. Kidder. Both worked at Puye. Morley's account of the excavations at the South House of this site was published in several places (Morley 1910a, 1910b, 1910c); he also examined the Spanish archives for information on the use of the Rito de los Frijoles (Morley 1938). Kidder excavated at Frijolito Ruin on the mesa south of the Rito de los Frijoles, but to date, few of his notes have been found. Kidder did incorporate data from this and other sites into his Ph.D. dissertation (Kidder 1914) and into a summary article on ceramics (Kidder 1915).

Others associated with Hewett's and the School of American Archaeology's investigations on the Pajarito Plateau include John P. Harrington, an ethnologist and linguist. Harrington and other colleagues examined the populations of the Rio Grande Valley and reconstructed geographical, botanical, and zoological uses of the area (Harrington 1916a, 1916b, 1919, 1920, 1947; Henderson and Harrington 1914; Robbins et al. 1916). Kenneth Chapman came to the School of American Archaeology as a staff member. His artistic talents were used in a rock art study on the Pajarito Plateau (Chapman 1916, 1917a, 1917b, 1927b, 1938), as well as in drawings and models of what these sites may have looked like when inhabited by the Anasazi.

Hewett introduced many people to the historic and prehistoric Indians of the Southwest through his field schools, AIA summer sessions, and visits to sites in the area. After 1910 an annual camp was established in the Rito de los Frijoles, as well as one at Puye. Meetings of the boards of directors of AIA and the School were also held in the Rito de los Frijoles so that the members could see the results of investigations first hand. By the 1920s Hewett had been in contact with officials from the Santa Fe Railroad and soon established a museum at Puye, with transportation from Santa Fe and Española to the site. Thus, many of the country's educated and wealthier citizens were able to observe southwestern archeology in action.

During this period Lucy L. W. Wilson and her husband, William Wilson, director of the Philadelphia Commercial Museum, became interested in the site of Otowi. Lucy Wilson was the principal of the Southern High School in Philadelphia. She spent three summers (1915, 1916, and 1917), assisted in part by Wesley Bradfield from the School of American
Archaeology, excavating Big Otowi and Little Otowi and several small sites and cliff dwellings in the area. Wilson's available reports for this site contain limited information (Wilson 1916a, 1916b, 1917, 1918a, 1918b); the collections are at the Museum of New Mexico. The field notes have never been located, and it is assumed that they perished in a flood in the Philadelphia Commercial Museum.

Because of his interest in preservation, Hewett tried to create a park that would encompass much of the Pajarito Plateau. He called it Pajarito Park at one time, the Cliff Dwellers Park at another (Cameron n.d.; Hewett 1903, 1916; Rothman 1988). Many bills were introduced to Congress, and debates continued for years. In the end, Bandelier National Monument was created in 1916; but it was not nearly as extensive as Hewett had hoped. Much of the land on the Pajarito Plateau was left under the jurisdiction of the Department of Agriculture or as part of the Indian Reservation system (Puye is on the Santa Clara Indian Reservation). The Ramon Vigil Grant remained a separate area for many years; later it was incorporated into the Los Alamos Scientific Park, on which Los Alamos National Laboratory is located (Lyon and Evans 1985; Pettit 1972; Truslow 1973; Truslow and Smith 1947).

Additional Surveys and Chronological Research

While Hewett and the School of American Archaeology were concentrating efforts on the central and northern part of the Pajarito Plateau, Nels C. Nelson of the American Museum of Natural History began a reconnaissance survey along the Rio Grande that extended from Cochiti Canyon to El Paso. Nelson wanted to develop a better chronology for archeological sites and employed various stratigraphic tests to achieve his goal (Nelson 1913, 1915, 1916, 1917). He tested the sites of Old Cochiti (or Koyiti), Pueblo Cañada, and Kuapa, all on the southern border of the Pajarito Plateau, as well as the Potroco de los Idolos, a major shrine. Unfortunately, his data were never published in detail; his field notes are on file at the Laboratory of Anthropology of the Museum of New Mexico, Santa Fe (Nelson n.d.a, n.d.b).

Another large survey was initiated by Reginald Fisher, a later student and colleague of Hewett's at the University of New Mexico and School of American Research. Fisher recorded known sites on the Pajarito Plateau in a system developed to encompass the entire state of New Mexico (Fisher 1931).

