LATE PUEBLO II AND PUEBLO III CLIFF DWELLINGS AND COMMUNITY PATTERNS IN GRAND GULCH, SOUTHEASTERN UTAH

By

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A thesis submitted in partial fulfillment of the requirements for the degree of

MASTER OF ARTS IN ANTHROPOLOGY

WASHINGTON STATE UNIVERSITY
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LATE PUEBLO II AND PUEBLO III CLIFF DWELLINGS AND COMMUNITY
PATTERNS IN GRAND GULCH, SOUTHEASTERN UTAH

Abstract

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The study area, a 6.5 km segment of Grand Gulch, includes 24 well-preserved late
Pueblo II-Pueblo III period (ca. A.D. 1060-1270) cliff dwellings. I use a spatial and
functional analysis of the cliff dwellings and their structures to infer social organization
and social integration. From analysis of room function, I distinguished three site types:
multiple household habitations, single household habitations, and isolated storage
structures. Architectural details, tree-ring dates and wall construction techniques are used
to interpret the sequence of construction for each cliff dwelling in the study area and to
establish contemporaneity between the sites.

Late Pueblo II structures were dismantled and incorporated into small multiple
household habitations and single household habitations representing part of a dispersed
mid-thirteenth century community. Great Kivas or large facilities that could have served
to integrate the small residential population are absent. Dispersed dwellings suggest
some degree of household autonomy. Functional classification of the architectural spaces
indicates little interhousehold cooperation and dependency even in multiple household
habitations.
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CHAPTER 1
INTRODUCTION

Problem Statement

Architectural remains have long been used to infer social organization and to specify the boundaries of prehistoric communities. An architectural space is "constructed by people in response to their needs and their conception of how both their community and the universe are ordered" (Hegmon 1989: 5). As a result, architectural evidence reflects the degree to which the prehistoric inhabitants of a community interacted with one another and with outsiders, and the space required to conduct certain activities.

The primary objective of this study is to interpret social organization on two different spatial scales through an architectural and chronological analysis of 24 late Pueblo II-Pueblo III cliff dwellings in the Grand Gulch study area of southeastern Utah (Figure 1). First, an architectural and dendrochronological analysis of individual sites, with an emphasis on 15 residential cliff dwellings, provides the framework for identifying the archaeological correlate of households and for understanding social organization of the households. Second, I use spatial analysis of loosely clustered residential cliff dwellings within the study area to make inferences about community structure and settlement patterns. In sum, the presence and spatial relationships of the
Figure 1. Regional map.
functionally distinct rooms within the various late Pueblo II-Pueblo III cliff dwellings led me to address the following questions: 1) What is the association between the spatial distribution of the architectural remains and the type of social groups who utilized those spaces; 2) What is the construction sequence and age of each site and the temporal relationships between the sites; 3) What inferences about prehistoric social interaction can be made from these spatial and temporal relationships; 4) How were the different architectural spaces used by the canyon residents; and 5) How does the Grand Gulch settlement pattern contribute to understanding late Pueblo settlement dynamics in the Four Corners region.

The analytical approach used in this study of social integration in the Grand Gulch study area follows that of Rohn (1965) and Dean (1969). They also made inferences about Pueblo III community organization and integration through the analysis of the spatial pattern of functionally distinct structures in Mesa Verde cliff dwellings and Tsegi Phase Kayenta cliff dwellings. Similar to Rohn and Dean's analyses, my functional classification of structures is dependent solely on architectural observations. None of the structures were excavated during the 1974 fieldwork. A small number of visible floor features were recorded in 1974, but primarily gross architectural features aided in the identification of structure use. Remodeling is evident in some of the structures and sometimes indicates a change in the way the structure was used. Architecture is reflective of the primary intended use of structures and is limiting in terms of determining what activities took place in particular architectural spaces. For this reason, archaeologists have commonly used artifact assemblages and floor features in conjunction with architecture to understand types of activities that took place therein.
Artifacts and features are more likely to reveal the actual primary use and last use of an architectural structure or space (Lipe and Hegmon 1989). Using only architectural data limits inference about the organization of activities and thus social organization. However, some information about prehistoric social interaction in the Grand Gulch study area can come from architectural remains and associated tree-ring dates.

Following Matson et al. (1988), I assign structures in this region, dating between A.D. 1060 and 1150, to the late Pueblo II period and structures dating between A.D. 1150 and 1270 to the Pueblo III period. All 188 tree-ring dates for the study area indicate two main periods of beam procurement. The number of cutting dates increases around the A.D. 1120s and 1130s and around the A.D. 1240s and 1250s. Hence, the data suggests intensive building in the early 1120s, followed by decline in construction by the middle 1140s. Another short building episode beginning in the A.D. 1230s preceded final abandonment by two or three decades. For the most part, the architecture remains at these sites postdate A.D. 1200. Most of the earlier structures, built during the late Pueblo II period, were apparently dismantled and their construction timbers reused in the construction of the Pueblo III structures.

Because people used most of the visible architecture during the early and mid-thirteenth century, study of household and community organization in this segment of the Grand Gulch is limited to the Pueblo III period. The archaeological correlate of the household dwelling in the study area usually consists of a kiva and/or habitation room(s) and associated (generally one to three) storage structures. The spatial clustering of the dwellings indicates that residents could have had face-to-face interaction; hence, I consider them to have constituted part of a dispersed community. The residents of the
surrounding mesa tops most likely also had daily contact with the canyon residents and were part of the Grand Gulch community population. None of the sites consist of more than 50 structures and there is no recognizable public architecture commonly associated with aggregated communities in the Mesa Verde region to the east. The dispersed community pattern probably reflects the way the residents responded to the environmental and social conditions of the agriculturally marginal Cedar Mesa area (Benson 1984, 1985; Matson et al. 1988).

Overview

The architectural data used to conduct this architectural analysis were compiled in 1974 as part of the Cedar Mesa Project under the direction of William D. Lipe and R.G. Matson. Additional fieldwork was undertaken in 1998 to verify the original 1974 descriptive notes and maps, that provided detailed information about room construction, the condition of the architectural remains, and the architectural attributes that aid in the identification of structure use. The 1974 tree-ring date reports, containing the tree-ring dates used in my chronological analysis, were compiled by the Laboratory of Tree-ring Research at the University of Arizona with Jeffrey Dean as collaborator. They are housed along with the other descriptive notes at the Department of Anthropology, Washington State University. Hence, the interpretations on social organization presented in this thesis are the product of the 1974 recording of the architectural features in the study area. Ahlstrom (1985) analyzed some of the tree-ring dated construction beams collected from the Grand Gulch sites in 1974 for part of his Ph.D. dissertation.
The 24 cliff dwellings are located on Cedar Mesa, each in separate alcoves of Grand Gulch, Kane Gulch and Todie Canyon (Figure 2). The farthest straight-line distance between sites in the study area is only about 6.5 km - approximately 15.5 km if the distance is measured along the trace of the canyon. A total of 215 extant architectural features were recorded for all the sites in 1974 (Appendix A). Each architectural feature was assigned a letter designation. Of the 215 architectural features, I interpret 182 of them as rooms. I define rooms as architectural features that were enclosed and roofed at some time before abandonment. Thus, all architectural features I identify as granaries, general storage rooms, habitation rooms and kivas are types of rooms. Throughout this thesis, I use the terms “room” and “structure” interchangeably.

The architectural visibility of each room ranges from just wall foundations to structures with intact roofs and walls containing datable wood beams. Due to their good preservation, the primary intended use after construction or remodeling for 175 of the recorded rooms could be inferred. The primary intended use of the remaining eight rooms is indeterminate on account of their relatively poor preservation. Rooms recorded in 1974 no doubt fall short of the original number of rooms constructed and/or used during the Pueblo III period. Some of the architectural remains were undoubtedly destroyed by postabandonment disturbance processes such as runoff from the cliffs or high energy alluvial events. Some damage from looting is also apparent, but is unlikely to have removed entire structures. The outlines of several pre-existing structures (i.e., ghost rooms) cling to the shelter walls. These remnant structures, perhaps used concurrently with the visible rooms, were excluded from the architectural feature counts. In any case, a conservative estimate of 34 habitation rooms, 21 kivas and 120 storage
structures make up the 24 recorded cliff dwellings. I believe that 96 of the storage structures were primarily granaries.

Some of the habitation rooms, kivas and storage structures occur together and form sites containing one or more residential or dwelling units. Eight of the 24 cliff dwellings are designated as multiple household habitations. That is, presence and number of habitation rooms and kivas indicate that multiple households occupied these cliff dwellings at some time during the late Pueblo II and Pueblo III periods. I identified eight single household habitations. These sites are composed of only one habitation room or kiva, an indication that perhaps only one household occupied the site at some time during the late Pueblo period. Eight cliff dwellings show no architectural evidence that they were used for purposes other than storage and are not spatially associated with definite habitation sites. These sites are recognized as isolated storage structures comprised of granaries and/or general storage rooms. I interpret the three site types as building blocks for a Pueblo III community.

A brief description of all the sites in the study area follows. The designations for the sites used throughout this thesis are Cedar Mesa Project field designations from the 1974 site records. Because only 13 of the recorded cliff dwellings have state numbers, I use the field designations instead of the state numbers (Table 1).

Cliff Dwelling K C2-1 is comprised of an isolated granary situated on a high ledge within a small southwest facing shelter. The shelter is inaccessible from the bottom of Kane Gulch, but is accessible from the rim.

Cliff Dwelling UGG C23-1 (Figure 3) is also named Junction Ruin because it is located in a south facing natural shelter at the confluence of Grand Gulch and Kane
Gulch. This is the largest site in the study area, consisting of 30 rooms and 5 other architectural features spaced along two ledges. The bottom ledge can be easily accessed from the canyon bottom, whereas the high upper ledge could only have been reached by ladder from an extant, prehistoric support platform. The bottom ledge contains three kivas and eight granaries, one habitation room, and one probable storage room. Seven habitation rooms and 10 granaries form four separate, perhaps contemporaneous, room blocks on the upper ledge.

Cliff Dwelling GG C2-1 (Figure 4) has four granaries and one probably noncontemporaneous room of unknown function. Three of the four granaries situated at the east end of the shelter are contiguous. I believe this site is a single household habitation because two of the granaries were originally occupied. The rooms are well protected within a south facing shelter that is easily accessible from the adjacent mesa top.

Cliff Dwelling GG C3-1 (Figure 5) is also named Turkey Pen Ruin after its existing turkey pen. The structures comprising this multiple household habitation are dispersed on two ledges within a large south facing natural shelter. Access to the bottom ledge from the canyon bottom is easy. Access to the upper ledge from the bottom ledge is by a series of natural narrow steps leading to a break in a defensive wall that is built along the west end of the upper ledge. One post A.D. 1235 kiva, five habitation rooms, five granaries and two architectural features of unknown function occur along the bottom ledge. A well preserved, late A.D. 1240s kiva, one granary and one probable storage room are isolated on the upper ledge.
As evidenced by the presence of four habitation rooms and one kiva, Cliff Dwelling GG C4-1 (Figure 6) held multiple households. The site is in a long shallow natural alcove, easily accessed from Grand Gulch Wash. A petroglyph on the rear of the shelter of a sheep standing over two sets of spirals has led to the name Sheep-on-a-Bicycle Ruin. Rooms occur on two ledges, with only one granary isolated on the upper ledge. A series of hand-and-toe holds or “Moki steps” facilitates access to the upper ledge from the lower ledge. Four habitation rooms, two granaries and four probable storage structures, spaced along the lower ledge, are fronted by one post A.D. 1171 kiva.

Cliff Dwelling GG C4-2 is a single household habitation composed of one circular kiva, one probable habitation room, and one room of uncertain function. The well sheltered structures occupy a high southeast facing alcove in a small side canyon of Grand Gulch (Figure 7). The shelter can be accessed from the adjacent rim and canyon bottom.

Cliff Dwellings GG C4-4 and GG C4-5 (Figure 7) are located in opposite facing alcoves high up on a side canyon’s wall. Cliff Dwelling GG C4-4 consists of one isolated granary, whereas Cliff Dwelling GG C4-5 has four isolated granaries and two small architectural features of unknown function. Access to the rim directly from GG C4-4 is impossible, and access to the canyon floor is difficult. Access to the canyon floor and rim from GG C4-5 is relatively easy.

Cliff Dwelling GG C4-6 is composed of two isolated granaries and one probable storage structure. One of the granaries was originally used as a habitation room, but was later remodeled to serve a storage function. Hence, I consider this single household habitation to have been occupied by perhaps one household at some time during the late
Pueblo II period or Pueblo III period. The site is located within a south exposed alcove with a very low overhang. Access to the rim is difficult, but easy to the canyon bottom.

Cliff Dwellings GG C6-3 and GG C6-7 (Figure 8) are single household habitations located on the same ledge but sheltered in separate south facing alcoves. A short, defensive wall was built where the ledge narrows between the two alcoves, making access between the two sites difficult. Cliff Dwelling GG C6-3 is composed of one habitation room, two granaries, two rooms of unknown function and storage cists. Cliff Dwelling GG C6-7 has two kivas and one granary. One of the kivas, constructed after A.D. 1258, is extremely well preserved.

Cliff Dwelling GG C6-4 consists of one isolated granary located in a low northwest facing natural shelter. The site is easily accessible from the canyon floor, but difficult from the rim.

Cliff Dwelling GG C6-6 (Figure 9) is a single household habitation site with one habitation room and three contiguous, post A.D. 1189 granaries. The site is situated on a narrow ledge close to the canyon floor and is poorly sheltered by a shallow high overhang.

Cliff Dwelling GG C7-1 is composed of one A.D. 1250s kiva, one contemporaneous granary and one room of unknown function. This single household habitation site is built within an east exposed shelter and is moderately protected under a high overhang. Access to the site is possible up a talus slope from the canyon bottom.

Cliff Dwelling GG C8-3 (Figure 10) is a single household habitation site containing one probable, poorly preserved habitation room with an attached probable storage room. Adjacent to these two rooms is a large architectural feature of unknown
function. This site is located within a low, east facing shelter and is poorly sheltered under a high overhang.

Cliff Dwelling T C1-2 (Figure 11), composed of 22 rooms, is the second largest multiple household habitation site in the study area. It is located on a high ledge and was most likely accessed from the bottom of Todie Canyon by a ladder. Three A.D. 1250s kivas are dispersed along a long, wide ledge with two other, perhaps contemporaneous, kivas, one habitation room, 15 storage structures and one room of unknown function. Eleven of the 15 storage structures were primarily used as granaries.

Cliff Dwelling T C3-2 (Figure 12) consists of 21 extant storage facilities and several mud outlines marking the remains of possibly earlier structures. Most of the structures exhibit extensive repair, rebuilding or remodeling. The structures are sheltered under a deep overhang, situated on a high ledge that can be accessed from the bottom of Todie Canyon. A short wall on a narrow section of the ledge restricts access to the west half of the alcove.

Cliff Dwelling GG C9-1 (Figure 13) is located within a south facing shelter and consists of two levels; the bottom level is an alluvial terrace and the top level is a small bedrock bench. Only one existing habitation room and nine storage structures were recorded in 1974. During the 1998 fieldwork, however, I noted a partially exposed kiva and a thick midden that had been covered by alluvium in 1974. I classify this site as a multiple household habitation because of its extensive midden and the likelihood that several structures - habitation rooms and kivas - have been buried by alluvium or eroded.

Cliff Dwellings GG C9-3 and GG C9-4 both consist of a single isolated granary. GG C9-3, situated on a high ledge in a southwest exposed shelter, can be viewed from
GG C9-1. It can only be accessed from the canyon bottom. GG C9-4 is located on a high ledge above GG C9-1 and is protected by a deep overhang. Access to the granary is moderately difficult from the canyon bottom.

Cliff Dwelling GG C10-1 (Figure 14), a multiple household habitation site, consists of one kiva, four habitation rooms, two granaries, one probable general storage room and two architectural features of uncertain function. The configuration of the rooms differs from the other sites. The rooms are incorporated into one large three-story room cluster. The site is easily reached from the canyon bottom.

Cliff Dwelling GG C11-3 is protected within a small, high northeast facing natural shelter. It consists of a single isolated granary accessible from the canyon bottom, but not from the mesa top.

Cliff Dwelling GG C12-1 (Figure 15) is on two levels in a high, shallow overhang. The lower ledge consists of one poorly preserved habitation room, one kiva and three granaries, whereas the upper ledge contains one habitation room with three associated storage structures and one room of unknown function. A low wall built along the edge of the upper ledge restricts access to the upper ledge.

I classify Cliff Dwelling GG C13-1 (Split Level Ruin) (Figure 16) as a multiple household habitation. It holds five habitation rooms, four kivas, four granaries, and four probable storage rooms. The large south facing shelter, easily accessible from the canyon bottom, contains two ledges. A series of low masonry walls on the upper ledge appear to have been defensive. The rooms and features on the west end of the lower ledge are not as well preserved as the mid-A.D. 1200s structures on the east end of the lower ledge; therefore, they may be earlier.
In this chapter, I proposed that the study area, a deeply entrenched segment of Grand Gulch having a higher site density than adjacent portions of the canyon, may have functioned as part of a dispersed Pueblo III community. In the second chapter, I provide information on the environment and archaeology of the study area. In Chapter 3, I discuss the architecture of the Grand Gulch sites, with particular emphasis on wall construction. Chapter 4 presents discussion of prior studies of structure use, particularly the function of late Pueblo II and Pueblo III kivas and the relationship between room size and room function. The following two chapters present architectural descriptions and interpretations for the multiple (Chapter 5) and single household habitations (Chapter 6). The sequence and chronology of construction at each of the cliff dwellings is presented in Chapter 7. In Chapter 8, I use the results of the architectural analyses to discuss household and community organization and to estimate population.
Figure 3. Plan view map of Cliff Dwelling GG C23-1.
Figure 4. Plan view map of Cliff Dwelling GG C2-1.
Figure 5. Plan view map of Cliff Dwelling GG C3-1.
Figure 7. Plan view map of Cliff Dwellings GG C4-4 and GG C4-5.
Figure 9. Plan view map of Cliff Dwelling GG C6-6.

Figure 10. Plan view map of Cliff Dwelling GG C8-3.
Figure 14. Plan view map of Cliff Dwelling GG C10-1.
Figure 15. Plan view map of Cliff Dwelling GG C12-1.
Figure 16. Plan view map of Cliff Dwelling GG C13-1.
CHAPTER 2

ENVIRONMENTAL AND ARCHAEOLOGICAL BACKGROUND

The Cedar Mesa Environment

The Cedar Mesa environment is described elsewhere in published articles and in theses and dissertations (Aasen 1984; Agenbroad 1975; Dohm 1988; Haase 1983; Lipe and Matson 1971, 1975; Matson and Lipe 1975, 1978; Matson et al. 1988; Salkin 1974, 1975; West 1978). For this reason, only a brief characterization of the climate, geology and physiography, and vegetation is provided here to familiarize the reader with the general environment that was utilized by the residents of Cedar Mesa during prehistoric times.

Cedar Mesa is an upland area in western San Juan County, southeastern Utah (Lipe and Matson 1971: 126). It is a distinct physiographic unit in terms of its elevation, drainage pattern, and vegetation (Gregory 1938: 11) that extends from the valley of the San Juan River on the south to the Elk Ridge highlands on the north. The deep serpentine canyon of lower Grand Gulch and the valley of Comb Wash bound Cedar Mesa to the west and east (Lipe and Matson 1971: 126). The Red Rock Plateau to the west of Grand Gulch, White Mesa to the east and Elk Ridge and the Abajo Mountains to the north, form uplands adjacent to Cedar Mesa. Most of Cedar Mesa is public land, and is overseen by the U.S. Bureau of Land Management. In 1972, Grand Gulch and its immediate surroundings were designated a “primitive area” by the BLM to prohibit the use of bicycles and motorized vehicles in the area. The study area that was the major focus of
the Cedar Mesa Project encompassed the central part of the mesa, which is entrenched by a number of deep canyons, the largest being Grand Gulch.

The geological structure of Cedar Mesa is controlled by the north-south trending Monument Upwarp. The mesa slopes gently upward from the west and from the east to a north-south divide, which in turn dips very gradually southward. The elevation of the divide averages approximately 6500 feet above sea level, and the elevation for the mesa top varies from below 5600 to as much as 6800 feet. Grand Gulch and other deeply cut canyons of Cedar Mesa are entrenched in the upwarped, crossbedded Permian Cedar Mesa Sandstone that composes the mesa surface (Baars 1972). Wind and water have carved numerous alcoves or rock shelters into the Cedar Mesa Sandstone exposed in the canyon walls. Underlying the Cedar Mesa Sandstone is the relatively impermeable Permian Halgaito Shale (Gregory 1938), exposed in a few of the deeper canyons in the south and southeast.

Grand Gulch, Slickhorn Canyon, and Comb Wash are the major drainages that funnel water from Cedar Mesa into the San Juan. Grand Gulch, which is approximately 75 miles in length, as measured along its meandering trace, drains the western and central portion of the mesa and a small portion of Elk Ridge. Overall, Grand Gulch is a steep, but relatively shallow canyon that never exceeds 1000 feet deep. Access into the canyon from the mesa top is possible only in certain places, since the walls begin at the rim with a vertical drop of 30 to 60 feet. Below this point, the canyon walls form a series of undercut ledges that vary from 10 to 40 feet high and from 5 to 10 feet wide (Gregory 1938:11). Grand Gulch, similar to the other canyon drainages, begins as a broad, shallow mesa top valley that channels runoff to a point of entrenchment. From this point, the
canyon becomes increasingly deeper with steep high sandstone walls, and the canyon floor widens.

Kane Gulch and Todie Canyon run east-west and both canyons drain the central portion of Cedar Mesa into Grand Gulch to the west. Kane Gulch is the chief head water tributary of Grand Gulch; however, Bullet Canyon is the main eastern tributary that drains central Cedar Mesa. The junction of Kane Gulch and Grand Gulch, where cliff dwelling UGG C23-1 (Junction Ruin) is situated, marks the northern extent of the study area. Trails at the heads of Todie Canyon and Kane Gulch provide the easiest access into the bottom of the Grand Gulch study area.

Cedar Mesa is a marginal environment in terms of growing maize. Hack (1942: 8) noted that a minimum of 12 inches of annual rainfall and a growing season of approximately 130 days is needed for maize agriculture on the Colorado Plateau. Annual rainfall, depending on elevation and location on Cedar Mesa, meets the minimum requirements, varying from 10 to 13 inches. The growing season on the north end of Cedar Mesa at an elevation of 6800 feet averages only 129 days. Good springs, seeps, and large potholes that collect runoff from summer showers provide water in the canyon bottoms throughout the summer. Potholes on the mesa top can also hold water for up to several weeks after a summer shower (Matson et al. 1988).

The higher areas of Cedar Mesa are covered by pinyon-juniper woodland interspersed with few large big sage (Artemisia tridentata) flats. Narrow sage parks are at the heads of some drainages before the point of drainage entrenchment (Lipe and Matson 1971: 28). At the lowest elevation on the mesa top are shrublands dominated by sage, grasses and blackbrush (Coeleogyne ramossissima). In contrast, the deeply
entrenched canyons have relatively sparse distributions of pinyon and juniper and have a greater diversity in vegetation than the mesa tops. Mountain mahogany (*Cercocarpus* sp.), cliffrrose (*Cowania stansburiana*), gambel oak (*Quercus gambelii*), serviceberry (*Amelanchier* sp.), yucca and a variety of cacti are among the many genera found on the rimrock areas and canyon walls. Cottonwood (*Populus fremontii*), willow (*Salix* sp.) and box elder (*Acer glabrum*), along with rushes (*Juncus* sp.), reeds (*Phragmites communis*) and other riparian genera are present in the canyon bottoms (Haase 1983: 26).

The higher botanical diversity in the canyons, as well as the springs and the dry, protected shelters, made the canyons attractive to the Cedar Mesa Anasazi. Yet, the majority of suitable locations for farming are located on the highest parts of the mesa top, which coincide with deep arable soil, dense pinyon-juniper, and relatively high precipitation (Haase 1983). Floodwater farming and dry farming were probably the most commonly used farming practices on the mesa tops. In addition, alluvium of some canyon floors was probably used for farming (Lipe and Matson 1975). At its middle reaches, Grand Gulch’s gradient lessens allowing for the formation of a series of alluvial terraces. From these alluvial terraces, Agenbroad (1975) defined a sequence of alternating periods of aggradation and degradation. His study indicated that the youngest and lowest terrace formed before and during Anasazi occupation of Grand Gulch and degradation of this terrace occurred near the end of Pueblo III occupation of Grand Gulch, possibly contributing to final abandonment of the area. The study area encompasses the broader and more deeply entrenched part of Grand Gulch, south of Kane Gulch. In this area, Lipe and Matson (1975) found a correlation between areas having alluvium and site locations. That is, the number of Pueblo sites and structures is greater
in areas having greater amounts of alluvium. The inhabitants of the Grand Gulch shelters in the study area probably used the alluvium on the canyon bottoms in conjunction with the aeolian sandy silts on the mesa tops for farming (Lipe and Matson 1975).

The juxtaposition of the mesa tops and deep canyons provided the inhabitants with a variety of economic plants. Lepofsky (1986) and Aasen (1984) analyzed macrofossils from a test pit in Basketmaker II midden deposits at Turkey Pen Ruin (Cliff Dwelling GG C3-1) to identify the plant contents of the samples and to understand what the Basketmaker Anasazi were eating at the site. Lepofsky (1986) examined the contents of seven flotation samples, while Aasen (1984) looked at the macrofossils and pollen of several coprolites. They both concluded that both wild and domesticated plant communities were harvested for food. The wild plant remains identified by Aasen (1984) included pinyon pine (*Pinus edulis*), Indian rice grass (*Stipa hymenoides*), yucca (*Yucca* sp.), species of Chenopodiaceae, and prickly-pear cactus (*Opuntia* sp.). She also found corn (harvested in late summer) and pine nuts (harvested in fall) to be the most frequent and abundant macrofossils (Aasen 1984). The plants represented in the samples indicated that Turkey Pen was inhabited during the fall and summer, but nothing in the micro- and macrofossil evidence suggested that Turkey Pen was clearly inhabited during the spring and winter months. Since these economic plants represented in the Basketmaker II deposits at Turkey Pen Ruin are presently growing in the study area, they were most likely continually exploited during late Pueblo II and III periods. However, wild foods such as pinyon were probably more important to the Basketmaker II people as a source for calories than to the later Pueblo occupants.
Archaeological Work Prior to the Cedar Mesa Project

Cedar Mesa and the surrounding region are highly significant in terms of the development of southwestern archaeology. It was at Cave 7, an alcove in a tributary of Cottonwood Canyon, where, in 1893, Richard Wetherill and other members of the Hyde Exploring Expedition discovered “Basketmaker” skeletal remains and artifacts underlying the well-known “Cliff Dweller” remains. Wetherill repeated and confirmed these observations in Butler Wash and Grand Gulch. Twenty years later, the stratigraphic relationships of these two cultural complexes would be formally recognized in the archaeological community through the work of S.J. Guernsey and A.V. Kidder in the Marsh Pass region, northern Arizona, who rightfully acknowledged Richard Wetherill’s work (Blackburn and Williamson 1997; Guernsey and Kidder 1921; McNitt 1957).

Before Wetherill’s discovery at Cave 7 and exploration of alcoves in Grand Gulch and other canyons of the Cedar Mesa region, Charles Mcloyd and Charles Graham of Durango ventured down Grand Gulch during the winter of 1890-91 in search of well-preserved artifacts (Blackburn and Williamson 1997; Mcloyd and Graham 1894). The late nineteenth century was a period of intensive exploration in the Southwest, which was brought on by the development of a market for antiquities. Motivated in part by the profit of relics, Mcloyd and Graham, as part of four separate expeditions during 1891-93, dug in a number of caves in Grand Gulch, including Turkey Pen Ruin (Cliff Dwelling GG C3-1) in 1892. Their dated inscriptions remain on the shelter wall at Turkey Pen. Blackburn and Williamson (1997: 40) estimated that Mcloyd and Graham took more than 2,000 artifacts from sites throughout Grand Gulch. Their collections were purchased by private collectors, who in turn sold the collections to exhibitors and museums.
After McLoyd and Graham's reconnaissance of southeastern Utah, Richard Wetherill led two expeditions to Grand Gulch and other tributaries of the San Juan. Wetherill found proof of the Basketmakers on the first expedition in the winter of 1893-94. This expedition was funded by the Hyde brothers, who were affiliated with the American Museum of Natural History in New York. At this time, he also documented 33 cliff dwellings in Grand Gulch, Allen Canyon, and Butler Wash (Blackburn and Williamson 1997). During the winter of 1896-97, Wetherill undertook a second Grand Gulch expedition, which is referred to as the Whitmore Exploring Expedition after its financier C.E. Whitmore. The primary objective of this expedition was to continue the documentation of the Basketmaker culture. Wetherill's investigation within the present Grand Gulch study area during this time resulted in the excavation of the cists and Kiva I at Turkey Pen (Keller et al. 1974). Although Wetherill accomplished more in the first expedition in terms of his Basketmaker discovery and artifact collecting, more of the written documentation of the second expedition has survived. His field records and collections from both expeditions are stored at the American Museum of Natural History. McNitt (1957) and Blackburn and Williamson (1997) are excellent sources for describing Richard Wetherill's two expeditions in detail.

Following Wetherill's second expedition, N.C. Nelson, a curator at the American Museum of Natural History, conducted the next archaeological reconnaissance in Grand Gulch in 1920-21. The goal of the survey was to embellish the Wetherill catalogs and sparse field notes with more information about the provenience of the Grand Gulch collections. Nelson (1920) recorded approximately 100 sites in Grand Gulch, took descriptive notes and made sketch maps of sites.
Between the period of Nelson's work and the Cedar Mesa Project, Harner (1954) conducted a brief survey in Grand Gulch in the early 1950s and Sharrock (1964) excavated several small sites in northern Cedar Mesa. During the summer of 1967, William D. Lipe, then of the State University of New York at Binghamton, conducted a reconnaissance survey to locate a number of sites in Grand Gulch between Kane Gulch and Bullet Canyon that were mentioned by Wetherill and Nelson. He also surveyed the adjacent mesa tops to find Basketmaker II open sites (Lipe 1979). Lipe used the information gathered during the 1967 survey to plan and carry out additional research in 1969 and 1970. He excavated several Basketmaker II and III mesa top sites and intensively surveyed a 1 by 4 mile mesa top transect east of Upper Grand Gulch and non-intensive surveyed Grand Gulch and other canyons (Lipe and Matson 1971). The site number GG 69-34 given to Turkey Pen during this survey indicates that it was the 34th site recorded in 1969. The 1969-70 fieldwork was supported by grants from the National Geographic Society and from SUNY at Binghamton. Table 1 is an equivalency list showing the various designations given to the sites in the Grand Gulch study area in the late nineteenth and twentieth century.

The Cedar Mesa Project

The Cedar Mesa Project is the title given to fieldwork and consequent analyses that were led by William Lipe of the Museum of Northern Arizona and R.G. Matson of University of British Columbia between 1972 and 1975 (Lipe and Matson 1975; Matson and Lipe 1975,1978; Matson et al. 1988). This project, supported by grants G-S 33413X
Table 1. Summary of the Various Site Numbers Assigned to the Grand Gulch Sites Mentioned in Text.

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Note: FW is the abbreviation for False Wetherill, which was the name assigned to Todie Canyon by N. C. Nelson.
and G-S 42570 from the National Science Foundation (NSF), undoubtedly was the most significant archaeological work ever conducted on Cedar Mesa. Several reports (Keller et al. 1974; Lepofsky 1986; Lipe et al. 1977; Matson and Lipe 1977), publications (Agenbroad 1975; Benson 1985; Creel and Long 1986; Eighmy 1979; Keller 1982; Lipe 1978; Lipe and Matson 1971, 1975; Matson 1991, 1994; Matson et al. 1988; Chisholm and Matson 1994; Matson and Lipe 1975, 1978; Nelson 1994; Salkin 1975), and theses and dissertations (Aasen 1984; Ahlstrom 1985; Benson 1984; Bloomer 1989; Brooks 1974; Camilli 1975, 1983; Dohm 1981, 1988; Haase 1983; Salkin 1974; Schlanger 1980; West 1978) contain partial results and analyses of the data gathered from systematic surveys and excavations that made up the Cedar Mesa Project. Matson, Lipe and Haase (n.d.) compiled all the quadrat survey data into a final monograph-length report that remains unpublished. The descriptive notes, detailed maps, and the tree-ring data used for the present analysis were produced as part of the larger Cedar Mesa Project.

The objective of the Cedar Mesa Project was to determine the distribution of site types with the intent to understand settlement patterns and prehistoric human adaptation in the region. The quadrat survey conducted between 1972 and 1974 was the major subproject of the Cedar Mesa Project. Because the central Cedar Mesa region (800 sq km) was considered too large to be completely surveyed, a sampling design was used. The area was first divided into 20 watersheds or drainage units. Then, five of these watersheds (Upper Grand Gulch, Bullet, North Road, West Johns, and Hardscrabble), representing the northern and southern portions of the mesa, were randomly selected for intensive survey. Within these watersheds, a sample of 400 meter square quadrats was selected at random. A comparison of the mesa top and canyon sites was deemed
important, but only a few of the quadrats encompassed the entrenched canyons. To solve this problem, the entrenched canyons that fell into the drainage units were completely surveyed (Matson and Lipe 1975). All located sites were recorded. An attempt was made to collect all artifacts, unless the artifact distribution was dense. In this case, grid units were laid out and the artifacts were only partially collected. Some of the located sites were tested between 1972 and 1973, under the direction of Joseph Winter. In conjunction with the testing program, R.G Matson and crew excavated a test pit (140 cm deep) into the Turkey Pen site midden to obtain samples for dates and for coprolite and macrobotanical analysis.

**1974 Tree-ring and Architectural Study**

During September and October 1974, the Grand Gulch sites analyzed in this thesis were intensively mapped and recorded, and all preserved wood was cored for dendrochronological dating as part of another subproject of the Cedar Mesa Project. This consisted of a special study of Pueblo architecture primarily on sites outside the five drainage units that were the main focus of the quadrat survey. The objective of this subproject was to better understand the Pueblo occupation of the entrenched canyons. Portions of two canyons – in Grand Gulch and in McLoyds Canyon (Bloomer 1989) - were chosen for detailed architectural study because they contained several well-preserved cliff dwellings. The majority of the work was carried out in the part of Grand Gulch discussed in this thesis. Initially, the located sites within this segment of Grand Gulch were recorded using the same methods for the site recordings in the five drainages.
The final 1974 recording of the Grand Gulch sites, however, was more intensive and detailed and tree-ring samples were collected. The Grand Gulch sites were given designations, such as GG C 3-1 for the Turkey Pen site, which refers to site number 1 within the "canyon quadrat" 3 in the portion of Grand Gulch that was surveyed (see Table 1). These designations are used consistently throughout this thesis. The use of the term quadrat here should not be confused with the 400 m sq quadrats used in the formal Cedar Mesa Project quadrat survey. Each "canyon quadrat" is a 400 m sq segment of canyon, based on a North-South, East-West oriented 400 m grid. This was done to make the canyon quadrat roughly comparable to the 400 m sq quadrats used in the quadrat survey. As part of this subproject, the Moon House Complex in McLoyd's Canyon was also extensively recorded, and Bloomer (1989) provides a detailed architectural analysis from the data collected.

