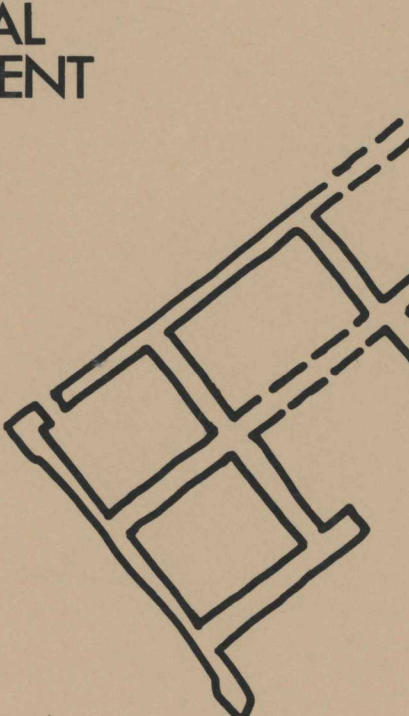




ARCHEOLOGICAL ASSESSMENT

WUPATKI NATIONAL MONUMENT

by
Dana Hartman
Arthur H. Wolf



MUSEUM OF NORTHERN ARIZONA
Department of Anthropology



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This report is in partial fulfillment of a project funded by the National Park Service, Southwest Region, Santa Fe, New Mexico, under Purchase Order Number PX7029-5-0980.

MUSEUM OF NORTHERN ARIZONA
Department of Anthropology
Archaeological Contract Section

February, 1977

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ACKNOWLEDGEMENTS

The authors deeply appreciate the assistance of a number of individuals during all phases of this project. Ronald J. Ice, National Park Service Regional Archeologist for the Southwest Region, reviewed the draft copy of this report and made pertinent suggestions for its completion. At Wupatki National Monument, the staff greatly expedited the field reconnaissance and research portions of the project. Superintendent John Wise allowed us free access to records at the Monument and clarified much of the recent history of the area. Ranger Richard Harris assisted in the field and aided greatly during some minor emergencies which occurred. Linda Labate spent a good deal of time helping us with the library research at the Monument. Several members of the Museum staff were involved in the various stages

of the project. Katherine Bartlett, Museum librarian, aided both authors on numerous occasions with the research for both the historic and prehistoric sections. Mark Sant provided field assistance for mapping and recording sites. Kelly Allen, Sally Cole and Donna Howard helped with the completion of the bibliographic sections. Editorial assistance was given by Mike Anderson and Kathryn Cunningham. The graphics for the report were all produced by Mike Donaldson. We wish to express our gratitude to these individuals for their invaluable aid on this project.

This report is in partial fulfillment of a project funded by the National Park Service, Southwest Region, Santa Fe, New Mexico, under Purchase Order Number PX7029-5-0980.

INTRODUCTION

The Wupatki region comprises a unique and fascinating national monument. During almost its entire history, this area was avoided by inhabitants of the surrounding regions; Wupatki is arid, wind-swept and inhospitable. For a time lasting less than 150 years, however, Wupatki flourished as a cultural contact zone. This population influx was due to the effects of the A.D. 1064-1065 Sunset Crater eruption, which spread a moisture-retaining layer of volcanic ash and cinder over the landscape and permitted agriculture in the previously unfertile area. The region served as a crossroads for both people and ideas, and the now-barren landscape supported a sedentary population in the thousands. Members of at least three major cultural groups - Anasazi, Hohokum and Sinagua - inhabited the Monument area, and the people incorporated ideas developed by groups living hundreds of miles away. Around A.D. 1225 the inhabitants of Wupatki abandoned the area. This emigration was probably in large part due to decreasing agricultural productivity. Following the prehistoric abandonment of the region, there was no major permanent inhabitation until Navajo sheepherders entered the area in the late 1880's.

The ruins at Wupatki were first described by the Sitgreaves expedition

in 1851. In the interim period between the Sitgreaves reconnaissance and the formation of the Monument in 1924, the pueblos at Wupatki were intermittently visited by various scientists and several pothunters. These activities focused attention on the area and led to the creation of the Monument. Full scale, documented excavation at the Monument began in 1933, when the Museum of Northern Arizona undertook the excavation of Wupatki Pueblo. Since that time various smaller excavations have been conducted in the area, and stabilization has been a continuous project at the Monument.

There are two major purposes of this report: 1) to provide a synthesis of the archeology, history and past research at Wupatki National Monument, and 2) to indicate research possibilities at the Monument. The research suggestions included in the report are certainly not comprehensive. There are no doubt a number of potential studies which did not occur to the authors during the preparation of the report, particularly in the fields of geology and biology. Nevertheless, it is apparent that the significance of Wupatki National Monument lies as much in the research potential of the area as in the work which has already been completed.

ENVIRONMENT

Climate

Located in the rain shadow produced by the San Francisco Peaks, Wupatki is significantly more arid than regions to the south. Precipitation at the Monument is highly variable, but the area rarely receives more than ten inches of moisture per year. Mean annual precipitation is about seven inches, most of which is in the form of rain. Snowfall is very limited--usually well under 20 inches per year. In addition to the lack of moisture, much of the precipitation occurs in the form of violent thunderstorms during the summer which do not provide long-term saturation of the soil. Contributing to the aridity is the high evaporation rate. Elevations in the Monument range from slightly under 6000 feet on the western side to about 4300 feet at the Little Colorado River. At this altitude solar radiation is intense; also, cloud cover in the region is infrequent. Furthermore, the Little Colorado River Valley is subject to severe winds which greatly accelerate the evaporation. As a result, evaporation exceeds precipitation throughout the valley (Pape 1968: 67).

Average last and first freeze dates are April 24 and November 1, respectively (Pape 1968). This produces a potential growing season of 190 days which is quite adequate for most crops. Of course, the aridity would severely limit agriculture.

Geology

The archeological history of Wupatki is integrally related to the regional geology. Wupatki is situated on the northeastern edge of the San Francisco Peaks volcanic field. This location had a definite impact on the course of human occupation within the area.

The base rock in the Monument is the Kaibab Formation. The Kaibab is an extensive deposit consisting essentially of limestone which was formed by sedimentation in a shallow sea during the Permian. The formation is the surface rock throughout much of northern Arizona; Wupatki is on the eastern fringe of the outcrop.

Running approximately through the middle of the Monument is a significant northeast-southwest trending fault.

The Kaibab Formation is the dominant base rock to the west of this fault while the Moenkopi Formation unconformably overlies the Kaibab to the east of the fault (Moore, Wilson and O'Haire 1960). The Moenkopi is also a sedimentary deposit, but in this area it is the result of continental rather than marine deposition which occurred during the Triassic. Sandstone is the major component of the Moenkopi Formation, but some shaley lenses are present (Colton 1960:23).

Capping the Kaibab and Moenkopi Formations in several places are Quaternary basalt flows and volcanic ash. The basalt is the result of the geologically recent eruption of a number of volcanic cones in the area. These eruptions began in the Middle Pliocene with periodic activity occurring as recently as slightly over 900 years ago (Anderson and Harshbarger 1958:39). At the present time mounds of volcanic ash and cinder are visible throughout the Monument particularly along the southern boundaries. These wind-blown dunes are the remains of the ash fall from the A.D. 1064-1065 eruption of Sunset Crater. The cinders originally covered an 800 square mile area in a continuous layer, but the strong winds in the Wupatki region probably have stripped much of the ash from areas of high relief and deposited it in basins and arroyos. There are both aa and pahoehoe lava fields at Sunset Crater.

The major landforms at Wupatki are basins, mesas and cinder cones (Figure 1). The basins are essentially alluvial surfaces surrounded by uplifts, so they are not actually structural basins in the sense of being downwarped features. Wupatki Basin is the largest of these structures. It is bounded by the Little Colorado River on the northeast, the Black Point monocline on the northwest, Woodhouse Mesa on the southwest and a number of small mesas and buttes on the southeast. The ground surface of Wupatki Basin is alluvium derived from the mesas (Childs 1948). The mesas are areas of high relief and are best typified by Black Point and Woodhouse Mesa. Black Point is actually the northern terminus of the Black Point monocline, a geologic uplift which runs approximately through the center of the Monument in a northeast-southwest direction along the fault zone. Woodhouse Mesa is an erosional remnant

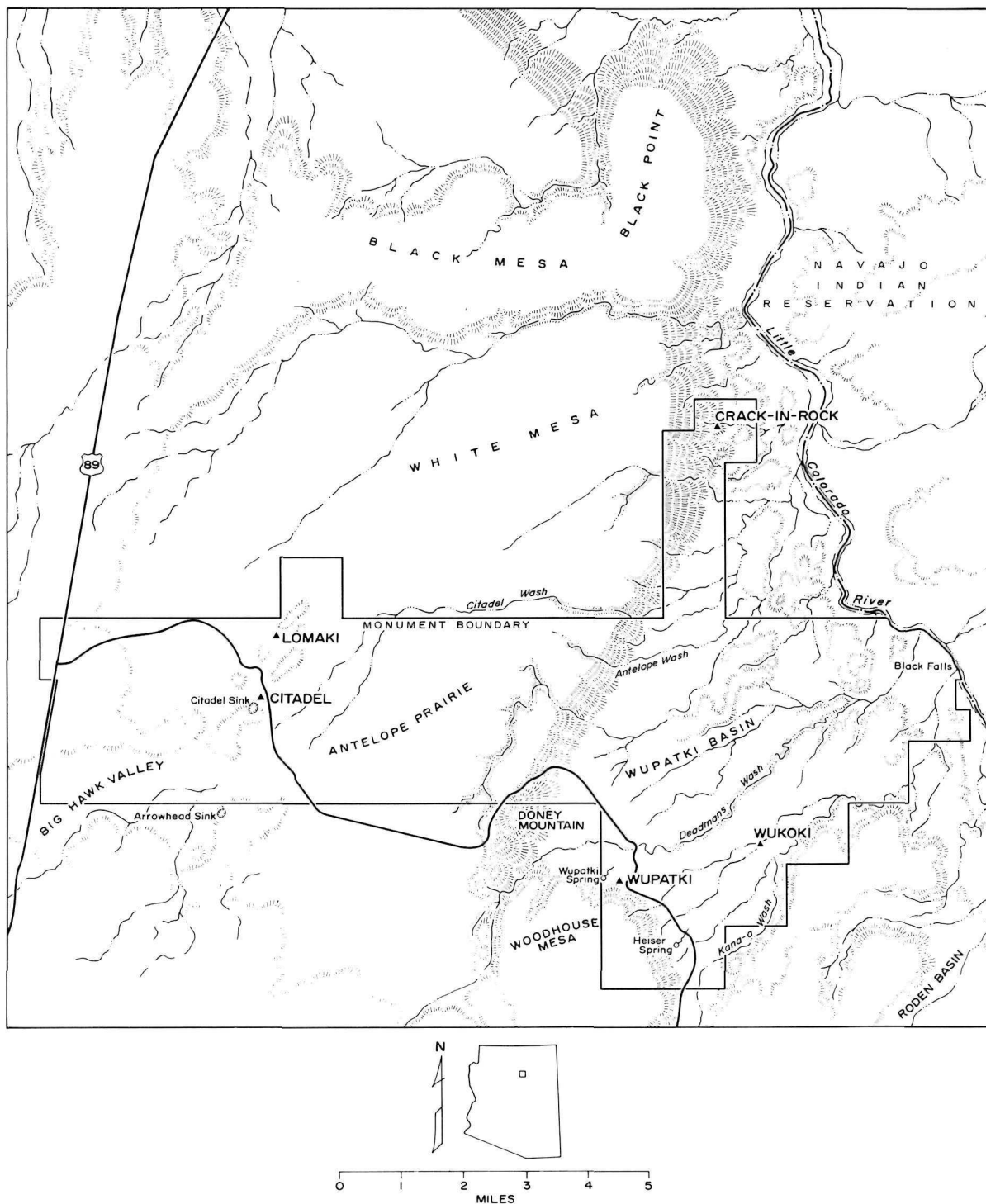


Figure 1. Physiographic map of the Wupatki region.

of a highland which once had a larger geographic extent. Black Point and Woodhouse Mesa are both capped by basalt. At Black Point the basalt is the obvious eastern extent of a large lava flow, hence the name of the feature. Cinder cones are not usually

considered major geologic structures. In the Wupatki area, however, cinder cones dominate the landscape in some places, particularly to the south and west of the Monument. Doney Mountain, located on the southern boundary of the Monument, is a good example of one

of the smaller volcanic cones. This mountain, often referred to as Doney Crater, is actually four individual craters. The mountain is situated directly on the fault zone which is related to the Black Point monocline (Childs 1948:Pl. 1). Although Doney Mountain is a very evident feature of the Wupatki landscape, it is relatively small when compared to some of the craters to the south, such as Merriam and Sunset.

Three related geological structures of interest are present in the Wupatki area--earthcracks, blowholes and sinks. The traditional explanation of these features has been that they are the result of a large, interconnected, solution-formed cavern system in the Kaibab limestone (Sartor and Lamar 1962). The Cave Research Foundation has recently (1976) completed a study which drastically alters the previous interpretation. Their research indicates the earthcracks are actually faults which are open due to a small amount of displacement along the contact zones. Occasionally the earthcracks have small openings to the surface. These openings, known as blowholes, alternately take in and discharge quantities of air in response to surface meteorological temperature and pressure changes. The major fault which bisects the Monument has produced significant earthcracks and blowholes, such as the earthcrack and blowhole near Doney Mountain. Some of the earthcracks are more than 500 feet deep. During the daytime, the blowholes connected to these deep earthcracks expel cool air, even in the summer. This has been suggested as a possible explanation for concentrations of ruins around some of the blowholes (Sartor 1964:26). Also, a small amount of prehistoric artifactual material has been found in a few of the earthcracks. This material is evidence that the aboriginal inhabitants did enter the earthcracks; they may have used the crevasses as cool retreats in the summer. Sinks are one of the most notable features in the Wupatki region. Citadel Sink, the largest of these structures, is 780 feet by 590 feet with a depth of 173 feet (Cave Research Foundation 1976:6). The sinks are the result of large areas of displacement along the fault zones, so they actually represent large earth cracks rather than collapsed caverns, as was previously thought. Ruins are associated with both Arrowhead Sink and Citadel Sink. It has been suggested

that the sinks were used as natural reservoirs during the prehistoric occupation. However, as the basal formations in the sinks are highly porous Kaibab limestone, this theory is rather unlikely.

The present agricultural possibilities at Wupatki are at best marginal. During the prehistoric occupation, however, the ash fall from Sunset Crater provided a moisture-retaining layer. The cinders which once blanketed the area greatly decreased the evaporation rate and permitted agriculture in the otherwise arid region. Although the beneficial effects of the ash fall were relatively short-term, Wupatki could never have supported a large sedentary population without the temporary increase in agricultural potential resulting from the eruption of Sunset Crater.

Water

Ground water at Wupatki is in extremely short supply. All of the geologic deposits in the region are very porous and will not hold moisture. Only the shaley layers contained in the Moenkopi Formation are capable of water production. Within the Monument there are only two permanent water sources, Heiser Spring and Wupatki Spring. Even these sources are somewhat marginal as they almost went dry during a drought in 1964 (U.S.D.I. 1970:13). There is a sump about 0.75 mi. northwest of Black Falls Crossing. The sump supports vegetation for a relatively wide area around it and it is continually productive. However, the water is of very poor quality; although adequate for irrigation, the sump water could never have been used for domestic purposes.

There is evidence that the water supply in the region has been significantly reduced during historic times. The Little Colorado River ran perennially when settlement in the area began. Also, several extinct springs were located on the sides of the mesas to the southwest of the Monument during field reconnaissance. A number of factors have contributed to the water depletion. The Little Colorado has been dammed upstream from Wupatki in a number of places. The river carries a tremendous silt load and these dams have never been very efficient; nevertheless, they significantly reduce the downriver flow. Overgrazing, particu-

larly by sheep, has removed much of the ground cover thereby reducing the water holding capacity of the soil. Field observation indicates that the extinct springs were blocked by volcanic ash blown over them. These springs still support a minimal amount of plant life, but the water is apparently far below the surface. A relatively recent climatic change has been hypothesized for the entire Southwest by a number of individuals. However, research on this topic has not been conclusive, and more evidence is necessary to support the theory.

Erosion is a serious problem throughout the Southwest. The area has a very fragile ecological balance and even minor disturbances of the natural habitat can have disastrous effects. As previously mentioned overgrazing has depleted the ground cover at Wupatki. During the summer thunderstorms, sheet runoff removes significant portions of the topsoil. However, due to the limited precipitation, stream dissection in the area is not very advanced (Pape 1968:4). Over the past several hundred years, wind has probably been a more significant erosive force in the region than water.

Biota

The Department of Biology at Northern Arizona University is presently conducting an inventory of the flora and fauna at Wupatki National Monument. When completed this inventory will provide any necessary source material concerning the biota of the Monument. Therefore, the following summary is only a brief resume of the biotic communities at Wupatki.

Several authors, notably King (1949:4-11) and Stanislawski (1963:14-19), have summarized the Wupatki

flora and fauna during the course of archeological investigations. In addition, McDougall (1962) compiled a checklist of seed plants within the Monument, and Lincoln (1962) surveyed the prehistoric and historic mammalian fauna at Wupatki.

Near the Little Colorado River the vegetation is essentially desert scrub. Cottonwoods (Populus fremontii) grow in and immediately adjacent to the river bed; away from the higher water table near the river, however, vegetation is restricted to shrubs, grasses and cactus. Typical species (King 1949:7) are Mormon tea (Ephedra sp.), pricklypear (Opuntia sp.) and yucca. From two to four miles west of the river, the vegetation takes on more of a grassland aspect. This ecological zone has been seriously affected by overgrazing in the past. Grazing is now controlled within the Monument, and the grassland is making a recovery. Grama grasses (Bouteloua sp.) are the dominant species throughout the Monument. The grassland also supports occasional junipers, but abundant juniper growth only occurs on the mesas outside the southern boundaries of the Monument.

Fauna at Wupatki are typical of a desert-grassland environment. The most common large mammal is the pronghorn antelope. Mule deer still occasionally wander into the area, although they are more commonly associated with the forested zones to the south of the Monument. Bighorn sheep were once present at Wupatki; these animals have been eliminated from the area during historic times (Lincoln 1962:131). The most commonly observed carnivores at the Monument are bobcats and coyotes (King 1949:11). In addition, jackrabbits, cottontail rabbits and various small rodents are quite numerous in the grassland areas.

PAST ARCHEOLOGICAL RESEARCH

Considering the size of the Monument, archeological investigations at Wupatki have been rather limited. Excavations have been restricted to a few ruins, and most of the Monument remains to be intensively surveyed.

The first scientific site recording at the Wupatki area was conducted by the Sitgreaves expedition in 1851. Lt. Sitgreaves (1853:8-9) described the ruins along the Little Colorado.

Jesse Walter Fewkes visited many of the larger, standing ruins at Wupatki in 1900. Fewkes (1900:422) referred to his work as a " cursory examination," yet he photographed, described and mapped most of the major ruins. These early maps proved to be remarkably accurate as later work was done at the sites.

Just prior to the creation of Wupatki National Monument, Samuel A. Barrett, Director of the Milwaukee Public Museum, surveyed and made collections in the ruins in the Citadel area. The survey recorded 55 sites of varying sizes and descriptions, and Barrett (1927) mapped and/or photographed all of them. In addition, some minor excavation was conducted in a large burial ground located just north of the Citadel. The burial area had been potted even prior to Barrett's early expedition to the region. Barrett joined Harold S. Colton, Director of the Museum of Northern Arizona, and J. C. Clarke of Flagstaff in making a plea for the formation of Wupatki National Monument. Through the efforts of these men and several other interested individuals, Wupatki became a Monument 15 months after Barrett's field work.

With the advent of dendrochronology in the Southwest, Andrew E. Douglass became interested in recovering beams from ruins for dating. Wupatki Pueblo at that time contained a number of extant timbers in good condition; Douglass, aided by Colton and Clarke, excavated Rooms 35, 36 and 45 in 1926-27 for the purpose of removing some of these beams (Stanislawski 1963:31). No report was ever made of this excavation and, as the rooms were later restored, the original contents and exact configurations of the rooms will never be known.

The Museum of Northern Arizona excavated Heiser Spring Ruin, NA1754,

in 1931. This site is not to be confused with Heiser Ruin, NA202. There is no formal report of this work; even the director of this excavation is unknown. However, the site record of this work, on file at the Museum, does contain a ceramic analysis and a very complete map of the site.

The first fully documented, major excavation at the Monument began in 1933, when the Museum started excavating Wupatki Pueblo. The field director of the excavation was Lyndon L. Hargrave, aided by three to four assistants, an architect and two laborers. Most of the excavations involved rooms in the southeast section and along the top of the ruin; by the end of the season, 14 rooms and the amphitheater had been excavated (Hargrave 1933:24-25). Colton (1933a) then evaluated the most important work remaining to be done at the ruin and wrote a proposal for the completion of the project by the Civil Works Administration.

A. Ten Broeck Williamson and James W. Brewer excavated two structures at NA2765, a site located just north of Wupatki Pueblo, in late 1933 (Williamson 1933). One of the structures, NA2765A, was only partially excavated. The notes on the excavation do not identify the structure, but it is apparently a pit house. Williamson also identified the other structure, NA2765B, as a pit house; later research revealed it to be an Anasazi kiva (Voll 1965:7).

Excavation at Nalakihi began in December 1933, under the direction of Dale S. King (1949). The excavation was conducted under F-68 C.W.A. Work Project No. 4. This project also provided for the intensive survey of 20 quarter sections in the Citadel region. The survey required two crew members and lasted for three months. Although this survey was one of the most thorough ever conducted at the Monument, the resulting map needs to be updated.

The excavations at Wupatki Pueblo were continued in December 1933 as F-68 C.W.A. Work Project No. 10 (Wupatki Collection n.d.). The C.W.A. project completed the excavation of 21 additional rooms. The notes of this excavation, on file at the Museum of Northern Arizona, are thorough and apparently complete. Unfortunately,

the C.W.A. project did not allot a sufficient amount of money for artifactual analysis; 30 years elapsed before an in-depth study was made of Wupatki Pueblo and materials recovered during the excavations.

Following the suggestion that Room 7 at Wupatki be made into a museum, Erik K. Reed and James W. Brewer (1937) completely excavated this room in 1936. Room 7 had been inhabited by shepherders in the 1880's who had constructed a chimney in the northeast corner of the room. The room was described by Fewkes in 1896 and later partially excavated by the C.W.A. project. Room 7 began to wash out following the C.W.A. work; the erosion, along with the idea of converting the room into an *in situ* display area, prompted the 1936 excavation. The excavation was begun by Reed and completed by Brewer; the resulting report is an extensive description of excavation techniques, materials recovered and the architecture of the room. Two of the more significant facts determined by the excavation are that Room 7 was constructed late in the architectural history of the pueblo and that the room was utilized as a burial area for six children and infants after the room had been abandoned. Reed (1939) later did a thorough analysis of the pottery from Room 7. This study showed Room 7 was abandoned prior to the date indicated by the one tree ring specimen from the room (A.D. 1168). Reed believed the beam was emplaced to support the door after the room was abandoned and while it was being used as a trash area.

The last excavation at Wupatki Pueblo took place in 1940-41, when Ranger David L. Jones excavated Rooms 11 and 12 (U.S.D.I. 1953a:14). No formal report of this work was ever made, and the field records of the excavation, if any, cannot be located.

The boundaries of Wupatki National Monument were expanded in 1937. In late 1944, Ben H. Thompson surveyed the boundary extension. Thompson, Chief of the Branch of Lands for the National Park Service, was assisted during this survey by Philip F. Van Cleave, Custodian at Wupatki. Thompson's report (1945) is a very thorough review of land use in the Monument. Thompson also discusses the auxiliary features of Wupatki, such as geology, biology and scenery. In 1935, Colton and Frank Pinkley, Superintendent of the Southwest National Monuments, had

proposed a rather extensive expansion of the Monument to the south. In the subsequent 1937 boundary change, only one half of Colton and Pinkley's proposed extension was included within the new boundaries. Nevertheless, Thompson also studied the area which was not included in the extension. Although the remaining one half of Colton and Pinkley's suggested extension has never been added to the Monument, Thompson felt that it should be at some point in time due to the site density in the area and the scenic value. Thompson's report is one of the few studies of Wupatki which deals with the overall setting of the Monument.

