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MOON HOUSE: A PUEBLO III PERIOD CLIFF DWELLING
COMPLEX IN SOUTHEASTERN UTAH

By
WILLIAM W. BLOOMER

A thesis submitted in partial fulfillment of
the requirements for the degree of
MASTER OF ARTS IN ANTHROPOLOGY

WASHINGTON STATE UNIVERSITY
Department of Anthropology
MAY 1989
To the Faculty of Washington State University:

The members of the Committee appointed to examine the thesis of William W. Bloomer find it satisfactory and recommend that it be accepted.
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William D. Lipe inspired me to study the Moon House Complex. He initiated the 1974 fieldwork and recognized the importance of the Moon House storage facilities. I am grateful for the efforts of my thesis committee, Fekri A. Hassan and Timothy A. Kohler. In addition, I appreciate the support of the Department of Anthropology office staff, which has been generously given throughout my enrollment at Washington State University.

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William D. Lipe planned and provided general direction for the 1974 fieldwork, which was supported by National Science Foundation Grants GS 3341 and GS 42570 and conducted under a Department of the Interior Antiquities permit to the Museum of Northern Arizona. My 1986 fieldwork was conducted under Bureau of Land Management ARPA permit #86UT57621 to Washington State University.
MOON HOUSE: A PUEBLO III PERIOD CLIFF DWELLING

COMPLEX IN SOUTHEASTERN UTAH

Abstract

by William W. Bloomer, M.A.
Washington State University
May 1989

Chair: William D. Lipe

The Moon House Complex is composed of 3 exceptionally well preserved 13th century cliff dwellings. An analysis of construction methods, room function, and construction sequence indicates recurrent reconstruction, remodeling, and reorganization of functionally distinct rooms. The early occurrence of similar residential units at each of the three cliff dwellings contrasts with the latest room configuration. This late A.D. 1260s reconstruction and reorganization resulted in functional differentiation and interdependence between the three cliff dwellings. A high ratio (5:1) of usable storage rooms to living rooms indicates that the potential food storage capacity during the late occupation of the Moon House Complex was approximately 5.9 times that necessary to feed a residential population for one year. Two alternative conclusions concerning food storage are suggested: 1) that the Moon House Complex was used to store an amount of food sufficient to feed a non-resident population greater than that represented by the observed habitation units, therefore probably functioning as a seasonally used storage facility; and/or 2) that a food surplus of greater than 2 years was stored by the Moon House Complex residents as a buffer against anticipated continuing poor harvests.
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CHAPTER 1

INTRODUCTION

Overview

This thesis is a functional analysis of the architecture of 3 late 13th century cliff dwellings (M-1, M-2, and M-3), which are interpreted to have been used together as an integrated complex during their last occupation. Forty-nine rooms were recorded within the cliff dwelling complex. Thirty-two of the rooms are well preserved and were used during the latest Moon House occupation. These rooms comprise the post A.D. 1264 Moon House Complex, and are the main focus of this thesis.

The 3 cliff dwellings are located on Cedar Mesa, each in separate natural shelters within a .5 kilometer stretch of Mcloyd's Canyon (Figures 1, 2, and 3). The designations M-1, M-2, and M-3 are Cedar Mesa Project field designations used on the 1974 site records. These designations are used throughout the thesis for convenience and for consistency with the previous reporting of Moon House data. The state numbers (SA-5004 and SA-5005) were given to M-2 and M-1, respectively, during the 1964 recording of these cliff dwellings (Bureau of Land Management Site Record Files, Monticello, Utah). M-3 apparently was not previously recorded.

The central Moon House cliff dwelling (M-1, SA-5005,) contains the only definite habitation rooms used during the late occupation of the complex. These five habitation rooms are associated with nine granaries, one general storage room, two rooms of unknown function, and the ruins of one noncontemporaneous kiva (Figures 4, 5, and 6). The extant rooms of the
eastern cliff dwelling (M-2, SA-5004) are incorporated into one long room block of 6 late A.D. 1260s granaries (Figures 7 and 8). The ruins of possibly 2 earlier habitation rooms and 2 or 3 earlier storage rooms are evident within the same shelter. Three well preserved individual granaries, and the ruins of at least 7 earlier probable storage structures, are spaced along the main ledge between Cliff Dwellings M-1 and M-2 (Figure 7). The western cliff dwelling (M-3) is composed of an above ground post A.D. 1265 kiva with at least 3 associated storage rooms, one large room of undetermined function, and the ruins of another possibly contemporaneous room of unknown function (Figures 9 and 10). Two granaries, contemporaneous with the kiva and its associated rooms, and 2 probably noncontemporaneous storage structures are located just east of the main M-3 shelter.

The post A.D. 1264 association of 5 habitation rooms and 10 storage rooms at M-1 indicates this central cliff dwelling served as the primary habitation site for the complex. The room block of 6 large granaries at M-2 indicates the eastern cliff dwelling served as a contemporaneous storage unit. The kiva and its associated rooms at M-3 indicates the western cliff dwelling served primarily as a ceremonial unit during this late occupation of the complex. The earlier architectural remains indicate that, prior to the late occupation, each cliff dwelling housed one or more dwelling units (Wilk and Rathje 1982:620) with an association of habitation and storage rooms. This earlier organization of habitation and storage rooms is similar to the organization of rooms recognized, ethnographically and archaeologically, as western Pueblo domiciles used by one or a few households (Eggan 1950:29-30; Rohn 1965:65, 1971:31; Dean 1969:34; Adams 1983:58).

During the early 1970's Dr. William D. Lipe (personal communication)
Figure 1. Regional Map.

The Moon House Complex location is symbolized by a dot within a hexagon.
Figure 2. Cedar Mesa Area Map.
Figure 4. Plan View Map of Cliff Dwelling M-1.
Figure 5. Overview of Cliff Dwelling M-1, west half.

Figure 6. Overview of Cliff Dwelling M-1, east half.
Figure 7. Plan View Map of Cliff Dwelling M-2.
Figure 8. Overview of storage rooms at Cliff Dwelling M-2.

Vertical and horizontal scales are 1 meter and 2 meters, respectively.
Figure 9. Plan View Map of Cliff Dwelling M-3.
Figure 10. Overview of kiva at Cliff Dwelling M-3.
noted the significance of these architectural relationships and the need for a detailed architectural recording and dendrochronological analysis of the cliff dwellings. After fieldwork at Moon House in 1974, a high percentage of room space devoted to granaries and general storage was recognized (Lipe 1978) as indicative of a possible seasonal food storage complex or distributional center for a population larger than the one living at the Moon House Complex. This greater population would perhaps have been drawn from eastern Cedar Mesa or Comb Wash (Figure 2) (Lipe 1978).

Since the initial 1974 recording, some of the Moon House data have been presented in an SAA paper (Lipe 1978), used for a case study of population growth trends based on tree-ring dated roof beams (Eighmy 1979), and incorporated into one Master's thesis (Schlanger 1980) and one PhD. dissertation (Ahlstrom 1985). Corn cobs collected from Cliff Dwellings M-1 and M-3 of the Moon House Complex have been used in a recent study of C-14 dating of Maize (Creel and Long 1986). The descriptive architectural data recorded in 1974 are housed at the Department of Anthropology, Washington State University.

**Statement of Purpose**

This study was undertaken to pull the Moon House architectural and chronological data together into a useful descriptive report, while at the same time presenting an interpretive functional analysis of the observed architectural relationships. Fieldwork in 1986 focused on rechecking and amplifying the original 1974 recording of architectural features. Close attention was paid to the identification of architectural remodeling that might be indicative of changes in room function. Interpretations of room
use and of changes in the organization of functional space have resulted from the analysis of both the 1974 and 1986 data. The analysis has been enhanced by 134 tree-ring dates, which provide a chronological context for interpreting the architectural relationships.

Lipe's initial (1978) hypothesis that the Moon House Complex was a seasonally used food storage and distribution center has necessitated research on the functions and organization of space within the Moon House Complex. No attempt was made to test this hypothesis within the framework of a larger regional settlement pattern. However, the results of a comparative study of area and room count ratios between storage and habitation rooms at 5 well documented cliff dwellings (Betatakin, Kiet Siel, Twin Caves Pueblo, Mug House, Standing Fall House) indicate that the relative storage space at Moon House is higher than the archaeologically recorded norm. In addition, archaeological reconnaissance surveys within Mcloyd's Canyon indicate that Moon House was the largest, and possibly the only, cliff dwelling complex in the canyon occupied during the late 13th century. Interpretations of intrasite organizational change during the latest Moon House occupation suggest a change in the spatial organization of residence units. This archaeologically observed change indicates that the systems for adaptation on Cedar Mesa were changing, possibly as a response to an increasing frequency of poor harvests (Matson et al. 1988). This problem would have necessitated increased storage, more defensive precautions, and better organized food distribution. These observations indicate a need for continued research on the Anasazi settlement patterns of the Cedar Mesa area.
Analytical Objectives

The objectives of this analysis from its inception have followed those of two functional and chronological studies of Pueblo III period Anasazi cliff dwellings: Dean's (1969) *Chronological Analysis of Tsegi Phase Sites in Northeastern Arizona* and Morris's (1986) *Archeological Investigations at Antelope House*. Those objectives are 1) to interpret the construction sequence and chronological relationships among architecturally defined rooms; 2) to interpret the construction sequence and chronological relationships for architectural features that are interpreted to be characteristic of room function; 3) to describe the architecture and interpret architectural phenomena as the result of functional types of behavior; 4) to document spatial organization of architecturally defined rooms and suggest interpretations of social organization; 5) to consider the place of Moon House in the larger context of late 13th century Anasazi settlement patterns; and 6) quoting Dean (1969:6), "to provide a firmer foundation for temporal and cultural interpretation" in an area of southeastern Utah where many cliff dwellings hold a great potential for archaeological investigation, but have had relatively little professional attention.

The similarity in Dean's (1969) and Morris's (1986) objectives over 15 years show the continued need for documenting architectural relationships within a well defined chronology. Methods for recognizing basic architectural relationships have also remained fairly standard throughout the history of Southwestern archaeology, though interpretations of architectural phenomena in behavioral and organizational terms has become more sophisticated (Wilcox 1975, 1982). Researchers recognize the
probability of multiple uses for rooms where the architecture does not restrict the use of the room. Architectural analysis alone is limited in its ability to define the actual activities which occurred in a room. This analysis is usually supplemented by the study of artifacts and features which are usually uncovered through the excavation of room fill. The inference of activities within a space at any one time is best accomplished through the analysis of occupation surfaces (Wilcox 1982:25), and a consideration of the systemic processes that resulted in the observed assemblage of floor artifacts (Schiffer 1972, 1987). Taken alone, architectural characteristics are considered to be indicators of the intended major use of a room or other architectural structure/feature, at the time it was constructed or remodeled.

Because the Moon House Complex was not excavated, this analysis is limited to interpreting above-ground architectural relationships. However, the well preserved nature of the Moon House cliff dwellings affords nearly ideal conditions for a significant architectural study. Most of the latest architectural features at each of the cliff dwellings are intact and many of the wood beams used in roof and jacal wall construction are preserved and have provided dendrochronological dates. Many other smaller cliff dwellings exist within Mcloyd's Canyon and in nearby areas of Owl Canyon and Fish Canyon, but Moon House is uncommon in its high quality of preservation. However, some of the other sites do have preserved wood beams, probably of datable species, and all have some degree of visible architecture ranging from wall foundations and kiva masonry to intact structures. The architectural analysis of Moon House serves to document architectural relationships and variability that will be significant within the larger context of regional prehistory and to continued archaeological
investigations in the Cedar Mesa area.

The remainder of introductory Chapter 1 discusses the Cedar Mesa environment and what is currently known of Cedar Mesa prehistory. Chapter 2 is a description of previous archaeological work at Moon House, and my 1986 fieldwork. Wall construction is described in Chapter 3. The interpreted chronological relationships between architecturally defined rooms at each of the cliff dwellings are presented in Chapter 4, followed in Chapter 5 by discussions of room functions and the concept of reconstruction. The bulk of Chapter 6 is composed of architectural descriptions and interpretations for individual rooms and room associations within each of the three cliff dwellings. A discussion of the results of the architectural analysis and conclusions are presented in Chapter 7.

**The Cedar Mesa Environment**

The following brief discussion of the Cedar Mesa environment is intended to orient the reader to the general environmental context encountered by the inhabitants of the Moon House Complex. More extensive treatments of the Cedar Mesa geology and physiography, climate, and plant and animal communities can be found in published articles (Agenbroad 1975; Lipe and Matson 1971; Matson and Lipe 1975, 1978; Matson et al. 1988; Salkin 1975) and in theses (Haase 1983; Salkin 1974) and dissertations (West 1978; Dohm 1988a).

Physiographically, Cedar Mesa is formed of Permian Cedar Mesa Sandstone; it is bounded on the south by the San Juan Valley, on the east and southeast by Comb Wash and Lime Creek, on the north and northwest by Elk Ridge and White Canyon, and on the west by the western edge of the Grand
Gulch drainage basin (Lipe and Matson 1971:126). Its elevation ranges from approximately 6,950 ft. at the north end of the mesa, gradually sloping to approximately 6,240 ft. at its extreme southern end. The precipitous southern escarpment of Cedar Mesa has an approximate 700 foot drop to the dry flatlands and benches above the Gooseneck bends of the San Juan River. State Highway 261 runs north-south along the mesa top and generally follows the high central divide. The Cedar Mesa uplands slope gradually east and west from the central divide to the edges of the mesa, approximated by the 5,320 ft. to 5,600 ft. topographic contours (USGS. 15', Bear's Ears Quadrangle; USGS. 15', Grand Gulch Quadrangle; USGS. 15', Cedar Mesa Quadrangle).

In general, Cedar Mesa is considered a marginal environment for the dry farm agriculture practiced by the Anasazi. Estimated average annual rainfall ranges from 12-13 inches on the northern mesa to 10 inches at the southern edge of the mesa, slightly less than the reported necessary average for successful harvests among the Hopi (Hack 1942:8). The eolian soil covering the Cedar Mesa uplands is suitable for cultivation and is deepest on the central mesa divide and on divide ridges between the entrenched drainages. It thins towards the slickrock bordering most canyons. The deepest soils hold the most moisture and are the most agriculturally productive.

The Cedar Mesa environment encompasses both the mesa top uplands and the deeply entrenched canyons. These are two ecologically distinct habitats that together provide a diverse botanical resource. The predominant upland plant community is the pinyon-juniper woodland, which spreads across most of the mesa. Stands of pinyon (Pinus edulis) and juniper (Juniperus osteosperma) are interspersed with sagebrush parks that occur on divide
ridges, but sagebrush (*Artemisia tridentata*) is most common in shallow valleys above the point of drainage entrenchment (Lipe and Matson 1971:128). Yucca (*Yucca* sp.), mormon tea (*Ephedra* sp.) and roundleaf buffaloberry (*Shepherdia rotundifolia*) are also common. Pinyon provided edible nuts, and both pinyon and juniper were resources for construction beams and firewood. Harvesting wood resources and clearing agricultural land may have been a conjoint operation, which could have resulted in the stockpiling of construction beams for later use. At the lower elevations on the flanks of the mesa, the woodlands give way to shrublands, where sage or blackbrush (*Coleogyne ramosissima*) are dominant.

The canyon plant community benefited from a relative abundance of water. Seeps and larger springs occur throughout the canyons, fed by the percolation of snow melt and rainwater through the Cedar Mesa sandstone. Large pot holes in the canyon bottoms collect runoff from summer showers that can persist throughout the summer. Consequently, small riparian communities that include cottonwood (*Populus fremontii*), box elder (*Acer glabrum*), willow (*Salix* sp.), cattails (*Typha angustifolia*), rushes (*Juncus* sp.), and reeds (*Phragmites communis*) are spread throughout the canyon environment (Haase 1983:26). Cottonwood, elder, and willow were used as construction materials, and most other canyon plant species were edible or useful for various purposes.

**McLoyd's Canyon**

The McLoyd's Canyon drainage runs for approximately 11.3 miles southeast from the high Cedar Mesa uplands to lower Fish Canyon, which it joins approximately 5.2 miles above the confluence of Fish Canyon and Comb Wash. McLoyd's Canyon follows the basic drainage pattern shared by the
other canyon systems that drain the eastern upland mesa runoff into Comb Wash, and eventually the San Juan River. These canyon drainages begin as shallow mesa top valleys that funnel runoff to a point of entrenchment. From here the canyon bottom gradually drops in elevation, with occasional major elevational changes at points where exposed bedrock creates high dropoffs. Eventually the canyons can become hundreds of feet deep, widening in their lower reach. The sandstone walls can drop vertically from the rim to the canyon floor, but horizontal ledges, some with sheltering overhangs, often terrace the sides of the canyon. The sheltered ledges provided a protected habitat for the Anasazi cliff dwellers within the canyons.

McLoyd's Canyon, from its point of entrenchment, can be divided into 3 general physiographic portions based on depth, width, and the characteristics of its sandstone walls (Figure 3). The upper reach of McLoyd's Canyon is a relatively shallow section of the canyon, downcutting to an approximate depth of 160 ft. at its eastern extent. Its walls have variable slopes, from short vertical drops to sloping talus deposits. Horizontal ledges terrace the canyon sides, but they are small and not often sheltered. Shelters that do occur often contain the ruins of one to several small masonry habitation and storage rooms, but the total number of cliff dwellings in the upper reach is small. Springs and seeps provide water, probably throughout the summer, and access in and out of the canyon by foot is not restricted. Small feeder canyons enter the upper reach at various locations, contributing runoff water, which increases downcutting.

The dividing feature between the upper and middle reach is a low dropoff into a spring fed pool. A well entrenched side canyon enters the main canyon from the south just above the dropoff. The middle reach begins at the canyon bottom elevation of approximately 5,680 ft., at the east edge
of section 34; T.38S., R.19E. From here the canyon becomes increasingly
deepen to the southeast, with steep high sandstone walls. Within this
portion, high wide sheltered ledges offer habitable space for the location
of cliff dwellings. Most of the recorded cliff dwellings within the canyon,
including the Moon House Complex, are located on the north wall of the
middle reach. Access into the middle reach is possible from the north rim,
but is restricted by vertical walls to specific routes. The south wall of
the canyon has eroded differently from the north wall, and is characterized
by fewer long vertical drops, closer spaced terrace ledges, and more talus
slopes between ledges. Consequently, there are more routes of access and
egress on this wall. Fewer ledges on the south wall are sheltered. Their
small size and northern aspect are undesirable qualities for habitation, but
most of the south side shelters have some evidence of use. A large deep
side canyon enters the main canyon at the southeast extent of the middle
reach (Figure 3). Cliff dwelling SA-5009 is spread out along a long
minimally sheltered ledge on the north wall of this side canyon.

The lower reach of McLoyd's Canyon begins at the southeast margin of
the mouth of the large side canyon, at an approximate canyon bottom
elevation of 4,950 ft., in the southeast 1/4 of section 1; T.39S., R.19E.
At this point the canyon widens. The south slope is terraced with vertical
drops between ledges, but with talus slopes providing some access between
ledges. The north side continues to be vertical, with sheltered ledges, for
a short distance into the lower reach of the canyon. All recorded cliff
dwellings within the lower reach of McLoyd's Canyon are located on the
sheltered ledges in this section of the north wall. Eventually the
frequency of talus increases, and the frequency of vertical walls and
sheltered ledges decreases, towards the canyon mouth. The wide high talus
covered slopes become similar on the north and south sides of the canyon and continue southeast to the confluence with lower Fish Canyon.

**The Archaeology and Prehistory of Cedar Mesa**

Grand Gulch and its tributaries, draining the western slope of Cedar Mesa, hold many multiroom cliff dwellings that were the major focus of early archaeological investigations on Cedar Mesa. Later work, conducted on the Cedar Mesa uplands, is characterized by Lipe and Matson (1971:129). Their paper, "Human Settlement and Resources in the Cedar Mesa Area, S.E. Utah" (1971), was presented as an outline for future research on Cedar Mesa. This paper summarizes the archaeological characteristics of the area based on data acquired during earlier surveys, including a mesa top survey and testing program near upper Grand Gulch directed by Lipe in 1969 and 1970.

In the past 18 years, many areas of the Cedar Mesa uplands have been archaeologically surveyed. In the early 1970s Dalley and Wilson surveyed an east/west highway corridor across the northern margin of Cedar Mesa. Archaeological sites were excavated to mitigate the effects of the relocation and improvement of Utah State highway 95 (Dalley 1973; Wilson 1974). A fairly large number of archaeological sites have been recorded sporadically in the canyons and across the mesa top as a result of numerous small, project specific, impact assessment contracts. The records of these archaeological sites are accessible through the Bureau of Land Management.

The most substantial archaeological investigations conducted on Cedar Mesa have been those undertaken by R. G. Matson and William D. Lipe through the Museum of Northern Arizona (Matson and Lipe 1975, 1977, 1978; Matson et al. 1988) and related research projects inspired by their work and
undertaken by their associates or students (Brooks 1974; Salkin 1974, 1975; Agenbroad 1975; Camilli 1975, 1983; West 1978; Dohm 1981, 1988a; Keller 1982; Haase 1983; Aasen 1984; Benson 1984, 1985;). In 1974 the Museum of Northern Arizona Cedar Mesa Project was developed to answer questions concerning Anasazi settlement patterns on Cedar Mesa. The uplands within 5 drainage systems (Upper Grand Gulch, Bullet, North Road, West Johns, and Hardscrabble) were sampled by conducting archaeological surveys within randomly chosen 400 meter square quadrats covering approximately 7% of each of the selected areas. Located sites were recorded and collected, and several were tested. The result of this work is the interpretation of Anasazi land use patterns on Cedar Mesa as an adaptation to critical environmental factors (Matson et al. 1988). A summary of the chronology and adaptation of Anasazi settlement patterns on Cedar Mesa is presented below. The information is drawn mainly from a recent journal article (Matson et al. 1988) and a Washington State University master's thesis concerning settlement patterns during the late Pueblo occupation (Haase 1983).

The archaeological record of the Cedar Mesa Project study area indicates that the Anasazi repeatedly occupied and then abandoned the central Cedar Mesa uplands between A.D. 200 and A.D. 1300. Four periods of continuous occupation appear to be associated with periods of mesic climatic conditions. Conversely, each occupational hiatus appears to be associated with more xeric conditions (Matson et al. 1988). The Anasazi on Cedar Mesa depended to a probably increasing extent on the dry farming of maize, beans, and squash. Sequential dry years without adequate precipitation for agriculture may have caused the Anasazi to periodically abandon the mesa. They returned after the first 2 extensive hiatuses, but with a lag period of approximately 50 years following the onset of a pattern of increased
precipitation. There was a long hiatus after the second abandonment of
Cedar Mesa at approximately A.D. 725, and the area was reoccupied at
approximately A.D. 1060. This reoccupation coincided with the late Pueblo
II period of the Pecos classification (Kidder 1927) and is designated as the
Windgate Phase. It lasted until about A.D. 1100, when it was replaced,
probably without a break in occupation, by the Clay Hills Phase (A.D. 1100 -
A.D. 1150). The Clay Hills phase is distinctive in its high frequency of
Kayenta ceramics, indicating immigration by people from the Kayenta area or
increased trade relations. Mesa Verde ceramics are dominant prior to Clay
Hills and after.

After a possible 15-year occupational hiatus, Cedar Mesa was reoccupied
at about A.D. 1165. This last continuous occupation of Cedar Mesa is
divided into two phases, based on variations in ceramic type frequencies and
site location patterns. The Woodenshoe phase occurred from approximately
A.D. 1165 to A.D. 1210, with a basic continuation of previous upland-
oriented Pueblo settlement patterns. The Red House phase followed from A.D.
1210 to A.D. 1270, and is distinguished by an apparent shift in settlement.
Anasazi settlement on Cedar Mesa had been focused at higher elevations
(predominantly above 6200 ft.) to take advantage of greater precipitation
and deeper soils for agricultural purposes. During the Red House phase,
settlement shifted to include a greater number of lower elevation site
locations, including numerous cliff dwellings within the canyons. The
implications are that people became concerned with access to reliable water
sources, dry storage, and the defense of stored foods and their persons.
Water and dry shelters, some located on high ledges with limited access, are
characteristic of the local canyon environment. Settlement and agriculture
would have continued on the upland divide, facilitated by the use of
seasonal field stations.

Habitations and field stations are the major recognized site types on Cedar Mesa throughout late Basketmaker to Pueblo III occupation. These sites were strategically dispersed to take advantage of the marginal Cedar Mesa resources and to maximize agricultural potential. Fields were probably planted in a variety of physiographic locations to minimize against catastrophic crop loss. The dispersed fields were tended and protected by people living at the small dispersed habitation sites, or episodically at the field stations. Storage was always important as a buffer against poor harvests and probably was intensified during the Red House phase. This is indicated by the prevalence of isolated storage structures and storage structures associated with habitation sites. After a thousand years of cyclic occupation and abandonment storage systems were probably well developed to provide food during short term dry periods within generally mesic periods. The development of a pattern of xeric conditions in the middle 13th century (Dean et al. 1985, Peterson 1988, Watson et al. 1988) probably put increasing demands on stored foods and eventually led to the final abandonment of Cedar Mesa by the Anasazi in the late 13th century.
CHAPTER 2

Fieldwork

Archaeological Fieldwork at the Moon House Complex

The original official recording of M-1 (42Sa5005) and M-2 (42Sa5004) of the Moon House Complex cliff dwellings occurred in August of 1964, but the circumstances of the recordings are not clear. The original site records have only a minimal amount of information, mostly location and the approximate number of obvious rooms, and are on file at the Bureau of Land Management office in Monticello, Utah. There is no Bureau of Land Management record to indicate M-3 was recorded prior to Cedar Mesa Project fieldwork in 1974.

1974 Fieldwork

The first extensive architectural recording of the Moon House Complex was during November, 1974, in conjunction with the larger Museum of Northern Arizona Cedar Mesa Project (Matson and Lipe 1975, 1978; Matson et al. 1988), under the direction of Dr. William D. Lipe and Dr. R.G. Matson. The Cedar Mesa Project was supported by National Science Foundation Grants GS 33413X and GS 43570 and conducted under a Department of the Interior Antiquities permit. For approximately 2 weeks, five archaeologists (and one cook) worked at the three cliff dwellings writing detailed descriptions of the characteristics of architecturally defined rooms and other structures.
Scaled plan-view maps were drawn for each room and profile-views were illustrated for selected rooms and room blocks (Appendix B). Architectural recording followed a written guide entitled "Notes for Ambitious Recorders of Pueblo Structures" (Lipe and Buick 1974; see Appendix B). This guide directed attention to the architectural construction sequence, to evidence of reconstruction, and to the architectural features and activity remains used by Dean (1969:26-39) to infer room function. The photographic record of the Moon House cliff dwellings was limited to color slides showing certain architectural features and overviews of individual rooms and room associations. The original field notes and professionally drafted maps and drawings compiled from the original field records are housed with Dr. William D. Lipe at the Department of Anthropology, Washington State University.

A surface collection at each of the three cliff dwellings was conducted in conjunction with the 1974 architectural recording. Surface collection of the ledge fronting each cliff dwelling recovered all visible artifacts, excluding large ground stone items. Collected artifacts were provenienced by numbering the mapped locations of artifacts or artifact clusters. Artifacts collected on the surface within rooms were numbered as one location. The recovered artifacts were ceramic sherds (white ware, red ware, and gray ware), projectile points, other chipped stone tools, chipped stone debitage, cores, manos, some bone, and other organic materials (including botanical materials, and cordage). The artifacts are housed with Dr. William D. Lipe in the Department of Anthropology, Washington State University. Excavation was not undertaken during the 1974 fieldwork.