This fieldwork was directed by William D. Lipe and R.G. Matson, who collaborated with the Laboratory of Tree-Ring Research at the University of Arizona, with Jeffrey Dean of the Laboratory as collaborator. The crew consisted of five archaeologists, who wrote detailed descriptions of the structures and features comprising each cliff dwelling. Scaled plan view and profile maps were drawn for each well-preserved room and roomblock. Larger scaled plan view maps of the sites were also drafted. These maps are used as figures in this thesis. The crew used Lipe and Buick's (1974) written guide, which served as a checklist for recording and describing Pueblo structures, for inferring building sequences, rebuilding and remodeling, and for interpreting the function of structures. Only color slides were used to document certain architectural features, rooms, and each site, as a whole. A few small test pits were dug to
obtain certain architectural information, such as the depth of the floor fill and the height of certain features (i.e. deflector). All collections and records are currently curated at the Department of Anthropology, Washington State University.

Richard Ahlstrom collected the tree-ring samples from beams by using a tubular core sampler, attached to a ¾” power drill; the bore holes were plugged with corks. From sites within the Grand Gulch study area, a total of 385 samples were taken from all preserved roof beams, wall support beams, and beams lying on the ground near structures that showed potential for crossdating. Potentially datable wood also included door lintels, vertical poles used in jacal walls, and large pieces of charcoal. An attempt was made to sample only datable wood species, e.g., Juniperus spp., Douglas-fir (Pseudotsuga menziesii), pinyon (Pinus edulis), and ponderosa pine (Pinus ponderosa). In addition, some samples were taken from other woods, primarily cottonwood (Populus fremontii) because tree species could not always be accurately identified in the field. The provenience, the diameter, and the species of all nonsampled and sampled beams were noted (Ahlstrom et al. 1974). The field notes also documented if the beams were charred or sooted, if the beams’ large ends were axe cut, and if other characteristics, such as beetle galleries, were present. Also included in the field notes are maps (no scale) showing the position of the beams in relation to the associated structure. The locations of the beams were also drawn on the scale maps of the architectural features. The tree-ring field notes are an essential part of the 1974 architectural recording, and provided the basis for my dendrochronological analysis. Appendix B is an explanation of the symbols used by the Laboratory of Tree-ring Research.

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In addition to the 1974 architectural and tree-ring documentation, a surface collection was conducted at all the sites. All artifacts visible, except for large groundstone artifacts, on the surface within and in front of the structures on the shelter ledge were collected. An artifact or a cluster of artifacts was given a location number that was mapped. At sites with high artifact density, 10 meter square grid units were laid out and numbered, and artifacts that fell within each grid unit were collected and provenienced under that grid number. Lithics, white ware, red ware, and gray ware pottery sherds, chipped stone tools and debitage, small pieces of groundstone, faunal specimens, and other organic remains were recovered and inventoried.

1998 Fieldwork in the Grand Gulch Study Area

To familiarize myself with the sites recorded in 1974, I conducted three days of additional fieldwork in May 1998, under the direction of Dr. William D. Lipe, presently affiliated with Washington State University in Pullman. The main objective was to verify the architectural descriptions and interpretations in the 1974 field notes. Additional notes, color slides, and black-and-white photos were taken to document any changes that might have occurred since the Grand Gulch sites were observed in 1974. After comparing the 1974 architectural records and photos with the newly taken photos, I only detected a few minor modifications in the Grand Gulch architecture.
Cedar Mesa Chronology

The following discussion is a summary of the Cedar Mesa chronology that was developed and outlined by Haase (1983) and Matson et al. (1988) from field data gathered from the Cedar Mesa Project surveys of the five drainage units. Three discrete periods of Anasazi occupation of the central Cedar Mesa region, which are separated by periods of little use or abandonment, have been documented (Haase 1983; Matson et al. 1988). The three major occupational periods coincide with the 1) late Basketmaker II, 2) late Basketmaker III, and 3) late Pueblo II and Pueblo III cultural stages of the Pecos classification (Kidder 1927). The Cedar Mesa phase chronology that was developed by Haase (1983) can be applied to both the canyon and mesa top environments in the Cedar Mesa region.

The main Basketmaker II occupation is the Cedar Mesa region is represented by the Grand Gulch phase, which probably began at about A.D. 200 and ended at A.D. 400. Similar to the greater Four Corners area, this period is marked by an absence of pottery, and an abundance of one-handed manos and large side- or corner- notched projectile points. On Cedar Mesa, shallow pithouses with long, narrow slab-lined entryways are the clearest Basketmaker II signature. In some areas on the mesa top, pithouses are essentially isolated. In a recent survey by Dohm (1994), clusters of pithouses, perhaps contemporaneous, were documented indicating that late Basketmaker II pithouses possibly formed dispersed villages composed of very widely spaced dwellings. Campsites, a site type that has hearths and/or slab-lined cists but no associated pithouses, are unique to this occupation period. A third site type – limited activity sites – was found in the Basketmaker as well as later periods. The Basketmaker II occupants made use of
the dry canyon shelters for the burial of the dead, pictographs, and perhaps seasonal
habitations. Recent studies (Aasen 1984; Chisholm and Matson 1994; Matson and
Chisholm 1991) indicate that Basketmaker II reliance on maize agriculture was almost as
great as that of following periods. However, Matson et al. (1988) suggest that although
maize was an important part of their diet, Basketmaker II individuals probably still relied
on hunting and gathering as a buffer against crop failure.

The Mossbacks Phase (A.D. 650-725) follows a long hiatus and coincides with
the late Basketmaker III occupation. The clearest marker for this period is the
appearance of plain gray ware and early decorated types of ceramics. The number of
pithouses documented for this short occupation period is higher than for the previous
period. Unlike the Basketmaker II period, habitation sites, sometimes comprised of
multiple dwellings, are frequently found in close proximity on the mesa top and would
have formed dispersed villages. During this period, pithouses have also been
documented in south facing shelters in the canyons and in the open on the canyon floors.

The Mossbacks Phase is followed by a long hiatus. Unlike certain parts of the
Mesa Verde region to the east, Pueblo I and early Pueblo II (ca. A.D. 725-1060) sites are
not common in central and western Cedar Mesa, and in the Canyonlands area to the north
and the Red Rock Plateau to the west (Lipe 1970; Varien et al. 1996). However, early
Pueblo II sites have been recorded in northeast Cedar Mesa (Benson 1984) and Pueblo I
sites are known from Comb Wash (W.D. Lipe, personal communication). On the basis of
the occurrence and frequency of various ceramic types, the late Pueblo II-III occupation
has been subdivided into four phases: the Windgate (A.D. 1060-1100), Clay Hills (A.D.
1100-1150), Woodenshoe (A.D. 1165-1210), and Red House (A.D. 1210-1270). During
the Clay Hills Phase, Cedar Mesa and adjacent regions were occupied or influenced by new settlers from the Kayenta area, as evidenced by the high frequency of Kayenta ceramics dating to this period. A gap in the tree-ring dates and break in the ceramic seriation indicate a possible period of little use or abandonment in the central Cedar Mesa region between about A.D. 1150 and 1165. Tree-ring dates, gathered mostly from the canyon sites, indicate strong building periods in the early 1100s and especially in the mid-1200s.

The material culture that characterizes the late Pueblo II-III occupation period are two-handed manos and corrugated gray ware and decorated ware sherds. Architecturally, multiroom pueblo dwellings appear, but small "unit pueblos" (a row of surface rooms fronted by a kiva) are more common. The Moon House complex in McLoyd's Canyon is the largest documented multiroom pueblo in the Cedar Mesa region with 32 rooms (Bloomer 1989). It is small, however, compared to other aggregated settlements in certain areas in the larger Mesa Verde region during the 1200s (Varien at al. 1996). Most habitation sites were probably occupied by a single nuclear or small extended family. Although numerous cliff dwellings appear in the canyons, mesa top settlements continue, along with mesa top farming. Dry storage, defense of stored foods, and close proximity to reliable water sources made the canyon shelters attractive for habitation.

The archaeological data used to construct the Cedar Mesa chronology indicates roughly similar settlement patterns and population density throughout the Anasazi occupation of Cedar Mesa (Matson et al. 1988). Habitation sites were generally small, formed loose clusters and continuously occurred at higher elevations near deep soils. Population estimates for each occupational period in the Cedar Mesa Project study area,
extrapolated from the five sampled drainages, are roughly the same - approximately 1000 persons. That the loose clusters of habitation sites are located on the deep soil areas suggests a continual reliance on maize agriculture. The dispersed spatial layout within and between dwelling clusters may be related to mobile adaptive strategies associated with growing maize in the marginal Cedar Mesa environment.

The last cutting dates in tree-ring records indicate abandonment of southeastern Utah either during or shortly after the 1260s (Lipe 1995). Matson et al. (1988) used paleoenvironmental data to argue for a correlation between climatic conditions and the alternating periods of abandonment and occupation on Cedar Mesa. However, whether or not the final abandonment of the Four Corners was solely a response to environmental change is currently the subject of debate. In terms of the Grand Gulch area, arroyo cutting may have been one of the “push” factors to cause the canyon residents to move settlement elsewhere (Agenbroad 1975, Lipe 1995). However, arroyo cutting would not have affected mesa top dry farming and mesa top runoff farming, and thus does not explain the permanent abandonment of the entire Cedar Mesa region. Other “push” factors such as intracommunity conflict could have worsened the effects of drought, thereby contributing to cultural change during the 13th century in the Cedar Mesa region, as well as the greater Four Corners. Also, an attraction of the northern populations to growing communities in the south who probably shared similar religious ideologies may have also influenced population movements (Lipe 1995).
CHAPTER 3
GRAND GULCH ARCHITECTURE

Bloomer (1989) was able to distinguish three types of masonry walls at the Moon House Complex (three late thirteenth century cliff dwellings) in McLoyd’s Canyon, a drainage of eastern Cedar Mesa. These wall construction techniques are also evident in the structures within the Grand Gulch study area. This chapter summarizes Bloomer’s (1989:49-52) detailed description of the types 1, 2, and 3 masonry and also the jacal, or post-and-mud, construction, which was occasionally used as a construction technique in the study area. The use of the three masonry types as a relative dating tool to determine site construction sequences is also addressed here.

The architectural details of some structures in the Grand Gulch study area, such as the presence or absence of plaster, and roof and wall construction information, are obscured by stabilization mortar that was used to fill in large cracks of various walls. A stabilization project was funded by BLM and conducted by Utah State University around the early 1960s. The 1974 architectural description notes describe the extent of the stabilization mortar, which for the most part is easily distinguishable from the prehistoric mortar. In some cases, it was difficult to determine whether a roof beam in one of these stabilized structures was actually part of the original roof. Consequently, dating rooms based on dates from these beams becomes problematic. The extent of the stabilization is described throughout the architectural descriptions of the stabilized rooms in Chapters 5 and 6.
Masonry

In contrast with the structures at the Moon House Complex, upright sandstone slabs served as the wall foundation for not only the type 1 masonry walls, but for all three of the masonry type walls in the study area. In any case, type 1 masonry construction (exemplified in the bottom courses of Rooms H, I1, I2, J1 and J2 at Cliff Dwelling UG C23-1, Room G at Cliff Dwelling GG C12-1 and Room J at Cliff Dwelling T C1-2), has a high proportion of mud, tempered with gravel and fiber (Figures 20, 21, 29 and 35). The core of a type 1 masonry wall consists of irregular, sandstone block courses laid between thick mud courses. Copious amounts of mud cover the core sandstone courses, creating a smooth wall surface.

Type 2 masonry walls are primarily differentiated from the other types of masonry wall construction on the basis that the somewhat even courses of irregular sandstone blocks were not laid to create a smooth wall surface. The edges of the sandstone blocks protrude beyond the mud mortar, producing rough inner and outer wall surfaces. The ratio of mud to stone is variable, but generally the proportion of the wall that consists of mud and chinking is low. Type 2 masonry is generally found in the construction of curvilinear walls. Rooms B and D at Cliff Dwelling GG C3-1 are defined by a curvilinear wall and are examples of structures that are constructed entirely of type 2 masonry. Type 2 masonry was employed in the repair of the top wall courses of Rooms E and F at Cliff Dwelling GG C3-1 (Figure 23). In addition, the walls of Rooms G and H at Cliff Dwelling GG C3-1, Rooms C1, C2, C3, D2 and J at Cliff Dwelling GG C4-1, and
Rooms A, N1 and N2 at Cliff Dwelling T C1-2 are constructed of type 2 masonry (Figures 24, 26, and 30).

Determining whether a structure is constructed of type 2 or 3 masonry can be rather subjective. Basically, walls showing a greater attention to creating smooth wall surfaces are classified as type 3 masonry walls. Type 3 masonry walls are generally smooth on one side only. Mud is minimally used, but often overlaps the flat stone surfaces. The type 3 masonry can be readily distinguished from type 2 masonry when the size of the irregular sandstone blocks are relatively uniform in size and shape, the stones are well coursed, and/or rows of chinking stones are placed evenly between the coursed sandstone blocks. The majority of recorded structures in the study area are of type 3 masonry construction. The walls of Rooms G1 and G2 at Cliff Dwelling GG C13-1 typify the type 3 masonry construction technique (Figures 37 and 38). Although Room G1 has a relatively high ratio of mud to stone, both rooms are constructed of fairly even courses of small and medium sandstone blocks, laid so that their flat sides face the interior and exterior. Chinking stones, evident in the exterior, were placed in rows in some portions of the walls. Square rooms with fairly straight walls such as Rooms G1 and G2 at Cliff Dwelling GG C13-1 are often constructed of type 3 masonry.

**Jacal**

The method and use of jacal construction is consistent throughout the study area. The wall dividing Rooms G and H at Cliff Dwelling GG C3-1 (Figure 24), the wall dividing Rooms C1 and C2 at Cliff Dwelling GG C12-1 (Figure 35) and the wall

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containing the entry for Room F at GG C13-1 (Figures 37 and 38) are jacal. Remnant jacal walls were incorporated into the later constructed masonry walls of Rooms C2 and C3 at Cliff Dwelling GG C2-1 (Figure 39) and of Room G at Cliff Dwelling GG C9-1 (Figure 32). Building a jacal wall first involved setting vertical posts evenly apart (10-13 cm in diameter) into the ground to create a frame for the wall. Then, vertical branches were placed in between the support posts until the space between the vertical posts was completely filled. Series of paired horizontal branches, approximately 50 cm apart and held together by strings of yucca leaf, were used to keep the vertical branches in place. The stick wall was packed with large amounts of mud on both sides; however, only the outer side of the jacal wall containing the entry to Room F at GG C13-1 was covered with mud. One vertical post from the jacal wall of Room F at GG C13-1 yielded a tree-ring date of 1132+B.

**Masonry Types as a Relative Dating Tool**

Bloomer (1989:53-55) was able to determine the approximate dates for the three masonry construction techniques at the Moon House Complex based on construction sequences and associated tree-ring dates. He found that the type 1 masonry technique preceded the use of both the type 2 and type 3 masonry techniques, and it dated no later than the middle A.D. 1240s. He also concluded that masonry types 2 and 3 were used concurrently during the late A.D. 1240s and early A.D. 1250s, since rooms dating to this last construction period were constructed of both types. Nothing in the architectural data
at the Moon House Complex indicated that the cruder type 2 masonry definitely predated the type 3 masonry.

In the Grand Gulch study area, the chronological relationships that Bloomer (1989) established between the three masonry types are also evident. The type 1 masonry is only found in the lower courses of Rooms H, I1, I2, J1, and J2 at Cliff Dwelling UGG C23-1, Room G at Cliff Dwelling GG C12-1, and Room J at Cliff Dwelling T C1-2. Smooth faced type 3 masonry was later used to remodel and reconstruct these type 1 walls. There is no datable wood associated with the type 1 masonry. The lower segments of the walls of Rooms A and B at GG C8-3 are uniquely constructed. Large upright sandstone slabs were set in pairs creating double upright slab walls. Mud was used to fill in the space between the outer and inner slabs. This slab and mud construction may have been used concurrent with or before type 1 masonry. Room B at GG C8-3 was rebuilt with coursed type 3 masonry. A log wall support for Room B yielded a tree-ring date of 964++vv, indicating the slab and mud wall construction is later than A.D. 964.

A construction technique that possibly dates as early as the Basketmaker III Period is evident in the lower courses of extant structures at Cliff Dwelling T C3-2 (William D. Lipe, personal communication). Upright slabs form the base and are set with large quantities of mud tempered with fiber.

On the basis of wall construction sequences, both masonry types 2 and 3 appear to have been used concurrently. The abutment of type 2 masonry Room D2 to type 3 masonry Room D1 at Cliff Dwelling GG C4-1 indicates that the type 2 masonry may postdate the type 3 masonry in the study area. However, the cruder type 2 masonry was
used to repair the smooth faced type 3 walls of Room E and F at Cliff Dwelling GG C3-1. Hence, the type 2 masonry was probably used at the same time as the type 3 masonry. A tree-ring date for Room B at Cliff Dwelling GG C3-1 indicates its type 2 masonry post dates A.D. 1181. All the structures directly dating to the mid-A.D. 1200s were built with the type 3 masonry technique. Room E at Cliff Dwelling GG C13-1, tree-ring dated to the early A.D. 1120s, is the earliest type 3 masonry room. Therefore, the type 3 masonry construction was perhaps continually used throughout the late Pueblo II and Pueblo III occupation of the study area.

Apparently, the chronological relationships between the three masonry types in the study area correspond to the order of the masonry types at the Moon House Complex. The type 1 masonry was used prior to the contemporaneous 2 and 3 masonry types, but the time range for its use cannot be determined. The use of type 1 masonry was most likely confined to the late Pueblo II period but types 2 and 3 might also have begun to be used during that period. The existing overlap between the type 2 and 3 masonry techniques indicates that the spatial variability of architectural design may not be attributed to a change in construction techniques over time.

Bloomer (1989) followed McGuire and Schiffer’s (1983) model to explain variability in architectural design through time at Moon House. On the basis that architectural design is influenced by the utilitarian, social and ideological demands of a social group, McGuire and Schiffer proposed that the resulting architectural feature will tend to satisfy these requirements. As a result, a compromise is made between the goals of production, use and maintenance because all these goals cannot be optimized. For example, minimizing the energy expended in manufacturing a structure will raise the cost
of maintaining it. The change in construction techniques over time (from type 1 masonry to types 2 and 3 masonry), evident in the structures at Moon House and in the Grand Gulch study area, involved maximizing the cost of the production process. Bloomer interpreted the increase in the uselife of dwellings over time as signifying a decrease in residential mobility, whether year round or seasonal occupation. I agree with Bloomer, but the spatial variability of architectural design evident in the study area may also relate to mobility at the household level (McGuire and Schiffer 1983). Households in the study area were most likely economically independent social units, and thus organized the construction of their separate dwellings. If households moved within and between communities, how each household would strike a compromise between maintenance and production costs would vary, thereby creating spatial differences in architectural design (McGuire and Schiffer 1983). Therefore, the varying mobility of households may be an explanation for why types 2 and 3 masonry construction techniques were employed contemporaneously in the study area.
CHAPTER 4

DETERMINING THE USE OF ARCHITECTURAL SPACES

Since the middle 19th century, when organized excavations and extensive reconnaissance surveys in the Southwest began, there has been an interest in the function of Pueblo rooms and the activities performed in them (Lipe and Hegmon 1989). The abundance of visible and well-preserved Puebloan sites in the arid Southwest influenced archaeologists to consider the social organization of people who lived in them. Further, the present-day native peoples of the region provided clear modern analogs for the determination of both room use and social organization (Cordell 1997). Unfortunately, contemporary Pueblo cultures were sometimes too heavily relied upon as models for determining prehistoric room use (e.g. Fewkes 1909) and social organization (e.g. Prudden 1903, 1914; Steward 1937). More recently, archaeological investigations of social organization have focused on the cross-culturally pervasive social units termed households (Adams 1983; Dean 1969; Hill 1968, 1970; Lightfoot 1994; Lowell 1988, 1991; Rohn 1965, 1971), the fundamental building blocks of prehistoric as well as modern Puebloan communities.

In the section below, I briefly review the various approaches for the determination of use of domestic architectural spaces that are associated with prehistoric Pueblo households. Much attention is given to the function of Pueblo II and III kivas and to the question of what level of social unit utilized these structures. I then focus on archaeological investigations of Pueblo III room use in the Mesa Verde and Kayenta
regions to illustrate how the function of certain architectural spaces (e.g. kivas) and prehistoric household organization in the Southwest varies by region.

**Archaeological Correlates of Households**

Public architecture (e.g. great kivas, biwall and triwall structures, great houses, and roads) consists of “structures or features that required organized, suprathousehold labor to construct and facilities interpreted to have functioned as community integrative structures” (Varien et al. 1996: 89). Using this definition, examples of public architecture have not been identified in the Grand Gulch study area. Only domestic architectural spaces or structures that did not contain suprathousehold activities are present. Shared household activities take place in houses or dwellings, “the physical structures associated with households” (Lowell 1991:22). Some activities that are repeatedly performed at the household level and are reflected in the archaeological record include cooking, food processing (grinding), sharing of resources (storage), and sheltering from the elements (Netting et al. 1984: xxii). Isolating these household units in archaeological contexts is a challenge, but a prerequisite for inferring household organization and function (Lipe and Hegmon 1989; Lowell 1988, 1991). Whether or not dwellings are contiguous, the development of functional typologies of rooms becomes crucial for clarifying the spatial configuration of dwellings and thus how interactions between the occupants were structured (Lowell 1988, 1991).

At the turn of the century, architectural studies of the historic and prehistoric pueblos of the Hopi and Zuni areas (Mindeleff 1891) defined three basic use categories
for domestic architectural spaces: (1) habitation, or domestic, rooms; (2) storage rooms; and (3) religious, or ceremonial, rooms. Archaeologists continually relied on these early descriptions of historical pueblos for their typological analyses of rooms (Ciolek-Torrello 1985). For example, Hill (1968, 1970) also identified these three major room types at Broken K Pueblo in east-central Arizona, primarily on the basis of size and other gross architectural features. According to Hill (1970: 48-54), storage rooms, which were for storage of food and nonfood items, were small and lacked distinctive architectural features. Habitation rooms were larger rooms that contained firepits, mealng (corn grinding) bins, and ventilators. Hill (1970) considered kivas, large subterranean rooms with unique architectural features such as benches, loom holes, and sipapus, to be ceremonial rooms. Hill (1968, 1970) checked these three functional types against artifact and ecofact data. However, he has been criticized for not examining the remains of each room individually before combining their contents with rooms of the same functional type to demonstrate a significant relationship between his functional types and the remains of activities that would have taken place in them (Ciolek-Torrello 1985).

Dean (1969:27-33), in his architectural study of the Tsegi Phase Kayenta cliff dwellings in northeastern Arizona, noted more structural variability among domestic architectural spaces than is represented by the traditional classification; he added granary and grinding rooms to his functional room typology. The granary room type was distinguished from storerooms on the basis of sealability-characteristics such as careful wall construction and doorways grooved to seat a stone-slab door. Dean (1969) defined the grinding room type as unroofed rooms containing sets of metates that are associated with household units. Rohn (1971:84) identified an additional room type at Mug House:
the “kihu” or special ceremonial chamber, which exhibited an unusual combination of features not found in kivas or domestic rooms. In his ethnoarchaeological study at Walpi, Adams (1983:49) recognized two more architecturally distinct rooms associated with some households: religious storage rooms and piki houses. Although the religious paraphernalia stored within the religious storage rooms are the responsibility of a particular individual or family, they are used by a larger social unit. These studies indicate that variability in room use and function existed not only among prehistoric pueblos, but also between historic pueblos and prehistoric pueblos.

Pursuing an analysis of room function is a first step towards identifying social units, such as the household. Assigning a room to a particular category can be especially problematic when remodeling and repair have changed the structural form of an architectural feature (Sullivan 1974). Substantial structural changes often result from a change of use or function of an architectural feature (see Bloomer 1989); however, a structural change is not always indicative of a functional change. In any case, recognizing that a room was remodeled is essential for differentiating between 3 different modes of structure use: 1) the “primary intended use”; 2) the “primary actual use”; and 3) the “last intended use” (Lipe and Hegmon 1989:17).

Although architecture can be an important source of information about how prehistoric societies thought about and organized space, there are limits as well. Architecture is more static than and harder to change than are artifact assemblages, so short-term changes in household organization may not be evidenced in the form of a structure. Therefore, inferences about intended or actual use based on architecture should ideally be tested against other evidence, such as the distribution of features and artifacts.
on floor, which may be more readily reflect changes in activity organization and structure use.

Lightfoot's (1994) ambitious analysis of Pueblo I household organization and activities at the Duckfoot site is an excellent case study for this method. Lightfoot first used architectural data such as structure form, spatial arrangement of structures, bondabutment sequences and tree-ring dates from building timbers to make inferences about household organization at Duckfoot. Then, he tested his architectural interpretation with a multivariate analysis, which involved the spatial patterning of floor-associated artifact and feature assemblages. Under the assumption that every household performs the same set of activities day after day, he was able to find patterns in the remnants of these activities to infer household boundaries. His conclusions about household organization were strengthened by his studies of abandonment and preabandonment formation processes. That is, Lightfoot understood the formation processes at Duckfoot before inferring activities and activity locations from the features and artifacts. Unfortunately, not all sites are as well-preserved or as well-studied as the Duckfoot site. In many cases, architectural remnants are the only available data in the archaeological record for determining room use.

The classification of structures into discrete functional types based on archaeological evidence does not preclude the possibility that architectural spaces were multifunctional. Furthermore, these classifications do not eliminate the possibility that the use of structures may have changed seasonally. For example, after his analysis of architectural form, artifacts, and features at Duckfoot, Lightfoot (1994) concluded that the primary use of the pit structures changed seasonally. According to Lightfoot, the pit
structures were the loci for domestic and ritual activities during the winter months, but
the surface rooms were primary residences during the warm months.

**Room Size and Room Function**

In most archaeological studies of room use, room size has been found to be
closely related to room function (Adams 1983; Dean 1969; Hill 1970; Jorgensen 1975;
Lightfoot 1994; Lowell 1991; Sullivan 1974). Many explanations have been put forth to
explain the relationship between room use and size. Hill (1970) argued that only certain
types of activities (e.g. storage) were suitable for very small rooms (e.g. storage rooms).
In addition, Hill assumed that the largest rooms were used for ceremonial purposes since
more space was required for ceremonial activities that involved several people.

In her population study of historic period Pueblos and of 19th and 20th century
Navaho settlements, Dohm (1990) proposed some factors determining the size and
possibly the shape of dwellings. First, she found that dwelling size, measured by number
of rooms and roofed area per household, is strongly correlated with Pueblo villages
having both large populations and high population densities. That is, with increasing
architectural aggregation, relatively more activities are conducted indoors and dwelling
space per household in villages increases. Dohm tied this relationship to the need for
privacy and other social psychological requirements. Rooms, according to Dohm, are
sometimes subdivided in order to satisfy individual space requirements. As a result, the
number of rooms in a house increases while room size decreases. Dohm attributed small
Pueblo house floor areas to the presence of outdoor private areas, which are more likely
to occur when houses are more dispersed. Also, dwellings may be proportionately smaller in warm climates, where activities can be performed outdoors rather than in enclosed spaces. Although Dohm’s study did not deal directly with room typologies, she offered explanations for why a considerable overlap in the range of size between room types may exist between and within pueblos.

Adams (1983), using his architectural data at the modern Hopi village of Walpi, found that room size was a reliable criterion for determining room use. He found that religious rooms were substantially larger than habitation rooms, which in turn were larger than storage rooms. He argued that religious rooms were larger, since certain activities involving several people were held there. In the case of two-story structures, however, Adams found that room story location was a better determinant for room function rather than size, since the floor area of both rooms were of equal size. In general, the lower rooms were used primarily for storage while the upper rooms were habitations.

Jorgensen (1975) used a multivariate approach at Table Rock Pueblo in east-central Arizona, involving factor analysis of artifact and room feature distributions of 42 excavated rooms. Her results indicated a relationship between room use and size. However, she assumed that the only source of variability in the floor assemblages was room use, and that her assemblages were only of de facto refuse and had a “Pompeii-like” character (Schiffer 1985, 1987).

Sullivan (1974) found room size of a small sample of rooms at Grasshopper Pueblo to be closely related to room function as in other pueblos. Ciolek-Torrello (1985), however, offered a contrasting view based on his factor analysis of artifacts and feature associations in structures at Grasshopper Pueblo. He argued that extensive remodeling at
Grasshopper distorted the relationship between room size and function. For this reason, he did not use architectural characteristics to define his 6 functional room types. Although he tried to determine the effect of formation processes on the distribution of floor assemblages, he made inferences about room use before understanding the formation processes involved. By disregarding the usefulness of architectural features for making functional interpretations, Ciolek-Torrello failed to uncover the intended uses of structures. Instead, his analysis was limited to the interpretation of the last uses of the rooms (Lipe and Hegmon 1989:19).

In his architectural study of the NAN Ranch Ruin in the Mimbres River Valley, Shafer (1982) found that room size alone could not be a reliable predictor for room use. After determining the household units from data on architectural construction sequences, he found a significant overlap of room size between the different room types. He attributed the size variability to differences in household size, the availability of building materials, and the social status of the household.

The Function of Pueblo II and Pueblo III Kivas

Recently, the function of kivas in Pueblo II and Pueblo III settlements has been reevaluated (Cater and Chenault 1988; Lekson 1988; Lipe 1989), thereby influencing the ways in which archaeologists interpret Pueblo II and Pueblo III household organization, particularly in the Mesa Verde region. Early Southwestern archaeologists recognized a structural difference between Pueblo I subterranean structures ("protokivas") and Pueblo II and Pueblo III underground structures ("kivas") in southwestern Colorado and
southeastern Utah (e.g. Brew 1946; Smith 1952). At Alkali Ridge, Brew noted the
general structural differences between the Pueblo I and later Pueblo subterranean
structures:

The Pueblo II kiva, after the installation of bench and pilaster, presented a quite different appearance from
that of the earlier pit houses.... The removal of domiciliary functions had, so to speak, cleared the floor. In
most of the Pueblo II and Pueblo III kivas the only permanent features on or in the floor were the deflector
and the firepit, with sometimes the addition of a sipapu.... The bewildering mass of pits, basins, and other
holes, characteristic of pit house floors, had disappeared (1946:211).

Brew assumed that the pithouse to kiva transition signified a change in function of
the subterranean structures. Although Brew (1946:207) emphasized the primary ritual
function of Pueblo II and Pueblo III kivas, he maintained that these structures retained
some domestic functions. Brew, unlike other archaeologists of the time (e.g. Fewkes
1909), noted that even the kivas of the modern Hopis were not reserved exclusively for
ceremonial activities. Until recently, the pithouse-to-kiva transition was believed to
represent an evolutionary event of Anasazi culture that marked the emergence of the kiva
as a specialized ceremonial structure, similar to those found in modern Pueblos. In fact,
the use of the term "protokiva" for Pueblo I pit structures reflects an underlying
assumption that Pueblo II and Pueblo III pit structures were the first "true kivas" or
specialized ceremonial structures that provided religious integration for households
(Lekson 1988). In addition, this change in structural form of the underground structures
suggested to some archaeologists the completion of the shift to surface room domiciles.
These assumptions about the function of Pueblo II and Pueblo III kivas have affected the
ways in which archaeologists have conceptualized Pueblo II and Pueblo III household organization, especially in the Mesa Verde area.

On the basis of ethnographic data collected among the modern Hopis (Mindeleff 1891: 129-133), early archaeologists inferred that Pueblo II and Pueblo III kivas served as the loci for male activities such as weaving and tool manufacture:

In the long winter the kivas served as the lounging places for the men who were engaged in an almost constant round of ceremonies of dramatic character, which took the place of the pleasures of the chase (Fewkes 1909:53).

After examining the spatial distribution of material remains at the Ute Canyon site, Gillespie (1976:183) concluded that throughout the Pueblo I period, pit structures revealed evidence of a wide range of domestic activities such as cooking, eating, and storage. By Pueblo II, the pit structures, now kivas, were the loci of only ceremonial activities and the activities of males such as eating, water storage, and the manufacturing of hunting equipment and clothing. Furthermore, women’s activities, at least during the winter, were now confined to the outdoors and surface structures. How Gillespie was able to determine which material remains were products of males is unclear. Moreover, why he attributed the presence of a milling bin in one of the Pueblo II kivas to ceremonial behavior rather than domestic activity is also left unexplained.

Recent papers have suggested that Pueblo II and Pueblo III kivas were utilized for selected domestic purposes as well as for ceremonial activities (Cater and Chenault 1988; Lipe 1989; Lipe and Hegmon 1989). Lekson (1988, 1989) and Cater and Chenault (1988) argued that Pueblo ceremonial architecture in the northern Southwest, similar in
form and function to the historic Pueblo ceremonial structures, did not appear until after Pueblo III. That ceremonial activities were limited to the kivas and domestic activities were confined to the surface structures after the pithouse-to-pueblo transition around A.D. 900 is not archaeologically evident (Cater and Chenault 1988). Lekson (1988:214) argued that during Pueblo I through Pueblo III, pitstructures were “probably not really kivas in any meaningful, functional sense, but were, instead, domestic pitstructures”. In other words, although there was a change in form, the function of the pitstructures remained the same. Lipe (1989) essentially agreed with Lekson’s arguments, except Lipe proposed that the small Pueblo I-III Mesa Verde protokivas and kivas were used for both ceremonial and habitation purposes. Mesa Verde protokivas and kivas display architectural and floor features, such as sipapus and roof entries, suggestive of ritual and symbolic functions that are related to modern Pueblo myths regarding an emergence from the underworld (Lipe 1989). Similarly, Varien and Lightfoot (1989) argue that Pueblo I pit structures at Duckfoot, although considered the main habitations, contain evidence for ritual activities not present in the surface habitation rooms. In any case, if Pueblo I-III “protokivas” and “kivas” are analogous to earlier pit structures in function, then it should follow that domestic activities as well as ritual activities took place within the kivas for at least part of the year.

Although the form of pit structures changed, they still would be thermally advantageous during the winter months (Cater and Chenault 1988, Lekson 1988). Farwell (1981) compared the insulation of underground structures to surface structures of 52 archaeological sites in New Mexico. She concluded that subterranean structures required less energy to heat since heat is stored longer in underground structures. For this
reason, it would be advantageous to live in subterranean structures at high elevations and in narrow canyons where the channeling of heavy winds and cold air creates a cold and highly variable winter climatic regime. In light of Farwell’s study, it seems highly unlikely that women would be excluded from pit structures, especially during the winter months.