The first work at Wupatki with any true methodological orientation was undertaken in 1948 when the Museum of Northern Arizona conducted an expedition in the Big Hawk Valley on the western edge of the Monument (Smith 1952). Watson Smith was the field director of the project, assisted by Milton A. Wetherill as foreman, three graduate students, a four-man Indian crew and a cook. The purpose of the expedition was to clarify the cultural relationships in this complex contact area. In addition, Smith and Wetherill conducted a plane table survey of approximately three square miles within the valley; 59 sites were recorded in this area. Four sites with varying architectural features were excavated in the Big Hawk Valley, and two other selected sites were excavated outside of the valley. The sites within the valley are NA618 (Three Courts Pueblo), NA680, NA681 and NA682 (The House of Tragedy). With the exception of three surface rooms at NA680, these four sites were completely excavated. NA680, NA681 and NA682 all proved to be Kayenta Anasazi sites dating from the Klethla Focus (early Pueblo III). NA618 showed Sinagua affiliations from two foci, Winona and Angell. Smith also excavated two talus slope structures, a kiva (Room 3) and Room 4 at Crack-in-Rock. During the later stabilization of Crack-in-Rock, it was noted that an "unknown party" had partially excavated Room 6 (Voll and Mayer 1964a:100). No mention of this "excavation" has been found in the literature. Crack-in-Rock is another Klethla Focus Kayenta site; it " . . . is the most northerly known site in the San Francisco Mountain region. . . ." (Smith 1952:70). The final work of the 1948 expedition was at a site on Juniper Terrace; however, this site

is three miles south of the Monument and not of direct concern here. Smith's publication on the 1948 field season is a fine example of archeological reporting. The report is extremely well illustrated with photographs, maps and diagrams, and the discussions are very complete and informative.

In 1953, the Museum excavated NA5701 and NA5702 near Wupatki Pueblo, and, in 1957, a further excavation was conducted at NA6301, located near Doney Mountain (Bradley 1959). These excavations were directed by George S. Cattanch (NA5701 and NA5702) and Zorro A. Bradley (NA6301). All three sites consisted of isolated, one-room structures associated with arable land. Bradley believed these structures to be field houses or granaries. The geographic location given for NA5701 and NA5702 is wrong, but Bradley describes both sites as being near Wupatki Pueblo; the mistakes are obviously in the township and range numbers. The report for these excavations is essentially a site description and sherd analysis, but it represents one of the few publications dealing with the smaller sites at Wupatki.

During a joint investigation of the Wupatki blowhole system, sponsored by the Rand Corporation and the Museum of Northern Arizona, NA7824 was excavated in 1961 (Schley 1962); the site is located around a blowhole on the western side of the Monument. The project was attempting to determine the relationship, if any, between the blowholes and prehistoric sites. NA 7824 is a four-component site consisting of two small pueblos, a rock shelter and some type of platform near the blowhole. Unfortunately, the report of this project is so superficial that it cannot be determined exactly what work was done at the site; also, there is no discussion of the site-blowhole relationship.

Michael B. Stanislawski completed the first analysis of the architecture and material remains of Wupatki Pueblo in his 1963 doctoral dissertation. Stanislawski's work is the only comprehensive study of the ruin, and no

attempt will be made to condense his extensive research here. Nevertheless, every aspect of the culture of the Wupatki people was considered, and the present interpretation of the history of Wupatki Pueblo is based primarily upon Stanislawski's analysis.

The Museum of Northern Arizona excavated the Wupatki Ball Court in May, 1965; the project was under the supervision of Alexander J. Lindsay and George J. Gumerman. The preliminary report for this project (Lindsay 1965) indicates the ball court was constructed late in the occupational history of Wupatki Pueblo. In conjunction with the ball court excavation, NA2765B was reexcavated. This is the kiva originally excavated by the Museum in 1933.

NA2077, a one room field house located near Wupatki Pueblo, was excavated by National Park Service employees in August, 1968. Albert E. Ward's (1976) report on this project is probably the most thorough discussion of a small site excavation at Wupatki in existence. However, Ward postulates that NA2077 is a pre-eruptive site. As this hypothesis is based upon one pre-eruptive sherd found in contact with the floor of the structure and a stratigraphic profile which could have more than one interpretation, Ward's conclusions are open to question.

Aside from the prestabilization work mentioned in the stabilization section of this report, one small project constitutes the most recent archeological work at Wupatki. In December, 1973, Museum of Northern Arizona archeologists James Bradford and Dana Hartman excavated a burial at NA12,512, a small alcove site near the Citadel (Hartman 1973). The pottery associated with this burial shows both Sinagua and Kayenta Anasazi affiliations. Although the alcove has been used recently as a shelter, the small amount of artifactual material recovered from this site indicates the cave was only used prehistorically for the isolated burial of one individual.

STABILIZATION

Ruins stabilization at Wupatki National Monument has had a very complex history. Work which has been completed within the last 25 years is recorded in the stabilization reports, but documentation of earlier projects is dispersed throughout the original field notes of the excavation (Wupatki Collection n.d.), the monthly reports of the various custodians and rangers at the Monument (Wupatki Custodians 1926-41) and the reports of more recent stabilization projects (NPS Stabilization Reports, cited in references by author).

The earliest stabilization efforts at the Monument were in conjunction with the original excavation at Wupatki Pueblo. During the 1933 excavation of part of the south unit, conducted by the Museum of Northern Arizona, restoration of Rooms 35, 36 and 44 was completed. The walls of the excavated amphitheater were capped at this time. With the continuation of the excavation as a Civil Works Administration project, Rooms 1, 2 and 4 were also restored and reconstructed. Further wall restoration was completed in Rooms 41, 60, 62, 63 and 68; in addition, a large number of walls in both the north and south units were capped. At this time additional stabilization was necessary in the northwest corner of Room 35. By March, 1934, it was also necessary to repaint the walls in Room 4.

While the C.W.A. Project was being conducted at Wupatki Pueblo, Nalakihi was also excavated by the C.W.A. under the direction of Dale S. King. King heightened the walls and reconstructed the roofs of Rooms 1 and 2; the remaining walls at Nalakihi were capped at this time.

Following the dissolution of the C.W.A. project in April, 1934, Wupatki was without a custodian in residence until James W. Brewer became the ranger in August, 1934. In the interim period Harold S. Colton of the Museum was the custodian of Wupatki, and he made regular visits to the Monument from Flagstaff. It was possibly at this time that the Museum attempted to brace the leaning east wall of Room 5 at Lomaki; there are no extant records of this stabilization effort. During Brewer's tenure he completed a number of minor projects, most of which involved work on Wupatki Pueblo. Rooms 36 and 63 were converted into

living quarters for Brewer and his wife Sallie. This conversion necessitated rather extensive work on the interior of the rooms including plastering the walls and repairing the roofs. Room 41B was torn down and rebuilt to become part of the ranger quarters during this time period, but records of this modification do not exist. After Room 36 was modified and inhabitable, one of the Brewer's first jobs was emergency stabilization at the Citadel involving the installation of a central roof support. Brewer then installed a drain in Room 49 at Wupatki and dug a drainage channel in Room 7 from the ventilator to the outside of the room. By the summer of 1935 problems were already arising with the original C.W.A. work. The wall and roof restoration in Room 35 had to be removed and replaced, and minor roof repairs were necessary in Rooms 1 and 4. The roof restoration in Room 1 at Nalakihi was repaired in August, 1936. Wupatki was used as a testing ground for various stabilization projects during the 1930's. In April, 1935, preservatives were sprayed on the walls of Room 41 and five exposed floor levels and firepit of Room 28. Preservatives were also applied to the firepit and plaster at NA2765, a pit house site. During February, 1936, the north half of the west wall of Room 72 was reconstructed to aid drainage. At the same time the roof construction begun by the C.W.A. in Room 63 was completed; this reconstruction required further work in August of the same year.

David P. Jones was appointed custodian at Wupatki in 1937. During August and September of that year, further repairs were necessary on the restored roof of Room 1 at Wupatki Pueblo. In November, 1938, Jones restored part of the south wall of Room 51. He also removed the C.W.A. capping in Rooms 49, 50 and 51 and recapped these walls. By the following summer leakage in several of the restored rooms had become serious. Therefore, Jones and two Civilian Conservation Corps workers sloped the roofs of the restored rooms during July to improve drainage.

All of the national monuments in the Southwest were severely understaffed during the 1930's; by the summer of 1940 this neglect was having some disastrous effects at Wupatki.

Custodian Jones, Collaborator A. E. Buchenberg and Engineer E. F. Preece therefore undertook several emergency stabilization projects. The exact dates of these various projects are unknown, except that all of the work was completed between the fall of 1940 and the summer of 1941. At Wupatki, stabilization of the east wall of Room 41 was begun at this time; Jones also braced the east wall of Room 5 at Lomaki again. Most of the emergency work, however, was at Wupatki. The northeast corner of this ruin, known as the "hanging corner," was stabilized, and wooden braces were placed in the doorway in the north wall of Room 3. The west wall of Area 5 and the north wall of Room 2 were also temporarily stabilized with wooden braces. Buchenberg capped and pointed some of the walls at Wupatki with various mortar mixtures during 1941; this work was of an experimental nature, however, rather than part of the emergency stabilization.

Between October and December, 1941, Albert H. Schroeder surveyed a number of major sites at the Monument to assess stabilization needs. Schroeder suggested various stabilization projects for NA202 (Heiser Ruin), NA203 (Wukoki), NA355 (Citadel), NA377, NA378, NA379 (Lomaki), NA404, NA405 (Wupatki), NA407 and NA1770. Following the completion of this survey, Schroeder, aided by a carpenter and two C.C.C. enrollees, was able to complete some of the suggested projects. At Heiser Ruin many of the walls were stabilized by grouting and resetting loose rocks; temporary capping was also applied to several walls. Grouting and pointing were used in the wall stabilization at Wukoki; Schroeder also removed the wooden braces placed by Preece in the north wall of Room 2 and repaired the wall. The work at the Citadel consisted of repairing a number of breaks and holes in the walls and minor wall stabilization. The east wall of Room 5 at Lomaki was again braced; this was the first effective stabilization of this wall. Room 2 at Lomaki also required some work; an erosion channel in the floor was filled, a break in the northwest corner of the room was stabilized and a hole in the exterior of the west wall was patched. Schroeder was also able to complete the stabilization of the east wall of Room 41 at Wupatki with the installation of an iron beam support. General maintenance stabilization was also completed in a number of rooms at Wupatki.

In 1952, the first full scale stabilization was undertaken at Wupatki Pueblo since the original excavation. The 1952 project was the result of a change in National Park Service Policy stressing preservation rather than restoration. In conjunction with the Wupatki stabilization, 18 rooms were excavated. These 18 rooms, along with the 37 rooms excavated in 1933-34, were all stabilized in 1952; the amount of stabilization necessary in each room was highly varied. All of the restorations completed in 1933-34 were removed; this work included returning Rooms 36, 41B and 63 to an approximation of their pre-1933 condition. The modern roof in Room 63 had been removed sometime prior to 1952, but there is no record of this project.

The N.P.S. policy change also affected the restoration at Nalakihi; this restoration was removed in August, 1952. After the modern reconstructions were dismantled, all of the walls at Nalakihi were capped. During the course of this work, it was noted that some unrecorded stabilization had been previously completed. The earlier stabilization was completed in 1950 and consisted of minor wall repairs.

The comprehensive stabilization and new excavation at Wupatki necessitated renovation of the drainage system. The removal of the reconstructed roofs and clearing of 18 additional rooms exposed the ruin to potential damage from erosion. Therefore, in the fall of 1953, drains were installed or improved in 25 of the 55 excavated rooms.

The first comprehensive stabilization at Wukoki, Citadel and Lomaki was completed in the fall of 1954. All of these ruins were rapidly deteriorating due to visitor traffic. At Wukoki the wooden braces placed in 1940-41 were removed and replaced by hidden supports. Extensive repairs to the walls were necessary; this work included patching, capping, grouting, fixing breaks and resetting several walls. The Citadel stabilization consisted mostly of extensive wall repairs. Also, increasing visitor traffic at the ruin necessitated some trail repairs as a safety measure. All of the walls at Lomaki were capped, and most of them required additional repair work. The temporary repairs made in 1940-41 were no longer effective in 1954. Therefore,

the wooden bracing in the doorway of the west wall of Room 1 was replaced with hidden steel supports. Also, all of the wooden braces which had previously been placed against the east wall of Room 5 were removed; these braces were also replaced by steel beams hidden in the wall.

Following the suggestions made by Schroeder in 1941, NA377 and NA378 were stabilized in 1955. These two small ruins are located on the route to Lomaki and they were being endangered by visitor traffic. All of the walls in the two ruins were stabilized; this work consisted primarily of capping, but most of the walls also required varying degrees of patching.

A second ruins stabilization inventory was conducted in 1956. At this time the Sunset Crater-Wupatki loop road was being built and the increasing visitor traffic was expected to affect several ruins. Stabilization was suggested for a number of sites, but priority was assigned to NA404, NA1754 and Crack-in-Rock. The majority of the ruins mentioned in the inventory have since been stabilized.

By 1961, maintenance stabilization was urgently needed at several small ruins which were deteriorating due to erosion and visitor use. All of the walls at NA348, NA350 and NA352 were defined and stabilized. A rather significant error in the 1961 stabilization report should be mentioned at this point. NA637 is identified in the report as Antelope House. Actually, Antelope House, designated as site NA625, is a much larger ruin located less than 0.5 mi. northwest of NA637. Antelope House was not stabilized until 1965. During the 1961 stabilization, however, the main room of NA637 required extensive repair and stabilization work; particular attention was given to the doorway in the west wall. The other two rooms at NA637 were also stabilized, and the west end of the ruin was partially rebuilt. Minor work was also completed at several previously stabilized sites. Wall repairs were made in Rooms 3, 18, 28, 32, 50, 51, 68 and 72 at Wupatki. At Heiser Ruin all of the standing walls were stabilized. The walls in the plaza at Wukoki were patched, and repairs were completed on the north wall of Room 2 and the interior of Room 3. Work at Lomaki consisted of patching a hole in the south wall of Room 7

and pointing the north walls of Rooms 2, 3 and 4 and the interior of Room 2. All of the walls at NA377 were patched and capped. The final segment of the maintenance work was at the Citadel. The wall on the northeast corner of this ruin was being destroyed by visitors shortcutting the trail. Therefore, the wall was repaired and built up to discourage traffic.

The first comprehensive stabilization of Crack-in-Rock was completed in 1964. Every room in the ruin and all of the mesa top walls received some attention during this project. On the mesa top all of the standing walls were capped and grouted. The northeast and southeast wall corners of Room A-1 were reset. In Room A-4 the east and west walls were reset and the doorway in the east wall was repaired. Room A-5 required resetting of the south wall and the corner of the east wall; also, the middle portion of the east wall, which is above the entrance to the ruin, was repaired. The doorway and north wall of Room A-6 were partially reset. Resetting was also necessary for the doorway and south wall in Room A-7 and for the east and south walls of Room A-9. Room A-10 was found under a pile of rubble while the north mesa top wall was being reset. All of the walls in Room A-10 were reset. The western half of the northeast mesa top wall was also reset, and the east mesa top wall required resetting of the jamb and sill in the south door. In the talus slope rooms all of the walls were capped. The walls of Rooms 1, 5, 7 and 9 were cleared of rubble and defined. The south walls of Rooms 1, 2 and 4 had to be reset. In addition all of the walls in Rooms 3, 4, 6, 7 and 8 were grouted.

Maintenance stabilization was again necessary at Wupatki Pueblo in 1964. There was no major work performed during this project, but every room in the ruin was checked for stabilization needs. Where required loose capping was reset and eroded walls were grouted. All of the floors in the excavated rooms were graded. The drainage system was inspected and drains were modified or repaired as necessary.

Maintenance work was also conducted at Lomaki in 1964. This work consisted essentially of spot grouting and resetting loose rocks. In addition a hole in the south wall of

Room 4 was repaired and the drain in Room 7 was cleaned. The unnumbered, basal rooms at Lomaki were all capped and grouted.

The final project of the 1964 season was the maintenance stabilization at Nalakihi. All of the walls in the ruin were grouted, loose capping was reset where necessary and the room floors were graded. The door stoop in Room 1 and the door lintel in Room 3 were reset. In Room 2 the reconstructed flagstone floor was removed. The modern steps into Room 9 were raised to facilitate access to the room.

Following the excavation of the Wupatki Ball Court in May, 1965, this structure was completely stabilized. The interior of the court required a great deal of reconstruction. This work was necessary because the wall core consisted of loose cinders, and the few remaining wall segments were inadequate to contain the cinders. The exterior wall of the court was well preserved; most of this wall only required grouting. The north end of the east wall, however, was underlain by three feet of cinders. Therefore, the wall and cinder base in this area were removed, a cement and rock footing were built and the wall was reconstructed on this base. The floor of the ball court was graded and returned to its original concave appearance. The area around the outside of the court was also excavated and graded to reveal the entire height of the exterior walls. The final work at the ball court consisted of rechanneling two arroyos to avoid potential flooding of the structure.

In conjunction with the ball court excavation, the blowhole near the court was found and cleared to bed-rock. The blowhole had previously been concealed by water-borne silt. A protective vent with a screen was built over the blowhole. This vent permitted visitors to study an un-

usual geological feature, and the screen prevented foreign material from entering the blowhole during air intake periods.

Antelope House was first stabilized during June and July, 1965. Excavation of Rooms 1, 2, 7 and 8 was completed in conjunction with the stabilization. With the exception of Room 9, the fallen wall rubble in all of the rooms was cleared and all of the standing walls were stabilized. The only work in Room 9 consisted of resetting and grouting the east wall. The three wing walls at Antelope House were all grouted, and the walls designated "Room 10" and "Room 11" were capped. All of the "Room 10" wall was reset; it was also necessary to reset the eastern 20 ft. of the unnumbered south wall.

During the summer of 1965 three small ruins at Wupatki were stabilized. The exterior of the south, north and west walls at Heiser Ruin were grouted; this work had not been attempted in the 1961 stabilization. In addition, the interior wall surfaces were grouted, pointed and capped wherever necessary. AT NA756 the four standing walls were stabilized. The final work in 1965 was at NA2765B. This is a kiva which was excavated in 1933 and reexcavated in 1965 during the ball court excavation. The walls and ventilator in the kiva were restored in 1965; however the floor features found in 1933 were left for restoration at a later date.

The most recent stabilization activity at Wupatki was conducted in 1976. This work consisted of pre-stabilization archaeology at three small sites (NA404, NA407 and NA2922). The only modification at these sites was rubble removal at NA404 and NA407. In addition 14 sites at Wupatki were inventoried and cost estimates were developed for prestabilization archaeology at these sites.

ARCHEOLOGY OF THE MONUMENT

The record of human occupation in the Wupatki region prior to the Sunset Crater eruption is very theoretical. Within the modern boundaries of the Monument, there are no unquestionable pre-eruptive sites. In the Little Colorado Valley there exist a number of stone quarries and lithic workshops on alluvial terraces above the river. These sites are typified by a stone industry known as the Tolchaco focus (Bartlett 1943). Tolchaco sites lack both architectural features and non-lithic artifactual material; it is almost a defining characteristic of the lithic sites that they cannot be dated. Therefore, the Archaic or pre-Basketmaker nature of the Tolchaco focus is debatable.

Ward (1976) reports the excavation of a pre-eruptive field house (NA2077) near Wupatki Pueblo. On the basis of one sherd found in contact with the floor, Ward assigns this site to the Rio de Flag phase of the Sinagua (early Pueblo II). Ward believes the stratigraphic profile of the field house reinforces his interpretation. There is just not enough information from this site to irrefutably state that it is pre-eruptive; NA2077 and other suspected pre-eruptive sites deserve intensive study before they are assigned to a definite time period. Colton (1946:57, 63) mentions some possible Basketmaker cists beneath the floor of the amphitheater at Wupatki Pueblo; again, more evidence is necessary to support the dating of these features.

It is apparent that if there was a pre-eruptive inhabitation of the Wupatki area, such an occupation was both sparse and intermittent. Before the A.D. 1064-65 Sunset Crater eruption, the Wupatki region undoubtedly supplied resource material for hunting and gathering forays; potential farmland, however, would have been limited to areas adjacent to the permanent springs. Therefore, the land would not support the long-term settlement of a large number of people. Then, during the eruption of Sunset Crater, the prevailing southwesterly wind blew ash and cinder over the Wupatki area. This fine, evenly spread eolian deposit protected the soil from the severe desiccation common to the area located in the San Francisco Peaks rain shadow. Although precipitation continued to be sparse, the rain which did fall was held in the soil for a much longer

period of time. Thus, the arid Wupatki region suddenly became capable of supporting agriculture which utilized dry farming techniques.

Before the beneficial results of the Sunset ash fall took effect, the cultural groups in northern Arizona maintained relatively independent geographic domains. The Kayenta, a distinctive branch of the widespread Anasazi culture, occupied most of northeastern Arizona. The Kayenta apparently stayed to the north and east of the Little Colorado River in the desolate Wupatki region. The Cohonina and the Sinagua both inhabited the San Francisco Peaks area, but the Cohonina lived to the north and west of the Peaks, while the Sinagua were essentially limited to the southern and eastern portions of the area. Although the three groups lived in geographic proximity, there were impediments to contact between them (Colton 1968). The Cohonina and Sinagua settlements were separated by the dense, ponderosa pine forest; as agriculture was not feasible in the timbered areas, both groups settled on the perimeters of the forest. There was no physical barrier to the southern expansion of the Kayenta; staying northeast of the Little Colorado River was probably simple practicality on their part. There would have been little reason to leave a productive resource area for the inhospitable Little Colorado region. Following the Sunset Crater eruption, segments of all three of these cultures began to exploit the new potential of the Wupatki area, but it must be remembered that these groups had all lived in the general vicinity long before the eruption.

The first post-eruptive habitations at Wupatki were probably pit houses. Some of the earliest ceramic dates at the Monument are from two pit houses (NA1754A and B) at Heiser Spring (Colton 1946:131). The early construction of these pit houses is further indicated by tree-ring specimens which represent a building period in the 1090's (Robinson, et al. 1975:48). Pit house habitation continued into the 1100's, but construction on the masonry pueblos for which Wupatki is noted may have begun as early as A.D. 1106, at least at Wupatki Pueblo (Robinson, et al. 1975:95). According to Colton (1946:131), the Heiser Spring site was originally occupied

by the Cohonina, with the Sinagua moving there slightly later. These two groups accounted for the pit houses. Shortly afterwards, the Kayenta began living at Heiser Spring, where they built a small pueblo and a kiva. Colton mentions that this reconstruction is based on a site with a complex history and that his interpretation should not be stressed. Nevertheless, knowledge of the architecture of these three groups appears to reinforce Colton's reconstruction of the site history. At the time Sunset Crater erupted, the Cohonina and Sinagua were both still using pit houses, whereas the Kayenta had begun building pueblos long before. As all three groups expanded into the Wupatki area, the idea of building above ground structures was adopted by the Sinagua and Cohonina, although all three of the cultures continued to use pit houses.

Almost since work began in the Sinagua area, some type of prehistoric land rush has been proposed for the post-eruptive region, with a number of cultural groups coming together and living peacefully in the area. However, the recent work of Pilles (1974) and Gilman and Thornton (1976), in conjunction with the research for this report, indicates that the earlier archeological interpretation may have to be modified.

A large variety of pottery wares, representing at least three major cultural groups (Anasazi, Cohonina and Sinagua), occur at sites throughout the Monument. In the past, sites which yielded predominantly Cohonina ceramics, for instance, were thought to have been inhabited by Cohonina peoples. The nature of the soil at Wupatki, however, provides a method of proving or disproving this theory. Any group of people migrating into the Wupatki area, if they remained for more than a short time, would eventually need to make vessels to replace those lost to breakage and wear. Presumably, the potters would retain their culturally distinctive styles, but they would have to utilize local materials for vessel manufacture. The soil at Wupatki contains a high degree of volcanic cinder from Sunset Crater, so that pottery made in this area also includes cinder in the temper material. Therefore, it is quite easy to determine which ceramics were locally produced. Gilman and Thornton (1976) analyzed the pottery from the three sites studied during the National Park Service prestabilization archeology project conducted

in 1976. They determined that the only locally manufactured ceramics were plainwares and corrugated vessels of Sinagua affiliation. These conclusions agree with observations made during the field phase of this project. In other words, the presence of the characteristic decorated pottery of the Anasazi on a site does not necessarily indicate that the Anasazi themselves were there. Instead, the presence of non-local pottery supports the logical assumption that the people maintained trade relationships with other cultural groups. There is really no evidence for the intermingling of people at sites throughout the Wupatki area.