A reconnaissance of an approximately 1.5 mile stretch of Mcloyd's Canyon was conducted by various field crew members under the direction of
Don Keller in addition to the recording of the Moon House Complex (Figure 11).

**Tree-ring Samples**

Tree-ring samples were collected by Richard Ahlstrom at the 3 cliff dwellings in conjunction with the 1974 architectural recording. Cores were taken from beams with a tubular core sampler, mounted on a 3/4" power drill. Electricity was provided by an automobile storage battery and, on occasion, by a portable generator. Ordinarily, the generator was used at night to recharge the storage battery. One hundred and ninety-two samples were taken from all potentially datable roof beams, wall support beams, door lintels, and vertical poles used in jacal walls. Field notes (Ahlstrom et al. 1974) record the species, diameter, and general characteristics of each wood beam within an architectural feature, including nonsampled beams. A large number of beams or sticks used as construction materials were field-identified as being either cottonwood, oak, or willow and were not cored. Sampled beams were exclusively juniper, pinyon, and unidentified conifer. Nonscaled maps, included in the field notes, locate each beam within an architectural feature. These can readily be correlated with the scale drawings made during the architectural recording.

**1986 Fieldwork**

I undertook additional fieldwork in June and July of 1986 under Bureau of Land Management ARPA permit #86UT57621. A total of 23 working days were spent at the Moon House cliff dwellings during 3 separate periods. At this time all 1974 architectural records were visually checked for accuracy and
completeness against the observed Moon House architecture. Additional descriptive notes and measurements were taken to supplement the original records, but interpretive notes and photographs comprised the bulk of the supplemental record. One additional scaled plan map of rooms G through K at M-2 was drawn to illustrate the relationships among these earlier rooms. Many black-and-white photographs were taken at each of the Moon House cliff dwellings to record architectural details, the overall form of each room, and room associations. Color slide photographs were also taken to parallel much of the black-and-white documentation.

Archaeological Reconnaissance in and Adjacent to Mcloyd's Canyon

An archaeological reconnaissance of Mcloyd's Canyon was conducted in 1986 to supplement fieldwork at the Moon House cliff dwellings. This reconnaissance was conducted to locate cliff dwellings and other Pueblo II and Pueblo III sites in order to collect architectural and locational data for comparing Pueblo III settlements in Mcloyd's Canyon. Additional data were collected during limited reconnaissance of Owl Canyon, on the divide between Owl and Mcloyd's Canyons, and in Lower Fish Canyon. Archaeological reconnaissance in and adjacent to Mcloyd's Canyon was conducted over 7 nonconsecutive days during June and July of 1986. The reconnaissance was undertaken to collect specific data from cliff dwellings concerning numbers of architecturally defined rooms, architectural features indicating room function, and techniques of wall construction. The reconnaissance covered the entire middle section of Mcloyd's Canyon, portions of the upper and lower sections of Mcloyd's Canyon, the lower part of Owl Canyon, noncontiguous areas of the divide between Owl and Mcloyd's Canyon, and a
portion of lower Fish Canyon (Figures 11 and 12).

Reconnaissance in the upper reach of Mcloyd's Canyon was conducted by walking the relatively shallow canyon bottom and north and south rims, scanning the ledges and overhangs on the north and south sides of the canyon with the aid of binoculars. Reconnaissance in the middle and lower sections of the canyon was conducted from the south rim, and minimally from the north rim, using binoculars to scan the ledges and shelters on the north and south walls of the canyon. Reconnaissance in Owl Canyon was conducted with binoculars from the south rim looking towards the north wall and down to the visible portions of the south wall. Lower Fish Canyon was surveyed on foot in the bottom of the canyon, accessing sites whose locations had been labeled by the U.S. Geological Survey on the U.S.G.S. Bluff NW., Utah, 7.5' quadrangle, topographic map. The divide between Mcloyd's Canyon and Owl Canyon was not systematically surveyed. Flat eolian ridges between the many small dissecting drainages were walked to search for Pueblo III surface remains.

The reconnaissance of these areas cannot be considered complete because the canyon bottoms and various ledges and small shelters along the canyon walls were not actually ground-searched, but were only inspected with the aid of binoculars, often from a far distance. The goal of the reconnaissance was to locate the larger ruins and it is highly probable that all cliff dwellings of more than 2 or 3 rooms in Mcloyd's Canyon were located. Reconnaissance of the other three areas was not intended to be as intensive as that in Mcloyd's Canyon, and other unrecorded cliff dwellings and PIII surface sites certainly exist in those areas.

The 1986 reconnaissance resulted in the recording of 51 sites, including 24 in Mcloyd's Canyon. Eleven sites were recorded in Owl Canyon
and 11 sites were recorded or rerecorded in Fish Canyon. Many sites on the
divide between Mcloyd's Canyon and Owl Canyon were observed, but only 5 were
recorded, including 2 sites with a Pueblo III component. Sites with visible
structures were recorded by describing the architecture and sketching a plan
map. Room functions were interpreted, based on general architectural
characteristics. A report of the 1986 reconnaissance and copies of the site
records are on file with the Bureau of Land Management San Juan Resource
Area office in Monticello, Utah.

Nine sites in addition to the three-site Moon House Complex were
recorded in November of 1974 by two or more of the five archaeologists
working at the Moon House Complex as they conducted a reconnaissance over an
approximately 1.5 mile stretch of the upper middle section of Mcloyd's
Canyon (Figure 11). The original site records are housed by Dr. Lipe in the
Department of Anthropology, Washington State University. Copies of all or
part of these records are housed by the Bureau of Land Management at the San
Juan Resource Area office in Monticello, Utah. Chronologically, the nine
additional sites recorded in 1974 range from probable Basketmaker II cists
located in a natural shelter to the remains of small masonry rooms which
might have been contemporaneous with the late Pueblo III use of the canyon
and hence with the Moon House Complex.

Sites M-1 (SA-5005) and M-2 (SA-5004) of the Moon House Complex, with
18 and 21 rooms respectively, have the largest number of obvious rooms of
any of the 29 cliff dwellings recorded within Mcloyd's Canyon (Table 1).
The Moon House Complex (M-1, M-2, and M-3) totals 49 rooms, of which 32 are
interpreted to have been used simultaneously during the last period of
occupation. Six cliff dwellings in Mcloyd's Canyon, other than those of the
Moon House Complex, are relatively large, having between 6 and 13+ obvious
Table 1. Archaeological Reconnaissance Data.
<table>
<thead>
<tr>
<th>Site No.</th>
<th>C/O</th>
<th>Recording Method</th>
<th>No. of Rooms</th>
<th>Habitation</th>
<th>Storage</th>
<th>Kivas</th>
</tr>
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<tbody>
<tr>
<td>SA-5005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-1</td>
<td>C</td>
<td>on-site</td>
<td>18</td>
<td>5</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>M-2</td>
<td>C</td>
<td>on-site</td>
<td>21</td>
<td>?2</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>M-3</td>
<td>C</td>
<td>on-site</td>
<td>10</td>
<td>?</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>M-4</td>
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<td></td>
<td></td>
<td>masonry ruins/cists; uncertain count</td>
<td></td>
</tr>
<tr>
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<td>C</td>
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<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
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<td>1</td>
<td></td>
</tr>
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</tr>
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<td></td>
<td></td>
<td>cist</td>
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</tr>
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<td></td>
<td>lithic reduction area/wall</td>
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<td>1</td>
<td></td>
</tr>
<tr>
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<td>?</td>
<td>1</td>
<td></td>
</tr>
<tr>
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<td>2</td>
<td>?</td>
<td>?</td>
<td></td>
</tr>
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<td>3 or 4</td>
<td>?</td>
<td>3 or 4</td>
<td></td>
</tr>
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<td>1</td>
<td>?</td>
<td>?</td>
<td></td>
</tr>
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<td>C</td>
<td>on-site</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>M-17</td>
<td>C</td>
<td>binocular</td>
<td>9+</td>
<td>1+</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>M-18</td>
<td>C</td>
<td>binocular</td>
<td>1</td>
<td>?</td>
<td>?</td>
<td></td>
</tr>
<tr>
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<td>C</td>
<td>binocular</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td></td>
</tr>
<tr>
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<td>1</td>
<td>?</td>
<td>1</td>
<td></td>
</tr>
<tr>
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<td>C</td>
<td>on-site</td>
<td>9+</td>
<td>3+</td>
<td>?</td>
<td>1</td>
</tr>
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<td>4</td>
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</tr>
<tr>
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<td>?</td>
<td>1</td>
<td></td>
</tr>
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<td>1</td>
<td></td>
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</tr>
<tr>
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<td>1</td>
<td>1</td>
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</tr>
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<td>3 or 4</td>
<td>?</td>
<td>?</td>
<td></td>
</tr>
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<td>binocular</td>
<td>10+</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
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<td>binocular</td>
<td>1+</td>
<td>?</td>
<td>?</td>
<td></td>
</tr>
<tr>
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<td>2+</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>M-30</td>
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<td>5 or 6</td>
<td>?</td>
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<td>?</td>
</tr>
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<td>2</td>
<td></td>
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<td>?</td>
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<td>?</td>
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<td>?</td>
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</tr>
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<td>?</td>
<td>?</td>
<td>?</td>
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</tr>
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<td>(west)</td>
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\text{SA-5069} & (F-3) & C & \text{on-site} & 14+ & 2+ & ? & ? \\
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D-5 & 0 & \text{on-site} & ? & ? & ? \\
\end{array}
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rooms. Each of those 6 cliff dwellings has one or more recognized or possible habitation rooms. One of the sites, SA-5009, was recorded in 1964 and rerecorded as SA-5009 (west) and SA-5009 (east) during the 1986 survey. Sites SA-5009 (west) and SA-5009 (east) are interpreted to have possibly functioned together as a unit, similar to the relationship between the Moon House Complex cliff dwellings. Another interpretation is that SA-5009 (west), being a room block of granaries, was an isolated storage facility used by a nonresident population. Cliff Dwelling M-21 (composed of 3 habitation rooms, 1 kiva, and indefinite storage rooms) is interpreted to have functioned together with its smaller neighbor, Cliff Dwelling M-22 (composed of 4 storage structures).

The designation of the recorded sites by numbers initially served an administrative purpose, to recognize spatial concentrations of structures and/or artifacts. However, many of the recorded sites, especially those with a single or primary use, probably functioned together at varying levels of community organization. The two complexes (SA-5009 west and east, and M-21 and M-22) appear to be like the Moon House Complex in that they have a cluster of storage rooms that are separate from nearby habitation and ceremonial rooms. Whether the elements in these two clusters were actually used at the same time is not known, however, because they have not been precisely dated. Their architectural styles indicate they were probably built and used sometime during the period A.D. 1150 to A.D. 1300.

One of the cliff dwellings rerecorded near the mouth of Fish Canyon might have had some connection with Moon House. SA-1369 is a 5 room cliff dwelling built on a ledge raised approximately 2 to 2.5 meters above the ground, overlooking Fish Creek. Probably one household occupied the cluster of one, or possibly two, habitation rooms and 3 storage rooms. The possible
connection with Moon House is indicated by pictographs and loop holes similar to those at M-1. A solid white horizontal band with a horizontal line of solid white dots below the band decorates the east wall of the definite habitation room at SA-1369. This design is similar to the horizontal white band and dots that decorate three habitation rooms at M-1. The difference between the designs is that the SA-1369 pictograph has its horizontal line of dots below the band instead of above the band as in the Moon House design. Also the SA-1369 pictograph lacks the triangular projections found along the lower margins of two of the three Moon House painted bands. The white band design within Room I at Moon House also lacks any triangular projections. White dots are also used to form an arch on the back wall of the SA-1369 habitation room.

Five loop holes have been incorporated into the south wall of the SA-1369 habitation room. Four of the holes point outside the rooms and one points into the western storage room. The loop hole pointing into the storage room may have been intended to point outside before the storage room was abutted to the west end of the south wall. If loop holes serve a defensive purpose for observation and assault as suggested by archaeologists who use their presence as criteria in the identification of defensive structures (a possibly tautological argument), then their presence at SA-1369 and Moon House indicates a possible contemporaneous defensive need at the two cliff dwellings.
CHAPTER 3

Wall Construction

Wall construction techniques vary throughout the Moon House Complex. This chapter describes the construction details of jical walls and 3 types of masonry wall. Walls will be referred to as jical or types 1, 2, or 3 masonry throughout the following chapters.

Jical

The jical walls at the Moon House Complex were typically constructed by erecting a main support frame of vertical poles, spaced approximately 30 cm apart and extending from the bedrock floor to the bedrock ceiling of the shelter. Most of the upright poles range in diameter from approximately 4 to 12 cm, but can be as small as 2 cm in diameter. Poles of juniper (Juniperus osteosperma), cottonwood (Populus fremontii), willow (Salix sp.), and oak (Quercus gambelii) were used in construction of the jical walls, in that order of frequency. Because juniper is datable in this area, many of the Moon House tree-ring dates came from jical walls. Space between the upright poles was filled with long smaller diameter branches, placed upright and parallel to the larger poles. The smaller upright branches were often secured with probable willow twig ties and strips of yucca leaf. Additional frame support was provided by long small-diameter branches, placed horizontally and spanning the entire length of the wall. The horizontal supports are not always regularly spaced, but are often spaced approximately
50 cm apart and are secured with probable willow and yucca ties.

Mud has been packed onto, and into, at least the outer-facing side of the framework from floor to ceiling to complete the wall. At Moon House it is not common for both sides of the jacal wall to have been fully finished with mud. In fact, it is common for the inside of an outer wall to have been only partially covered with mud. In these cases the lower 1/2 or 1/3 of the inner wall is covered, but other inner walls have a completely exposed framework. One side of the inner walls dividing rooms is always completely covered, while the other side may be partially covered or not covered at all. The mud surface of the jacal walls is generally smoothed, though finger impressions from packing and smoothing remain obvious.


**Masonry Type 1**

Type 1 masonry is exemplified by the curvilinear architecture of Rooms B1-B3, located around Court 2 at Cliff Dwelling M-1 (Figures 6 and 14). These masonry walls were constructed primarily of mud, and are tempered with small gravel and fiber. Upright sandstone slabs served as a wall foundation for courses of relatively small irregular sandstone blocks which were alternately coursed with thick layers of mud. Thick mud typically covers the sandstone courses, except where the mud covering has been eroded through weathering. At Moon House the sandstone coursing is minimally exposed at the exterior of the east wall of Room B1. The internal coursing of the irregular sandstone blocks is better exemplified in the decomposing type 1 masonry walls at Cliff Dwelling SA-5009/east in McLoyd's Canyon. Compared
with type 2 and type 3 masonry, the core sandstone within the mud walls is widely spaced horizontally within a course as well as vertically between courses.

A variation on the type 1 construction is exemplified by the existing south wall of Room B5 at Cliff Dwelling M-1. Here, horizontal poles span the length of the wall and appear to be another mechanism for providing wall support. In Room B5, at least 2 poles (possibly 3) are set within the mud wall, above the entry. This wall is not decomposing and therefore the frequency of sandstone rubble core materials is not very visible. It does appear that sandstone coursing is present only in the lower portion of the wall, and that the upper 70 cm of wall may be strengthened mainly by the horizontal beams.

**Masonry Type 2**

Type 2 masonry at Moon House is typically used in the construction of curvilinear, often bee-hive shaped, walls. This masonry is characterized by the use of irregular shaped sandstone blocks, placed to sit on their flat surfaces with irregular jagged edges protruding from both the inner and outer surfaces of the wall. The blocks are set in fairly even, usually single wythe, courses and are mortared with mud. The larger sandstone blocks are often incorporated into the lower courses with size decreasing towards the top of the wall. The walls are predominantly rock, and chinking is minimal. Storage Room E1 at M-1 (Figures 5 and 14) and Storage Rooms F (Figure 22), O, P, and Q (Figure 23) at M-2 are the existing Moon House structures constructed mostly of type 2 masonry. Habitation Room C at Cliff Dwelling M-1 employed type 2 masonry in its top four courses. Though Rooms
0 and P are classified as having type 2 masonry, their walls show a greater attention to creating relatively smooth wall surfaces.

Masonry Type 3

Type 3 masonry is used in the construction of almost all of the latest tree-ring dated masonry structures at each of the 3 cliff dwellings. This masonry was constructed of irregular sandstone blocks, often double wythe, laid to expose the flattest surfaces to the outer and/or inner wall. Mud is used as mortar between the blocks, and is spread to overlap the edges of the blocks to create a uniformly smooth wall surface. The rooms constructed using this masonry technique are well coursed, and the latest rooms are constructed with very even courses. Variation among type 3 masonry walls is dependent on: 1) the size range of the sandstone blocks; 2) the evenness of the coursing, which is often dependent on the uniformity of block size; 3) the frequency of chinking; and 4) the linearity of the chinking, which is usually dependent on the evenness of coursing. Chinking is used between the courses as a space filler, but takes on a decorative quality, and possibly a decorative function, when a continuous row is placed between very evenly coursed blocks. These linear patterns are sporadic in some walls, but the latest walls of Room G at Cliff Dwelling M-1 and Rooms A and B at Cliff Dwelling M-2 have that apparently decorative quality. The structural need for chinking as a space filler is greatest for the less well-coursed masonry, where large gaps between blocks are more common. In these walls, pockets of chinking probably serve a structural support function, but it is not clear if the chinking directly supports the sandstone blocks or is just lodged in the mortar to prevent shrinking and cracking of thick mud. For
masonry of very evenly coursed and matched blocks chinking was probably not needed to directly support the sandstone blocks, but was more likely to have prevented cracking or served as decoration.

The decorative nature of chinking is illustrated by the incorporation of one horizontal row of white chinking rocks into the inner surface of the east wall in Room D at Cliff Dwelling M-2. White linear chinking is also used above the entry in the same room. The squareness of the entryways and outside corners at wall junctures, in conjunction with smooth straight wall surfaces, gives type 3 masonry a distinctive square and formal appearance.

The Sequential Order of Masonry Types

A sequential pattern for use of the three masonry techniques is evident in the archaeological record at Moon House. The distinction between early and late masonry types is based on construction sequence and dendrochronological relationships. The earliest is the type 1 masonry technique. It is recorded for Rooms B1, B2, B3, B5, and the lower courses of Room C at Cliff Dwelling M-1, and at Cliff Dwelling M-2 in Rooms G, H, and I, and in the vicinity of Room K. It is also evident in portions of the lower courses in Rooms O, P, and Q. Room C1 of Cliff Dwelling M-3 has remnants of possible type 1 masonry in the lower courses, where its east and west walls abut the rear of the shelter. Storage Room E of Cliff Dwelling M-3 is constructed on an upright slab base, but appears primarily to be mud with large quantities of fiber temper and may date to the Basketmaker III Period (William D. Lipe, personal communication). This structure has undergone at least 3 or 4 reconstructions, with only the top courses being masonry (not type 1).
In all of these rooms the type 1 masonry technique precedes any use of either the type 2 or type 3 masonry techniques. The latest dated use of type 1 masonry at the Moon House Complex is pre-A.D. 1244 in the construction of Rooms B1, B2, and B3 at Cliff Dwelling M-1.

Masonry types 2 and 3 are late masonry types at the Moon House Complex. Both types were used concurrently, but type 2 may have been transitional between masonry type 1 and type 3. Type 3 masonry was used in the construction of all of the latest tree-ring dated masonry structures at each of the 3 cliff dwellings. In addition most remodeling and reconstruction of type 1 masonry walls at each cliff dwelling used the smooth faced type 3 masonry. Type 2 masonry was used for the construction of Rooms F, O, P, and Q at Cliff Dwelling M-2. Rooms O, P, and Q cannot be dated, but probably predate the middle A.D. 1260s construction period and may be contemporaneous with Room F. Room F is indirectly dated to a pre-A.D. 1260s construction period, based on its remodeling and abutment by Room E. This evidence indicates a possibility that type 2 masonry was in use prior to the A.D. 1260s construction period, which used mostly type 3 masonry.

Masonry type 2 continued to be used into the last construction period based on the abutting of Room E1 to Room E2 and the presence of type 2 masonry in Room C above type 3 masonry at Cliff Dwelling M-1. Room E1 masonry is characteristic of type 2. Room E2 is characterized by the presence of type 3 masonry. Within the framework of bonding and abutting theory (Wilcox 1975:133-139) Room E1 is interpreted to have been constructed after Room E2. It is quite probable that the type 2 masonry was used mainly when construction plans called for a curved walled, beehive shaped, storage structure. Floor areas for these structures are less than that for square storage structures and the curved walls probably allowed them to be molded
to the available sheltered space.

I suggest that the early type 1 and late type 3 masonry are distinctively sequential in their use at the Moon House Complex. Chronologically, the type 1 masonry may have been used until the A.D. 1260s construction at Cliff Dwellings M-1 and M-2, but is dated not later than the middle A.D. 1240s. Room B5 at M-1 was constructed using a variation of the early type masonry and approximately post dates A.D. 1244, based on its abutment to Room B4. At Cliff Dwelling M-3, tree-ring samples from an jacal wall in Room C1 indicate its type 3 masonry was constructed during the early A.D. 1250s. These chronological relationships indicate that at the Moon House Complex the transition from the early type 1 masonry to the later type 3 masonry occurred in the late A.D. 1240s to early A.D. 1250s. Type 2 masonry is considered to have possibly preceded the use of the later type 3 masonry as a major construction technique. It at least co-occurred with the type 3 masonry.

The probability that the 3 masonry types were chronologically sequential outside the Moon House Complex is not known, but could possibly be tested. All three masonry types have been observed at various cliff dwellings in Mcloyd's Canyon, and several of the cliff dwellings in Mcloyd's Canyon and lower Fish Canyon have preserved beams that might allow for the tree-ring dating of masonry structures. A survey of Cedar Mesa cliff dwellings, including the recording of the sequential nature of masonry types, would help to refine canyon settlement patterns, possibly based in part on the distribution of masonry construction techniques.
Variation in Masonry at Moon House as a Response to Production, Use, and Maintenance

McGuire and Schiffer (1983) have proposed a general explanatory theory of architectural design which requires the consideration of architectural design as a response to the compromised optimization of three goals: 1) production costs, 2) use factors, and 3) maintenance costs. Intended use of a structure is given the highest priority in design, with the balance between production cost and maintenance cost dependent on the intended "uselife" of a structure. High production costs are required to build a structure that can be used for an extensive period of time with low maintenance. If the intended use life is short, maintenance is a minimal consideration and production costs can be less. McGuire and Schiffer expand their theory within the theoretical context of the Pithouse to Pueblo transition, associating the adaptive mobility of the Basketmakers with short uselife, low cost structures. They conclude that as the Anasazi became more sedentary, the intended uselife of structures increased. The cost of construction increased as structures were built to last for longer periods of time with minimal maintenance.

In contemplating the observed variation in masonry at Moon House it is instructive to consider construction cost and maintenance cost as indicators of intended uselife. Although without experimental studies there can be no conclusive statement presented as to the relative construction and maintenance costs of the three masonry types (discussed above); a greater attention to geometric uniformity, durability, and possibly appearance is indicated during the last period of masonry construction. The achievement of these qualities in the later masonry type is tentatively considered to
have required more effort than was necessary for either of the other masonry types. This effort was expended in constructing buildings that were both sturdy and esthetically pleasing in appearance. In comparing maintenance costs for the three masonry types, the type 2 masonry and the type 3 masonry are probably similar in durability and security from rodents and moisture, and hence may have similar maintenance costs in the cliff dwelling environment. In an open environment, the type 2 construction may have weathered more rapidly due to the greater surface exposed by its irregular construction. The early type 1 masonry of primarily mud with a sandstone support core, and upright sandstone slab base, probably required more maintenance and provided less security than the later two masonry types. These observations are used to suggest that the intended uselife of the type 3 masonry was as great or greater than that of the early type 1 masonry. The perceived attention to formal detail in the late masonry compared to the type 2 masonry probably reflects a later concerted effort to build high quality structures.

The construction of higher quality structures during the late A.D. 1260s construction period indicates an intention to use the complex for an extensive period of time, whether Moon House was continuously occupied throughout the year or occupied seasonally.
CHAPTER 4

Chronology

Dendrochronology and Construction Sequence

The laboratory analysis of tree-ring dates collected from the Moon House Complex in 1974 was conducted by Richard Ahlstrom at the University of Arizona Tree-ring Laboratory. A summary of the results of that analysis was presented as part of Ahlstrom's Ph.D. dissertation (1985:360-374). My reexamination of the dendrochronological evidence, following the approach of Bannister (1962) and Dean (1969:10), concurs with most of Ahlstrom's interpretations and are presented here along with a discussion of room construction sequence.

One hundred and ninety-two tree-ring samples were collected in 1974. The laboratory analysis of those samples produced 134 cates. Of those dates, 106 are cutting dates (79 %) while only 13 are "v" dates (9%) (Table 2) (Ahlstrom 1985:362). Unfortunately, many of the cutting dates are also "+" dates, possibly adding a small margin of error to the interpreted dates. When a "+" accompanies the outside tree-ring date, it means that one or more rings may be missing near the end of the ring series and, therefore, the tree-ring date has an early bias. The "+" date should be interpreted to be "correct to within zero to three years and is probably never off by more than five (Ahlstrom 1985:35). Still, the sample is composed of a high frequency of cutting dates, which indicate the nearly continual cutting of beams for approximately 42 years, between A.D. 1226 and 1268. Many other
Table 2. Tree-ring dates for the Moon House Complex.

The symbols used with the inside date are:

- **p** - pith ring present
- **fp** - the curvature of the inside ring indicates that it is far from the pith
- **+- p** - pith ring present, but an exact date cannot be assigned
- **+-** - the inner ring is not the pith ring and an absolute date cannot be assigned

The symbols used with the outside date are:

- **B** - bark present
- **G** - beetle galleries are present of the surface
- **L** - a characteristic surface patination and smoothness, which develops on beams stripped of bark, is present
- **v** - a subjective judgement that, although there is no direct evidence of the true outside on the specimen, the date is within a very few years of being a cutting date
- **vv** - there is no way of estimating how far the last ring is from the true outside
- **+** - one or more rings may be missing near the end of the ring series
- **++** - a ring count is necessary due to the fact that beyond a certain point the specimen could not be dated
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Figure 13. Number of tree-ring dates per year for the Moon House Complex. Five dates earlier than A.D. 1200 have been omitted from the figure. Those dates are 1) A.D. 1199+18 from Room C at M-3; 2) A.D. 1185+18G from the kiva at M-3; 3) A.D. 1166+18 from Room B3 at M-3; 4) A.D. 1143B from Room C at M-1; and 5) A.D. 1143G from Room J at M-1.
tree-ring dates are spread throughout the early 13th century and late 12th century, with the two earliest dates at A.D. 1143B and A.D. 1143G.

This chapter presents room construction sequences for each of the three cliff dwellings of the Moon House Complex, based on tree-ring dates and/or bonding and abutment data for each of the rooms. The chapter is organized to present data for court groups (rooms grouped together around a courtyard), room blocks (blocks of contiguous rooms with shared walls), and individual rooms at each of the separate cliff dwellings. The data are summarized at the end of the chapter in a discussion of 3 periods of beam procurement and room construction. The chronological evidence presented here is the basis for suggesting that at least 32 rooms of the Moon House Complex were in use during the late A.D. 1260s.

M-1 (42-SA-5005)

Court Group 2

Court Group 2 is composed of contiguous Rooms B1-B5 and Room D, located on the northern margin of court 2 (Figure 14). The original wall construction and major portion of Rooms B1-B3 and B5 is type 1 masonry. Room D was constructed of type 3 masonry and Room B4 was constructed using jaca. Tree-ring samples from the jaca west wall of Room B4 date the original construction of Rooms B1, B2, B3, and B4 to no later than about A.D. 1244. Room B4 tree-ring dates range from A.D. 1234+V to A.D. 1244+B (Table 2).