Several lines of evidence have been used to counter the widely accepted view that the appearance of the characteristics of kiva architecture marks a functional change from residential pithouses to specialized ceremonial rooms. First, room-to-kiva ratios are indicative of the scale of social unit that used a kiva, such as a household or village. Lekson (1988) argued that a low room-to-kiva ratio suggests that the kivas were not used to integrate the inhabitants of a community. For example, the room-to-kiva ratios on Mesa Verde are approximately 10 to 1 (Lekson 1988). Assuming each 10-room unit (habitation and storage rooms) is an individual house, then it follows that the kivas did not function as village integrative architectural units. Lipe (1989) following Steward (1937) looked at the spatial patterning of kivas and surface rooms of Pueblo I through Pueblo III sites in the central Mesa Verde area as well as Pueblo IV and historic sites in the Eastern and Western Pueblo areas. He noted that the room-to-kiva ratio was strikingly lower for Pueblo I, II, and III sites than for the Pueblo IV and historic sites. Hence, Lipe agreed with Lekson’s conclusions that the kivas generally did not integrate suprahousehold groups before A.D. 1300.

Second, the spatial distribution of milling bins has been used as additional supporting evidence for domestic use of Pueblo II and Pueblo III kivas (Cater and Chenault 1988). Milling bins are found in kivas at several sites at Mesa Verde. For
example, Cater and Chenault (1988) noted metates and milling bins were found sitting on
the floor in Kiva C, on the roof of Kiva F, and in the southeastern quadrant of Kiva D at
Mug House. In addition to their list, the plan view map at Mug House (Rohn 1971: 39)
also shows several metates on the floor of Room 29, which is connected to Kiva B by a
tunnel. Although Hayes and Lancaster’s (1975) excavation report of the Badger House
avoided a consideration of room use and social organization, Cater and Chenault (1988)
noted the presence of a possible milling bin located in Kiva B at this site.

Finally, the distribution of hearth and/or fire blackening within a site can lend
support to the argument that the kivas were the primary dwellings for households at least
during the colder months (Fiero 1998). Indeed, at Spruce Tree House, Fewkes (1909)
noted that most of the hearths were located in the courtyards and kivas. He argued that
poor ventilation of the surface rooms would have prevented the occupants from
remaining in the dwellings if a fire was burning. The distribution of hearths at Spruce
Tree House presents a contradiction to Fewkes’ functional interpretation of the Spruce
Tree House kivas. If kivas were in fact reserved for ceremonial and male activities and
the surface rooms were the primary residential units, then why were the surface rooms
not constructed to facilitate fire burning? That the primary residences were the surface
rooms during the summer and the kivas during the winter is a more plausible
interpretation.
Previous Work on Household Organization

A review of a few of the most influential studies of Pueblo III household organization is presented below, keeping in mind the continuing debate on kiva use. Sites in the Mesa Verde area have a low room to kiva ratio, which suggests that each kiva was used by one or two households rather than the entire village. On the contrary, this low room to kiva ratio is not evident in the Kayenta and Mogollon regions. Hence, the kivas in these areas may have functioned to integrate social segments above the household level. Since the number and configuration of kivas in these areas are somewhat similar to historic and modern pueblos, perhaps Adams’ ethnoarchaeological study of Walpi (1983), as well as Mindeleff’s work (1891) would be particularly helpful for making inferences about room use and social organization in these areas.

From architectural data at Mug House, a well-preserved Mesa Verde Pueblo III cliff dwelling, Rohn (1971:37) defined households at Mug House as groups of related individuals that performed activities together such as preparing and consuming food and sleeping. Rohn’s (1965, 1971) site reports, products of the Wetherill Mesa Project, were a pioneering attempt for conceptualizing socioeconomic groups as they are perceived in the archaeological record. Rohn did not attempt to project specific kin groupings such as family, lineage or clan onto the architectural units. Instead, he focused on the groupings that could be recognized from archaeological evidence of co-residence or frequent cooperative interaction. At Mug House, Rohn recognized 3 architectural units and their corresponding social (behavioral) groups: room suites (household units), courtyard units, and villages (the community).
The consistent grouping of storage chambers with living rooms at Mug House allowed Rohn to single out the household suites. Also, construction sequences and the interconnectivity of rooms by means of doorways were used to infer different levels of social interaction and hence the architectural correlates for each household and the other social groups. Each architectural suite, which consisted of 4 to 5 rooms and an outdoor area with a hearth, was occupied by a single household. Rohn determined room types primarily on the basis of size, but also on a combination of floor and wall features. For example, the largest room with a hearth in the center of a household unit was inferred to have served as a living room. The smaller rooms without fire blackening were identified as storerooms and/or sleeping rooms for children. The rooms in which Rohn referred to as “smaller storage spaces” are actually small granaries.

Rohn did not infer what type of social group occupied the courtyard units. Courtyard units consisted of a cluster of rooms that open onto a common courtyard. In some cases, one room suite is equivalent to a courtyard unit, so one household could have occupied a courtyard unit. Perhaps the other courtyard units that are formed by two or more room suites were occupied by extended-family-type households.

The Mug House community consisted of Mug House, the focal point of the community, and contemporaneous dwellings that were close enough to have had day-to-day interaction with the Mug House occupants. He also noted a possible dual division of the Mug House community, on the basis of walls that would have restricted access between the two segments, and the difference in kiva styles between the kivas in the north segment and the kivas in the south segment. He found an analog for this dual
division in the house arrangement in several Rio Grande villages and in the two-kiva system of the Tewa and eastern Keres.

Rohn (1971:67) identified the Mug House kivas as "primarily ceremonial" structures, similar in function to historic Pueblo kivas. Although he included kivas in several room suites, he did not infer what type of household activities, if any, took place in the kivas. As in other Pueblo III cliff dwellings on the Mesa Verde proper, the room to kiva ratio is 10:1 at Mug House. Following Lekson's (1988) argument, this low ratio suggests that it is unlikely that the kivas at Mug House served to integrate the entire village. That the Mug House kiva probably had domiciliary functions as well as special ceremonial purposes is a more tenable inference.

In more recent architectural analysis of a Pueblo III Mesa Verde cliff dwelling, Fiero (1998) suggested that the kivas at Balcony House were used as more than just specialized ceremonial structures for two reasons. First, heavy smoke blackening on the walls and roofs of kivas indicated intensive use. Second, ceramic vessels, manos, and metates, deposits probably resulting from domestic activities, were found in the kivas. With a kiva to room ratio of 1:15 compared to the usual ratio of 1:10 on Chapin Mesa, Balcony House is unusual for a Mesa Verde cliff dwelling. However, Fiero's plan view map (1998:123) of the construction history of Balcony House indicates that when Balcony House was first constructed during the A.D. 1250s, there were approximately 7 surface rooms to 2 kivas. The number of kivas did not increase with the addition of approximately 31 surface rooms resulting from the immigration of different social groups into the village (Parks and Dean 1998). Unfortunately, how the function of the two kivas changed after the "political transition between small-site family organization and large-
site suprafamilial integration” (Parks and Dean 1998:12) was not explored. Perhaps the kivas, like the North Plaza, were primarily used for integrative ceremonial purposes during the site’s last occupation.

Few surface rooms at Balcony House contain a hearth, and the most intensive smoke blackening on the site is in the refuse area located in the back of the alcove behind a roomblock. This enclosed part of the alcove, in addition to the kivas, may have also provided the inhabitants an efficient means to stay warm during the colder months (Fiero 1998). The many surface rooms that lack interior features could, as Rohn suggested, have been used for storage or sleeping during the warmer months. Fiero (1998) noted that the primary function of rooms at Balcony House most likely frequently changed during the time the rooms were used.

Unlike Mug House and other typical Mesa Verde cliff dwellings, Balcony House does not have distinguishable room blocks or clusters containing all four of the identified functional types: (1) living rooms, (2) storage rooms, (3) milling rooms, and (4) ceremonial rooms (kivas) and spaces (plazas) (Parks and Dean 1998). This factor, along with an unclear distinction between living rooms and storage rooms, posed a challenge for distinguishing household architectural complexes at Balcony House. Nevertheless, Fiero (1998) was able to demarcate 4 room suites (household units) on the basis of which rooms had interconnecting doorways or were mutually accessible. Some room suites were combined into courtyard units since they were organized around a single courtyard or open space and kiva. Fiero (1998) did not infer which type of social unit corresponded with the courtyard unit. Parks and Dean (1998) argue for a dual division at Balcony House; the construction of the retaining wall during the 1270s partitioned the site into 2
sections. This compartmentalization of the courtyard units possibly reflects a change in the types of social groups living side by side at Balcony House (Parks and Dean 1998).

At Betatakin and Kiet Siel, late Pueblo III period cliff dwellings in Tsegi Canyon, northeastern Arizona, Dean (1969) relied on architecture and tree-ring dating to define social groupings. Dean followed Rohn’s approach of using socially distinct architectural spaces to delineate social units at the Tsegi Phase sites, and found an architectural configuration similar to that of Mug House, but with fewer kivas. Hence, Dean suggested that a single-family household occupied a room cluster (equivalent to a “room suite” at Mesa Verde), that generally consisted of at least one living room, one or more storage rooms, and one or more granaries. Because most room clusters had more than one living room and dwellings had been added to extant room clusters, Dean concluded that extended family households occupied the Tsegi Phase sites. In only a few cases, two or more room clusters were associated with or located around a courtyard, which Dean called courtyard complexes. Because more than one room cluster formed the courtyard complexes, he inferred that the courtyard complexes were occupied by multiple-family households. An architectural unit that corresponded to a social unit between the extended family type of household and the village could not be determined. As a result, Dean (1969:38) inferred that if lineages resembling Hopi matrilineal lineages were present during the Tsegi Phase, they must have been nonlocalized.

Unlike Mug House and other Mesa Verde cliff dwellings, Dean (1969) found that the Tsegi Phase kivas were not associated with any room clusters or courtyard complexes, and had a much greater degree of structural variability. Since kivas could not be linked with subvillage level residence units, Dean (1969:38-39) proposed that kiva
membership crosscut household units and may have served to strengthen village integration. Hence, the Tsegi Phase kivas probably served primarily as integrative, ceremonial structures like those in the Western Pueblos, but unlike those in Mesa Verde during the Pueblo III period, which are structurally associated with sub-village architectural units. The lack of great kivas in Tsegi Canyon led Dean to conclude that there was no formalized intervillage ceremonial organization that would serve to integrate the occupants of the different villages.

Functional Room Typology

Few classifications encompass the full range of variability between rooms. However, using a traditional or narrow classification enables archaeologists to work with a broad conceptual framework for interpreting prehistoric household organization. The typological variables used in this analysis to determine at least the primary intended use of the architectural spaces at the Grand Gulch sites were drawn from Dean’s (1969:26-39) variables, also used by Bloomer (1989) in his architectural analysis of the Moon House Complex. Table 2 shows the criteria used to define four different structure use classes at the Grand Gulch study area: 1) granaries; 2) general storage; 3) habitation; and 4) kiva. A structure was assigned to a certain functional type on the basis of a combination of attributes. For example, a subterranean structure with a cribbed roof, roof entry and bench would be identified as a kiva, even though pilasters or wall niches were not present. None of the rooms were excavated, so floor features such as hearths were seldom used to determine the primary intended use of a room. Hence, the visible
Table 2. Typological Variables Used for Interpreting Room Function.

<table>
<thead>
<tr>
<th>Use Class</th>
<th>Distinctive Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granaries</td>
<td>Absence of soot on the interior walls; Entries small and short; entry sills are 1 to 3 feet above the ground; when habitations are remodeled into granaries, the bottom part of the original entry is sealed to raise the sill; door jambs, sill, and lintel are usually grooved to seat a sandstone slab door, or mud coping is present; plaster usually not present on the interior wall surfaces; small door stoop is commonly located just outside the entry and level with the entry sill; no floor features; walls usually not constructed of jachal; wall pegs (pot hangers) common on interior walls; loop holes can occur on either side of an entry.</td>
</tr>
<tr>
<td>General Storage Rooms</td>
<td>Absence of features designed to seal the structure from the outside; absence of soot; often rooms that cannot be positively identified as a granary type of storage room, but lack habitation features (e.g. sooted and plastered interior walls), are called general storage rooms.</td>
</tr>
<tr>
<td>Habitation Rooms</td>
<td>Entry relatively low silled, tall, and large; roof entry sometimes present or inferred; doorway sometimes T-shaped and commonly lacks characteristics of granary entries; hearth, deflector and/or ventilator may be present; interior walls generally sooted and sometimes plastered; shelves and/or niches may be present; jachal wall, if present, usually contains entry; usually not subterranean or double-walled.</td>
</tr>
<tr>
<td>Kivas</td>
<td>Generally circular or keyhole shaped with a southern recess; often subterranean or double wall construction; commonly have benches and pilasters; cribbed roof sometimes is present; roof entry usually present or inferred; hearth and/or sooted interior walls generally present; interior walls often plastered; wall niches common.</td>
</tr>
</tbody>
</table>
architectural characteristics were more frequently used in this functional room typology. Often, at least one habitation room and one or more granary or general storage room will be contiguous, forming a room cluster.

**Room Size and Room Function in the Grand Gulch**

Room size was not used as one of the criteria in my assignment of rooms to different types (Table 2). A slight correlation is evident between room size and the use class of structures at Grand Gulch (Figures 17 and 18). Hence, although room size (floor area) can be a product of technological and cultural factors, room function may account for some of the variability in room sizes at Grand Gulch. In general, the rooms of different uses do differ in size, but there is also a significant overlap in size between rooms of different functions. All the rooms measuring between 1.0 and 3.0 sq m have been interpreted as granaries or as general storage rooms. Rooms in this size class appear to have been utilized for only a limited number of activities (primarily storage). However, as indicated in Figures 17 and 18, granaries and general storage rooms can be as large as habitation rooms and kivas, and may have been multifunctional throughout the course of their use lives. Hence, room size alone cannot be considered a distinctive characteristic for granaries and general storage rooms. Size, however, may be used as a criterion for these use classes in the case of very small rooms that could not have been used for domestic purposes. Another complicating factor: floor area is not necessarily a good indicator of usable space in many structures, which may have very low ceilings.
Figure 17. Frequency of room types by room area. Rooms with an uncertain function and/or estimated floor area were not included in the graph (see Appendix A).
Figure 18. Histogram comparing room area for four room types. Rooms with an uncertain function and/or estimated floor area were not included in the graph (see Appendix A).
because they are built under ledges or sloping cliff walls. Hence, some storage structures with large floor areas may have low total enclosed volume.

The smallest habitation room at Grand Gulch is 4.1 sq m. The smallest habitation room at Moon House is also 4.1 sq m (Bloomer 1989: 177). Apparently, the type of domestic activities that took place in these rooms required at least this amount of space. The majority of habitation rooms in Grand Gulch are between 7.1 and 9.0 sq m, but Grand Gulch kivas vary more in size, ranging from 5.5 to 17.0 sq m. Formal Mesa Verde style kivas (keyhole-shaped with an encircling bench and 6 pilasters) dominate the largest size class (15.1-17.0 sq m). This size variation among Grand Gulch kivas suggests that they may have been used differently and that the size of the one or several households who used them also varied.

**The Function of Kivas in the Grand Gulch**

Although the term “kiva” traditionally implies that Pueblo II and III pit structures were socially integrative facilities used primarily for ritual or ceremonial activities, it is designated as a separate room type in this analysis only in terms of its structural differences. A combination of certain architectural features distinguishes Grand Gulch kivas from habitation rooms on a structural level. Whether the structural differences between the two “use classes” indicate a functional difference is discussed below. Based on room counts and floor area measurements, I propose that the Grand Gulch kiva was the central and most important room in a household. The more generic label, “pit structure”, is not applicable since not all of the Grand Gulch kivas are subterranean.
Following Lekson (1988) and Lipe (1989), I use the Grand Gulch room-to-kiva ratio to argue that the Grand Gulch kivas did not serve to integrate large social groups, but instead were used by one or two households for ritual, as well as domestic activities. Most likely, ritual and domestic activities were not confined to the kivas. A low room to kiva ratio of approximately 8:1 (8 surface rooms to 1 kiva) for the Grand Gulch study area is comparable to the Pueblo III room to kiva ratios in the larger Mesa Verde region (see Lipe 1989: Table 1). This ratio was calculated by combining all the rooms from all the Grand Gulch sites used in this analysis (Table 3). The ratio of room area to kiva area (approximately 3:1 m²) is also low, indicating that about one third of roofed floor area in the study area is kiva floor area. A large proportion of the total floor area for all the Grand Gulch rooms is granary floor area. Granaries were most likely not enclosed living areas. Hence, considerably more than a third of roofed floor area in the study area that was used as living space was kiva floor area.

Nineteen of the 21 kivas either have extant attached surface rooms or have immediately adjacent surface rooms. Fourteen kivas are in close proximity to three or fewer (1-3) granaries and general storage rooms. Five kivas are immediately adjacent to a single isolated habitation room or a habitation room with attached storage room(s). The remaining two kivas are not in close proximity to other rooms. In other words, the majority of kivas are not isolated from other rooms. Assuming that the same group of people used rooms that are in close spatial proximity rather than rooms that are located far apart, I conclude that a dwelling generally consisted of one or more storage rooms, a kiva and/or a habitation room. Because the majority of the floor area in the study area is
Table 3. Numbers and Floor Areas of Rooms and Kivas.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>No. of Kivas</th>
<th>Total Floor Area (m²) of Kivas</th>
<th>No. of Rooms</th>
<th>Total Floor Area (m²) of Rooms</th>
<th>Ratio of Rooms to Kivas (counts)</th>
<th>Ratio of Room Area:Kiva Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>K C2-1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>?</td>
<td>1:0</td>
<td>—</td>
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<tr>
<td>UGG C23-1*</td>
<td>3</td>
<td>45.0</td>
<td>27</td>
<td>119.9 (est.)</td>
<td>27:3</td>
<td>120:45</td>
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<tr>
<td>GG C2-1*</td>
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<td>0</td>
<td>5</td>
<td>41.8 (?)</td>
<td>5:0</td>
<td>42:0</td>
</tr>
<tr>
<td>GG C3-1*</td>
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<td>25.7</td>
<td>12</td>
<td>64.6</td>
<td>12:2</td>
<td>65:26</td>
</tr>
<tr>
<td>GG C4-1*</td>
<td>1</td>
<td>11.1</td>
<td>11</td>
<td>60.9 (?)</td>
<td>11:1</td>
<td>61:11</td>
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<tr>
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<td>19.1</td>
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<td>19:14</td>
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<td>14:0</td>
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<td>0</td>
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<td>7:0</td>
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<td>1</td>
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<td>1:2</td>
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<td>2</td>
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<td>6:0</td>
</tr>
<tr>
<td>T C1-2*</td>
<td>5</td>
<td>47.4</td>
<td>17</td>
<td>35.6 (est.)</td>
<td>17:5</td>
<td>47:36</td>
</tr>
<tr>
<td>T C3-2</td>
<td>0</td>
<td>0</td>
<td>21</td>
<td>60.8 (?)</td>
<td>21:0</td>
<td>61:0</td>
</tr>
<tr>
<td>GG C9-1*</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>44.1</td>
<td>10:0</td>
<td>44:0</td>
</tr>
<tr>
<td>GG C9-3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3.5</td>
<td>1:0</td>
<td>4:0</td>
</tr>
<tr>
<td>GG C9-4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4.8</td>
<td>1:0</td>
<td>5:0</td>
</tr>
<tr>
<td>GG C10-1*</td>
<td>1</td>
<td>11.0</td>
<td>7</td>
<td>43.5 (est.)</td>
<td>7:1</td>
<td>44:11</td>
</tr>
<tr>
<td>GG C11-3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5.2</td>
<td>1:0</td>
<td>5:0</td>
</tr>
<tr>
<td>GG C12-1*</td>
<td>1</td>
<td>13.8</td>
<td>9</td>
<td>33.8 (?)</td>
<td>9:1</td>
<td>34:14</td>
</tr>
<tr>
<td>GG C13-1*</td>
<td>4</td>
<td>40.3 (?)</td>
<td>13</td>
<td>45.9 (?)</td>
<td>13:4</td>
<td>46:40</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21</strong></td>
<td><strong>228.7</strong></td>
<td><strong>162</strong></td>
<td><strong>667.7</strong></td>
<td><strong>7.7:1</strong></td>
<td><strong>2.9:1</strong></td>
</tr>
</tbody>
</table>

Key: est. = measurements of floor area for some rooms are rough estimates due to their poor preservation; ? = rough estimates of floor area could not be calculated for some rooms due to the lack of available data and/or poor preservation; therefore, measures of floor area are conservative approximations; * = single and multiple household habitation sites.
kiva floor area, a Grand Gulch kiva probably served as the primary domestic room for one household.

A great amount of stylistic variability is evident among Grand Gulch kivas. The eight largest kivas in the study area (Rooms E and G at Cliff Dwelling UGG C23-1, Room I at Cliff Dwelling GG C3-1, Room I at Cliff Dwelling GG C4-1, Room A at Cliff Dwelling GG C4-2, Room B at Cliff Dwelling GG C12-1, and Rooms B and E at Cliff Dwelling GG C13-1) are formal Mesa Verde style kivas. That is, they all have six inferred benches and pilasters, roof entry, cribbed roof and a keyhole shape (with the exception of Room A at Cliff Dwelling GG C4-2, which lacks the southern recess). Four of these kivas have a visible L-shaped ventilator shaft. With the exception of Room A at Cliff Dwelling GG C4-2, which was built on ground surface, the other formal kivas most likely have L-shaped ventilator shafts. The remaining 13 kivas are informal and smaller than the Mesa Verde style kivas. They differ from Mesa Verde style kivas in that they are not keyhole shaped, but rather are circular or square. Also, none of the informal kivas have more than three inferred pilasters; six of these kivas have no pilasters. With the exception of Room H at Cliff Dwelling T C1-2, the informal kivas do not have cribbed roofs. Similar to the Mesa Verde kivas, the informal kivas have inferred roof entries and at least one bench and/or niche. These stylistic differences, notably in size, may reflect a difference in the size or mobility of the households who used these two different kiva types.

With only architectural evidence, it is difficult to determine whether there were differences in activities that took place in structures classed as kivas and those classed as habitation rooms. Both habitation rooms and kivas are heavily smoke blackened and
contain or have associated hearths, which indicates domestic use for extended periods of time. Nineteen out of the 21 Grand Gulch kivas (90 percent) have heavily sooted interior walls, and 32 out of the 34 Grand Gulch habitation rooms (94 percent) are sooted. Six hearths were visible during the 1974 recordings. Habitation Rooms N1, O and P1 on the upper ledge of Cliff Dwelling UGG C23-1 contain hearths (Figures 21 and 22); an additional hearth located immediately outside the entry of Room P1. Both Kiva I at Cliff Dwelling GG C3-1 and Kiva O at Cliff Dwelling T C1-2 have a hearth located immediately outside their walls (Figures 24 and 30). Whether these kivas also have hearths inside is unknown. Hence, both kivas and habitations appear to have been used for domestic activities involving fire. That both structure types are smoke blackened also raises the question whether use of the kivas varied by season. If the kivas were used as primary habitations during the winter, then it should follow that the surface structures would not be smoke blackened, but this is not the case. Varien and Lightfoot (1989) propose that perhaps during winter all structures were used more intensively. More people probably occupied the sites during the winter when stored food was relied upon for subsistence and mobility was reduced.
CHAPTER 5
ARCHITECTURAL DESCRIPTION OF MULTIPLE HOUSEHOLD HABITATIONS

Cliff Dwelling UGG C23-1 (42SA3712, Junction Ruin)

With approximately eight extant habitation rooms and three kivas, Junction Ruin may have been the largest aggregation of households in the study area during the Pueblo III period in the Grand Gulch study area. Three kivas, one habitation room, one probable storage room and eight granaries are dispersed along the lower ledge (Figure 3). The upper ledge consists of four room blocks. Two of the room blocks are comprised of granaries. Each of these room blocks has a room block of habitation rooms in close proximity. Junction Ruin is the only site in the study area that has room blocks of more than two contiguous habitation rooms. Outlines of approximately 10 ghost structures on the lower ledge and the absence of ghost structures on the upper ledge indicate that possibly as early as the late Pueblo II period, the entire site was located on the lower ledge. During the Pueblo III period, the residents dismantled many of the lower ledge rooms and recycled the building material in the construction of the upper level rooms.

A late Pueblo II occupational period at Junction Ruin at approximately A.D. 1133 is evidenced by a weak cluster of three cutting dates from juniper beams at the base of Wall T and a loose roof beam associated with Room N4 on the upper ledge (Table 4). The end of one beam is charred and another beam is smoke blackened on both sides indicating that they were possibly recycled from the roofs of the rooms on the lower
ledge. The beams from Wall T are most likely not old wood since their large ends are stone axe cut. None of the extant rooms on the lower ledge contain datable wood. Two pieces of charcoal from Room O yielded two non-cutting dates indicating that at least the upper ledge was occupied during or after A.D. 1175. These pieces of charcoal could have come from the inner portion of a log or logs, as the actual death date of the tree(s) may well have been considerably later. Other evidence suggests that most construction on the upper ledge was in the A.D. 1200s.

Table 4. Tree-ring Dates for Cliff Dwelling UGG C23-1.

<table>
<thead>
<tr>
<th>Provenience</th>
<th>Field Number</th>
<th>Species</th>
<th>Inside Date</th>
<th>Outside Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room N4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loose log (primary?) on floor</td>
<td>GRG-94</td>
<td>JUN</td>
<td>1046±p</td>
<td>1132v</td>
<td>Smoke blackened over total surface</td>
</tr>
<tr>
<td>Room O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charcoal fragment on floor</td>
<td>GRG-575</td>
<td>JUN</td>
<td>1076fp</td>
<td>1174vv</td>
<td></td>
</tr>
<tr>
<td>Charcoal fragment outside</td>
<td>GRG-577</td>
<td>PNN</td>
<td>1080fp</td>
<td>1175++vv</td>
<td></td>
</tr>
<tr>
<td>Room P2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charcoal fragment on floor</td>
<td>GRG-580</td>
<td>PNN</td>
<td>738fp</td>
<td>836vv</td>
<td></td>
</tr>
<tr>
<td>Wall T</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log in base</td>
<td>GRG-97</td>
<td>JUN</td>
<td>1044+p</td>
<td>1130v</td>
<td>Large end stone axe cut</td>
</tr>
<tr>
<td>Log in base</td>
<td>GRG-98</td>
<td>JUN</td>
<td>1059</td>
<td>1133v</td>
<td>Bottom surface charred near outside end</td>
</tr>
<tr>
<td>Log in base</td>
<td>GRG-99</td>
<td>JUN</td>
<td>1055</td>
<td>1133G</td>
<td>Large end stone axe cut</td>
</tr>
</tbody>
</table>

**Description of the Lower Ledge**

The lower ledge is easily accessible from the canyon bottom. All the roofs of the extant rooms, with the exception of Rooms J1 and J2, have been dismantled. For this
reason, it is difficult to determine whether these rooms were in use at abandonment or at
the same time as the rooms on the upper ledge. Three kivas (Rooms B, E, G), one
habitation room (bottom story of Room H), one probable storage room (upper story of
Room H), and eight granaries (Rooms A, C1, C2, I1, I2, I3, J1, J2) were recorded on the
lower ledge at Junction Ruin. Feature D is interpreted as a historic windbreak built on
top of a prehistoric trash deposit. Feature K is probably a remnant room that is presently
represented by a low wall stub. Whether this probable remnant room was used
contemporaneously with the other rooms at the site is unclear. A midden area is located
immediately downslope from the center of the lower ledge. Lying on the ground in
between Room C1 and Room B is a large sandstone metate and a piece of groundstone.
This space was probably used as an outdoor work area.

At some time, Kivas B, E and G were probably the primary habitations at the site.
Based on the spatial positioning of the extant rooms, the occupants of Kiva B had
restricted access to Granary A. Likewise, access to Granaries I1, I2, and I3 was probably
restricted to the occupants of Kiva G and Room H. Kiva G and Room H were probably
shared by one household or by various members of the same household. The isolation of
Granaries J1 and J2 and Granaries C1 and C2 does not permit their assignment to a
particular household. These granaries were probably communally shared or were used
individually by each of the households.

Major remodeling occurred at Room H, a two-story room, and at Granaries I1, I2,
J1, and J2 at the eastern end of the shelter. The changes included the reconstruction of
the walls, the sealing of old entries, and the addition of new entries and other features.
Apparently, all three of these rooms were originally constructed of type 1 masonry,
which is still evident in the bottom wall segments. The original walls were reconstructed with type 3 masonry similar in style to the type 3 masonry used to construct Rooms A, B (Kiva), C1, C2, E (Kiva) and G (Kiva) on the lower ledge. Hence, two building stages for the structures on the lower ledge can be postulated based on the two distinct masonry styles. Rooms H, I1, I2, J1 and J2 were first constructed with type 1 masonry. Then, the type 3 masonry Rooms A, B, C1, C2, E and G were constructed simultaneously with the remodeling of Rooms H, I1, I2, J1 and J2.

The remodeling of Rooms H, I1, I2, J1 and J2 does not appear to signal changes in the way the rooms were primarily used. However, whether the bottom story of Room H was originally used for habitation is unclear. Its plastered interior walls and its shelf, attributes generally associated with habitation rooms, are part of the original wall construction. Hence, the addition of two ventilators and a deflector at the bottom story of Room H probably indicates the continued use of the bottom story of Room H as a habitation room.

Mud and soot outlines indicate an earlier Pueblo construction episode on the lower ledge involving the construction of approximately 10 rooms. These older rooms, which were either dismantled or eroded, could represent more than one construction episode. Between Room C and Feature D is a mortar outline of a two-story masonry room. Tan mud with twig inclusions was used in its construction, and the top of the room was repaired with red mud. The rear of the shelter within the confines of these ghost structures is not sooted indicating a storage use. Within the space occupied by Kiva E, there are mud and soot outlines of ghost structures on the rear of the shelter. From these mud outlines and sooting, it appears two adjacent two-story rooms were erected before
Kiva E was constructed. Based on the extent of the soot, one of the two-story rooms was used for habitation while the other two-story room was used for storage. Two more ghost structures on the lower ledge - one between Room E and Feature F and the other in the space occupied by Kiva G - are evidenced by mortar outlines.

Room A

Room A is a poorly preserved granary built on top of juniper bark and 10 cm of litter. This walled structure is situated on the outer edge of the thick northern wall of Room B, between Room B and the shelter wall (Figure 19). It is enclosed by one short continuous type 3 masonry wall and the rear of the shelter, which is its north wall. It is constructed of upright slab footings with overlying courses of masonry that are faced on the interior and irregularly chinked with small pieces of sandstone. How this granary was roofed could not be determined. Although the interior of the granary is lightly sooted, it is too small to have been used for habitation. The east side of its small south entry shows mud coping and a lintel stick.

About 2 m south of Room A is a roughly coursed, double masonry wall running northeast to southwest (Figure 19). There is a mud outline of a wall at this point in the shelter wall, which extends higher than the extant double masonry wall. South of this remnant wall is another wall stub, which also extends from the shelter wall. The juncture between this wall and the rear of the shelter is mortared. The rear of the shelter between this wall and the east wall of Room A is heavily sooted. A remnant structure east of Room A is evidenced by a short wall stub running perpendicular to the shelter wall and wall rubble forming the outline of a structure. The chronological relationship between the
Figure 19. Plan view and profile map of Cliff Dwelling UGG C23-1, Rooms A-C2 and E.
four wall stubs and the granary is unclear due to the disturbed nature of the area. This area may have been remodeled; therefore, determining whether part of this space was used for habitation at abandonment based on the extent of the sooting is difficult. The exact function of the areas adjacent to Room A is indeterminate.

Room B (Kiva)

Room B is perhaps a D-shaped subterranean kiva, located 2.5 m southeast of the shelter wall (Figure 19). Its straight north wall runs parallel to the shelter wall. Only three pilasters are visible; two of the pilasters are located at the two corners of the north wall (3.4 m apart), while the third pilaster is only 1.2 m south of the northwest corner. Sandy fill covers the benches and the south half of the kiva. For this reason, the shape of the kiva is indeterminate.

The walls, including the pilasters, are constructed of relatively small rock with a high amount of mud mortar. At the top of the wall in the north corner above the pilaster is a 6 cm thick layer of juniper bark, which continues underneath one course of masonry in the north wall. The juniper bark was most likely part of the kiva’s roof. Room A was built on top of this layer of juniper bark, which indicates that Room A was built after Room B. Above the opposite pilaster in the wall is a beam hole (7 cm in diameter), which secured a small beam that ran parallel to and at the top of the north wall. With the exception of the top two courses of the interior north wall and the pilasters, all the interior walls have been plastered with BLM stabilization cement. Consequently, only a minimal amount of soot on the interior walls is apparent. In addition, any wall construction information for Room B could not be determined.
Rooms C1 and C2

Based on the absence of soot on their interior walls and the nature of their south entries, contiguous Rooms C1 and C2 were primarily used as two granaries. The few corncobs in the floor fill also support this functional inference. Room C1 is defined to the south and west by one continuously bonded masonry wall (Figure 19). The wall defining Room C2 encloses the east end of Room C1; hence, Room C1 was built near the same time as or after Room C2. The shelter wall serves as the rooms’ north walls. Nothing in the architectural data indicates how these rooms were roofed.

Room C1 seemingly has a large entry (54 cm wide, 97 cm high), but the door sill has broken away. Mud coping still adheres to the edges indicating that a slab door could have been set against the stick lintel and set in place. Outside and below the entry of Room C2 is a mortared masonry stoop. BLM stabilization mud was applied around the frame of the entry and as a result has obscured information about the door sill and lintel.

Feature D

Room D is interpreted as a historic windbreak. It is defined by two dry-laid masonry walls (Figure 3). The walls consist of stones sooted on various sides indicating they were scavenged from the pueblo rooms. There is no evidence of any prehistoric structures on the shelter wall behind the two walls. Adjacent to Feature D is a large boulder containing several axe grooves. This space could have been used as an outdoor work area.
Room E (Kiva)

Room E is a subterranean keyhole shaped kiva with a southern recess and six pilasters and benches (Figure 19). Its diameter below the benches is approximately 4.5 m. The benches were carved into the bedrock. The north side of the kiva uses the rear of the shelter as its interior wall, and the two northern masonry pilasters are mortared to the shelter wall. Though almost the entire roof has been dismantled, the kiva is fairly well preserved. A primary cottonwood beam, which was stone ax cut to fit the dimensions of the room, extends across the central pilasters running east-west and is incorporated into the wall construction. A substantial amount of sandy fill, at least 40 cm deep, covers the floor, obscuring some architectural features. Nevertheless, two rectangular niches with rounded sides are evident in the north bedrock bench face. The fronts of the benches and pilasters are plastered. The tops of the benches are worn, but appear to also have been plastered. The sides of the pilasters were never plastered revealing that the mortar contains more chinking stones than the mortar in the interior walls above the benches. Irregular stones were laid in horizontal courses for the construction of the interior walls, which are faced on the interior.