By 1922 Dr. Harry P. Mera, a physician who had a deep interest in the Pueblo Indians and their ceramics, had begun a survey of prehistoric sites in the Rio Grande area. He walked much of New Mexico to map many sites and make surface collections in order to define ceramic wares and establish more detailed chronologies than were available. His work on the Pajarito Plateau (Mera 1932, 1933, 1934, 1935, 1940) led to a revised ceramic sequence for the area, as well as a discussion of population, migration, growth, and settlement. The collections are maintained by the Museum of New Mexico at the Laboratory of Anthropology.

ordination of type names and chronological control. To provide other types of chronological control, studies of tree-ring dates (Robinson et al. 1972; Smiley 1952; Smiley et al. 1953; Stallings 1933, 1937) were initiated and continue to help refine our knowledge about the development of the Pueblos through time, but the number of samples from excavated sites is small, and more work is needed to establish a good chronology for this area. Obsidian hydration dating has been used (Russell 1981a, 1981b) on both the Pajarito Plateau and in the neighboring Jemez Mountains; Wolfman and Willmer (1991) review the chronology for the larger area.

**Work on Federal Lands--Bandelier National Monument and Los Alamos**

Government agencies that are responsible for large areas on the Pajarito Plateau developed their own programs as they needed new data or made changes in land use. In 1935 James Fulton, a forester, surveyed the ruins on the Ramon Vigil Grant. He relocated many ruins already located on available maps, some of which Bandelier and Hewett had identified. Fulton created a base map (NM/BAN 4947) used by others (Worman 1959, 1967). His field notebook (on file in the archives at Bandelier National Monument) indicates that he located 287 sites; recorded data include the length and width of each ruin and the number of rooms and rock art panels at each site.

In 1942 Los Alamos National Laboratory was established on the northern half of the Pajarito Plateau in order to develop and test a fission bomb. As the goals and mission of this facility have changed from a closed military operation to an open town and institution devoted to peaceful use of atomic energy (Lyon and Evans 1985), ever-expanding use of the land has necessitated survey and excavation of archeological sites. Roads and buildings were constructed, and an entire town sprung up on the high mesas. There is little information on the work that was done during the early years, but several archeologists have been consultants for Los Alamos. The first such person to conduct research on a long-term basis for this facility was Frederick C. V. Worman; he was succeeded by Charlie Steen, David H. Snow, and Beverly M. Larson.

Before his association with Los Alamos, Worman began a multiyear archeological project in 1948 that included both survey and excavation by field-school participants from Adams State College in Alamosa, Colorado. The area covered in this research was on the Ramon Vigil Grant and in what is now the northern part of Bandelier National Monument (Rito de los Frijoles and mesa to the north). In 1948 39 sites were located (Worman 1949); in 1949 an additional 45 sites were recorded (Worman 1950). Excavations were carried out at Rainbow House, RV 128, and RV 45. Unfortunately, Worman left Adams State College before completion of the planned five-year program. The only publication that resulted from this program was by Caywood (1966), who reported on the excavation data from Rainbow House many years later. Worman continued to work on the Pajarito Plateau for the Department of Energy (Los Alamos National Laboratory); he surveyed and excavated sites in areas that were being used by that facility (Worman 1953, 1967; Worman and Steen 1978). Worman (1967:1) indicates that he revised all of Fulton’s 1935 site numbers and listed them in the Laboratory of Anthropology (now ARMS) system; the collections were turned over to the Museum of New Mexico.

By the 1950s several additional projects were under way. The Los Alamos Archaeological Society carried out an excavation at Fulton’s site 190 (LA 8681) from 1953 to 1956. This is an Anasazi pueblo of 21 or more rooms located in what is now the Pajarito Acres section of the town of White Rock (Fretwell 1954, 1959). During 1956 and 1957 the society
also excavated an Anasazi cave site near Tsirege (Tsirege Cave, LA 170). Some data are available in Maxon (1969) and Young (1954b). No other reports were published, and the material is curated at the Museum of New Mexico.

The National Park Service undertook partial surveys of the Otowi Section (now reduced in size and called the Tsankawi Section) of Bandelier National Monument as a result of the need for roads and waterlines to the Los Alamos community. In 1946 Ralph Lassiter, Carl Alleman, James M. Eden, Dale S. King, and Walter W. Taylor examined a proposed waterline through Los Alamos Canyon; eight sites were recorded. In 1948 Erik K. Reed checked a road through Sandia Canyon; even though no free-standing pueblo sites would be impacted by the road, several talus sites at the base of the cliff along the north side would be affected. A survey of the entire Otowi Section was conducted in 1952 by John F. Turney, a NPS archeologist. His 1955 draft report indicates that 55 sites were recorded and given numbers in the Laboratory of Anthropology (now ARMS) system. Included in the records are 43 pueblos, 11 cliff sites, and one sherd scatter, most of which date to the A.D. 1100-1500s.