Pilles (1974) questions the post-eruptive population boom often hypothesized for the Sinagua region. Site density definitely did increase after the Sunset Crater eruption, but Pilles notes that many of the post-eruptive sites are actually field house structures. Due to the increased agricultural potential after the eruption, farming would have been a much more profitable venture and field houses became necessary for the maintenance of this endeavor. Field houses, of course, were only used seasonally and do not represent a population increase. The contention of Pilles' report is that there were not large-scale migrations nor a great population increase, but rather a change in subsistence strategies in the post-eruptive Sinagua area. This argument challenges the earlier conception of the Sinagua region as a cultural melting pot, and it appears to be valid for Pilles' study area, which is about 25 miles south of Wupatki. In the Wupatki region, however, a post-eruptive population increase cannot be questioned. Nevertheless, Pilles' theory tends to indicate that Sinagua influence at Wupatki may have been much greater than was previously supposed. Members of at least three distinct cultural groups inhabited the Wupatki area, but the Sinagua might have had a larger representation in this population than has been hypothesized.

The geographic location of Wupatki made it a natural crossroads for prehistoric groups. The Little Colorado Valley has functioned in both historic and prehistoric times as a travel route. During the time the Wupatki area was inhabited, the valley made contact possible among the people from the Mogollon Rim to the Colorado River. Also, Wupatki is just north of

a number of mountain passes which connect the northern and southern sections of Arizona. The people themselves may not have actually traversed these geographic connections, but their ideas certainly did. About 25 miles south of Wupatki is a large pit house settlement known as Winona Village. Excavations at Winona Village have revealed many Hohokam characteristics (e.g., a ball court, pottery with Hohokam traits, Hohokam architecture, etc.). This settlement may even have been a Hohokam colony. If so, this is by far the most northerly known Hohokam group. These people had their homeland in the Gila and Salt River valleys, although a significant number of Hohokam people did live in the Verde Valley. The influence of the Hohokam people at Wupatki is obvious. The most visual aspect of this influence is the Casa Grande type ball court just north of Wupatki Pueblo. Some artifactual remains from the pueblo, such as copper bells and certain types of shell, have definite Hohokam affiliations. In addition, the Wupatki people kept parrots and macaws, probably to use the feathers in ceremonies. The people of Chaco Canyon are known to have raised these birds, but the Chacoans derived the idea from the Hohokam. Therefore, whether the people of Wupatki got the birds from Chaco Canyon or directly from the Hohokam, the idea of keeping parrots and macaws derived ultimately from the Hohokam. Of course, the basis of subsistence in the Wupatki area, agriculture, also originated to the south; this revolutionary concept began in Mexico and radiated north through the Hohokam area to the other cultures of the Southwest.

The settlement of the Wupatki area was highly complex. Of the three major groups actually inhabiting the region, the Cohonina have been studied the least. This is a result of the fact that the Cohonina had a rather marginal subsistence base and the Cohonina population was never very large or dense. Therefore, Cohonina habitations, primarily inconspicuous pit houses, are not numerous or particularly noticeable. The Cohonina did build massive defensive forts, but these structures are very limited in number and do not exist at Wupatki. Although Cohonina ceramics are present at most of the sites at Wupatki, none of the larger pueblos appear to have been inhabited by the Cohonina. The Cohonina and the Sinagua were apparently the first groups to inhabit the Wupatki area, but the Kayenta soon moved

into the region and became the dominant cultural element. Of the larger settlements, only Wupatki Pueblo appears to have been inhabited by the Sinagua. Actually, the first construction at Wupatki Pueblo was probably by the Kayenta, but the Sinagua account for the major building period at the pueblo around A.D. 1137 (Colton 1946:62). Wupatki Pueblo was probably the most northerly outpost of the Sinagua. The remaining large pueblos at the Monument, such as Wukoki, Crack-in-Rock and the Citadel, were all built and inhabited by the Kayenta.

The pueblويد inhabitation of the Wupatki area was relatively short-term when compared to the occupational histories of most other large pueblos in the Southwest. The final period of construction activity at Wupatki Pueblo occurred in A.D. 1190-94; terminal construction at the other dated ruins took place at approximately the same time (Robinson, *et al.* 1975). Therefore, it may be assumed that the settlements were either deserted or in the process of being abandoned by about A.D. 1225, or a generation after the last building took place. Stanislawski (1963:535) believes a small group of Hopi may have reoccupied Wupatki Pueblo in the late 13th or early 14th century, but this reoccupation was for a short period of time.

Unlike many other ruins in the Southwest, the abandonment of the pueblos at Wupatki is not totally unexplained. Even with the mulch provided by the Sunset ash fall, agriculture at Wupatki was probably marginal. In addition, the porosity of volcanic ash makes it subject to leaching (Eggler 1959:274), so the nutrients would be rapidly removed from the soil. But it was probably the intense wind at Wupatki that eventually defeated the agricultural efforts. Today, the volcanic cinders are no longer spread in an even layer over the ground surface; areas of higher relief have been stripped by the wind and the cinders are mounded in useless piles in arroyos and low areas. It undoubtedly took a relatively short amount of time for the wind to achieve this effect.

At about the same time that Wupatki was abandoned, the population of the Verde Valley began to increase. It is probable that some of the people from Wupatki went south to the Verde when farming at Wupatki became impractical. There is also a good pos-

sibility that some Wupatki residents migrated to the Kayenta Anasazi area to the northeast. The Anasazi were already beginning to decline by A.D. 1200, and the Kayenta people had also left their homeland within a century of the Wupatki abandonment. A number of Hopi clan legends involve both the pueblos at Wupatki and travels through the area (Stanislawski 1963:530-533). The legends, along with the Hopi re-occupation of Wupatki Pueblo after the Sinagua abandonment, indicates close ties and possible cultural continuity between the Wupatki people and the Hopi.

Although Wupatki was intensively

settled for only a little over 100 years, there may have been as many as 4,000 people occupying just the Wupatki Basin at one time (Stanislawski 1963:534). Wupatki was a cultural contact zone, and the interchange of cultural traits is probably best represented by the architecture at the Monument. At Wupatki Pueblo alone, there is Sinagua masonry, a Hohokam ball court and a ceremonial structure (the amphitheater) which resembles an Anasazi great kiva. Although the actual intermingling of these people at one site is open to question, there was obviously a significant amount of cultural exchange between the groups.

POST-ABANDONMENT HISTORY

Introduction

Between its abandonment around A.D. 1300 and the mid-19th century, the Wupatki area was visited only by transient groups. These groups included Havasupai and Hopi Indians on hunting and trading missions, Spaniards who were exploring New Spain and cataloging the riches of its terrain, expeditions of the United States government intent upon establishing new lines of communication across the Arizona and New Mexico Territories and Mormons on their way up the Little Colorado to settle in the Winslow-Holbrook-St. Johns area.

The Navajo probably first entered the western part of what is now their reservation in the early 1860's, just before the forced march to Bosque Redondo in New Mexico.

The 1880's saw an influx of Anglos from the East - herders, ranchers, miners, railroad men and traders. All of these groups figured in the history of the Wupatki region and remains of their tenure have been found within its boundaries.

With the creation of Wupatki National Monument in 1924, the prehistoric ruins in the area were better protected. At the same time, agents of government and science altered the land with their own dwellings and modifications. As the Monument is developed and interpreted for the public, this rich post-abandonment history should have an increasing importance to an understanding of the diverse ways in which men have wrought a living from the black cinders and red sandstone of the Wupatki area.

Transient Hunters and Gatherers

From the time of abandonment around A.D. 1300 until the Spanish exploration of northern Arizona in the 16th to 18th centuries, nothing is known of the aboriginal inhabitants, if any, of the Wupatki area. Except for the Hopi towns of long duration, data are so inadequate and contradictory that it is nearly impossible to distinguish between tribes or to place them exactly in a geographic sense (Manners 1974:32). Not until the 19th century does more precise information exist.

Bartlett (1945:43) shows the Havasupai occupying territory near Wupatki on the Little Colorado in 1848. Havasupai were living in the Coconino Basin as late as 1873 (Euler 1974:296), and, according to Spier (1928:94), they considered a large part of the plateau as their range. The Havasupai supposedly used Hull Spring, north of the San Francisco Peaks, and a spring near Black Tank, 10 mi. northwest of Wupatki, during their winter hunts (Spier 1928:94).

In 1885, the Havasupai in Cataract Canyon told Major John Wesley Powell that the ruins along the Little Colorado were their ancestral homes vacated only a few generations before when the Havasupai were expelled by the Spaniards (Powell 1891:xxi).

As improbable as the above tale seems, it illustrates the transient nature of human visitation in the Wupatki region between A.D. 1300 and the late 19th century when livestock interests entered the area in the form of Navajo herders and Anglo ranchers.

Spanish Explorers

There is no evidence to suggest that any Spanish explorers ever actually went to Wupatki. Some may have seen it from the Hopi Mesas, although their diaries are not exact on this point.

While Cardenas, one of Coronado's captains, visited the Hopi in 1540, the first Spaniard to go any further south and west was Antonio de Espejo in 1583 (Bolton 1940:10). Espejo ultimately reached the Verde River where he inspected some Indian mines near present day Jerome (Bartlett 1942:25). In 1595, Don Juan de Onate was given a contract by the Viceroy of New Spain to colonize New Mexico (Bolton 1940:10). In 1598, Onate's Captain of the Guard and Horses, Marcos Farfan de los Godos, set out with eight companions and some Hopi guides to visit the mines which Espejo had seen (Bartlett 1942:22). Bartlett (1942:25) believes that the most probable routes for both Espejo and Farfan would have gone from Awatovi to Sunset Crossing near Winslow, then to Sunset Pass, Chavez Pass and through either Pine Springs and Stoneman Lake (Farfan) or to Mormon Lake and down to Rattlesnake Tank (Espejo). Thus the closest

they came to the Wupatki region was perhaps 40 or 50 miles.

In October, 1604, Onate set out from San Gabriel to find a route to the "South Sea." With Onate went 30 men who travelled to Zuni, Hopi and the Colorado River (Bannon 1970:39). By 1605, Onate had descended the Bill Williams Fork to the south (Bolton 1940:11). Finally he was forced to turn back to New Mexico; the Viceroy's summation of the expedition was not a favorable one (Bannon 1970:40): "Nothing but naked people, false bits of coral, and four pebbles." Onate probably passed to the north of Wupatki on his way to the Colorado and Bill Williams Fork.

Father Francisco Garces' objectives in the course of his 2000 mile trip from Monterey to New Mexico were to missionize and subjugate the Indian peoples along the route (Galvin 1965:v). The journey took nearly a year, from October 21, 1775, to September 17, 1776. Garces travelled up the Colorado, crossed the Coconino Plateau and described a difficult crossing of the Little Colorado near Cameron on his way to the Hopi Mesas (Galvin 1965:68). The return trip followed a similar course. Garces listed the Yavapai as occupants of the vast territory between the Colorado and Gila Rivers at this time (Galvin 1965:90).

While Garces was heading east from Monterey looking for a route to New Mexico, Father Escalante was preparing for an expedition westward to Monterey (Bolton 1940:13). With a small party Escalante explored much of northwest New Mexico, southwest Colorado, southeast Utah and northeast Arizona. While never coming even remotely close to the Wupatki area, Escalante's explorations into previously unknown territories were to aid later travellers and explorers.

The Spanish never settled northern Arizona and never established a short land route between the California coast and their settlements on the Rio Grande. They did, in the persons of explorers such as Espejo, Farfan, Onate, Garces and Escalante, describe much of the territory and record data on the inhabitants. It is perhaps significant that as the last expeditions were completed, the United States was being formed to the east. It was the U.S. expansion which caused more explorers to be sent to northern Arizona 75 years later.

Anglo Explorers

After the New Mexico Territory, including both present day New Mexico and Arizona, was established in 1850 (Greever 1954:7), transcontinental transportation became a matter of concern, especially the establishment of a southern route to California. The government sent out parties to explore the terrain for suitable routes. Although surveying parties and scientific expeditions have been active through the 1920's and even to the present day, several of the first surveys in the San Francisco Peaks region are noteworthy.

The first of these expeditions was led in 1851-52 by Lieutenant Lorenzo Sitgreaves. His purpose (Sitgreaves 1853:4) was "to explore the Zuni River to its junction with the Colorado, determining course and character, particularly in reference to its navigable properties, and to the character of its adjacent land and productions." Sitgreaves was also to pursue the Colorado to its junction with the Gulf of California. The expedition was organized in Santa Fe and left from Zuni in 1851. Following the Little Colorado until they reached Black Falls, the party was forced to turn west. Sitgreaves' diary (1853:8) for October 8, 1851, at Camp No. 14 mentions that after leaving the river they saw "all the prominent points occupied by the ruins of stone houses of considerable size, and in some instances of three stories in height." Sitgreaves and his party therefore became the first Anglos to record the ruins of the prehistoric Sinagua and Anasazi peoples in the Wupatki area. Sitgreaves further remarked that the ruins must have been the remains of a large town extending over eight or nine miles, and that the pottery was thickly strewn over the ground. He attributed the abandoned state of the ruins to the absence of water and compared both the dwellings and scattered pottery to those existing at the time in the Rio Grande pueblos. Camp No. 14 was at an elevation of 5950.7 ft. (Sitgreaves 1853:26) somewhere near Wupatki Pueblo. On October 10, Camp No. 15 was made further to the west, probably somewhere near Aztec Seep. By this time the explorers were out of the Wupatki area, having recorded the first description of the ruins. The party eventually circled the San Francisco Peaks from the west and discov-

ered Leroux Spring, a permanent source of water, before moving west on the 35th Parallel. Today Sitgreaves is honored by the peak near Flagstaff which has been given his name; Samuel Woodhouse, the medical officer on the expedition, has been honored by the attachment of his name to the large lava outcropping directly above Wupatki, Woodhouse Mesa.

The next exploration of the Wupatki area was authorized by Jefferson Davis, Secretary of War, as a survey to find a practical railroad route to the Pacific Ocean along the 35th Parallel. Lieutenant Amiel Weeks Whipple of the Corps of Topographical Engineers was chosen for the survey (Foreman 1941:7).

Whipple's survey left Fort Smith, Arkansas, on July 14, 1853 (Foreman 1941:19). Along the route Whipple's assistants drew maps, recorded the geology and zoology and took barometric and climatic readings. The expedition reached the area of Leroux Spring in mid-December of 1853 and continued south of the San Francisco Peaks (Foreman 1941:167-171). Whipple's report was generally well received although nothing came of it at the time. The report had, however, proposed a route for a transcontinental railroad from St. Louis to the Pacific along the 35th Parallel (Foreman 1941:22). This proposal would have great impact later and lead to surveys such as that of Beale for a wagon road in 1857.

As early as 1836 camels had been proposed as rapid transportation possibilities in the West (Lesley 1929:4). During the years 1853-54, Jefferson Davis backed plans to import camels from North Africa. Lieutenant Edward Beale, then Superintendent of Indian Affairs in California and Nevada, was given the assignment of surveying for a wagon road from Fort Defiance to the Colorado River near the 35th Parallel (Lesley 1929:13). The Beale expedition set out in 1857. By the first week in September of that year, Beale passed through the San Francisco Peaks region, camping near Canyon Diablo, Leroux Spring and other unnamed points (Lesley 1929:197-213). Beale returned through the area the first week in February, 1858, stopping at Walnut Canyon to look at the ruins there (Lesley 1929:269).

The 1860's and 1870's saw the exploration of the Grand Canyon and

Little Colorado areas by Major John Wesley Powell. In 1879, Congress provided money for the completion of Powell's work. This ultimately led to the creation of the Bureau of American Ethnology (Fowler, *et al.* 1969:1). In 1885, Powell was in the Wupatki area and he gave a description of Citadel Ruin and Citadel Sink (Powell 1891:xix). Powell erroneously described the sink as a pit from which material had been removed. However, Powell also assumed, nearly correctly, that the ruins were of a comparatively late date, having been abandoned three or four centuries previously (Powell 1891:xxi). This point of view was probably prejudiced by the aforementioned story told to Powell by the Havasupai in Cataract Canyon.

Navajo Herders

The Navajo occupation in the Wupatki region has from the first been by members of the Peshlakai family. The patriarch of the group, Peshlakai Etsedi, was born in 1851, the same year that Sitgreaves saw Wupatki (Euler 1949:12).

Peshlakai Etsedi made the "Long Walk" with the rest of his people to Bosque Redondo, New Mexico, in 1863, returning to Arizona in 1868. However, he did not enter the Wupatki area until 10 years later, around 1878 (Johnston 1939:22). Peshlakai was forced to move several times as ranching interests bought the lieu land on which he was living (Johnston 1939:21). An account of the several instances of land disputes between local ranchers and the Peshlakai family can be found in Euler's report (1949:14) on the economic situation of the Navajo in the Wupatki area. The elder Peshlakai also went on two trips to Washington in 1902 to negotiate Navajo land allotments with Theodore Roosevelt (Euler 1949:13).

As late as 1949 (Euler 1949:13), all of the 65 Navajo inhabitants of the area were directly descended from Peshlakai Etsedi and his wives. In 1933, Van Valkenburgh (1947:10) reported four household units living in Wupatki Basin and grazing their sheep. These households included that of Peshlakai Etsedi living on lower Antelope Wash, his son Cal Peshlakai living nearby, a son-in-law, Little Fat, living on Deadman Wash and another son, Clyde Peshlakai,

living near Wupatki Pueblo. These four related groups comprised the Peshlakai outfit at the time.

The economy of the Navajos at Wupatki was based on herding and the sale of wool and lambs to various traders at Black Falls and along U.S. 89; this income was supplemented with part-time labor for the Park Service (Euler 1949). Winter residence was in hogans near supplies of firewood, while summer shelter often consisted of shades or ramadas built in the grazing areas.

Clyde Peshlakai died in 1970; under a previous agreement made in 1950, the families could have been evicted from their lands once again. However, the National Park Service (U.S.D.I. 1970:2) has indicated the probability of continued Navajo sheep grazing within the Monument.

Trails in the Monument

Evidence exists concerning trails made by the Hopi Indians through Wupatki en route to both the Havasupai-Grand Canyon area and the San Francisco Peaks. The Navajo have historically utilized several trails in the Wupatki region. Also, game animals migrate between areas within the Monument on established game trails.

Maps as early as 1876 (Rand, McNally and Co.) have shown trails going southwest from Black Falls toward the San Francisco Peaks through areas dotted with "ruins." Also shown are more northerly trails running from the "Moqui villages" west to Havasupai and Tusayan. These trails are pictured on almost every map of the region published before 1900, but on few after that time (see also U.S. Chief of Engineers 1879; Eckhoff and Riecker 1880; Rand, McNally and Co. 1881; Hamilton 1884; U.S. Geological Survey 1894).

Euler (1949:12) notes that faint traces of the northern trail running from Oraibi through the northern portion of the Wupatki Basin indicate a former use of the area by the Hopi.

Colton (1964:93-94) gives more specific evidence for the southern trail:

A trail from Hopi pueblos is described by Jim Kewanwytewa who made the trip as a young man. The trail leads

west from Oraibi around the end of Oraibi Butte into the valley of the Dinnebito Wash. . . . following down the valley to a point near the Little Colorado, the trail crosses the river just south of Black Falls. A stop was made at Heiser's Spring and pahos were placed in the ice cave at Sunset Crater.

Van Valkenburgh (1947) illustrates several historic Navajo trails within the Wupatki Basin which connected the various hogans of the Peshlakai family.

James Brewer (1934b:124) reported a "migration trail" between Wupatki and O'Leary Basin which was used by 200 head of deer and antelope.

Trails over the cinder dunes are less likely to be preserved than those across the Moenkopi sandstone, especially if the dune trails are not constantly used. Therefore, a horizontal perspective will not be of as much use as a vertical one when searching for trails. Aerial photography would be a useful aid in locating these trails.

Mormons on the Little Colorado

The year 1876 brought Mormon migrants to the Little Colorado valley and the Wupatki area. Unlike the previous Spanish and U.S. expeditions, these people meant to settle permanently in northern Arizona. Led by Lot Smith, President of the Northern Arizona Stake from 1876 to 1892, Mormon missionaries followed an earlier trail from Utah crossing the Colorado at Lee's Ferry and moving up the east side of the Little Colorado.

Black Falls was the first major landmark for these settlers and missionaries. The surrounding hills provided good grazing; stock too weak to make the upstream trek were reputedly held over at Black Falls to recover (Peterson 1973:82).

In the early years Lot Smith established a commune at the United Order town of Sunset near present day Winslow (Peterson 1970:398). Eventually Smith ran cattle and horses from Mormon Dairy and Fort Moroni south of the San Francisco Peaks to Hay Lake, Canyon Diablo and the Colo-

rado River. This range included the Wupatki area.

In his later years Smith's sons took over his southern holdings, while Smith retained control of those lands near Moenkopi Wash and Tuba City. Taking advantage of the public domain and the natural reproduction rate of his animals, Smith became a prosperous livestock raiser (Peterson 1970: 406).

Smith was killed June 21, 1892, in a quarrel at Moenkopi with a Navajo over grazing rights (Peterson 1970: 412). Smith's Circle S brand was registered on November 16, 1893; the brand was later taken over and certified by Charles J. Babbitt on June 30, 1897 (Coconino County Record of Marks and Brands Book 1:415). By 1896, most of the Mormon settlers on the Little Colorado had obtained clear title to their land (Peterson 1973:175).

The Babbitt Brothers and the CO Bar Ranch

Perhaps the most influential Anglos connected with the local history of the Wupatki area were the five Babbitt brothers, Edward, Charles, David, George and William.

Originally from Cincinnati, Ohio, the brothers decided to move to the West in the 1880's. David and William Babbitt arrived in Flagstaff on April 7, 1886, just two months after a fire had destroyed the business district (Babbitt 1967:2). Eventually, the other three brothers arrived, and the Babbitt ranching, trading and mercantile businesses which still exist in northern Arizona were established.

William and Charles Babbitt were instrumental in the Babbitt ranching interests. Starting with a herd of 864 cattle in 1886, they controlled much of the ranching in northern Arizona and northern New Mexico by 1920. The key to their success was a practice commonly used in the arid Southwest of buying or leasing the water sources (Babbitt 1967:4). The remainder of the land being grazed was at first technically public domain.

When Lot Smith was killed in 1892, the Babbitts assumed control of his holdings including the Wupatki area (Babbitt 1967:12); no deed was recorded in Coconino County Courthouse, however.

In 1899, the Babbitts bought the Arizona Cattle Company, which doubled their range, and in 1901, they gained control of the famed Hashknife Outfit of the Aztec Land and Cattle Company (Babbitt 1967:12).

The best days for the Babbitt cattle raising interests were from 1907 to 1917 with a peak year in 1915 when the sale of their cattle reached \$1.5 million. Among the nearly 100 brands absorbed under CO Bar control was that of the Kellam Land and Cattle Company which operated to the south of Wupatki (Babbitt 1967:13).

The Babbitts, along with other stockmen on the public domain, objected to the railroad sale of consolidated lands to individuals in 1919-1920. They banded together to form the "Northern Arizona Protective Association," an organization devoted to convincing the government not to make lieu exchanges of land with the railroad (Greever 1954:101).

After large losses in the Depression years, the CO Bar Ranch and the larger Babbitt Brothers Trading Company were able to reconsolidate and still retain a very prominent place in the commerce and finance of northern Arizona.

Relations in the early days between the Babbitts and the Navajo residents of the Wupatki region were apparently not always good. Euler (1949:14) quotes a letter written in 1930 from Phillip Johnston, long time friend of the local Navajos, which tells of the ransacking of Clyde Peshlakai's house by men presumably acting under Babbitt orders. Peshlakai later found many of the stolen items on land owned by the Babbitts at Heiser Spring. This incident is the only one with which the Babbitts have been connected, but there are at least two other instances of the forced eviction of Wupatki Navajos from their own land allotments by local ranching interests and posses from Flagstaff (Euler 1949:14; Cocconino Sun 1947 and 1948b).