The top of the deflector in front of the southern ventilator tunnel and shaft is visible. It is composed of several mortared stones that are plastered presumably to the floor level. The opening of the ventilator shaft is at ground surface just outside the south wall. The interior wall of the ventilator shaft is heavily smoke-blackened, as is the north facing side of the deflector. The interior walls of the ventilator shaft and tunnel are completely covered with at least two layers of plaster. Soot is also evident underneath the plaster layers.
There is evidence that an earlier pit structure occupied this space. Three partially burned vertical cottonwood posts extend through the northeast and northwest benches and the south pilaster. The bottoms of the posts are probably below the kiva’s floor level. The visible segments of the posts were plastered and incorporated into the benches and pilaster when Kiva E was constructed. These three vertical posts were possibly used as roof supports for the pre-existing pit structure, but had no apparent structural function in Kiva E.

A wall stub abuts the southwest corner of the kiva wall and extends to the west (Figure 19). Abutting this wall stub is another wall stub, which extends towards the southwest. A third wall stub is mortared to the rear of the shelter and abuts the northwest corner of Kiva E. Whether these wall stubs were part of enclosed structures used concurrently with the kiva could not be determined.

Feature F

Feature F consists of one mortared masonry wall and one dry-laid wall (Figure 20). No soot is evident in the space defined by these remnant walls. The masonry wall built on top of a large boulder consists of eight courses of long tabular sandstone mortared with mud and very small chinking stones. The west end of the wall is considerably deteriorated. Mortar adhering to the boulder indicates that the wall extended along the entire length of the boulder. Whether this wall was part of a room that was used concurrently with the extant rooms on the lower edge is indeterminate. The mud outline of a two-story room is visible above Feature F. The masonry wall on the boulder is possibly related to this ghost room; however, there is no intervening wall to
Figure 20. Plan view and profile map of Cliff Dwelling UGG C23-1, Feature F and Rooms G, H, and I1-I3.
support this assumption. To the east of the masonry wall stub is a large rock with several
grinding areas.

The dry-laid wall extending from the large rock north to the rear of the shelter
consists of irregular courses of various construction materials, including jacal, stones
from previous wall fall, and groundstone. A hearth is located directly east of the dry-laid
wall. The hearth could not have been frequently used, as evidenced by the lack of soot
on the hearth stones. The dry-laid wall and hearth appear to be a historic windbreak or
shelter that is not related to the mortared masonry wall.

Room G (Kiva)

Room G is a somewhat symmetrical keyhole shaped kiva with 6 benches and
pilasters (Figure 20). It was built into an excavated pit in old shelter deposits. The
benches were cut into bedrock and leveled with plaster. The masonry interior walls and
pilasters were built on top of the benches. The interior walls are regularly coursed,
mortared, chinked, and heavily sooted. The south and southwest walls are of a rougher
masonry; the courses and chinking are much less regular. The pilasters appear to be
integrated into the walls either by interlocking courses or bonded mortar. Only the front
faces of the pilasters and benches and the tops of the benches are covered with plaster (5
cm in thickness). The plaster on the north bedrock bench has worn away. The interior
walls and the sides of the pilasters are sooted indicating that they were never plastered.
Much sediment (approximately 50 cm thick) covers the kiva’s floor. The west side of the
northwest corner bench is also covered with fill.
Loose stones have been placed, perhaps recently, to enclose the opening of the ventilator tunnel into the kiva. The interior of the vent shaft is sooted and partially filled with rocks and sand. The opening of the ventilator shaft is approximately 50 cm outside the south wall. A deflector is not visible, but may be underneath the floor fill. The kiva has three niches. Two square niches with rounded corners in the middle of the north bedrock bench are vertically aligned. The third large niche, which is rectangular with rounded corners is located in the middle of the northeast bench.

An in situ cottonwood primary beam (25 cm in diameter) rests on the middle pilasters spanning east-west. It is sooted on the underside. No other beams are present suggesting the roof was dismantled, perhaps prior to site abandonment. The several chunks of roofing mud in the floor fill, which have impressions of juniper bark, are also evidence of dismantling. Much juniper bark is also in the floor fill and above the southeast corner of the kiva.

Room H

This room is two stories high (Figure 20). The top story is interpreted to have been used for storage and the bottom story for habitation. The interior walls are only sooted within the confines of the first story. That the top story was not sooted is also indicated by the extent of the soot outline on the rear of the shelter, which serves as this room’s north wall. The west wall, which is not intact, may have been dismantled prehistorically as indicated by a lack of wall rubble. Its materials were most likely recycled in the construction of the rooms on the upper ledge. A continuously bonded masonry wall, which has been stabilized with BLM mortar, defines Room H to the east
and south. BLM mortar does not conceal any important architectural information in the east wall. However, information regarding the remodeling of the entry in the south wall is unclear due to BLM stabilization. The walls are regularly coursed with stone and mortar, and the interior walls are plastered. No chinking is present. Unlike most of the other extant rooms on the lower ledge, the floor fill is shallow and does not cover the deflector, which consists of three vertical slabs near the center of the room. The two northernmost slabs are heavily sooted on the interior faces indicating that a hearth was situated on the north side of the deflector.

Reconstruction and remodeling is evident in the architecture of Room H. The first phase of construction is obvious from the use of type 1 masonry (stone in mud construction) in the lower portions of the extant walls. Based on the height of the original type 1 masonry wall segments, the original room was two stories. The second phase of construction involved converting the original south entry into two ventilators, or perhaps into one ventilator and one entry, by partially sealing the original entry. In addition, portions of the upper walls were reconstructed with type 3 masonry consisting of irregular shaped stones with chinking. The rebuilt wall segments were not plastered. The upper interior wall segments that have one layer of plaster remaining are part of the original wall construction. The addition of the deflector was probably concurrent with the addition of the ventilators. The size of the original south entry is obscured by BLM stabilization mud that was applied in copious amounts around the border of the original entry and the small ventilator.

The three beam holes (approximately 15 cm in diameter) in the east wall would have supported the roof for the first story. A beam impression above the beam holes runs
perpendicular to the rear of the shelter, but no beams are present. Access to the lower story must have been through the west wall, which is no longer standing. How the second story was accessed is indeterminate. There is no evidence for a second story roof; however, there are two V-shaped notches near the top of the extant east wall. The wall segment that was above these notches was probably broken off when the roof beams were removed. Roofing debris to the west of the room, containing sticks, branches and roofing mud, is probably from the first story roof because it is heavily sooted.

A shelf extends one meter from the northwest corner (110 cm above the floor level). A few corncobs are resting on the shelf. It was incorporated into the walls during the original construction of the room. An area on the interior of the east wall, 35 cm above the floor level, shows designs scratched into plaster.

The vents in the south wall appear to have been made prior to BLM involvement. The sandstone slabs framing the openings were probably not installed by BLM since the slabs are held in place by mortar that is readily distinguishable from BLM mortar. The portion of wall around the large vent in the south wall is composed of different mortar than the rest of the south wall. Hence, the vent was built after the original wall construction. Due to BLM stabilization, it is not possible to determine whether the smaller vent was part of the original construction of the room.

Another room appears to have existed 1.35 m to the east of Room H, perhaps a low granary or storage room (Figure 3). Based on its mortar outline on the rear of the shelter, the roof was 1.5 m above floor fill, coinciding with the beam holes of Room H. This room may have also been dismantled prehistorically with the intention of building new rooms on the upper ledge.
Rooms II-13

Contiguous Rooms II-13 are three small granaries at the eastern end of the shelter (Figure 10). The absence of soot, the mud coping around the entries and the sealed juncture between the masonry walls and the shelter wall support this functional interpretation. Rooms II and I2 were originally constructed in one episode, but there is evidence for later reconstruction.

One long wall abutting the north bedrock wall of the shelter encloses a space, which is subdivided by a perpendicular masonry wall creating Rooms II and I2. Room I3 was the latest addition to this complex of granaries since it abuts the continuous wall defining Rooms II and I2. The bottom half of these walls (1 m high) are of type 1 masonry construction. The top portions were built with type 3 masonry. A wall stub abutting the south wall of Room II and extending towards the west was built with upright slab footers. The top courses of this wall stub, as well as the wall of Room I3, were constructed of the same type 3 masonry used to reconstruct the walls of Rooms II and I2.

Rooms II and I2 have small south entries. Mud still adheres to the edges of the entries. Room II has a double stick lintel, but the lintel in Room I2 has been removed (its indentation remains).

The ceiling of the shelter is too high to have served as a roof for these rooms, but there is no evidence of a roof for Rooms II and I3. Two beam holes, however, are in the west and east walls on the tops of the coursed masonry portions of the walls of Room I2.
Figure 21. Plan view and profile map of Cliff Dwelling UGG C23-1, Rooms J1, J2, M1-M5, and N1-N4.
Rooms J1 and J2

Rooms J1 and J2 are two contiguous granaries isolated on a narrow ledge with a low overhang at the east end of the shelter (Figure 21). One continuous wall encloses the east, south, and west sides of Room J1. Similarly, Room J2 is defined to the east and south by one continuous wall. The rear of the bedrock shelter is the north wall for both rooms. The ceiling of the bedrock shelter served as their roofs.

There is evidence indicating that these two rooms underwent major remodeling. The bottom portions of the walls of Room J1 and J2 are of type 1 masonry construction and represent the original wall construction. At the southwest corner of Room J1 the original type 1 masonry wall is approximately 40 cm high, and is 20 cm high under the entry to the rear of the shelter. The original small, raised entry for Room J1 was in the south wall. The south entry has two lintel sticks and is difficult to access, but Moki steps are cut into the bedrock cliff below the entry. When Room J1 was remodeled, along with Room J2, the south entry was sealed. In order to seal the entry, a crude masonry stoop was built on the narrow ledge below the entry to support the mud and stone closure. On the other hand, this stoop may have been added to support the stone sill for the entry, before the entry was sealed. The present east entry for Room J2 was incorporated during the original type 1 masonry wall construction indicated by its mud sill. Its lintel consists of three parallel sticks.

The ratio of mud to stone varies between the reconstructed type 3 masonry wall segments. The mud used for the reconstruction is darker and redder than the mud used for the original type 1 masonry walls. The opening for the west entry of Room J1 was apparently cut into the original type 1 masonry wall. Mud and few stones were laid over
the lintel. Hence, the west entry of Room J1 was built when the walls were
reconstructed. The lintel for this west entry is composed of six serviceberry sticks tied
together with split twigs to form a horizontal, flat surface.

The most noteworthy characteristic of Room J2 is a small cottonwood beam
located 25 cm below the overhang ceiling, extending the length of the room along the
interior of the south wall. It is incorporated into the east original type 1 masonry wall.
Here, it is supporting three courses of type 3 masonry, which fill in the gap between the
mud wall and the overhang. The west end of the same beam extends on through the type
1 masonry portion of the west wall and into Room J1, which indicates that the beam was
part of the original type 1 masonry wall construction.

Feature K

Feature K, a probable remnant room, is represented by a low wall stub that
consists primarily of mud (Figure 3). The north end of the wall abuts a large boulder that
possibly formed part of a room’s north wall. The underside of the boulder is smoke
blackened indicating that fire related activities took place in this space. A possible wall
remnant west of the wall stub may have been the west wall of Feature K. There is no
evidence indicating a fourth wall.

Feature L

Feature L is a masonry platform that presumably supported a ladder leading to the
upper ledge. It is crudely constructed with solid layers of irregular masonry blocks. One
large pinyon log runs parallel to the cliff, protruding out of the west side of the platform;
another large pinyon log runs perpendicular along the east side of the platform, protruding out of the south side of the platform. Tree-ring samples were taken from both logs, but neither log yielded dates.

Description of the Upper Ledge

Prior to its being dismantled by BLM, there were rungs ties with wire to rebar set in holes drilled into the cliff. The construction of this is unknown, but it was used with rope to access the upper ledge in 1974. Presumably, the upper ledge was accessible prehistorically only by a ladder for which Platform L was built on a ledge directly above Room A. The top of the ladder would have been situated to the west of Wall T at the west end of the shelter. The posture of the rooms on the upper ledge indicates that personal safety and the safety of stored food was an issue for the later inhabitants of Junction Ruin. Whether the last occupation of the shelter was confined to the upper ledge is difficult to determine since only a few tree-ring dates could be obtained (Table 4).

The upper ledge consists of two sets of contiguous habitation rooms. The spatial arrangement of the room blocks suggests that the occupants of Habitations O, P1, P2, and Q had mutual access to Granaries R and S while the occupants of Habitations N had mutual access to Granaries M. One household could have occupied each habitation room. Alternatively, one household or members of the same household could have occupied each complex of contiguous habitation rooms. If the former were the case, then food storage may have been communal rather than private. This detachment of habitation rooms from their storage rooms indicates a loosening of ties between individual households and their stored food; hence, the distribution of food may have gone beyond
the household social unit. The two roomblocks could, however, just represent a
difference in household size and organization.

Access to Granaries R and S may have been limited to the household(s)
occupying the O-Q room block. A resident would have had to pass the O-Q room block
to access Granaries R and S. The proximity of Habitations N to Granaries M indicates
that the occupants of Habitations N could have had restricted access to this complex of
contiguous granaries.

Purplish red mortar was used in the wall construction of all the rooms, with the
exception of the original walls of Habitation Q, which was constructed with tan mortar.
The original Room Q may have been the first room built on the upper ledge. Granaries
M and Habitations N were repaired with orange mud similar to that used in the
reconstructed walls of Room Q. Hence, Rooms M1-M5, N1-N4 and Room Q were
perhaps built simultaneously. A layer of tan mud covers the orange plaster at Rooms M2
and N2.

Rooms M1-M5

Rooms M1-M5, located on the west end of the upper ledge, are a complex of
contiguous granaries (Figure 21). The rear of the shelter serves as the north wall, and the
ceiling of the shelter serves as the roof for all these rooms. One continuously bonded
type 3 masonry wall defines the south and west wall of Room M1 and the south wall of
Room M2. This wall abuts the type 3 masonry wall enclosing Room M3. A type 3
masonry wall, which abuts and is perpendicular to the south wall of Rooms M1 and M2
subdivides Rooms M1 and M2. One long continuous masonry wall, which abuts Room
M3, was constructed to define the south walls of Room M4 and M5, as well as the east wall of Room M5. A short type 3 masonry wall that extends from the rear of the bedrock shelter and abuts the south wall, subdivides Rooms M4 and M5. Because the walls defining Rooms M1, M2, M4 and M5 abut the wall of Room M3, Room M3 was the first granary built. The walls of Rooms M4 and M5 are similarly constructed with a large percentage of tabular stones and chinking indicating that these two rooms were perhaps built at approximately the same time. Whether they postdate Rooms M1 and M2 is indeterminate.

Room M1 has a shallow floor fill layer and was constructed on the bedrock floor. Faint sooting on the shelter wall and ceiling is present, but the interior walls are not sooted. Hence, the sooting occurred before the construction of Room M1. Upright slabs served as the base for the type 3 masonry walls, which consist of irregular stones, flat surfaces exposed to the interior and exterior of the walls. The mortar occasionally overlaps the stone faces. The size of the stones generally decrease toward the top of the south and east walls. Orange mud was used to reseal the juncture between the south wall and the shelter overhang. In the south wall, Room M1 has a typical granary entry with mud coping around the edges, a door stoop, and a height of 55 cm from the lintel to the sill. Two cottonwood beams serve as the lintel.

The south entry for Room M2 is similar to that of Room M1. It has mud coping along the edges, two cottonwood lintels, a door stoop, and a length of 50 cm. The walls of Room M2 have a similar masonry style to that of Room M1: upright sandstone footers beneath courses of unshaped stone with mortar between, partly covering the stone courses. Orange mud was used to fill in the junction between the walls and the shelter.
ceiling. This orange mortar on the west and south walls is mostly covered by tan mud. The door stoop was originally mortared with the same purplish red mud used in the walls, but was repaired in one section with orange mud and in another section with tan mud.

The lower courses of masonry of Room M3 are composed of long, thin sandstone slabs laid horizontally. Towards the upper portions of the walls, the stones become thicker and shorter. Mortar is thickly packed around the masonry courses. The same orange mud used for repairs in Rooms M1 and M3 was applied to the junction of the shelter ceiling and the top of the walls and also to the lining of the south entry. Again, the entry has mud coping, two cottonwood lintels, a door stoop, and a height of 60 cm. At some time, a pit (35 cm deep, 20 cm in diameter) was dug into the bedrock floor near the center of the east wall.

The primary intended use for Room M4 was storage, as evidenced by the small south entry designed for the inset of a door slab. The top portions of the interior walls, and the shelter wall and ceiling are lightly sooted, which contradicts a storage function. All evidence, except for the sooting, indicates the continued use of Room M4 as a granary. There is no evidence for remodeling. Except for an application the orange mud at the junction of the walls and shelter ceiling, repair was minimal. The courses of masonry consist mostly of thin, tabular slabs (50 cm in length and 10 cm in thickness) and are mortared with mud. Some chinking of small, flat sandstone is visible on the exterior and interior walls.

Room M5 is constructed of type 3 masonry similar to that of Room M4, though the stones that were used tended to be more blocky than tabular. Almost the entire east wall consists of two large upright slabs. Coursed masonry of small, thin stones fills the
gap between the bottom half portions of the upright slabs. It appears that the interior portion of the room was intentionally excavated into bedrock in order to create a bedrock footer (10 cm high) for the south wall. Its granary style entry and its relatively small size are consistent with a storage function.

Rooms N1-N4

Rooms N1-N4 are located east of and in close proximity to Rooms M1-M5. All the rooms appear to have been built on top of the bedrock shelter floor and are defined to the north by the rear of the shelter (Figure 21). Rooms N3 and N4 were primarily used for habitation. A soot outline on the shelter wall and ceiling and a hearth represent Room N1. Room N3 is defined to the east, south, and west by one continuously bonded type 3 masonry wall. The south type 3 masonry wall of Room N4 abuts the southeast corner of Room N3 and the type 3 masonry wall defining Room N2 abuts the west wall of Room N3.

The slab-lined hearth of Room N1 was dug into the soft sandstone floor of the shelter. The depression shown in Figure 21 is not the actual size of the hearth; vandals have removed the ashy hearth fill and in doing so have destroyed the actual dimensions of the hearth. The hearth was at least 25 cm deep. Sooting, perhaps associated with the hearth, extends 40 cm above the level of the shelter floor, 2 m south of the hearth along the shelter ceiling, up to and on the bottom 50 cm of the east wall of Room M5, and to the adjacent wall of Room N2.

Based on its small size and the absence of sooting, Room N2 was primarily used as a storage bin. Presently the wall of Room N2 stands to a height of 40 to 50 cm above
bedrock and abuts the west wall of Room N3. It is constructed of the same masonry as Room N3. The juncture between the shelter ceiling and walls were resealed with orange mud and later tan mud. Sooting is not present on the interior of Room N2, but the rear of the shelter above the space occupied by Room N2 and its exterior walls are heavily sooted. Hence, Room N2 had a roof that was later dismantled.

Based on the size of the door (105 cm in height) and the smoke blackening on the interior, Room N3 functioned primarily as a habitation room. The fill contains several small stones (probably chinking stones) and sticks. The masonry is similar to that of Rooms M4 and M5 with courses of mortared tabular stone. The upper courses of its walls are mortared with coarser and darker mud than the lower courses. These differences may indicate two different construction episodes, but no other architectural evidence is indicative of remodeling. Some of the stones in the bottom courses of the south and west wall have fallen out. Smooth orange mud was used to patch holes in the interior and exterior walls and around the southern entry.

Room N4, similar to Room N3, is heavily sooted on the interior and had a large entry. The west curved edge of the southern entry still remains intact, which reveals that the height of the entry was approximately 90 cm. Based on the length of a possible lintel stick found in the floor fill, the entry was approximately 50 cm wide. The same type of building stone was used in the construction of Room N4 as in Room N3. Possibly due to structural weakness, the top third of the courses of the south wall have fallen outward. The fill contains chunks of mortar and building stone. One juniper roof beam (9 cm in diameter) is overlying the floor fill. The large end of the beam fits perfectly into a semi-circular impression in the east wall, 140 cm above the interior floor fill. Based on the
angle of the beam hole, the small end of the beam would have fit into the south wall. The entire surface of the beam is smoke blackened indicating that it was recycled from elsewhere. Thus, the date of A.D. 1132v from this probable primary beam gives an early bias for the construction of Room N4 (Table 4).

Room N3 was the first room in this complex to be built evidenced by the fact that the walls of Room N2 and N4 abut Room N3. The soot outline defining Room N1 does not extend beyond the walls of Room N2. Thus, Room N2 was built before the hearth was extensively used and was most likely roofed. In addition, the top portion of Room N2 must have been dismantled after the use of the hearth ceased. Considering that Room N1 was used after the construction of Room N2, it is likely that Room N1 was used at the same time as the other rooms in this complex.

Rooms O, P1, P2, and Q

This roomblock is composed of four habitation rooms. The north walls and roofs of all these rooms were defined by the rear of the bedrock shelter and overhang (Figure 22). The east end of the south type 3 masonry wall of Room O clearly abuts the southeast corner of type 3 masonry Room P1. The south wall of type 3 masonry Room P2 abuts the exterior corners of Rooms P1 and Q. Hence, the construction of Rooms P1 and Q predate the construction of Rooms P2 and O. At some time, the residents dismantled Room O, possibly before Room P2 was built. At some time during the occupation of the site, however, all the rooms in this complex were probably used concurrently.
Figure 22. Plan view and profile map of Cliff Dwelling UGG C23-1, Rooms O, P1, P2, Q, R, S1-S3, and Feature T.
Room O was primarily used as a habitation room as evidenced by heavy sooting and a slab lined hearth (approximately 15 cm deep). Room O is defined by two remnant portions of a chinked masonry south wall composed of unshaped stones. A few of the stones are oxidized. The shelter ceiling is heavily sooted within the confines of the remnant room. A possible south entry is evidenced by the gap between the two remnant wall segments. The walls appear to have been dismantled prehistorically. Wall rubble between the rear of the shelter and the west end of the south wall and to the south of the south wall is not enough to account for the entire missing walls. Two charcoal fragments – one from the floor of Room O and one immediately outside of Room O – yielded two noncutting dates of 1174vv and 1175++vv.

A slab-lined hearth is located directly inside the south entry of Room P1 and the walls are heavily sooted indicating a habitation function. This room is defined to the west and south by one continuous masonry wall. The east side of the room is enclosed by a masonry wall composed of large blocky stones, which abuts the interior east end of the south wall. This room has large upright slab footers for its south wall and for the remaining portions of its west wall. To support the upright slabs, a course of mortared masonry was laid against the exterior of the upright slabs. Overlying the upright slabs are courses of blocky stones with several chinking stones pressed into the mortar.

The south wall of Room P1 contains a large entry (110 cm in height) with two cottonwood lintel sticks. Below the exterior of the entry is a low door stoop. A low dry-laid masonry wall, now only about four courses high, rests against the south wall on the west side of the doorway. To the west, this dry-laid wall is eventually incorporated with the wall fall from the south wall of Room O. There is no evidence of repair on the walls;
however, orange repair mud was heavily packed on the door stoop. A small hole in the south wall at roof level functioned as a ventilator evidenced by its sooted interior. Nothing in the architectural data rules out the inference that the entry, door stoop, and ventilator hole were part of the original construction of the room.

Room P2 is defined by a south wall, which encloses the space between Rooms P1 and Q. The east end of the south wall clearly abuts the southwest exterior corner of Room Q. The west end of the south wall also abuts the southeast exterior corner of Room P1. However, the west half of the wall was rebuilt using dry-laid masonry, consisting of long, thin stones and small, irregular blocky stones. Whether the original south wall abutted Room P1 is indeterminate. This south wall contains the large entry (110 cm in height) into Room P2. The entry’s sill and lintel are poorly preserved and its east side is broken off.

The shelter ceiling and the interior walls of Room P2 are heavily sooted. Wall repairs were made with orange mortar. Both types of mortar are sooted, which indicates that after the repairs, Room P2 retained its habitation function. The extant south wall no longer stands at its original height. The lack of wall fall indicates that the upper courses of the south wall were removed prehistorically, perhaps for building elsewhere.

Room Q is defined to the east, south, and west by what appears to be one continuously bonded type 3 masonry wall. This room shows evidence of at least three phases of construction. All that remains of the original room are portions of the base of the west and east walls. The original wall fragments are composed of masonry blocks with smooth faces on the interior and exterior; they are mortared with tan mud. At a later date, upright slabs were placed along the south end of the west wall and along the whole
length of the south wall to form a footing for new walls. A course of thin stones was placed against these slabs on the exterior of the walls to support them. Small, flat stones with their flat faces towards the interior, were then laid in courses. On the interior, purplish red mortar was plastered over these courses of stone. Concurrently, the entry in the south wall and its large door stoop were built. The stones of the stoop seem to have been incorporated into the exterior of the masonry wall. The stoop is composed of large blocky stones with flat sides. The last phase of construction involved the placement of large blocky stones over the original west wall fragment. These courses of masonry were plastered with purplish red mud, which overlaps the old plaster. The entire interior walls and plaster are sooted. This indicates that activities involving the use of fire took place during the room’s last use. Whether the intended function of the room was for habitation could not be determined. The amount of wall fall surrounding the room indicates that after abandonment none of the construction materials had been removed.

Rooms R and S1-S3

This roomblock is located at the east end of the upper ledge (Figures 3 and 22). Because of the lack of sooting, small and high entries and the sealing of the junctures between the wall and the shelter ceiling (not including Room S3), these type 3 masonry rooms are interpreted to have been used as granaries. The east wall of Room R abuts the west wall of Room S1. Room S3 utilizes the west wall of Room S2 for its east border. Also, the west end of the south wall of Room S3 abuts the rounded exterior southeast corner of Room S2. Hence, Rooms S1 and S2 appear to have been built before abutting Rooms R and S3.
Approximately one third of the walls of Room R are missing, and no wall fall is present; therefore, the building material was probably reused elsewhere. Room R is defined to the east and south by one continuous masonry wall. Small upright slabs on the bottom interior of this wall serve as footers. Coursed masonry consisting of blocky, unshaped stones was laid on top of and on the exterior side of the upright slabs. At 90 cm above the floor fill, this portion of the wall was finished by plastering the interior of the wall and rounding the top off with plaster. The wall was then extended up to the shelter ceiling with coursed sandstone masonry, smoothly plastered only on the exterior. During this construction episode, the entry was built into the south wall. A temporal gap between the construction of the bottom and upper courses is not apparent; the same purplish red mortar was used for the top and bottom courses. Orange mud was used at a subsequent time to seal the juncture between the wall and the shelter ceiling. The west wall was built using the same masonry as the bottom courses of the south wall, but without the upright slab footers and the plastered interior. There is no evidence of a break in the construction of this wall that still stands at its maximum height of 100 cm.

Rooms S1 and S2 were built simultaneously. Both rooms have large upright slabs for footers. Overlying the footers are courses of thin stones alternating with thick layers of mortar. The walls were built up to the overhang, which indicates that the ceiling of the shelter served as their roofs. However, two beams are lying in the fill of Room S2. Whether these beams were originally part of Room S2 is unclear. For reasons unknown, tree-ring samples were not taken from these beams. A southeast entry for Room S2 is inferred based on the presence of massive chunks of dried mud (possibly used to secure a door slab) adhering to the top of a double coursed deteriorated section of wall.
The south wall of Room S3 clearly abuts the southeast corner of Room S2. Room S3 has no upright slab footers. It consists of coursed masonry of long thin and thick stones, and several small thin slabs mortared with abundant chinking. Chinking material includes corn cobs and small sandstone chunks. Based on the extent of the mud outline on the rear of the shelter, the walls did not extend all the way to the shelter ceiling. Roofing material is not present, but the roof was probably made of beams and mud. Two long upright stone posts (75 cm in length) support the stone slab sill of the well-preserved rectangular entry in the east end of the south wall. A mud collar outlines the entry. Sticks lining the edge of entry are grooved, and the lintel is a thick stone slab.

Feature T

Feature T is a retaining wall built immediately east of where one would access the upper ledge by means of a ladder. Based on the position of this wall in relation to the ladder and the rooms on the upper ledge, it most likely had a defensive function. The wall is eight courses high, constructed with tabular blocks of sandstone. Five upright cottonwood posts and three small horizontal juniper logs at the base would have served as anchors for the wall. The juniper logs yielded three cutting dates: 1130v, 1133v and 1135G.

Cliff Dwelling GG C3-1 (42SA3714, Turkey Pen)

Rooms A, C, and D are interpreted to be habitation rooms, perhaps contemporaneous, which have either extant attached storage rooms or show evidence of
once having had storage rooms in close proximity (Figure 5). Each of these habitation rooms may have been occupied by one household or part of one household during the last occupation at Turkey Pen. In addition, the primary intended function of Rooms J2 and O was possibly habitation, but whether these poorly preserved rooms served a domestic function at abandonment is unclear. Kiva I and Granaries G and H on the lower ledge, and Rooms L, M and N on the upper ledge, may have each been a dwelling or may have been communally used by the households at abandonment (Figure 5). Whether Room O was dismantled before the construction of Kiva I is unknown. Hence, at abandonment as many as six households could have occupied this shelter. Each household had its private storage, but some storage facilities could have been communally shared. The turkey pen is not associated with one particular dwelling, which indicates the supply of domesticated bird was also shared by the households.

The upper ledge is narrow. It has less available space for occupation than the lower ledge of the shelter. Jacal remnants, located on the west side of the upper edge, indicate the existence of previous rooms. Access to the upper ledge is by a natural series of tiny ledges, which form a series of steps to a break in the low retaining masonry wall (Feature K) at the west end of the shelter. Some of the surfaces have been pecked prehistorically to form foot or hand holds. The retaining wall contains four upright posts and one horizontal beam that crosses the base of the entry. Tree-ring samples were collected from all four posts in 1974, but none of the samples produced dates. The complex of rooms on the upper ledge may have been for communal use or could represent just one dwelling unit. That is, probable Storage Room L and Granary N were either used in conjunction with ritual activities associated with Kiva M, or were part of a
dwelling complex that included Kiva M. The natural bedrock bench between Rooms L and M and the flat roof of Kiva M could have served as an open courtyard.

A Basketmaker II component is evidenced by eight hardpan cists on the east end of the shelter’s lower ledge. A test unit was dug in 1972 by R. G. Matson and three crew members that confirmed a Basketmaker II occupation of the shelter (Figure 5). Previous Pueblo occupations of the site are represented by several ghost structures, especially on the lower ledge. Particular concentrations of ghost structures are found between Rooms F and G and in the space occupied by Feature J1 and Room J2. These ghost structures are defined by mortar outlines on the rear of the shelter.

The only strong evidence for remodeling of rooms at Turkey Pen is in Room L. Room L was originally used as a habitation space indicated by soot on the interior of the original wall construction. The rebuilding and plastering of the original walls signifies an alteration of this room apparently for general storage use. It is interpreted as a probable storage room because it lacks evidence of domestic activities.

Rooms A, D, and J2 have features often associated with kivas, but are interpreted to have been used primarily for domestic activities. Both Rooms A and D have a ventilator, a double wall, and a possible roof entry. In addition, Room A has a masonry bench and a pilaster that did not serve as a roof support, and Room D has a niche and shelf. Room J2 has a bench but no other features commonly found in kivas. Room I has a ventilator, two niches, a hatched roof entry, and a double coursed wall. Its isolated position from the main occupation area of the shelter distinguishes it from these other rooms, and thus may have been used primarily for special activities.
Rooms A and B

Although both rooms were built at ground level, the floor of Room B is approximately 40 cm higher than the floor of Room A. The west wall of Room B was built in conjunction with the east wall of Room A (Figure 23). The two walls are joined by interlocking upper courses. Although the upper courses are interlocked, the lower courses of the two walls diverge evidenced by a gap between the lower courses of Room A and Room B. Three upright slabs constitute the bottom course of the east side of this shared wall.

The type 2 masonry wall enclosing the south and east sides of Room B was built in conjunction with the shared wall. The courses above the south wall entry of Room B are bonded with the upper courses of the wall shared by Rooms A and B. The upper courses of the south segment of the type 3 masonry east wall of Room A are abutted to the shared wall. This south segment of the east wall continues to define Room A to the south. The collapsed west wall of Room A apparently abutted the south wall. The shelter ceiling served as the roof for the north half of the room, but a roof would have needed to be built for the south half.

The interior walls of Room A are heavily sooted. Soot on the shelter wall follows the top of the pilaster and bench that were built against the shelter wall and the north end of the east wall. Sooting on the pilaster and bench is faint. Perhaps the outer sooted plaster layer on the bench and pilaster was eroded. An alternative explanation is that the pilaster and bench could have been a later addition. If this remodeling occurred, it does not appear to signal change in the way the room was used.
Figure 23. Plan view and profile map of Cliff Dwelling GG C3-1, Rooms A-F.
The heavy sooting of the room suggests Room A was primarily used as a habitation room. Yet, based on its double coursed walls, ventilator, possible roof entry, pilaster and bench (features commonly associated with kivas), it probably was also used for ceremonial activities. The plastered column built against the rear of the shelter could be a pilaster, at least formally. Functionally, it did not serve as a roof support, since the roof was much higher than the top of the column. Adjacent to Room A on the rear of the shelter is a mortar and soot outline of a ghost structure. Some time before abandonment, this room may have been used as a habitation space concurrently with Room A.

The lack of sooting on the interior walls and the relatively small size of its entry (50 cm x 40 cm) indicates Room B served as a granary. There is no evidence that the door was ever sealed. Its roof is intact and is constructed of five small juniper beams laid parallel to the shelter wall. One of these beams, tree-ring dated at A.D. 1181B, is set into the shared interlocked wall (Table 5). Whether the beam that produced this cutting date was cut to fit the dimensions of the room could not be determined, but the presence of bark on the beam indicates that Room B was most likely constructed in A.D. 1181 or shortly thereafter. Since Rooms A and B are bonded, they date no earlier than approximately A.D. 1181. The closing material is small sticks placed across the small primaries, parallel to the shelter ceiling. Smooth mud was packed on top.
Table 5. Tree-ring Dates for Cliff Dwelling GG C3-1.