Over the years, the National Park Service has conducted some excavations as part of a program to preserve cultural resources. In addition, erosion has led to excavation and collection in specific areas; reports are on file in the archives at Bandelier National Monument. Creutz (1975) summarized the program of ruins stabilization that was carried out. Listed below are the sites and references to the work completed on these stabilization or salvage/mitigation projects.

<table>
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<th>Site</th>
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<tr>
<td>Otowi Section</td>
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<td>Potasii'I II</td>
<td>Hendron (1945)</td>
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<td>Tsankawi</td>
<td>Johnson (1960—burial)</td>
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<td>Hendron (1938a)</td>
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<td>Onstott (1947, 1948b, 1952)</td>
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<td>Turney (1950)</td>
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<tr>
<td>Large Kiva east of</td>
<td>Hendron (1937c, g)</td>
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<td>Tyuonyi</td>
<td>Onstott (1948c)</td>
</tr>
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<td></td>
<td>Turney (1950)</td>
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<tr>
<td>Long House, Group D</td>
<td>Lister (1939a, 1940a)</td>
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<td></td>
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<td>Group M</td>
<td>Hendron (1943b)</td>
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<td>Turney (1948)</td>
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<tr>
<td>Frijoles caves</td>
<td>Lister (1940c)</td>
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<td>Rainbow House</td>
<td>Richter (1968)</td>
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<td>Ceremonial Cave</td>
<td>Hendron (1937b, 1938b)</td>
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**Ethnology and Archeology**

Studies in related anthropological fields also contribute to our understanding of the prehistoric and historic Pueblo Indians. Ethnologists began detailed studies in the early 1900s and continue. Many published reports (Dozier 1958, 1961, 1966; Fox 1960, 1964, 1967; Goldfrank 1927; Lange 1944, 1950a, 1950b, 1952b, 1952a, 1953a, 1957, 1958a, 1958b, 1959, 1961, 1980; Ortiz 1969; Parsons 1929, 1932, 1939; White 1930, 1944; Whitman 1940, 1947; and Wittfogel and Goldfrank 1943) add greatly to our understanding of the various Rio Grande Pueblo peoples. Archeologists often use these data to generate testable hypotheses or to provide models of culture change.

During the 1950s Charles H. Lange, of the University of New Mexico and later Southern Illinois University (SIU), began a long-term anthropological study of the modern Cochiti and their ancestors. In addition to ethnological research (see above), he spent many years conducting archeological survey and excavation programs on lands that would be affected, in part, by the construction of Cochiti Dam on the Rio Grande. In 1957, 1958, and 1959 Lange and his oldest son conducted a horseback survey on the Cañada de Cochiti Grant (then owned by James Webb Young),
Bandelier National Monument, and the southern part of Los Alamos lands. The goal was to verify locations of mound sites indicated on existing maps. These three areas eventually saw much additional research. Some field notes and collections from Lange's projects are in the NPS collections; a brief report on their contents was prepared by Peter J. McKenna (1986). Other notes and artifacts are housed at various institutions under which research was conducted or that owned land in these areas.

Lange spent only the summer of 1957 on the Cañada de Cochiti, which in 1964 was turned over to the University of New Mexico (UNM). In 1969 UNM asked Lange to complete the survey and conduct some test excavations at small house ruins. This was done in 1969 and 1970. He and his students from SIU recorded 150 new sites for which surface samples were collected in addition to the sites previously recorded by Lange; all sites were given LA numbers. The area encompassed the west end of the James Webb Young Ranch, including the east potrero of West Mesa. The northeastern corner of the Cañada was not surveyed because of its inaccessibility; and on the far west, the survey was limited to the Rio Chiquito and the terraces immediately north and south of it (Frisbie et al. 1970). A second field season completed the survey and began test excavations in small house ruins; these data from small pueblos form part of the discussion in a dissertation by Bruce Moore (1979).

Additional work by UNM on the Cañada de Cochiti includes a 1973 survey designed to assess the intensity and accuracy of previous work (Flynn and Judge 1973); an additional 111 sites were recorded. In 1990 Wirt H. Wills conducted a UNM archeological field school on this land; his purpose was to teach mapping techniques.