Construction sequence shows that Room B2 was the first room constructed. Remnants of the original type 1 masonry south wall of Room B3 indicate that Room B3 may have originally bonded to Room B2, but subsequent
type 3 masonry reconstruction of B3's south wall abuts to the west wall of Room B2. In any case Room B3 was probably constructed with Room B2. Room B1 was built abutting the south wall of Room B2, and also was probably built as part of a unit that included Rooms B2 and B3. Room B4 was built abutting the west wall of Room B3, with tree-ring dates placing the construction of Room B4 at approximately A.D. 1244. Room B5 abuts Room B4 and was therefore constructed post A.D. 1244, after Room B4 and hence after Rooms B1-B3. Because Room B5 is built of type 1 masonry, this mode of construction continued to be used at least into the mid A.D. 1240's. There are no tree ring samples that directly date the original type 1 masonry construction of Rooms B1-B3. These rooms are the earliest extant structures at M-1 and are architecturally distinct from the later masonry rooms.

Wall reconstruction events in Rooms B1-B3 occurred after the original wall construction and most incorporate type 3 masonry to repair or remodel the original architectural features. Details of the reconstructions are described in Chapter 6. There are no direct tree-ring dates for wall reconstruction, but the reconstructed roof has been tree-ring dated and provides an approximate upper limit for reconstruction at Rooms B1-B3.

Roof reconstruction at Room B2 is dated by one beam at approximately A.D. 1261 (Table 2). The reconstructed roof on Room B1 overlaps the roof on Room B2, therefore postdating the B2 roof construction. Because the reconstructed roof on Room B2 rests on the reconstructed east wall of Room B2, it is inferred that reconstruction of the east wall occurred prior to A.D. 1261. Room B2 is heavily sooted except where the type 3 masonry has replaced the original type 1 masonry in the east wall and in the remodeling of the entry. There is also no soot on the underside of the reconstructed roof. The lack of sooting on all reconstructions and the use of type 3
masonry indicates that the east wall, entry, and roof reconstructions in Room B2 all occurred at approximately A.D. 1261. Wall repair in Room B1 appears to be bonded with the east wall construction in Room B2, therefore dating that reconstruction to the same period. The reconstruction of the eastern part of the south wall of Room B3 is type 3 masonry and probably also dates to the same period of reconstruction and remodeling.

These major reconstructions and the remodeling of the Room B2 entry from a larger habitation entry to a small granary style entry, and the lack of sooting on all reconstructions, indicate that Room B2 was changed from a habitation room to a storage room. These architectural changes can be chronologically placed at approximately A.D. 1261 or later, considering the high frequency of probable beam reuse throughout the Moon House Complex. I consider the reconstruction and remodeling of Rooms B1-B3 to be contemporary with the last period of construction and reconstruction at the Moon House Complex.

Room D is the latest constructed room accessed from Court 2. A primary roof beam within this type 3 masonry room dates at A.D. 1264+68. The earlier dates from two other primaries, and the slight charring of the more recent of the two, indicate their reuse from earlier structures. Room D stands alone sharing no common walls with other structures, and was probably constructed when the court 1 rooms were constructed. The dashed-line wall that abuts Room D in Figure 14 is the projected location of an earlier wall. This projection and that of Room B6 are based on curved mud outlines on the shelter ceiling, referred to as "ghost structures". These possible rooms could not be included in this analysis. Neither room was present during the A.D. 1260's construction period, but Room B6 may have been standing with Rooms B1-B5 of court group 2 before the late construction.
Court Group 1

Court group 1 is composed of Rooms F through L, located behind wall M in the west half of Cliff Dwelling M-1 (Figure 14). Tree ring dates and room construction sequence indicate that most of the extant rooms of Court Group 1 were built in the middle A.D. 1260s. The earliest dated Court Group 1 structure is type 3 masonry wall M, at no earlier than A.D. 1253. This date is from the only tree-ring dated sample for the structure and comes from one of four beams used to construct a wall support scaffold near the west end of the wall. Ahlstrom's 1974 notes record the surface of the beam as weathered, indicating use of a deadwood beam or that the beam had been exposed prior to its use in the wall. The actual building date of wall M is uncertain, but clearly post dates A.D. 1253 and might be contemporary with the middle A.D. 1260s constructions. Wall M is also an early structure based on wall abutment. Both Room F and Room L are defined by jacal walls which abut wall M and a portion of wall M was used for each of their exterior walls (Figure 14). Two tree-ring samples collected from the east wall of Room L could not be dated. Room L at least post dates the construction of wall M. Room F is dated at A.D. 1262 by a tree-ring sample from an jacal wall vertical pole. Four other beams within the jacal wall were dated from A.D. 1251+6 to A.D. 1259+6B with two clustering at A.D. 1257. Construction details indicate that the A.D. 1262 date is not from a repair element, so A.D. 1262 is probably the date of construction of the room, or close to it. Room F, along with Rooms L, K, and J, was one of the first rooms constructed behind wall M.

Rooms K and J are defined by one long jacal south wall, divided into individual rooms by a perpendicular jacal wall. The tree ring dates from the continuous south wall range from a late date of A.D. 1267+6B to an early
date of A.D. 1207vv. Dated samples from the perpendicular wall range within the same time period. The A.D. 1267++B date is possibly incorrect because of its "++" symbol, which indicates that beyond a certain point the sample could not be dated, but its bias is in an early direction (Ahlstrom 1985:36). This A.D. 1267++B date presents an interpretive problem in that a three year gap exists between it and the next latest tree-ring date (A.D. 1264) from Rooms D, J, and K at Cliff Dwelling M-1. Yet, A.D. 1267 is consistent with the A.D. 1268 date at Cliff Dwelling M-2 and A.D. 1265 and 1266 dates for the kiva (Room A) at M-3. These dates are within the zero to three year early bias of "+" dates, indicating a possible post A.D. 1268 construction for most of the late period rooms. Being conservative, I have chosen to deemphasize the A.D. 1267++B date in favor of an earlier minimal cluster of two dates at A.D. 1264+B. Construction of the south wall of Rooms K and J is considered to at least postdate A.D. 1264, but possibly post date A.D. 1267. All other rooms, except Rooms F and L, of Court Group I sequentially abut this south wall and therefore postdate A.D. 1264. The bonded type 3 masonry wall which defines Room I on the south and Room H on the south and southeast abuts the exterior southeast corner of Room J. Rooms I and H are separated by an jacal wall incorporating beams which range in date from A.D. 1211vv to A.D. 1261+B. The procurement of these beams predates the construction of the dividing wall. Room G is the last constructed room in Court Group I. It is defined by a masonry wall abutting the exterior southeast corner of Room H and the exterior of the jacial west wall of Room F. No tree-ring samples were collected from this room.

All of the structures of Court Group I, including wall M, could have been built after A.D. 1264 as a single planned event. Reuse of beams and the use of stockpiled beams are indicated by the wide range of dates from
wall construction beams (Table 2). Alternatively, the construction of wall M and Room F may have preceded the other constructions by a few years.

Room A (Kiva)

The remains of Room A stand alone, and there is no preserved wood for dating. The scarcity of roof beams and wall rubble indicates that the construction materials of this structure were reused for later construction. Large beams that would have been necessary for the roof of the kiva may have been incorporated into the later construction of the kiva at M-3.

Room C

This room has been reconstructed at least twice since its original construction. The one dated primary roof beam is set into the latest reconstructed wall masonry. It produced a cutting date of A.D. 11438, indicating the reuse of this beam after its procurement or natural death over 100 years before the construction of the majority of the preserved Moon House structures. The ends of this beam extend beyond the walls of Room C, indicating that the beam was probably not procured for this room; hence, it may have been reused from an earlier structure that is no longer in evidence. Room C does not abut another room, therefore, like Rooms D and A, it cannot be placed into a relative bonding and abutting construction sequence. Its habitation room characteristics resemble those of Room I. The evidence of late reconstruction and the presence of an in-place roof beam indicate it was still in use during the latest (post A.D. 1264) occupation.

The reconstruction events of Room C are evident in the use of various masonry types in the south wall. The original construction of Room C was
Type 1 masonry. Later, the west wall and an upper portion of the south wall were reconstructed using a variation in type 3 masonry. The very upper courses of the south wall, into which the beam is set, and the upper courses of the west and east walls are constructed of what appears to resemble type 2 masonry. The masonry of the upper courses is very eroded, but the jagged and irregular blocks, set on their flat surfaces, resemble type 2 construction. The reconstructions indicate the continual use of Room C, probably as a habitation structure.

Rooms E1 and E2

There was no wood present in either of these rooms for tree-ring dating. The abutting of Room E1 to E2 is interesting only in the observation that the well laid angular type 3 masonry of Room E2 is abutted by the rough surfaced type 2 masonry of Room E1. Rooms E1 and E2 cannot be dated directly.

Room N

Four of the five beams which comprise the scaffold of this isolated alcove were cored. An approximate date of A.D. 1263+G comes from one of the two in-situ primary beams which support the scaffold. Two of the logs, loosely laid on the primaries, produced dates of A.D. 1262+G and A.D. 1256+G. Room N was most likely built during the middle A.D. 1260's along with the other latest room constructions and reconstructions of M-1.
Room Block 1 and Room F

Room Block 1 is a block of 5 large granaries located in the east half of Cliff Dwelling M-2 (Figure 22). Very little wood was used in building these well preserved type 3 masonry rooms because the low shelter ceiling served as a roof for most of the rooms. Tree-ring samples were collected only from Room D. Four roof beams were cored, producing 3 dates. The latest date, at A.D. 1268+B, is also the latest date in the Moon House Complex. The other dates are A.D. 1259GB and A.D. 1215+G (Table 2). The beam dated to A.D. 1215+G shows slight remnant sooting, indicating its reuse from another structure. The A.D. 1259GB beam might also have been reused, although there is no direct evidence.

The abutment sequence for Room Block 1 shows Room C to have been the first room constructed. Room D (dating to A.D. 1268) is abutted to the southwest corner of Room C. Room E is abutted to the southwest corner of Room D and the southeast edge of Room F. The long bonded masonry south wall of Rooms A and B abuts to the southeast corner of Room C. The relatively homogeneous construction of Room Block 1 indicates that it was constructed as a single event, incorporating the technique of abutting longer bonded walls to previously constructed rooms, and then dividing the enclosed space with a perpendicular wall. This method is also characteristic of the latest room construction at M-1.

Room F was a usable granary during the construction of Room Block 1. Its abutment by Room Block 1, and its type 2 masonry construction, indicates that Room F predates Room Block 1. The lower wall remnants of Room G are also abutted (if not bonded) to a remnant of type 1 masonry at the lower
southwest edge of Room F. Room G is a probable habitation room and is part of the spatial organization of an earlier episode of use. Therefore, it is probable that Room F was originally part of this earlier organization of room space and probably predates the construction of Room Block 1 by some years.

The other Rooms of M-2 cannot be directly dated. These remnants of earlier structures are present within the M-2 shelter and to the west along the M-2 ledge. Again, the lack of rubble and beams indicates construction materials from these other structures had been removed, probably for use as firewood or as elements in later construction. Three intact individual granaries (Rooms O, P, and Q) are present between Room Block 1 at M-2 and M-1 (Figure 23). These structures cannot be directly dated, but they are well preserved and therefore were potentially in use during the latest construction period.

M-3

Rooms C1 and B3

Chronologically, Rooms C1 and B3 are defined by architectural features that include beams with date clusters in the A.D. 1240s and A.D. 1250s, respectively. The latest dates for each of these rooms are also the earliest known construction dates for the extant M-3 structures (Table 2). These dated architectural features are the remains of rooms which were conceived, built, and used prior to the construction of the M-3 kiva (Room A). This relationship is most evident in the nature of Room C1. Room C1 is the best preserved of the two early rooms. Before the construction of the kiva, Room C1 was a habitation room. In about A.D. 1265, approximately 12
years after the construction of the south wall of Room C1 (A.D. 1253), the kiva (Room A) was built against the exterior of that jacal wall and the exterior southeast wall of Room B3. Room C1 was remodeled at that time to serve a storage function.

The original entry through the south wall was blocked with a type 3 masonry kiva pilaster, and a small granary type entry was constructed into Room C1's west wall. The entire inside of the room is heavily sooted except where the remodeling occurred. These characteristics indicate a shift from a habitation to a storage function.

Room B3 is more problematic in its relationship to the kiva. The latest tree-ring dates for this room all cluster at A.D. 1252+B and are from 4 vertical poles in the southeast wall and one horizontal primary beam that probably supported a roof over the south portion of the room. One anomalous A.D. 1259+B date within Room B3 (M-3) comes from a out of place beam lying on fill in the middle of the room, but it is likely that the south wall of B3 was constructed in the early A.D. 1250's in that it appears to be bonded with the south wall of Room C1 at M-3. The latest date for Room C1 at Cliff Dwelling M-3 is A.D. 1253+B, while other beams in Room C1 date to A.D. 1252+B, A.D. 1249B, and during the early A.D. 1240's clustering. The architectural nature and history of the southeast wall is not easily understood. The vertical poles of the southeast wall indicate an jacal construction method. But, the absence of secondary vertical and horizontal branches and plaster on the south sides of the poles indicates that either the wall was never jacal, or that any previous jacal had been removed without a trace. It is uncertain whether the southeast wall is the remains of an earlier wall which defined Room B3 before the kiva construction, or is a later wall built especially to support the northwest kiva wall. The
vertical poles of the southeast wall and the horizontal roof beams in the south portion of Room B3 do not incorporate wood cut during the latest A.D. 1260s procurement period. The lack of later dates and the relatively high degree of clustering within Room B3 indicate that the southeast wall and possibly the southern roof were part of the earlier Room B3 construction. The architectural nature of the original structure is not clear.

Room A, The Kiva

The extant kiva was built approximately 12 years after the suggested construction dates for Rooms C1 and B3. The latest in-situ tree-ring date is A.D. 1265+B, from a beam supporting the ceiling over the first bench west of the north entry. The late construction date for the kiva is further supported by other in-situ tree-ring samples (Table 2). Two other beams date at A.D. 1266+B and A.D. 1265+v, but were lying out of place on the kiva fill. Many of the beams sampled within the kiva were lying on the room fill within the structure or just outside its walls. These beams were interpreted, during 1974, to have been primaries and secondaries from the collapsed kiva roof. The dates from these beams are relative to the latest kiva construction and, though they span a wide range, 50% cluster between A.D. 1257 and A.D. 1266 (Table 2).

Room E

Room E is an individual storage room, not connected to another room, but close to Room D (Figures 9 and 22). An A.D. 1256B date in Room E comes from one beam placed horizontally across the west and east walls, parallel to the bedrock shelter wall, and mortared in place. It is likely that the beam is associated with the last reconstruction of the room. Four
different, sequential, types of mud wall indicate at least 3 stages of reconstruction on the same foundations. The initial walls were constructed with a base of upright sandstone slabs set in purplish colored mud. The first reconstruction is evinced by a tan colored mud with numerous small particles of gray, tan, and purple sandstone. Larger angular chunks of sandstone are also numerous, with abundant quantities of organic materials that include cordage and probable human hair.

The second reconstruction is visible only in the west wall. This is a brownish tan mud with fewer tempering materials, but may contain semi-coursed stone core material, possibly resembling type 1 masonry construction. The surface is much more cracked than the other mud reconstructed areas. The top layer, representing the third reconstruction, uses masonry of small irregular pieces of sandstone mortared with a purplish mud. The organic content of the mud is high, but not as great as in the lower mud layers. The dated horizontal beam is set into the upper mud layer of the west and east walls. It probably indicates the roof line of this approximately 1 meter high structure. W.D. Lipe (personal communication) suggests that the foundation of this structure may date to a Basketmaker III-Pueblo I occupation of the site, probably in the late A.D. 600s or early 700s. A small collection of Chapin Gray and Chapin B/W sherds from the surface of the Moon House Complex is consistent with this interpretation.

Room F

Room F is an jacal granary. Its construction is contemporaneous with the construction of the kiva. Two vertical poles in-situ in the jacal wall were tree-ring dated to A.D. 1265+B. Nine other in-situ poles range in dates from A.D. 1263+GB to A.D. 1229+B. Five poles lying on the room fill
are probably from the jacal wall and range in dates from A.D. 1265+8 to A.D. 1237B.

Room G

This type 3 masonry granary abuts the southeast jacal wall and raised masonry sill of Room F. The abutment against Room F indicates that Room G postdates the middle A.D. 1260's construction of Room F. Three pieces of wood beams lying on the room fill were not cored, probably because of their small size and disturbed nature. There was no other wood present within the structure.

Summary

Date Clusters

Clustering of tree-ring dates from the entire Moon House Complex indicates three main periods of beam procurement (Figure 13). The earliest cluster of dates includes beams cut during the three years of A.D. 1242 to 1244, possibly for their immediate use in room construction. The use of many of these beams to construct Room C1 of M-3 at approximately A.D. 1253 indicates that the A.D. 1240's cluster represents an earlier building period from which the beams were reused, or that the beams were stockpiled and used approximately 8 years later during the early A.D. 1250's construction period. Other beams dating within the early cluster were reused, or were stockpiled for later use, in the jacal construction of Rooms J and H at M-1. Probable early A.D. 1240's construction for Rooms B1 to B5 of M-1 and the presence of "ghost structures" (remnant mud wall outlines on the shelter ceiling) throughout the Moon House complex supports the probability that the
early A.D. 1240's cluster represents a building period, and that most of these beams have been reused.

The second indicated building period occurred between A.D. 1249 and A.D. 1254 with a peak in beam procurement at A.D. 1252. Again many of these beams were used to construct a single room (Room B3 at M-3), while other beams dating to this period were used in the construction of later rooms. Five dates from the south wall of Room B3 at M-3 cluster at A.D. 1252+B. This cluster, together with the A.D. 1253 construction date for the south wall of Room C1 dates the construction of the south wall and the probable roof at the south end of the room within the early A.D. 1250's. The original 1974 architectural notes hypothesize the existence of an earlier organization of rooms in the M-3 shelter before the construction of the kiva. Rooms C1, B3, and probably Room C2, once present east of Room C1, are interpreted as the remains of a pre-kiva room group built during the early A.D. 1250's.

Many beams were cut during the third period of procurement, between A.D. 1256 and A.D. 1265. Except for a sharp peak at A.D. 1257 and a low point at A.D. 1258, the number of beams cut during any one year is relatively equal. Many of these beams were used during the construction of Room F and the kiva at M-3, with late dates of A.D. 1265+B and 1266+B respectively. Most of the other beams from this period were used to construct many of the Court Group 1 rooms and Room N at M-1. The M-1 rooms have a late date of A.D. 1267++B. The uncertainty of this "++" date and the 3 year gap between it and the next latest cluster of 3 dates at A.D. 1264+B reduces the possibility that the construction of Court Group 1 post dates A.D. 1267. It is more probable, being conservative, that the latest M-1 construction does not much post date A.D. 1264.
Room Construction Dates

Only one extant room (B4 at M-1) is directly tree-ring dated within the early A.D. 1240s date cluster. The accuracy of the sample in representing the room's construction date is questionable, considering the range of dates present in any one structure. However, the dating is probably relatively accurate, considering that abutment patterns show that the Room B4 jical wall was both preceded and followed by construction of type 1 masonry walls. The type 1 masonry is not found in any later wall constructions. Based on the Room B4 tree-ring dates, close room proximity, and the occurrence of type 1 masonry, Rooms B1-B5 of Court Group 2 at Cliff Dwelling M-1 are interpreted to have originally been constructed at approximately A.D. 1244.

The second construction period in the early A.D. 1250's is represented by the extant walls of Rooms B3 and C1 and one probable roof beam in Room E at M-3. No other room constructions at the Moon House Complex can be directly, or indirectly, dated within this second construction period. However, it is probable that the poorly preserved ruins at M-2 and the kiva ruin at M-1 were constructed during the A.D. 1250s, prior to the last A.D. 1260s construction period and possibly after the A.D. 1240s construction period. The number of A.D. 1240s and 1250s beams incorporated in Period 3 constructions indicate that a number of earlier structures were dismantled or at least de-roofed. It is probable that the destruction of type 1 masonry rooms at Cliff Dwelling M-2 and the kiva (Room A) at Cliff Dwelling M-1 resulted from intentional dismantling.

The latest tree-ring dates directly date the initial construction of 9 rooms within the A.D. 1260s. They are Room D of Court Group 2 at M-1, Rooms F, H, J, K, of Court Group 1 at M-1, Room N at M-1, Room D at M-2, and Rooms A (kiva) and F at M-3. Seven additional late period room constructions are
indirectly dated through abutment analysis. These include Rooms G and I of M-1, Rooms A, B, C, and E, of M-2, and Room G of M-3. In addition, a tree-ring sample from the roof of Room B2 of Court Group 2 directly dates that reconstruction to the early A.D. 1260s. The reconstructed roof of Room B1 overlaps the dated roof of Room B2, therefore indicating an early A.D. 1260s date for that reconstruction.

A total of 18 room constructions and reconstructions can be directly or indirectly dated within the A.D. 1260s. The variability of tree-ring dates within each room is probably due to beam reuse, almost continuous procurement between A.D. 1226 and A.D. 1268, and stockpiling. Ahlstrom discusses the possibility of the use of dead wood and suggests that the frequency of "++" dates (6%) is less than would be expected if weathered dead beams were collected. Also, the record of weathered beams is not frequent in the 1974 tree-ring sample field notes. He also suggests that tree death occurs at irregular intervals, therefore if dead wood was commonly used that the range of dates would span a much greater time period than the 30 to 40 years of major beam procurement between A.D. 1230 and 1270 (Ahlstrom 1985:366-367).

The high frequency of reused or stockpiled beams indicates that the late dates for each room are only minimal dates, and that any of the rooms could have been constructed or reconstructed entirely with reused and stockpiled beams. I suggest that all rooms constructed and reconstructed during the last building period were built between A.D. 1264 and A.D. 1268. This follows from the major post A.D. 1264 construction of the habitation and storage rooms behind the defensive wall at M-1, and the approximate A.D. 1268 construction of the storage room block at M-2. The construction dates for the kiva and Room F at M-3 fall comfortably within this period. I also
suggest that most of the other earlier and undated rooms that are still extant and well preserved were either constructed, reconstructed, or at least in use after the A.D. 1260s building period. These include Rooms B3, B5, C, E1, E2, and L at M-1, Rooms F, O, P, and Q at M-2, and Rooms B1, B2, B3, and C1 at M-3. Wall M at M-1 is also considered to have probably been built as the initial court 1 construction of the last construction period, and that its A.D. 1253+G date comes from a reused beam.

The inclusion in this period of Rooms B3 and B5 at M-1 is based on their reconstruction with type 3 masonry and their probable ability to have been used during the late period. Room C at M-1 has one reused beam dating to A.D 1143B, but was probably still in use contemporaneous with the other late structures. This assumption is based on the similarity of the interior habitation features, including pictographs, between Room C and the other court 1 habitation rooms. Room E2 at M-1 is included because of its construction using angular type 3 masonry. Room E1 is abutted to E2 and must post date the construction of Room E2. Room L is included because it is part of Court Group 1 and abuts wall M. At M-2, the east wall entry to Room F was at some time closed off and a new entry constructed in the south wall. This was probably done to facilitate the abutting of the storage room block to Room F, allowing Room F to continue to be used as an individual storage room during the late period. At M-3, the entry to Room C1 was blocked by the construction of the kiva. It appears that the entry was concurrently moved to the west wall, allowing passage between Room C1 and Room B3 and indicating the continued use of the rooms.
CHAPTER 5

The Interpretation of Architectural Features

Room Function

The theoretical perspective for interpreting the functions of individual rooms within the Moon House cliff dwellings follows the precedent-setting study of Dean (1969). Many of the distinctive architectural characteristics employed by Dean were recognized as criteria for the inference of room use during early archaeological investigations of the cliff dwellings at Mesa Verde and within the Tsegi Canyon region (Fewkes 1909, 1911a, 1911b, Nordenskiold 1979). The assignment of room function based on architecture does not preclude the possibility of multiple room use. Inferred room function is an estimate of original intent, and changes in the functional characteristics of architecture (remodeling) should indicate changes in intended use. A further archaeological interpretation is that the room was in fact primarily used for the intended purpose. Often this assumption can be checked against evidence from activity-related features (e.g., mealing bins and hearths) and activity remains (sooted walls and attributes of artifacts).

Functional Room Typology

The following typological variables were taken from Dean (1969:26-39) and used at the Moon House Complex to interpret room function. Only variables which proved to be useful for distinguishing room function are
listed. The most useful variables are listed first for each room type.

Habitation Rooms (Dean used the term "living room")

a. doorway low silled and taller than that of granaries
b. doorway large and occasionally T-shaped
c. doorways do not have characteristics of granary doorways
   (e.g., low silled and lack coping)
d. firepit is just inside the doorway, with a deflector
   wall between the doorway and the firepit

  e. presence of sooted walls
f. plastering of the interior walls
g. presence of shelves of varying sizes
h. may have one or more niches in one or more walls
i. room size larger than 5' x 5'
j. jacal walls present
k. if an jacal wall is present, the doorway will be in
   the jacal wall

j. masonry walls are less well made with fewer chinking stones
   and more mortar than are the walls of granaries

(variables a.- e. are the only characteristics found to be exclusive
for habitation rooms at the Moon House Complex)

Granaries

a. no sooting of the interior walls
b. doorway sills are one to three feet above the ground;
   footholds may be located in the wall below the sill
c. when habitations are converted to granaries, the sill
   is raised by walling the lower portion of the doorway
d. door jambs, sill, and lintel are usually grooved to seat a sandstone slab door, or mud coping is present

e. room entries seal from the outside

f. plaster usually not present on the interior wall surfaces

g. a small platform is commonly located just outside and level with the doorway; occasionally platforms have niches, which are probably steps

h. floors do not have habitation room or ceremonial room features (usually no floor features are present)

i. walls are usually not constructed of jacal

j. wall pegs (pot hangers) are common just below the primary beams, usually inside

k. loops can occur to either side of a doorway, through which a stick secures a slab door

l. exterior wall masonry is often of superior quality

(variables a.- d. are exclusive for granaries at the Moon House Complex)

**General Storage Rooms** (similar to Dean's Storerooms)

a. absence of granary characteristics

b. may have jacal walls

(the distinguishing criteria at the Moon House Complex is sealability; all extant preserved storage rooms at the Moon House Complex, except Room L at Cliff Dwelling M-1, were sealable granaries; in that they had lower lintles, and/or coping, against which to secure and seal a door)

**Kivas**

a. a circular or oval shape is most common, with or without
an encircling bench
b. pilasters present, not necessarily for a cribbed roof
c. roof entrance (inferred for the kiva at Cliff Dwelling M-3 from the presence of 4 large sandstone slabs, resting on the room fill, which typically border a roof entrance)
d. firepits present (inferred from the presence of sooted interior walls)
e. wall niches present

**Grinding Rooms**
a. the presence of 2 or more mealing bins holding metates
b. features indicative of other room functions are absent (because habitation rooms can have mealing bins)
c. most are not roofed
d. may be 3 walled or with the 4th wall of low masonry or a jacal screen
e. not numerous
f. may or may not be associated with household units
g. walls are not usually sooted

**Courtyards**
a. an open area
b. surrounded by habitation and storage rooms that open onto it
c. absence of a roof
d. firepits present
e. mealing bins and metates are common

**Room Clusters**
a. at least one living room and one to four storage rooms,
often located around a courtyard
b. rooms associated with a courtyard are usually only
entered from that courtyard or through rooms entered
from the courtyard
c. courtyard association is not required

Social Organization

Architecture is a result of human decision making processes and labor, and is indicative of human needs, human interactions, and general aspects of human behavior. It follows that a spatial grouping of rooms having different functions is an architectural organization of space that is indicative of activity organization. This spatial organization should be related to some level of social organization. The recognized relationship between the spatial organization of architecturally defined rooms in archaeological contexts and social organization has been a subject of inquiry since the earliest Southwestern archaeological investigations of the late 19th and early 20th centuries (V. Mindeleff 1891, Prudden 1903, 1914, 1918). More recently Rohn (1965, 1971), followed by Dean (1969), and Wilcox (1975, 1982), have considered contiguity and shared access between rooms of similar and different function to be indicative of a close social relationship between the people who used that space. Rohn (1965) suggests that this type of spatial patterning indicates frequent interaction by groups involved in socioeconomic relationships.