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<th>Provenience</th>
<th>Field Number</th>
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<th>Inside Date</th>
<th>Outside Date</th>
<th>Notes</th>
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<tr>
<td>Room B Primary beam</td>
<td>GRG-120</td>
<td>JUN</td>
<td>993</td>
<td>1181B</td>
<td>Large end in wall</td>
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<tr>
<td>Room D Beam end in wall</td>
<td>GRG-121</td>
<td>PNN</td>
<td>870</td>
<td>991+vv</td>
<td>Heavily weathered</td>
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<td>Room F Primary beam</td>
<td>GRG-118</td>
<td>DF</td>
<td>1135p</td>
<td>1203B</td>
<td>Top surface smoke blackened; small end in original wall</td>
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<td>PNN</td>
<td>1116np</td>
<td>1195+vv</td>
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<td>PNN</td>
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<td>1217+vv</td>
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<td>JUN</td>
<td>1141fp</td>
<td>1235+vv</td>
<td></td>
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<td>GRG-125</td>
<td>DF</td>
<td>1109</td>
<td>1173+v</td>
<td>Large end stone axe cut and against cliff wall; Small end set in beam hole; Weathered</td>
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<td>DF</td>
<td>1133p</td>
<td>1179+G</td>
<td>Large end stone axe cut</td>
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<td>DF</td>
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<td>1184v</td>
<td>Large end stone axe cut; Weathered</td>
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<td>JUN</td>
<td>1001±p</td>
<td>1225+G</td>
<td>Outside end burned</td>
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<td>JUN</td>
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*Room C*

Habitation C was built on a footing of upright slabs and large sandstone blocks (Figure 23). A double coursed type 3 masonry wall was built on the footers, enclosing
Room C. The horizontal courses of irregular stones were mortared with tan mud. The interior walls are heavily sooted. An earlier structure (possibly a pit structure), in the space occupied by extant Room C, is evidenced by a low soot outline on the shelter wall behind the north masonry wall of Room C.

The roof has collapsed into the structure and remains almost completely intact on top of the floor fill. The roof was constructed by placing a single cottonwood beam (5 cm in diameter) parallel to the rear of the shelter. Then, the secondary elements ranging 1-2 cm in diameter were placed perpendicular to the primary beam. Tan mud was thickly packed over the sticks and against the rear of the shelter.

A ghost structure, adjacent to Room C to the east, is represented by a red mud outline adhering to the rear of the shelter. The height of the mud outline indicates that its roof was approximately 10 cm higher than the roof of Room C. The tan mud used to build Room C was used to repair or seal the juncture between the top of the walls of the ghost structure and the rear of the shelter. This suggests the ghost structure was built before Room C. Based on the absence of soot on the rear of the shelter, the ghost structure most likely had a storage function. The ghost storage structure was later dismantled and then replaced by another storage structure. A small wall stub extending from the rear of the shelter to the south represents this younger storage structure. This room also appears to have been dismantled. At abandonment, Room C may not have had an attached storage room.
Rooms D, E, and F

One continuous double coursed type 2 masonry wall was constructed to define the south and west walls of Room D (Figure 23). The base of the south wall is composed of upright slabs with coursed masonry on top. The south wall abuts the east wall, which contains the ventilator, indicating the east wall was built before the south wall was constructed. After the wall construction was completed, the interior of Room D, including the shelter wall, was plastered. The niche and the small shelf above the niche in the northeast corner could have been a later addition; however, nothing in the architectural data rules out the possibility that they were built concurrent with the original wall construction. Based on its sooted walls, Room D functioned primarily as a habitation space. However, the presence of kiva features, such as the south ventilator, double wall, possible roof entry, niche and shelf suggests this room also served a ceremonial function.

The preservation of the roof of Room D is poor, but roofing debris is in the floor fill and directly outside of the west wall. The height of the roof is indicated by the extent of the soot on the rear of the shelter, by a primary beam impression in the south wall, and by an end of a small, heavily weathered juniper beam still embedded in the south wall. Whether the juniper beam was heavily weathered before or after it was emplaced in the wall of Room D is unknown. The juniper beam end was cored in 1974 and produced an early date of A.D. 991+vv (Table 5). This date is too early to be considered a construction date for Room D. If the roof of Room D was similarly constructed as the roofs of Rooms E and F, then its roof was composed of two primary beams laid parallel
to the south wall. Based on the contents of the roofing debris, branches spanned across the primaries, followed by a layer of mud. A roof entry is likely, as there is no indication of an entry in the extant walls.

The south and west walls of Room E are defined by one continuously bonded type 3 masonry wall (Figure 23). The east wall of Room D abuts the southwest corner of Room E. The east end of the south wall of Room E abuts the southwest corner of Room F. Upright slabs serve as the base for the west wall. At some time, the eastern half of the south wall was repaired with type 2 masonry, including the portion of wall surrounding the south entry. Mud coping is absent around the entry, but a door slab lies just outside the entry. A flat stone serves as the sill. Corncobs in the floor fill, the height of the entry (approximately 50 cm) and the raised sill (45 cm above floor level) indicate this room was primarily used as a granary.

The roof is intact indicating method of construction. The roof was constructed by first placing two cottonwood primary beams (6 cm in diameter), which were cut for the length of the room, parallel to the south wall. The ends of the beams were built into the original walls. Branches were then laid across the primaries, which in turn were covered with closing material, including twigs and cornhusks. Lastly, mud was packed over the closing material.

Room F was built against the rear of the shelter, and its west, south, and east walls are one continuously bonded type 3 masonry wall (Figure 23). Upright slabs compose the base of the east wall. The section of south wall above the entry was repaired with type 2 masonry. Room F has the same granary characteristics as Room E, but it also has
two wall peg holes. Its extant entry is uncharacteristically tall for a granary, but the bottom of the original entry has either been removed or has fallen.

The intact roof is of slightly different construction than Room E. Two primary beams (9 cm in diameter) were laid parallel to the south wall, ends incorporated in the tops of the walls. Sticks were placed perpendicular to the primaries, which were capped by a thin layer of leaves and 6 cm of mud. One of the primaries produced a date of A.D. 1203B (Table 5). The top of the primary is smoke blackened suggesting reuse. Thus, this date is probably earlier than the actual construction date of Room F.

This complex most likely dates after A.D. 1203. Room F, defined by one long bonded wall, was the first room in this complex to be constructed. Next, Room E was added to Room F. Room D, abutting Room E, was the last room in this complex to be built.

**Rooms G, H, and O**

Rooms G and H are two well-preserved, contiguous granaries that were probably used by the residents of Kiva I and Room O, a probable habitation room (Figure 24). The nature of the wall construction is hidden by several centimeters of floor fill. Nevertheless, one continuous mortared type 2 masonry wall defines the east and south side of Room H and the south side of Room G. A jacal wall, unusual wall construction for granaries, subdivides these rooms. The west end of Room G is also enclosed by a jacal wall. These two jacal walls abut the masonry wall and the shelter wall. The primary beam running east-west through the middle of the rooms is built into the jacal walls and the east masonry wall of Room H. The small secondary beams were also built into the
Figure 24. Plan view and profile map of Cliff Dwelling GG C3-1, Rooms G-I, J2, and O and Feature J1.
masonry. Hence, the frame for the jacal walls (the upright posts) and the roofs (primary and secondary beams) were built along with the masonry wall. The jacal walls and the roofs were then completed. The posts in the jacal wall and roof beams are cottonwood and thus did not produce tree-ring dates. Some of the stones exhibit sooting on the outside, evidence of recycling of construction materials.

The height of the south entry of Room G from the sill to the stick lintel is 56 cm. The south entry of Room H is larger with a height of 76 cm. The stone lining the entries were shaped by pecking for accommodating a tight fitting slab in each entry. In the vicinity of these rooms are three shaped stones that resemble door slabs. Mud coping is evident on both entries.

The roofs of these two structures, although similar in construction, show quite a difference in the spacing of the tertiary sticks. The tertiary sticks of Room G are very closely arranged, but the sticks of Room H are 10 cm apart and twigs were used to fill in the gaps between the sticks. Perhaps this difference is the result of two different teams of builders or of different roof construction episodes. The latter explanation is unlikely because both rooms share a primary beam. Two of the cottonwood secondary beams in Room G appear to have been reused; soot is present on the top sides of these beams.

These rooms primarily served a storage function, but were also used for perhaps some preparation activity involving fire, as indicated by their lightly sooted interiors. Regardless, the relatively small size of the entries, the sealing of the roof and overhang joint, the lack of extensive sooting on their interiors, and the shaping of the doorways to accommodate a slab are all indicators of a storage function.
A slab lined room existed in the space just west of Room G prior to the time Room G was built. The west end of the south wall of Room G was built on top of the earlier structure’s outer upright slabs. It was also built against a jacal portion of the earlier structure’s east wall, as indicated by sooted stick impressions in the west end of the south wall of Room G. The slab-lined structure was replaced by Room O that was built on top of the upright slabs of the earlier structure and abutted against the south masonry wall of Room G. Room O is represented by its south remnant masonry wall. A gap in the south wall is indicative of a south entry. Room O was probably a habitation. The end of the primary beam of Rooms G and H protrudes into Room O. The bottom of this section of the primary beam is heavily sooted. Also, the rear of the shelter is heavily sooted within the confines of Room O’s wall outline. The lack of wall rubble indicates the missing wall segments were removed probably for construction elsewhere.

Room I (Kiva)

This subterranean kiva is isolated from the other rooms at the east end of the shelter (Figures 5 and 24). Its diameter, excluding the estimated bench area, is approximately 4 m, making it the largest room in the shelter. A large amount of sandy fill and vandalism have obliterated any evidence of the floor level and floor features (e.g., ventilator), the foundation construction, and the benches. In addition, there is no evidence of a southern recess. Its single coursed masonry walls consist of unshaped sandstone blocks, horizontally laid to expose their square flat faces to the inner surface. Few chinking stones are evident in the mud mortar.
The spatial patterning of the six pilasters indicates that the sandy fill is obscuring six benches. The face of the pilasters are plastered and heavily sooted. The soot on the sides of the pilasters indicates that the sides of the pilasters were never plastered. Two small sticks project from the two southern pilasters, and their function is unknown.

Most of the roof has either collapsed or was dismantled. The edges of the roof are still intact and provide information on how the roof was constructed. The roof was flat. The six pilasters supported cottonwood logs (13-20 cm in diameter), which were cribbed out from the sides to form the base of the roof. Overlying the logs were sticks, followed by a layer of brushy twigs and a layer of juniper bark. A thick layer of mud (6 to 8 cm thick), that capped the top of the kiva, was placed over the bark layer. Tree-ring dates of 1195+vv, 1217+vv, and 1235+vv from charcoal fragments in the floor fill, if derived from its roof, place the construction of Room I at sometime after A.D. 1235 (Table 5). A firepit, located approximately 1.5 m directly north of the kiva, indicates that the roof of the kiva and the space between the kiva and Rooms G, H, and O functioned as an open courtyard.

Room J2 and Features J1 and J3

Rooms J2, located at the west end of the lower ledge of the shelter is a poorly preserved masonry structure (Figures 5 and 24). There is no evidence to suggest that the architectural spaces designated as J2 and J3 were actually used as enclosed, roofed structures. An outline of a probable remnant room adjacent to Feature J1 is indicated by wall rubble. Whether these architectural features were used concurrently with the other rooms at Turkey Pen at abandonment is unknown. How these features were used is also
unclear. Feature J1 consists of a remnant mortared masonry wall. A probable entry is indicated by a gap in the middle of the wall. There is no evidence of roofing to suggest that this feature was actually roofed. Room J2 was possibly used primarily as a habitation room. Although the shelter wall is plastered, there is no other indication that Room J2 had a habitation function. The plastered shelter wall is not sooted and there is no sign of a ventilator. It may have been used as a habitation only during the warmer months. Feature J3 consists of one short section of mortared masonry, built against a dry-laid wall. The dry-laid wall extends from the masonry wall to the rear of the shelter, forming a semi-circle. There is no indication that the walls were higher or that the structure was ever roofed. Based on its position, it could have served as a defensive wall, limiting access to the upper ledge.

Room J2 is the best preserved architectural feature of this complex. Although this structure has kiva characteristics (a bench and double coursed walls), it probably served primarily a habitation function. It is constructed of mortared courses of type 3 masonry consisting of blocky stones and upright slabs faced on the interior. Some sections of its north and east walls are double coursed. Although sandy fill covers the top of the southwest masonry wall, it appears to be single coursed. A bench in the northwest corner is of uniform construction and is an integrated part of the wall. It must have been incorporated into the wall during the original construction of the room. Based on the horizontal mud line visible on the rear of the shelter, the roof was flat and probably rested on primaries paralleling the shelter wall. The north shelter wall was plastered with tan mud and is similar to the mud used in the masonry. There is presently no plaster on the interior masonry walls, but it may have been eroded.
Figure 25. Plan view and profile map of Cliff Dwelling GG C3-1, Rooms L-N.
Above Room J2, on the rear of the shelter, are the outlines of four ghost structures. The rooms were probably dismantled for the construction of Feature J1 and Room J2. On the basis of the absence of soot within the mud outlines, these ghost structures were probably primarily used for storage.

Room L

Room L, the easternmost room on the upper ledge, was originally used as a habitation room, but was later remodeled to perhaps serve primarily a storage function (Figure 25). Preservation is poor; the upper courses of all the walls are missing and only the bottom four courses are what remain of the east wall. The first construction episode for this room first involved placing large upright sandstone slabs into the soft earth and bedrock. Then, smaller upright slabs mortared with purple mud were placed on top of these foundation slabs. The upright slabs, the purple mortar, and the rear of the shelter are heavily sooted, which indicates that the room was originally used as a habitation.

Room L was later repaired, rebuilt, and remodeled with orange mortar and horizontally laid flat stones, which make up the remaining top four courses of the south and west wall. The orange mortar used to repair and rebuild this room is not sooted like the original purple mortar, which indicates that storage was possibly its last primary intended use. The floor was also plastered with orange mortar when the room was remodeled into a storage room. A possible east entry is inferred. The face of the natural bedrock bench served as the north side of the entry. The collapsed stack of flat laid slabs formed a column that would have served as the other side of the entry. There is no indication of how the room was roofed (no beam holes etc.), but at least the original roof
was one course higher than the extant walls, as evidenced by the height of the soot on the rear of the shelter.

*Room M (Cliff Kiva)*

Room M was built directly on the sandstone bedrock shelf and is constructed entirely above ground (Figure 25). The rear of the shelter serves as the north wall. Most of the west outer wall has fallen away, revealing the nature of the double wall construction. The south and east walls are one continuous bonded wall. The west wall, the last wall to be built, abuts the interior end of the south wall. If construction materials were brought from below along the ledge from the west, such a construction sequence would have facilitated access to the walls being built.

The walls were entirely constructed of horizontal courses of unshaped sandstone blocks, but the interior has two upright slab footers. The exteriors of the outer walls are faced. The stones are placed to expose a flat surface to the outside to create a smooth wall face on the interior and exterior. Rows of small chinking stones are present, particularly in the interior and the exterior of the south and east walls.

There is a niche that penetrates the west inner wall. If it penetrated the outer wall, now fallen away, it would have served as a ventilator. Another niche, east of the entry in the south wall, penetrates through the inner wall, but not the outer wall. A ventilator is incorporated near the bottom of the south wall, aligned directly south of the roof entry. After the lower courses of the walls were constructed the roof was added, which is still intact and consists of two cottonwood primary beams, secondary beams (primarily juniper), tertiary roofing material (split log shakes), and mud. The walls were built up
several courses higher than the primaries, and approximately one course higher than the roofing mud. The primary beams were built into the walls, while the secondary beams rest on top of the south wall and against the shelter wall. The tertiary material was laid up to the inner face of the west wall, but is not incorporated into it. A stone that is incorporated in the east outer wall protrudes 10 cm from it, creating an ideal step, especially when used in conjunction with the main roof beam protruding above it. Nine of the sampled secondary beams yielded tree-ring dates. The latest of these is 1249++G, which places the construction of Room M as after A.D. 1249 (Table 5). The secondary and primary beams do not fit the dimensions of the room, which suggest that the beams were possibly recycled from elsewhere. A number of the “v” and “+” dates are from beams that are axe cut, so they were probably not produced by the use of dead wood in this room’s construction. In other words, these dates can be interpreted as near cutting dates. The primary beams extend through the east and west wall and several of the secondary beams extend beyond the south wall. Therefore, the dated beams may give an early bias for the construction of Room M.

Room M is no larger than the habitation rooms at the site. Nevertheless, its isolated location on the high narrow ledge, hatched roof entry, double wall construction, and ventilator suggests that it could have functioned primarily as a kiva at least during part of the year.

Room N

Room N is a granary with an adjacent open mealing bin, which has been vandalized (Figure 25). It was built on top of soft sandstone with irregular courses of
masonry. The masonry consists of large tabular and blocky stones. A few large chinking stones are visible. Adhering to the ceiling of the shelter (approximately 1 m above the floor level) is a horizontal line of roofing clay. Access to the room may have been through a low entry in the south wall. Mud was used to seal the space between the masonry walls and shelter wall.

The mealing bin was a later addition. The west wall of the storage room defines the east side of the mealing bin. The west side of the scattered mealing bin consists of shaped, door-hatch-like slabs set on end into the ground. A large blocky stone appears to be supporting one of the slabs. After the placement of the slabs, they were smoothly plastered with tan mud. Later, the junctions were repaired with red mud. Five other shaped slabs are scattered within and around the mealing bin.

*The Turkey Pen*

This feature was not assigned a letter designation. The copious amounts of turkey droppings observed in this part of the midden indicates that this well-preserved feature, entirely composed of jacal construction, was used as a turkey pen. What remains of the walls are several upright twigs and a few larger upright branches. There are three visible horizontal rows of twigs that continue around the entire feature. The horizontal twigs are tied together with strips of yucca. The small amount of debris present indicates that this feature was not roofed. The bottoms of the walls are 20 cm below the fill level.
Cliff Dwelling GG C4-1 (42SA5110, Sheep-on-a-Bicycle)

This shallow rock shelter consists of two levels with the principal architectural concentration on the lower level (Figure 6). A Basketmaker II component of this shelter is indicated by four hardpan cists on the lower ledge. Flooding caused the collapse and erosion of many of the extant rooms. No ghost structures are present on the lower ledge. The upper level contains only one extant room (Room J), but many outlines of masonry and/or jacal ghost structures. Access to the upper level was by a series of natural rock steps and then by a set of Moki steps.

As many as four habitation rooms (Rooms A, B, D1, G), four probable storage rooms (Rooms C1, C2, C3, E), three granaries (Room D2, F, J), and one kiva (Room I) were in use during the last occupation at Sheep-on-a-Bicycle. Some of the rooms interpreted as storage rooms were probably used as granaries, but nothing in the scant architectural evidence supports such a specific functional interpretation. In any case, one to five households may have occupied this shelter at abandonment. Each habitation room and Kiva I may have been occupied by one household. Alternatively, one unusually large household may have shared more than one of the habitation rooms.

Rooms A, B, and C1-C3 constitute a roomblock located at the west end of the shelter. There was no direct access between Habitations A and B and the attached storage rooms. This roomblock may represent a dwelling for one household. Or, one household could have occupied each habitation room. Nevertheless, that the storage rooms were attached to Habitations A and B indicates the occupants of Habitations A and B shared access to these storage rooms. Kiva I could also have been communally shared.
by the members of the household or households. Its position in front of Habitation G, however, suggests Rooms E, F, G, and I may have represented a dwelling for one household.

The only major remodeling of the rooms occurred at the entries in the south walls of Habitation G and Granary J. The reduction of the entry of Room G into a T-shaped entry may not mark a change in room function, for the appearance of the original entry could not be determined. The raised sill of the entry of Room J may indicate a change in use of the structure from habitation to storage. The exact nature of the original entry is unknown, but the patches of soot on the interior walls indicates that at some time, possibly before the modification of the entry, Room J functioned as a habitation room.

The presence of midden layers beneath flood deposits indicates a flood occurred after the last pueblo occupation of the shelter, possibly as recent as in the early twentieth century. The flood deposits are thickest at the west end (downstream end) of the lower level. Approximately 1 m of alluvial fill covers the floors of Rooms A and B, located at the west end of the shelter. The flood caused the lower courses of the walls to weaken and led to the collapse of the roofs of Rooms A and B. It also caused the collapse and hastened the decomposition of most of the other rooms on the lower level. The height of the floodwaters is marked by eroded mud mortar in the walls.

At some time after the flood, subsequent downcutting of the main channel and lateral bank erosion into the ruin occurred in front of Rooms A through D2 and Room I. The arroyo was later partially filled with eroded material from the rooms and aeolian sand. Then the main channel moved outside of the shelter and downcut further, strandng trees in the initial channel. Windblown rain has also caused erosion of mortar and soot
Figure 26. Plan view and profile map of Cliff Dwelling GG C4-1, Rooms A-D2 and J.
on the east facing walls of some of the rooms at the west end of the shelter. The west end of the shelter is more exposed to wind and rain, and offers very little flat area for construction.

*Room A*

Room A is inferred to have functioned as a habitation room based on the heavy sooting on the shelter north wall and the bottom of the roof beams. This roofed type 3 masonry room has collapsed before Nelson visited the site in 1920. Approximately 20 cm of alluvium covers the wall fall. The wall rubble from the collapsed south wall is missing due to the erosion of the bank where the south wall once stood. The south end of the west wall curves towards the east suggesting that the west wall continued, enclosing the south end of the room (Figure 26). Based on the curvature of the west wall of Room B, the south wall of Room A abutted the west wall of Room B. The remnants of the west masonry wall appear to be double coursed. The masonry consists of elongated rectangular stone laid in horizontal courses, which are faced on the interior. The rear of the shelter serves as its north wall.

Whether the roof beams were socketed into the original wall construction could not be determined. The roof fall contains five juniper primary beams (13-15 cm in diameter) that were laid parallel to the rear of the shelter. Above the primary beams are 17 juniper secondary beams (7-12 cm in diameter), which run perpendicular to the primary beams. Two of the primary beams, one of which is stone axe cut, yielded tree-ring dates of 1180v and 1183+v, indicating the probable roof construction of Room A shortly after the early A.D. 1180s (Table 6). However, two of the secondary beams
produced later tree-ring dates of 1203v and 1205+G, suggesting that the roof of Room A was either constructed or repaired as late as the early A.D. 1200s. The overall pattern of tree-ring dates, however, suggests this structure was built with recycled beams. There is no evidence (e.g. the beams were weathered prior to being incorporated in the roof) that supports this inference. Split shanks cover the roof beams. The closing material consisting of branches, twigs, and juniper bark is still evident on some portions of the roof fall. Mud was packed on top of the closing material.

Table 6. Tree-ring Dates for Cliff Dwelling GG C4-1.

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137
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Large end sawed; probably added to room by BLM to stabilize SE corner

Large end broken; Upper surface burned

Large end broken

Large end broken; Weathered

Large end axe cut; Weathered

Large end axe cut; Surface weathered

Visible end broken

Large end burned

Large end stone axe cut; weathered

Large end axe cut; Weathered

Large end broken

Large end broken; Weathered

Large end broken; Weathered

Large end burned; Weathered

Large end broken; Weathered
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<td>Large end axe cut; surface heavily weathered</td>
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Room B

The underside of the beams and the shelter north wall are heavily sooted. The bench and pilasters and possible roof entry indicate that use of this room may have included a ceremonial function (Figure 26). But, based on the heavy sooting and the lack of other features associated with kivas, it was probably used primarily for habitation purposes. The masonry style of the east and west walls is reminiscent of the type 3 masonry of the original walls of Rooms E and F at Turkey Pen: elongated, rectangular stone evenly laid in regular courses with rows of chinking in between. Some of the stones are pecked. The collapsed south wall was eroded when arroyo cutting occurred along the south border of the room.

Due to the disturbed nature of Room B, the junctures between the east wall and the bench and pilasters are obscured. There is nothing in the architectural data that rules out the possibility that the bench and pilasters were built at the same time as the walls. The remnant section of the exterior wall behind the bench, however, appears to have served as the back of the bench, and is independent of the corner pilasters and the bench. The masonry of this wall section is of blocky rather than rectangular stones, not faced on the exterior or interior. Chinking is minimal in this wall section.

The collapsed roof reveals that it was constructed in a similar fashion to that of Room A. Three or four juniper primary beams ran parallel to the rear of the shelter. In the east wall, in between and at the same level as the two remaining primary beams, is a beam hole that would have supported a primary beam. Based on the distance of the three defined primary beams, another primary beam may have run along the south perimeter of
the room. Underlying the primary beams are five short roof supports that run across the bench. The latest tree-ring date from Room B (1214G) was produced from one of these roof supports, placing the construction of Room B’s roof no earlier than A.D. 1214 (Table 6). A stone axe-cut primary beam yielded a date of 1211G, supporting the inference that the roof was constructed in the early A.D. 1200s. The presence of a variety of earlier cutting dates in the roof (Table 6) suggests, however, that this roof includes many recycled beams. The lack of a strong date cluster in the early 1200s also suggests that the latest dated beams might also have been recycled from earlier constructions. Split shanks run perpendicular to and over the secondary beams (6-10 cm in diameter). Overlying the split shanks is a layer of mortar, followed by a layer of juniper bark, which is beneath more mortar. Nelson (1920) noted a roof entry; however, presently there are no signs of this roof entry in the collapsed roof.

Rooms C1, C2, and C3

Three extant remnant type 2 masonry walls, perpendicular to the rear of the shelter, define this row of probable storage rooms (Figure 26). The shelter wall behind these rooms is not sooted. The relatively small size of the rooms and the absence of habitation features indicate these rooms probably had a storage function. The east wall of Room B encloses the west side of Room C1. The south wall of Room C1 is a stub covered by rubble from the roof of Room B. Therefore, it is difficult to interpret the construction sequence of the walls of Room C1 and Room B. Room C2 is defined to the west by the east wall of Room C1. Room C3 was built using the east wall of Room C2 for its west boundary. The masonry of all these walls consists of large, unshaped stones.
stacked in courses mortared with little mud. Evidence for the method of roof construction is absent.

The alluvial fill in these rooms contains ash, charcoal, and some trash. The trash appears to have been washed in with the deposited sediment. In other words, this area was not used as a midden before the construction of Rooms C1-C3. In addition, the fill of Room C2 includes much wall fall. On top of the alluvium in Room C3 is fibrous material perhaps derived from its roof.

The remaining section of the coursed masonry south wall of Room C3 has an upright slab as a base. The other slab footer for the south wall has fallen to the south. According to Nelson’s notes (1920), a south entry for the room was located about 1 m above the ground level. The entry may have been located directly above the toppled upright slab footer, which would have stood at no more than 1 m above ground level. There are no apertures visible in the other wall fragments. The east wall of Room C3 consists of stone and mortar, and an upside down metate, which is incorporated in one of the bottom courses just above the fill.

Rooms D1 and D2

Room D1 is a habitation room, as evidenced by its T-shaped entry and the heavy sooting on the interior masonry walls and the shelter wall (Figure 26). Its small entry, its wall peg holes and the lack of sooting within Room D2 indicate that this room served as an attached granary. The south wall of Room D2 clearly abuts the east wall of Room D1.

Type 3 masonry in Room D1 was constructed of single coursed masonry, consisting of large tabular slabs at the base, becoming more chunky and irregular in the
upper courses. The walls show some attention to creating relatively smooth wall surfaces. Chinking is minimal. The south ends of the east and walls have fallen, revealing that Room D1 was built on clean compact sand, which lies beneath approximately 8 cm of midden.

The two beam holes in the east wall indicate Room D1 had a flat roof supported by at least two primaries. The beams may have projected beyond the east wall and into Room D2, and perhaps also served as the roof supports for the roof of Room D2.

On the west wall are two small holes, which penetrate through the exterior wall. They appear to be peepholes built into the wall at the time of its construction. It is unlikely that these holes were roof supports on the basis of their small diameters and their low locations on the wall. On the contrary, the holes may have been used for roof supports for an adjacent previous existing room for which there is no structural evidence. The peephole closest to the rear of the shelter seems to have been built by inserting a branch through the wall and setting small mortared stones against it. After another section of the wall was built, the stick was pulled out. Whether the function of the peepholes was defensive is unclear.

A T-shaped entry was built in the east wall. Only the north half of the entry remains revealing the height and shape of the entry. The south half can be reconstructed from the fallen wall. Its low sill, covered by fill, is not visible. The sockets for the lintel indicate that it was composed of two branches (5 cm in diameter) set about 15 cm below the base of the primary roof beam. The roofs of both rooms seem to have been eroded and constitute the bulk of the fill in the rooms.
Figure 27. Plan view and profile map of Cliff Dwelling GG C4-1, Rooms E-G, and I.
Type 2 masonry Room D2 is defined to the south and east by one continuously bonded, single coursed type 2 mortared masonry wall. The courses of blocky stones protrude from both the interior and exterior faces of the wall, and are mortared with tan mud. A total of nine wall peg holes are on the interior south wall of Room D2. A small rectangular entry was built in the east wall. Two upright sticks were set vertically on the sill and frame the entry. Mud adhering to the exterior wall around the entry is indicative of a mud collar. A door slab was probably set against the collar and the door jamb. Tiny holes in the remaining collar mud suggest that the door slab was also secured with a stick set in loops. The height of the wall prehistorically was probably the maximum height of the standing wall as evidenced by the roof line on the rear of the shelter. The pit immediately west of Room D1 appears to be a pothole that was dug into the midden. Whether the wall was built on top of midden is unknown.

Room E

Extant Room E is defined by two masonry type 3 walls projecting from the shelter wall, one of which is the west wall of Room F (Figure 27). The double coursed masonry west wall is extremely thick. It consists of horizontally laid courses of large elongated, rectangular and small stones faced on the interior and exterior. Some haphazard chinking is evident. The entire south wall, with the exception of its foundation, and the south ends of the two projecting walls has fallen. The foundation masonry was laid on a shallow depression in the existing hardpan. A south entry is likely, as no openings are evident in the extant walls. Because the ends of the remnant south wall have been heavily plastered by BLM, reconstructing the building sequence for this room is difficult. Regardless, the
southwest corner curves from the west wall and into the south wall. The existing foundation of the south wall follows this course suggesting that the west and south walls were one continuous bonded wall. This wall probably abutted the southwest corner of Room F because the wall construction of the two rooms is different.

A cottonwood beam running parallel to the rear of the shelter extends through both Rooms E and F, but was placed there by BLM stabilization work. Also stabilized is the joint between the walls and the shelter wall. It is not clear whether this room was roofed. Soot is not present on the rear of the shelter or on the interior walls. The absence of habitation features suggests that this room was probably used for storage.

Room F

The east side of Room F is enclosed by the west wall of Room G (Figure 27). The double coursed masonry type 3 west and south walls of Room F are faced on the interior and exterior, and consist of horizontally laid courses of regular tabular stones. The south wall has several bands of small chinking, but little chinking is evident in the west wall. The foundation for these walls was laid on the existing hardpan, and the largest stones were used for the bottom courses.

BLM stabilization was done at the abutment of the south wall of Room F to Room G, around the south entry, and in the placement of the primary beam, which runs east-west across the room. There is a narrow purplish ribbon of adobe along the rear of the shelter at the level where a roof would be, but no other evidence of a roof exists. Only the east half of the south entry remains intact. The east edge of the entry is rounded and smoothed with a reddish plaster down to the level of the stone slab sill, which is
approximately 50 cm above ground level. The height of the sill and the absence of habitation features, including sooting, indicates that Room F was used as a granary.

**Room G**

Room G, at the east end of the roomblock, is defined by three walls and the rear of the shelter (Figure 27). All the walls are intact with the exception of the middle section of the south wall. The southwest and southeast corners are clearly bonded, and thus this room was probably built in one episode.

This room is built on upright sandstone slabs that were excavated into the hardpan. The southeast corner foundation is unusual in that the vertically laid slabs terminate before intersecting at the corner. Instead, the corner is rounded rather than squared off, and is built of small irregular stones mortared with thick layers of mud. Above the foundation, the walls are thicker and are made of horizontally laid courses of irregular stones with thick mud mortar. The result of the thick walls on the vertical slabs is an unstable room that leans out, particularly at the southeast corner. Soot still remains on the interior west and south walls. The diagonally placed primary beam, tree-ring dated at A.D. 1133v, is the result of BLM stabilization and therefore cannot be considered an approximate construction date for Room G (Table 6). Given the beam’s date and general appearance, it probably came from somewhere in site GG C4-1, but its long length indicates it is unlikely to have come from Room G.

The entry is in the south wall. Only the west side of the entry remains intact. This side of the entry was originally 70 cm to the west. When it was remodeled, small, rough stones and mortar were added, creating a new smoother entry edge. As a result,
the entry was made narrower and T-shaped. The mud used to remodel the entry was used to plaster the east and south walls. The plastering of the walls and the alteration of the entry may signal changes in the way the room was used. No architectural evidence, however, rules out the possibility that the room continued to be used primarily for domestic activities.

**Feature H**

Feature H consists of three masonry wall stubs and wall rubble with irregular chinking and stones of various shapes and sizes (Figure 6). Based on their curvature, these wall stubs could be the remnants of as many as three rooms. If so, the rooms probably had a storage function based on their projected small size and lack of sooting. Whether Feature H was built and used contemporaneously with the other rooms in the shelter during the last occupation at the site is indeterminate.

**Room I (Kiva)**

Room I is a keyhole shaped kiva (Figure 27). The kiva appears to have been built within a large pit dug in what was probably old alluvium or cave fill. Outside the east wall of the room, the arroyo has exposed what may be the edge of the old pit. If this is the case, the exposure shows that the walls of the pit slope down towards the bottom of the kiva. As a result, the walls of the pit probably conform better to the diameter of the kiva at floor level. The space between the pit wall and the kiva wall was filled with sand containing small stones and charcoal. This sandy fill is exposed directly north of where one of the main beams rests on the west wall of the kiva, near where the southern recess
nearly begins. The charcoal in the fill suggests that the site was occupied before the kiva was built.

The floor is covered in most places by at least a meter of alluvial fill. The interior walls are also obscured by fill and roof cribbing. Based on the small amount of the interior walls exposed, they appear to be constructed of single coursed masonry. In one exposed segment of wall, a thick coat (approximately 1-2 cm) of smoke blackened mud appears to cover the interior face. In another place, the stones are not plastered, but instead are exposed and sooted. Both these exposures are presumably above the pilasters. Since the exposures are sooted, the space (approximately 50 cm) between the cribbing logs and the kiva’s walls was probably not filled with sediment. The few exposures that exist suggest that this space was roofed over with cedar bark, small sticks and mud.

The cribbed roofing suggests that the kiva contains benches and pilasters. The top of a probable pilaster appears at the junction of the east wall and the southern recess. The top of the pilaster is about 90 cm below the extant top of the adjacent southern recess wall, which is probably the same distance below the top of the roof. The number of pilasters is indeterminate because only the top courses of logs are observable in the north half of the kiva.