The Cochiti Dam

The decision to control the Rio Grande by placing a dam across the river near Cochiti Pueblo led to archeological surveys and mitigation of sites below the floodwater line beginning in the 1960s. Construction of Cochiti Dam necessitated use of land belonging to the Pueblo of Cochiti, the University of New Mexico, the National Park Service, the Atomic Energy Commission, and the U.S.D.A. Forest Service, as well as private landowners. Funds from the U.S. Army Corps of Engineers were administered by the National Park Service through grants to the Museum of New Mexico and other contractors between 1962 and 1967. A major contract for the area south of Bandelier National Monument was awarded to Lange and SIU through the Museum of New Mexico (Lange 1968a, 1968b). Work on this project included survey on both banks of the Rio Grande by Alfred E. Dittert, Jr., Charlie R. Steen, and Albert H. Schroeder in 1962. Stan Bussey, Stewart Peckham, and Charles H. Lange continued this work from 1963 through 1964. A total of 28 sites, ranging from a knapping area to a large pueblo with 100 rooms, were located. Peckham and Wells (1967) provide additional site information. Excavations at some sites and additional survey were carried out by David Snow (1971, 1972a, 1973a, 1973c, 1976, 1979). Excavations are reported by Snow (1971) for the 1964-66 seasons, and Snow (1973a, 1973b, 1973c, 1976, 1979) for other years. An ancillary study of petroglyphs was conducted for the Museum of New Mexico by Polly Schaafsma in 1966 (Schaafsma 1967, 1971, 1972). Her 1972 overview of Rio Grande rock art indicates differences among elements between the areas north and south of Frijoles Canyon, a difference also noted by Steen (1977:20-24, 1979).

It was realized, however, that these endeavors were insufficient, so a proposal for more intensive survey and mitigation was requested in 1973 from the Office of Contract Archeology of the University of New Mexico to correct the deficiencies (Biella and Chapman 1975). A contract for intensive anthropological and archeological research began in late 1974. It included the areas encompassed by both the
permanent and maximum flood pools; research included assessment of the existing cultural resources, intensive survey, and mitigation. Approximately 9,070 acres of land were examined under the direction of Jan V. Biella and Richard C. Chapman (Broilo and Biella 1977:3). Sites recorded within the inundation pool included 121 nonstructural proveniences at 91 locations, 228 Anasazi proveniences at 187 locations, and 128 historic proveniences at 85 locations. The survey and excavations are reported in four volumes (Biella 1979a; Biella and Chapman 1977a, 1977b; Chapman and Biella 1977) that include discussions of the environment, detailed analyses of settlement pattern, artifacts, and architectural features, as well as the development of social complexity in the Rio Grande Valley.

In addition, National Park Service archeologists were assigned survey and assessment tasks. To the north in Bandelier National Monument, early work by Natt Dodge and Zorro Bradley in 1959, Edmund Ladd in 1968, and Bradley in 1969; reconnaissance by Ron Ice, Don Fiero, and Dan Lenihan in 1973; and survey by Bruce Anderson, Don Fiero, and George West in 1974 have been incorporated into a major report by Lyndi Hubbell and Diane Traylor (1982), who surveyed 361 acres that would be impacted by water held back by Cochiti Dam. All sites within the area were well recorded, several were excavated, and an analysis of the cultural remains is presented. Hubbell and Traylor add new information, particularly about the Archaic use of the area, two rock shelters, and a number of small masonry pueblos.

Bandelier and Los Alamos in the 1970s and 1980s

Other work in Bandelier National Monument included excavation at Saltbush Pueblo in Frijoles Canyon, which was carried out by David Snow, of the Museum of New Mexico, in 1971 (Snow 1974). This pueblo consisted of two units with 11 rooms and a keyhole kiva. Because the original ventilator was oriented toward the south (later remodeled), it suggested to Snow a possible affiliation of its inhabitants to those in the Mesa Verde area. His dating of the site is ca. A.D. 1175-1250; thus, it falls within the right time period for such a tie if one assumes that Galisteo Black-on-white was present in the site by A.D. 1250 (see Breternitz 1966 for the accepted range of dates for this pottery type).

In 1972 Charlie R. Steen succeeded Frederick Worman as the archeological consultant at Los Alamos National Laboratory. He continued archeological surveys (for a total 402 sites identified), excavations, and report writing (Steen 1974, 1977, 1979, 1980a, 1980b, 1982). The majority of the sites recorded and analyzed were occupied between the thirteenth and sixteenth centuries, and include pueblos, kivas, cavate rooms, rock art, rock alignments, water collection devices, agricultural sites, shrines, and game pits. Steen's analysis of settlement on the northern half of the Pajarito Plateau is informative and presents a number of ideas to be pursued as further research continues in this area.