In prehistoric pueblos, contiguous and interconnected rooms usually consist of one or more habitation rooms and a number of granaries and general storage rooms (approximately 1 to 4 storage rooms per habitation).
These groupings are termed room suites (Rohn 1965), room clusters (Dean 1969), and room sets (Wilcox 1975). Sociologically, these room associations are viewed as "the smallest identifiable structural unit" (Dean 1969:34) and "the domain of a socioeconomic group" (Wilcox 1982:24), essentially a dwelling unit (Wilk and Rathje 1982:620) representing a whole or partial household (Rohn 1965:65).

The architectural analysis of the Moon House Complex follows the perspective that the basic spatial organization of a viable community includes architecturally defined storage and habitation space. These are the two basic components of Anasazi dwelling units (Wilk and Rathje 1982:620), probably occupied by a household or a portion of a household (Rohn 1971:31). The kiva is a room that complements this basic association of rooms (Prudden 1903). The habitation rooms, storage rooms, and kiva are often organized together as "courtyard units" (Rohn 1971:37). A functional association, on a "courtyard unit" level, is essentially the suggested relationship between the three Moon House cliff dwellings during their last construction period. Moon House proper (Cliff Dwelling M-1) served a habitation and storage function for 5 households. The extant room block at Cliff Dwelling M-2 (Rooms A through E, and F) was used only for storage. The extant Kiva and storage rooms of Cliff Dwelling M-3 were communal, probably ceremonial in nature. The 5 households of Cliff Dwelling M-1 with the addition of the M-2 storage rooms and M-3 ceremonial rooms comprise a complex of 3 cliff dwellings functioning together as one organizational unit; the Moon House Complex.
Architectural Reconstruction as Remodeling or Repair

The interpretation of an interdependent relationship between the three Moon House cliff dwellings is based on observation of the latest preabandonment architectural features. Certain architectural changes evident at each of the Moon House cliff dwellings indicate the intentional remodeling of an earlier organization of space that was quite different from the final spatial organization. Other observed architectural changes were the result of needed maintenance, sometimes using different construction methods and resulting in little or no functional or organizational change. Therefore it is necessary to clarify the concept of reconstruction as a general term for the rebuilding of an architectural element (i.e., wall, entry, sill, roof, etc.). The more specific terms, repair and remodeling, imply two different and distinct contexts for reconstruction. Reconstruction serves the purpose of repair and/or remodeling. It may occur for either purpose or it may serve both.

Remodeling is reconstruction that significantly changes the structural form of an architectural feature. Significant structural changes usually affect the use or function of an architectural feature. Alteration of a major portion of the construction materials of a feature, not necessarily changing its use or function, is also a significant change and therefore considered another type of remodeling (i.e., a type 1 masonry wall reconstructed with type 3 masonry). In the archaeological record, unless evidence indicates that there was a need for repair, construction as a repair activity is not obvious. Remodeling can occur along with needed repair or may occur in the absence of needed repair.

Repair is defined as reconstruction that does not change the use or
function of an architectural feature, and does not alter the major portion of the structural materials of the overall feature.

The recognition of remodeling is necessary for interpretations of the intent of human decision and behavior to change an architectural form. Repair is maintenance, and for cliff dwellings well protected from weathering (such as the Moon House Complex) the frequency of repair is probably essentially relative to: 1) the intensity of use; 2) the quality of the initial construction; or 3) the frequency of intentional destruction. Remodeling, though possibly initiated as a result of needed repair, is evidence of a changed conception of needed functional space and/or changed methods of construction. This changed conceptualization of architectural method and/or form is obvious at Moon House, and certain original architectural features of a room may have been intentionally destroyed to facilitate the remodeling of that room.
CHAPTER 6

Architectural Description and Functional Interpretation

Cliff Dwelling 42-SA-5005 (M-1)

Cliff Dwelling M-1 is composed of 2 groups of rooms set around courtyards and 5 individual rooms not clearly associated with a courtyard organization. A total of 18 rooms are recorded for the M-1 cliff dwelling. Sixteen of those rooms are interpreted to have been in use during the late A.D. 1260s occupation.

Court Group 1

Court Group 1 is sheltered under the M-1 overhang and behind a defensive wall (Figures 14, 15, and 16). Access to the court is through a raised entry in the defensive wall. At abandonment, 4 habitation rooms (Rooms F, I, J, K), 2 granaries (Rooms G, H), and 1 general storage room (Room L) constituted the court group. Each room was accessed only from the court with no direct access between rooms. It is possible that 1 to 4 households shared the personal safety afforded by the defensive posture of Court Group 1. Each habitation room would have been occupied by one household or by various members of the same household (Rohn 1965:65; 1971:31). The spatial organization of storage facilities behind the defensive wall, outside the defensive wall, and at M-2 does not permit their assignment to a particular household. The storage facilities were probably
Figure 14. Plan View and Profile Map of Cliff Dwelling M-1.
Figure 15. Overview of Court Group 1 at Cliff Dwelling M-1, looking west. Vertical and horizontal scales are 1 meter and 2 meters, respectively.

Figure 16. Overview of Court Group 1 at Cliff Dwelling M-1, looking east. Vertical scale is 1 meter. Square scale is 80 cm x 80 cm at its outer edge.
communally shared or were used individually by each of the households. These late occupation households would also have shared other activity areas and the kiva with its associated storage rooms at M-3.

Type 3 masonry and jacal were used to construct the rooms of Court Group I. Habitation Rooms J and K were constructed using only jacal, though Room K has a remodeled type 3 masonry entry sill. Jacal was used to enclose the west end of Habitation Room F, and to divide Room I (habitation room) and Room H (granary). Jacal was also used to enclose the east end of Room L (general storage). One continuous masonry wall was constructed to define the south wall of Room I (the last habitation room constructed, abutting Room J) and the south and east walls of Room H (granary). A masonry wall was constructed abutting Room H and Room F to enclose Room G (granary). All of the Court Group I rooms are behind a long continuous type 3 masonry wall (Wall M, possibly the earliest of the extant walls of Court Group I). The west and east ends of Wall M form the south walls of Rooms L and F, respectively.

The only major remodeling of the Court Group I rooms occurred at the entry in the south jacal wall of Room K. The original habitation style entry of Room K was changed to a functionally contradictitious combination of a massive raised masonry sill and a tall habitation style entry. All evidence, except the height of the sill, indicates the continued use of Room K as a habitation room.

The defensive posture of Court Group I results from the construction of Wall M. Wall M is a long continuous type 3 masonry wall, built to a height of approximately 150 cm to 185 cm along the outer edge of Court I. Three masonry pillars, spaced at various distances, extend from the top of the wall to the shelter ceiling. These pillars probably functioned to stabilize
the wall (W.D. Lipe, personal communication). Court 1 Habitation Rooms F, I, J, and K, and 3 storage rooms are located behind the wall. Court 1, itself, is a natural ledge approximately 3 to 4 meters above the main bedrock shelf. The only access to Court 1 and the Court 1 rooms is through a raised entry in the east half of Wall M. This entry is approximately 130 cm above an outside ledge, which is at an intermediate elevation between the main shelf and Court 1. The entry is seemingly protected by 5 "loop holes", constructed so that the openings angle downward and across the path of entry. Speculatively, these 5 holes through the wall could have been used to direct arrow launchings toward unwanted intruders attempting to gain access to the protected court, or just used as observation ports. A total of 27 loop holes were built into the wall, most of which could only have been accessed from the court. Wall M serves as the outer wall for Rooms F and L, and a number of the loop holes are accessed only from within these rooms.

Many of the loop holes probably functioned only as observation ports. Loop holes were placed at various heights above the court surface and were oriented to various vertical and horizontal angles. The angles of some of these loop holes allow an overlapping view of every canyon access trail along the south side of the canyon, a view of the canyon bottom, and a view of the main shelf towards the southeast. Other loop holes point directly downward to the main ledge below the wall.

Pictographs at Court Group 1 are located on the exterior surface of the south wall of Rooms J and K (Figures 15 and 16), around the inside of Room I (Figures 17 and 18), and on the bedrock high above the narrow passage to Room L. The same motif is repeated with some modification at each of these locations. The design is a horizontal solid white band with a horizontal
Figure 17. Pictograph of a Crescent Moon in Room I of Cliff Dwelling M-1.

Figure 18. Pictograph of a Full Moon in Room I of Cliff Dwelling M-1.
line of solid white dots above the band and intermittently spaced triangular projections pointing downward along the lower margin. The name Moon House was inspired by a design variation of the pictograph within Room I. Here the white band and dots encircle the room approximately 45 cm above the level of the room fill. A full circle, produced by leaving the mud plaster unpainted, is present within the band near the middle of the east wall (Figure 18). Directly opposite, within the band on the west wall, is a crescent shape (Figure 17). The crescent is also formed by the absence of white paint. These designs have been interpreted by earlier visitors (W.D. Lipe, personal communication) as phases of the moon, resulting in M-1 being named Moon House. The other pictographs at Court Group I are a serpent design on the bedrock above the narrow passage to Room L, and hand prints on the bedrock ceiling within Room G.

Habitation Rooms

Room F

Room F is defined by its jacal west wall, which contains the room entry, abutting the rear of the shelter and the interior of Wall M. Wall M serves as the south and southeast walls of Room F. The rear of the bedrock shelter is the north wall. The jacal west wall is constructed of vertical poles with diameters ranging from 5 to 9 cm. The uprights extend from floor to ceiling, with long smaller diameter branches placed vertically between the larger poles. Horizontal branches are placed only at the top of the wall and span the length of the wall from above the entry to the north wall. The interior side of the jacal wall is not plastered and the exposed wood is very sooted.

Sooting in general is heavy within Room F. There are no visible hearth
remains, but there is a vent hole located in Wall M just below the ceiling at the southwestern corner of the room. Six loop holes also open through Wall M within Room F.

The habitation room style entry is located at the south end of the west wall (see Appendix A for room entry dimensions). There is no visible sill and the lintel is made of mud with no apparent use of branches for lower support, although a thin horizontal branch is present just above the mud lintel. One vertical juniper pole is located on each side of the entrance.

Outlines of ghost structures are apparent on the ceiling of Room F. One outline to the east is overlapped by the construction of Wall M, indicating that those earlier structures either collapsed or were removed prior to the later construction of Wall M. Zero or minimal fill, consisting of a thin layer of loose sediment, is present covering the floor.

Rooms J and K

One long jacal wall abutting the west and north bedrock walls of the shelter encloses a space which is subdivided by a perpendicular jacal wall creating Rooms J and K. The jacal dividing wall abuts the long jacal wall on its interior and the bedrock wall at the rear of the shelter. Jacal construction is similar to that of Room F. Upright poles, with a diameter range from 4 cm to 12 cm, extend from floor to ceiling with thin long branches placed vertically between the uprights. Thin long horizontal branches are held to the uprights with twig ties. Mud is plastered onto the outside of the jacal framework creating the finished wall.

A pictograph of a wide solid white horizontal band, with a horizontal line of solid white dots above and triangular downward pointing projections
spaced intermittently along the lower margin of the band, spans the upper portion of the exterior surface of the south wall. This motif is present, with modifications, inside Room I, and on the bedrock wall above the passage to Room L (Figure 14). Seventy two dots are visible along the top of the white band that runs across the front of Rooms J and K. Eroded gaps in the line of dots indicates that 4 or 5 other dots were once present increasing the number to 76 or 77. The remodeling of Room K's entry appears to have destroyed a portion of the original pictograph that probably extended uninterrupted across the front of Rooms J and K.

Room J

The south and east walls of Room J are defined by the east half of the long jacial wall. The jacial dividing wall is the west wall and the north wall is the rear of the shelter. Inside Room J only the lower half of the jacial walls is plastered with mud. The upper half of the walls is exposed all around the room, and there is no evidence of plaster falling off the jacial framework. Sooting is equally heavy on the plastered surface and on the exposed jacial framework.

The entry to Room J is located in the south wall in the southwest corner. A raised masonry sill of small irregular sandstone was abutted to the plastered wall exterior below the entry. This raised sill is approximately 22 cm high above the court floor and approximately 10 cm above the fill surface within Room J. Its surface slabs are metate fragments. It is not evident if this stoop is part of the original construction or a later addition.

A low masonry wall, probably acting as a deflector, is located to the east, immediately inside the entry. There is no evidence of a hearth on the
floor east of the deflector. But, at some time after wall construction, an upright pole was removed from the jacal wall immediately east of the deflector wall to allow a smoke hole to be built just below the ceiling. Excavation of the floor fill east of the deflector wall would probably uncover evidence of a hearth, similar to that in Room I. The fill covering the floor of Room J is thin loose sediment.

A bedrock and masonry bench (or shelf) in Room J is located along the north wall, abutting the rear of the shelter. The bench was constructed of short tabular sandstone slabs, plastered, flat faced, and angular. The relative proportions of masonry to bedrock are obscured by mud plaster which covers the bench. A niche in the bench face is present near the east wall, similar to the niche in Room I.

Room K

The west half of the long jacal wall is the south wall of Room K. The east wall of Room K is the jacal dividing wall, and its north and west walls are the bedrock walls of the shelter. The east jacal wall is entirely plastered from the ceiling to below the level of fill. The interior of the south jacal wall is not plastered at all. This is in contrast to the treatment of the inside south wall in Room J, which is plastered to approximately half-way up from the floor. All surfaces are heavily sooted.

The original entry through the south wall of Room K was similar to the entry of Room J. This entry was blocked and remodeled at some time after the original construction, moving its position east and immediately adjacent to the original entry. Type 3 masonry, constructed with sandstone blocks, thick tabular sandstone slabs, and thin short slabs, was used to block the original entry and raise the new massive sill approximately 90 cm above the
surface of the court. The lintel of the new entry was also constructed, not equally correspondent to the height of the raised sill, but high enough to create a large (75cm. high) habitation style entry. The height of the sill indicates a storage function for the room, yet all other evidence contradicts a storage function. The large entry, sooting of the remodeled wall materials, a vent at the bottom of the masonry sill, and another original vent or smoke hole to the east of the entry indicate continued use of this distinctively remodeled room as a habitation room. Why a raised sill was constructed is unknown. Possibly the need for privacy or the protection of objects within the room led to the construction of the raised sill. At least 30 cm of fill in the room obscures any indication of artifact assemblages or floor features, which might indicate activities within the room. Only the top of a probable masonry deflector wall, similar to that within Room I, is visible east of the remodeled entry.

A plastered masonry bench (or shelf) was constructed at the back of Room K, similar to the shelf of Room J. A niche is not apparent in its face, though the fill above the floor may be covering a low niche.

Room I

Room I was constructed by abutting a type 3 masonry south wall to the southeast exterior corner of Room J and then dividing that space with an jacal wall abutting the rear of the shelter and the interior of the masonry south wall. The masonry is of irregular but fairly large sandstone blocks mortared with mud and laid to create a flat faced wall. Coursing is fair but not always even, and the exterior chinking appears as a combination of placement to fill large gaps between sandstone blocks and linear horizontal rows between courses. The inside of the masonry wall is plastered smooth.
The east wall and the west wall are of jacal. The east jacal wall is completely plastered on the inside surface of Room I, but there is no plaster on the majority of the other side of the same wall viewed from within Room H. The west wall is the exterior of the jacal east wall of Room J. This wall also is completely plastered, as viewed from inside Room I. The north wall is the rear of the shelter. All of the interior walls and ceiling are heavily sooted.

The entry to Room I is T-shaped with a raised masonry sill. This is the only classic T-shaped doorway within the three cliff dwellings of the Moon House Complex. One other possible T-shaped doorway is an entry through the north wall of the M-3 kiva. Immediately inside Room I to the east of the entry is a deflector wall. On the east side of the deflector is a hearth with a mortar coping around its perimeter. Above the hearth is a vent hole, just below the shelter ceiling. A raised shelf runs along the entire back of the shelter. It is made of masonry, probably incorporating bedrock, and completely plastered (obscuring the details of its construction). The shelf is approximately 45 cm high and not suitable for a sitting bench because of the low ceiling. A rectangular niche has been built into the eastern face of the shelf.

The pictograph that inspired the name Moon House is located in this room. The white 24 cm wide band with white dots above runs completely around the room just below the height of the shelf surface. A circle created by the absence of white paint is located in the middle of the band on the east wall. This design was interpreted by earlier archaeologists as a "full moon" (Figure 18). Directly across from the circle on the west wall is another area lacking white in the shape of a crescent, interpreted as a "crescent moon" (Figure 17). One hundred and fifty five dots encircle the
room above the band [13 dots on the south wall, 37 on the east wall, 49 (possibly 50) on the north wall, and 56 on the west wall (including the southwest corner wall which abuts Room J)]. Thin loose sediment covers the floor of the room.

Granaries

Room H

Room H is defined to the south and east by one continuously bonded masonry wall. The south wall is a bonded continuation of the masonry wall that forms the south wall of Room I. The east wall abuts the rear rock wall of the shelter and bonds with the south wall at the angular southeast corner of Room H. The west wall of Room H is the jacial wall that separates Room H from Room I. The north wall is the rear of the shelter.

Inside the room the jacial west wall is plastered only in a small area near the entry. Plaster near the entry extends approximately 75 cm north from the south wall and approximately 2/3 the distance up from the floor to the ceiling. The remaining majority of the wall is exposed jacial framework.

The type 3 masonry wall is constructed (as described for Room I) of irregular sandstone blocks. The incorporation of variable sized blocks interrupts the evenness of the coursing, therefore the chinking is linear only in a few places and clustered in areas where gaps are large between the blocks. The inside of this masonry wall is not completely plastered, but mud is heavily spread between courses so that the mud overlaps the edges of the blocks. The vertical surface of the walls is fairly smooth and all corners and edges are angular.

The entry to Room H is typical of a granary entry. Its size is small compared to the typical entry of a habitation room (Appendix A). It has a
one stick lowered lintel (spanning the entry below the masonry lintel to support a door slab) and its sill is high (approximately 70 cm) above the surface of the court. Mortar is used at the lower corners of the entry (midway into the entry) to create a door jamb, against which to secure the placement of a sandstone slab door.

The absence of soot within Room H is typical of granaries. Hanging pegs are located inside just below the ceiling in the west and south walls. Thin loose sediment covers the floor.

Room G

Room G was the last of the court group rooms to be constructed. It was defined by enclosing a space between Rooms F and H with a type 3 masonry wall abutting the jacal exterior of Room F and the southeast masonry corner of Room H. The masonry of the south wall of Room G, compared to other Moon House masonry, is the most uniform in the size of sandstone blocks, evenness of coursing, and use of chinking. The sandstone blocks are tabular with a relatively small size variation. The masonry courses are well laid with chinking in a fine linear pattern between courses. The outward appearance is most similar to that of Rooms A and B of the M-2 storage structures. Its appearance is even more similar to that of a masonry granary located at site M-22, approximately 1.3 miles down canyon from Moon House.

The entry to Room G is located in the southwest corner and is small (see Appendix A) with an approximately 65 cm high sill. The lintel is not lowered, but is made of 6 sticks supporting the wall above the opening. Mortar placed in the lower corners of the entry (midway through the opening) served as a door jamb. The interior of the room is not plastered and is not sooted. Remnant soot on some of the sandstone blocks indicates the reuse of
those blocks as construction material from previous structures. Hanging pegs are located in the west wall just below the ceiling. The small high-silled entry and lack of sooting indicate a granary function for Room G, though the absence of a lowered lintel may indicate intended use of the room for types of other storage that did not require of a sealable door. There is no evidence that the door was ever sealed. There is essentially no room fill other than thin loose sediment.

Handprint pictographs are located on the shelter ceiling within Room G near the east wall. These prints are done in three styles, 1) a negative silhouette using soot, 2) a negative silhouette using mud, and 3) a positive silhouette using soot. The chronological relationship between the creation of the pictographs and the construction of Room G is uncertain.

**General Storage Room**

**Room L**

Room L is located at the end of a narrow passage leading west from the southwest corner of Court 1 (Figure 14). Its west and south walls are the west end of Wall M and the bedrock is the north wall. The entry is through the east wall. Preservation of this east wall is poor. Vertical poles and a masonry sill, into which the poles are set, are all that remain. During the 1974 field recording, the east wall above the entry was much more intact than in 1986. The 1974 descriptive records and photographs show the east wall to mainly be a narrow frame for the entry. The wall above the entry and the masonry sill were the major features. The upper part of the wall was constructed of 4 horizontal sticks secured against the vertical poles. Mud was packed between the horizontal sticks, and between the vertical side poles and their adjacent north (bedrock) and south (Wall M masonry) walls.
This upper portion of the east wall was not present in 1986. The entry sill is the masonry base of the east wall. This lower wall is constructed of relatively flat tabular sandstone slabs mortared with mud. Chinking is used as filler in large spaces between slabs.

Within Room L, sooting is absent. Two small shelves are located just below the ceiling, one in the northwest corner and another 2/3 of the distance west from the entry along the south wall. Two hanging pegs are also present along the south wall just below the ceiling. Two loop holes through the south wall (Wall M) afford narrow views of the main shelf and a lower ledge. Fill covers the floor to an unknown depth. Though the entry was originally small and the room is not sooted, the presence of loop holes indicates the room was not built to function as a sealable granary. The room probably served as a general storage room.

The Entry Ledge to Court Group 1

Court Group 1 is accessed from a bedrock ledge, which is intermediate in elevation between the main ledge and Court 1. The bedrock ledge of Court Group 1 is approximately 130 cm above the entry ledge. This entry ledge is a natural bedrock outcropping. Masonry retaining walls were constructed on its southwest and southeast margins. Soil was added behind the retaining walls to create a flat surface. A granary (Room E2) is also accessed from this entry ledge. Room E2 is described below as a Noncourt Room.

The southwest retaining wall is a bonded extension of the type 3 masonry south wall of Room E2. Its masonry is composed of well laid medium sized tabular sandstone blocks, mortared with red mud, and chinked horizontally between courses. The southeast retaining wall is mainly of
type 3 masonry, apparently bonded to a western extension of the original type 1 masonry south wall of Room C. This extension, like the lower south wall of Room C to which it is bonded, appears to be constructed of mud with a supporting core composed of widely spaced courses of small irregular sandstone blocks. This type 1 masonry wall extends only 90 cm west of Room C before the type 3 masonry wall begins. The apparent bonding between these two construction methods may represent a change in construction method before completion of the retaining wall. However, the masonry section may be a later addition or a reconstructed section built as if bonded to the mud wall.

Court Group 2

Court Group 2 is composed of five contiguous rooms (B1-B5) arranged along the northern margin of a flat and open court (Figures 14, 19, and 20). Each room is accessed individually from the court, as in Court Group 1, with no access from room to room. The final function of four rooms (excluding B4) appears to have been storage (granaries or general storage). Originally Room B2 functioned as a habitation space but was remodeled in the A.D. 1260s to serve a storage function. Room B4 also might have originally been used as a habitation, though it is small for a habitation room and possibly was never enclosed by a south wall. Room B4 is sooted, indicating a habitation function, but might have been used as an open work area if it was never fully enclosed by a wall. The lack of apparent maintenance or remodeling for Room B4, possibly contributing to its poor preservation, indicates its disuse during the remodeling of Rooms B1-B3. Poles from the jacal wall of B4 have been displaced in the recent past by visitors to the ruin, therefore
Figure 19. Overview of Court Group 2 at Cliff Dwelling M-1, looking west. Vertical scale is 2 meters.

Figure 20. Overview of Court Group 2 at Cliff Dwelling M-1, looking east. Vertical scale is 1 meter. Horizontal scale is 2 meters.
its poor preservation and lack of an intact south wall might also be solely
due to historic vandalism. Evidence of other vandalous acts over the past
15 years is apparent, though relatively minimal when compared to the
disturbance of the other cliff dwellings in McLoyd's Canyon.

The spatial organization of Court Group 2 indicates the original
existence of a court focused living group. The use of Room B2 as a
habitation space indicates at least one household occupied Court Group 2.
If Room B4 was a small habitation room, its presence indicates an additional
household or its use by some member or members of an extended household.
The extant remains of Court Group 2 can be interpreted as being originally
composed of one or two habitation rooms (B2 and possibly B4) and 3 storage
rooms (B1, B3, B5) used by one to two households. It is probable that
another room (B6) within the original court group was located west and
adjacent to Room B5. Evidence for this room was slight in 1986, but was
noted during the 1974 recording. Evidence of many earlier structures is
apparent throughout M-1. The relationships among these earlier structures,
including Room B6, cannot be determined.

Remodeling of the Court Group 2 structures during a later construction
period changed the functional organization of space so that Court Group 2 no
longer functioned as a dwelling unit. But, the flat open court probably
continued to be used for domestic activities by households occupying Court
Group 1. Groundstone slabs are present on the open court and might indicate
domestic activities, but their present location is just as likely to be the
result of actions by recent visitors who often move artifacts.

Rooms B1-B3

A lack of sooting and small size indicates Room B1 was not used as a
habitation room. The entry does not fit well within Dean's (1969) functional classification system, yet its intermediate size and ability to be closed and sealed is consistent with a storage function. Room B2 is heavily sooted, indicating its original use as a habitation room. Later remodeling altered the architecture of its entry to facilitate a storage function. The absence of soot on the reconstructed part of the architecture supports the interpreted functional change of Room B2 from habitation to storage. Room B3 is small in area, has no sooting, and has an entry similar to that of Room B1. It was most likely used as a storage room.

The entry of Rooms B1 and B2 is located in the west wall of each room and is accessed from the court. The entry of Room B3 is in the south wall and is also accessed from the court. The original entries of these three rooms are not distinctive as to function. Their form and size do not fit into Dean's functional classification using characteristics of the room entry. Their shape is an elongated oval ranging in size from 64 cm to 67 cm high and 37 cm to 49 cm wide at their widest point (Appendix A). These dimensions are intermediate between those which characterize the functionally distinct habitation rooms and granaries of Dean's classification. This type of architecture is apparent in the earliest structures at Moon House and at other cliff dwellings within Mcloyd's Canyon. A mud collar characteristically frames the entry, probably to support a door slab and to facilitate a tight seal when the entry is blocked. This architectural characteristic indicates a need to seal the entry, probably to protect stored items during a seasonal shift in residence or for general long term storage.

The lintel of Room B1 is composed of 4 small sticks (probably cottonwood or willow). Room B3 has a lintel composed of 5 small cottonwood
and willow sticks at the front and one larger cottonwood stick behind. These lintels are not lowered and therefore did not serve to support the slab door, as did the lowered lintels of other entries. The entry to Room B2 has been reconstructed, obscuring the details of the original construction. The original dimensions of the ovate entry can still be observed, however, on the inside wall around the present entry.