The southern recess did not have a cribbed roof, thus provicing the best exposure of masonry in the room. The wall is about 50 cm thick, and is made predominately of large tabular sandstone, some of which span the full width of the wall. Some of the larger stone have been shaped by scrubbling. Most stones appear to have been placed so that their smoother faces are to the recess interior. The stones are regularly coursed with occasional chinking. The southern recess is not plastered and the exposed stones are not
sooted. Any soot or plaster might have been removed by weathering since it is very close to the drip line. The east recess wall definitely appears to have been covered by fill on the outside; patches of fill remain and the exterior is very rough. The small intact section of the west recess wall is faced on the interior and exterior, which suggests that the wall may have protruded above ground surface.

The main part of the kiva was cribbed with logs about six courses from the top of the pilasters. The cribbing reaches approximately the level of the top of the masonry walls. Two large center beams were laid east-west across the cribbing, extending all the way to the exterior masonry walls. These beams dip about 25 cm from east to west. Subsequently, stringers were laid north-south from the top of the north cribbing to the large center beams. Then, a layer of shakes, made by splitting up dead juniper logs, was laid over the stringers. Lastly, a layer of cedar bark was placed over the shanks, followed by a layer of sandy mud. There is no evidence as to how the roof was finished in the south half of the room and in the southern recess. There is a stub of a vertical post included in the west wall of the southern recess. This may have had something to do with roof support. The latest tree-ring date of A.D. 1171B for Room I was produced from a juniper cribbing log that was cut to fit the dimensions of the room (Table 6). The majority of the other tree-ring dated beams that yielded much earlier dates were burned to fit the dimensions of the room. This suggests that primarily dead, dry wood was used in the roof construction of Room I. Given that the latest date of 1171B is a cutting date, Room I was most likely built in A.D. 1171 or shortly thereafter.

No signs of remodeling or repair are apparent. Entry must have been through the roof. What appears to be a very weathered ladder pole (8 cm in diameter) protrudes from
the fill near the west side of the room. This is unlikely to have been its original position, but it might have been dislodged when the roof collapsed. There are three notches at approximately 35 cm intervals on the pole, the uppermost at the level of the top of the central beam.

Following abandonment of this room, most of the south part of the roof was removed, including the stringers, shakers, bark, and mud. Perhaps a flood washed this portion of the roof away. The subsequent arroyo removed part of the southern recess. Also after abandonment, the south wall of Room E, directly north of Kiva I, collapsed outward onto the kiva roof. Hence, the construction and use of the kiva preceded the collapse of the south wall. Some of the stones from the south wall of Room E may be buried under the present fill.

Room J

Room J is situated on a bedrock ledge above the lower ledge to the west (Figures 6 and 26). This poorly preserved type 2 masonry room is composed of a south wall, which is abutted to an east wall. Although the masonry of the two walls is slightly different, the two walls were probably built concurrently. The west wall was removed; there is not enough rubble present to account for its fall. The outline of the top of this wall is clearly visible on the shelter ceiling. The shelter ceiling is heavily sooted within the confines of the room, but the interior walls are only lightly sooted. Perhaps some of the soot on the shelter ceiling predates the construction of Room J.

The south wall is 1.35 m high, and must have been roughly 30 cm higher to meet the ceiling of the shelter as indicated by the remaining mud. The south wall is presently
situated on the edge of the ledge, though a substantial amount of sandstone has slabbед off here, which may have occurred after abandonment. The south wall is constructed of courses of irregular, unshaped stones of various sizes with some chinking in between. The exterior of the south wall is unfinished. It may have been built from the inside and the front never smoothed.

The south wall also contains the room’s entry (48 cm wide), with a sill 67 cm above the floor. There is mud coping remaining on the entry’s edges. The section of wall underneath the entry is built of thicker and larger stones and more mortar compared to the other sections of the wall. This suggests that the sill of the original entry was raised. On the basis of the soot on the interior walls, Room J originally functioned as a habitation room. Room J was last used as a granary when the size of the entry was reduced.

The east wall is similar to the south wall, but uses more chinking stones and mortar. Also, the exterior of the east wall is more finished and smoother than the south wall. It contains many small tabular stones, plus a row of large stones in the middle courses and a few in the bottom courses. Its present height to the ceiling of the shelter was its maximum height. At some time, probably post-abandonment, a hole was knocked out of the bottom segment of wall near the rear of the shelter. This hole would have facilitated passage to the other side of the room, for there is no room to walk in front of the room. A thin layer of sandy fill covers the bedrock floor.

Many rooms on this ledge were built, used, and dismantled at various times as evidenced by mud outlines of ghost rooms adhering to the rear and ceiling of the shelter. No rubble is present to account for what materials were used in the construction of the ghost rooms and features. There are mud outlines of two small round features within
Room J, which are presumed to have been storage facilities. Whether their construction and use precede or are subsequent to the construction of the walls of Room J is indeterminate. Sooting is more intense within Room J than within the outlines of the storage features suggesting that the storage features may predate at least the use of fire within Room J. Faint sooting is visible within some of the ghost structure outlines outside of Room J on the rear of the shelter. This ledge appears to have hosted multiple activities, and the temporal sequence is unclear.

**Cliff Dwelling T C1-2 (42SA5114)**

This site is situated on a narrow ledge under a high overhang (Figure 11). Access to the site is from the east along the ledge where a series of low masonry walls control passage along the ledge. Alternatively, a ladder could have been placed on a bedrock exposure beneath the west end of the shelter to access the site. Access to the rim is possible on the opposite side of Todie Canyon just upstream from the site. The mortar, sandstone, and limestone used in the structures’ construction were derived from this ledge. A limestone outcrop forms a ledge on which some structures were built. The collapse of several structures occurred after abandonment and resulted from slabs falling from the cliff wall.

Twenty-two rooms were recorded at this shelter. At abandonment, five kivas (Rooms H, M, O, P, K) and one habitation room (Room N2) are interpreted to have been in use. Most of the other rooms were primarily used as granaries. Room J, however, served as a general storage room. Poorly preserved Storage Rooms A, G, and N1 were
probably granaries, but nothing in the architectural data permits such a specific functional classification. Based on the number of kivas and habitation rooms, approximately five households could have inhabited the shelter during its last occupation. Three of the granaries (Rooms B, C, D) are not in close proximity to the kivas and habitation room, which indicates that some stored food could have been communally shared by the households.

Four of the kivas (Rooms M, O, P, K) were originally habitation rooms, but were later remodeled. The changes included the addition of new features, such as niches, benches, and pilasters. In the case of Room K, remodeling entailed the sealing of its former entry, the dismantling of the old walls and construction of new walls within the perimeter of the old room. The interior walls and roofs of the kivas are heavily sooted suggesting a great deal of use. This suggests that the kivas were used for more than occasional special ceremonies. With the exception of Room M, domestic activities most likely continued to take place in the kivas.

**Room A**

Room A is composed of two wall stubs of single coursed type 2 masonry construction, which abut the rear of the shelter and extend east under a small overhang (Figure 11). The height of the standing walls is 75 cm above the bedrock ledge. The smooth sides of the irregular stones used in the wall construction were not laid to face either the interior or exterior. Mortar is coarse reddish mud with small sandstone inclusions. Slabs that have fallen from the cliff wall have contributed to the destruction of the walls of this room. As a result, the width of the room is indeterminate. This room
probably had a storage function, as indicated by the lack of soot on its interior walls. Evidence of repair or remodeling is not present in the wall stubs.

Smaller sticks thickly mortared with tan mud were probably laid over one or two roof beams. This inference is based on a chunk of thick roofing clay resting on the floor. The missing roof beams may have been removed prehistorically. The location of the entry is indeterminate due to the poor preservation of the room.

**Room B**

One continuously bonded, double coursed masonry wall, along with the rear of the shelter, encloses this short room (Figure 28). Irregular stones laid in horizontal courses mortared with mud form the wall. The type 3 masonry wall is faced on the exterior and interior. A few sandstone blocks have been set upright in the wall construction.

The wall is in poor condition due to erosion of the sandstone. Evidence of a roof or entry is absent in the existing wall. If the entry was built in the wall and not the roof, it must have been at least 50 cm above ground, which is the average height of the existing wall. Sand and wall fall cover the floor. This structure was primarily used as a granary based on the absence of sooting and its well constructed wall.

**Room C**

This small type 3 masonry room was built in one construction episode; both of the single coursed masonry wall corners are bonded (Figure 28). It was constructed of small and large sandstone blocks, and was built directly on the bedrock beach. Chinking, set in
Figure 28. Plan view and profile map of Cliff Dwelling T C1-2, Rooms B, C, and F1-H.
the mortar, is evident on the interior of the northeast wall. The mortar in the west corner has been completely eroded.

No evidence remains of the roof, which was probably removed in prehistoric times. A column of flushed masonry marks a probable small entry in the northeast wall. Mud coping or other evidence of sealing is not evident. The sandy fill within the room is sterile. This room was primarily used as a granary, as evidenced by the lack of sooting, its well constructed walls, and probable small entry.

Room D

Room D consists of two single coursed type 3 masonry wall stubs abutted to the shelter wall (Figure 11). The remnant walls show horizontal courses of various sized and shaped stones mortared with reddish coarse mud. The flat faces of the stones are roughly aligned on the interior and some scrabbling on the exterior faces is evident on a few stones. The shelter ceiling is low enough to have served as the roof. Fine tan mud was used to reseal the junction between the walls and the shelter wall. This room is interpreted to have functioned as a granary based on its lack of sooting and the sealing of the juncture between the masonry walls and the shelter wall.

Room E

This room was probably enclosed by a partially double coursed type 3 masonry wall (Figure 28). The wall is very weathered and may have been entirely double coursed. It is constructed of irregular stones, flat faces towards the interior, and is mortared with coarse red mud. Part of the south wall has fallen outward.
Mortar and bark still adheres to the shelter wall indicating the level of the roof at 130 cm. The roof debris in the floor fill consists of impressions of sticks in mortar, but no wood is evident. The entry was built in the northeast corner. Its raised stone sill is set approximately 50 cm above the floor level. The raised sill and the lack of soot on the interior walls are typical granary characteristics.

Rooms F1 and F2

Contiguous Rooms F1 and F2 are interpreted as granaries, based on the lack of sooting on their interior walls and the nature of their entries (Figure 28). Room F1 was built before Room F2; the southeast wall of Room F2 abuts the southeast corner of Room F1. The two rooms were probably built concurrently since the same reddish coarse mortar was used in the construction of all the masonry walls. The missing wall segments are accounted for by the large amount of wall rubble indicating that these rooms were not dismantled. There is no evidence for rebuilding or repair of these rooms.

A huge slab from the shelter wall that is leaning against the rear of the shelter encloses the east side of Room F1 and also serves as its roof. The north and south masonry walls were built to bridge the gap between the slab and the shelter wall. Three possibilities for the non-existing south wall are indicated by the configuration of the wall rubble at the south end of Room F1. The existing type 3 masonry north wall was constructed of horizontal courses of sandstone blocks, laid with their smooth faces toward the interior. A thick mud collar, which probably framed an entry in the northeast corner, is packed on the column of masonry forming the north wall and on the edge of the slab.
Room F2 was built on bedrock. Upright slabs served as footers for the northeast section of wall, but the south section was built entirely of single coursed type 3 masonry of irregular stones. The interior and exterior walls are faced. How this room was roofed is not evident. An east entry is indicated by a mud collar with impressions of vertical sticks on the flushed ends of the two wall sections. The stone sill is approximately 80 cm high.

Rooms G and H (Kiva)

Rooms G is a remnant masonry structure that was probably used for storage suggested by the lack of habitation features. It was probably used by the occupants of adjacent Kiva H (Figure 28). Only sections of the east and west walls of Room G remain. A large upright slab comprises half of the east wall. Irregular stones mortared with mud were set around the slab. Two large slabs, one in the fill and the other to the east of the room, were not incorporated into the existing remnant walls, but fell from the overhang after the room was built. The collapse of the room may have resulted from the rock fall, for the slab on the fill is overlying wall rubble.

The maximum height of the room was probably approximately 95 cm above the fill level, the height of the extant east wall. Evidence of roofing is not present. The south end of the west wall remnant is flushed indicating a possible location for the entry.

Room H is a circular shaped kiva. This structure is badly eroded and covered with sand, obscuring many architectural features and the wall construction. The south wall was built beyond the drip line, and consequently was heavily eroded. The rear of the shelter serves as the north wall while the other three walls are of masonry construction.
Part of its cribbed roof remains intact indicating the cribbing began at 75 cm above floor level at the shelter wall. The estimated room height of 1.25 m, from the floor level to the top of the roof, is relatively shallow for a kiva. Three upright stones resting on the floor near the middle of the south wall indicate a deflector. The stones are heavily weathered, which accounts for the absence of sooting.

At least two layers of cribbing are evident at the corners above the primaries parallel to the shelter wall. Closing material overlying the cribbing logs in the northeast and northwest corners consists of cornhusks, which were probably mortared over with mud. The majority of the secondary beams are broken or displaced. The general locations of the secondaries indicate their original placement was perpendicular to the rear of the shelter. The bottoms of several of the beams are heavily sooted. Tree-ring dates from the loose and in situ roof beams date the construction of Room H at some time during the early A.D. 1250s (Table 7).

Table 7. Tree-ring Dates for Cliff Dwelling T C1-2.

<table>
<thead>
<tr>
<th>Provenience</th>
<th>Field Number</th>
<th>Species</th>
<th>Inside Date</th>
<th>Outside Date</th>
<th>Notes</th>
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<td>PNN</td>
<td>845fp</td>
<td>965+vv</td>
<td>Rotted</td>
</tr>
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<td>Cribbing log</td>
<td>GRG-212</td>
<td>JUN</td>
<td>963fp</td>
<td>1114vv</td>
<td>Surface weathered</td>
</tr>
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<td>Loose beam in</td>
<td>GRG-228</td>
<td>JUN</td>
<td>1016fp</td>
<td>1142vv</td>
<td>Large ené stone axe cut; Surface weathered</td>
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<td>fill</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cribbing log</td>
<td>GRG-218</td>
<td>JUN</td>
<td>1001+</td>
<td>1157++vv</td>
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<td>GRG-227</td>
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<td>943</td>
<td>1162+vv</td>
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</tr>
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<td>PNN</td>
<td>995</td>
<td>1173++vv</td>
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</tr>
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<td>Date</td>
<td>Type</td>
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<tr>
<td>Primary beam</td>
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<td>JUN</td>
<td>1057fp</td>
<td>1188+v</td>
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<td>1062p</td>
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<td>Cribbing log</td>
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<td>1208B</td>
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<td>1116±</td>
<td>1229+v</td>
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<td>GRG-238</td>
<td>JUN</td>
<td>1061fp</td>
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<td>GRG-240</td>
<td>JUN</td>
<td>1059±p</td>
<td>1243G</td>
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<td>JUN</td>
<td>1212</td>
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<td>1194</td>
<td>1251+v</td>
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<td>GRG-223</td>
<td>JUN</td>
<td>1126±</td>
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<td>Large end splintered; Surface weathered</td>
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<td>1257+B</td>
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<td>Secondary beam</td>
<td>GRG-246</td>
<td>JUN</td>
<td>1070±p</td>
<td>1265+GB</td>
<td>Large end axe cut; Resting on top of wall</td>
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<td>1161</td>
<td>1265+GB</td>
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<td>GRG-255</td>
<td>JUN</td>
<td>1128</td>
<td>1256+B</td>
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Table 7 cont’d.

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<th>Unknown Beam</th>
<th>GRG-254</th>
<th>JUN</th>
<th>1117</th>
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*Feature 1*

Feature 1, located in a small alcove, consists of remnant jacal walls, a remnant masonry wall, and mortar lines on the low overhang (Figure 11). Together these walls perhaps comprised at least four features, perhaps rooms, which may not have been used at the same time as the extant rooms in the shelter. The shelter ceiling could have served as the roofs for the probable rooms. The single coursed masonry wall that abuts the rear of the shelter was constructed of large limestone and sandstone blocks. Most likely, this wall continued to abut the rear of the shelter, defining a masonry room. The space to the east of the masonry feature was previously occupied by jacal structures. The rear of the shelter and overhang are sooted in this part of the alcove. The relationship between the jacal and masonry features is unknown.

The outermost mortar outline on the shelter ceiling indicates that originally one large jacal or masonry structure was situated in this alcove. One continuous wall enclosed the entire alcove. This structure was burned indicated by soot and was replaced by the three or more bin-like structures of jacal construction. Several pieces of mud with pole and stick impressions are still evident on the bedrock floor. No wood is present. The mortar outlines on the shelter ceiling of these structures covers the soot. Hence, this alcove was probably originally used for domestic activities involving fire, but was perhaps last used for storage.
Room S

Room S is a remnant room perched on a bedrock shelf 2.2 m above the main shelter ledge (Figure 29). The only possible access to the structure would have been from the east, where a door slab and a probable door stoop are located. The presence of the door stoop and door slab indicates that this room was primarily used as a granary. Its close proximity to Room K indicates that access to this room was restricted to the occupants of Room K.

The walls, which formed an enclosure with the natural shelter, are missing. Mortar adhering to the rear shelter wall indicates that the north wall abutted the shelter wall south of the door stoop. There is no wall rubble but several large chunks of mud with branch and twig impression are lying on the bedrock floor. Branch impressions are also evident on the mud adhering to portions of the south side of the door stoop. The remnant pieces of jacal were either part of the roof or wall construction. If the walls were of jacal construction, this room would have been an unusual granary. There is no wood present around the structure, except for a couple of twigs set in the shelter wall 18 cm above the wall mortar line. These were probably part of the roof. Pieces of floor plaster remains on the bedrock shelf indicating that at one time the whole floor was plastered. A masonry platform was constructed along the outer edge of the east side of the room to support the wall.

Rooms J and K (Kiva)

The building sequences of adjacent Rooms J and K are interrelated (Figure 29). Room J was used as a general storage room, based on the lack of sooting. It is not
Figure 29. Plan view and profile map of Cliff Dwelling T C1-2, Rooms J, K, M1, M2 and S.
interpreted as a granary due to the large size of its entry. Room K was originally used as
a habitation room, based on the large size of its original entry and the sooting on the
interior of its original north wall. Room K was later extensively remodeled to serve
ceremonial purposes as well domestic activities. Remodeling not only involved the
building of new south, north, and west walls, but also the addition of a south ventilator, a
pilaster, and a bench. Kiva K, which is somewhat rectangular in shape, also has a
plastered interior and a partial double wall. The space in between Rooms J and K may
have been enclosed, and possibly was used as storage space, but no specific evidence
supports this latter inference.

Room J appears to have been constructed earlier than the original Room K. The
construction of the north wall of Room J was possibly the first construction event
involving Rooms J and K. This type 1 masonry wall, footed on upright slabs, was
constructed predominately of mud with a core of large tabular and small blocky stones.
Thick layers of coarse reddish mud were applied to the stone core on both sides. An
entry was built as part of the original construction of the wall. Concurrently, another type
1 masonry wall abutting the east end of the north wall was built. This wall probably
continued to abut the shelter wall. It was constructed of the same coarse reddish mud as
the north wall, but it is thinner and its core is composed of smaller sandstone chunks.
Clean tan mud was used to seal the joint between the two walls.

Some time after the construction of these two walls, the entry in the north wall
was sealed with coursed, mortared masonry. Also, a section of the south side of the room
was knocked out for the construction of a new entry. The part of the abutting wall that
meets the rear of the shelter was rebuilt with type 3 masonry, which perhaps was related
to the construction of the new entry. These three events probably occurred at the same time. A probable door stoop was added to the entrance in the south wall. The height of the roof and how the roof of Room J was constructed is unknown.

Two construction phases are evident in the extant type 3 masonry walls of Room K. The first construction phase involved the construction of the east and outer north walls. Although the northeast corner is missing, these walls were probably built contemporaneously. Both walls were constructed of tabular blocks with haphazardly placed chinking stones. The north wall, however, is slightly thicker and an upright slab was used as part of the footing for the wall. The west edge of the north wall is aligned and finished indicating the location of an entry between the shelter wall and the end of the north wall. The east wall is footed on a cottonwood horizontal log, which is parallel to the wall and was part of a platform for a remnant retaining wall built along the ledge. The south end of the east wall of Room K has broken off, so the exact extent of this wall is unknown. The third wall needed to enclose Habitation K must have abutted the shelter wall. This wall, which no longer exists, could have abutted the east part of the north wall of Room J, which extends beyond the perimeter of Room J.

Some time before the second construction phase (the construction of Kiva K), the south corner of the east wall and the non-extant wall, which enclosed Habitation K, were either dismantled or naturally collapsed. Then, the west wall of Kiva K, including the pilaster, was constructed. This wall abuts the north walls of Room K and J. The space between the west wall and the rear of the shelter was filled in with sand. The entry in the north wall was probably sealed with coursed masonry at this time. Evidently, the north wall of Kiva K abutted the west wall and the east wall, which also defined Habitation K
to the east. The south wall of Kiva K clearly abuts the east and west walls. A ventilator was built at the base of the south wall. The south wall is double coursed. No mortar is evident in the outer wall, which may have been a dry-laid wall. Between the abutment of the south and east walls is a section of jacial.

How Kiva K was entered is not evident in the extant walls. Entry may have been through the roof, which was most likely flat. A flat roof would have allowed the occupants to have access to the ledge on both the east and west sides of Room K. The shift in access into Room J over time may be due to the change in use of Room K or the space in between Rooms J and K.

**Room L**

Because only the bottom portion of the west corner is intact, the dimensions of this room are difficult to determine (Figure 11). Also, the function of this room is indeterminate from the extant architectural remains. Assuming the fallen sandstone slabs were part of the east front wall, this room was approximately 2 m by 1.15 m. The slabs probably served as footers, for no wall fall is under the slabs. Also, blocky stones, which presumably composed the rest of the wall, appear to have fallen with the slabs. Due to the poor preservation of this room, the location of the entry is indeterminate. The only evidence of the roof is some charcoal in the fill, which appears to have come from a wood member.

**Rooms M1 (Kiva) and M2**

Room M1 is a circular room located in a secluded alcove immediately east of Room L (Figures 11 and 29). It abuts Room M2, a semi-circular structure. At one time,
Room M1 was defined by one continuously bonded wall. Most of the south portion of the wall appears to have been dismantled prehistorically, as indicated by the lack of wall rubble. Its extant east and west type 3 masonry walls are built of horizontally coursed sandstone blocks mortared with coarse red mud. Chinking is not present. The walls are faced on the interior; the jagged edges of the stones face the exterior. The low overhang could only have served as the roof for the north half of the room. The entry was probably located in the missing south wall. The sandy floor fill is deep, approximately 50 cm in some places.

The interior of the east and west walls are heavily sooted, as is the shelter ceiling. Some time after the sooting of the walls occurred, a low wall subdividing the room was built. This wall, which consists entirely of masonry, is not sooted and has a niche. Perhaps the construction of this wall signifies a change in function of the room from primarily habitation to ceremonial, in which activities not involving fire took place. After this modification, the south end of the west wall appears to have been repaired indicated by the lack of soot on this portion of wall.

Adjacent Room M2 served as a granary, as evidenced by its small east entry (53 cm in height) that has a door slab in close proximity, and the lack of sooting. The wall of Room M2 is built of horizontal courses of mortared stones with chinking in between. The mortar is red, but is finer than the mortar used in Room M1. The segment of its wall that Room M1 abuts is heavily sooted on the exterior. The interior wall has been repaired with reddish mortar in a few places.

Several ghost structures are evident in the alcove occupied by extant Rooms M1 and M2, as evidenced by mortar outlines on the ceiling. Some of the ghost structures had
to be dismantled for the construction of Room M2. On either side of Room M2, the overhang is sooted indicating some structures were built at the same time or after the construction of this extant room. Sooting on the overhang above Room M1 continues pass the east and west walls indicating previous structures existed in the space presently occupied by Room M1.

*Rooms N1 and N2 and Feature N3*

Rooms N1 and N2 and Feature N3 are partly defined by two remnant masonry walls (Figure 30). The central structure, Room N2, appears to have been used as a habitation. Feature N3 was probably used for food preparation or as an open work area. No architectural evidence suggests that the east side of Feature N3 was enclosed. Room N1 was probably used for storage. A mortar line 130 cm above the floor level on the shelter wall indicates that it was probably an enclosed structure. Natural basin niches at the base of the shelter walls were probably used for storage, particularly the north niche in Room N2, which is enclosed by a low masonry wall.

The wall separating Room N1 from Room N2 is of type 2 masonry construction. The stones are irregular and protrude beyond the mortar. Two mortar types are present. The earlier type is red with crushed brown shale and charcoal inclusions. The later type, used for repair, is smooth and tan. Only the red mortar is evident in the type 3 masonry wall adjoining Room N2 and Feature N3 and the low masonry wall enclosing the niche in Room N2.

The west shelter wall and the interior of the masonry walls of Room N2 are heavily sooted. The ashy floor fill is only 1 cm deep. Room N2 had a T-shaped entry,
Figure 30. Plan view and profile map of Cliff Dwelling T C1-2, Rooms N1, N2, O, P, and R1-R3 and Features N3 and Q.
which was in the north wall. The end of the segment of the north wall extending from the shelter wall is finished, and 55 cm above the floor of Feature N3 the wall end is set back 4 cm. There is evidence that the roof was repaired. The pieces of sooted jacal on the floor from the roof of Room N2 are mortared with the smooth tan mud. One piece, however, has 2 cm thick layer of the tan mortar plastered over 5 cm of the coarse red mortar, which has twig impressions. One long piece of corn stalk suggests the roof was built with corn husks and branches on top of support members. Rock fall from the rear of the shelter could have at least caused the collapse of the roof. An impression of a beam that was parallel to the non-extant south wall of Room N2 is evident in a space 15 cm below the ledge. Perhaps the beam supported the south wall.

The niche and the shelter wall of Feature N3 are lightly sooted. A thin trash layer on the floor continues beyond the face of the rock ledge. Room N1 shows no evidence of fire activities, but the floor and shelter wall have been plastered smooth. Remnants of the roofing mortar are found in the fill, but no wood is present.

A slab-lined feature is located on a ledge below the rooms. Soot is evident on the slabs and underneath the ledge supporting the rooms. The fill contains charcoal, sherds, corncobs, sticks, and stones, which is probably trash from Room N2 and Feature N3. Wall rubble east of this feature probably originated from the south wall of Room N2. In size, shape, and construction this feature is like a storage cist, and thus might predate the rooms. The soot, however, suggests the feature had a different use.
Rooms O and P (Kivas) and Feature Q

Rooms O and P were built simultaneously. The type 3 masonry wall that defines Room O to the west and south continues to enclose the south side of Room P (Figure 30). The type 3 masonry wall subdividing the two rooms is bonded to the south wall. The original function of these rooms may have been for habitation, but as indicated by the addition of kiva features, they were later remodeled to also serve ceremonial activities. Room O has a south facing vent, plastered and heavily sooted interior walls, a niche, and roof entry. Room P also has a south facing vent, plastered and heavily sooted interior walls, a niche, an inferred roof entry, and a bench.

How Feature Q relates to Rooms O and P in function and construction is difficult to determine due to the poor preservation of this architectural feature. It may not have been an enclosed and/or roofed structure. Its dimensions are unclear and no visible features indicate the use of this space. Feature Q is bounded on one side by the east wall of Room P and on the other side by a low wall. On the edge of the ledge there is a dry-laid retaining wall supported by a number of small cottonwood logs (Figure 30).

Rooms O and P were built on bedrock and talus boulders. One upright slab forms the base of the subdividing wall. The walls were built of large unshaped sandstone blocks laid in horizontal courses with smooth faces towards the interior, and were mortared with coarse red mud. With the exception of the south wall, the exterior walls are also well aligned. Little chinking is present. All that remains of the east portion of the roof of Room O is one juniper primary beam. Only one juniper roof beam remains intact from Room P; it could not be tree-ring dated. Perhaps the roofs were removed prehistorically.
Some time after the original construction of these rooms, kiva features were added (probably concurrently) to both rooms. Niches were added to both rooms and a masonry bench was built along the shelter wall in Room P. Holes were knocked out in the south walls for the construction of vents. Subsequently, the walls were weakened and were repaired with smooth tan mud, which was also used in the vent construction. The same type of tan mud was also used to plaster the lower portions of the interior walls and the floors of Rooms O and P, in the construction of the niche and bench in Room P, and in the wall repair on the exterior walls of Room P and exterior west wall of Room O.

Remodeling of Room O also occurred at the roof. The original roof of Room O was removed. The nature of the original roof’s construction is indeterminate. Its new roof was constructed by first laying a few courses of masonry on the small bedrock shelf located in the shelter wall just below the level of the roof. These masonry courses were mortared with the same tan mud used in the remodeled and repaired sections of Rooms O and P. The primary beams for the new roof were incorporated into these courses. Whether the beams from the old roof were recycled for the construction of the present roof could not be determined. Presently, thirteen juniper primary beams are set side by side in the west half of the room. There is a gap between the single primary beam comprising the east section of roof and the other thirteen primary beams. Seven secondary beams were laid across this gap; their ends rest on the two primary beams framing the gap. The latest tree-ring date produced from one of the primary beams set into the repaired upper portion of wall is A.D. 1259+B (Table 7). One of the primary beams and one of the secondary beams, which are not incorporated into but are resting on top of the repaired upper portion of the wall, tree-ring dated to A.D. 1265+GB. Juniper
bark was laid over the primary beams in the west half of the room, followed by a layer of com stalks and a course of masonry, which were capped with the tan mud. At some time, a hearth was built on the ledge in the shelter wall.

Because the extant walls of Room O stand at their maximum heights and no entry is evident in the walls, entry to Room O must have been through the roof. The entry for Room P is not as clear due the collapsed east wall. A roof entry is likely, indicated by a probable hatch liner near the rubble of the east wall.

Reconstruction of Rooms R1, R2, and R3

As shown on Figure 30, the walls are designated r1, r2, r3 and r4. The three masonry types indicated on Figure 30 do not correspond with the three masonry types used in this study. These labels were added when the maps and drawings were made in the mid-1970s, prior to the developments of the masonry type definitions used in this thesis and in Bloomer (1989). The three different masonry styles apparent in the wall construction of Walls r1, r2, r3 and r4 are all slightly different styles of type 3 masonry construction. Abutment is clear between each wall indicating the construction of the roomblock began with the construction of the remnant room west of Room R1 and ended with addition of Room R3. The rear of the shelter served as the north wall for these rooms. Based on their small raised entries and the absence of soot on their interior walls, these rooms functioned as granaries.

Upright slabs are incorporated at the base of all the walls. The masonry style of the east portion of masonry Wall r1 is different than the other walls, distinguished by small and large stones mortared with red mud and finished to give an even face. The
south portion of the wall is of a different masonry style indicating rebuilding. This masonry style uses tan mortar with larger and longer rectangular stones. This same masonry style and mortar was used in the construction of Wall r3.

Evidence for the other walls or any other features of the remnant room defined by Wall r1 is lacking. Perhaps the original room was dismantled for the construction of a new room that was never completed. The small raised entry in Wall r1 appears to have been built as part of the original wall construction. The original room may have been accessed through this entry. The original room was possibly dismantled when Room R1 was constructed.

Walls r2 and r3 were the next walls to be constructed, and share the same masonry style. The interior faces of the blocky stones protrude beyond the mortar, but the smooth sides face the exterior. Red mortar was used in their construction. Wall r2 encloses Room R1. One large cottonwood beam (9 cm in diameter) runs perpendicular to the shelter wall. One end of the beam is incorporated into the south wall and the other end rests on the shelter wall. Besides the primary beam, no other roofing material is evident. Wall r3 encloses Room R2, which was accessed on the east side near the shelter wall. This entry was sealed with the same red mud used in its wall construction, leaving the only possible access through the roof, if another entry existed. One of the door slabs in the floor fill fits the sealed entry. Remnants of the roof consist of pieces of roofing mud in the floor fill and two small beam impressions on the shelter wall and the east wall. The last room added, Room R3, was built of a different masonry style. Part of the south and most of the east wall of Room R3 has collapsed. Access to Room R3 was possibly through the east wall. One of the upright slabs at the base of the wall is ground
and covered with thick layers of mud. The stones and mortar are lightly sooted in the south corner, indicating only temporary occupation. There is no evidence for roof supports.

Roof mortar chunks in the floor fill in Rooms R1 and R2 indicate that the roofs were constructed with the same coarse red mortar used in the wall construction, but were later repaired with the tan mortar used in the construction of Wall r3 and the south section of Wall r1. When Room R3 was constructed, Rooms R1 and R2 were repaired and the south portion of Wall r1 was rebuilt.

The roof beams were probably removed prehistorically to be used elsewhere. The presence of an ashy floor lense under the south wall of Room R3 indicates that this space was used as a work area before the construction of Room R3.

Cliff Dwelling GG C9-1 (42SA5115)

This site is located on an alluvial terrace and on a bedrock bench just above a wash and under a low and wide overhang (Figure 13). Much trash is in the drainage in the sage flat in front of the shelter. The canyon bottom can be easily accessed from the site, but access to the rim is impossible in the immediate vicinity.

Prehistorically, the shelter housed many more structures than at present. Several rooms may have been washed away or buried by alluvium. Wall stubs and mortar remnants support this inference. In addition, some time after the 1974 recording of this site, the front of the alluvial terrace was cut away by the wash, exposing part of a subterranean room, possibly a kiva. Much of the mud mortar of the extant rooms has
eroded, leaving the rooms in poor condition. Most of the extant rooms show signs of prehistoric repair, which may be indicative of the ineffectiveness of the shelter overhang in warding off the elements. However, the repair may be evidence for a number of separate occupations of this shelter.

The structures in the shelter presently consists of the possible kiva mentioned above, plus five granaries (Rooms A, B, and D-F), two general storage rooms (Rooms C1 and C2), one habitation room (Room G), and two rooms of uncertain function (Rooms H and I). Due to the natural deterioration that has occurred at the site, these existing rooms are probably not reflective of the original functional composition of the shelter. That this site was a single household habitation is unlikely. The occupants of Room G probably did not use or have access to all the granaries and storage rooms at the site, but they probably had exclusive access to Rooms H and I, which most likely had a storage function.

*Rooms A and B*

Type 3 masonry Rooms A and B are granaries (Figure 31). Their typical small granary entries in the west walls have raised stone sills and door stoops. Only the bottom portions of the entries remain intact. Sooting is absent on their north shelter walls and interior masonry walls.

The existing south wall of Room A is 10 cm shorter than its original height of approximately 160 cm, as evidenced by a horizontal line of mortar adhering to the rear of the shelter. The west and east walls are more eroded; the latter is only 75 cm high. The east wall is composed of large upright slabs mortared with little mud, but the west and
Figure 31. Plan view and profile map of Cliff Dwelling GG C9-1, Rooms A-D.
south walls consist of small irregular stones mortared with much mud. The upper courses of the west wall are mortared with different mud indicating this wall was rebuilt. Unlike the cleaner mortar in the bottom courses, the mortar used in the upper courses has sherd, charcoal, and organic inclusions. A juniper beam mortared to the top of the south wall and extending towards the north shelter wall could be the product of BLM stabilization rather than part of the original roof construction. Regardless, the beam did not yield a tree-ring date.