In recent years the CO Bar Livestock Company has been cooperative with the National Park Service in exchanging sections of land to form the present boundaries of the Monument and in creating right of way for roads outside the Monument boundary. An agreement in 1960 provided for ex-

change of Babbitt owned lands around Crack-in-Rock ruin for 20 year grazing rights on 23 sections in the western portion of the Monument; these grazing rights will expire in 1983 (U.S.D.I. 1970:Appendix B). Thus the Babbitt ranching interests are still connected with the Wupatki area and the Monument as they have been since the 1880's.

Ben Doney and the Lost Padre Mine

One of the more colorful characters associated with the Wupatki area was Ben Doney, a rancher and part-time prospector who is remembered today through the application of his name to the red cinder hill northwest of Wupatki Pueblo, Doney Mountain.

A veteran of the Civil War, Doney came to Flagstaff in 1883 and died at the age of 89 in 1930 (Colton 1940:18).

Doney was an avid pothunter in the 1890's and possessed one of the finest collections of prehistoric artifacts in Arizona at the time. He guided Dr. Jesse Walter Fewkes to various ruins at Wupatki, and Fewkes commented on Doney's collection in a 1904 report (Fewkes 1904:50). Supposedly this collection was sold in California at a later date. Doney, however, was not the only one to pothunt in the Wupatki area. Groups of Mexicans were reportedly at Wupatki one winter for the same purpose (Gilman and Thornton 1976:7).

Doney was fascinated with the legend of the "Lost Mines of the Padres," also known as the legend of Sierra Azul (Colton 1940:17). This legend concerns rumors that the early missionaries sent by the Spaniards to the Hopi mesas had discovered rich mercury mines 40 miles west of the mesas at a red hill (Cerro Colorado) which was at the base of a blue mountain, the Sierra Azul (Colton 1940:19). Later the padres were removed in the Pueblo Revolt of 1680, and the "mines" were lost. Rumors of this sort have inspired generations of treasure hunters in the Southwest. Ben Doney was no exception; it would be easy to visualize any one of the red cinder cones in the Wupatki area as the Cerro Colorado at the base of the Sierra Azul (San Francisco Peaks). Among the many mines Doney started, one was apparently situated on the east side of the large cinder cone

which today bears his name. The entrance to the mine was at one time visible from the old Wupatki road going west from Wupatki Spring (Bartlett 1976), since the roughly strewn tailings were in contrast with the fine cinder cover of the mountain.

Harold S. Colton later came upon the mine claim document, which has been preserved in the archives of the Museum of Northern Arizona (Wupatki Collection n.d.). The document, dated December 31, 1922, listed B. Doney as the claimant for "The Lost Padre Mine;" the location is given as "generally on the east side of Doney Mountain." A stone cairn marked the spot of the discovery shaft. Colton also found the shaft itself, which was equipped with a windlass. The shaft had been driven through the floor of a masonry pit house (Colton 1940:17).

In 1936, Ranger James Brewer (1936a:163) mentioned a "mining party" which was doing some work in the "long-abandoned" Doney mine. Apparently the work was not worth the effort as the party gave up after several days.

Sometime after this, the mine was filled in and the tailings removed by the National Park Service (Wise 1976). At the present time the exact location of the shaft is unknown; however, it is generally located on several old maps.

C. M. Schulz

Sheep raising is a business which Anglos as well as Navajos have conducted in the Wupatki region. In the 1880's C. M. Schulz, a sheep owner, cleared some rooms (probably Rooms 4 and 7) in Wupatki Pueblo for his herders (Colton 1933b:62; Gilman and Thornton 1976:7). When these rooms were excavated, fragments of the San Francisco Evening Bulletin were found, dated September and November, 1889. Schulz was also responsible for the windbreak which connected the north and south sections of the ruin (Colton 1933b:62).

It is not clear in Colton's account if C. M. Schulz might not have actually been C. H. Schulz, who came to Flagstaff in 1880 driving his sheep from Texas. C. H. Schulz at one time was the largest sheep raiser in Arizona; Schultz Pass and Schultz Spring near Flagstaff are named after him (Cline 1976:103).

No matter which Schulz was responsible, the modifications made by the herders are an interesting chapter in the continuing use of the Wupatki area.

Traders and Trading Posts

Several traders established posts near Wupatki to serve the local Navajo population. All of the posts were at or near Black Falls and carried the appellation "Black Falls Trading Post."

At least three, and possibly four, trading posts were established. One was on the south side of the river, and the other three were most likely on the north or east side of the Little Colorado near or to the south of Inscription Point on the Navajo Reservation.

The earliest post in the area was supposedly a stone building established in 1888 on the north side of the river at Black Falls by Samuel Preston, who also had a post at Tuba City. The original Black Falls store closed in 1890. Another post in the same building was run by Fred Volz; it, too, lasted only two years from 1891 to 1893 (Richardson 1966:12).

From 1912 until 1914, Albert Biggs conducted business in a post on the northeast side of the Little Colorado near Black Falls. He was backed in his venture by D. K. Ward, trader at the Tolchaco Trading Post farther upstream (Johnston 1976).

In 1935, Jack and Glen Taylor, sons of trader Johnny Taylor at Tona-lea, started trading in a wooden building on the east side of the river. They continued until 1941 (Richardson 1966:12). This post is probably the one run by the "store owner" who told the Navajos they would have to move across the river to the east in 1935 (Euler 1949:14).

In 1941, a post was established on the south side of the river by Emmet Kellam, nephew of Joe Kellam of the nearby Kellam ranch. Emmet Kellam had been in the Indian Service and supervised the construction of the Black Falls Dam on the river (Mack 1968). The small, well-stocked post dealt only with Navajos due to its isolation. Kellam and his wife spoke fluent Navajo and entertained the local Navajos at Christmas time on several occasions (Coconino Sun 1948a). They extended credit to the local fam-

ilies, payable in the fall when the lambs were sold and in spring when the wool was brought in from shearing (Euler 1949:39). The Kellams ran the post from April, 1941, until 1952 (Mack 1968).

The next eleven years saw five traders come and go at the Black Falls post. B. B. Bonner (1952 - Jan. 1, 1954), Herbert Hukreide (Jan. 1, 1954 - Nov. 30, 1954), Ed Bergman (Dec. 1, 1954 - Dec. 7, 1956), Paul Knee (Dec. 7, 1956 - Jan. 1963) and Tom Hagan (Jan. 1963 - Dec. 1963) all traded in succession. When the permit expired at the end of 1963, the post was considered abandoned; it was torn down in 1964 (Mack 1968). Today foundations of several buildings and scattered trash remain at the site.

Since 1964 the Navajos in the Wupatki area have had to trade either in Flagstaff or at the numerous trading posts and gas stations along U.S. 89 between Flagstaff and Cameron.

Railroad Influence on Land Development

In 1880 the travels of the early explorers finally paid off, as the Atchison, Topeka and Santa Fe Railroad agreed with the Frisco Railway (formerly the Atlantic and Pacific) to build west from Isleta, New Mexico, along the 35th parallel (Greever 1954:29).

The railroad reached Flagstaff in 1882, but the consequences of its arrival reached far north to the Wupatki area, especially in the way the lands there would be divided. The railroads had been given a land grant consisting of alternate, odd-numbered sections for 20 miles on each side of the track in the United States and for 40 miles in the territories. In Arizona an additional ten mile strip, for a total of 50 miles, was granted to the railroad for an indemnity on properties already occupied by Anglo homesteaders and "others" (Greever 1954:20). By 1887 the additional strip of land had been revoked and the area reopened to general occupancy (Greever 1954:37).

The Navajos were the largest impediment to the sale of odd-numbered sections by the railroad. Believing that the Navajo presence on almost two million acres kept white settlers away, the railroad pushed for lieu exchanges of land with the government for public domain elsewhere. This

policy paid off for the railroad and ultimately for the settlers and ranchers who bought railroad land.

To exchange lands with the government, the railroad followed a standard procedure. First, the railroad paid half the cost of surveying its own land. Then it would identify individual sections and make formal demands for full legal title to them; at this time the government would grant a land patent to the railroad. Then the railroad would deed title back to the government, submitting an abstract to show the property free of unpaid taxes or liens. Finally, the railroad received in payment the right to select lieu land from the public domain (Greever 1954:66). Examples of this exchange in the Wupatki area are the deeds recorded at the Coconino County courthouse (Coconino County Register of Deeds Book 30:139; Book 41:247) in which the railroad deeded to the United States the whole of Township 25 North, Range 9 East and Township 26 North, Range 10 East. This property, on the Navajo Reservation east of Wupatki, was traded for public domain elsewhere.

By the end of 1904, the railroad had disposed of nearly all of its lieu lands. These lands were often selected because they were strategic tracts which could control adjacent areas of the public domain (Greever 1954:66). An example of this maneuver would be the control of Heiser Spring by the CO Bar Livestock Company.

Between 1915 and 1919, the Babbitt brothers bought nearly 300,000 acres of the railroad land (Greever 1954:107). The period of land exchange and tract sales was entirely over by 1920.

In the Wupatki area the Santa Fe railroad has been generous with donations of land. When preparations were being made for the expansion of Monument boundaries prior to 1937, Ranger Brewer noted the visit of Mr. Collinson, Land Commissioner of the Santa Fe. Brewer remarked that "after a thorough inspection Mr. Collinson seemed kindly disposed to trade off the Wukoki section in order to complete the hookup" (Brewer 1934a:71). An offer was made in September, 1934, for 11,115 acres and later the railroad donated 11 sections in Township 25 North, Range 10 East, which is the heart of the Wupatki Basin (Thompson 1945:7).

The railroad, besides bringing new settlers and an unprecedented ease in transportation, had considerable control over which lands were ultimately settled and consolidated and which lands became government property in the Flagstaff area.

Formation of the Monument

Wupatki National Monument was created by Presidential Proclamation No. 1721 on December 9, 1924; President Coolidge, under provisions of the Antiquities Act of 1906, designated two units of land comprising 2234.10 acres for the purpose. One section, the North $\frac{1}{2}$ of Section 20, Township 25 North, Range 10 East, contained Wupatki Pueblo; the other, larger section encompassed the Citadel-Lomaki group of ruins (original documents reproduced in U.S.D.I. 1970: Appendix A).

Franklin D. Roosevelt's Proclamation No. 2243 of July 9, 1937, greatly increased the size of the Monument, adding 33,631.20 acres (U.S.D.I. 1970:Appendix A). This grant included 11 sections in Township 25 North, Range 10 East, which was given to the government by the Santa Fe Pacific Railroad (Thompson 1945:7).

Another Roosevelt proclamation, No. 2454, on January 22, 1941, reduced the size of the Monument by a small amount of acreage in Section 12, Township 25 North, Range 10 East. This land was to be freed for the unsuccessful construction of the irrigation diversion dam on the Little Colorado at Black Falls (U.S.D.I. 1970: Appendix A).

State lands totalling about six sections within the Monument area were exchanged with the government in 1942. These exchanges are filed in the Coconino County courthouse as Deeds of Relinquishment No. 1133 and No. 1914 (Thompson 1945).

A Memorandum of Agreement dated May 24, 1960, with the CO Bar Livestock Company recommended boundary changes in the Crack-in-Rock area which resulted in the deletion of 960 acres and the inclusion of 800 acres. Additionally, the CO Bar received 20 years of grazing privileges on 23 sections in the western portion of the Monument (U.S.D.I. 1970:Appendix B). These land exchanges have brought the Monument to its present size of 35,554.50 acres (U.S.D.I. 1970:10).

HISTORIC ARCHEOLOGICAL SITES

Not all of the archeological sites found within the boundaries of Wupatki National Monument date from Sinagua and Anasazi times. Sites created in this century and the last by resident Navajos, traders, herders, miners, archeological expeditions and the agents of the National Park Service will ultimately come to have a significance of their own in the history of the Wupatki region.

Several sites in this category have been located in the course of general reconnaissance and historical research. Others no doubt exist and should be recorded during an intensive survey.

Navajo

The Navajo Peshlakai Etsedi was born in 1851, the same year Sitgreaves passed through the Wupatki area (Euler 1949:12). Peshlakai settled near Black Point in the 1870's and lived in the Wupatki area until his death in 1939. As late as 1949 (Euler 1949:13), all of the Navajo residents at Wupatki were descended from Peshlakai Etsedi and his wives. Therefore, it is safe to assume that almost all the historic hogans encountered in the Monument area were built by Navajos related to the Peshlakai family.

Three styles of historic hogan were noted during field reconnaissance. The first, a fine masonry hogan of red sandstone with a cribbed wooden roof, was found just off the main channel of Antelope Wash near the road to Crack-in-Rock ruin. It has been designated as site NA14,580 (Figure 2). According to Page (1937:48), the ownership of a stone hogan implied a certain degree of wealth since the owner was responsible for hauling in the required stone and feeding the laborers as well.

A second type of hogan, the forked stick variety, was observed just above Antelope Wash on the road to Crack-in-Rock. This hogan consists of about 35 logs leaned against several other logs which were piled upright and held in the fork of one large log; the entire hogan was then covered with earth. It has been designated as site NA14,581 (Figure 3).

A third type of hogan is represented by the stone house near Wupatki Pueblo which was built by Clyde



Figure 2. Masonry hogan, NA14,580.



Figure 3. Forked stick hogan, NA14,581.

Peshlakai, one of Etsedi's sons. This hogan is now the burial place of Clyde Peshlakai; it is fenced off and preserved by the National Park Service.

Other more modern hogans exist in the Monument and are still used by the Navajos from time to time. Due to Navajo beliefs which include the abandonment of hogans where a death occurs, information should be obtained from a local informant before deserted hogans are entered or studied.

Anglo

In addition to the Navajo sites, several different types of Anglo sites exist at Wupatki.

The earliest record of actual Anglo occupation at Wupatki was discovered during the excavation of Wupatki Pueblo in 1933. C. M. Schulz, a pioneer sheep owner, cleared out two rooms, probably Rooms 4 and 7, for his herders to use in the 1880's (Gilman and Thornton 1976:7). Schulz

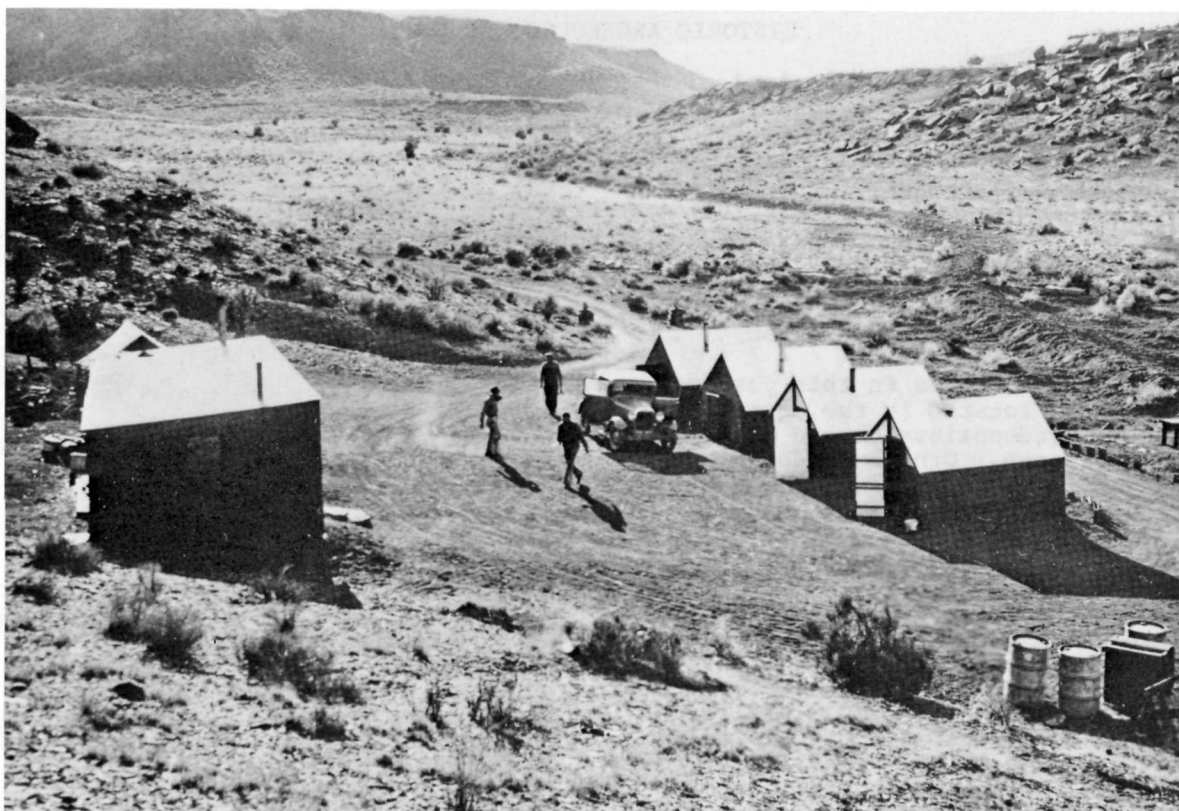


Figure 4. Civil Works Administration camp, NA14,582.

also built a wall as a windbreak between the north and south sections of the ruin. These "improvements" have been retained in part.

The next Anglo modification at Wupatki was probably the Lost Padre Mine claimed by Ben Doney on the east side of Doney Mountain in 1922. The claim document was found by Harold S. Colton (1940:17) and is preserved in the archives of the Museum of Northern Arizona (Wupatki Collection n.d.). According to John Wise (1976), Superintendent at Wupatki, the mine was at one time filled and the tailings were removed. It is possible that the mine could still be located and recorded.

The 1930's saw the construction of several sites which are now in ruins and all but forgotten. Two of these are the camp sites which were used by crews of the Museum of Northern Arizona and the Civil Works Administration in 1933-34 during the excavations at Wupatki Pueblo. The MNA camp was approximately 30 m. west of the present visitor center at the Monument. No trace remains of this camp. A second camp in operation was established by the C.W.A. on

December 15, 1933, and abandoned April 12, 1934 (Colton 1933c:12 and 1934:17). The camp consisted of at least six portable houses supplied by the Museum and a 12 ft. by 36 ft. Wooden mess kitchen (Figure 4). Some men were also lodged in Rooms 35, 36 and 44 of the ruin itself (Colton 1933c:12). The site is located down the wash and around a ridge from the ball court. Thus it was out of sight of the ruin and protected from prevailing winds. Stone foundations from the portable houses, discarded masonry from the Wupatki excavation, historic trash and discarded pottery remain on the site which has been designated as NA14,582. The kitchen building was not dismantled immediately with the rest of the camp but provided storage for the Monument.

The first ranger at the Monument, James Brewer, and his wife, Sallie, lived for two years in Rooms 36 and 63 of Wupatki Pueblo (Brewer 1934a:70). Their modifications made during 1934 and 1935 have since been removed.

A trading post to serve the Navajos was established near Black Falls Crossing in 1935 (Mack 1968). The post served a generation of Navajo

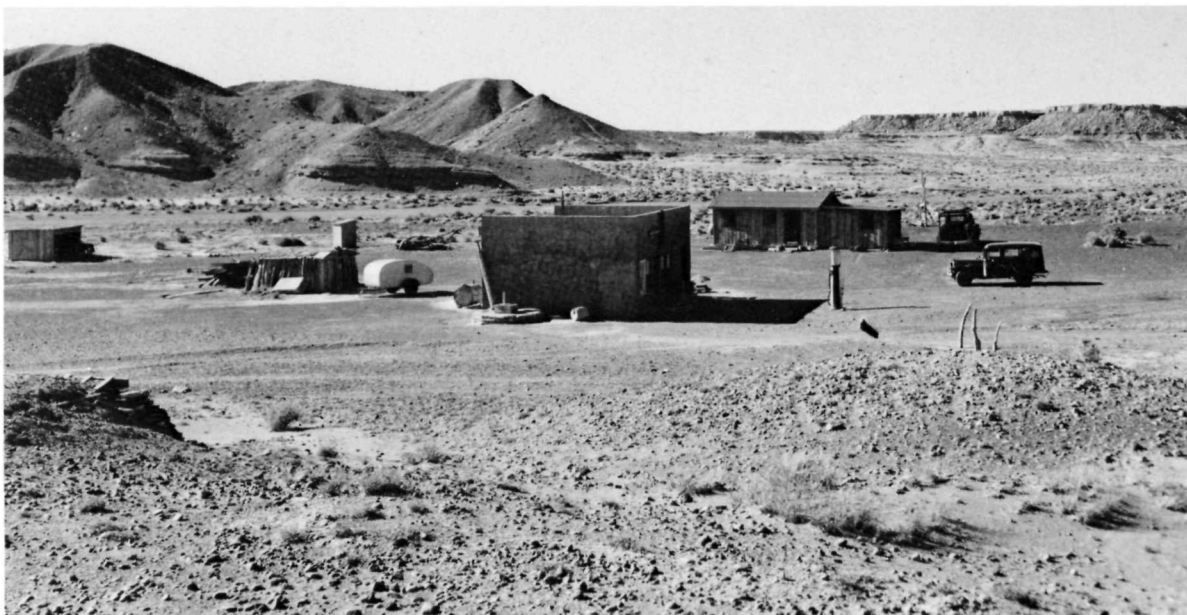


Figure 5. Black Falls Trading Post, NA14,583.

residents in the area and was torn down in 1964. A 1956 photograph (Figure 5) shows six structures at the post: a house, the store itself, a garage, storage shed, privy and a cellar dug into a nearby bank. Surface indications remain for all of these structures at the site designated as NA14,583. Historic trash deposits mark areas between the structural remains.

A final historic site discovered during field reconnaissance is one which could be misleading for future archeologists. In April, 1936, Ranger Brewer selected a site for the construction of a "ceremonial" hogan to be used in conjunction with a Navajo Arts and Crafts show which was to be held at the Monument. The location south and west of the $\frac{1}{4}$ section marker in Section 30 near Wupatki Pueblo was just over a ridge to the east of the C.W.A. camp (Figure 6). The hogan, which was finished in May, 1936, stood 14 feet high, 18 feet in diameter, used 150 tree trunks in its construction, took 457 man hours to complete and was said to be the "best hogan between Cameron and Leupp" by local Navajos (Brewer 1936b:345). In June, 1936, four ramadas were placed in a quadrangle east of the hogan (Brewer

1936c:423). Today only a ring of earth and a historic trash pile mark the spot of what was a successful arts and crafts show in 1936. The site has been designated as NA14,584.



Figure 6. Ceremonial hogan constructed for Navajo Arts and Crafts show, NA14,584.

Of the sites mentioned, only the Black Falls Trading Post and the legendary Doney Mine are well known to personnel at the Monument. Sites created in this century are and will be significant in the history of the development of the Monument and the relations between the government and the Navajo residents of the area.

RESEARCH SUGGESTIONS

The following research suggestions were developed during all phases of this project. A cost estimate was produced for the comprehensive site survey. This estimate only allows for location and precise recordation of sites; it does not include the report time necessary for an analysis of documentary material gathered on survey. The comprehensive site survey is deemed the most valuable recommendation because a synthesis of the Monument archaeology would be superficial without accurate knowledge of the type and exact location of each site. With a few exceptions, the research suggestions should not be implemented until the survey is complete. Several of the research possibilities were originally suggested by other authors; in each of these cases the original source of the suggestion is cited.

Prehistoric

1. Comprehensive site survey.

This survey would involve an on-foot coverage of the entire Monument. Each site, both prehistoric and historic, would be accurately plotted on U.S.G.S. 7.5 Minute Series maps, photographed and described. To insure accuracy in mapping and to aid in locating trails, site clusters and other features, a study of low-level aerial photographs would be an ancillary part of the survey. In addition, past

survey information would be incorporated and updated in the comprehensive survey. The United States Forest Service in Flagstaff presently has a map of the central portion of the Monument onto which has been projected the early site survey information (Pilles 1976); this map would be an invaluable aid in locating pre-recorded sites. The comprehensive survey would not include any testing, excavation or collection; all sites would be left in their original condition.

2. Definition of Sinagua-Anasazi-Cohonina boundary.

Following the completion of the comprehensive site survey, which would include the cultural identification of each site, a closer definition of cultural boundaries within the Monument would be facilitated.