The bedrock shelter ceiling serves as the roof for Room B3 and the north half of Room B2. The existing roofs on Room B1 and the south half of Room B2 were reconstructed during the last construction phase at Moon House and are described below. There are no visible floor features in these rooms. Fill material of sediment, rubble, corn cobs, and other organics obscure the actual floor in Room B1. Room B2 has a minimal amount of fill, but sediment may be covering some evidence of floor features. Room B3 also has some undetermined amount of fill.

Reconstruction of Rooms B1-B3

Reconstruction of portions of these three structures is obvious from the use of type 3 masonry incorporated into the original type 1 masonry walls. A change in function for Room B2 is evident from the remodeling of the entry, and the absence of sooting on all architectural reconstructions.

Room B1

The most obvious reconstruction in this room occurred in the north half of the east wall. Masonry of irregular sandstone blocks was used to reconstruct a section of wall that originally abutted the exterior south wall of Room B2. This section of masonry repair is ovate in shape, but does not appear on close inspection to be blocking an earlier entry. Flat
surfaces of the sandstone blocks were placed to construct a relatively smooth inner wall, though the result is not as smooth as the inner surface of the east wall of Room B2. The outside of the repaired section is jagged with no attempt to create a smooth surface. This characteristic is similar to type 2 masonry and contrasts with the outer surface of the Room B2 east wall. These observations are significant in light of the fact that from the outside the east wall repair of Room B1 appears to be bonded with the reconstructed type 3 masonry east wall of Room B2, indicating a single construction event. Yet, the difference in masonry styles is suggestive of two construction events, or the bonding of two sections of the same wall that did not require a continuity in form. These two wall sections also come together at a concave angle. This probably follows from a reconstruction of the curvature of the original walls.

Wall repair is also apparent at the inside top of the north wall of Room B1. This is actually the exterior side of the curvilinear south wall built to delineate Room B2, to which Room B1 is abutted. The repair is evident only on the inside of Room B1. This repair is not of masonry. The small area is repaired with rock tempered mud and courses of small sandstone spalls and ceramic sherds of a size commonly used for chinking. No attempt was made to smooth the surface, as the sandstone and sherds protrude from the mud. The wide vertical spacing of the courses, and the wide horizontal spacing between spalls within the courses is interesting in that it resembles the spacing of the supporting sandstone core within the type 1 walls of B1-B3. The sequential relationship of this repair to other reconstruction is that it preceded the remodeling of Room B2 and the latest roofing of Rooms B1 and B2.

The roof on Room B1 is considered a reconstruction in that it rests on
the reconstructed roof of Room B2 and the wall reconstructions of Rooms B1 and B2, postdating all reconstruction of Rooms B1 and B2. The roof on Room B1 is constructed of 9 cottonwood and oak beams, 4 to 9 cm in diameter. The beams are laid on the north and south walls, perpendicular to the bedrock shelter ceiling. The closing material is thin cottonwood and willow sticks placed across the small primaries, parallel to the shelter ceiling. The closing materials were secured to the primaries with twig ties. Rock tempered mud was packed on top. Burned areas on some of the primaries and traces of soot on some of the closing material indicate the reuse of these materials from other structures. The burning and sooting is not consistent and does not resemble that associated with sooting of a habitation room, although some of the roofing materials were probably taken from earlier habitation rooms.

Room B2

This space was originally used as a habitation room, evidenced by heavy sooting of walls and the shelter ceiling. Absence of soot on the architectural reconstructions indicates the post reconstruction absence of fire within the room. The entry was changed from an elongated oval shape to a smaller rectangular opening (Appendix A). It was reconstructed of masonry, using small pieces of tabular sandstone mortared with mud. The masonry was laid from the court surface to the roof, though an original upright slab was retained in the foundation. Only a portion of the original type 1 wall around the entry was reconstructed. The lintel is composed of 3 cottonwood sticks, and cottonwood sticks were also placed as uprights at each side of the entry.

The east wall has been completely replaced with a type 3 masonry wall,
using small tabular sandstone blocks mortared with fine textured mud. Flat surfaces of the sandstone blocks were positioned to create a flat inner wall surface. Mortar overlaps the margins of the blocks, obscuring their actual size and further smoothing the inside wall surface. The inside surface of this reconstructed east wall is not sooted.

The roof abuts the bedrock shelter ceiling to the north and hence the constructed portion covers only the south 1/2 of the room. The sandstone shelter ceiling serves as the roof for the north 1/2. The roof is determined to be a reconstruction, based on its lack of sooting and that it is supported on the east by the upper course of the nonsooted masonry wall. The roof is constructed with 3 juniper beams (8 cm to 12 cm in diameter) laid parallel to the shelter wall and resting on the top course of the west and east walls. Shakes, probably juniper, were laid perpendicular to and resting on the three juniper beams. A layer of mud was laid on the shakes and used to fill the remaining open spaces.

Room B3

Reconstruction of Room B3 replaced a portion of the south wall, east of the entry, including the top of the wall above the entry. The repair used masonry with long tabular slabs at the base. Above, large irregular sandstone blocks and smaller thin sandstone blocks were mixed with no apparent pattern to the coursing. Small sandstone pieces were used as chinking. Large tabular slabs were placed at the top of the wall. Both the interior and the exterior are fairly smooth, but more so for the interior. The mortar is red, moderately coarse, and rock tempered with some fibrous material.

The reconstructed south wall abuts the west wall of Room B2. The
original south wall, being of type 1 masonry, may originally have bonded with the west wall of Room B2. This is evidenced by the westward curve of a remnant of the lower exterior west wall of Room B2, visible at the inside lower southeast corner of Room B3. If so, Rooms B2 and B3 were originally constructed together as a single event.

The top 2 courses of the west wall of Room B3 shows repair, using thin sandstone slabs and loafs of red mud. This west wall repair overlaps the jacal south wall remnant of Room B4 in its southeastern corner, post dating the construction of Room B4. The western side of this reconstruction (inside Room B4) is not sooted, but overlaps the earlier slightly sooted wall, indicating Room B4 was not used for its possible original habitation function after the repair of Room B3.

**Room B4**

Room B4 is a space delineated by the remains of one possibly continuous jacal wall on the west and south. The jacal wall was constructed with upright poles of cottonwood, oak, juniper, and willow branches ranging from 2 cm to 8 cm in diameter. Long slender willow branches were laid horizontally against the uprights and secured with twig and bark ties, probably of willow. Mud, tempered with rock, was apparently packed onto both sides of the framework and sculpted into a flat surface. The south wall was probably a bonded extension of the west wall that curved around to become the south wall of the room. The small remnant of the south wall, abutting Room B3, is of the same construction as the jacal west wall which abuts the bedrock at the rear of the shelter.

Whether this room was ever enclosed by a complete south wall, with entry, has not been determined through the observation of the wall remnants.
Fallen wall materials were not present in 1986, but tree-ring samples were collected in 1974 from poles lying on the floor within the room. Photographs from 1971 show jacal poles outside Room B4, used by visitors to construct a crude table. Most probably, Room B4 was originally enclosed. A possible habitation use is indicated by light sooting present on the inside of the west jacal wall and on the exterior of the Room B3 west wall, inside Room B4. Sooting is also apparent on the shelter ceiling, though much of the ceiling has exfoliated, destroying most of the sooting. The remnant sooting on the ceiling probably resulted from a hearth fire within Room B4, but could have resulted from earlier fires within earlier rooms or from court fires near the back of the shelter.

Mealing bin (sandstone slab) and metate fragments found lying on the floor inside Room B4 during 1974 were recorded as indicative of a mealing function for Room B4. These artifacts were not present in Room B4 during the 1986 recording. Moon House is heavily visiting by people who, on occasion, will move metates, door slabs, beams, wall rubble, etc. The presence in 1974 of mealing bin fragments, which were lying flat on the floor, and metate remains cannot be used reliably as an indication that mealing activities occurred in Room B4. Visitors may have moved them into the room, just as visitors were probably responsible for moving the same artifacts out of the room. Sooting on the inside of the jacal wall indicates the presence of fire within the room. The function of Room B4 remains uncertain.

Room B5

Room B5 is interpreted as a storage room due to a lack of sooting on the inside walls and the relatively small size of its entry. Sooting is
present within the room on some nonexfoliated portions of the sandstone shelter ceiling. This sooting could have occurred during earlier occupations, either within rooms built at the same location or as a result of open court fires. Ceiling soot cannot be the only criteria for assigning a function to this room. The absence of sooted walls is more conclusive as to the function of the existing structure, and therefore a storage function is indicated for the use of this room.

Room B5, like Rooms B1-B3, was constructed of type 1 masonry. One, possibly two, cottonwood beams and one possible coniferous beam are laid horizontally within the south wall, above the entry. The lowest beam is located approximately 104 cm above the floor and runs the length of the south wall. This horizontal beam supports the upper 70 cm of the wall. The upper portion of the south wall shows no evidence of the sandstone rubble core used in the lower portion of the wall. The beams probably replace the supporting function of the sandstone core within the mud matrix.

This south wall is constructed so that it overlaps the southwest corner of Room B4, and once abutted the probably curved southeast wall of Room B6 (no longer present). This overlap and abutment shows Room B5 to have been the last room constructed as part of the original court group.

The entry, located high in the center of the south wall, is the smallest in Court Group 2. The lintel is made of small sticks. In addition, two small sticks are set diagonally, one at each upper corner of the entry, in order to hold a door slab in place. A raised platform sill abuts the exterior south wall below the entry. This may be a later addition. It is constructed of masonry, using thin sandstone slabs, both large and small, laid in alternating courses of mud and sandstone. The platform surface is a single sandstone slab that protrudes 30 cm out from
the wall. The platform is supported by a large sandstone block, set with its longest dimension vertical and with mortar used to secure its position. Originally, red mud was used to form a collar around the entry to help seal the door slab. Later, tan mud possibly the same type used in the reconstruction of the west wall was added to the collar. This tan mud overlaps the masonry sill construction, indicating that a door slab had been sealed in place at least once after construction of the door sill platform.

Four, and possibly six, vertical solid white stripes are painted on the exterior of the south wall. Vertical stripes have not been seen at any other location within Mcloyd's Canyon.

The west wall of Room B5 appears to have been reconstructed using type 3 masonry. Though most of the wall has fallen to rubble, the lower two courses are still intact. The remains show the masonry to be of large irregular blocks, mortared with tan mud and chinked with small thin pieces of sandstone. These remains are not necessarily indicative of the masonry of the entire wall. Often the lowest courses of a wall are constructed using large blocks to give the wall foundation support. The size of wall blocks often decrease towards the ceiling. Most importantly, the wall is type 3 masonry, indicating that Room B5 was rebuilt during the latest building period. Masonry was also used in the construction of the raised platform sill abutting the outer wall below the entry. The use of masonry and its abutment to the exterior wall indicate the raised sill is another possible late addition to the original structure.

Room D

Room D is a type 3 masonry storage room accessed from the west end of Court 2. It is not one of the original Court Group 2 rooms, but replaced
other probable mud wall structures that may have been associated with the Court 2 households. Ghost structure outlines on the bedrock ceiling within and outside Room D are evidence of the existence of earlier rooms.

The masonry of Room D is similar to that of Rooms H and I at M-1, and to the masonry of the M-2 storage room block. Irregular shaped sandstone blocks are coursed fairly well and mortared with mud. The chinking forms a filler between the courses. It is linear in places, but inconsistently so. Flat surfaces of the sandstone blocks were placed to create a flat exterior wall surface, and protrusions from the surface were sometimes pecked flat. The overall form of the structure is very angular at its edges. This squareness is even more apparent because the room sits alone with no shared walls.

The entry is raised, angular, and small. The lintel is lowered and composed of two sticks. Mud is packed at the lower corners of the entry midway into the opening to hold a door slab in position to seal the room.

The south half of the room is roofed, but the north half extends up to the natural rock overhang, which forms the north part of the ceiling. The roof is constructed of three primary juniper beams lying parallel to the bedrock ceiling with wood shakes lying, side by side, perpendicular on the primaries (similar to Room B2 roof construction). Mud is placed thickly on the shakes.

The underside of the roof and the inside walls are not sooted. The absence of soot and the small entry indicate a storage function for Room D. Eleven hangers are located around the inside of the room, just below the roof and bedrock ceiling. The floor of the room is bedrock with narrow flat terraces sloping north to south, created by chipping at the sloping bedrock.
Rooms Not Accessed from a Court

Room A

Room A is an above-ground kiva. Its wall foundation is resting on the bedrock shelf. The structure of the kiva is indicated by the remains of a curved type 3 masonry wall, a masonry bench surface, and a masonry lower lining wall. These architectural features are visible only in the remains of the north wall. The lower lining wall was constructed against the inside of the type 3 wall, creating a double wall with the type 3 wall comprising the outer wall of the kiva. Most of Room A was located beyond the protection of the shelter ceiling and has essentially been washed away by water runoff.

The remaining segment of the north wall measures approximately one meter high. The small exposure of outer wall indicates that the wall masonry was composed of relatively poorly coursed large sandstone blocks mortared with mud. The inside surface of the outer wall functioned as the upper lining wall of the kiva. The lower lining wall is approximately 65 cm high and is positioned inside the exterior wall to create a 50 cm wide masonry bench. The masonry of the lower lining wall is composed of thin (5-10 cm thick) roughly shaped horizontally laid sandstone slabs. The slabs are well coursed and mortared with a small amount of coarse rock tempered mud. Larger slabs are used for the lower courses of the lower lining wall. A northern niche is also present in the lower lining wall. The arch of the remaining northern wall can be projected to suggest an approximate inside diameter of 5 meters within the lower lining wall. This is very similar to the inside diameter of the kiva at M-3.

Reuse of masonry blocks for the original construction is indicated by
the presence of grooved blocks, incorporated into the wall in such a way that the grooves could not have been used or produced while the block was part of the wall. The reuse of Room A wall rubble for later wall construction is indicated by the lack of associated rubble around the kiva. Weathering from precipitation and water runoff probably contributed to the lack of kiva remains, but I would expect a greater amount of unweathered wall rubble if scavenging did not occur. The reuse of kiva wall rubble indicates the kiva was not used during the late occupation of the Moon House Complex. It is probable that the kiva at M-1 was replaced by the kiva at M-3.

**Room C**

Room C is a habitation room. Its lower walls are constructed of type 1 masonry, indicating the original construction was probably contemporaneous with the original construction of the Court Group 2 structures. Two distinct techniques of masonry wall construction are evident above the lower type 1 wall remnant. The two distinct masonry styles are probably the result of two reconstruction events (wall repair). The first reconstruction replaced the west wall and the southwest corner with a type 3 masonry wall. This reconstruction masonry is similar to that used for reconstruction of the Court Group 2 structures and is possibly contemporaneous.

The second reconstruction consisted of one to four courses of masonry added to the top of the west and east walls, and four courses added to the top of the south wall. This masonry was probably put in place during the re-roofing of the structure. The upper masonry supports the roof and is constructed of larger irregular sandstone blocks with little attempt to lay the stones to create a flat vertical wall surface. This upper masonry is
similar to the irregular type 2 masonry of Storage Room E1 at M-1 and Storage Rooms F, O, and P of M-2. The use of this masonry style has been observed both to abut, and be abutted by, the flat faced type 3 masonry that is characteristic of most of the latest structures. There is only one tree-ring date from a primary roof beam directly associated with the upper Room C masonry. This date is relatively early for Moon House (A.D. 1143B) and probably indicates the reuse of the beam during later construction.

The lower west wall is interesting in that large sandstone blocks are used and mortar is absent. It is not apparent whether the mortar has eroded or was never there to begin with, yet it seems unlikely that the foundation courses of the west wall would be dry laid. A large hole in the south corner of the west wall is probably the result of weathering or historic vandalism. There is also a large hole in the south corner of the east wall that probably resulted from one or both of the same reasons.

A constructed roof covered the entire room. All that remains are two large primary beams laid north-south from the rear bedrock wall to the south wall. The center beam (dated) extends through the upper masonry, protruding out from the wall exterior. There is no further evidence of roof construction. Construction probably followed the method of placing secondary beams perpendicular to the primaries with a covering material of small branches or shakes. Mud would then have been packed on top of the closing material. The roof was probably dismantled at some point after or during the last occupation.

The entry to Room C is ovate in shape and built through the lower type 1 masonry south wall. The form of the entry is similar to the entries of the original Court Group 2 rooms. This entry style and the mode of construction of the lower wall of Room C indicate that the original
construction was probably associated with the construction of Court Group 2. The entry's lintel appears to have been reconstructed. As it now exists, it is composed of two horizontal sticks and one vertically diagonal stick in the east corner. The mud collar around the exterior margin of the entry has been refinished several times by adding new layers of mud. A purple tinted mud collar overlays the original collar of brownish red colored wall mud. And another collar of brownish red mud overlays the purple.

The interior of this room has habitation room features and a pictograph similar to the one in Habitation Room I. The entire inside of the room is sooted, including the under side of the primary roof beams. The south wall shows 3 or 4 layers of plaster, exposed by erosional peeling. Each of the layers was sooted before being plastered over. The top layer, and possibly all layers, of plaster overlap all of the three masonry styles, but are mostly eroded from the upper masonry, due to greater exposure to rain and dripping water. There are three shelves on the bedrock north wall. One in the northeast corner and one in the northwest corner are small flat bedrock ledges. A masonry shelf running across the lower north wall has a small niche built into its vertical face. Six small diameter holes at the southeast corner of the room - three in the east wall and three in the south wall - are evidence that a fourth shelf once existed. The shelf was built with three sticks laid diagonally across the corner and set into the wall approximately 115 cm above the level of room fill. Room fill is approximately 30 cm deep at the south wall.

The interior pictographs include a 6 cm wide horizontal white band that probably ran continuously around the room, approximately 46 cm above the level of the fill. Other white figures on the interior south wall, just above the fill, are badly eroded. The white band here is similar to that in
Room I except the dots and the moons are not apparent. Exposure to the weather has resulted in the erosion of the pictographs, and the generally poor preservation of Room C.

**Rooms E1 and E2**

Rooms E1 and E2 are both granaries located in a small, low ceilinged shelter below Court 1 (Figure 14). They have small entries, very low bedrock ceilings and have no sooting on the interior. Room E2 also has 6 hanging pegs in the west and south walls just below the ceiling.

Room E2 was the first of the two granaries to be constructed. Its north wall is the bedrock rear wall of the shelter. Its west, south, and east walls are bonded type 3 masonry, constructed of medium sized tabular sandstone and some square sandstone blocks. The courses are well laid and mortared to create smooth faced vertical wall surfaces, with horizontal linear chinking. The mortar used is red with a high frequency of small subangular white sandstone pieces. The entry to Room E2 is in the east wall, accessed from the ledge below the entry to Court 1 through Wall M. The lintel is not preserved and so the actual height of the entry was not measurable. At the ceiling a mud outline indicates a section of wall was once present above the entry. Room fill includes miscellaneous organic material and corn cobs.

Room E1 is abutted to Room E2. Its type 2 masonry wall curves north from its abutment with the southwest corner of Room E2, to abut against the bedrock north wall. Room E1 masonry is composed of type 2 masonry, similar to that of Rooms F and Q of M-2. Two types of mud were used as mortar. The lower 2/3 of the wall was mortared with a light tan colored mud. The upper 1/3 was mortared with red mud similar to that used for Room E2, but there is
no evidence that the different types of mud indicate remodeling. The entry is small and faces west. Room E1 was not entered during the 1986 recording because of its difficult access, resulting from its height above the main ledge.

Room N

This room was defined by wall construction at both ends of a fairly large natural opening through the sandstone cliffs at the west end of the M-1 shelf. This natural crevice or pass-through sits approximately 2.5 meters above the main shelf (Figure 21). Access must have been by ladder from below the north or south opening. The position of this loft affords a good view up and down McLoyd's Canyon, but the M-3 cliff dwelling is not visible to the north. The observatory position of this loft lends itself to a defensive interpretation, but the actual function of this space is uncertain. The architecture is not well preserved or distinctive as to function. There is no evident sooting on the walls or ceiling, and there is no evidence of a hearth. Use of the entire space for storage or habitation would be hampered by an open crevice in the ceiling, which allows water to course through the loft. Artifacts recorded within Room N indicate some activities did occur within the sheltered loft. Artifacts collected in 1974 include 12 ceramic sherds (5 corrugated, 4 black-on-white, 2 white ware, and 1 misc.), 1 lithic flake, and 1 unidentified bone. Artifacts observed in 1986 included 4 ceramic sherds (both corrugated and plain gray body sherds) and 1 large red fine grain siliceous flake.

A remnant of a masonry wall runs across the entire north opening. The lower 2 courses are all that remain, but sandstone blocks from the wall are evident on the slope below. This north wall probably served to block the
wind and restrict room access, allowing entry only through the southern opening. Loop holes through the wall, if present, would have allowed observation up the canyon. The masonry walls at the south opening are better preserved but difficult to interpret. The dominant structure is composed of 2 east-west oriented primary beams that probably supported a scaffold that spanned a gap between narrow ledges that run along both walls of the crevice. At the south edge of each narrow ledge is a segment of type 3 masonry wall extending out from the shelter wall to the primary beams at the south edge of the platform remnant. It is possible that the two segments of masonry wall were once part of a single wall that ran along the south edge of the platform. There are mud stains along the tops of the primaries, and the irregular end of the east wall segment has one sandstone block jutting out into space. The main interpretive problem is that the first primary beam is offset just to the north of the indicated location of the wall. There is no indication that there ever was a supporting primary beam directly below the present wall remains. The west wall segment is curved along the edge of its narrow ledge, stopping at the primaries. This west wall possibly indicates that short curved walls existed on both sides of the platform, possibly abutting another wall, which ran straight across the offset primaries. The noncurving form and ragged edge of the east wall is unresolved. The actual existence of a fully floored platform is also uncertain. Weathering, resulting from water coursing through the crevice, may be responsible for the destruction of the walls and platform. The structures may also have been dismantled at some point before or after abandonment.

The narrow ledges on both sides of the possible platform were constructed with fill dirt placed behind low type 3 masonry retaining walls
Figure 21. Overview of Room N at Cliff Dwelling M-1.
Vertical scale is 2 meters.
to create flat ledges. Both ends of the primaries are set into the artificial ledges, though probably resting on bedrock.

One loop hole, similar to those in Wall M, is present in the east segment of the south wall. This loop hole looks down across the bedrock shelf below the main shelf, to the north side of the canyon bottom. The possible use of the loop hole for defensive observation indicates a possible defensive function for Room N.

**Cliff Dwelling SA-5004 (M-2)**

Room Block 1, the well preserved block of granaries within the main M-2 shelter (Figures 8 and 22), represents the last use of the shelter before abandonment. The latest tree-ring date from Room D places the construction of the room block at approximately A.D. 1268. Individual granaries O, P, and Q that are located under smaller overhangs to the west of Room Block 1 were originally recorded as components of the M-2 cliff dwelling (Figures 7 and 23). These structures may or may not have had a specific organizational connection to the block of granaries within the M-2 shelter. They are considered to be part of the Moon House Complex, however, and were probably used along with the granary room block during the last occupation. The isolated granaries are described with the other M-2 components for continuity.

An earlier use of the shelter is represented by the remains of Rooms G, H, I, J, and K (Figure 22). These rooms appear to comprise at least one suite of rooms that would have been occupied by a household group. The one obvious association of rooms is provided by evidence of shared access
between Rooms G and H. Room G is sooted with a habitation style entry. Room H is small, located at the rear of the shelter, and was probably a storage room. It could only have been accessed from Room G. Whether there had been a raised sill access from Room G to Room H could not be determined, but it was clear that there was no floor level access. The other possible functional association of rooms is between Room K and Room I. Room K was dug into the shale bedrock, has remnants of plaster at its lower rear wall, and is sufficiently large to have been a habitation room. Sooting was not observed, however, on the minimal remains of the structure. Room I is small and located to the rear of Room K. Access cannot be determined due to poor wall preservation, but its location and construction make an association with Room K probable.

Two wall construction methods are apparent in this suite of early rooms. The earliest construction is type 1 masonry, similar to the type 1 construction of rooms around Court 2 of Cliff Dwelling M-1. Some wall remnants show a later construction of type 3 masonry above the type 1 walls. The room suites of Cliff Dwelling M-2 were probably constructed and inhabited concurrently with the earliest construction and occupation of Court 2 of Cliff Dwelling M-1. This association is based on the similarity in wall construction methods. The use of type 3 masonry for a later construction, most obvious in Room G, indicates the M-2 room suites might have continued to be occupied during the time that the Court Group 2 rooms of Cliff Dwelling M-1 were being remodeled and repaired. Lack of wood beams and large quantities of wall rubble indicate that M-2 structures G through K were dismantled and the building materials were probably reused. The presence of some wall rubble indicates that walls were not completely dismantled, but have decomposed and fallen since abandonment.
Figure 22. Plan View and Profile Map of Cliff Dwelling M-2.
Foundation remnants of early probable Storage Rooms L, M, N, R, S, T, and U are located west of the main M-2 shelter under a shallow fairly unprotective overhang (Figure 7). These structures may have been used in conjunction with the early habitation suites just described. Lack of rubble in the vicinity of these ruined structures indicates their materials were removed for use in other construction. Weathering probably cannot account for the almost complete lack of wall rubble at these structures. Mortar outlines on the bedrock ceilings in Rooms A, D, and E are evidence of other early structures within the main shelter. The function of these "ghost rooms" is undetermined.

Room Block 1

Room Block 1 is composed of 5 large granaries (Figure 22). The uniform construction of each room within Room Block 1 and the pattern of wall abutments indicates the room block was constructed as a unit. The room block was built on an exposed shaley bed within the Cedar Mesa Formation sandstone, which was excavated to create a level floor area within each room. The dividing wall between Rooms A and B, and possibly other room block walls, was built on top of a shale balk left between the excavated room floors. The type 3 masonry walls are usually double wythe except where a large block spans the width of the wall. Wall blocks are irregular, except at entries, and are placed to expose a flat surface to the outside to create a smooth wall face. Coursing is even to poor with linear chinking and patches of chinking used as space fillers. Variations in the evenness of coursing and frequency of chinking may be due to variation in techniques among several builders. The smooth faced angular type 3 masonry of the room block is similar to the masonry in Rooms D, G, H, and I of Cliff Dwelling M-
1. Variations in coursing and chinking can also be observed between the M-1 rooms.

The last rooms constructed at Cliff Dwelling M-1 and M-2 evince the most even coursing and finely patterned chinking of any of the type 3 walls within the complex. At Cliff Dwelling M-1, Room G is the most evenly coursed and has the most decoratively even chinking. Room G was the last room constructed behind Wall M. Room D, outside Wall M, is second in evenness of coursing and chinking and was also a late construction (A.D. 1264), but possibly not as late as Room G. At Cliff Dwelling M-2, Rooms A and B within the granary room block were two of the last rooms to be constructed. Coursing and chinking of the continuous south wall defining these rooms is the most even in the M-2 room block.

One of the three tree-ring dates from Room D places its construction, and that of the entire room block, at approximately A.D. 1268. The construction sequence of the M-2 room block is based on the observation of wall abutment and bonding. The first room constructed in the room block was Room C. Its south wall was constructed first. The east and west walls were abutted to the interior of the south wall and the rear of the shelter to enclose the room. The south wall of Room D was abutted to the southwest corner of Room C. Room D was then enclosed by abutting a perpendicular wall to the interior of the south wall and to the rear of the shelter. Room E is similarly constructed by abutting its south wall to the southwest corner of Room D. Its west wall is probably abutted to the interior of the south wall, but the upper portion of the joint appears bonded. Mortar often obscures the nature of joints, as it does in this case. The short west wall of Room E abuts the southeast corner of the curved outer wall of Room F. Room F is an earlier construction and will be discussed below.
Rooms A and B were constructed to the east of Room C. Their position in the construction sequence is the same as that of Room D. The plan of Rooms A and B is different from that of the rest of the room block. These rooms were first defined as one large room by a continuously bonded wall abutting the southeast corner of Room C. The wall runs east, turning north at its southeast corner to abut the rear of the shelter. The large space was then divided into Room B to the west and Room A to the east by a wall abutting the interior of the south wall and the rear of the shelter. This method of delineating one large room and then dividing it was used at Cliff Dwelling M-1 to separate Rooms H and I, and Rooms J and K.