Though the south wall of Room B abuts the east wall, both walls were built simultaneously. Both walls are similarly constructed of small irregular stones mortared with mud, identical to the south and west walls of Room A. A juniper roof beam, perhaps also set by BLM, extends from the top of the southwest corner to the northeast corner. The beam could not be tree-ring dated. A dry-laid masonry wall stub, adjacent to Room B, is perhaps representative of a remnant room. However, there is no evidence of a remnant room on the shelter wall.

*Rooms C1 and C2*

These contiguous rooms probably served primarily as general storage rooms (Figure 31). Soot and features designed to seal the structures from the outside are absent. The door sills of the entries in the east and west sides are not raised. Though the entries are narrow, their low sills indicate the rooms were not built to function as sealable granaries.

Both rooms are enclosed by one long continuously bonded type 3 masonry wall. Similar to Rooms A and B, this wall is composed of courses of small irregular stones
overlain with thick coats of mud containing sherds and charcoal. The large upright slab and short section of masonry wall in the northwest corner could have been part of an older room that collapsed or was dismantled prior to the construction of these two rooms.

A low dry-laid masonry wall (30-40 cm high), constructed of irregular large stones, partitions the two rooms. There is no evidence on the shelter wall indicating that the existing partition ever extended to the shelter wall. Because the interior of the room is filled with a thin layer of wind blown sand, the bedrock floor is partially exposed.

**Room D**

Room D is a uniquely constructed isolated granary (Figure 31). It is comprised of stones of various sizes and shapes and mortar of many different colors and textures. It is unclear whether the different mortars indicate different construction episodes, remodeling, sealing, resealing, or just haphazard construction.

The entry in the southeast corner faces the ledge by which access to the room from the site is attained. The lintel and sill consist of mortar. Columnar sandstone slabs serve as door jambs. Mud coping on these jambs is absent, but the size of the entry and the sealed junctures between the top of the walls and the shelter ceiling indicate a granary function for Room D.

**Room E**

The type 3 masonry south wall abuts the type 3 masonry east wall of this small granary (Figure 32). The east wall extends south from the shelter wall beyond the confines of the room, which suggests that Room E abutted another room, built before or
Figure 32. Plan view and profile map of Cliff Dwelling GG C9-1, Rooms E-I.
at the same time as Room E. The mortar of the two walls is similar, though the south wall has more regular courses of stones than the east and west walls.

If the roof did not contain the entry, then the entry must have been located in the extant low west wall. If this were the case, the sill must have been high. Mortar was used to seal the juncture between the masonry walls and the shelter wall. The existence and nature of the roof is unknown due to the absence of roofing material. A thick layer of fill obscures whether or not this room was built on bedrock.

Room F

This room is a relatively shallow granary of type 3 masonry construction (Figure 32). The height of the overhang determined the height of the room. Upright slabs and mud form the base of the east wall. Though the construction of the east wall uses more stone than the south and west walls, the same mud was used in all the walls indicating coeval construction. The tops of the south and east walls, however, have been rebuilt with large blocky stones mortared with relatively less mud. The wall segments around the south entry are eroded. Nevertheless, the original entry was approximately 40 cm wide. Some of the sticks in the fill may have served as lintels, but none are shaped or grooved.

Rooms G, H, and I

Rooms G, H, and I are three contiguous rooms (Figure 32). The south wall of Room H abutted Room G, while the south wall of Room I abutted Room H. Therefore, Room G was the first room in this complex to be constructed, and Room H and I were
built probably shortly after. At one time, this space could have been occupied by a room block composed of six rooms. At abandonment, Room G functioned primarily as a habitation room, and Rooms H and I were probably primarily used for storage. The overhang served as the roof for Room G. Although no roofing material remains, Rooms H and I probably had constructed roofs. The overhang does not fully cover these rooms. The entries for Rooms H and I are not visible. The east ends of their south walls, which have collapsed, probably contained the entries.

Room G is relatively low (1 m maximum) for a habitation room. The interior walls and shelter ceiling are heavily sooted. The southeastern entry, measuring 81 cm high, is intact, and several horizontal sticks are mortared beneath its stone lintel. Its type 3 masonry walls consist of irregular large unshaped stones mortared with mud. Small chinking stones are present.

A section of its west wall, extending from the rear of the shelter, is of different and earlier construction. It consists of upright slabs with jacial construction (upright posts and mud) in between. The exterior face of this wall segment has been replastered, probably when the existing Room G was built. The curvature of this wall fragment suggests that a slab and jacial structure originally existed in the space presently occupied by Room H.

The east wall of Room G and a remnant wall to the east enclosed a space that was probably used for storage. The height of this structure was approximately 40 cm and no sooting is present. Its exact dimensions and location of its entry is indeterminate. The masonry style of the wall stub is similar to the east and south walls of Room G. Hence, this remnant room may have been built and used concurrently with Room G.
Room H served as storage room indicated by its relatively small size and the absence of habitation features. Heavily weathered soot is evident on the shelter ceiling, but the soot most likely resulted from the use of the ghost jícal structure.

The type 3 masonry walls of Room H consist predominately of large blocks and tabular stones and rows of chinking. The stones are unshaped and some were set with their jagged faces exposed to the exterior and interior. However, the exterior walls have been plastered to even out the rough surface.

Type 3 masonry Room I was built of large blocks and thick tabular stones. The stones are unshaped and laid horizontally in regular courses with their flat faces towards the exterior. Much of the mortar has been eroded, but some of the stones in the interior are still covered with mortar containing chinking stones. The absence of soot on its interior walls and its relatively small size indicates a storage function for Room I.

Two wall stubs to the west of Room I indicate previous use of this space. The easternmost wall stub is no more than a chunk of mortar wedged under the very low overhang. The other wall stub is primarily mortar, though a stone lying nearby has obviously fallen out of the matrix. These wall stubs may represent two enclosed spaces that were built and used at the same time as Rooms G, H, and I.

Cliff Dwelling GG C10-1 (42SA5116)

This shelter is composed of eight extant masonry rooms (Figure 14). The configuration of these rooms, grouped together in one large three-story room cluster, is an anomaly in the Grand Gulch study area. This structural arrangement may have
resulted from the limited amount of dry space afforded by the shelter rather than a
difference in social organization. The residents rebuilt Rooms H1 and I1 in anticipation
of the construction of the third story. If two households occupied Rooms H1 and I1, then
this rebuilding event would have required interhousehold cooperation. Evidence for
rebuilding is obvious in the wall construction of Rooms F and G, as well. The rebuilding
of the rooms could represent either continuous abandonment and reoccupation of the site,
the addition of new households to the site, or the changing composition of the households
that continually occupied the site. The rooms appear to have been built and used roughly
contemporaneously indicated by their common type 3 masonry construction. When the
rooms were rebuilt, the original stones and mortar were reused. As a result, inferring a
building sequence for this site is difficult.

The second story consists of Room H1 and I1, and the third story consists of
Rooms H2 and I2 (Figures 33 and 34). At abandonment, four habitation rooms (Rooms
F, G, I1, I2), one kiva (Room D/E), two granaries (Rooms C, H1), and one probable
storage room (Room H2) composed this shelter. Whether Features A and B, which are
probably remnant rooms, were used during the last occupation at this shelter is
indeterminate due to their poor preservation. The households probably shared access to
the well-preserved granary in 175 m west of the site (Figure 14). Each habitation room
would have been either occupied by one household or by various members of the same
household. The lack of interconnecting doorways makes defining dwellings at GG C10-1
difficult. Rooms H2 and I2 are inferred to have an interconnecting doorway; hence, the
occupants of Habitation I2 would have had direct access into Storage Room H2. That
Figure 33. Overview of Room C, H1, and H2 at Cliff Dwelling GG C10-1 looking east.

Figure 34. Overview of Rooms C, D/E, H1, H2, I1, and I2 at Cliff Dwelling GG C10-1 looking north.
Habitation I1 is adjacent to Granary H1 suggests that these two rooms represent at least part of a dwelling.

Rooms D and E are considered one room in this reconstruction. A masonry wall partitions the two spaces designated D and E, but never completely separated the two spaces into two enclosed rooms. Based on its heavily sooted interior, this enclosed space may have served primarily as a habitation room. However, it is interpreted to have functioned as a kiva based on its comparatively large size and its central position in the site. It also has a partial double south wall and a large niche. Perhaps the partition was built to form a passageway, designated by the letter E, leading into the kiva. Rooms F, G, and I2 are interpreted to have been primarily used as habitation rooms, as evidenced by the presence of soot on their interior walls. Room I1 was originally used as a storage room but was later remodeled into a habitation room.

None of the roofs remain intact, but roofing debris is evident in room fill. Much roofing debris may be buried by wind blown sand. Nevertheless, two horizontal juniper log supports for the front wall of Room I1 yielded two tree-ring dates of 1068+GB and 1156+G, which indicate that the construction of the original Room I1 postdates A.D. 1156 (Table 8). The two logs were probably collected as dead wood, as indicated by the beetle galleries and the broken large ends. Therefore, these dates give an early bias for the construction of Room I1. The fact that the two logs differ in date by nearly 90 years also indicates that they do not represent the harvesting of trees specifically for this construction event.
Table 8. Tree-ring Dates for Cliff Dwelling GG C10-1

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<tr>
<th>Provenience</th>
<th>Field Number</th>
<th>Species</th>
<th>Inside Date</th>
<th>Outside Date</th>
<th>Notes</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wall support</td>
<td>GRG-266</td>
<td>JUN</td>
<td>862fp</td>
<td>1068+GB</td>
<td>Built into wall; Large end broken</td>
</tr>
<tr>
<td>Wall support</td>
<td>GRG-264</td>
<td>JUN</td>
<td>1082</td>
<td>1156+G</td>
<td>Large end broken; Built into wall</td>
</tr>
</tbody>
</table>

Site Construction Sequence

The oldest room in this complex is Room C, which is defined by one continuously bonded masonry wall that was built on bedrock. The wall is composed of large tabular and irregularly shaped stones, some of which have scabbled edges. The smooth sides of the stones face both the exterior and interior walls. Small flat chinking stones, serving as space fillers, were decoratively placed in horizontal rows. A coarse red mortar was predominately used, but finer tan mud was used to repair portions of the wall. The interior walls are plastered with red mud. The north wall was built on top of a bedrock ledge; hence, the top half of the wall is masonry and the bottom half is bedrock. The entry was built into the upper portion of the south wall. Only the bottom portion of the entry remains intact. A door slab could have been secured in the entry evidenced by mud coping around the edges.

Although this room has a plastered interior, it is interpreted to have served primarily as a granary. Its small entry, wall pegs, and lack of sooting supports this functional inference. At some point, the roof of Granary C was removed, and subsequently a new roof was constructed using the old beams and tan mud; the same type of mud was also used to repair the north wall, probably also at this time. Both the original mud mortar and tan repair mortar are still adhering to a cottonwood roof beam in the fill.
Room H1, situated on a bedrock ledge approximately 150 cm above the floor level of Room C, was built after the roof of Room C was rebuilt. Its south wall was built directly on top of the north wall of Room C. All the wall corners are bonded indicating this room was built in one construction episode. This room was similarly constructed as Room C, but decorative chinking is evident only on the interior walls. A shelf or niche was incorporated into the construction of the southwest corner. The entry was built in the south wall with a lintel consisting of four mortared horizontal sticks.

At some time, the east wall was removed and was then rebuilt abutting the east end of the south wall. The rebuilt east wall consists of large tabular stones (probably reused stones from the previous wall), flat faces towards the interior and exterior. As in the other walls, smooth red mud was used as mortar. A new entry was built in the center of the rebuilt east wall; the south entry was not sealed, but was used concurrently with the new east entry. The exterior of the rebuilt east wall is plastered with tan mud, which was also used for repair in the other walls.

The original Room H1 served primarily as a granary and continued to be used as a granary after the addition of the second entry and new east wall. The room and both entries are small (54-58 cm high). Mud coping is evident around the original south entry indicating the placement of a door slab.

Rooms D, E and I1 were built after Rooms C and H1. The south wall of Room I1 clearly abuts the rebuilt east wall of Room H1. Rooms D/E and I1 were built at the same time. Incorporated in the construction of the original north wall of Room D/E is a log platform built to support the south wall of Room I1. This platform in conjunction with the natural stone ledge underneath may have formed a functional niche in Room D/E.
The partition may not have been part of the original construction of Room D/E, for it abuts the south wall of Room D/E. Similar to Room C, these rooms were constructed of large tabular blocks mortared with tan mud, but with larger chinking in horizontal rows. The smooth faces of the stones are aligned on the interior and exterior walls.

Access into the original Room I1 may have been through the superfluous entry in the east wall of Room H1, though the entry is small. In fact, the east wall of Room H1 was probably rebuilt in anticipation of the construction of Room I1. The tan mud plaster on the interior of the east wall and the north shelter wall of Room I1 is sooted. Soot is evident on the shelter wall underneath the plaster layer.

Presumably after the construction of Room I1, the top portions of the walls of Room H1 containing beam holes were rebuilt. The rebuilding of the top portion of the south wall involved putting in new beam holes and an extra lintel beam in the south entry. Perhaps the roof was rebuilt in preparation for the construction of Rooms H2 and I2. The rebuilt upper courses consist of stone courses not as neatly faced as the lower courses. The original stone and mortar were probably reused in the rebuilding of the upper portion of the walls.

Perhaps subsequent to this rebuilding episode, the original Room I1 was dismantled, except for the lower courses. Room I1 was rebuilt on the wall remnants of the original room. Blocky stones were laid in horizontal courses with their two flat sides facing the exterior and interior and were mortared with coarse red mud. Small irregular chinking stone used as space fillers were placed haphazardly. A new entry was built into the south wall. Presently, only one side of this entry is extant, but it appears to have been approximately only 40 cm high. Concurrent with the rebuilding and remodeling of Room
I1, the entry of the east wall of Room H1 was sealed with mud similar to that used in the construction of the rebuilt Room I1.

Some time after Room I1 was rebuilt, the third story (Rooms H2 and I2) was built directly on top of Rooms H1 and I1. Although the entire middle portion of the south wall of Room I2 is missing, it is evident that these rooms were built at the same time. The southwest corner of Room H2 and the southeast corner of Room I2 are bonded. The south wall continues east pass the southeast corner of Room H2. Hence, one long masonry wall abutting the north bedrock wall of the shelter enclosed a space, which was subdivided by a perpendicular masonry wall separating Room H2 from Room I2.

The end of the south wall at the southwest corner of Room I2 is flushed indicating a south entry for Room I2. The top face of a large tabular slab that serves as the sill shows wear. Another horizontal tabular slab, which was incorporated into the south wall and partially laid over the sill, gives this partially intact entry a T-shaped appearance (Figure 34). No entry is evident in the extant wall defining Room H2, but the middle section of the dividing wall is missing. Therefore, an entry interconnecting Rooms I2 and H2 is inferred.

Concurrent with or subsequent to the construction of Room D/E, a curvilinear wall perpendicular to the east wall of Room D/E was built. This wall encloses the north side of Habitation F and the south side of Habitation G. The entire bottom half of this wall has been mortared over with BLM cement. Consequently, whether the bottom portion of this wall is bonded or abutted to the east wall of Room D/E is unclear. The upper courses of this wall, however, are clearly abutted to the east wall of Room D/E. At some time, a section of the west half of this wall was dismantled and then rebuilt. The
rebuilt section is composed of thin tabular slabs with rows of chinking. The older wall segments consist of large blocky stones mortared with coarse red mud. Chunks of sandstone were also used as chinking stones, but were placed haphazardly.

A large rectangular vent (30 by 40 cm) was built into the bottom of the rebuilt wall section. It is lined with thin tabular slabs covered with the same tan mortar used in the rebuilt section of wall. Whether the addition of the vent signifies a change in the original function of Room G is indeterminate. Both sides of this wall are heavily sooted.

After the south wall of Room G was rebuilt, the top of the wall was repaired. A few courses of tabular stones mortared with tan mud were added to the upper part of the south wall. The flat sides of the stones face the exterior and interior. Horizontal rows of chinking were placed in between the stone courses. The tan mortar was also used to seal the gap between the new top courses and the older sections of the south wall.

Concurrent with these repairs on the south wall of Room G was the dismantling and rebuilding of the east part of the old section of the south wall. At this time, the east wall of Room F was built. The lower courses of this wall are constructed of thin tabular stones with horizontal lines of chinking set in mortar. The upper courses are similar but consist of more irregular stones and only a few large chinking stones. These upper courses seem to be bonded to the repaired courses in the south wall of Room G. Hence, the upper courses of the east wall of Room F were built concurrently with the repairs of the south wall of Room G.

Both the existing east wall of Room G and the east wall of Room F are of the same masonry style suggesting that these two extant rooms were perhaps built contemporaneously. The remnant of the east wall of Room G abutting the rear of the
shelter is dissimilar to the masonry of the south wall section containing the vent. Also, the east wall is slightly offset from the south wall of Room G. Perhaps an older room existed in the space occupied by extant Room G. The end of the east wall of Room G is flushed marking the location of the entry. The location of the entry of Room F is indeterminate, but was probably built into its collapsed south wall.

At some time, Features A and B were built on to Room C. How these two features relate to the construction of the existing rooms at the site is unknown. Another feature was adjacent to Features A and B, evidenced by the extension of the south wall of Feature B. The north wall of Feature A was constructed of blocky stones laid in horizontal courses with flat sides facing south. No chinking is present. The south wall of Feature A consists of thick long tabular stones, smoother faces facing south, and no chinking. Feature A was built before Feature B; the west wall of Feature B abuts the south wall of Feature A. Large thick stones with smooth sides facing east comprise the west wall of Feature B. Rows of large chinking stones were set in tan mortar. The extent and the function of Features A and B are indeterminate due to the absence of features and the poor preservation of the walls.

Cliff Dwelling GG C12-1 (42SA5117)

The rooms within this high, shallow bedrock shelter are located on two ledges (Figure 15). Access to the rim from the shelter may be possible downstream on the other side of the canyon. Much vandalism in the form of potholes has occurred on both of the ledges. The upper ledge is a bedrock bench approximately 10 m above the lower ledge.
The lower ledge is covered by alluvium. The rooms on the lower ledge (Rooms A, B, C1, C2, E) are very eroded, but the rooms on the upper ledge (Rooms G, H, I, J1, J2) are well preserved. Feature F, situated on the north end of the upper ledge, was never roofed and therefore is not considered a room. At the south end of the lower ledge are hardpan cists (Feature D) representing a probable Basketmaker II component at the site. Two ghost rooms are indicated by soot outlines on the shelter wall between Rooms A and B on the lower ledge. An extensive midden is located just outside the drip line.

Ten rooms were recorded at this shelter. All of these rooms could have been used during the last occupation of the shelter. At abandonment, the shelter included a formal kiva (Room B), a habitation room (Rooms I), five granaries (Rooms C1, C2, E, J1, J2), and a general storage room (Room G). Room H may have been built for defensive purposes, and Feature F was more likely to have been used as an open courtyard. Whether Room A, a remnant habitation room, was used during the last occupation of the shelter is indeterminate. Based on the spatial distribution of the rooms, Kiva B and Granaries C1 and C2 could have constituted a dwelling for one household. In addition, one household could have used Rooms H, I, J1 and J2 as a dwelling. The other rooms are isolated, and thus may have been communally shared by the occupants of the shelter. Overall, as many as two or three households could have occupied the site at abandonment.

Remodeling is evident at the entry of Room H. Although its T-shaped entry was modified to form a ventilator and window, Room H continued to be primarily used as a habitation room. The masonry type 1 walls of Storage Room G were reconstructed of type 3 masonry. Whether the reconstruction of Room G indicated a change in function is
indeterminate; however, the absence of soot suggests that the room was primarily intended for storage.

*Room A*

Only the bottom four courses of the type 3 masonry south wall of this room remain intact (Figure 15). The walls could have been dismantled and their materials used elsewhere. Nevertheless, a habitation function can be inferred on the basis of the remnants of a T-shaped entry and the presence of much sooting. The south wall appears to have been double coursed and constructed of irregular stones with their flat sides facing both the interior and exterior. No outlines of the walls or roof are visible on the ceiling and rear of the shelter. The ceiling of the shelter could have served as part of the roof, but wood roofing must have been required. This room has been heavily pot hunted.

*Room B (Kiva)*

Room B is a formal kiva that is subterranean to the top of its upright slab wall footers (Figure 35). It is circular with three visible pilasters and a possible ventilator shaft to the south. Four pilasters are inferred from the spatial arrangement of the three visible ones. The pilaster in the southeast corner is plastered, as well as portions of the interior masonry walls. The plaster is heavily sooted. Soot is not present on the interior masonry walls and pilasters lacking plaster, indicating that the entire room’s interior, with the exception of the shelter wall, was plastered before abandonment. The upper courses of the kiva’s walls have fallen outward.
Figure 35. Plan view and profile map of Cliff Dwelling GG C12-1, Rooms B, C1, C2, G, H, I, J1, and J2.
The kiva was built on top of and against the hard-packed fill of the shelter in an excavated pit. The first step in the construction of the south wall involved the placement of irregular sized, unshaped upright slabs in the fill of the shelter. After the upright slabs were set, the masonry walls were built on top of the slabs. Presently, the highest point of the masonry wall is one meter above the fill level. Elongated unshaped tabular stones predominate and their smooth faces seem to have been selected for the inside of the wall. The exterior of the extant masonry walls, buried underneath the cave fill, is not exposed.

After the masonry walls were constructed, the three extant masonry pilasters were built. The pilasters were part of the original room construction. The top of the southwest corner pilaster is bonded with the bottom course of the masonry wall, but abuts the vertical slabs. The top of the north wall pilaster also appears to be bonded to the masonry wall. The southeast pilaster, however, appears to abut the masonry wall.

A jacal wall, along the northeast side of the room, was built either prior to or during the construction of the kiva. The jacal wall could have been built later to support the masonry wall. The jacal wall has an upright post (5 cm in diameter) at the west end. Numerous small sticks laid horizontally and vertically are to the east of the post. An upright juniper post in the northwest corner of the room may have been used as a roof support for an earlier room or may have been part of the original kiva construction. Though cored for tree-ring dating in 1974, the post could not be dated. A mud outline extends up the cliff from this post. The presence of the jacal wall segment, the upright post, and the mud outline suggest that a pit structure previously occupied this space.

The top of the roof was probably near the top of the existing north masonry wall. The heavily sooted large and small ends of a roof beam, which would have extended
along the shelter wall, are at this level. The soot on the northwest shelter wall does not continue above the level of this beam. One of the beam ends extends through the lower courses of the masonry wall that defines Room C1 and C2. Hence, a tree-ring date of 1035+\(\nu\) from this beam end places the construction of Room B, as well as bonded Rooms C1 and C2 some time after A.D. 1035 (Table 9). One of the pieces of charred wood fragments in the fill, possibly from the roof, provided the latest tree-ring date for Room B of A.D. 1083. The charred probable roof beam fragments and charred sticks in the jaccal wall indicate that this room may have burned.

Table 9. Tree-ring Dates for Cliff Dwelling GG C12-1.

<table>
<thead>
<tr>
<th>Provenience</th>
<th>Field Number</th>
<th>Species</th>
<th>Inside Date</th>
<th>Outside Date</th>
<th>Notes</th>
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<tr>
<td>Room B Wood in fill</td>
<td>GRG-354</td>
<td>JUN</td>
<td>859</td>
<td>954+(\nu)</td>
<td>Large end burned; Surface very weathered</td>
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<td>Beam extending across Room B through wall of Room C1</td>
<td>GRG-351</td>
<td>JUN</td>
<td>842fp</td>
<td>1035+(\nu)</td>
<td>Large end stone axe cut</td>
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<tr>
<td>Wood in fill</td>
<td>GRG-352</td>
<td>JUN</td>
<td>798fp</td>
<td>1036++G</td>
<td>Visible end burned</td>
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<tr>
<td>Wood in fill</td>
<td>GRG-572</td>
<td>unknown</td>
<td>935p</td>
<td>1083(\nu)</td>
<td>Surface and ends burned</td>
</tr>
</tbody>
</table>

Rooms C1 and C2

Rooms C1 and C2 are two contiguous granaries built adjacent to Kiva B (Figure 35). In an attempt to improve the sealability of the rooms, mortar was heavily applied, covering some stones on the interior and sealing the juncture between the masonry walls and shelter wall. Most of the walls have collapsed, apparently by natural processes; the
amount of wall rubble can account for most of the wall material. The maximum height of the walls as indicated by mud adhering to the shelter ceiling was approximately 150 cm.

A continuously bonded curvilinear masonry wall defined these two rooms to the south, with the jacal wall abutting the rear of the shelter and the interior of the masonry south wall. Wall fall immediately east of the south end of the jacal dividing wall supports this inference. In addition, both type 3 masonry wall segments are built of blocky stones and fairly thin tabular stones, which are unshaped and faced on the interior. The jacal wall is composed of upright sticks as well as horizontal sticks, which are held to the uprights with twig ties. Mud is plastered onto both sides of the jacal framework creating a finished wall.

An older habitation room may have occupied this space. Sooting in a small area on the shelter ceiling within the confines of Room C1, and on the rear of the shelter behind the north end of the jacal wall and the north end of the masonry wall of Room C2 indicate a previous use for this space. Also, the upright post in the middle of the jacal wall is smoke blackened. The masonry walls, however, show no sign of soot indicating that storage was the intended use for these rooms.

**Room E**

Room E is a rectangular shaped granary built between the rear of the shelter and a large boulder, which serve as its east and west walls (Figure 15). The south wall is thick (40 cm) and is constructed of irregular masonry blocks with coarse brown mortar containing charcoal and gravel inclusions. The north and south walls were built concurrently; the north wall was also built of irregular stones (some of chinking size and
shape), and the same coarse brown mortar. The existing north and south walls and the roof were 50 cm higher as indicated by mud adhering to the boulder. Sandy fill covers the floor obscuring any floor features.

The entry is small and narrow. The door sill, a flat stone, is 1 m above ground level. A stone protruding from the wall beneath the entry served as a step. Three cottonwood branches serve as a lintel. Mud coping is present at the top and north edge of the entry. The nature of the entry and the resealing along the juncture of the masonry wall and shelter wall suggest that this room was primarily used as a granary.

Feature F

This architectural feature is situated on the east end of the upper ledge (Figure 15). It is defined to the south by a low remnant type 3 masonry wall, and to the west by a slightly higher wall. Horizontal and vertical cottonwood logs support the dry-laid south wall, which consists of irregular stones. The west masonry wall is composed of long tabular slabs with their flat sides facing the interior. The mud mortar is tan with charcoal and fiber inclusions.

This feature was probably not roofed; remnant roof mortar is not evident on the rear of the shelter. Wall mortar still adhering to the rear of the shelter indicates that the maximum height of the west wall was 1 m. Only a small amount of wall rubble is present. Sooting is patchy, localized on the wall fall and on the rear of the shelter in the northwest corner. This feature possibly functioned as a retaining wall or a walled courtyard. The sandy floor fill contains many cornhusks and stalks suggesting that this space may have been used for food preparation. Yet, no metates or mealng bins are
found in close proximity to this area. The feature has been heavily pot hunted, so perhaps vandals have removed them.

Room G

Room G was originally of type 1 masonry construction with small chunky pieces of sandstone and upright slab footers, as evidenced in the bottom courses of the extant south wall (Figure 35). Tan mud mortar with charcoal and fiber inclusions was applied smoothly over the interior and exterior surfaces in equal amounts. At some time, Room G was rebuilt with type 3 masonry. The upper courses of the east wall are bonded to the four or more courses built on top of the south mud wall. The east wall and the rebuilt section of the south wall are composed of large thick, tabular pieces of sandstone with horizontal rows of chinking. Fragments of metates were also used as wall stones. The flat sides of the stones face the interior.

The west wall has been knocked outward, probably by vandals; a historic campfire is located immediately west of the room. Nevertheless, a particularly large flat slab, only 10 cm above ground level, remains as the sill for an entry in the west wall. The center of the top surface of the sill is worn.

How this room was roofed and the maximum height of the walls is indeterminate. The height of the extant walls may be the roof level but this cannot be demonstrated. Based on its low sill, wall peg and absence of habitation and granary features, the primary intended use of this room was for general storage.
Rooms H and I

Rooms H and I are located on the west end of the upper ledge and were built on sloping bedrock (Figures 15 and 35). Access to these rooms is fairly easy to the northeast up slick rock. There is no evidence for major rebuilding or modification, except for the reduction of the entry of Room I. Room I functioned primarily as a habitation room, but the function of Room H is unclear. The east wall of Room H is clearly defensive in nature (it is thick and contains peep holes), as is the positioning and location of these rooms. The double coursed masonry wall that separates Room H from Room I was built in one construction episode. It is high (extending approximately 250 cm above ground level) and is composed of tabular stones with mortar that completely covers some of the interior faces. Overall, both sides of this wall have a smooth appearance and little chinking.

A large cottonwood beam is mortared into the top of the dividing wall and the west wall of Room I. It extends towards the east wall of Room H. Running perpendicular and over the cottonwood beam is another cottonwood beam, which is mortared on top of the south wall of Room I. These beams may have been placed here by BLM, and therefore whether these beams were actually roof supports is unknown. There is no evidence of other beams or beam holes. Roof debris in the floor fill of Room H and I includes juniper bark, twigs, and mortar.

Room H is square with two extant masonry walls defining its east and west sides. The rear of the shelter is its north wall. Rubble from the collapsed south wall, which ran along the edge of the ledge, is located downslope. The fill consists of aeolian sand, wall rubble, and roof debris.
The extant east wall stands at 150 cm above ground level and consists of irregular stones horizontally laid in courses with sandy brown mortar. It extends to the edge of the ledge, restricting access to Rooms I, J1, and J2. Four peepholes built into the wall look down the upper ledge to the northeast. The exterior wall has chinking around the peepholes. A T-shaped entry was built into the east wall. Only the bottom half of the entry remains. Oddly, a branch was used as a door sill, which would make for a precarious entry into the room. Perhaps a step was built around the sill.

Room I is a rectangular room defined to the south and west by a continuously bonded masonry wall. The interior walls are heavily sooted to the fill level. A narrow bench is formed where the east wall is thicker at the bottom (approximately 1 m above floor fill). A metate was placed upright, perhaps recently, against the east wall in the northeast corner. The west wall is composed of irregular courses of tabular stone laid in brown mortar. No chinking is evident.

Large upright sandstone slabs were used as footers for the south wall. Only minimal chinking is evident in the bottom courses. The south wall had a large T-shaped entry that was later modified in order to make a ventilator and a window. At the same time, a deflector made of mortared small stones was built north of the ventilator. The entry was filled with masonry halfway up the wide part of the T and halfway down the narrow part of the T. The mortar used to modify the entry cannot be distinguished from the mortar used in the wall construction. Chinking stones were also used to partially seal the entry. There is no evidence for the addition of another entry. Perhaps there was a roof entry or an entry in the east end of the south wall.
Rooms J1 and J2

Contiguous Rooms J1 and J2 were probably built concurrently. Although the walls of Room J1 abut the walls of Room J2, these rooms shared a common north wall (Figure 35). Cottonwood log footers for the north wall of Room J2 extend to the east, beyond the east wall of Room J2. Only the bottom course of the south wall of Room J1 remains intact; it may have been dismantled prehistorically. How these rooms were roofed is indeterminate. There is no evidence of rebuilding or repair.

Room J2 is defined by one continuously bonded masonry wall. The walls consist predominately of small blocky stones. Some long tabular stones were used and they were laid with their smooth faces towards the interior and the angular faces towards the exterior. A thick layer of plaster covers the stone faces on the interior, creating a smooth interior surface. Plaster is less consistently applied on the exterior faces of the stones. The upper parts of the walls are made primarily of mud, and are thinner than the bases. Both upright and horizontal logs were used as supports for the south wall. A flat slab (approximately 60 cm above ground level), overlying the log footers in the north wall, served as the lintel for the room’s entry. The height of the sill indicates Room J2 was a granary. Room J1 was also used primarily as a granary, as evidenced by the lack of soot on its interior walls, its relatively small size, and the use of mud to seal the structure from the outside.
Cliff Dwelling GG C13-1 (42SA5118, Split-Level Ruin)

The rooms comprising this site were built on bedrock and rock fall within a well protected, high and wide shelter (Figure 16). Access to the rim appears possible immediately across the canyon. The rooms at the site are dispersed along two ledges. The rooms on the lower ledge have been stabilized by BLM. As a result, the cementing over of many wall corners and the original wall mortar has obscured evidence of repair and remodeling. Also, the original positions of beams are unclear due to the cementing of many beam emplacements. Windblown rain is accountable for the erosion of the mortar of many of the lower level rooms. Access to the upper level seems to have been from the west edge of the ledge.

At abandonment, at least three kivas (Rooms B, D, E), three habitation rooms (Rooms F, G1, J), and four granaries (Rooms A, C1, C2, G2) were situated on the lower ledge of the shelter. The function of Features G3, G4, and G5 is unknown, but Feature G5 was most likely a work area. The architectural features (Feature H and Rooms I, J, K, L, M, N) at the west end of the lower ledge are poorly preserved. Most of these architectural spaces, with the exception of Rooms K and J were probably primarily used for storage. Room K was probably used as a kiva, while Room J was probably primarily used for domestic activities. The ratio of kivas to habitation rooms is high at this site, a strong indicator that domestic activities as well as ceremonial activities took place in the kivas.

Most likely, three households occupied the lower ledge at abandonment. On the basis of the spatial positioning of the rooms, Rooms A, B, C1, and C2 probably
constituted a dwelling for one household. The isolated position of Rooms I, L, M, and N does not permit their assignment to a particular household. However, the occupants of Kiva K probably had access to Room L while the occupants of Habitation J had access to Room I. More than one household could have occupied Kivas D and E and Habitations F and G1, which are in close proximity to each other. The occupants of these rooms could have shared access to Granary G1 and Feature H. The roof of Kiva E and the space between Kiva E and Habitation G1 probably served as an open courtyard. The south entry of Habitation G1 allowed its occupants direct access to Kiva E, which may indicate that members of the same household occupied these two rooms. The wall construction sequence of Rooms G1 and G2 indicates that the construction of these two rooms was concurrent, and thus the occupants of Habitation G1 probably had restricted access to Granary G2. The location of the entry of Room G2 in the south wall also supports this inference.

Strong evidence of remodeling and reconstruction on the lower ledge is apparent at the walls of Rooms C2, F, M, G1, and G2. Only the remodeling at Rooms G2 and M indicates a change in the way the rooms were used. The modification of the entry of Room G2 is evidence that originally Room G2 was used as a general storage room, but at abandonment was used as a granary. The shelter wall within the confines of Room M is smoke-blackened, which suggests that domestic activities once occurred in this space. However, the walls of Room M are not sooted suggesting that this space was not last used for domestic purposes.