A fire on lands located on Bandelier National Monument and Los Alamos National Laboratory occurred in 1977. As a result, many studies of both natural and cultural resources were initiated (Foxx 1984). A 100 percent archeological inventory of areas affected by fire-suppression teams was made; 99 sites were recorded, and 4 were excavated (Traylor et al. 1990).

During the 1980s, the National Park Service initiated a study of historic Civilian Conservation Corps (CCC) buildings within Bandelier National Monument. A report of the results is available (Harrison et al. 1988).

David H. Snow, Beverly M. Larson, and other archeologists continue to survey and excavate sites as part of cultural resource
management at Los Alamos National Laboratory. Numerous reports have been prepared (Larson 1986, 1987a-c, 1988a-b, 1991; Larson and McGehee 1989; McGehee 1988, 1989, 1992a-b; McGehee et al. 1992; McGehee and Larson 1988, 1989a-b; McGehee and Munz 1991; McGehee and Schillaci 1992; Snow 1982a) and a major resurvey of some areas is underway. LA 4618 and LA 70029 have been excavated, but only one report has been published (Biella 1992). Others are in preparation (Larson, personal communication 1992).

Recent Research Projects

During the 1970s James N. Hill, of the University of California at Los Angeles, was interested in behavioral responses to stress. His goal was to examine a general model of human responses to long-term subsistence stress based on climatic shifts. The Pajarito Plateau was chosen as a case study to determine whether or not there are ordered, predictable regularities in one area; if so, then other study areas could be examined to determine whether or not this pattern held cross-culturally. Hill and his students designed a stratified random sample survey that covered selected areas of the Pajarito Plateau bounded by Santa Clara Canyon on the north, Bland Canyon on the south, the divide between the Pajarito Plateau and the Valle Grande on the west, and an 8-km distance east of the Rio Grande (Hill 1976; Hill and Orcutt 1979; Hill and Trierweiler 1986). Lands included those under the jurisdiction of several government agencies and private individuals (Hill 1977). A 1977 pilot study was followed by three years of research. Sites were defined as five or more artifacts within the area examined, and a total of 889 sites were recorded using LA numbers (Hill 1979b). Although final research reports are still in preparation, several preliminary reports were completed for work done on Forest Service land (de Barros and Hill 1980; Orcutt and Hill 1981; Trierweiler et al. 1979; Walsh et al. 1979; Walsh et al. 1978).


Expanding on this initial study, Robert W. Preucel developed the Pajarito Field House Project, an intensive survey of a limited area that examined spatial relationships between pueblos and field houses. The Pine Springs area of the Santa Fe National Forest, north of Los Alamos, was surveyed; 55 additional sites were recorded (Preucel 1985a, 1985b, 1986a-c, 1987a, 1990).

Building on earlier work by Hill, the National Park Service initiated the Bandelier Survey Project under the direction of Robert P. Powers in 1985 (Powers 1988). As in Hill's work, the research goal was to test the hypothesis that Anasazi settlement, aggregation, and organizational complexity are cultural responses designed to buffer resource unpredictability or depletion. This model differs from Hill's in that it focuses on population expansion and the reduction of the subsistence base as the initial causes of a long-term process of village formation and aggregation into larger sites. In addition to increased reliance on agriculture as a response to food stress, population aggregation may have brought about exchange, partial task responsibility, craft specialization, and even raiding.

In addition, data were gathered by the survey crews to provide management and researchers with an accurate database that can be used for planning, interpretation, and preservation of cultural resources in Bandelier National Monument, as well as to answer other, more refined questions about culture history and broader theoretical problems. A stratified random sample of 40 percent of the total park area was surveyed. Because the database provides the most information on the period between A.D. 1150-
1550 and 1600, that 400-year period provides the framework for most of the questions to be addressed. Also, some of these questions cannot be answered using surface survey data alone; therefore, some excavation was undertaken in cooperation with Washington State University (Kohler et al. 1989). Preliminary results of both survey (Head 1992; Orcutt 1990a, 1991a; Orcutt and Powers 1989; Powers and Orcutt 1988; Toll 1986; Toll et al. 1988) and excavations (Kohler 1989, 1990; Kohler and Root 1992) are available. Final results await completion of ongoing detailed analyses.