The natural ceiling of the shelter served as the full ceiling within Rooms A, B, and C, and as most of the ceiling within Rooms D and E. A small southern portion of Rooms D (approximately 50 cm) and E (approximately 80 cm) was covered by a constructed roof. Both rooms probably had the same roof design, but remains of the roof are present only in Room D. The remnant roof is composed of 2 approximately 10 cm diameter beams and 2 approximately 7 cm diameter beams laid across the east and west walls, parallel to the shelter. Their west ends are resting on one beam laid diagonally across the southwest corner of the room. Beam impressions in the southwest corner of Room E are evidence of a similar construction technique. Shakes are laid parallel above the beams in Room D, then mud and thin sandstone are layered above the shakes. The exposed mud layer on the inside of Room D's roof is chinked with one row of small rocks that forks into two rows at its west end.

The entries to each room in the block are raised. Their dimensions are listed in Appendix A. The upper walls, above the entries, are not preserved in Rooms A or B, but their lintels were probably lowered, as in the other
rooms. Entry construction is similar for each room. The lowered lintels are one or more sticks (usually cottonwood) set in mortar and supported by the upright lateral sandstone slabs that border the entryway. The entry sill is usually one large sandstone slab that spans the entire width of the double wythe walls.

Few features exist within each room. Rooms C and D each have approximately 6 wall hangers located, some on each wall, just below the ceiling. Room B has a long shallow shelf in the south wall of its southeast corner. Room C has a niche in its east wall in the southeast corner and another in the south wall just east of the entry. A small shelf is present in Room D in the west wall at the northwest corner. Room D also has 4 outside wall hangers just below the top of the wall.

Room F

Room F is a granary abutted by Room E of Room Block 1. Two styles of masonry construction are evident in its walls. A small portion of the lower walls are constructed of type 1 masonry and are probably the remnant of an earlier structure that was reconstructed using the extant masonry. The majority of Room F is type 2 masonry, constructed with large to small irregular sandstone blocks laid in uneven courses. The blocks are placed resting on their larger flat surfaces with the jagged edges protruding outward and inward from the face of the wall. The protruding masonry style here is similar to that of Room Q of the M-2 structures and Room E1 of Cliff Dwelling M-1. The masonry construction of Room F also shares similarities with Rooms O and P of M-2. The similarity with these structures is mainly in the use of a curvilinear plan. The upper walls of Room F slope upward and inward to create a dome shape, enclosing the room by abutting the
natural ceiling of the shelter.

The extant southern entry to Room F has been reconstructed in its present location. The original raised entry was through the upper type 2 masonry in the east wall. This entry was probably concave-upward in its lower portion, but was squared at the top, with a horizontal lintel. It was blocked by the same jagged-faced masonry used to construct the upper walls of the room. The present entry is constructed through type 2 masonry, faces south, is raised, and its shape is a somewhat squared oval. A lowered lintel is constructed of one large and one small horizontal stick with another small stick placed diagonally across the upper west corner. A recess around the entry helped to support the door slab and facilitate sealing. The repositioning of the entry of Room F may have coincided with the construction of Room E. The remodeling of Room F would have closed off access to between Rooms E and F, and made the entry to Room F face south, as do the entries to newly-constructed Rooms A-E.

Room G and Room H

Room G is a habitation room and Room H is a storage room accessed from Room G (Figure 22). The preservation of these structures is poor. Quantities of rubble in their vicinity indicate the walls may have collapsed post abandonment and were not completely scavenged for late period construction. Though only lower walls are present, architectural features, sooting, and variations in masonry technique are recognizable. The two indications of a habitation function for Room G are the low silled entryway and sooting on the upper portions of the remaining walls. Sooting is especially evident at the rear of Room G where it abuts to the lower type 1 masonry of Room F, and in the south wall just east of the entry, where a
hearth might have been located. The remnants of the west wall and the south wall west of the entry are constructed of type 1 masonry. The type 3 masonry that is present in the upper north and east walls, and east of the entry, is probably the result of a later reconstruction. The irregular sandstone blocks are fairly evenly coursed and laid on their widest flat surfaces. This reconstruction masonry is minimally represented, but is most similar to the type 3 masonry used to reconstruct the type 1 masonry walls of Rooms B2 and B3 at Cliff Dwelling M-1.

Room H is small and located at the rear of Room G. Its west wall is type 1 masonry, built upon shale bedrock. Its east wall was probably the early type 1 masonry west wall of Room F, before Room F was built of type 2 masonry. The entry to Room H appears to have been from Room G, but structural remains of the south wall and entryway are minimal.

Rooms I, J, and K

Room I was probably a storage room. Its entry is not apparent, but its location and configuration relative to the surrounding rooms indicate access from Room K. The west wall of Room I is constructed of type 1 masonry built on a bedrock shale balk. The east wall is also type 1 masonry, built on a bedrock shale balk and shared with Room H. Many of the M-2 walls abutting the rear of the shelter are built upon shale balks left intact during excavation of the shale. The balks appear to have been left as room wall foundations. The shale was probably excavated to create a large level floor area for each room. The south wall of Room I is masonry, similar to the masonry of Room G.

Room K is large and was prehistorically excavated into the shale bedrock. The exposed shale walls were plastered and type 1 walls were
constructed on the shale. The minimal wall remains indicate that Room K had a circular plan. No sooting was observed on the walls and room features are not preserved. The large area of the room indicates it might have been used as a habitation room associated with Room I, and possibly with Room J.

Room J is a small space central to Rooms G, I, and K (Figure 22). The form, access, and function of this room are not obvious. A possible location of the southern wall is suggested, but poor preservation and a large quantity of wall rubble obscure any architectural features. The rubble in Room J and bordering the east margin of Room K may be the result of historic disturbance.

The past presence of other rooms located immediately west of Room K, between Room K and Rooms L through U (Figure 7), is indicated by excavated shale areas bordered by shale balks. Remnants of mud plaster can be observed on the vertical surfaces of the balks.

Rooms L, M, N, R, S, T, U

These rooms are located in close proximity to each other, west of the main M-2 shelter (Figure 7). They are minimally sheltered by a long shallow overhang and are very poorly preserved. Each room was long and shallow, planned to maximize protection from the overhang. Walls were probably constructed to abut the bedrock ceiling, making roof construction unnecessary. Their small size indicates they might have been used as storage structures, but there are no other features that indicate their function. Wall fall rubble is scarce and was probably used for masonry construction at other locations.

Room R is represented by a one course masonry wall, similar to those of
Rooms L, M, and N, which abuts the bedrock shelter wall. This wall is approximately 1.5 m long and 25 cm wide. It probably was the west wall of an approximately 2 m x 2 m room. The east wall of Room R is represented by a mud foundation.

Room L is defined by 2 to 3 remaining lower masonry courses. The west, south, and east walls are one continuously bonded wall that angles at the southwest and southeast corners to abut the rear of the shelter. The walls are constructed with irregular sandstone blocks and mortared with coarse rocky mud. This masonry was probably most similar to type 2 masonry.

Rooms M and S are represented only by remnants of wall mortar on the rear wall of the shelter and mortar outlines on the ceiling. These rooms were probably joined at a central dividing wall.

Room N is similar in appearance to Room L. A 5 course masonry wall remnant shows a relatively smooth inner face and a jagged outer surface, most similar to type 2 masonry. Plaster is preserved on the rear wall and mortar outlines are visible on the ceiling. The south wall remnant of Room N abuts the exterior west wall of Room T. The west wall of Room T is bonded to a small remnant of a south wall that extends east from the southeast corner of Room N. Room T is only indicated by this small south wall remnant. Room T might actually be the west portion of Room S, but the dimensions of one room, composed of Rooms S and T, between Rooms M and N would be larger than the average size of these rooms. There is no other evidence to indicate whether 1 or 2 rooms occupied the space. Room U is indicated to the west of Room N by a western extension of the south wall of Room N, and by the presence of mortar on the rear of the shelter.
Rooms 0, P, Q

Rooms 0, P, and Q (Figures 7 and 23) are granaries located between Cliff Dwellings M-2 and M-1. Each is constructed under one of the two protective overhangs in this area of the shelf. Each is composed of a single continuous masonry wall, which curves at both ends to abut the rear of the shelter and slopes up and back to abut the shelter ceiling. The masonry of Rooms 0 and P is a combination type 2 and type 3. Both structures are similar to other type 2 masonry structures in that their form is a beehive shape. Yet, attention was given to creating smooth faced wall surfaces that approach that of type 3 masonry. Room Q is mainly type 2 masonry. All three granaries would have been intact at abandonment and were potentially in use during the A.D. 1260s occupation.

A variation in wall construction indicates Room 0 might have been reconstructed in its present form. That variation is that the north section of the east wall is heavily plastered on its interior surface, while the rest of the interior is unplastered. Sandstone blocks protrude out from the inner surface of Room 0 except where the wall is plastered. The masonry observed on the outer surface of the plastered wall is similar to the rest of the structure, though it appears that the unplastered masonry is the result of the reconstruction of that portion of the wall.

Mud plaster covering the rear of the shelter, extending outside Room 0 for approximately 1 meter to the west, indicates that another structure occupied the shelter at an earlier time. The entry to Room 0 faces west. It is not well preserved in that only the lower courses of the probable raised sill are still intact. Pictographs of unidentified figures and handprints are done in silt on the bedrock ceiling.
Figure 23. Plan View and Profile Map of Cliff Dwelling M-2, Rooms 0, P, and Q.
Room P also shows a different and probably earlier wall construction in its lower northwest corner. The wall here appears to have been constructed of type 1 masonry. The most interesting feature of Room P is the 2 upright sandstone slabs supporting the outside of the south wall. The support slabs were placed either during or after construction of the wall. The interior shows the southward projection of the wall above the support slabs. The reason for the out-of-line wall construction is uncertain, but the slabs are obviously placed to fix a problem by supporting that section of the wall. The entry to Room P is raised with a lowered lintel made of one whole stick and one split stick. Mud has also been placed at the sides of the opening approximately half way into the entry to support and facilitate sealing a door slab. Mud has been placed into cracks in the ceiling, possibly to stop moisture or rodents from entering the granary. The mud may also serve to slow the exfoliation of bedrock slabs from the ceiling. One such slab is resting on the fill inside the room.

Room Q has a remnant of a slab based mud wall in its northwest corner, probably the remnant of an earlier type 1 masonry structure that was weathered beyond use and/or dismantled. The remainder of the structure is type 2 masonry with sandstone blocks laid in courses with the jagged edges protruding from the wall surface. The size of the coursed blocks decrease in size from bottom to top. Mortar between the courses appears to be weathered towards the bottom, accentuating the protruding masonry. Towards the top of the wall, finger prints in the mortar indicate less weathering. The mortar is coarse with large rock temper in the lower portion of the wall. Coarse mud was also used to make repairs to the entry. The entry is raised with a raised masonry platform abutted to the wall just below the sill. A collar of fine red mud has been added around the entry, probably to
facilitate sealing the door.

**Cliff Dwelling M-3** (No recorded state site number)

Cliff dwelling M-3 is composed of 10 rooms dominated by the presence of a large aboveground kiva, Room A. The kiva and 5 contiguous rooms are located in the main shelter, with the other 4 rooms spread to the east along the minimally protected ledge (Figures 9 and 24). During construction of the kiva after A.D. 1265, 2 contiguous habitation rooms (Rooms C1 and B3) were remodeled to serve supporting functions for kiva-focused activities. The remodeling indicates that Cliff Dwelling M-3 functioned as a ceremonial unit within the collective Moon House Complex during its last period of occupation. Prior to kiva construction, the cliff dwelling served a habitation function similar to that observed earlier for Cliff Dwellings M-1 and M-2.

Architectural changes have obliterated and obscured some of the architectural history of the cliff dwelling, so that the original form of the earlier habitation rooms (Room C1 and Room B3) is not completely apparent. The latest tree-ring dates from Rooms C1 and B3 place their last major construction within the early A.D. 1250s. Building after that time occurred as remodeling in conjunction with the construction of the kiva. A small remnant section of a type 1 masonry wall is present at the northern foundation of the dividing wall between Rooms C1 and B3. This masonry, visible in the lower northwest corner of Room C1, indicates an earlier wall construction that may have given either of the rooms a different form. Minimal architectural remains indicate that another room (Room C2) was at one time present to the east of Room C1. The function of the room,
Figure 24. Plan View and Profile Map of Cliff Dwelling M-3.
MOON HOUSE COMPLEX
AREA M3

LEGEND

- sandy fill
- stone or slab
- dry-laid masonry
- mortared masonry
- mortar
- local
- mortar outline
- plaster
- face of cutting plane
- cutting line
- wall fall
- datum plane
- grinding slick
- rock art
- bar/rope
- beam center
- 1/4" beam diameter

0 1 2 meters
its association with Room C1, and its later relationship to the kiva are not clear. An entry through the north wall of the kiva provides access between Room C2 and the kiva.

The other 4 rooms of the cliff dwelling (Rooms D, E, F, and G) are spread out along the ledge to the east of the main structure. These rooms are all storage rooms, built during various construction periods. Of the 4, only Room F has been well dated, with a construction date of A.D. 1265+8. Only Room F and Room G (abutted to Room F) were potentially used in conjunction with the kiva and its associated rooms after the late construction period.

The architectural structures of Cliff Dwelling M-3 are not as well preserved as those at the other 2 cliff dwellings. Exposure to the weather is greatest for the kiva and the 4 eastern structures, which are not well protected by the shallow overhang. Poor preservation coupled with the complexities of design have made the architectural description and explanation of some of the kiva's features difficult. Those features include apparently purposely leaning walls, parallel bi-walls, and diverging bi-walls. The original form and purpose for these features is unknown. Excavation to uncover obscured architectural features would be necessary for further investigation of the architectural relationships of the M-3 structures. Fill within each of the rooms is substantial enough to possibly be covering floor features and artifact assemblages that might indicate room use.

**Room A (Kiva)**

The kiva is the central structure, around which all the rooms in the main shelter are focused (Figure 24). Its diameter below the bench is
approximately 5 meters, making it the largest room in the shelter. It sits on the sandstone bedrock shelf and is constructed entirely above ground. The kiva is asymmetrically constructed using various masonry techniques and structural designs. It is apparent that the kiva was built to intentionally abut the southeast jolca walls of Rooms C1 and C2, using the existing walls as the exterior of the northwest kiva wall. During kiva construction, the southern entry into Room C1 was closed with masonry and abutted with a pilaster. The kiva's type 3 masonry exterior wall was abutted to the southeast corner of Room C2 and the southwest corner of Room C1. The masonry consisted of single and double wythe courses of large irregular sandstone blocks, laid to expose their square flat faces to the outer surface, and mortared with mud. A lower lining wall was abutted against the inside of the exterior wall, forming the bench surfaces and providing support for the pilasters. The lower lining wall was constructed of short square sandstone slabs, well laid to create a smooth vertical face. Vertical beams, extending almost to the bedrock ceiling, were incorporated into the construction of the northeast 1/4 of the exterior wall. These beams probably served to support the masonry construction and are used only minimally within other portions of the masonry. Why the beams extend higher than the indicated roof line is unknown. Much of this northeast portion of the Kiva wall has fallen, but one section (Figure 24) is still standing.

Vertical beams are used in a different way to support the construction of the western exterior wall, which is abutted to the southwest corner of Room C1. The western exterior wall leans against 14 vertical beams that are supported against horizontal primary beams that also probably supported a roof over the southern portion of Room B3. This wall appears to be purposely leaning and has not fallen from a previously more vertical
position. This leaning wall does not parallel the curving line of the lower lining wall, but diverts to the south, either abutting or bonding the south wall of Room B3.

From the south wall of Room B3 the exterior wall of the kiva follows the circular line of the lower lining wall, though continuing to diverge as it proceeds around to the southeast side of the kiva. At the furthest remaining extent of this divergent bi-wall there is a gap of approximately 40 cm between the exterior of the inner lower lining wall and the inner side of the exterior kiva wall. The reason for the space is not clear, and it may have been filled solid. Much of the southeast and east walls are not preserved and there are no traces of architectural features that might have served as the southern recess. A southeast facing passage through the southeast lower lining wall may be the ventilator tunnel. It is probable that at this location the exterior wall began converging on the lower lining wall to close the gap at the eastern wall. The probable ventilator tunnel may actually have served as an alternate entry to gain access to the gap between the southern exterior wall and the lower lining wall. Northeast of the possible vent, the exterior wall and the lower lining wall were constructed against each other with no intervening gap.

The spatial patterning of the five remaining pilasters indicates that there were at one time 8 large pilasters separating 7 or 8 recessed benches. The pilasters were constructed with masonry similar to that of the lower lining wall and are in fact its extension, forming an upper lining wall into which the benches are recessed. The pilasters served to directly support 3 to 5 small beams set as a roof over each recessed bench. The pilasters did not support a cribbed roof. The masonry pilasters and upper lining wall extended higher than the roofs of the recessed benches for at least 3
courses. Thick red mud was plastered to create a smooth surface over the vertical faces of the lower lining wall, the pilasters, the upper lining wall, and the inner exterior wall at the back of the recessed benches.

The roof was flat. Most of the roof has collapsed or was dismantled, except for a portion over the southwestern edge of the kiva. The roof's first, and lowest, supporting structure covers the southwestern curve of the circular kiva. Four beams are laid on the upper lining wall approximately east-west and perpendicular to the back of the shelter, spanning 3 pilasters, 2 recesses, and a portion of the kiva floor. Mud is layered above the beams. Another layer of smaller beams is then laid parallel, above the lower beams, perpendicular to the rear of the shelter. Beam impressed mud above the second set of beams indicates a third set of beams was present. This technique was probably repeated on the northeast side of the kiva, but there is no evidence of roofing features. An auxiliary beam (Dean 1969:26) has been placed across the western margin of the kiva, approximately north-south and parallel to the bedrock back wall of the shelter. Its south end rests on the lower beams above the west pilaster, and its north end rested above the north or northeast pilasters. Other primary beams, paralleling the auxiliary beam, probably spanned the center and the southeastern margin of the kiva. Many other obvious roof beams are present in and around the kiva. Most are probably large secondary beams that were laid above and perpendicular to the primaries. There is no other evidence of the roof construction. Four large sandstone slabs, which often border the edges of roof entries, are present in the room fill in the west portion of the kiva. These slabs indicate the presence of a roof entry, though possibly not in the western portion of the roof.

Other features within the kiva include a niche in the lower lining wall.
below the north pilaster and an entry through the northwest recessed bench. The entry was recorded in 1974 as a T-shaped doorway. This label was probably assigned because the lower portion of the entry cuts through the northwest bench before continuing through the exterior wall. The shoulder created by the bench surface resembles the shoulder of a T-shaped doorway within the rectangular frame of the recess. It is not a usual T-shaped doorway, such as that of Room I at Cliff Dwelling M-1, but may have been conceptually the same. Other descriptive observations concerning the entry could not be duplicated. It was reported that the placement of the entry coincided with the original entry through the masonry and jacal south wall of Room C2. This observation is likely correct, but the observed jacal wall remnants which supported the contention were not present during the 1986 field work. The jacal remnants may have been destroyed through visitor use.

Horizontal twig loops are present on the inner vertical surface of the north pilaster and the northwest pilaster, on either side of the entry. Their purpose is not clear because of their horizontal orientation, but they must be some type of device to secure a door slab.

One loop hole is present through the southwest exterior wall. It allows air passage and visibility from outside into the gap between the exterior wall and the bench recess between the south and southwest pilasters. It is not clear if the back of the bench recess extended all the way to the inner surface of the exterior wall, including the 40 cm gap. The presence of the loop hole allows for the possibility that the bi-wall gap was not filled and may have been a passageway. The nature of the roof over the gap is not clear. The possibility of the open passage complements speculation that another bi-wall extending southwest from the kiva, along the south wall of Room B3, was a passageway.
The complex of walls which essentially define the south wall of Room B3 are an extension from the southwest wall of the kiva (Figure 24). The south wall connects with the kiva to the east and with the masonry of Room B1 to its west. An entry into Room B3 might have existed through the east portion of this wall, or through the roof which covered the south portion of Room B3. There are no observable entry features because the east portion of the south wall has collapsed, but easy access, other than through the granary size entry from Room C1, was probably necessary. Room B3 is relatively large and adjoins smaller storage rooms accessed only from within the room. The south wall is the logical location for an entry. An outer wall constructed parallel and to the south of the Room B3 south wall created a gap between the two walls of approximately 30 cm. The reason for the gap is not apparent, but it might have provided access to an entry to Room B3 and to the gap between the exterior southwest wall and lower lining wall of the kiva. The reasons for the complex construction in this west portion of the kiva and of the Room B3 walls are unclear.

Another lateral wall extends out from the northeast kiva wall. This wall is in a poor state of preservation, but probably was constructed to abut the rear of the bedrock shelter. This northeast wall, and its southwest mirror image (the south wall of Room B3), served as front walls to enclose the rooms behind the kiva.

Room B1, B2, and B3

It is apparent that Room B3 was originally a large habitation room. Sooting is heavy on the bedrock ceiling, where it underlies later masonry features. Sooting is also present on the surfaces of some of the later masonry. Soot is light on the leaning vertical poles of the east wall, and
on the masonry and mortar of the remodeled entry accessing Room C1.
Understanding the construction sequence of the Room B3 walls and the
implications of the sooting of the walls is necessary to interpret the last
function of the room, concurrent with the use of the kiva. Uncertainties
concerning the construction of the south and southeast walls necessitate
more than one possible interpretation.

The extant form of Room B3 is defined by the masonry south wall and the
east wall, which is constructed of vertically leaning poles, and which
supports the masonry exterior wall of the kiva. Both of these walls have
been previously discussed above. The relationship of each of these two
walls to the late construction of the kiva is confusing. Tree-ring dates
for the vertical poles indicate the pole-supported wall was constructed
after approximately A.D. 1252. Tree-ring dates indicate the south jacal
wall of Room C1 to the east of Room B3 was constructed at approximately the
same time. These 2 walls may be bonded, and at least were constructed at
the same time. The kiva was tree-ring dated at approximately A.D. 1265 and
therefore appears not to have been built at the same time as the east wall
of Room B3. The south masonry wall of Room B3 is not directly dated, but
the primary roof beams resting on its western section date no later than
A.D. 1252+B. Although plaster obscures the joint between the B3 south wall
and Room B1, the south masonry wall appears to be bonded with the masonry of
Room B1. To the east, the south wall runs into a confused area of masonry
that prevents the interpretation of architectural relationships in this
area. It would be instructive to know if the B3 south wall bonds into the
masonry construction of the kiva's exterior wall. If so, a case might be
made for the construction of the kiva, the south wall of Room B3, and Room
B1 as one single event. This is unlikely, considering the tree-ring dates,
but not impossible. The primary roof beams of Room B3 might all have been reused during late construction, if the south wall construction was contemporaneous with the kiva.

The presence of sooting on the upper plastered outer surface of the Room B1 east wall and on portions of the B3 south wall indicates that Room B3 was used as a habitation after these walls were built. If the walls were constructed contemporaneously with the kiva, then Room B3 may have been used as a habitation during the use of the kiva. If they were constructed before then, the soot may be residual from the earlier habitation use, also evidenced by heavy soot over other areas of the room. The presence of only light sooting on the vertical poles of the B3 east wall and on the remodeled entry to Room C1 indicate little or no use of fire in Room B3 after these features were constructed. A change in the use of Room B3 is probably concurrent with the more obvious functional remodeling of Room C1. Lack of heavy sooting indicates that habitation was not the last primary purpose of Room B3. The slight sooting that does occur indicates possible brief habitation use or special purpose use in conjunction with kiva activities.

A predominantly masonry wall divides Room B3 from Room C1. Two small masonry storage structures (Rooms B1 and B2) were built at the rear of Room B3. Neither are sooted on their interior masonry walls. Soot within the rooms is located on the bedrock ceiling and is probably the result of sooting prior to the construction of the 2 storage rooms. A remnant of mortar along the floor between the 2 rooms indicates the small space between the rooms was enclosed. Its mode of access cannot be determined. The inside of Room B3 was mud plastered after construction of the small storage rooms. Sooting continued, indicating use as a habitation, at least until construction of the kiva and remodeling of the entry to Room C1. Hanging
pegs are located within Rooms B3, B2, and B1. A niche is present in the northern masonry wall within Room B2. Vertical twig loops on either side of the remodeled granary entry into Room C1 indicate the door was sealed from within Room B3.

Room C1

Masonry remnants in the lower northwest corner and in the lower northeast wall indicate Room C1 was originally defined by walls constructed of type 1 masonry. Later the southwest wall was reconstructed with type 3 masonry. Type 3 masonry was also used to reconstruct the lower portion of the northeast wall. The upper portion of the northeast wall was constructed of jacal, but is now mostly destroyed. The southeast wall was constructed entirely of jacal, which extends to finish a small portion of wall on top of the southwest wall. Tree-ring samples date the jacal construction, the last enclosure of the room, at approximately A.D. 1253+B. A tall habitation type entry was constructed at the north corner of the southeast jacal wall. This entry and heavy sooting over most of the interior of the room indicate Room C1 functioned as a habitation after its last major construction, and probably before. The habitation entry was later blocked with wall masonry during construction of the kiva at approximately A.D. 1265. The kiva was constructed against the southeast jacal wall of Room C1, probably to use the wall for a supporting external wall, to facilitate use of the original rooms for kiva activities, and to maximize use of the available sheltered space.

The function of Room C1 was changed, probably from habitation to storage during construction of the kiva. A small raised sill granary entry was constructed in the southeast end of the southwest masonry wall, probably at the time the original habitation entry was blocked by construction of the
kiva. This new entry construction shows no evidence of sooting. The
masonry blocking the earlier habitation entry also shows no evidence of
sooting. The northeast wall of Room C1 is not well preserved. Another
entry might have been constructed here after or before the kiva was built,
but there is no evidence for speculation. There are numerous hanger pegs in
the southwest wall. There are also 2 niches in the southwest wall, one over
the raised entry and one at the west end of the wall.

Room C2

Room C2 is located to the northeast of Room C1. Room C2 is only
minimally preserved and there are no architectural features from which to
infer function. Its east wall location can be inferred from the northward
curve of a south wall remnant and the presence of mortar where the east wall
abutted against the rear of the bedrock shelter. The south wall appears to
have been constructed in a manner similar to the northeast wall of Room C1,
with a lower masonry wall and an upper jacaal wall. Remains of the jacaal
south wall were more intact during the 1974 recording. Indications of the
lintel height of the original entry through the jacaal were recorded in 1974
and used to suggest that the north entry into Room C2 from the kiva was
established in the same location as the prekiva Room C2 entry. This
observation was not clear in 1986. The kiva was constructed against the
south wall of Room C2, and its existing entry may have been modified to
provide access from the kiva. Obviously the Room C1 entry was not in a
suitable location, and was blocked by the construction of the masonry
pilaster and lower lining wall in favor of the new entry from Room B3.

The form and function of the unnumbered space east of Room C2, behind
the front wall extending northeast from the kiva, are unknown. Excavation
in this area would be necessary to uncover features and artifact assemblages to indicate its use. Its location behind the front wall indicates a relationship with the kiva, but the remnants are too unclear to give the space a room designation.