3. Conduct a study of the pre-eruptive occupation.

Although there is little indication of a pre-eruptive occupation at Wupatki, there is a possibility that certain areas of the Monument, such as the springs and blowholes, were used by nearby people before the Sunset Crater eruption. This study should include the possible Archaic quarry sites along the Little Colorado River.

4. Extract a core sample from Cita-

Cost Estimate

Project Development Phase

Project Manager (1)	2 days @ \$84.00/day	\$168.00
Supervisory Archeologist (1)	5 days @ \$62.00/day	310.00
		<u>\$478.00</u>

Field Phase

Project Manager (1)	8 days @ \$84.00/day	\$ 672.00
Supervisory Archeologist (1)	356 days @ \$62.00/day	22,072.00
Assistant Archeologist (2)	356 days @ \$45.00/day	34,176.00
Supplies and Equipment	356 days @ \$10.00/day	3,560.00
Mileage	84 mi./day @ \$0.25/mi.	7,476.00
Field Living Expenses	356 days @ \$7.50/day	2,670.00
		<u>\$70,626.00</u>

Total Direct Costs		\$71,104.00
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Indirect Costs	48% of direct costs	<u>\$34,129.92</u>
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Total Project Costs		<u><u>\$105,233.92</u></u>
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del Sink (Schley 1962:8).

A study of the core sample would determine if the sink held water prehistorically (doubtful). Also, paleoenvironmental and geochronological data could be obtained.

5. Conduct a burial restudy.

The majority of the burials excavated at the Monument are from Wupatki Pueblo. Stanislawski (1963) devotes a section in his dissertation to these burials, but his discussion is mostly limited to the cultural attributes of the burials, such as grave offerings and burial position. The burials should be restudied by a physical anthropologist to more closely analyze the living conditions of the Wupatki inhabitants. A restudy of the burials would determine the life span and general health conditions of the people; it could also verify the cultural affiliation of the Wupatki residents.

6. Obtain pollen and flotation samples from unexcavated sites.

There has been a great deal of speculation about the prehistoric environment at Wupatki. Pollen and flotation samples from undisturbed ruins would clarify whether or not the Wupatki region once supported a different or more dense vegetation cover.

7. Make maps for inclusion in the stabilization reports showing the exact location of stabilization work.

Some of the stabilization reports are very ponderous, and it is difficult to retrieve information from them. It would greatly facilitate future research and stabilization projects if a coded map was included in each stabilization report.

8. Excavate NA2795 (Figure 8).

This site is located about 400 feet east of Clyde Peshlakai's stone hogan. The site is a fine example of Kayenta basalt construction, and display of the site would give visitors an idea of the variety of architecture present at the Monument.

9. Re-excavate NA1754 and make into an exhibit because it is unique (U.S.D.I. 1956a:153).

This multi-component site near Heiser Spring was excavated in September, 1931, by the Museum of Northern Arizona. The site consists of a kiva, two pit houses and a 3-room surface structure. The field notes for the excavation suggest that all of the surface rooms were used as granaries. However, Room 2 contains a firepit, and the room may have also been utilized as a habitation. Stratification at the site indicates relatively long-term occupation with different building periods representing at least one re-occupation. Both Kayenta and Sinagua architecture are present.

10. Complete trenching around Nalakihi (King 1949:11).

The excavation map in King's report indicates that there is a good possibility of undisturbed remains, particularly cists and burials, outside of the areas trenched during the 1933-34 excavation.

Navajo

1. Obtain an oral history of the Navajo at Wupatki, including individual biographies of the herders (essentially an update of Euler 1949).

As acculturation of the Navajo continues, it is essential that an oral history of these people be obtained before they all leave the Wupatki area. A tremendous amount of ethnohistorical data could be lost if this opportunity is overlooked.

2. Conduct a study of settlement patterns (revealed by oral history and intensive survey) in relation to season and carrying capacity of the land; also, study "outfit" patterns and spatial relations.

This study would be in conjunction with the previously mentioned suggestion. The Navajo settlement at Wupatki is a prime research topic for an economic anthropologist studying land use.

3. Investigate the abandonment of hogans - seasonal vs. death, etc.

There is a number of extant hogans at Wupatki, and dates of abandonment can be obtained for several of these structures. It would be enlightening to determine the causes of

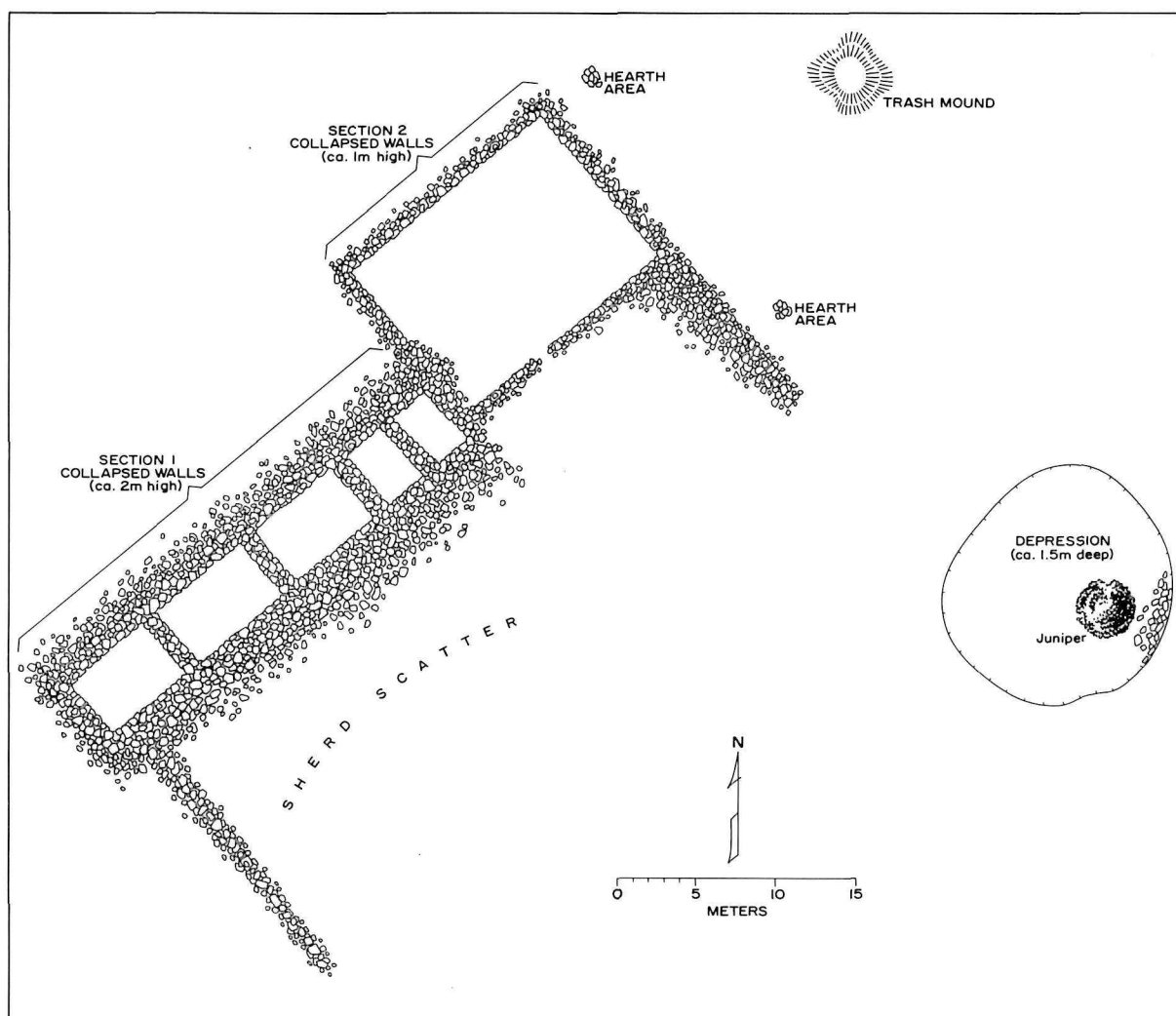


Figure 7. Plan view, NA2795.

abandonment of these hogans. Also, a study of the rates of decay and artifacts left behind in hogans deserted for different reasons would definitely aid studies of Navajo archeology in other regions.

4. Locate and identify the original Peshlakai settlement near Black Point.

Although this early Navajo settlement is situated outside of the Monument boundaries, it is important for future research purposes to accurately locate the site before all traces of it disappear.

Hopi

1. Locate, identify and map the various trails through the Wupatki area.

Using aerial photography, particularly infra-red techniques, it should be possible to locate old Hopi trails at Wupatki. One of the known trails is a trade route between Hopi and Havasupai which runs through the northern part of the Wupatki Basin (Euler 1949:12). Also, Colton (1964:93-94) mentions a trail between Oraibi and Sunset Crater which was used for ceremonial purposes.

Anglo

1. Locate and map the various mines of Ben Doney.

Old maps of the Wupatki vicinity indicate several locations for Doney's mines, and it is known that he mined in more than one location. It would be of interest to local historians to accurately locate these mines.

2. Map and record the Black Falls Trading Post (various locations) and write a detailed history of its operation.

The Black Falls Trading Post played a significant role in the recent history of Wupatki, and it should be included in any synthesis of the area. This study should incorporate sub-surface testing; if the cultural deposits are significant, the site should be excavated.

3. Collect an oral history about the area from former residents and frequent visitors.

As it is now over 50 years since Wupatki became a national monument, it would be quite pertinent to obtain the recorded recollections of individuals that were in the area during the early years of monument status. An oral history could be assembled by interviewing former rangers, residents of Black Falls Trading Post, members of the early archeological expeditions and several other individuals. Although the interpretive focus at Wupatki is primarily archeological, the Monument has had a fascinating recent history which should not be ignored.

ANNOTATED BIBLIOGRAPHY

The following bibliography was compiled from three primary sources: the libraries of the Museum of Northern Arizona, Wupatki National Monument and Northern Arizona University. The bibliography includes all available references dealing with the Monument and surrounding area and is intended to be as comprehensive as possible. The sources listed include scientific and popular references concerning all aspects of the Monument and the prehistoric cultures in the region.

Anonymous

- 1961 You'll Find These Ancient "Apartments" Just 30 Miles North of Flagstaff: Wupatki National Monument. Sunset, Vol. 127, No. 4.

Very brief description of ruins and their history and directions to Wupatki from Flagstaff.

Atkeson, Ray

- 1950 Wupatki National Monument. Lincoln-Mercury Times, Vol. 2, No. 3, p. 5.

Short history of the ruins.

Barrett, Samuel A.

- 1927 Reconnaissance of the Citadel Group of Pueblo Ruins in Arizona. Yearbook of the Public Museum of the City of Milwaukee, Vol. 6, pp. 7-58.

In the summer of 1923, the Milwaukee Public Museum conducted a reconnaissance survey and made collections at the Citadel and surrounding area in hopes of preserving and developing the area in the form of a national monument (the Citadel Group became a part of Wupatki National Monument on December 9, 1924). Reports on condition and architectural details of 25 major structures and many minor structures, including small enclosures, terraces and petroglyphs.

Bartlett, Katherine

- 1933 Pueblo Milling Stones of the Flagstaff Region and Their Relation to Others in the Southwest. Museum of Northern Arizona Bulletin, No. 3.

Detailed description of the types of milling stones recovered from archeological sites northeast of Flagstaff during the 1931-32 expeditions of Lyndon L. Hargrave. Illustrated with sketches and photographs. Two types of metates are described: those with a troughed or grooved surface and those with a flat, plain surface. Manos associated with the metates are variations of one type: rectangular shape with a grinding surface on one side only. Modern Hopi manos and metates are also described and comparisons are made with the prehistoric types. A developmental sequence of metates is hypothesized.

- 1934 The Material Culture of Pueblo II in the San Francisco Mountains, Arizona. Museum of Northern Arizona Bulletin, No. 7.

Report on artifacts recovered during the Museum's 1930-32 excavations of 100 Pueblo II sites in the San Francisco Mountain region: lithics, wood, bone, basketry, cordage, textiles, ceramics, shell and other ornaments, paints and pigments, foods, petroglyphs, burials and burial offerings.

- 1939 A Prehistoric "Mine" of Red Argillite, Resembling Pipestone, Near Del Rio, Arizona. Museum Notes, Vol. 11, No. 12, pp. 75-78.
- Probable sources of Wupatki argillite (mined A.D. 900-1400) is located near Del Rio, north of Prescott. The mine is composed of three or four small, shallow pits dug into a layer of red argillite found in the Mazatzal Quartzite, a deposit of Precambrian age. The Del Rio argillite closely resembles the catlinite or pipestone utilized in the Midwest. The mine was an important source of raw material for ornaments, the most unusual of which are lip, nose and ear plugs.

- 1943 A Primitive Stone Industry of the Little Colorado Valley, Arizona. American Antiquity, Vol. 8, No. 3, pp. 266-268.
- Analysis of the Tolchaco focus, a possible Archaic tool tradition along the Little Colorado. The Tolchaco sites are quarry areas and workshops. The cultural affinity of these sites has not been fully clarified.

Beaty, Janice J.

- 1964 Land Rush to Wupatki. Desert Magazine, Vol. 27, No. 5, pp. 26-27.
- Reconstructs the arrival of the Hohokam, Anasazi, Mogollon and Cohonina to join the Sinagua at Wupatki after the eruption of Sunset Crater.
- 1966 The Rise and Fall of Wupatki. Pacific Discovery, Vol. 19, No. 1, pp. 2-7.
- General history of the settlement and abandonment of Wupatki. Includes a description and photographs of the ruins.

Bengelsdorf, Irving S.

- 1963 Old Indian Pueblos had Air Conditioning. Los Angeles Times, July 16.
- A brief report on the meteorological and geological studies of the Wupatki blowhole system conducted by the Rand Corporation. The blowholes are considered to be different openings to an extensive underground maze of small caves and fissures. The natural labyrinth is virtually inaccessible to investigation and reveals its presence only by the intake and subsequent expulsion of cool air. This interpretation was somewhat altered by later studies (Cave Research Foundation 1976).

Bird, Milo

- 1970 Ruins of Tall House (Wupatki). Desert Magazine, Vol. 33, No. 5, pp. 32-33.
- Speculations about the life of the people that inhabited Wupatki Pueblo.

Bradley, Zorro A.

- 1959 Three Prehistoric Farm Structures at Wupatki National Monument. Plateau, Vol. 32, No. 1, pp. 12-22.
- One of the few publications on the excavation of small structures associated with village sites at Wupatki. NA5701, NA5702 and NA6301: shallow, rock lined pits with little artifactual material; probable granaries or farm shelters. Includes comparisons with similar structures in Flagstaff area.

Brady, Lionel F.

- 1935 Cheirotherium Footprint at Wupatki. Southwestern Monuments Monthly Report, September, p. 231.

A weathered natural cast of the left hind foot palm print of a large reptile was found in the Moenkopi Formation near Wupatki. The entire length of the original imprint (on the basis of comparison with Museum specimens) would have been over 27 cm., considerably larger than the largest of the species of this genus from the Bunker Sandstone of Europe.

Breed, William J.

- 1969 A Pliocene River Channel in Wupatki National Monument, Arizona. Journal of the Arizona Academy of Sciences, Vol. 5, No. 3, pp. 177-181.

From aerial photographs of the Monument an anomalous river channel near Doney Crater appeared to be significantly older than many of the features of the area. The sequence of events postulated is: 1) formation of the Black Point segment of the East Kaibab monocline; 2) faulting; 3) possible eruption of older basalts; 4) development of Black Point surfaces, establishment of drainage that formed Doney Channel and superposition of this drainage into the Kaibab Formation; and, 5) eruption of lavas Stage IB through Stage IV and establishment of modern drainage relationships in the area.

- 1976 Molten Rock and Trembling Earth: The Story of a Landscape Evolving. Plateau, Vol. 49, No. 2, pp. 2-13.

Discussion of the geologic history of Sunset Crater and Wupatki, with descriptions of the various geologic features found at both Monuments.

Breternitz, David A.

- 1957 1956 Excavations near Flagstaff: Part I. Plateau, Vol. 30, No. 1, pp. 22-30.

1956 Excavations near Flagstaff: Part II. Plateau, Vol. 30, No. 2, pp. 43-54.

Reports on excavations of pre-eruptive Sinagua sites: NA1531, NA4375, NA5903, NA5971 and NA5947A.

- 1962 Review of the Archaeology of the Flagstaff Area in the Light of Recent Tree-Ring Studies. Paper read at the 27th Annual Meeting of the Society for American Archaeology, May 3. Tucson.

Based on dated timbers from a pit house in Medicine Valley, the date for the eruption of Sunset Crater is thought to be A.D. 1066-67 (later revision dates the eruption as occurring between the growing seasons of A.D. 1064 and 1065).

- 1963 Excavation of Some Pre-Sunset Eruption Pithouses near Flagstaff, Arizona. Plateau, Vol. 35, No. 4, pp. 135-143.

Report on the excavation of two Pueblo I pit houses at NA1125 on O'Leary Mesa and two Sinagua timbered pit houses of the Rio de Flag Phase at NA1904.

- 1966 An Appraisal of Tree-Ring Dated Pottery in the Southwest. Anthropological Papers of the University of Arizona, No. 10, pp. 13, 74-75, 99-100, 104.

Contains series of tree-ring dates identified as to provenience. Breternitz dates Flagstaff B/w at 1085-1275 and Wupatki B/w at 1125-1300. Wupatki B/w, therefore, does not replace Flagstaff B/w but is instead contemporaneous with the later part of the Flagstaff B/w time span. Wupatki B/w is described as a Kayenta Anasazi Late Pueblo III B/w. On the basis of ceramic as well as tree-ring data, the occupation of Wupatki Pueblo began as early as 1085 with the major habitation occurring during the last 75 years of the 12th century.

- 1967 The Eruption(s) of Sunset Crater: Dating and Effects. Plateau, Vol. 40, No. 2, pp. 72-76.

With the evidence of burned pit house NA1238, Breternitz suggests the date A.D. 1066-67 for the eruption instead of Smiley's A.D. 1064-65 (Smiley's dates are supported by local geologists). A.D. Douglass has suggested that Sunset Crater actually erupted twice, a lesser eruption in 1065 and a major eruption in 1067. A review of geological studies, dendrochronological interpretations and archeological evidence is needed.

Brewer, James W.

- 1935a A Museum Prospectus for Wupatki National Monument. Southwestern Monuments Monthly Report, February, pp. 74-79.

A proposal for the type of museum which should ideally exist at Wupatki and suggestions for the content of its rooms and information to be displayed. Includes sketch plan of Wupatki Pueblo.

- 1935b Sorrow Among the Navajos. Southwestern Monuments Monthly Report, January, p. 53.

Ethnological notes on Navajos living at Wupatki - customs after the death of a person.

- 1935c Wupatki Petroglyphs. Southwestern Monuments Monthly Report, Supplement (August), pp. 129-132.

Sketches and short explanations of petroglyphs.

- 1936a Date Seeds at Wupatki. Southwestern Monuments Monthly Report, February, pp. 131-133.

Date seeds were found in the midden at the base of the low westernmost wall of Wupatki Pueblo. There is no other evidence of a date culture in prehistoric times. Date seeds from Europe were distributed by Spanish priests during the 16th century. Whether prehistoric or historic, the seeds at Wupatki Pueblo are the product of trade. Cabeza de Vaca, in his wanderings through Sonora in the late 1800's, observed Indians who cultivated maize and traded parrot feathers for green stones with peoples to the north. Their houses were made of the date palm leaves which grow in that region.

- 1936b An Interesting Room at Wupatki. Southwestern Monuments Monthly Report, Supplement (May), pp. 401-402.

A description of Room 43. Ventilation was ingeniously provided for this inside room by a natural crack in the lower part of the Moenkopi Sandstone which forms the west wall.

- 1936c Kishmus Party. Southwestern Monuments Monthly Report, December, pp. 436-437.

Report on the Christmas party held by the Brewers for the neighboring Navajos at Wupatki National Monument.

Bullard, Jean V.

- 1953 We Live at Wupatki. Denver Post, Empire Magazine, March 8.

One woman's story of her life in a trailer with her husband and two children as one of the three non-Navajo families living at the Monument. Clyde Peshlakai, age 70 at the time, and his wife, Katharine, 30, lived nearby.

Carothers, Steven W. and Nancy H. Goldberg

- 1976 Life after the Rain of Fire: The Biology of the Wupatki and Sunset Crater Region. Plateau, Vol. 49, No. 2, pp. 14-21

Description of life zones at the two Monuments, including a discussion of some of the plants and animals found there.

Cave Research Foundation

- 1976 Wupatki National Monument Earth Cracks. Cave Research Foundation, Yellow Springs, Ohio.

The most recent study of the earth cracks at the Monument. The conclusion is that the earth cracks are areas of displacement along fault zones, rather than components of a cavern system.

Caywood, Louis R.

- 1935 About Wupatki. Southwestern Monuments Monthly Report, October, p. 294.

Informal letter describes recent activity at Wupatki, including visits of Harold S. Colton, Emil Haury, John C. McGregor and Charles Amsden, and reactions to the suggestion of Haury that the "bowl" may be a ball court similar to but half as big as the one at Snaketown.

Childs, Orlo E.

- 1948 Geomorphology of the Valley of the Little Colorado River, Arizona. Bulletin of the Geological Society of America, Vol. 59.

Description of the formation, stratigraphy and structure of the Little Colorado River Valley between Leupp and Cameron.

Clarke, J. C.

- 1928 Excavation at Wupatki. Southwestern Monuments Monthly Report, January.

Source not available.

- 1931 Vandalism at Wupatki. Southwestern Monuments Monthly Report, July.

Source not available.

Coconino Sun (Reprint)

- 1936a Woollcott at Wupatki. Southwestern Monuments Monthly Report, February, pp. 136-137.

Celebrated author, critic and radio broadcaster, Alexander Woollcott, was the guest of Custodian and Mrs. James Brewer one weekend at Wupatki. The Brewers lived in the second story of the main pueblo at Wupatki.

- 1936b First Show by Navajos a Success. Southwestern Monuments Monthly Report, June, pp. 488-489.

Report on Navajo crafts exhibit and sale at the Monument. A hogan was also built on the grounds and utilized as a typical sweathouse.

Colton, Harold S.

- 1918 The Geography of Certain Ruins near the San Francisco Mountains, Arizona. Geographical Society of Philadelphia Bulletin, Vol. 16, No. 2, pp. 37-60.

Colton is concerned with reconstructing the physical and organic environment of the people who inhabited the small house ruins within 200 square miles: from the San Francisco Peaks south to Walnut Canyon and from Flagstaff east to Turkey Tank and Winona. The construction, habitation and abandonment of the structures is correlated with the dry and wet periods observed in the prehistoric climatic cycle. Colton concludes that the Pueblo Indian belongs to the Upper Sonoran Life Zone and that his past distribution into the transition of yellow pine zone may have been as a casual migrant or a factor of the climatic cycle - a hypothesis verifiable only by further archeological work which will establish an exact chronology of the different classes of small house ruins and correlations between one part of the Pueblo region and another.

- 1922 Geographical Distribution of Potsherds in the San Francisco Mountains. International Congress of Americanists, 20th Session, Vol. 2, pp. 119-121.

Preliminary observations on pottery distribution. Here Colton places the sherds from Heiser Spring Tower House and the Citadel in the "Kayenta" Complex.

- 1929 Sunset Crater and the Lava Beds. Museum Notes, Vol. 2, No. 4, pp. 1-3.

Describes the volcanic phenomena of the Sunset Crater region and suggests a general sequence of (1) lava flow, (2) ash fall and (3) more lava flow.

- 1930a A Brief Survey of the Early Expeditions into Northern Arizona. Museum Notes, Vol. 2, No. 9, p. 2.

Records the discovery of Wupatki by Lt. Sitgreaves in 1851.

- 1930b The Citadel. Museum Notes, Vol. 2, No. 8, pp. 1-4.

Describes the location of Citadel pueblo and the surrounding ruins in the area. Includes map and directions for visitors.

- 1932a Sunset Crater. The Effect of a Volcanic Eruption on an Ancient Pueblo People. Geographic Review, Vol. 24, No. 4, pp. 582-590.