Recent analysis of available prehistoric burial material, using a new technique to determine hereditary developmental defects in the axial skeleton, provides information on the relatedness of inhabitants of several large pueblos (Barnes 1991). As additional studies are carried out, it is anticipated that relationships among modern and prehistoric groups will be better defined.

Rock art in the Rito de los Frijoles has been examined by Arthur Rohn (1989) and near Tsirege by Loy C. Neff (1990). According to these analysts, some petroglyphs seem to be localized while others are found throughout a larger area, possibly reflecting use by different groups. Similar results have been obtained by Lance K. Trask (1991, 1992) in the Jemez Mountains, but his interpretations of the panels suggest that some symbols were intended for viewing by the general population while others are in secluded areas and meant for limited audiences.

Most of the sites recorded during all the aforementioned surveys and excavations have been entered into the ARMS files of the State Historic Preservation Office in Santa Fe. Also on file are site survey data resulting from contract archeology projects, such as examination of transmission lines. In addition, the U.S.D.A. Forest Service has conducted archeological survey as part of clearance procedures whenever road maintenance work or timber removal is scheduled. The Forest Service office in Santa Fe maintains maps indicating survey locations and sites as well as the clearance reports pertinent to them. Some of these reports (only those that include archeological sites) have been entered into the cultural resources section of the bibliography even though they may not be totally within the area of the Pajarito Plateau outlined earlier in this volume.

Summary

A considerable amount of archeological investigation has taken place on the Pajarito Plateau during the past century. Several overviews and discussions of the problems of where the people came from, why they were there, and how they adjusted to the environment have been presented (Chapman and Biella 1979, 1980; Collins 1975; Cordell 1978, 1979a, 1989; Ellis 1967b; Ford et al. 1972; Reed 1949, 1950, 1951a, 1954; Steen 1977, 1980a; Stuart and Gauthier 1981; Wendorf 1954; Wendorf and Reed 1955). Ongoing research, especially the projects undertaken by Hill and Powers, will continue to refine these interpretations.
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# APPENDIX A.

## Correlation of Site Names and LA Numbers

<table>
<thead>
<tr>
<th>Common Name</th>
<th>LA Number</th>
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<tbody>
<tr>
<td>Big Kiva east of Tyuonyi</td>
<td>LA 77722</td>
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<tr>
<td>Ceremonial Cave</td>
<td>LA 13663</td>
</tr>
<tr>
<td>Cueva Pintada (Painted Cave)</td>
<td>LA 13662</td>
</tr>
<tr>
<td>Frijoles Cave (see Long House, Talus House, etc.)</td>
<td></td>
</tr>
<tr>
<td>Frijolito Ruin</td>
<td>LA 78</td>
</tr>
<tr>
<td>Fulton’s Site 190</td>
<td>LA 8681</td>
</tr>
<tr>
<td>Group D - Long House</td>
<td>LA 13665</td>
</tr>
<tr>
<td>Group E - Talus House</td>
<td>LA 13664A</td>
</tr>
<tr>
<td>Group M</td>
<td>LA 13664D</td>
</tr>
<tr>
<td>Koyiti (Old Cochiti)</td>
<td>LA 295</td>
</tr>
<tr>
<td>Kuapa</td>
<td>LA 3444</td>
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<tr>
<td>Lions in the Potrero de los Idolas</td>
<td>LA 50977</td>
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<tr>
<td>Little Otowi</td>
<td>LA 32, 2774</td>
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<tr>
<td>Long House (Group D)</td>
<td>LA 13665</td>
</tr>
<tr>
<td>Old Cochiti (Koyiti)</td>
<td>LA 295</td>
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<td>Otowi (see also Potsui’i)</td>
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<td>Painted Cave</td>
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<tr>
<td>Potsui’i (see also Otowi)</td>
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<td>Potsui’i II</td>
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<td>Pueblo Cañada</td>
<td>LA 35</td>
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<td>Puye</td>
<td>LA 47</td>
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<td>Rainbow House</td>
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<td>R.V. 45</td>
<td>LA 3842</td>
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<td>R.V. 128</td>
<td>LA 207</td>
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<td>San Miguel</td>
<td>LA 370</td>
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<td>LA 795</td>
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<td>Stone Lions Shrine</td>
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<td>Talus House (Group E)</td>
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<tr>
<td>Tsankawi</td>
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<tr>
<td>Tsirege (and Tsirege Cave)</td>
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<td>Tyuonyi</td>
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<td>Yapashi</td>
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<td>Turney’s survey</td>
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