Room D

Room D is a small individual masonry room located east of the kiva and M-3 main shelter (Figure 9). Its preservation is poor, and it consists mostly of a south wall and small remnants of the east and west side walls. Its small size and lack of sooting indicate the room was used for storage. Its type 3 masonry is of irregular sandstone blocks mortared with gritty mud, with a high frequency of juniper fiber. The masonry blocks are laid somewhat more smoothly on the outside than on the inside. The walls probably extended to the bedrock ceiling to enclose the room without the need of a roof. Fill within the room is probably less than 5 cm deep. Sandstone wall rubble to the east may have come from the collapse of Room D, but also may indicate the remains of an adjacent structure. Sooting on the bedrock ceiling to the east also indicates some activity in this area that may have been associated with an earlier unpreserved structure.

Room E

Room E is a small structure constructed predominantly of mud with a sandstone slab base. Only its west and east walls remain. The south wall has been exposed to the weather and dripline water runoff and has decomposed to the point that only a couple of upright slabs and traces of mud remain. The small size of the room and lack of sooting indicate it has been used as a storage structure. Four different and sequentially patterned types of mud
wall construction indicate at least 3 stages of reconstruction on the initial foundations. The original walls were constructed with a base of upright sandstone slabs set in purplish colored mud. The variety of cultural materials mixed with the mud indicates that midden may have been used as temper. Those materials include charcoal, small bones, small stones (not cultural), plant fragments, and organic material. The first reconstruction is evinced by a tan colored mud with numerous small particles of gray, tan, and purple sandstone. Larger angular chunks of sandstone are also numerous. Abundant quantities of organic materials are also present in this mud, including cordage and probable human hair.

The next reconstruction is visible only in the west wall. This is a brownish tan mud with fewer tempering materials, but which may contain semi-coursed stone core material. The surface is much more cracked than in the other mud reconstructed areas. The top layer is a reconstruction that uses masonry of small irregular sandstone mortared with a purplish mud. The organic content of the mud is high, but not as great as in the lower mud layers. One horizontal beam, tree-ring dated at A.D. 1256B, is set into the upper layer of the west and east walls. It probably indicates the roof line. A low wall of the original construction mud sits on the bedrock at the rear of the shelter, abutting the west and east walls. It appears to delineate a subspace within the room, but the original height of the enclosing wall is not apparent.

Incised cross-hatching is visible on the exterior of the east wall in the first layer of reconstruction. It covers an area of approximately 20 cm x 15 cm. Fill within the room is almost nonexistent.
Room F and Room G

Room F and Room G are located on a raised and narrow portion of the main shelf to the east of Room E (Figure 9). Room F was constructed using jacal with a raised masonry entry step abutted to its southeast wall. The top of the step is just below the sill of a small rectangular entry. The small raised entry and the lack of sooting within the room indicate Room F was used as a granary. The jacal framework is plastered in only a few places on the inside of the room. The outer surface is well plastered with mud tempered with sandstone and shale pebbles. The step is made of coursed sandstone slabs mortared with mud.

Room G abuts Room F on the east and was constructed of type 3 masonry using irregular sandstone blocks mortared with mud and minimally chinked, mostly on the outer surface. The masonry is fairly well coursed, but not especially smooth surfaced. The entry to Room G is raised and small, and there is no evidence of sooting on its interior. Room G probably functioned as a granary.

Both rooms use the rear of the bedrock shelter for their back wall, and the shelter overhang as a ceiling. The masonry wall of Room G has preserved fairly well, but the south and west walls of Room F have collapsed. Treering dates from vertical juniper poles in the intact jacal east wall of Room F date its construction to approximately A.D. 1265. Room G abuts Room F and therefore dates no earlier than approximately A.D. 1265. Both structures were constructed and used at the same time as the kiva.
CHAPTER 7

Conclusions

Social Organization

The interpretation of associated units of functional space as the domain of social groups is common practice in Southwestern archaeology (Rohn 1965, 1971; Dean 1969; Hill 1970; Wilcox 1975, 1982). Researchers often follow Rohn (1965) in defining the living quarters of a household based on close spatial proximity and shared access among rooms. The inference of structural dwelling units (Wilk and Rathje 1982:620), which probably represent the living quarters of single household groups or the living quarters of members of larger households (Rohn 1965, 1971), at the Moon House Complex is based on the same assumption (see Chapter 5:87).

The majority of the existing architectural structures at the Moon House Complex represent the latest, post A.D. 1264, community organization. That late organization is indicated by three separate cliff dwellings, with each serving a specific function. Collectively, the three cliff dwellings form a viable organization of habitation (M-1), storage (M-2), and ceremonial (M-3) space. Although Cliff Dwelling M-1 provided the major habitation space for the complex, Room B3 of Cliff Dwelling M-3 might also have been used as a habitation. However, its function is not clearly indicated. A relative lack of sooting on the remodeled portion that probably dates to the time of kiva construction indicates that the room might have been remodeled after A.D. 1264 to be used for special purposes in association with kiva

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activities.

The late organization of habitation rooms at M-1 is a departure from the traditional ethnographic and archaeologically observed patterns of pueblo household organization. Ethnographically, Hopi households were known to use a group of contiguous rooms with a single habitation room as their nucleus (Mindeleff 1891:102; Titiev 1944:197). Hopi nuclear families, which may be all or part of a household, are ethnographically recorded as occupying at least one habitation room and one storage room (Mindeleff 1891:65; Beaglehole 1937:5). Archaeologically, Rohn (1965, 1971) and Dean (1969) considered a cluster of granaries and general storage rooms associated with one or two habitation rooms to be the living quarters of a household. Habitation rooms connected to storage rooms were again used, more recently, by Adams (1983:53, 58) to distinguish household living quarters at Walpi.

Based on ethnographic and archaeological precedent, the presence of 5 habitation rooms at Cliff Dwelling M-1 indicates the presence of 5 separate households. But, 4 of the 5 probable habitation rooms are located together behind the defensive wall, and the fifth is an individual room located just outside the defensive wall. Three of the 4 habitation rooms behind the defensive wall share common walls and the fourth is separated from the other 3 only by 2 granaries. Hence, the close spatial proximity of the 4 habitation rooms behind the defensive wall at Cliff Dwelling M-1 indicates that each habitation room might not represent a separate household. All of these rooms are accessed only from the court area in front of them. There is no access from room to room and the court is accessed only by an entry through the defensive wall. Following traditional analysis, the access of these rooms from a common court indicates they form a room cluster (Dean
1969:34-35), which Dean interprets as the residence of one household. The high number of habitation rooms in such a room cluster is a significant variation from the traditional pattern, however. If each habitation room accessed separate storage rooms, a variation on Dean's "courtyard complex" might be inferred (1969:35). But, both storage and habitation rooms are accessed from the same court and therefore represent a room cluster organization. Room clusters with a ratio of habitation to storage rooms as high as 4:3 have not been previously recorded in the archaeological record.

The need for defense might have dictated the close spatial organization of the M-1 habitation rooms behind the defensive wall. Also, if the Moon House Complex functioned as a seasonally occupied agricultural storage facility, its residents were possibly a collective of households or individuals from a number of households, cooperating as one large communal socio-economic unit. Therefore, the spatial patterning of habitation and storage rooms might reflect that communal organization. The segregation of the three major functional components of the Moon House Complex at Cliff Dwellings M-1, M-2, and M-3, during the last occupation, essentially aggregating the community's living quarters, might have developed from the need to affirm a communal organization.

Population

The late occupation population of the Moon House Complex is discussed below, based on the standard assumption that 5 households are indicated by the presence of 5 contemporaneous habitation rooms (C, F, I, J, and K at Cliff Dwelling M-1). Members of a larger community centered around the Moon House Complex may have lived in the area and also used the complex's
facilities. The larger population of people who might have used the Moon House Complex cannot be inferred from the present data. The possible intracomplex population can be inferred using a number of methods and assumptions.

As noted above, common practice in prehistoric pueblo research (e.g., Steward 1937:95 and Dean 1969:76; after Turner and Lofgren 1966:127) is to infer that 1 habitation room represents 1 household, and that a single household is occupied by an average of 5 people. Following this method, approximately 25 people occupied the habitation rooms of the Moon House Complex. Hill (1970:76) reviews the various numbers of persons per habitation room that researchers have multiplied by the total number of identified habitation rooms to calculate site population. Those numbers range from 5 to 7 or 8. Hill averaged the various estimates and used 6.1 persons per habitation as one method for calculating population at Broken K Pueblo. This method results in a Moon House population of approximately 30.5. Hill (1970:75) then used another method for calculating population based on ethnographic population data for the Hopi and Zuni. Considering the general per room population estimates of Stubbs (1950) and Titiev (personal communication with Hill) Hill used an average figure of 2.8 persons per room, including habitation and storage rooms, but excluding kivas. Because the contemporaneity of his rooms was unknown, Hill subtracted 22% of his total room number as an average of estimated abandoned rooms at any one time. The contemporaneity of the late occupation Moon House rooms is fairly well established and therefore a percentage of total rooms is not subtracted during similar calculations.

A total of 30 habitation and storage rooms were used during the late occupation period at Moon House. This figure includes Room B3 of M-3 for
the purpose of population calculation, even though its function is uncertain, necessitating its exclusion from the calculation of habitation to storage ratios. The figure of 30 contemporaneous rooms excludes the kiva at Cliff Dwelling M-3 and Room N of M-1 (following Hill's exclusion of communal rooms, i.e., ceremonial and courtyards). Room B4 of M-1 and Rooms D and E of M-3 are also excluded due to the uncertainty of their contemporaneity as late occupation structures. The multiplication of 2.8 persons (following Hill 1970:75) by 30 rooms yields a late period population at Moon House of 84 persons. When he used the figure of 2.8 persons per room, Hill considered the results too high to be reasonable. The results for Moon House also appear to be extremely high.

One probable explanation for the apparently high population estimates is that the ethnographic population data on which the various calculations are based are relative to the architectural dwelling units occupied by those ethnographic populations. Some ethnographic period Hopi habitation rooms were twice as large as those of the Moon House Complex (Adams 1983:52). Ethnographically the number of habitation rooms and the number of storage rooms at Hopi and Zuni were fairly equal, with families generally occupying one habitation room and one storage room (Mindeleff 1891:65; Beaglehole 1937:5). At Moon House the ratio of habitation to storage rooms is quite disproportionate; 5:24 or 1:4.8, respectively, excluding Room B3 of M-3.

Nickens (1981:23) followed Hill's use of ethnographic data for a population estimate of Johnson Canyon cliff dwellings, but determined that the average room size at Johnson Canyon was significantly less than that observed ethnographically and at Broken K Pueblo. He therefore reduced Hill's estimate of 2.8 persons per room to 1.6 persons per room. Nickens compared the results to the results obtained by using Clarke's (1974)
formula that population equals one-third the total floor area of roofed space. The results of using Clarke's formula correlated well with population figures he had obtained by applying the adjusted version of Hills formula (Nickens 1981:23). Unfortunately, it appears that Nicken's estimate was based on 1.6 persons per habitation room instead of following Hill's method of using the combined number of habitation and storage rooms. Hence, agreement with estimates made from Clarke's formula is spurious.

Clarke's formula of calculating population as 1/3 the total floor area is biased at Moon House by the disproportionate number of storage rooms, producing a high population estimate of 39. Naroll's method is to calculate settlement population as 1/10th of the total floor area in square meters (1962:587-589). LeBlanc has commented on Naroll's formula and considers its application to result in inadequately low population estimates (LeBlanc 1971:210). Hill (1970:77) calculated population for Broken K Pueblo using Naroll's formula and concluded that the results underestimated obviously higher population figures. Hassan reviews the various methods of calculating settlement population and concludes that total floor area is not as useful as considering the number of individual rooms with identifiable functions (Hassan 1981:72-73). In discussing the various formulas using numbers of people per household, Hassan recommends a figure of 4-5 persons per household (Hassan 1981:73).

The ethnographic and archaeologically observed phenomena of at least one habitation room per household, associated with 1 to 4 storage rooms, indicates that at Moon House population estimates should be based on the number of habitation rooms. Following Dean's (1969:76) suggestion of 5 persons per household results in a calculation of a minimum population of approximately 25 persons living in 5 households, as represented by 5
habitation rooms at Moon House during the late occupation. This figure is in line with Hassan's views on the matter and has been employed in other recent attempts to estimate populations (Schlanger 1985:136; Gross 1987:192). Because the Moon House rooms are very small, this formula may overestimate total population. Nevertheless, it seems better to use a commonly accepted approach than to attempt to develop a new formula.

**Changes in the Organization of Functional Space**

The architectural remains of masonry rooms which pre-date the late Moon House occupation have been observed at each of the 3 cliff dwellings. Early walls at each of the cliff dwellings are sooted, indicating the past presence of rooms used for habitation. The former presence of large habitation type entries at some existing rooms at M-2 and M-3 further indicate the past presence of habitation rooms at these 2 cliff dwellings. The existence of habitation rooms at each of the 3 cliff dwellings during the A.D. 1240s and 1250s occupation contrasts with the clustering of habitation rooms at Cliff Dwelling M-1 during the late occupation.

The middle A.D. 1260s change in spatial organization resulted from the conversion of each cliff dwelling to serve a distinct function within the larger cooperative complex of 3 cliff dwellings. Specific architectural changes have been described in Chapter 6 and constitute the basis for the following inferences. Post A.D. 1264 construction and remodeling at Cliff Dwelling M-1 continued the use of M-1 for both habitation and storage. Post A.D. 1268 construction at Cliff Dwelling M-2 discontinued the function of M-2 as a residential locus, replacing habitation rooms and earlier storage rooms with a large room block devoted to granary storage. Post A.D. 1265
construction and remodeling at Cliff Dwelling M-3 added a kiva and converted a habitation room to a storage room. A second habitation room (B3) at M-3 was remodeled during the middle A.D. 1260s, discontinuing its primary use as a habitation room. The presence of the above ground kiva indicates a dominant ceremonial function for Cliff Dwelling M-3.

The observed changes in community organization, residence pattern, and the need for personal defense are likely related to the complexities of environmental stress and concomitant social reaction. Increased integration of community structure, cooperation in subsistence activities, and emphasis on storage are often hypothesized as reactions to late 13th century environmental stress (Hill 1970:108-109; Lipe and Matson 1971:136-137; Dean 1985:547; Matson et al. 1988). The changed organization of functional space at the Moon House Complex is possibly a result of these processes. Adaptation to the Cedar Mesa environment throughout Anasazi prehistory has focused on buffering against consecutive periods of food shortage. Migration out of the area for extended periods occurred when buffering systems could not cope with continual poor harvests. Populations returned to Cedar Mesa when general environmental conditions could again support reliable production of the food resources necessary to sustain a regional population (Matson et al. 1988).

The Defensive Posture of Moon House

The defensive posture of the Moon House complex is clearly represented only by the "defensive wall" which fronts Court 1 of the M-1 cliff dwelling. Restricted access through the defensive wall and strategically placed loop holes indicate a defensive function, but other anomalies confuse the issue
and indicate the need for continued research. Loop holes, or observation ports (Lindsay 1981:94), through walls are wide-spread on the northern Colorado Plateau including Cedar Mesa (Lipe and Matson 1971:131). The inference that this type of structure served a defensive purpose is conceptually easy to understand, but is usually demonstrated only by reference to the loop holes. Loop holes are said to be either observation ports (Lindsay 1981:94) or to have been used for launching arrows at presumably human targets (William D. Lipe, personal communication). One problem with the functional interpretation of these attributes at Moon House, and probably at many of the other cliff dwellings with defensive walls, is that some of the loop holes are very low in the vertical profile of the wall. It is unlikely that people would construct defensive loop holes that could not be aimed or peered through without lying prone or sitting on the ground. Another aspect of the loop holes that seems contrary to their reported functions is that some of them at Cliff Dwelling M-1 point directly down to the main shelf below the defensive wall without apparent utility either for visibility or for launching arrows. If these anomalous loop holes were located to serve the same functions as the other loop holes, the "defensive" interpretation is weakened.

The placement of most of the loop holes, however, makes them equally useful for launching arrows across the path of intruders attempting to enter Court 1, or as view ports facilitating the observation of all major approaches to the cliff dwelling. If defense was an issue for the later inhabitants of Moon House, they appear to have been most concerned for personal safety and less concerned for the safety of stored food. Four of the 5 habitation rooms of the Moon House Complex are located behind the defensive wall. But, only one general storage room and 2 granaries are
located behind the defensive wall. Almost all of the other storage structures are vulnerable to intrusion by outsiders. The room block of granaries at Cliff Dwelling M-2 is not even visible from Cliff Dwelling M-1 and is accessible without observation from M-1. It could be argued that the kiva and the rooms behind the kiva at Cliff Dwelling M-3 were protected by the exterior walls of that room block. One loop hole is preserved in the southern exterior wall of the kiva and might have been accessed from the possible western passageway between the inner and outer walls. The outer walls might have been designed to protect the occupants of the kiva and its associated rooms, and other loop holes could have existed prior to the collapse of the outer walls. The 2 late granaries east of the kiva (Rooms F and G) are not protected.

A 5 room cliff dwelling near the mouth of Fish Canyon (SA 1369) has loop holes incorporated into its outer wall. Each loop hole in the outer wall was placed to alternate between open square windows. The cliff dwelling was constructed on the raised floor of a shelter, approximately 2 meters above the ground and overlooking the drainage bottom. Its position is not very defensible and the windows in the outer wall seem to be ill adapted for defense. Big Westwater Ruin, in Westwater Canyon, south of Blanding, has 18 loop holes incorporated into its early 13th century masonry walls. This ruin is not well located for defense, but its loop holes overlap in trajectory and allow observation of all site approach trails and portions of the sandstone rim above the cliff dwelling. The loop holes through Wall M of Cliff Dwelling M-1 have the same overlapping orientation. In addition, some Big Westwater loop holes allow observation of site areas and features (Lindsay 1981:101-102).

Cliff dwellings M-1 and M-3 of the Moon House Complex, Cliff Dwelling
SA 1369, and Big Westwater Ruin were constructed with loop holes through outer walls. These occurrences indicate a continuity in the form and probably in the function of loop holes. Loop holes might have been used as observation ports and/or for launching arrows, but certain aspects of their construction, discussed above, are inconsistent with those interpretations. Until these inconsistencies are fully explored, our knowledge of the prehistoric functions of loop holes will probably remain incomplete.

**Storage**

The present interpretation of human adaptive response to the marginal Cedar Mesa environment between A.D. 200 and A.D. 1270 includes the use of stored foods as a buffer against periods of poor harvest (Matson et al. 1988). Lipe (1978) suggested that the high ratio of storage rooms to habitation rooms at Moon House indicates the possible use of Moon House as a central storage facility, with an increased resident population during the summer growing season. Architectural analysis of the Moon House Complex has resulted in an interpretation of room functions and chronological relationships that supports the hypothesis. Though Lipe's original hypothesis concerning the overall function of Moon House has not been thoroughly tested, ratios of habitation to storage based on room count and maximum interior room area have been calculated.

Calculations of functional space ratios were restricted to contemporaneous rooms with recognized functions. Chronological and architectural analyses, discussed above, have resulted in the identification of 29 contemporaneous rooms with interpreted functions of either habitation or storage (including granaries and general storage rooms). Contemporaneous
rooms with unclear functions, such as Room B3 at M-3 and Room N at M-1 were not included in the calculations. Room B4 at M-1 was not included because of its unclear function and its unclear chronological relationship. Storage Rooms D and E at M-3 were not included because of their unclear chronological relationship to the late period occupation. The kiva at M-3 (Room A) was also not included because of its communal function as a ceremonial structure. I have concluded that all other late occupation storage and habitation rooms had the potential to be in use together, and that their architecturally identified functions were their primary use. Room areas were computed using a Numonics 1224 digitizer (an electronic planimeter) to trace the inside room area of each room field recorded on the original 1974 plan view maps. Maximum room areas are listed in Table 3.

The Moon House ratio of habitation to storage space, based on room count, is 5:24 or 1:4.8 (habitation:storage). Calculation of a functional ratio based on room area yields a ratio of 32.60 : 90.14 square meters, or 1:2.8 (habitation:storage). A comparative study of other well reported cliff dwellings was undertaken to determine: 1) if the seemingly significant difference between calculated ratios based on room count vs. room area is unique to Moon House, or common to various cliff dwellings; and 2) if the ratio of storage to habitation space at the Moon House Complex is greater or similar to that of other cliff dwellings, using both methods of ratio calculation. Functional room count and room area ratios for other cliff dwellings were calculated from published plan maps using the Numonics 1224 digitizer. The sample includes ratios for Betatakín (Dean 1969:42-43, 52), Kiet Siel (Dean 1969:88-89, 99-100), Twin Caves Pueblo (Dean 1969:168-169, 171), Batwoman House (Dean 1969:164-165), and Mug House (Rohn 1971:28-29, 268-275), all reported to have been occupied in the late 13th century.
Table 3. Dimensional Data for Rooms of the Moon House Complex.

a = digitized area, using a Numonics 1224;
b = fill within each room was not measured or accounted
   for in height measurements, but ranges from zero or
   minimal depths in most rooms to at least 30 cm in Room K
   at M-2; height was measured at the center of each room;
c = most rooms that abut the rear of the shelters have
   curvilinear sloped bedrock ceilings; therefore measures
   of volume are rough approximations;
d = the first designation was the original room function, the
   second designation is the extant post A.D. 1260s function;
? = uncertain function; a probable function may or
   may not be designated;
<table>
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<th>Room Height at Center (meters) b</th>
<th>Volume (m³) c</th>
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<td>*</td>
<td>17.68</td>
<td>&gt;2.00</td>
<td>&gt;35.36</td>
</tr>
<tr>
<td>B1</td>
<td>Storage</td>
<td>*</td>
<td>1.37</td>
<td>0.58</td>
<td>0.79</td>
</tr>
<tr>
<td>B2</td>
<td>Storage</td>
<td>*</td>
<td>1.71</td>
<td>1.02</td>
<td>1.74</td>
</tr>
<tr>
<td>B3</td>
<td>Hab./Hab?-Stor?</td>
<td>*</td>
<td>7.30</td>
<td>1.83</td>
<td>13.36</td>
</tr>
<tr>
<td>C1</td>
<td>Hab./Storage</td>
<td>*</td>
<td>7.81</td>
<td>1.60</td>
<td>12.50</td>
</tr>
<tr>
<td>D</td>
<td>Storage</td>
<td>*</td>
<td>5.14</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E</td>
<td>Storage</td>
<td>*</td>
<td>4.22</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F</td>
<td>Storage</td>
<td>*</td>
<td>5.50</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>G</td>
<td>Storage</td>
<td>*</td>
<td>1.27</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 4. Habitation room to storage room ratios for the Moon House Complex and six compared cliff dwellings.

The three room count and room area ratios for the Moon House Complex reflect the possibility of 5, 6, and 7 late habitation rooms, though only 5 are clearly late habitation rooms (C, F, I, J, and K of Cliff Dwelling M-1). Room B4 of Cliff Dwelling M-1 and Room B3 of Cliff Dwelling M-3 are included as the possible 6th and 7th habitation rooms.

a = post A.D. 1268;
b = A.D. 1286 (Dean 1969:143);
c = A.D. 1286 (Dean 1969:75);
d = A.D. 1280 (Dean 1969:174);
e = post late A.D. 1270s (Dean 1969:165);
f = A.D. 1050 (Klesert 1978:80);
g = post late A.D. 1270's (Rohn 1971:26-27);
<table>
<thead>
<tr>
<th>Complex</th>
<th>Habitation</th>
<th>Storage</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moon House a</td>
<td>5</td>
<td>24</td>
<td>1:4.8</td>
</tr>
<tr>
<td>Room Count</td>
<td>6</td>
<td>24</td>
<td>1:4.0</td>
</tr>
<tr>
<td>Room Area</td>
<td>39.90</td>
<td>90.14</td>
<td>1:2.3</td>
</tr>
<tr>
<td>Room Count</td>
<td>7</td>
<td>24</td>
<td>1:3.4</td>
</tr>
<tr>
<td>Room Area</td>
<td>42.93</td>
<td>90.14</td>
<td>1:2.1</td>
</tr>
<tr>
<td>Kiet Siel b</td>
<td>19</td>
<td>77</td>
<td>1:4.1</td>
</tr>
<tr>
<td>Room Count</td>
<td>113.26</td>
<td>226.74</td>
<td>1:2.0</td>
</tr>
<tr>
<td>Room Area</td>
<td>22</td>
<td>41</td>
<td>1:1.9</td>
</tr>
<tr>
<td>Room Area</td>
<td>133.38</td>
<td>141.99</td>
<td>1:1.1</td>
</tr>
<tr>
<td>Betatakin c</td>
<td>12</td>
<td>32</td>
<td>1:2.7</td>
</tr>
<tr>
<td>Room Count</td>
<td>14</td>
<td>18</td>
<td>1:2.6</td>
</tr>
<tr>
<td>Room Area</td>
<td>75.62</td>
<td>80.14</td>
<td>1:1.1</td>
</tr>
<tr>
<td>Twin Caves d</td>
<td>7</td>
<td>18</td>
<td>1:2.6</td>
</tr>
<tr>
<td>Room Area</td>
<td>43.21</td>
<td>72.33</td>
<td>1:1.7</td>
</tr>
<tr>
<td>Batwoman House e</td>
<td>14</td>
<td>33</td>
<td>1:2.4</td>
</tr>
<tr>
<td>Standing Fall</td>
<td>117.95</td>
<td>61.87</td>
<td>1: .5</td>
</tr>
<tr>
<td>Mug House g</td>
<td>43</td>
<td>38</td>
<td>1: .9</td>
</tr>
<tr>
<td>Room Area</td>
<td>174.64</td>
<td>84.51</td>
<td>1: .5</td>
</tr>
</tbody>
</table>
Ratios from Standing Fall House, a reported A.D. 1050 (though possibly later), 55 room cliff dwelling on Black Mesa, were also included because of the reported high frequency of storage rooms at the cliff dwelling (Klesert 1978:76, 79-82). Table 4 lists ratios of habitation to storage rooms calculated by area and room count for each of the sampled cliff dwellings.

The same criteria for the calculation of ratios for Moon House were followed during the calculation of ratios at the other cliff dwellings. Rooms reported to have been abandoned, when the majority of the other rooms were being used, were not included in the ratio calculations. Rooms with undetermined functions or functions other than that of habitation or storage, such as milling rooms and kivas, were also not included. Rooms reported with a question mark to indicate an indefinite function were included only when their functions were reported as probable. The question of contemporaneity was the most difficult to resolve, and was undertaken because the abundance of good tree-ring dates at Moon House allows for the inference of contemporaneity between rooms. Under ideal dating conditions only contemporaneously used rooms should be included in a calculation of ratios of functional space. Unfortunately the lack of tree-ring dates at many cliff dwellings, such as Standing Fall House, precludes the inference of contemporaneous room use. In cases of uncertain contemporaneity, all rooms of reported function were incorporated into the calculations.

Methods for calculating room function ratios and percentages for comparative studies is apparently inconsistent between researchers. Klesert's hypothesis that Standing Fall House may have been a storage and redistribution center (1978:79-80) is based on a calculation of the storage and habitation room percentage of all 55 rooms of varying room type, including kivas and courtyards. Fourteen of the 33 storage rooms and 3 of
the 14 habitation rooms were originally classified as having undetermined functions, but were later reclassified based on room size, construction using masonry walls, and a protected intrasite location. Klesert calculated that 60% of all roofed space at Standing Fall House was devoted to storage, based on counts of functionally identified rooms. He then did the same for Betatakin, Kiet Siel, Batwoman House, Twin Caves Pueblo, Nagashi Bikin, and Mug House, and used reported figures (Martin and Plog 1973:356) for Spruce Tree House and Cliff Palace. His reported percentages of storage space for all these cliff dwellings are much less than that reported for Standing Fall House, with Kiet Siel a close second at 53%.