The eruption of Sunset Crater covered an area of 800 square miles between Flagstaff and the Little Colorado River with a black, basaltic sand or ash layer to a depth of a few inches to a foot or more. This cover appears to have functioned as a mulch to conserve moisture and make agriculture possible. After the eruption, the cinder-covered area was the scene of a major population increase. Distributions of pre- and post-eruptive sites are mapped. Over a period of a few hundred years westerly winds gradually removed the fine cinder cover, piling the sand into dunes too deep for agriculture or into canyons to be carried away by intermittent streams. By A.D. 1200, the area was virtually abandoned. Colton also hints of survey methods dependent

on uprooted trees to find pre-eruptive sites. Maps indicate a minimal density of pre-eruptive sites and a considerable density of post-eruptive sites north and east of Sunset Crater.

- 1932b A Survey of Prehistoric Sites in the Region of Flagstaff, Arizona. United States Bureau of American Ethnology, Bulletin 104, pp. 33-41.

A general survey of the structural remains in the Flagstaff area with brief descriptions and sketches. In 1916, Colton began the continuation of the survey and reconnaissance started by Fewkes in 1894. It was observed that a few miles east of the San Francisco Peaks sites were much more abundant than in other regions of similar altitude, rainfall, drainage and soil conditions. This is the area on the periphery of the ashfall area where the cinder cover is finest and maize agriculture most productive.

- 1933a Wupatki, The Tall House. Museum Notes, Vol. 5, No. 11, pp. 61-64.

A brief description and history of Wupatki, noting its establishment as a National Monument in 1924 under the direction of J. C. Clarke and its subjection to pothunting; contains a list of the items in the collection of Ben Doney.

- 1933b Archaeological Report on Excavation at Wupatki. Southwestern Monuments Monthly Report, April, pp. 14-17.

Duplicates "Wupatki, the Tall House," Museum Notes. Contains a brief bibliography on Wupatki.

- 1933c Pueblo II in the San Francisco Mountains, Arizona. Museum of Northern Arizona Bulletin, No. 4, pp. 1-14.

Pueblo II is defined. Data from field seasons 1930, 1931 and 1932 are summarized and the distribution of 648 Pueblo II sites near the San Francisco Peaks is mapped.

- 1933d A Proposed Outline of Work for the C.C.C. on the Wupatki National Monument. Ms. on file at Wupatki National Monument.

Rough outline of the proposed Civilian Conservation Corps excavation of Wupatki Pueblo and ancillary projects.

- 1934a Archaeological Report on Excavation at Wupatki. Southwestern Monuments Monthly Report, February, pp. 2-5.

Contains report of James W. Brewer, Jr., Ten Broeck Williamson, Richard Van Valkenburgh and J. C. Fisher Motz on Civil Works Administration Project 10 with a description of architecture at Wupatki. There was remarkable preservation of organic materials, especially textiles and wooden objects, due to the hanging walls of sandstone which support some of the rooms and keep out moisture. Four parrot burials were also excavated and it is interesting that, according to a Hopi informant, the site was the traditional stopping place of the Parrot Clan of the Zuni on their way from the Grand Canyon to the Zuni Valley, New Mexico. There are also Project 4 reports: Dale S. King on Nalakihi excavation; Robert L. Harris on a topographic survey of the region about Tewelanki to provide a map on which to locate all prehistoric sites in the Citadel area; and, Charles Steen on an archeological survey of the Citadel, checking 33 previously recorded sites and locating 64 new sites.

- 1934b Archaeological Report on Wupatki. Southwestern Monuments Monthly Report, March, pp. 16-19.

Appends general report of Dale S. King on progress of F-68 Civil Works Administration Project 34, excavations at Tewalanki (the Citadel). Actually, confined solely to excavation and partial restoration of Nalakihi (NA358). Survey of the area has boosted the number of new sites beyond 150 and made 20 more sherd collections. Several burials were excavated and the artifact count reached 200. Also, report on Project 10 (Wupatki Pueblo) by James W. Brewer, Jr., A. T. Williamson and J. C. Fisher Motz.

- 1935a Stages in Northern Arizona Prehistory. Museum Notes, Vol. 8, No. 1, pp. 1-7.

Colton explains the origin and principles of the 1927 Pecos Chronology for Southwestern Archaeology, based on pottery types. A comprehensive table records the diagnostic culture traits and indexes pottery types for the prehistoric stages in the San Francisco Mountains and Hopi area, beginning with Basketmaker III (A.D. 500-700) and complete through Pueblo V (A.D. 1600-1900). Wupatki Pueblo is placed within Pueblo III (A.D. 1100-1300).

- 1935b Report on Archaeological Activities of the Museum of Northern Arizona in 1934. American Antiquity, Vol. 1, No. 2, p. 51.

Brief report on the Museum of Northern Arizona and Civil Works Administration excavation and repair of Wupatki and Nalakihi.

- 1936 The Rise and Fall of the Prehistoric Population of Northern Arizona. Science, Vol. 84, No. 2181, pp. 337-343.

Population decreases and a high rate of infant mortality after A.D. 1100 resulted in the abandonment of many of the pueblos and the migration of peoples. Colton suggests these population deficiencies may be due to bad sanitation in the pueblo villages and not, as generally thought, due to drought or dietary deficiency.

- 1937 The Eruption of Sunset Crater as an Eye Witness Might have Observed It. Museum Notes, Vol. 10, No. 4, pp. 9-12.

Based on accounts of eye witnesses of other volcanic eruptions and on the results of the Museum's archeological surveys, excavations and tree-ring studies, Colton reconstructs the scene at the time of the eruption.

- 1938a The Exploration of Limestone Solution Cracks. Museum Notes, Vol. 10, No. 10, pp. 29-32.

Summarizes the history of the exploration of Kaibab limestone fissures in the Flagstaff area, including Doney Fissure, Lomaki Crack and Sipapu Cavern at Wupatki National Monument.

- 1938b The Economic Geography of the Winona Phase. Southwestern Lore, Vol. 3, No. 4, pp. 64-66.

Summarizes the geological and climatic activity which enabled a great population increase after A.D. 1064 and which may account for a population decrease after A.D. 1150.

- 1939 Prehistoric Cultural Units and their Relationships in Northern Arizona. Museum of Northern Arizona Bulletin, No. 17.

The first attempt to utilize the Gladwin System to establish a chronology for Northern Arizona. Wupatki (NA405) is placed within the Elden Focus of the Sinagua Branch, Mogollon Root. Diagnostic traits define a Sinagua Branch; its geographic location is the country between the San Francisco Mountains and the middle Little Colorado River.

- 1941 Winona and Ridge Ruin: Part II: Technology and Taxonomy of the Pottery. Museum of Northern Arizona Bulletin, No. 19.
- Preliminary analysis of the ceramic technology of the Pueblo II-III sites near Winona Station, excavated by the Museum of Northern Arizona from 1936 to 1939.
- 1942 Archaeology and the Reconstruction of History. American Antiquity, Vol. 8, No. 1, pp. 33-40.
- The problems of reconstructing the nature of Kayenta-Sinagua interaction, A.D. 900-1100, are discussed.
- 1945a Sunset Crater. Plateau, Vol. 18, No. 1, pp. 7-14.
- A description of the volcanic activity which produced Sunset Crater. Estimates show that 1/2 billion tons of basalt contributed to the cone. Almost as much fell as ash, and the lava flows contained over one million tons. The activity probably lasted four to six months. Sunset Crater plays an important part in Hopi mythology.
- 1945b A Revision of the Date of Eruption of Sunset Crater. Southwestern Journal of Anthropology, Vol. 1, No. 3, pp. 345-355.
- On the basis of ceramic evidence and new tree-ring dates on beams from Wupatki Pueblo, Colton convincingly argues for a revision of McGregor's (1936) date for the eruption of Sunset Crater. He considers a date between A.D. 1046 and 1071 (probably around A.D. 1070) to be more accurate than the previous A.D. 875 to 910.
- 1946 The Sinagua. Museum of Northern Arizona Bulletin, No. 22.
- A general survey of the archeology of the Flagstaff region, a frontier zone for at least three cultures. Presents the results of the Museum of Northern Arizona's 1933-1934 field excavations at Wupatki under the direction of Lyndon L. Hargrave. Includes ceramic analysis and tree-ring data. Colton states that the ruin was occupied for a brief 75 year period during the span of Flagstaff B/W pottery and abandoned shortly after this type was replaced by Wupatki B/W. The ruin was first settled A.D. 1120-1130, by Anasazi people, Klethla Focus, Kayenta Branch, and followed by a Sinagua settlement (Elden Focus) at A.D. 1137, when the main construction of the pueblo began. The pueblo was abandoned between A.D. 1200 and 1225. There is some non-ceramic evidence that a Basketmaker II or III site underlies the amphitheater.
- Colton concludes with a detailed outline of the "classical" Sinagua. He uses Alameda Brownware utility pottery as the principal criterion of a Sinagua Branch occupation or component. At this time, it was not possible to assign the Sinagua to the Mogollon or any other root. Although contemporary with the Anasazi Basketmaker III (A.D. 500-700) to the north, the Sinagua of the San Francisco Mountains are defined as a separate branch on the basis of pit house and pottery remains. The branch remained intact until the eruption of Sunset Crater, followed by the arrival of new peoples - Hohokam and Anasazi - and a period of blending of cultures. By A.D. 1125, a uniform Sinagua culture with pueblo architecture had developed which persisted until about A.D. 1275.
- 1947 A Revised Date for Sunset Crater. Geographical Review, Vol. 37, No. 1, p. 144.
- The correlation of dated timbers associated with certain pottery types found above and below the ash layers with dated timbers from sites with similar pottery complexes outside the ash fall area yielded new dates of A.D. 1066-1070 for the eruption of Sunset Crater (since revised).

- 1949 The Prehistoric Population of the Flagstaff Area. Plateau, Vol. 22, No. 2, pp. 21-25.
- Population estimates for the period A.D. 600 to 1350 based on habitation sites and ceramic and tree-ring dating. The population following the eruption of Sunset Crater is noted.
- 1955a Check List of Southwestern Pottery Types. Museum of Northern Arizona Ceramic Series, No. 2.
- A guide to the classification of Southwestern pottery types listing reference sources for each type.
- 1955b Pottery Types of the Southwest: Wares 8A, 8B, 9A, 9B. Museum of Northern Arizona Ceramic Series, No. 3A.
- Pottery types and their distribution are defined.
- 1956a Names at Wupatki. Plateau, Vol. 29, No. 1, pp. 22-24.
- Explains the derivations of the site names. Wupatki and Wukoki were named in 1921 by J. C. Clarke; Fewkes had previously known Wupatki as Wukoki which means "big house" and may be more appropriate than Wupatki ("long house").
- 1956b Pottery Types of the Southwest: Wares 5A, 5B, 6A, 6B, 7A, 7B, 7C. Museum of Northern Arizona Ceramic Series, No. 3C.
- Pottery types and their distribution are defined.
- 1958 Precipitation about the San Francisco Peaks, Arizona. Museum of Northern Arizona Technical Series, No. 2.
- Seasonal and annual precipitation is recorded for 17 stations. Plant zones are briefly described. Wupatki data for 1932-1955 are available.
- 1960 Black Sand. University of New Mexico Press, Albuquerque.
- Presents a general synthesis of the prehistory of the 800 square mile cinder-covered area northeast of Flagstaff; summarizes 42 years of archeological work. Includes brief discussions of dating, geology, petroglyphs, burials, agriculture, population problems; attempts to reconstruct the lifestyle of the prehistoric inhabitants.
- 1962 Archaeology of the Flagstaff Area. In Guidebook of the Mogollon Rim Region, East-Central Arizona. New Mexico Geological Society, 13th Field Conference, pp. 171-172.
- Brief summary of the physical conditions and human occupation of the area between the Little Colorado River and the San Francisco Peaks, both pre- and post-eruption of Sunset Crater. Detailed map of prehistoric sites.
- 1964 Principal Hopi Trails. Plateau, Vol. 36, No. 3, pp. 91-94.
- One of the major trails from the Hopi Mesas to the San Francisco Peaks leads west from Oraibi around Oraibi Butte into the valley of Dennebito Wash. The trail follows the wash and crosses the Little Colorado River just south of Black Falls. A stop was made at Heiser Spring and pahos were placed in the ice cave at Sunset Crater. From Sunset Crater the trail led to a spring on the side of the San Francisco Peaks.
- 1965 Experiments in Raising Corn in the Sunset Crater Ashfall Area East of Flagstaff, Arizona. Plateau, Vol. 37, No. 3, pp. 77-79.

Modern Hopi corn was planted over a wide area covered with volcanic ash from Sunset Crater during the summers of 1931, 1932 and 1933. It was found that corn planted in oxidized and weathered volcanic ash at higher altitudes (Sunset Crater and Turkey Hill) did better than at Wupatki. It was again observed that corn that survived with a mulch did a little better than without a mulch.

- 1967 The Basaltic Cinder Cones and Lava Flows of the San Francisco Mountain Volcanic Field. Museum of Northern Arizona Bulletin, No. 10 (revised edition).

Colton classifies Sunset Crater as a Stage 5 cinder cone with Stage V lava flows and describes the volcanic activity surrounding the formation of the crater.

- 1968 Frontiers of the Sinagua. In Collected Papers in Honor of Lyndon Lane Hargrave, by Albert H. Schroeder (ed.). Museum of New Mexico Press, Santa Fe.

Natural barriers isolated the Sinagua on the west, south and east. The northern frontier between the Kayenta and Sinagua was an imaginary line during PII and PIII times, a period of 300 years during which the cultures mixed. The results of the ceramic analysis of 22,537 sherds from Wupatki Pueblo: date to PIII (A.D. 1135-1220), 25% Kayenta, 70% Sinagua.

Colton, Harold S., and Frank C. Baxter

- 1932 Days in the Painted Desert and the San Francisco Mountains. Museum of Northern Arizona Bulletin, No. 2.

A guide book which plans 27 trips of historical, archeological and geological interest within the area with brief descriptions of the sites to be observed.

Colton, Harold S., and Lyndon L. Hargrave

- 1937 Handbook of Northern Arizona Pottery Wares. Museum of Northern Arizona Bulletin, No. 11.

Basic guide to pottery types.

Colton, Mary-Russell F., Harold S. Colton and Edmund Nequatewa

- 1932 Hopi Legends of the Sunset Crater Region. Museum Notes, Vol. 5, No. 4, pp. 17-23.

The stories of Yaponcha (the Wind God) and the Kana-a kachinas of Sunset Crater are recorded.

Coscia, Phil

- 1966 Wupatki National Monument. Western Gateways, Vol. 6, No. 3, pp. 14-15, 40.

Brief summary of the prehistoric occupation and ruins of Wupatki.

Cosner, Oliver J.

- 1960 Ground Water in the Wupatki and Sunset Crater National Monuments, Coconino County, Arizona. Prepared in cooperation with the National Park Service. Open file report, U.S. Geological Survey Ground Water Branch, Tucson.

Geological report on ground water investigations at the Monuments during the fall of 1954. The results of the field investigations indicated that adequate ground water supplies were available from

the Coconino Sandstone to supply the National Park Service. A well was drilled at the Monument headquarters in 1958 to a total depth of 904 feet.

Darton, Nelson H.

- 1910 A Reconnaissance of Parts of Northwestern New Mexico and Northern Arizona. U.S. Geological Survey Bulletin, No. 435.

Brief description of the "Leroux formation" (upper unit of the Chinle Formation) near Black Falls.

Dodge, Natt N. (compiler)

- 1940 Compiled Index, Southwestern Monuments Monthly Reports, April 1926 - December 1940, Inclusive. Southwestern Monuments Monthly Report, Supplement (December), p. 420.

Lists notes on Wupatki in Monthly Reports.

Dorsey, George A.

- 1903 Indians of the Southwest. Atchison, Topeka and Santa Fe Railway System.

Short, romanticized description of ruins and surrounding area.

Douglass, Andrew E.

- 1929 The Secret of the Southwest Solved by Talkative Tree Rings. National Geographic, Vol. 56, No. 6, pp. 736-770.

Explanation of tree-ring dating. Includes map of dated Southwestern ruins showing Wupatki construction dates as A.D. 1087-1197.

- 1935 Dating Pueblo Bonito and Other Ruins of the Southwest. National Geographic Society Contributed Technical Papers, Pueblo Bonito Series No. 1.

Gives brief history of establishment of Wupatki chronology. Table includes all dated Wupatki specimens (A.D. 1073-1205).

- 1938 Southwest Dated Ruins: V. Tree-Ring Bulletin, Vol. 5, No. 2, p. 11.

Tree-ring dates from 69 specimens range from A.D. 1073-1205 for Wupatki Pueblo.

Dozier, Edward P.

- 1965 Southwestern Social Units and Archaeology. American Antiquity, Vol. 31, No. 1, pp. 38-47.

A summary list of the recent types of social, political and ceremonial organizations reported in the ethnographic literature for the Southwest. Where social units are localized it is noted whether such units can be identified by architectural features (i.e., to aid the identification of such units in archeological sites).

Fewkes, Jesse Walter

- 1898 Archaeological Expedition to Arizona in 1895. Bureau of American Ethnology, 17th Annual Report, pp. 574-576.

Describes explorations of ruins in Tusayan and the Verde Valley. Fewkes was the first to note certain distinctions between the material culture north and south of the Little Colorado, notably the general absence of circular kivas in the south.

- 1900a Tusayan Migration Traditions. Bureau of American Ethnology, 19th Annual Report, pp. 573-633.
- Fragments of Hopi legendary history, collected at Walpi; recounts the origins and course of migrations of the different clans and the customs which they brought to the pueblo where their descendants now live. Suggests some parts of Hopi ceremonial life come from south, not north; need archeological identification of ancestral clan habitations.
- 1900b Pueblo Ruins near Flagstaff, Arizona. American Anthropologist (n.s.), Vol. 2, pp. 422-450.
- Detailed description of ruins near Black Falls. Fewkes identifies Ruin A, Group B as the Wukoki of the Hopi legends. These are the ruins now known as Wupatki and the ones exhibiting evidence of longest occupancy: surface plastering on interior walls and an abundance of wooden beams. The work of Fewkes is the first systematic work of any kind at the ruins. He made small collections, took photographs and surveyed the area several times.
- 1904a Two Summers' Work in Pueblo Ruins. Bureau of American Ethnology, 22nd Annual Report, Part I, pp. 17-195.
- Describes ruins and presents results of archeological field work on the Little Colorado River in the summer of 1896. Fewkes here calls Ruin A, Group B, Wukoki, the present name of a small ruin to the east of Wupatki and labels the present Wukoki, Wupatki.
- 1904b Cluster of Arizona Ruins which Should be Preserved. Records of the Past, Vol. III, Part I, pp. 2-19.
- Description of structures and surface collections, which include textiles and pottery; speculations concerning arrival of inhabitants and abandonment of pueblos.
- 1926a An Archaeological Collection from Young's Canyon, near Flagstaff, Arizona. Smithsonian Miscellaneous Collections, Vol. 77, No. 10.
- Artifact inventory and description of a collection made in the Wupatki area.
- 1926b Archaeological Studies in the Wupatki National Monument. Explorations and Field Work of the Smithsonian Institution in 1925.
- Preliminary descriptions of the ruins: the Citadel, Tcuaki (Snake House), Alaki (Horn House), Wukoki; with photographs. Fewkes defines two types of structures: the Citadel type and habitations which are described as "rectangular ruins of slabs of stone masonry erected on the rims of shallow canyons." Short description of pottery. He labels the northeastern Arizona culture area Tokonabi.

Gladwin, Harold S.

- 1943 A Review and Analysis of the Flagstaff Culture. Medallion Papers, No. 31. Gila Pueblo.
- A reanalysis of the archeology of the Flagstaff area with criticisms of the Museum of Northern Arizona's work. The confusion arises because Gladwin gives precedence to archeological evidence for dating over tree-ring dates. He believed masonry dwelling had replaced pit houses by A.D. 900-925 and that they were not contemporaneous. He apparently visualized the archeology of this area as peripheral Anasazi.
- 1944 Tree-Ring Analysis Problems of Dating I: The Medicine Valley Sites. Medallion Papers, No. 32. Gila Pueblo.

Gladwin questions the accuracy of tree-ring dating for sites and considers the problem with specific reference to Medicine Valley. He resolves all discrepancies by giving precedence to architectural and ceramic evidence over tree-ring dates. As a further source of confusion, he correlates tree-ring specimens with Lukachukai and Chaco composites rather than with the Flagstaff composite.

Green, Christine and William D. Sellers (eds.)

- 1964 Arizona Climate. University of Arizona Press, Tucson.

General climatological information by region plus specific data, year by year, for weather stations located throughout the state.

Green, Denise S.

- 1971 A Re-Evaluation of the Southwestern Ball-Court Theory. M.S. thesis, California State College, Hayward.

An inventory of Southwestern and Mesoamerican ball court sites; the sites are dated and their distribution mapped. The hypothesis that these structures may be ball courts is reasserted, but the exact nature of the game played is not conclusively established.

Guernsey, Samuel J.

- 1931 Explorations in Northeastern Arizona. Papers of the Peabody Museum of American Archaeology and Ethnology, Vol. 12, No. 1.

Major reference source for the excavation of Basketmaker II and III and Pueblo I sites at Kayenta, Chinle and Tsegi Canyon.

Gummerman, George J. and S. Alan Skinner

- 1968 A Synthesis of the Prehistory of the Central Little Colorado Valley, Arizona. American Antiquity, Vol. 33, No. 2, pp. 185-199.

1966 excavations by the Museum of Northern Arizona clarified a complex regional sequence beginning with a Clovis-Folsom horizon and ending in Pueblo IV. The area manifests an Anasazi-Mogollon amalgam which, by adaptation to its arid basin environment, produces a distinct subculture area.

Hack, John T.

- 1942 The Changing Physical Environment of the Hopi Indians of Arizona. Papers of the Peabody Museum of American Archaeology and Ethnology, Vol. 25, No. 1.

1935-39 excavations by the Peabody Museum at Awatovi contributed to an ecological study of a Hopi area over a period of 1000 years. This report of the geologist, Hack, is divided into six chapters: 1) present day physiography of the Hopi country, climate, vegetation and water supply; 2) Hopi people, population, economics and early history; 3) Hopi agriculture; 4) sand dunes as indicators of climatic change; 5) erosion and sedimentation; and 6) a discussion of how a changing environment affected the ancestors of the Hopi.

Hamilton, Mrs. I. C.

- 1941 Here We Sit in Brooklyn Moping. Arizona Highways, Vol. 17, No. 6, p. 49.

Letter describing experiences when lost and stuck near Wukoki.

Hargrave, Lyndon Lane

- 1930 Prehistoric Earth Lodges of the San Francisco Mountains. Museum Notes, Vol. 3, No. 5, pp. 1-4.
- Description of two types of pit houses found in Wupatki area.
- 1932 Guide to Forty Pottery Types from the Hopi Country and the San Francisco Mountains, Arizona. Museum of Northern Arizona Bulletin, No. 1.
- Pottery types are described, named and classified.
- 1933a A Review of Archaeological Activities in the San Francisco Mountain Region. Museum Notes, Vol. 5, No. 7, pp. 33-36.
- General account of the archeological investigations of the 1933 field party at Wupatki National Monument. Three rooms were restored and several others partially restored.
- 1933b Pueblo II Houses of the San Francisco Mountains, Arizona. Museum of Northern Arizona Bulletin, No. 4.
- Primarily a discussion of PII architecture in Medicine Valley and vicinity. Changes in architectural features are ascribed to a changing ecological environment. The development of masonry surface dwellings is an outgrowth of surface masonry granaries and the pit house was retained for ceremonial purposes in PIII.
- 1933c Archaeological Report on Excavation at Wupatki. Southwestern Monuments Monthly Report, October, pp. 19-21.
- Report on 1933 mapping, excavation and restoration at Wupatki stimulated by the increase in pothunting after the building and grading of the road. Geological and meteorological data, as well as collections of mammals, birds and reptiles, were obtained. Three hundred people visited Wupatki during the summer season. Hargrave considers the most impressive point about the Monument, besides its natural beauty and harmonious setting, is that the pueblo of Wupatki is entirely in the open and exposed to the elements at all times.
- 1933d The Museum of Northern Arizona Archaeological Expedition, 1933: Wupatki National Monument. Museum Notes, Vol. 6, No. 5, pp. 23-26.
- General report on Museum's excavations. A rectangular kiva or ceremonial room (Room 49) was discovered. A small ventilation opening was found in the outside wall of most first row rooms and many other architectural features were investigated. The most notable discovery was the large kiva-like structure with interior encircling masonry bench and enclosed by a high masonry wall. The structure resembles the great kivas of Chaco but was apparently roofless. Its use as a public dance plaza is speculated.
- 1935 Birds of Wupatki National Monument. Ms. on file at Museum of Northern Arizona.
- Lists birds observed at Wupatki: western turkey vulture, eight varieties of hawks, golden eagle, three varieties of owls, American raven, western mourning dove and over 80 other passerine species.