Unlike Klesert, I did not include kivas, courtyards, or any room other than habitation rooms and storage rooms. My ratio calculations for Moon House and the compared cliff dwellings are based only on the relative areas of identifiable habitation and storage rooms. My method follows from the assumption that storage and habitation rooms are the essential functional elements in the comparison. The storage of food is directly related to its use by the population, all or part of which occupied the identified habitation rooms. Therefore discussions of increase or decrease in surplus storage, relative to the resident population, should be based on ratios of habitation to storage space. Comparisons of these ratios are a sound basis for comparing relative storage space and for inferences of increased storage as a buffering surplus or as an indication of distributional function. Including other functional space such as kivas, milling rooms, and courts into calculations of relative storage and habitation space measures space which is less directly related to agricultural subsistence activities, economic organization, and population.

This method is advocated with the understanding that habitation and
storage space are not isolated from the influence of other variables within an organized community. Available space and crowding has been shown to affect the size of enclosed room space within ethnographically recorded Pueblo residence units, which are also composed of habitation and storage rooms (Dohm 1988b). The consideration of crowding is therefore essential to interpretations of population and behavior based on functional space. It follows then that all functional space and relationships between that space should be considered in the analysis of spatial data. Methods for interpreting those relationships are beyond the scope of this thesis, however, and it is felt that the simpler and more expedient analysis of habitation to storage space will be a source of useful comparative data.

The results of calculating habitation to storage ratios, based on room count and room area, for Moon House and 6 other cliff dwellings are listed in Table 4. A comparison of the data shows that ratios based on room area are consistently lower than those based on room count. The variation in the degree of difference is predictably relative to the average size of the rooms. My methods calculate the room area ratio for Standing Fall House at 1:0.5 sq m, habitation to storage. This figure does not support the reported 60% storage space for that cliff dwelling. My calculated room count ratio for Standing Fall House is 1:2.4, habitation to storage. This room count ratio is again much higher than a ratio based on room area and reflects the large number of storage rooms. This room count ratio is consistent with the ratios for some of the other cliff dwellings, but quite a bit less than that for Kiet Siel and Moon House. Comparing the room count and room area ratios shows Moon House to have the largest ratios for storage space, followed closely by Kiet Siel.

It is obvious that the Moon House Complex has an unusually large amount
of storage space relative to habitation space. This is true both for room counts and room areas. The greater reliance on storage at Moon House may be due to its use as a buffer against an increasing probability of crop failure, or may indicate that Moon House was a center in a system of regional distribution.

The varying relationships between room counts and room areas raise questions about the socio-economic system which is reflected in the archaeologically observed organization of storage space. The relevant question is: why would people choose to construct a large number of small rooms, or a small number of large rooms, or any combination of the two? At Moon House the later storage rooms were increasingly large, rectangular, and constructed of angular type 3 masonry. The earlier structures are smaller in area and the walls are curvilinear in plan. The size and shape of rooms are apparently determined by their intended use. Discussing house form in general, Hunter-Anderson equates a round architectural plan with low volumes of materials and undifferentiated activities, and associates rectangular rooms with high volumes of materials and separate activities (Hunter-Anderson 1977:295; Glassow 1982:83). The same relationships, extrapolated to storage facilities, are discussed in terms of the homogeneity or heterogeneity of the stored contents, and the ease of access to the stored contents.

The stated determinants for the use of storage space are interrelated, but can be specified as: 1) the degree of homogeneity or heterogeneity of the stored contents, which affects the need for (2) retrieval efficiency, necessitating separate containers; and 3) access efficiency, facilitated by pathways of unfilled space (Hunter-Anderson 1977:296-297). Acceptance of these variables leads to the conclusion that the large rectangular late
storage rooms were built to facilitate easy access to a probably increased diversity of materials. That diversity might have resulted from variations in the types of items stored or in the age of the stored materials. Ethnographically, corn of different ages is kept separate. Also, in times of stressed environmental conditions, agriculturalists will supplement their diet with an increased reliance on gathered and hunted resources. The storage of corn and other food stuffs for an increased number of people might also increase the diversity of stored items.

The M-2 room block of 5 large square and rectangular storage rooms was the last construction at the complex (A.D. 1268). At least 19 other storage rooms were in potentially usable condition (some remodeled) and available for use at that time. Without the room block of 5 storage rooms the Moon House room count ratio is 1:3.8 (habitation:storage); still higher than most, but approximately equal to the Kiet Siel room count ratio. Without the storage room block, the Moon House room area ratio is 1:1.9 (habitation:storage); again higher than most, but similar to that of Kiet Siel. Obviously at approximately A.D. 1268 the Moon House occupants needed increased storage space, even though they had more storage space than is archaeologically apparent at other reported cliff dwellings.

In fact, following calculations used by Gross (1987:103-105), the storage space at the Moon House Complex was enough to have held an approximate 5.89 year supply of corn for the inferred population of 25 people. Storage figures for the compared cliff dwellings show Moon House had the potential to store approximately twice as much corn as any of the other cliff dwellings and feed a population of 146.97 people for one year (Table 5). The compared figures are based on the assumption that corn supplied 75% of the population's caloric intake, with 75% of the available
Table 5. Estimates of population, storage space, and corn storage potentials for the Moon House Complex.

Years of Stored Corn per/person and the Potential Fed Population are based on corn supplying 75% of the population's caloric intake, with 75% of the available storage space devoted to corn. The three population estimates for the Moon House Complex reflect the possibility of 6 and 7 late habitation rooms, though only 5 are clearly late habitation rooms.

a = less than the reported total population, but based on the number of mapped habitation rooms;
b = this figure represents less than the total number of probably contemporaneous rooms; only complete room clusters were included;
c = Rohn estimates 20 households composed of one or more habitation rooms and storage rooms, and a total Mug House population of 80-100.
<table>
<thead>
<tr>
<th>Cliff Dwelling</th>
<th>Estimated Population</th>
<th>Observed Storage Area (m²)</th>
<th>Storage Area per/person (m²)</th>
<th>Years of Stored Corn per/person</th>
<th>Potential Fed Population (1 year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moon House Complex</td>
<td>25</td>
<td>90.14</td>
<td>3.61</td>
<td>5.89</td>
<td>146.97</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>90.14</td>
<td>3.00</td>
<td>4.89</td>
<td>146.97</td>
</tr>
<tr>
<td></td>
<td>35</td>
<td>90.14</td>
<td>2.58</td>
<td>4.22</td>
<td>146.97</td>
</tr>
<tr>
<td>Kiet Siel</td>
<td>95 a</td>
<td>226.74</td>
<td>2.39</td>
<td>3.89</td>
<td>369.68</td>
</tr>
<tr>
<td>Betatakin</td>
<td>110 a</td>
<td>141.99</td>
<td>1.29</td>
<td>2.11</td>
<td>231.51</td>
</tr>
<tr>
<td>Twin Caves</td>
<td>60</td>
<td>80.14</td>
<td>1.34</td>
<td>2.20</td>
<td>130.66</td>
</tr>
<tr>
<td>Bat Woman House b</td>
<td>35 a</td>
<td>72.33</td>
<td>2.07</td>
<td>3.37</td>
<td>117.93</td>
</tr>
<tr>
<td>Standing Fall House</td>
<td>70</td>
<td>61.87</td>
<td>.88</td>
<td>1.43</td>
<td>100.88</td>
</tr>
<tr>
<td>Mug House</td>
<td>100 c</td>
<td>84.51</td>
<td>.94</td>
<td>1.54</td>
<td>137.79</td>
</tr>
</tbody>
</table>
Table 6. Fed Population and Food Surplus Potentials for the Moon House Complex; assuming a 1 year, 2 year, and 3 year store of corn per/person.
<table>
<thead>
<tr>
<th>Percent</th>
<th>needed</th>
<th>Calories from Corn area m2/person</th>
<th>Years of Storage</th>
<th>Estimated Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>.61</td>
<td>1 year</td>
<td>73.89</td>
<td>110.84</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 year</td>
<td>36.94</td>
<td>55.42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 year</td>
<td>24.63</td>
<td>36.95</td>
</tr>
<tr>
<td>75%</td>
<td>.46</td>
<td>1 year</td>
<td>97.98</td>
<td>146.97</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 year</td>
<td>48.99</td>
<td>73.49</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 year</td>
<td>32.66</td>
<td>48.99</td>
</tr>
<tr>
<td>50%</td>
<td>.31</td>
<td>1 year</td>
<td>145.39</td>
<td>218.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 year</td>
<td>72.69</td>
<td>109.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 year</td>
<td>48.46</td>
<td>72.70</td>
</tr>
</tbody>
</table>

50% 75% 100%
(45.07 m²) (67.61 m²) (90.14 m²)

Percent of storage floor area devoted to corn
(Moon House Complex storage area devoted to corn)
storage space devoted to corn.

Gross assumes an agriculturalist's total caloric intake at 2200 kcal/day or 803,000 kcal/year. He reports that an average ear of corn has a volume of 153 cubic centimeters with an average of 56.6 grams of kernel. Using a figure of 356 kcal/100g. of corn meal (Davidson et al. 1975:198), Gross calculates that .61 square meters of floor area represents enough corn (stacked 1 meter high) to provide a person's total caloric need for 1 year. Obviously, other foods contributed to the caloric needs of the population.

To simulate a more varied diet, and possibly account for access space, I assume that approximately 75% of a person's needed calories were supplied by corn, and, therefore, that only .46 m2 of corn storage area is needed per person per year. A 5.89 year supply is much more than the ethnographically reported 2 year supply of corn usually stored, with 1 years supply serving as a buffer against poor harvests (Stevenson 1904:353; Whiting 1939:15). Assuming a 2 year supply of stored corn for people using the Moon House Complex results in a calculated population of 73.49 persons who could have been fed from the Moon House food stores (Table 6).

Two conclusions concerning food storage are suggested: 1) that the Moon House Complex was used to store an amount of food sufficient to feed a non-resident population greater than that represented by the observed habitation units, therefore probably functioning as a seasonally used storage facility; and/or 2) that a surplus of greater than 2 years was stored by the Moon House Complex residents as a buffer against continuous poor harvests. Either of these possibilities is conceivable within the theoretical framework of Anasazi adaptation to the marginal Cedar Mesa environment (Matson et al. 1988). Both are possible temporary solutions to the probably decreasing annual precipitation (Peterson 1988, Dean et al. 1985) and the
resulting unpredictability of agricultural harvests during the late 13th century. The probable environmental degradation may have resulted in the archaeologically observed abandonment of Cedar Mesa by the Anasazi in the late 13th century.
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APPENDIX A

Room Entry Dimensions; SA-5005 (M-1), SA-5004 (M-2), M-3
## Room Entry Dimensions

### Cliff Dwelling M-1

<table>
<thead>
<tr>
<th>Room</th>
<th>Function</th>
<th>Entry Height</th>
<th>Entry Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>Storage</td>
<td>67 cm</td>
<td>48 cm (widest point)</td>
</tr>
<tr>
<td>B2</td>
<td>Hab./Stor.</td>
<td>64 cm</td>
<td>49 cm (widest point, pre-remodeling)</td>
</tr>
<tr>
<td></td>
<td>(post remodeling)</td>
<td>52 cm</td>
<td>30 cm (at lintel)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>34 cm (at sill)</td>
</tr>
<tr>
<td>B3</td>
<td>Storage</td>
<td>64 cm</td>
<td>37 cm (widest point)</td>
</tr>
<tr>
<td>B5</td>
<td>Storage</td>
<td>54 cm</td>
<td>44 cm (widest point)</td>
</tr>
<tr>
<td>C</td>
<td>Habitation</td>
<td>90 cm</td>
<td>44 cm (widest point)</td>
</tr>
<tr>
<td>D</td>
<td>Storage</td>
<td>55 cm</td>
<td>32 cm (at lintel)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>36 cm (at sill)</td>
</tr>
<tr>
<td>E2</td>
<td>Storage</td>
<td>-</td>
<td>36 cm (widest point)</td>
</tr>
<tr>
<td>F</td>
<td>Habitation</td>
<td>107 cm</td>
<td>38 cm (at lintel)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35 cm (at sill)</td>
</tr>
<tr>
<td>G</td>
<td>Storage</td>
<td>54 cm</td>
<td>34 cm (at lintel)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35 cm (at sill)</td>
</tr>
<tr>
<td>H</td>
<td>Storage</td>
<td>60 cm</td>
<td>30 cm (at lintel)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>33 cm (at sill)</td>
</tr>
<tr>
<td>I</td>
<td>Habitation</td>
<td>96 cm</td>
<td>33 cm (at lintel)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>44 cm (at T shoulder)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>38 cm (at sill)</td>
</tr>
<tr>
<td>J</td>
<td>Habitation</td>
<td>90 cm</td>
<td>43 cm (widest point)</td>
</tr>
<tr>
<td>K</td>
<td>Habitation</td>
<td>75 cm</td>
<td>43 cm (widest point)</td>
</tr>
<tr>
<td>L</td>
<td>Storage</td>
<td>57 cm</td>
<td>34 cm (at lintel)</td>
</tr>
</tbody>
</table>

### Cliff Dwelling M-2

<table>
<thead>
<tr>
<th>Room</th>
<th>Function</th>
<th>Entry Height</th>
<th>Entry Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Storage</td>
<td>-</td>
<td>36 cm (at sill)</td>
</tr>
<tr>
<td>B</td>
<td>Storage</td>
<td>-</td>
<td>38 cm (at sill)</td>
</tr>
<tr>
<td>C</td>
<td>Storage</td>
<td>62 cm</td>
<td>38 cm (at lintel)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>44 cm (at sill)</td>
</tr>
<tr>
<td>D</td>
<td>Storage</td>
<td>67 cm</td>
<td>36 cm (at lintel)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40 cm (at sill)</td>
</tr>
<tr>
<td>E</td>
<td>Storage</td>
<td>66 cm</td>
<td>33 cm (at lintel)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>39 cm (at sill)</td>
</tr>
<tr>
<td>F</td>
<td>Storage</td>
<td>61 cm</td>
<td>36 cm (at lintel)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>36 cm (at sill)</td>
</tr>
<tr>
<td>P</td>
<td>Storage</td>
<td>53 cm</td>
<td>38 cm (at center)</td>
</tr>
<tr>
<td>Q</td>
<td>Storage</td>
<td>51 cm</td>
<td>38 cm (at lintel)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35 cm (at sill)</td>
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### Cliff Dwelling M-3

<table>
<thead>
<tr>
<th>Room</th>
<th>Function</th>
<th>Entry Height</th>
<th>Entry Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Kiva (North entry)</td>
<td>87 cm</td>
<td>50 cm (widest point)</td>
</tr>
<tr>
<td>B2</td>
<td>Storage</td>
<td>58 cm</td>
<td>38 cm (at lintel)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>36 cm (at sill)</td>
</tr>
<tr>
<td>C1</td>
<td>Hab./Storage</td>
<td>56 cm</td>
<td>36 cm (at lintel)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>42 cm (at sill)</td>
</tr>
<tr>
<td>F</td>
<td>Storage</td>
<td>50 cm</td>
<td>35 cm (widest point)</td>
</tr>
</tbody>
</table>

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APPENDIX B

Notes for Ambitious Recorders of Pueblo Structures

Added note:

Pages 201-211 following include "Notes for Ambitious Recorders of Pueblo Structures" and "Notes for Architectural Mapping." These notes were prepared by William D. Lipe and Ruby Buick during the 1974 field season to assist members of the field crew in making consistent observations and inferences as they recorded Pueblo structures. Pages 212-213 are "Some Graphical Conventions for Mapping and Drawing." These were prepared by Ruby Buick in 1974 for use during field mapping and in drafting the plan maps, sections, and elevations reproduced in this thesis.

These notes and conventions also were used in field recording and mapping, and in drafting final figures, for the sites reported by Melanie Bedell in her MA thesis "Late Pueblo II and Pueblo III Dwellings and Community Patterns in Grand Gulch, Southeastern Utah" (unpublished Master's thesis, Department of Anthropology, Washington State University, 2000).

William D. Lipe
Pullman, WA
February 19, 2007
Notes for Ambitious Recorders of Pueblo Structures

I. How was the structure built?
   A. What was it built or dug into?
      Clean fill, trash, bedrock, etc.
   B. Was it built in a pit?
      Inference as to dimensions of pit and relationship of structures to it.
      Was pit simply plastered or lined with masonry, or were free-standing walls built in pit and rubble filled in behind?
   C. How were the walls built?
      Infer sequence of building steps, from footings to finishing top of wall.
      Include description of wall material, whether mud, masonry, dry masonry, jacal, or whatever. Provide detail on style of basic wall construction. Were stones shaped or unshaped; were they selected because they had one smooth face, or two smooth faces, or what; what is the approximate ratio of mortar to stones; were tabular or irregular stones selected; was stone chinking used in the mortar; was mortar tempered with juniper bark or other fibrous material; is wall one course thick, or two, or what; is one side of the wall, both sides, or neither side smooth faced; is either side of the wall plastered, etc?
Inside description of apertures in walls, such as doorways, ventilator openings, niches. Indicate the steps or actions involved in building these apertures.

How are the walls of the same structure related? Bonded, abutted? Are corners of structure rounded or squared? If interior corner is rounded, is exterior corner also? Include detailed plan map in notes.

D. How was the roof built?

Provide step-by-step reconstruction of how roof was built. Distinguish inference from observation in your account. Discuss how roof was related to wall, e.g., primary beams laid on top of wall or incorporated in it or supported by pilasters, etc. Were ties used to hold secondary beams to primary beams? What materials were used as primary, secondary, and tertiary elements in roof construction? Provide a sketch of roof showing relationships of elements to each other and to the walls. Key dendro specimen numbers to map or to structure notes.

E. Can anything be determined about the floor?

Give distance from floor to roof if determinable. This will ordinarily require testing the fill; only very limited testing should be undertaken, however. If this is not sufficient, this information will have to be forgone or inferred from other evidence. A cross-section, and in many cases, an elevation
drawing of the structure should be in the notes. If floor to roof distance is not determinable, give distance form floor to top of wall. How are floor and walls related--mortar or plaster coping, floor extends under wall, etc.? In cross-section, is floor-wall contact at right angle, or curved? How is floor made--bedrock, puddled mud or clay, trampled dirt, subsoil, etc. Can floor features be recognized--firepits, deflectors, ash pits, sipapus, storage pits, partitions, etc. Describe steps in construction of floor. Is more than one floor level discernable? Indicate relationships of different floor levels to features and walls.

F. What is the relationship of the structure to adjacent or associated structures or features?

Provide step-by-step reconstruction of building sequence, citing evidence such as wall abutments, etc., and distinguish observation from inference in your account. Indicate associated pictographs, petroglyphs, mud splats, etc. Were any of these probably made while the maker was standing on the roof of the structure?

G. Was the structure ever remodeled?

Provide a reconstruction of sequence of steps involved in remodeling, such as partial weathering or collapse of mud wall and repair with masonry; closure of apertures with masonry or other material; development of new apertures, etc. Clearly indicate the nature of the evidence for remodeling, e.g.,
different colors of mortar or plaster; different styles of masonry; differential weathering of portions of walls or roof; floored over firepits; walls dividing rooms; removal of walls separating rooms, etc.

II. How was the structure used?

A. Architectural attributes.

A storage function might be indicated by small size, small doorway with evidence of tight closure or sealing; very tight construction; location impractical for habitation; low ceiling; sloping bedrock floor; hanger sticks on wall interiors; lack of firepit or other features; unsmoked walls and roof, etc.

A habitation function might be indicated by large size, large doorway, firepit, metate bin, level prepared floor, relatively high ceiling, etc.

A temporary occupation or special use function might be indicated by lack of prepared floor, less than full height walls of dry masonry or hasty construction, lack of a roof, etc.

A kiva would be indicated by semi-subterranean construction, pilasters, ventilator shaft and tunnel, deflector, firepit, sipapu, niches, bench, southern recess, loom anchors, round floor plan, roof entryway, etc.
Cliff kivas have some kiva features, but are largely of above ground construction. They often have a double wall, and a roof entrance. The ventilator usually is simply an aperture in the wall, opening directly to the outside. In other words, there is often no ventilator tunnel and shaft.

Outside work or use areas are often defined by low walls, or by spaces between buildings. They usually have floor features, such as firepits, metate bins, loom anchors, etc. They are not roofed.

Defensive structures are generally indicated by location in a difficult-of-access place. One type is just a wall or sometimes a room blocking access along a ledge. If there is a doorway, it is generally narrow. There almost always are small holes in the wall, apertures that "cover" the entrance. Another type of structure is a long medium height wall enclosing the front of a shelter. The entrance is usually restricted, and there ordinarily are numerous "porthole" apertures, some of which "cover" the entrance.

Towers, "lookouts", retaining walls, etc., are other architectural features having distinctive characteristics and functions.

B. Traces of use.

Smoke-blackened walls and ceiling suggest a firepit and are indirect evidence of habitation. Care must be taken not to
confuse smoke-blackening from this source with smoking that has resulted from the burning of the structure.

The nature of remodeling—e.g., making doorways smaller, may suggest conversion of a structure from habitation to storage.

Walking surfaces may develop on trash or unprepared floors, indicating activity areas.

Wear on doorways sills, metates, etc., may roughly indicate length of occupation as may number of coats of plaster or number of floors.

C. Association of artifactual and ecofactual materials.

Abundant corn cobs, sparse artifacts, and lack of traces of fire might bolster an inference of storage function.

Generally, habitation structures may be expected to have a greater variety of associated artifacts than other types of structures, with the possible exception of kivas. Associated midden deposits may also imply habitation.

III. What has happened to the structure since it was occupied or used in prehistoric times?

A. When was the structure abandoned relative to other structures at the site?
What is the evidence for your placement--trash fill, walls and roof robbed aboriginally, walking surface enveloped in fill, etc?

B. What shape was the structure left in when the site was abandoned?
If the structure is not now roofed, was the roof in tact at site abandonment and later collapsed due to weathering and decay? If so, where might the beams and poles have gone? Were small sticks, juniper bark roofing mud also removed from the area of the structure? If roof elements are gone, do you think they were removed aboriginally, perhaps for use in other structures or as firewood, or have they been removed by recent vandals, or have they simply weathered away? If the structure walls are not now standing full height, why not? Have they collapsed in place due to weathering? If so, is there enough rubble in the area to support this hypothesis? If not, were the wall materials robbed aboriginally for use in other structures? Could wall materials have been displaced or removed by recent vandals?

C. How was the structure filled--trash deposited aboriginally, collapsed roofing and/or walls, blowsand, cliff wash, rock fall, alluvium, colluvium, packrat nests, pot hunters' backdirt, etc?
How much fill is there above the floor?

D. How much has the artifact sample and its distribution in and around the structure been affected by erosion, animal
disturbance, collecting, pothunting, etc., since the site was abandoned?

IV. Possibilities for further work.

A. What questions remain that could be settled by additional surficial investigation, or by excavation? What special problems might excavation pose?

B. What are your recommendations for stabilization?
Notes for Architectural Mapping and Drawing

A plan drawing is a horizontal section or plan view taken at some established datum level. It can cut through walls, etc. or can be viewed totally from above. The choice of where the plan cutting line is taken, either above or through walls, should be determined by what is primary to show, such as form, wall thickness, etc. Ordinarily the plan will show all architectural characteristics in and below the cutting plane.

The following reminders will be helpful in executing a plan drawing.

1. Establish overall dimensions and choose scale
   (ordinarily 1" = 1 m).

2. Establish datum plane and lay out coordinates from which measurements will be taken.

3. Establish logical sequence for taking measurements.

4. Materials should be indicated by symbol insofar as possible.
   Verbal notation should be used to indicate materials for which no standard symbol has been adopted.

5. Dimensions should be shown by scale insofar as possible.
   Keep dimension notation to a minimum.

6. If a vertical section is to be drawn, show its cutting plane on the plan and indicate with an adjacent arrow the direction of view to be shown on the section drawing.

7. Information to be included on the plan should include north arrow (magnetic north unless otherwise specified; scale; title of drawing ("plan view of Feature G," etc.); date; name or initials of recorder; and cluster, quad, site, and feature designations.

8. Archaeological features to be shown on plan should include
outline of walls; doorway openings; wall niches; any observable floor features; beam locations; boulders or shelter wall used as part of room wall; ventilator openings; location of inscriptions, pictographs, or petroglyphs on shelter wall in or associated with structure; shelter wall at floor level if determinable and at cutting plane level; drip line of shelter if within area of drawing; drainages and vegetation clusters within area of drawing; etc.

9. Show locations of test pits, looters' pits, etc., in addition to archaeological features.

Once the plan has been drawn to scale, it can be used in drawing the section by projecting the distances to the section. A section drawing is a vertical plane cut through the plan at a given point. It usually passes through the approximate center of a structure, either along the long or short axis of the structure. The purpose of a section drawing is to more clearly define the structure under investigation and to record dimensions and relationships not easily shown on the plan. Therefore the selection of the location for the section cutting plane is important. Features of special interest can be shown by cutting through them, or in elevation looking past the cutting plane. An elevation simply shows characteristics of the structure, such as walls, doorways, pilasters, etc. as they look in three-dimensional perspective, viewed looking transversely through the cutting plane from a point behind it. If a section is drawn without an elevation, it can be referred to as a profile. The structure can also be drawn entirely in elevation, of course, without showing a section or profile at all. When drawing a section with elevation, a heavy line should be used to indicate where the cutting plane cuts walls or features; the elevation of
characters beyond the cutting plane should be shown in lighter lines. Sections and elevations should ordinarily be drawn to the same scale as the plan. The location of the cutting plane of the plan should be shown. Ordinarily in drawing a section, a level line will be set up along the section cutting plane, so that the section will be oriented relative to true horizontal. Measurements to floors, roofs, etc. are made up or down from the level line at measured intervals. Most of the reminders 1-9 listed above in the discussion of plans also apply to sections.
Some Graphical Conventions for Mapping and Drawing:

Heavy solid line. Indicates passage of cutting plane of section of plan through walls of structure or feature, or through shelter or boulder surface if this is incorporated in the structure.

Light dashed line. Indicates drip line or lip of rock ledge or overhang

Light solid line. Indicates walls, features, etc. observed in plan or section, but not in cutting plane.

Light dotted line. Indicates assumed continuation of wall, floor, ceiling, niche, pilaster, etc., where this continuation cannot actually be seen from the plan or section perspective.

Ceiling designation: Main and secondary beams indicated by center line of this type.

Indicates diameter.

Grid boundary designation

Drainage

Direction of fallen wall

Conifer

Deciduous tree

Shrub

Grinding slick

Test pit

Access route (in cases where access is restricted)
<table>
<thead>
<tr>
<th>Plan</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="dry_laid_masonry" /></td>
<td>Dry-laid masonry (not mortared)</td>
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<tr>
<td><img src="image" alt="mortared_masonry" /></td>
<td>Mortared masonry</td>
</tr>
<tr>
<td><img src="image" alt="masonry_wall_with_plaster" /></td>
<td>Masonry wall with plaster</td>
</tr>
<tr>
<td><img src="image" alt="slab_wall" /></td>
<td>Slab wall</td>
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<tr>
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<td>Jacal wall</td>
</tr>
<tr>
<td><img src="image" alt="wood" /></td>
<td>Wood</td>
</tr>
</tbody>
</table>

- **Deposit** -- indicate type -- wall, ceiling, aeolian, talus, midden, etc. (Plan)
- **Ashy lense** (Plan or section)
- **Sand fill** (Section)
- **Rock** (Plan or section)
- **Mortar** (Elevation)
- **Plaster** (Elevation)
- **Sooting** (Elevation)