Harlan, Thomas P.

- 1962 A Sequence of Ruins in the Flagstaff Area Dated by Tree-Rings. M.A. thesis, University of Arizona.
- A recent revision of the Flagstaff area tree-ring chronology. Harlan re-dated many of the wood specimens from Wupatki and concluded that

only 21 specimens can be safely dated. His revision does not change the range of dates from the site. The ruin was settled shortly after the eruption of Sunset Crater and abandoned early in the 13th century. Harlan places Wupatki within the Elden Phase (Focus). An invaluable compilation of data utilizing Colton's sequence of foci for the Sinagua area.

Hartman, Dana

- 1973 Final Report for Human Burial Salvage, Prehistoric Site NA12,512, Ariz. I:7:1 (MNA). Ms. on file at Museum of Northern Arizona.

Excavation report of an isolated burial found in a small alcove near the Citadel.

- 1976 A Chronicle in Wood and Stone: An Archaeologist Views the Wupatki-Sunset Crater Region. Plateau, Vol. 49, No. 2, pp. 22-32.

Discussion of the archeology of the two Monuments, emphasizing the ecological effects of the Sunset Crater eruption.

Hodges, Carroll A.

- 1962 Comparative Study of S.P. and Sunset Craters and Associated Lava Flows. Plateau, Vol. 35, No. 1, pp. 15-35.

The study concludes that S.P. Crater is older than Sunset Crater in spite of the more striking appearance S.P. presents in aerial photographs. The primary Bonito lava flow was followed by an ash fall and then by the Kana-a lava flow. It seems probable that the Sunset Crater cinder cone was built up over a period of two or more years.

James, George Wharton

- 1900 Discovery of Cliff Dwellings in the Southwest. Scientific American, Vol. 82, pp. 40-41.

Source not available; known to include description of Wupatki.

Jarcho, Saul, Norman Simon and Edgar M. Bick

- 1963 A Fused Hip from Wupatki. Plateau, Vol. 35, No. 3, pp. 69-74.

Presents the results of a study of a fused human hip, part of a composite burial. The fusion was probably caused by a non-tuberculous infection. Tomograms (section X-rays) showed that nearly the whole of the cavity of the hip joint had been consumed by the infection.

Johnson, Alfred E.

- 1965 The Development of Western Pueblo Culture. Ph.D. dissertation, University of Arizona.

Postulates that Western Pueblo culture supersedes Mogollon after A.D. 1000.

Johnston, Phillip

- 1939 Peshlakai Atsidi (1850?-1939). Plateau, Vol. 12, No. 2, pp. 21-25.

Biography of the Navajo patriarch, stressing the land dispute problems he had during the last years of his life.

Jones, Courtney

- 1939 Rock Wrens at Wupatki. Southwest Monuments Monthly Report, July, pp. 69-72.

Report on observations made on 14 different days in May, 1939, of a pair of rock wrens (Salpinctes obsoletus obsoletus) that nested and raised a family in Room 7 of Wupatki Pueblo.

Jones, David J.

- 1939 The Yucca and the Moth. Southwestern Monuments Monthly Report, August, pp. 147-148.

Reports a profusion of white yucca blossoms on cinder dunes south of Wupatki in May, 1939. Describes the plant's pollination by moths.

- 1942 Red Ruins in Black Cinders. Arizona Highways, Vol. 18, No. 11, pp. 16-21, 40.

Conjectural history of the occupation of Wupatki after the eruption of Sunset Crater; summary of archeological work at the Monument.

Kelly, Roger E.

- 1963 The Socio-Religious Roles of Ball Courts and Great Kivas in the Prehistoric Southwest. M.A. thesis, University of Arizona.

Ball court construction probably began after A.D. 1070 in the Flagstaff area and continued until about A.D. 1150. This fluorescence in the Flagstaff area occurred while the Hohokam were discontinuing use of their own courts. It is possible these structures had a different function and less significant role in the cultural traditions of the north than among the people of southern Arizona. Known ball court distribution in northern Arizona extends from Wupatki to Winona. The Wupatki court is the only known masonry-lined ball court north of the Hohokam area.

Kent, Kate P.

- 1957 The Cultivation and Weaving of Cotton in the Prehistoric Southwestern United States. Transactions of the American Philosophical Society (n.s.), Vol. 47, Part 3.

Prehistoric textile material from museum collections and excavated sites in the Southwest, including Wupatki, is analyzed.

King, Dale S.

- 1949 Nalakihi: Excavations at a Pueblo III Site on Wupatki National Monument, Arizona. Museum of Northern Arizona Bulletin, No. 23.

Report on findings of 1933-34 excavations at Nalakihi, "The Lone House." Nalakihi has been called Ruin A, Group A by Fewkes; No. 7, Rectangular Building by Barrett; and NA358 by Colton. Detailed descriptions of the construction and condition of each of the excavated rooms. Nalakihi is a masonry pueblo of ten ground floor rooms, with three or four others once having formed a second story. It yielded a peculiar ceramic complex and a few unusual architectural features were noted: a deflector in a doubtful kiva, a jar-shaped storage pit, ornamental courses of basalt in walls, loom holes and windbreaks or shelter walls. Structurally, the building fits in the Elden Focus of the Sinagua Branch, but the ceramics and material culture present a more complex picture. The pueblo was abandoned due to fire.

Report discusses structural features of excavated pits and pit ovens with flues; human burials; stonework; shell, horn and antler; ceramic analysis; textiles; general summary and conclusions.

Nelakihu was built in the late 1100's and occupied into the first quarter of the 13th century - probably contemporaneous with the Citadel. Kayenta people (Klethla Focus) apparently occupied the northern portion of Wupatki National Monument and the Sinagua (Elden Focus) the southern part. Nalakihi was situated in a contact zone and exhibits traits of both cultures and a complicated mixture of ceramic types.

Krause, Betty Fennemore

- 1947 Wupatki National Monument. Arizona Guide, Vol. 9, No. 1, pp. 12-14.

General description of the ruins and their prehistoric occupation.

Lamar, Donald L.

- 1963 Geology of the Wupatki Blowhole System. Plateau, Vol. 37, No. 1, pp. 35-40.

A gravity survey of an area containing several blowholes suggested that sinuous or multiple branched passages in the Kaibab limestone link the blowholes and blowing wells. The blowholes and connected blowing water wells lie in a line 24 miles long, parallel to the direction of ground water flow. This suggests that the cavity system provides channels for the ground water movement and that the system may have formed in part by solution action (hypothesis revised by later studies).

Leavitt, Steven W.

- 1973 A Resume of the Geology of the San Francisco Volcanic Field and Meteor Crater, Northern Central Arizona. Ms. on file at Museum of Northern Arizona.

Presents a general comprehensive introduction for those unfamiliar with the geology of the area. Describes the sequence of fracturing and flows at Sunset Crater. Includes tree-ring data dating the eruption at A.D. 1064.

Lee, Thomas A., Jr.

- 1962 The Beale's Saddle Site: A Nonconformity? Plateau, Vol. 34, No. 4, pp. 113-128.

Museum of Northern Arizona excavations at NA3750 during 1959 and 1960 revealed two distinct architectural types, a pueblo and a detached subterranean structure, previously considered assignable to two different phases. Ceramic types, however, suggested contemporaneous habitation and, because of internal features, temporal association and spatial position, the function of the subterranean structure is thought to be ceremonial.

Lincoln, Edward P.

- 1961 A Comparative Study of Present and Past Mammalian Fauna of the Sunset Crater and Wupatki Areas of Northern Arizona. M.S. thesis, University of Arizona.

Eight thousand and ninety-eight mammal bones were identified from excavated skeletal material from eight archeological sites in the Wupatki region. A study of modern mammals was also conducted and a comparative morphological and distributional analysis was made of the two fauna. Morphological differences between modern and

prehistoric specimens were found in only two species of the deer mouse (*Peromyscus*). No major distributional change with the past 800 years was noted.

- 1962 Mammalian Fauna from Wupatki Ruin. Plateau, Vol. 34, No. 4, pp. 129-134.

The analysis of the mammalian skeletal remains excavated from Wupatki in 1936 indicates that ecological conditions of the region have not changed since the occupation of Wupatki Pueblo 800 years ago. Morphological differences were noted in only two species of rodents.

Lindsay, Alexander J., Jr.

- 1965 Preliminary Report on Excavations at Wupatki Ball Court, Wupatki National Monument. Ms. on file at Museum of Northern Arizona.

The Wupatki Ball Court lies about 450 feet north and 40 feet below the stabilized ruin of Wupatki Pueblo. Between May 3 and 27, 1965, the ball court was excavated, followed by stabilization of the court by the Ruins Stabilization Unit. Structural features and their condition are described. The Wupatki Ball Court is of the Casa Grande type. On the basis of preliminary ceramic analysis, it is probable the ball court was constructed during the later portion of the period A.D. 1050-1200.

McDougall, Walter B.

- 1962 Seed Plants of Wupatki and Sunset Crater National Monuments. Museum of Northern Arizona Bulletin, No. 37.

A complete floral index, with key, of the seed plants at the two Monuments.

McGregor, John C.

- 1931 The archaeology of the Little Colorado Drainage Area. M.A. thesis, University of Arizona.

Summarizes archeological work to date with brief interpretive section. On the basis of ceramic and architectural data, McGregor concludes that the Little Colorado drainage area does not represent a distinctive cultural area in the development of Southwestern archeology.

- 1936a Ball Courts in Northern Arizona? Museum Notes, Vol. 8, No. 11.

Reports the results of the Museum's 1935 excavation of the ball court at NA804 and describes the Pok-ta-pok ball game as played in the Maya area.

- 1936b The Effects of a Volcanic Cinder Fall on Tree Growth. Tree-Ring Bulletin, Vol. 3, No. 2, pp. 11-13.

One hundred and eighty-four borings were made and the rings of trees in ash covered areas were compared with those of nearby ash-free areas. The cinder cover acts as a mulch to conserve the scanty water supply and greatly increases the size and growth of rings of the Western yellow pine (*ponderosa* pine).

- 1936c Dates from the Tsegi and Nalakihi. Tree-Ring Bulletin, Vol. 3, No. 2, pp. 15-16.

Nalakihi is dated at A.D. 1183. Earlier tree-ring dates obtained from the Citadel indicate that the Citadel and Nalakihi were built at approximately the same time.

- 1936d Dating the Eruption of Sunset Crater, Arizona. American Antiquity, Vol. 2, No. 1, pp. 15-26.
- Using tree-ring specimens with archeological context, McGregor dates the eruption between A.D. 875 and 910, probably A.D. 885. This dating was prior to the revision of the tree-ring chronology.
- 1936e Culture of Sites which were Occupied Shortly Before the Eruption of Sunset Crater. Museum of Northern Arizona Bulletin, No. 9.
- Summary of results of the Museum of Northern Arizona's 1930-35 field work in Medicine Valley, on Bonito Terrace, at Baker's Bluff and at Grand Falls. The excavations at the pre-eruptive sites indicate the presence of two different groups of people in the area from the San Francisco Peaks to the Little Colorado River: one group living on the slopes of the mountain and the other group along the river flats.
- 1937 Winona Village. Museum Notes, Vol. 9, No. 7, pp. 39-42.
- Summary of results of 1936 excavations at NA804, a Hohokam-influenced Sinagua site. A northern Arizona ball court type is postulated. Ceramics date the site as late Pueblo II, circa A.D. 1100.
- 1938 Some Southwest Dated Ruins: III. Tree-Ring Bulletin, Vol. 4, No. 4, p. 6.
- A list of tree-ring dates for Wupatki Pueblo range from A.D. 1084-1179.
- 1941 Winona and Ridge Ruin, Part I: Architecture and Material Culture. Museum of Northern Arizona Bulletin, No. 18.
- Complete report on 1936-39 excavations at late Pueblo II - early Pueblo III sites near Winona Station. Winona Village may have been settled originally by Hohokam groups from the Verde Valley after A.D. 1070. During the Angell Focus there is evidence of the peaceful co-mingling of two cultures: Hohokam people living in house NA2133A, while Mogollon-like people were living in NA2135C, less than 300 yards away. Ridge Ruin is one of the earliest Sinagua masonry villages and is in many features similar to Wupatki, possibly as a result of emigration or influence from Chaco Canyon. The description of the ball court near Ridge Ruin most closely resembles the Casa Grande type court at Wupatki. Finds at Winona and Ridge Ruin indicate that two new groups moved into the region after the eruption of Sunset Crater: The Hohokam forming the Winona Focus and a group exhibiting traits from the upper Little Colorado - upper Tularosa area of the Cibola.
- 1942 Dates from Wupatki Pueblo. Tree-Ring Bulletin, Vol. 8, No. 3, pp. 18-21.
- An extended list of 52 tree-ring dates range from A.D. 1084-1192. The provenience for each specimen is given.
- 1943 Burial of an Early American Magician. Proceedings of the American Philosophical Academy. Vol. 86, No. 2.
- Describes the excavation of a Pueblo III burial at Ridge Ruin and the over 600 artifacts - many of which indicate wealth and highly skilled workmanship - which accompanied the burial. Hopi informants were able to identify the ceremony with which the paraphernalia is traditionally associated and establish an 800 year history for the ceremony in the Southwest.
- 1955 A Sinagua Kiva. Plateau, Vol. 27, No. 3, pp. 11-17.

Room 3 at the Pollock pueblo site (A.D. 1250-1325) exhibits many features of a kiva, previously unknown or unrecognized at Sinagua sites. The presence of Hopi trade pottery suggests a close relationship between these people and it is possible the later Sinagua people adopted certain features of the Hopi kiva.

- 1965 Southwestern Archaeology. University of Illinois Press, Urbana.

Defines diagnostic traits of Sinagua and geographic distribution. McGregor notes similarities to traits in the Mogollon area before the Sunset eruption and an "admixture of cultural backgrounds" after the eruption. He takes the series of Alameda Brown Ware pottery varieties as the distinguishing characteristic of Sinagua culture.

Maule, Stuart H.

- 1963 Corn Growing at Wupatki. Plateau, Vol. 36, No. 1, pp. 29-32.

Modern Hopi corn was planted near Wupatki Pueblo in the summer of 1961. it was observed that with no cinder cover there was no germination; that the best row (40% germination) was the one covered with one inch of cinders; and, that in two and three inch cinder cover germination was less (23% and 10% respectively). Thus cinder cover was definitely needed for dry farming at Wupatki and the optimum depth of cinders (the minimum which prevents run-off, preserving the moisture in the soil) is near one inch. Maule concludes that when the people began to settle the area after the eruption of Sunset Crater, the most highly prized land was probably that near the edge of the ash fall.

Merriam, C. Hart and Leonard Stejneger

- 1890 Results of a Biological Survey of the San Francisco Mountain Region and Desert of the Little Colorado, Arizona. U.S. Department of Agriculture, North American Fauna, No. 3.

Thorough faunal inventory including description of biological zones, biogeography of representative species and geographical description of region.

Miller, Alan H.

- 1962 Geological Investigations of the Wupatki Blowhole System. Ms. on file at Museum of Northern Arizona.

Using geologic maps, aerial photographs and field checks, all blowholes were located and plotted in an attempt to establish the areal extent of the system. The Wupatki system was found to occupy approximately 3200 square miles of the San Francisco Plateau. The physiography, stratigraphy, geology and geohydrology of the region are described. The blowholes are dated as Tertiary or later and the cavity system as post-Laramide but pre-Tertiary.

Mindeleff, Victor

- 1886- A Study of Pueblo Architecture: Tusayan and Cibola. Bureau of
1887 American Ethnology, 8th Annual Report, pp. 1-228.

Source of information on Pueblo architecture utilized by architect J. C. Fischer-Motz in the 1934 reconstruction of Wupatki.

Moore, Richard B., Edward W. Wolfe and George E. Ulrich

- 1974 Geology of the Eastern and Northern Parts of the San Francisco Volcanic Field, Arizona. In Geology of Northern Arizona, Part II: Area Studies and Field Guides, G.S.A. Rocky Mountain Section Meeting, Flagstaff.

Report based on detailed geologic mapping and petrographic studies of the volcanic rocks north and east of the San Francisco Peaks. Sunset Crater is the youngest volcanic unit - a 300 m. high cone of basaltic cinders.

Murbarger, Nell

- 1948 Arizona's First Land Rush. Natural History, Vol. 57, No. 1, pp. 37-41.

Reconstructs the arrival of new and diverse peoples after the eruption of Sunset Crater. Describes the ruins of the Citadel, Wukoki and Wupatki.

Nequatewa, Edmund

- 1947 Truth of a Hopi and Other Clan Stories of Shungopovi. Museum of Northern Arizona Bulletin, No. 8.

Yaponcha, the Wind God, tells the story of the creation of the Wupatki blowholes. The story of the Kana-a kachinas of Sunset Crater is also recorded.

Nichol, A. A.

- 1937 The Natural Vegetation of Arizona. Technical Bulletin, No. 68. University of Arizona, College of Agriculture, Agricultural Experiment Station.

The vegetation at Wupatki is described as semi-desert with highland grass type of flora.

- 1939 Special Report, Wupatki and Sunset Crater National Monuments. National Park Service, Region Three Office, Santa Fe. Ms. on file at Wupatki National Monument.

Description of vegetation at the two Monuments.

Nichols, Mary J.

- 1939 Wupatki Wildlife. Southwestern Monuments Monthly Report, July, pp. 59-61.

Lists 21 species of birds observed at Wupatki during June; the most common include the desert sparrow, house finch, rock wren, Western mockingbird and Western nighthawk.

- 1940 They Live in an Ancient Ruin. Desert Magazine, Vol. 3, No. 8, pp. 10-14.

Describes the life of Ranger David Jones and his wife who lived in an apartment in reconstructed Wupatki Pueblo.

Phillips, Allan R.

- 1947 Bird Life of the San Francisco Mountains; No. 5: Hawks and Owls. Plateau, Vol. 20, No. 2, pp. 17-22.

List of species present, where seen, how common; with descriptions. At Wupatki Pueblo: Western turkey vulture and American goshawk are two uncommon species observed. A mummified saw-whet owl was discovered in 1946 near Crack-in-Rock.

Pilles, Peter J., Jr.

- 1974 Post Sunset Crater Eruption Developments in the Sinagua Culture: A Reevaluation. Paper presented at the 39th annual meeting of the

Society for American Archaeology, Washington, D.C. Ms. on file at Museum of Northern Arizona.

A reinterpretation of the supposed prehistoric land rush following the eruption of Sunset Crater. Pilles believes the post-eruption building boom represents a changing subsistence pattern rather than a great population influx. Much of the post-eruption architecture is related to agricultural activities (field houses, etc.) rather than habitation.

Pinkley, Frank

- 1927 Beam Dating at Wupatki and Walnut Canyon. Southwestern Monuments Monthly Report, November.

Source not available.

Reed, Erik K.

- 1939 Preliminary Study of Pottery, Room 7, Wupatki Pueblo. Southwestern Monuments Monthly Report, Random Paper, March, 1938.

Pottery types present in Room 7 are described in detail. Deposition of pottery as trash in Room 7 indicates occupation of Wupatki Pueblo from about A.D. 1100-1125 to about 1300. From architectural evidence this is a late room and a tree-ring date from the door in the east wall is A.D. 1168. Dendrochronological dates for Wupatki suggest abandonment soon after A.D. 1200. The occurrence of six pottery types manufactured in the last part of the 13th century is evidence that the pueblo continued to be occupied, at least in small numbers, until nearly A.D. 1300.

- 1944 The Place of Citadel Polychrome in San Juan Orangeware. Southwestern Lore, Vol. 9, No. 4, pp. 5-7.

Citadel Polychrome is a type which was separated from Tusayan Polychrome comparatively recently and which connects Tusayan Black-on-red with Tusayan Polychrome. Reed suggests that Citadel Polychrome be classified with the other types grouped as San Juan Redware; he also suggests that Pueblo I Black-on-red and Tsegi Orangeware be classified as San Juan Orangeware.

- 1948 The Western Pueblo Archaeological Complex. El Palacio, Vol. 55, No. 1, pp. 9-15.

The distinction is made between the northern Anasazi Pueblo sites and the Western Pueblo sites south of the Little Colorado River. Circular kivas and grayware characterize the north and polished brown pottery is diagnostic at the southern Mogollon-derived sites which contributed importantly to the development of historic Western Pueblo culture. Sometime around A.D. 1200 the "Western Pueblo Complex" became recognizable and most of east-central Arizona, including the region occupied by the Sinagua, was characterized by this pattern during the 13th and 14th centuries.

- 1950 Eastern-Central Arizona Archaeology in Relation to the Western Pueblos. Southwestern Journal of Anthropology, Vol. 6, No. 2, pp. 120-138.

It can be suggested that the basis of the Western Pueblo pattern of east-central Arizona may be due to Mesoamerican political and religious influence on earlier Hohokam, Chacoan and Sinagua area peoples. By A.D. 1300, the pattern is important for the first time all over the inhabited northwestern Pueblo area. Reed rejects the thesis that the pueblos of east-central Arizona represent local "peripheral" developments of the San Juan Anasazi and reviews the distributions of diagnostic traits. He concludes that the Western

Pueblo archeological division is of ultimate Mogollon derivation.

To the south of the Little Colorado River, the Puebloan groups are distinguished quite sharply by: the absence of circular chambers in some areas; the occurrence of rectangular kivas; polished brownware and a variety of painted pottery; vertical occipital cranial deformation; 3/4 grooved axes; and, extended inhumations.

- 1956 Types of Village Plan Layout in the Southwest. In Prehistoric Settlement Patterns in the New World, by Gordon R. Willey (ed.), Viking Fund Publications in Anthropology, No. 23.

Wupatki Pueblo may partially fulfill Reed's definition of the Anasazi unidirectional settlement pattern.

Reed, Erik K. and James W. Brewer

- 1937 The Excavation of Room 7, Wupatki. Southwestern Monuments Special Report, No. 13.

Reviews previous archeological work in Room 7: Fewkes, 1896; C.W.A., 1933-34; Brewer, 1936. Describes 1936 excavation procedures and artifactual, non-artifactual and skeletal material recovered; also discusses architectural features and condition of the structure. Room 7 was apparently abandoned towards the end of the prehistoric occupation of Wupatki. The large number of child burials seems to indicate a high rate of infant mortality which may have led the inhabitants to abandon the pueblo.

Robison, Henry H.

- 1913 The San Francisco Volcanic Field, Arizona. U.S. Geological Survey Professional Paper, No. 76.

Classic investigation of the volcanic field. Robinson's "Periods of Eruption:" 1) early basaltic period, 2) middle period of intermediate to acidic volcanism and 3) late basaltic period, have since been shown to be oversimplified (Sabels 1960).

Robinson, William J., Bruce G. Harrill and Richard L. Warren

- 1975 Tree-Ring Dates from Arizona H-I, Flagstaff Area. Laboratory of Tree-Ring Research, University of Arizona, Tucson.

Compilation of all dated tree-ring specimens from the Monument; dated structures include Heiser Spring Ruin, Wupatki, Nalakihi, the Citadel and Lomaki.

Rose, Robert H.

- 1933 Conference on Progress of Wupatki Excavations. Southwestern Monuments Monthly Report, October, pp. 3-4.

On October 29, 1933, 100 members of the Northern Arizona Society of Science and Art gathered at Wupatki to hear Dr. Colton and Field Director Hargrave discuss the results of the season's archeological field work. At that time several rooms had been excavated and restored and the "amphitheater" excavated and reconstructed.

Ruch, Walter W.

- 1973 Flagstaff's Circle of Wonders. Friends, Vol. 30, No. 3, pp. 4-8.

Tourist sites to visit around Flagstaff.

Russell, Carl P.

- 1933 Observations in Some Southwestern National Monuments. Ms. on file at Museum of Northern Arizona.

Russell, N.P.S. field naturalist, visited Wupatki on May 7, 1933, with L. L. Hargrave. Report makes general observations on the restoration of the pueblo and development of the Monument.

Sabels, Bruno E.

- 1960 Late Cenozoic Volcanism in the San Francisco Volcanic Field and Adjacent Areas in North Central Arizona. Ph.D. dissertation, University of Arizona.

The cause and sequence of volcanic events along the southwestern rim of the Colorado Plateau are detailed and the accepted concepts of late Cenozoic history for the area are revised. Results of thermoluminescence, spectrography, counting techniques and microscopic work are presented.

- 1962 Mogollon Rim Volcanism and Geochronology. In Guidebook of the Mogollon Rim Region, East Central Arizona, New Mexico Geological Society, 13th Field Conference, pp. 100-106.

A chronology for the geological history of northern Arizona is outlined.

Sanborn, William B.

- 1955 Crack-in-the-Rock. Natural History, Vol. 64, No. 1, pp. 25-27.

A visit to Crack-in-Rock at Wupatki with a brief description of the ruins.

Sartor, J. Doyme

- 1964 Meteorological Investigations of the Wupatki Blowhole System. Plateau, Vol. 37, No. 1, pp. 26-34.

Meteorological data obtained during the summer of 1961 and a re-analysis of Schley's (1961) data are presented. During periods of low pressure, air flows out of the blowholes and during periods of high pressure, air flows in. The velocity of air flow was found to be related to the time rate of change in pressure and often exceeds 30 mph.

Sartor, J. Doyme and Donald L. Lamar

- 1962 Meteorological-Geological Investigations of the Wupatki Blowhole System. The Rand Corporation, Memorandum RM-3139-RC.

The blowholes both exhale and inhale in response to atmospheric pressure changes. Sartor and Lamar calculate the absolute minimum volume of the interstitial space of the cavity system to be 7.2 billion cubic feet.

Schley, Robert A.

- 1961 Diurnal Air Flow through an Earth Crevice, Wupatki National Monument. Plateau, Vol. 33, No. 4, pp. 105-111.

In July, 1960, Schley conducted meteorological studies of the blowhole system. The data indicate that the intake-exhaust air flow cycle is the result of an atmospheric pressure pattern caused by diurnal heating and cooling and synoptic pressure changes. The blowhole system is a complex of deep, narrow crevices that probably

intersect an extensive cavern system composed of both Kaibab limestone and Coconino sandstone. Speculates about the possible significance of this geophysical feature for prehistoric peoples.

- 1962 Excavation of the Wupatki Blowhole Site, NA7824. The Rand Corporation, Memorandum RM-32-36-RC.

Four occupation areas along a northeast-southwest axis about 120 m. long were identified as a single site. Ceramics, petroglyphs, masonry and other evidence suggest a 12th century occupancy (A.D. 1130-1210). The significance of the association of air-breathing crevices, earth cracks and sink holes with numerous post-eruption sites in the Wupatki area can at present only be speculated. It is interesting that many sites appear to have been located closer to the crevices than to the nearest available water.

Schroeder, Albert H.

- 1944 A Prehistoric Method of Collecting Water. American Antiquity, Vol. 9, No. 3, pp. 329-330.

Sherds from one vessel were noted in an area less than one meter square at Wupatki. Upon excavation, sherds forming the base of the vessel were found embedded in the clayey soil. The pot may have been strategically placed to collect rainwater run-off from a Moenkopi sandstone outcrop. The maximum internal diameter of the vessel was 35 cm. and its height was 46 cm.

- 1949 Cultural Implications of Ball Courts in Arizona. Southwestern Journal of Anthropology, Vol. 5, No. 1, pp. 28-36.

Certain traits common to all courts (a playing floor, occasional markers, surrounding walls and the embellishment of the ends) imply that the game played in the Southwestern courts involved the same fundamentals as those of early Mesoamerican courts. The east-west Snaketown type of court is associated only with pre-A.D. 1050 Hohokam sites during a sedentary period of homogeneity and ornateness. After A.D. 1050, all courts are north-south, smaller Casa Grande type. The farthest north ball court of this later type is at Wupatki Pueblo. The fact that the Casa Grande court replaced the earlier court in the Hohokam area proper suggests that the associated Hohokam religious and ceremonial activity was deteriorating.

- 1957 The Hakataya Culture Tradition. American Antiquity, Vol. 23, No. 2, Part 1, pp. 176-178.

Traits of the Hakataya tradition are defined. The label "Yuman" is rejected and Hakataya introduced. Hakataya means Colorado River in the Walapai and Havasupai languages. Summarizes 1956 Pecos Conference discussion of archeology of area west of Anasazi occupation. The region is bounded by the Pacific Coast ranges on the west, the Mogollon Rim to the east, the Gila River to the south and the Grand Canyon as the northern limit.

- 1960 The Hohokam, Sinagua and Hakataya. Archives of Archaeology, No. 5.

Schroeder distinguishes between the Hakataya (formerly Yuman) and the Hohokam cultures. The Pioneer Period of southern Arizona is no longer considered to be Hohokam but Hakataya; the Sinagua pattern of A.D. 600 to 1060 is demonstrated to more closely resemble the Pioneer Period Hakataya than the contemporaneous Hohokam of A.D. 700-1150. It is concluded that the Hakataya culture was basic to the entire desert area between the Mogollon Rim and the lower Colorado River and between the Grand Canyon and the Gila River. Certain Mexican-derived traits were adopted by the Pioneer

Period Hakataya on the Gila River. The Hohokam culture (A.D. 700-1150) is a complete new pattern introduced to the Southwest around A.D. 600-700. Up to A.D. 1060, the Sinagua exhibited very few of the contemporary Hohokam traits. Around A.D. 1070, a colony of Hohokam moved north from the Verde Valley to settle in the San Francisco Peaks area. The middle Verde Valley was inhabited by the Hohokam up to about A.D. 1125 and, from A.D. 1125 to 1400, by the Sinagua. Schroeder indicates that about A.D. 1150 some of the Sinagua continued south and settled with the Hohokam of the Gila Basin, bringing to an end Hohokam domination. The Sinagua pattern moved south as a cultural intrusion and the subsequent Classic Period was mainly a mixture of Hohokam and Sinagua traits. Survey material collected from 41 sites in the middle Verde Valley formed the data base for Schroeder's definition of the new root, Hakataya.

- 1961 The Pre-Eruptive and Post-Eruptive Sinagua Patterns. Plateau, Vol. 34, No. 2, pp. 60-66.

Comprehensive summary which traces the sources from which the pre-eruptive Sinagua derived their Hakataya traits and considers the origin of the post-eruptive Sinagua pattern. The earliest Sinagua sites with ceramics (NA1293 and NA3996) in the Flagstaff area are estimated to date between A.D. 500-700 and exhibit Hakataya-Anasazi influence. After A.D. 700, the pattern more closely resembles the Hakataya. Schroeder emphasises the Hakataya affiliation of pre-eruptive sites and considers the Sinagua pattern to have arisen through the post-eruption intermingling of peoples.

- 1963a Hakataya, Patayan and Hohokam. Regional Research Abstract, No. 308.

Summarizes thesis of Schroeder's 1960 paper. Pre-A.D. 1070 inhabitants of the Flagstaff area were of a Hakataya tradition. After the eruption of Sunset Crater, the intermingling of Hohokam, upper Little Colorado and indigenous Hakataya peoples gave rise to the Sinagua pattern which dominated the Flagstaff area until the withdrawal to the south beginning about A.D. 1125.

- 1963b The Sinagua Branch. Regional Research Abstract, No. 309.

Changes in the Sinagua pattern through time are observed and diagnostic traits of each focus listed.

- 1963c Diffusion North Out of South-Central Arizona. El Palacio, Vol. 70, No. 1-2, pp. 13-24.

A summary of Hohokam culture history and traits. Schroeder traces the diffusion of Hohokam influences north out of the Gila River area after A.D. 600 until the period of domination by the expanding Sinagua pattern from the north in the mid-12th century.

Shreve, Forrest

- 1942 The Vegetation of Arizona. In Flowering Plants and Ferns of Arizona, by Thomas H. Kearney and Robert H. Peebles, U.S. Department of Agriculture Miscellaneous Publication, No. 423, pp. 10-23.

The vegetation of Wupatki fits Shreve's description of desert-grassland transition type.

Sitgreaves, Lorenzo

- 1853 Report of an Expedition Down the Zuni and Colorado Rivers. Senate Executive Documents, No. 59.

First published reference to Wupatki. Description as first seen by men on 1851 U.S. expedition to explore the Little Colorado Valley.

Smiley, Terah L.

- 1951 A Summary of Tree-Ring Dates from Some Southwestern Archaeological Sites. Laboratory of Tree-Ring Research Bulletin, No. 5.
- Contains a series of 137 different dated specimens from Wupatki (65 by Douglass and 72 by McGregor). The series ranges from A.D. 1070-1205, with concentrations of 25 dates at about A.D. 1115, 38 at A.D. 1150, 25 at A.D. 1185 and 10 between A.D. 1191 and 1205. Nalakihi is dated at A.D. 1183, Lomaki at A.D. 1192 and the Citadel at A.D. 1159+-1192+.
- 1958 The Geology and Dating of Sunset Crater, Flagstaff, Arizona. In Guidebook of the Black Mesa Basin, New Mexico Geological Society, 9th Field Conference, pp. 186-190.
- Based on tree-ring specimens from Wupatki, Smiley determined the date of the eruption of Sunset Crater to be "sometime after the growing season was over for the year A.D. 1064 (probably in September) and before the season of the following year was advanced, somewhere about June of 1065." Includes brief summary of the geology and dating of the crater.

Smith, Watson

- 1949 Excavations in Big Hawk Valley. Plateau, Vol. 21, No. 3, pp. 42-48.
- Research and excavation of four PII-PIII sites was directed toward determining the occupational limits of the Kayenta, Sinagua and Cohonina Branches in the Valley and the degree of cultural modification effected by their contacts with each other. Preliminary analysis suggests NA618 to be the earliest site occupied by Sinagua-influenced Cohonina. The other sites (NA680, 681 and 682) were slightly later and basically Tusayan with strong Cohonina influence but very little Sinagua.
- 1952 Excavations in Big Hawk Valley, Wupatki National Monument, Arizona. Museum of Northern Arizona Bulletin, No. 24.
- Comprehensive report on the 1948 Museum excavations at NA618 (Three Courts Pueblo), NA680, NA681, NA682 (The House of Tragedy), NA537 (Crack-in-Rock) and NA1814E (Juniper Terrace). Ceramic and architectural evidence indicate a peaceful mingling of diverse peoples in Big Hawk Valley. The relative proportions of Sinagua and Cohonina components decreased as Kayenta influence increased, bearing out the hypothesis of Kayenta influx into the region toward the end of its occupation (mid-12th century). After this time the importance of the Kayenta people is continued to the northeast where the pueblos of the Citadel, Wupatki and Crack-in-Rock were all constructed mid- or late 12th century as representative of the Kletthla Focus of the Kayenta Branch and without admixture from the Cohonina and Sinagua. The complex of Anasazi, Sinagua and Prescott ceramics at Nalakihi is problematic.

Stanislawski, Michael B.

- 1963a Wupatki Pueblo: A Study in Cultural Fusion and Change in Sinagua and Hopi Prehistory. Ph.D. dissertation, University of Arizona.
- Wupatki Pueblo was occupied between A.D. 1080-1225. The maximum population (A.D. 1150-1170) was about 120 when approximately 60 rooms were in use. Material culture remains recovered from excavations at Wupatki indicate Chaco and Hohokam contacts after A.D. 1070 and the introduction of ultimately Mesoamerican religious, agricultural, weaving and ornamental items. There is marked Anasazi influence in utility items only. The settlement pattern is

a mixture of Anasazi masonry styles, early rectangular kivas, round unroofed Chaco-type ceremonial structures and a Hohokam ball court. A transition toward the Anasazi Pueblo village is evident and a change in political organization and social integration is suggested. Contrary to Schroeder (1961) and Colton (1946), Stanislawski suggests that there is little evidence for a uniform, post-eruptive "Sinagua" culture. It appears that an assemblage of traits may have diffused from northern Mexico to the Chaco and Hohokam regions about A.D. 1050-1100. The traits were then introduced to the Sinagua of the Wupatki area about A.D. 1080 and by the Sinagua to the Hopi Mesa peoples - probably by the actual migration of clans between A.D. 1200-1350 when the entire Sinagua area was abandoned. While there was not a uniform cultural pattern in the Sinagua area from A.D. 1070 to 1350, there was a new cultural synthesis of Anasazi, Hohokam and Mesoamerican cultural traits on the Hopi Mesas after A.D. 1300.

- 1963b Extended Burials in the Prehistoric Southwest. American Antiquity, Vol. 28, No. 3, pp. 308-319.

Summarizes the distribution of extended burials in time and space. Pre-A.D. 1000, flexed burials are most common. Concentrations of extended burials first appear at Chaco Canyon sites about A.D. 1050 and the pattern seems to spread from there first to the Sinagua region and neighboring Mogollon groups, then to the Hopi and Zuni regions and, with the Sinagua and Salado migrations, into the Gila-Salt River Valley. The complex may ultimately be of Mesoamerican origin. After A.D. 1120, Sinagua burials are almost always extended. Only at culturally mixed sites, such as Wupatki where there is heavy Anasazi influence, are there numbers of flexed as well as extended burials.

- 1964 Prehistoric Cultural Contacts between the Peoples of the Hopi Mesas and Wupatki Ruin, Arizona. American Anthropological Association Abstracts, 63rd annual meeting.

Legends connect Wupatki with the Hopi parrot clan and indicate migrations to the Mesas from the south. Similar artifact traits appear in both areas sequentially and Hopi pottery is found in rooms at Wupatki. These traits suggest that changes in the late 13th century Hopi cultural pattern may, in part, be the result of emigration from Sinagua sites, such as Wupatki, which exhibit similar Mesoamerican traits in the 12th century and earlier.

- 1966 Mesoamerican Influence in Northeastern Arizona (as Shown at Wupatki). Actas y Memorias, 36th International Congress of Americanists, pp. 309-319.

Traits of Mesoamerican origin were introduced to the Sinagua of Wupatki Pueblo by the Chaco Anasazi and Hohokam groups after A.D. 1070. Many of these same traits seem to have been carried by the Sinagua to the Hopi Mesas by A.D. 1250-1300.

Thompson, Ben H.

- 1945 Wupatki National Monument Boundary Report. Ms. on file at Wupatki National Monument.

Thorough study of land use at Wupatki, along with overview of areas included in 1937 boundary extension. Thompson also surveyed areas to the south of the Monument which had been considered as a possible addition to the Monument. The conclusion was that the southern lands should be included at some future date, but the boundaries as of 1944 were acceptable. Illustrated with photographs of the environment and several of the ruins. Three maps included.

U.S. Department of the Interior, National Park Service

- 1941-1976 Stabilization Reports. Mss. on file at Wupatki National Monument.
- Reports by various authors of the stabilization projects conducted since 1941. Documented stabilization has been carried out at all of the major ruins at the Monument and a large number of the smaller ones.
- 1970a Park Wilderness Proposal. Public hearing notice (seven pamphlets). Ms. on file at Museum of Northern Arizona.
- The National Park Service found Wupatki unsuitable for inclusion in the National Wilderness Preservation System due to livestock grazing throughout the Monument and the fact that the focal point of interest at Wupatki is archeological. The results of the wilderness study, notice of public hearings, pamphlets and news releases are included.
- 1970b Master Plan for Wupatki and Sunset Crater National Monuments, Arizona. Preliminary working draft. Ms. on file at Museum of Northern Arizona.
- A description of the ruins and natural features and a summary of the recommendations of the National Park Service for the development and use of the two Monuments. Includes plans to accelerate research in archeology and natural history, to conduct a complete archeological survey and to excavate and stabilize Citadel Ruin. Includes documents relating to land exchanges which have resulted in the present configuration of the Monument. This Master Plan has since been abandoned.

Van Valkenburgh, Richard

- 1947 Don't Knock on a Hogan Door. Desert Magazine, Vol. 10, No. 12, pp. 9-13.
- Contains map of Wupatki Basin, showing hogan locations of the Peshlakai family.

Voth, Henry R.

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- Records a traditional story of the Hopi which may refer to the eruption of Sunset Crater.

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- 1976 Sinagua Farmers Before the "Black Sand" fell: An Example from Wupatki National Monument. Paper presented at the Field House-Small Site Symposium, Tucson, April 23. Ms. on file at Museum of Northern Arizona.
- Thorough report on a small site excavation, NA2077. Ward questionably dates the site as pre-eruptive.

Whiting, Alfred F.

- 1941 Specimens in the Herbarium of Wupatki National Monument, October, with Notes on Recent Collections. Ms. on file at Wupatki National Monument.
- List of most important modern plants growing at the Monument.

Wilson, John P.

- 1969 The Sinagua and Their Neighbors. Ph.D. dissertation, Harvard University.

A definitive and objective re-analysis of Sinagua prehistory. All previous work is reviewed and data from 290 sites in the Flagstaff area incorporated. For comparative purposes, a complete report on excavations at the Pershing Site is included. This pit house site spans the time of the eruption of Sunset Crater (A.D. 900-1100) and lies outside the area of the ash fall. Wilson also conducted an extensive survey east-southeast from Anderson Mesa to recover information about the extent and nature of Sinagua utilization of that area, which remained well-populated until around A.D. 1400. The ceramic analysis is included. Results of palynological studies suggest reduced moisture condition after A.D. 1065 and a need to re-evaluate the significance of the Sunset Crater ash fall to agriculturalists. Wilson concludes that the term "Sinagua" refers not merely to an area or a people but to the "culture history of people who made Alameda Brown Ware and left the other remains associated with such pottery." Traits which define the Sinagua cultural tradition are enumerated. Alameda Brown Ware is the principal material element of continuity from before A.D. 800 to approximately A.D. 1400. Migrations from the south, east and north caused many changes and the rise of several regional patterns after the Sunset Crater eruption. The area inhabited by the Sinagua was quite constant through time: a crescentic zone south of the Little Colorado River bounded at one end by Deadman Wash drainage and at the other end by East Clear Creek. Extensive bibliography, plates and maps.

Wilson, John P. and Roger E. Kelly

- 1966 A Working Bibliography of Sinagua and Cohonina Archaeology. Compiled for the 1966 Pecos Conference. Ms. on file at Museum of Northern Arizona.

A working guide to the Archeological literature in the Flagstaff, central and upper Verde Valley and Cohonina areas of northern Arizona.

Wupatki Collection (entire ms. on file at Museum of Northern Arizona)

- n.d. MS 35-1 Scientific Report of the Excavation of Wupatki F-68 C.W.A. Work Project No. 10, Wupatki National Monument. Contains: 1) Field Notes on Archaeological Excavation and Reconstruction, by Ten Broeck Williamson and Richard F. Van Valkenburgh; reports excavation procedures, condition of rooms, artifact content, burials and photographs; 2) Report of Architect, by J. C. Fischer-Motz; notes on Wupatki architecture, reconstruction, repair and preservation; and, 3) A Statistical Report of Cultural Material Recovered at Wupatki, by James W. Brewer.
- MS 35-2 References to the Ben Doney Collection from a notebook of Jesse W. Fewkes, dated 1911.
- MS 35-3 Collected Field Notes of 1933-34 Excavations at Wupatki National Monument; also contains Skeletal Material from Wupatki: field notes for burials.
- MS 35-4 Miscellaneous Field Notes.
- MS 35-5 Field Notes of A. T. Williamson on the North Section and R. F. Van Valkenburgh on the South Section, C.W.A. Wupatki Expedition 1934; contains daily log and progress reports.
- MS 35-6 Notes on Reconstruction by J. C. Fischer-Motz.
- MS 35-7 Notes on Wupatki National Monument textiles by Kate Peck Kent.
- MS 35-8 Notes on shells from Wupatki, copper objects, fiber identifications.

- MS 35-9 Ceramic analysis; newspaper clippings; dates from Wupatki Pueblo by J. C. McGregor; Report to the Chief Architect through Custodian of Wupatki National Monument, February 26, 1934, by Harry Langley, Assistant Architect.
MS 35-10 Photographs.
MS 35-11 Artifact catalog.

Wupatki Custodians

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APPENDIX I

Collections

Aside from dendrochronology specimens stored at the Laboratory of Tree-Ring Research, Tucson, all archeological materials from Wupatki reside at three institutions: the Monument, the Western Archeological Center, Tucson, and the Museum of Northern Arizona, Flagstaff. The condition of the artifacts is highly varied and a wide range of artifact types is represented. The majority of this material is fully cataloged. With a few notable exceptions (Stanislowski 1963; Reed and Brewer 1937; King 1949), the artifactual material from Wupatki National Monument has received rather superficial treatment. The specimens stored at the three above institutions are generally well curated and possess a tremendous research potential.

Wupatki National Monument

Archeological specimens stored or displayed at the Monument total 696 individual items. This material includes small collections from sites NA1735, NA5701, NA5702 and NA6301. Divided by artifact type, the Monument inventory of prehistoric materials is as follows: 87 ceramic items, 368 worked stone artifacts, 64 items of wood (worked and unworked), 56 specimens of vegetal material, 49 examples of textiles and weaving, 2 pieces of deer antler, 2 pieces of shell, 29 worked bone artifacts, 34 pieces of unworked bone and 5 copper artifacts. In addition, the Monument collections contain 21 examples of different minerals, 3 fossils and 16 biological specimens. Finally, the Monument curates a small ethnographic collection comprising 12 modern Hopi items and 55 examples of Navajo artifacts.

Western Archeological Center

Cataloged into the National Park Service Museum Record Catalog are 1022 items stored at the Western Archeological Center; this material includes 14 items from Sunset Crater. The Center also stores 19 items recovered from the Citadel (NA355) during the 1954 stabilization work. There are also 87 items stored and cataloged at the Center which were recovered from various small projects. These specimens include 40 site sherd collections made by Schroeder during his 1941 survey, some items from a

test at NA203, projectile points from sites NA377 and NA2222 and some miscellaneous surface collections of uncertain provenience. In addition, the Center stores three cartons of archeological material from Antelope House (NA625), recovered during the 1965 stabilization project, and pre-stabilization material from NA404, NA407 and NA2922, recovered in 1976.

Museum of Northern Arizona

Of the approximately 1840 cataloged artifacts in the Museum of Northern Arizona collections, 60% (1100) are from Wupatki Pueblo (NA405). Most of these specimens were collected during the 1933-34 excavations, while 6 were collected during the 1965 excavation of the Ball Court. The cataloged artifacts from NA405 include a wide variety of types and materials: ground stone, chipped stone, worked wood and bone; basketry fragments, cotton textile fragments, fiber and hair cordage, sandal fragments; seeds, seed pods, and other plant materials; stone and shell ornaments; copper bells; pigments; human, canine and avian skeletal material; and ceramics (sherds and whole vessels), plus numerous miscellaneous artifacts. The most common ceramic types are Sunset Red and Walnut Black-on-white; the collection includes several whole vessels, in good condition, of each of these types. Many of the cataloged artifacts are in excellent condition and are suitable for exhibit and research purposes.

An additional 197 cataloged artifacts are from NA358 (Nalakihi), 45 from NA557, 100 from NA618 (Three Courts Pueblo), 117 from NA680, 130 from NA681, 75 from NA682, 20 from NA1754 (Heiser Spring Ruin) and the remainder (56) from 24 other sites.

The Museum of Northern Arizona Wupatki collections also include an estimated 125 cubic feet of boxed excavated material, 10 cubic feet of boxed survey material and 15 cubic feet of boxed non-artifactual material from sites within the Monument boundary. Approximately 60% (75 cubic feet) of the excavated material is from NA405 (Wupatki

Pueblo); this material consists primarily of sherds and ground stone. The following sites are also represented by boxed excavated material: NA358 (10 cubic feet), NA618 (11 cubic feet), NA680 (6 cubic feet), NA681 (5 cubic feet), NA682 (3 cubic feet) and NA1754 (3 cubic feet). This material also consists mainly of sherds and ground stone. The

approximately 10 cubic feet of boxed survey material from 200 sites consists of about 95% ceramics (sherds) and 5% lithics. Thirteen of the 15 cubic feet of boxed non-artifactual material is from NA405; the remaining 2 cubic feet comes from 16 other sites, including about 0.6 cubic feet from NA358 (Nalakihi).