The upper ledge is composed of two narrow bedrock benches high above the lower ledge under a deep, high overhang. The spatial configuration of the architectural
features, namely Walls O and P, is defensive in nature. Access was apparently up the
steep face of the cliff, as evidenced by Moki steps. The rooms are well protected from the
elements, but the location is not conducive to long-term habitation, for the ledges are very
narrow and high, and difficult to access. The absence of cultural material also indicates
that this part of the site was not inhabited for a substantial period. Transporting building
materials up the cliff face to the upper ledge must have been laborious; numerous stones,
mortar components, and roof material do not occur on the ledge. Perhaps the structures
on the upper ledge were communally shared by the household(s) that occupied the lower
ledge. Two rooms (Rooms S and T) were clearly used for domestic purposes, but the
function of the other extant architectural features is indeterminate. Nothing in the
architectural data indicates that remodeling or repair occurred at the upper ledge.

Room A

This granary is enclosed by type 3 masonry wall, constructed of small tabular
stones, and the rear of the shelter (Figure 36). A beam impression on the top of the west
wall indicates that it was not roofed. This beam impression and a horizontal mortar line
on the shelter wall indicate that the present height of the walls was the original height.
The fill contains split twigs from the roof, numerous corncobs, and some charcoal. A
split twig serves as a lintel for the rectangular entry in the west wall. A stone slab serves
as the raised sill.

Room B (Kiva)

This kiva is circular with a double coursed masonry wall, southern recess,
benches, and pilasters (Figure 36). Three pilasters are visible; the two corners of the
Figure 36. Plan view and profile map of Cliff Dwelling GG C13-1, Rooms A, B, C1, and C2.
southern recess also probably served as pilasters. The spatial patterning of these five remaining pilasters indicates that there were at one time six pilasters separating 6 recessed benches. The 1 m of sandy fill in the room, at level with the top of the benches, and sandy fill surrounding the room, obscure any features, including a ventilator. The floor fill, containing lithics, sherds and corncobs, is differentially deep and has been pot hunted. The sandy fill of unknown depth surrounding the room conceals whether the kiva is subterranean or was built above ground. However, that the roof of the kiva is level with the bottom of the walls of Rooms C1 and C2 suggests that the kiva is at least semi-subterranean.

Most of the cribbed roof has collapsed or was dismantled, except for a portion over the northwestern edge of the kiva and on top of the southwestern wall. One end of a large pinyon primary beam (30 cm in diameter) lies on the northwestern bench, and the other end lies in the sandy fill. Two loose beams are lying on top of the northwestern wall. A tree-ring date from one of these beams possibly dates the construction of at least the roof of Room B to approximately A.D. 1168 (Table 10). Most likely, however, given their burned and broken ends, the beams were collected as dead wood, and thus the date of 1168+B gives an early bias for Room B’s construction. A cottonwood beam was mortared to the top of the southwestern wall by BLM. The remaining portions of the roof are composed of small beams, twigs, pinyon branches, and juniper bark. The present height of the walls approximates the original height as indicated by the roof remains.
Table 10. Tree-ring Dates for Cliff Dwelling GG C13-1.

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<thead>
<tr>
<th>Provenience</th>
<th>Field Number</th>
<th>Species</th>
<th>Inside Date</th>
<th>Outside Date</th>
<th>Notes</th>
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<td>Room B</td>
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<td>Beam in fill</td>
<td>GRG-268</td>
<td>PNN</td>
<td>856fp</td>
<td>1097++v</td>
<td>Large end stone axe cut; Bottom surface burned</td>
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<tr>
<td>Loose beam on wall</td>
<td>GRG-270</td>
<td>PNN</td>
<td>898fp</td>
<td>1168+B</td>
<td>Both ends burned and broken</td>
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<td></td>
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<td>Primary beam</td>
<td>GRG-316</td>
<td>JUN</td>
<td>1013</td>
<td>1133v</td>
<td>Ends mortared into wall; Entire surface sooted</td>
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<tr>
<td>across recess</td>
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<td>Room E</td>
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<td>Secondary beam</td>
<td>GRG-290</td>
<td>JUN</td>
<td>782</td>
<td>897v</td>
<td>Ends broken; Entire surface sooted</td>
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<td>Secondary beam</td>
<td>GRG-286</td>
<td>JUN</td>
<td>839</td>
<td>986++B</td>
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<td>Cribbing log</td>
<td>GRG-273</td>
<td>JUN</td>
<td>925</td>
<td>1051++B</td>
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<td>GRG-289</td>
<td>JUN</td>
<td>987</td>
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<td>JUN</td>
<td>1050</td>
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<td>GRG-280</td>
<td>JUN</td>
<td>847</td>
<td>1118+B</td>
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<td>941p</td>
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<td>789p</td>
<td>1119++G</td>
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<td>JUN</td>
<td>1046p</td>
<td>1122GB</td>
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<td>Room F</td>
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<td></td>
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<td>Door jamb</td>
<td>GRG-319</td>
<td>JUN</td>
<td>963</td>
<td>1132+B</td>
<td>Large end stone axe cut</td>
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<td>Room G1</td>
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<td>Secondary (?) on floor</td>
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<td>JUN</td>
<td>1097</td>
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<td>Primary beam</td>
<td>GRG-313</td>
<td>JUN</td>
<td>1065p</td>
<td>1198+B</td>
<td>Large end embedded in wall</td>
</tr>
<tr>
<td>Secondary beam</td>
<td>GRG-310</td>
<td>JUN</td>
<td>986</td>
<td>1204++B</td>
<td>Large end mortared in wall; Surface weathered</td>
</tr>
<tr>
<td>Secondary beam</td>
<td>GRG-307</td>
<td>JUN</td>
<td>1150p</td>
<td>1219GB</td>
<td>Large end embedded in wall</td>
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<td>Table 10 cont’d.</td>
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<tr>
<td>Primary beam</td>
<td>GRG-312</td>
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<td>1110</td>
<td>1223B</td>
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<tr>
<td>Secondary beam</td>
<td>GRG-311</td>
<td>JUN</td>
<td>1146</td>
<td>1234+v</td>
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<td>Secondary (?) on floor</td>
<td>GRG-314</td>
<td>JUN</td>
<td>1132p</td>
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<td>1013p</td>
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<td>JUN</td>
<td>1168p</td>
<td>1249G</td>
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</tr>
<tr>
<td>Room G2</td>
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<td>JUN</td>
<td>806</td>
<td>1063++B</td>
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<td>Primary beam</td>
<td>GRG-299</td>
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<td>796</td>
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<td>JUN</td>
<td>1123p</td>
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<td>Secondary beam</td>
<td>GRG-304</td>
<td>JUN</td>
<td>1154+tp</td>
<td>1243G</td>
<td></td>
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<tr>
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<td>GRG-302</td>
<td>JUN</td>
<td>1171</td>
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<td>Room J</td>
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<td>JUN</td>
<td>1081+</td>
<td>1213G</td>
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<td>Loose beam nearby</td>
<td>GRG-324</td>
<td>JUN</td>
<td>1080p</td>
<td>1223+G</td>
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<td>JUN</td>
<td>1051</td>
<td>1228G</td>
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<td>JUN</td>
<td>961p</td>
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<td>GRG-328</td>
<td>JUN</td>
<td>1083p</td>
<td>1235++G</td>
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<td>Room K</td>
<td>GRG-347</td>
<td>JUN</td>
<td>949</td>
<td>1124++B</td>
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<td>GRG-343</td>
<td>JUN</td>
<td>953</td>
<td>1175+B</td>
<td></td>
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<td>JUN</td>
<td>1035+p</td>
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<tr>
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<td>JUN</td>
<td>868+p</td>
<td>1205++B</td>
<td></td>
</tr>
<tr>
<td>Room S</td>
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<td>JUN</td>
<td>868+p</td>
<td>1205++B</td>
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<td>GRG-330</td>
<td>JUN</td>
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The walls were constructed of large irregular stones laid in smooth brown mortar. Most mortar is obscured by BLM cement. Upright slabs were used for the construction of portions of the back of the southwest bench and the inner wall of the southern recess. No plaster is present on the exposed portions of the interior.

Heavy soot is evident on the southern recess and on the southeastern and northeastern recessed areas near the fill level, the only portions of the room’s interior that BLM did not stabilize with their cement. The undersides of the in situ beams are also heavily sooted.

The southeast corner of a masonry room was built on top of the edge of the roof in northwestern part of the kiva. A stratified midden on the ground surface immediately to the north and northeast of the kiva indicates that activities continually took place on the roof of the kiva.

*Rooms C1 and C2*

These two granaries have been stabilized by BLM, obscuring details of the original wall construction. BLM cement covers the juncture where the south wall of Room C2 meets the south wall of Room C1 (Figure 36). A masonry wall subdivides the two rooms. The west end of the south wall of Room C2 possibly abuts Room C1, indicating the construction of Room C1 before Room C2. Rebuilding of Room C2 is suggested by the obvious discontinuity of type 3 masonry styles in the south and west walls. A remnant room to the south, represented by a short wall stub, was built contemporaneously with the base of the original Room C2. Room C2 was possibly rebuilt after this remnant room was dismantled.
Figure 37. Plan view map of Cliff Dwelling GG C13-1, Rooms D, E, F, G1, and G2 and Features G3-G5.
Figure 38. Plan view and profile map of Cliff Dwelling GG C13-1, Rooms D-G2 and Feature H.
The original mortar in both rooms is fine-grained tan mud, but fine red mud was used in the rebuilt wall sections of Room C2. Irregular blocky stones, flat sides facing the interior, were used in the construction of the original walls of Rooms C1 and C2. Though no roofing material is present, a beam impression is evident on the top of the west wall of Room C1. An entry is not indicated in the extant walls of Room C2, which stand at their maximum height. Perhaps the entry was built into the roof or was sealed to form a courtyard for the kiva. The top of the west entry of Room C1 is missing, yet its raised stone sill and mud collar remains, indicating that a door slab was used to close the entry.

*Room D (Kiva)*

This room is interpreted as a kiva based on its recess and apparent double wall and subterranean appearance (Figures 37 and 38). Room F, immediately to the west of Room D, was built at the roof level of Room D. Only the west wall of this kiva, which has been reinforced with BLM cement, remains visible. The west end of the south wall is also exposed and appears to abut the west wall. The west wall was constructed of large irregular stones laid in smooth brown mortar.

Two roof beams are mortared in over the recess, and their entire surfaces are sooted. A noncutting tree-ring date from one of these beams places the construction of Room D some time after A.D. 1133. The roofing material overlying the beams included phragmites, small branches, juniper bark, and corncobs. Much roofing material is also found in the sandy fill, along with stones, ash and charcoal, several corncobs, and sherds and lithics.
The room has been pot hunted, and the resulting large backdirt pile along the edge of the room is sliding into the room. Wall rubble, including heavily sooted stones on top of the northwest wall, probably resulted from pothunters throwing stones out of the kiva.

*Room E (Kiva)*

This formal kiva is subterranean; the top of its roof is the floor level of Room G1 (Figures 37 and 38). Six pilasters are inferred, though only two sides of the two inferred pilasters in the northeast and northwest corners are visible. A wide masonry bench occurs between all the pilasters except where bedrock is exposed near the northeast corner of the room. The asymmetrical shape of the north end of the kiva is due to its construction against the face of the talus slope. Before the kiva was built, the builders excavated until reaching talus boulders and bedrock. Neither end of the ventilator is visible, though it probably has an outer opening below or somewhere within the wall rubble just south of the southern recess. There is a plastered niche in the north wall, under the top of the bench. No floor features are visible under the sandy fill.

Except for the south wall, the single-coursed masonry walls are intact. The fill has been heavily pot hunted. Almost half of the roof is missing. The missing beams were either removed prehistorically, torn off by pothunters, or are completely covered by fill.

A burned upright post is set in the northeast corner of this room. For some reason, the post could not be cored for tree-ring dating. Opposite this post, in the northwest corner, is a bulge in the wall, covered completely with plaster. Another upright post may be hidden under this bulge. The upright posts may indicate that another pit structure predating the kiva occupied this space.
Because BLM cemented over the walls for stabilization, it is difficult to discern if the wall sections are bonded or abutted. Most sections, however appear to be bonded. At the southeast corner, the east end of the southern recess wall is bonded to the pilaster. The masonry walls were constructed of predominately tabular stones mortared with smooth brown mud. None of the exposed stones seem to have been intentionally shaped. The flat sides of the stones face neither the interior or exterior and many courses are not evenly laid. The one exception occurs behind the bench in the north wall, where exposed tabular stones are neatly laid. There is no indication of remodeling or rebuilding, but some dark brown mortar in the top courses in the southeast corner suggests minor repair. Five layers of plaster can be distinguished on the pilaster in the east wall along the north wall below the bench. The material used for plaster is reddish-brown, unlike the brown mortar used in the wall construction.

The first layer of roof was built with juniper beams extending from the top of one pilaster to the top of an adjacent pilaster. In three cases, four parallel beams bridge the gaps between the pilasters. The second layer is a continuation of the cribbing completed in the first layer. Using the underlying beams for support, the third layer consists of juniper beams extending east-west across the north half of the room. Cribbing was continued in the southwest corner. Small juniper beams (7 to 10 cm in diameter) were then laid at right angles to those of the third level. However, these beams do not extend across the south half of the room. One of these beams yielded a tree-ring cutting date of A.D. 1122GB, the latest date from Room E. There is a fairly strong cluster of cutting dates at A.D. 1117-1122. However, there are also earlier cutting dates at A.D. 1086, 1095, and 1104, suggesting that the roof is made of recycled materials or includes logs.
collected as dead wood. A hatch entry must have existed in this unroofed area. Small
sticks were set at right angles to the fourth level. Where extant, a 5 cm thick layer of
juniper bark was laid over the sticks. Lastly, a thin layer of mud capped the roof. None
of the roof beams were cut to fit the dimensions of the rooms. The entire surfaces of
some beams are sooted, which is indicative of the reuse of beams from other structures.

*Room F*

This large room is unique because the east wall containing the narrow entry is of
jacal construction with 6 vertical poles ranging from 10 to 13 cm in diameter (Figures 37
and 38). Long smaller diameter sticks were placed vertically between the larger poles.
Horizontal sticks are set 40-50 cm apart. Unlike the other interior walls, the interior of
the jacal wall was never plastered, as evidenced by the heavily sooted exposed wood on
the interior. The extant entry may not have been part of the original wall construction, as
sticks have been broken to form the opening. One of the vertical poles framing the entry
yielded a tree-ring date of A.D. 1132+B, which is close to the actual cutting date. This
piece of wood was evidently cut to fit the wall, indicating it was built not long after A.D.
1132. A portion of the wall was then removed at some later date to create the extant
entry.

The south wall was constructed of masonry, using large irregular blocks with
chinked mortar. A small heavily sooted circular vent was built into the top of the south
wall. The existing south wall does not meet the rear of the shelter. The west portion of
the wall has fallen into the room, revealing two brown mortar lines on the bedrock shelter
floor and the rear of the shelter, which indicate Room F was reconstructed. The original
mortar outline encloses a larger space on the west side than the wall outline of the existing room. This original mortar outline curves around what was probably the former boundary of the rear of the shelter, which has slabbed off. Soot extends to both mortar outlines, suggesting that the use of this space as a habitation room did not change when the walls were reconstructed. Two boulders were incorporated into the original wall construction; they align with the mortar outline and are sooted underneath.

Rooms G1 and G2 and Features G3, G4, and G5

Masonry type 3 Rooms G1 and G2 are part of a complex of architectural features that were used in conjunction with Kiva E. Rooms G1 and G2 appear to have been built simultaneously. Later, Features G3, G4, and G5 were added to Rooms G1 and G2.

Feature G3, a small circular structure abutting Room G2, was used either as an animal pen or a storage bin (Figure 37). There is no architectural evidence that suggests Feature G3 had a roof. Its short wall is constructed of large irregular sandstone blocks with chinked mortar. Feature G4, perhaps a remnant room, is represented by a curvilinear masonry wall, which apparently abutted Feature G3 and Room G1 (Figure 37). This wall was built using irregular sandstone blocks and light brown mortar. If this feature is a remnant room, then it was perhaps primarily used for storage, given the lack of soot on its interior wall. There is no evidence for a roof, so alternatively, this space could have been primarily used as a work area. Feature G5 abuts the east corner of Room G1 (Figure 37). This area was outlined in part by the south wall of Feature G4. Fairly large, irregular blocks were used in its construction. Two parallel upright slabs in the interior, partly covered by sandy fill, may have formed a mealing bin. The lack of
evidence of a roof or hearth suggests this feature may have also functioned as a work area.

Room G1 is a large rectangular room situated just to the northwest and above Kiva E (Figures 37). It may have served primarily a habitation function. It also may have been used ceremonially in conjunction with Kiva E, as evidenced by its plastered interior, bench, and ventilator. A thick layer of sandy fill, containing roofing material and sandstone blocks, obscures any floor features. The entire room is defined by one long continuously bonded masonry wall that was built on bedrock.

The wall was built of irregular stones laid horizontally. The stones were mortared and plastered with two types of mud: clean, light brown sandy mud, and dark reddish-brown mud containing a small amount of chinking stones and organic material. The latter type overlaps the lighter plaster in some portions of the interior west wall; however, both mortars were used concurrently. The two layers of plaster on the interior walls are heavily sooted. Soot on the outer layer of plaster is especially thick.

The room shows evidence of remodeling. First, a window in the south wall was sealed with masonry. Heavy sooting is evident underneath and over the plaster of the sealed window, indicating that the sealing of the window occurred early in the use of the room. Second, a T-shaped entry in the south wall was slightly narrowed. The narrowed part of the entry was not plastered and is only lightly sooted, suggesting that the remodeling of the entry occurred late in the use of the room. A ventilator was built into the west wall (Figure 38). Because its lintel is mortared as part of the original wall, the ventilator was an original feature of the room. A low masonry bench runs along the east wall. The bench is not sooted, indicating that it may have been a later addition to the
room. The lack of soot, however, may be due to the bench’s low position on the wall. All evidence for remodeling indicates continued primary use of Room G1 as a habitation room.

The roof was built concurrently with the room’s wall; the primary and secondary beams were built into the walls. The roof was built by first setting three juniper primary beams into the south and north walls. Then, approximately 25 juniper secondary beams were laid over and perpendicular to the primaries. One of the primary beams produced the latest cutting date for Room G1, placing its construction at or after A.D. 1249. The cutting dates from this roof are scattered over an approximately 160-year range, suggesting that the roof was constructed of recycled and or dead-wood beams. Closely packed parallel sticks (1-2 cm in diameter) were set over and across the secondaries, and in turn were covered with mud. These tertiary roofing sticks were incorporated into the wall mortar in the southeast wall, but not in the northwest wall.

Room G2 is enclosed by one continuously bonded masonry wall (Figure 37). The walls are of thin tabular stones mortared with light brown mud containing few chinking stones. The smooth sides of the stones face the interior and exterior. The south wall was built on the north wall of Room G1. Although these two walls were built with different masonry styles, they were built in one construction episode. The southwest corner of Room G2 is bonded to the northwest corner of Room G1, which is higher than the level of the roof. Hence, the construction of Rooms G1 and G2 was planned together. The roof of Room G1 may have served as a veranda in front of Room G2.

The construction of the roof of Room G2 is similar to the construction of the roof of Room G1. Three juniper primary beams were used to support at least nine juniper
secondary beams, several tertiary sticks, and a thick layer of mud. The configuration of the roofing material matches that of Room G1. One of the secondary beams produced the latest cutting date for Room G2, A.D. 1255+B. This beam is stone-axe cut, indicating that it may have been harvested for use in this roof.

Room G2 originally had a T-shaped entry in the south wall that was later remodeled into a small granary style entry. The modified entry is the size and shape of a door-like slab found on the floor of Room G. The lintel of the present entry consists of five small juniper sticks. One of these sticks produced a date of A.D. 1238. This date does not indicate when the entry was remodeled because it is earlier than the estimated A.D. 1250s construction date for Room G2. Faint soot is evident in the southeast corner, on the mortar used to change the entry, and on the ceiling above it, indicating the modification of the entry signals a change in the primary use of the room. The opening in the west wall and the northwest corner have been stabilized by BLM (Figures 37 and 38). The stabilization crew packed cement on the northwest corner section of wall, and also outlined and shaped the opening in the west wall with copious amount of mud. As a result, the opening looks like an entry.

On the basis of the lack of soot in most of the room, it was probably never primarily used as a habitation. The original T-shaped entry contradicts this functional inference, but all other evidence indicates a storage function for Room G2. This room may originally have served as a storage room for non-perishable material. After the door was modified, it could have served as a granary - a storage room for perishable material. Similar to Room G1, this room may have also been used for ceremonial purposes in conjunction with Kiva E, given its close proximity to Kiva E.
Feature H

Feature H consists of three wall stubs of the same masonry style and height that were perhaps each part of separate structures (Figure 38). Based on the amount of rubble on the slope between the two westernmost walls, a south wall enclosed the area between these walls. Evidence of the roofs and of any features indicating the function of this space is not present. The lack of soot evident on the three walls and adjacent shelter wall suggests that this space may have been used for storage.

The middle wall appears to continue around to meet the eastern wall. The space this wall encloses may have been part of a small room that was partly defined by the eastern wall. The length and height of the room represented by the eastern wall stub is indeterminate. Much of the rubble in the floor fill probably came from the walls.

Rooms I, J, and K

Room I is demarcated by a line of wall rubble and the rear of the shelter (Figure 16). A mortar outline on the rear of the shelter, extending 1.9 m above the fill level, indicates the original height of the walls and roof. The stones in the wall rubble are unshaped, large and blocky. Wall mortar and roof debris is absent. None of the stones are sooted to indicate whether this space was used for habitation. Much fill from upslope has entered the room area from the west side.

A 90 cm high remnant wall represents the west end of the south wall of Room J (Figure 16). The end of the south wall abutting the rear of the shelter is defined by a large mortared upright slab. Roof fall containing several heavily sooted juniper roof
beams (approximately 5-15 cm in diameter) lies in the southeast corner. The latest tree-ring date produced from one of the loose beams – A.D. 1235++G – indicates Room J was constructed some time after that date. Based on the presence of sooted beams, domestic activities probably occurred in this room.

Room K is a depression that was possibly a kiva or a pit house (Figure 16). The area has been pot hunted. As a result, some loose juniper roof beams were uncovered. Two of the beams yielded tree-ring dates of A.D. 1124++B and A.D. 1175+B.

*Rooms L, M, and N*

These three remnant rooms are located at the south end of the lower ledge (Figure 16). Rooms L and N are assigned a probable storage function. Room M was probably used as a storage room during its last use. The original Room M was used as a habitation room, but was later rebuilt and remodeled, perhaps to serve as a storage room. The wall stubs of Rooms M and N share the same masonry style, suggesting contemporaneity of construction and use.

Room L consists of two masonry wall stubs that extend from the rear of the shelter to a large boulder. The masonry wall stubs are constructed of large irregular unshaped blocks mortared with fine tan mud. The boulder fell from the bedrock overhang after the room was constructed.

The ceiling of the shelter served as the ceiling for Room M. This room is large and the shelter ceiling is heavily sooted indicating a habitation use. On the contrary, the two short extant wall stubs and the wall mortar outlines adhering to the shelter are not sooted. Hence, activities involving the use of fire may have occurred before the
construction of the extant walls. The longer and higher north wall is similar to the east wall of Room N, composed of large tabular stones, flat sides facing the interior. Fine tan mud was used as mortar.

Room N was built on bedrock. The north and south wall stubs of single coursed masonry were footed on upright slabs. The east wall stub is constructed of large tabular stones mortared with fine tan mud. The overhang is too high and shallow to have provided a roof for this room. Given the small size of this room, a beam with one end resting on the north wall and the other end resting on the south wall could have supported the roof.

Features O and P

The defensive posture of the upper level architectural features result from the construction of Features O and P (Figure 16). These walls could have restricted access to Features Q and R and Rooms S and T from the west end of the upper level (the only present access route to the upper level). Their dry-laid masonry wall construction indicates these features were not intended to be used for a long period. Wall O is a long low dry-laid wall running along the edge of the northwest end of the lower ledge below Walls P. Walls P are a series of small dry-laid walls lining the ledge’s edge above Features Q and R and Rooms S and T. This ledge is very narrow and extends along the entire length of the upper level. The standing walls are low, but are probably at their maximum heights. Wall fall is not present, but some stones may have fallen off the ledge. Some of these walls are semi-circular and some are linear. The semi-circular walls have the appearance of turrets, suggesting a defensive use for these walls.
Features Q and R and Rooms S and T

Feature Q is defined by a low, long wall (50 cm high) bordering the bedrock ledge and by two masonry wall stubs, which abut this wall and a large boulder (Figure 16). Wall fall from the semi-circular west wall stub indicates the wall had a greater height. The remnant walls were built of large irregular stones mortared with smooth brown mud. The interior walls show faint sooting. The primary intended use of this feature is unknown.

Feature R is represented by one wall abutting the rear of the shelter, which presently does not extend all the way to Room S (Figure 16). Wall fall between Feature R and Room S suggests that Feature R abutted Room S. Its wall is of irregular stones horizontally laid in a coarse pinkish mortar like that used in the wall of Room T. Two large boulders serve as wall footers. Sooting and roofing debris are not apparent. The use of this room at the time of abandonment is indeterminate.

Room S is a square, roofed habitation room defined by a continuously bonded masonry wall and the rear of the shelter (Figure 16). The room is heavily sooted on the interior. Its wall is composed of large irregular stones mortared with smooth brown mud. The stones were laid so that their smooth sides faced the interior. One vertical slab was used as a footer. An upright post was used as a door jamb for the east entry.

The roof of Room S was constructed by first lying one cottonwood primary beam on top of the west wall. Two juniper secondary beams were then laid perpendicular to the primary beam. The west ends of the secondary beams rest on top of the primary beam. The east end of one of the secondary beams rests on top of the east wall. The east end of the other secondary beam is supported by a vertical post that was set into the
ground next to the east wall. The secondary beam yielded a tree-ring date of 1205±B, placing the construction of Room S some time after that date. Approximately 10 tertiary beams were laid over and perpendicular to the secondary beams. Juniper bark and mud, present in the floor fill, were used to finish the roof.

Room T is a semi-circular habitation room with a collapsed roof (Figure 16). Its masonry walls are heavily sooted as in the shelter wall. Roof material inside the room consists of one primary beam covered with twigs and mortar. One horizontal beam was incorporated into the construction of the masonry wall, otherwise built of large tabular stones laid horizontally in mud mortar. Brown smooth mortar was used for the lower courses while coarse pinkish mortar was used in the upper courses. In some places the brown mortar overlies the pink mortar, but in some cases the opposite is true. Hence, the two different mortars do not constitute evidence for rebuilding. The mortars were probably used concurrently but were derived from different sources.
CHAPTER 6
ARCHITECTURAL DESCRIPTION OF SINGLE HOUSEHOLD HABITATIONS

Cliff Dwelling GG C2-1 (42SA5107)

Cliff Dwelling GG C2-1 is composed of four rooms located under a small overhang, which can be easily accessed from the mesa top, but with great difficulty from the canyon floor. The bedrock ledge on which the shelter is situated can be reached by means of a nearby talus slope to the west. Rooms A, C1, C2, and C3 represent the last use of the shelter before abandonment. An earlier construction and use of the shelter is represented by the remains of Room B and by older wall segments that had been incorporated into the walls of extant Rooms C2 and C3. These remnants of older rooms may represent just one earlier construction and occupational period. All the rooms are in close proximity to each other; however, Rooms C1-C3 are contiguous (Figures 4 and 39).

Room B, outlined by two wall stubs, may have functioned primarily as a habitation room, but its exact function is unknown. It was possibly dismantled with the intent to build one of the extant rooms. Rooms A and C2, originally habitation rooms, were later remodeled to be used for storage. Hence, the cliff dwelling originally was a habitation – for perhaps one household – which was later remodeled to function purely for storage during its last use. There is no indication of the length of time between the original construction and the repairing and/or remodeling of the extant rooms. All the extant type 3 masonry walls of Rooms A and C1-C3 consist of mostly tabular sandstone laid horizontally and of a few blocky and irregular stones, mortared with mud and
Figure 39. Plan view and profile map of Cliff Dwelling GG C2-1.
chinked with small pieces of sandstone. All the walls are faced on the interior. Based on their similar wall construction, Rooms A and C1-C3 are most likely roughly contemporaneous.

Room A

Room A, the westernmost room of the shelter, probably was originally used as a habitation that was later remodeled to serve as a granary in conjunction with Rooms C1-C3. Two characteristics suggest that Room A may have been originally used as a habitation. First, all the interior walls and the ceiling of the shelter are heavily sooted. Second, the original entry was large with a low sill. The size of the entry was reduced and the sill was raised with packed on mud. That Room A was primarily used as a granary after remodeling is indicated by its typical granary entry. The remnant of a small door stoop and fragments of a door slab (approximately 45 cm wide) lie directly outside the entry. In addition, the small holes in the walls and the juncture between the shelter wall and masonry walls were plastered to improve the room’s sealability. Several corncobs lying in the floor fill also suggest a granary function for Room A.

All the walls of Room A are bonded, indicating that the room was originally built in one construction episode (Figure 39). The walls extend up to the ceiling of the bedrock shelter and abut the rear of the shelter, the north wall of the room. The interior and exterior of the south wall and the interior west wall are plastered. The south wall and southwest corner of the room are footed on horizontal juniper and pinyon logs (approximately 20 cm in diameter). The pinyon log, which is undoubtedly old wood, yielded a tree-ring date of A.D. 765GB (Table 11). This date may be related to the earlier
construction of jacal and upright slabs elsewhere in the shelter. One course of masonry, built in front of the logs, supports the footers, for they run along the slope of the small ledge on which the room is situated. The west and east masonry walls were built directly on top of the bedrock. The extant southern entry to Room A is raised, and its shape is rectangular. The lintel is composed of one horizontal juniper stick.

Table 11. Tree-ring Dates for Cliff Dwelling GG C2-1.

<table>
<thead>
<tr>
<th>Provenience</th>
<th>Field Number</th>
<th>Species</th>
<th>Inside Date</th>
<th>Outside Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room A Wall support</td>
<td>GRG-143</td>
<td>PNN</td>
<td>539</td>
<td>765GB</td>
<td>Extremely weathered; Large end broken</td>
</tr>
</tbody>
</table>

Room B

Room B, defined by two wall stubs and the rear of the shelter, is possibly the remnant of a habitation room (Figure 39). However, the function of this remnant structure is indeterminate due to the absence of distinctive attributes. A third wall stub to the west of Room B suggests that Room B had an attached enclosed storage bin. The rear of the shelter is partially sooted. The sooting occurs with little relation to the present conformation of the room’s extant walls, which is indicative of pre-existing rooms.

The three wall stubs extend from the rear of the shelter towards the south. A mortar line adhering to the ceiling extends out from the east wall stub, over the wall rubble in front of the room to the west wall stub. The south wall is represented by a line of wall rubble. The wall stub in the middle, consisting of upright sandstone slabs, probably subdivided the room into two smaller rooms. Based on mortar type, the east
wall stub was built before the other two wall stubs, since the red mortar used to repair the east wall stub was used to construct the other two wall stubs.

Reconstruction of Rooms C1-C3

Contiguous Rooms C1-C3 are large granaries situated on the eastern periphery of the shelter. One long continuously bonded masonry wall defines the south and west sides of Room C1, and the south and east sides of Room C2 (Figure 39). Hence, Rooms C1 and C2 were built at the same time. Based on the abutment of the south wall of Room C3 to east wall of Room C2, it is clear that Room C3 was built after Rooms C1 and C2. Remnant jacial walls were incorporated into the later - constructed east masonry wall of Room C2 and into the east wall of Room C3. This indicates that earlier rooms composed of jacial and upright sandstone slab construction stood in the place of Room C3 and perhaps Room C2. There is evidence for repair of all the ovate-shaped south entries and at the junction between the top of the walls and the overhang ceiling.

Room C1

The storage function of Room C1 is evidenced by a few cobs and a typical granary entry. A flat sandstone slab serves as an entry sill, which is raised 27 cm above ground level. Mortar adhering to the ground in front of the entry may be the remains of a door stoop. Thick mortar frames the entry, indicating the reduction, repair or sealing of the entry. Although the ceiling is lightly sooted, no other evidence points towards an earlier primary habitation use. The middle section of the south wall of Room C1, including the top of the entry, either naturally collapsed into the room or was
vandalized. Room C1 is defined to the east by a masonry wall that subdivides Rooms C1 and C2. Mortar still adheres to the ceiling of the shelter, where the tops of the walls and the ceiling once met.

Room C2

This space was originally used as a habitation room, as evidenced by soot on the interior walls and shelter ceiling. Absence of soot on the repair and sealing mortar on the interior of the east wall indicates that activities involving fire did not occur within the room after architectural repairs. The presence of one wall peg hole, the small size of the entry, and the raised door sill indicate that the room was last used as a granary. Vertical slabs at the base of the east wall appear to be the remains of an earlier construction that was incorporated into the masonry wall. This wall also incorporates an earlier section of a jacal wall, which is bonded to the rear of the shelter.

Room C3

The absence of sooting indicates that the primary intended use of this room was not habitation. The intended use of this room for storage is evidenced by four wall peg holes, corncobs on the floor, and a typical granary entry. The masonry east wall, which continues to enclose the south side of Room C3, was also built over a jacal wall stub protruding from the rear of the shelter. Four upright wall slabs in the south wall, also part of an earlier room and perhaps contemporaneous with the jacal wall segments, were incorporated into the type 3 masonry wall. A lintel was built over one of the slabs to support the overlying masonry courses. There is some decorative chinking on the
exterior walls of Room C3; continuous bands of very small, flat stones (2-5 cm) were used to fill the gaps between the courses.

**Cliff Dwelling GG C4-2**

This shelter is composed of three extant rooms, which are rapidly eroding downslope. Room B is adjacent to Kiva A, and at one time was connected to Kiva A by an entry that was subsequently mortared over. Prior to this, Room B was probably used for activities associated with the kiva. After the passageway was sealed, Room B may have continued to be used in association with the kiva, but was probably primarily used for habitation. Room C is a masonry room built within a small alcove under the overhang. Presently, the shelter does not prevent water from dripping onto the site. There is an abrupt break in the ledge and a steep slope south of the site. Wall stones and other cultural debris have fallen and continue to fall downslope. Apart from the scattering of material on this slope, no midden is present.

The type 3 masonry of the three extant rooms is similar suggesting approximate contemporaneity of construction and use. Apart from the mortaring over of the entrance to the kiva from Room B, there is no other evidence for reconstruction, repair, or remodeling of the extant structures.

**Room A (Kiva)**

Room A is a circular kiva built into the hardpan of the bedrock ledge. A large boulder or bedrock projection was incorporated into the construction of the east wall.
The top courses of the south wall have fallen. The fill contains aeolian sand and a considerable amount of wall fall, which is concentrated in the southeast corner of the room. The depth of the fill is unknown. Three masonry pilasters that are somewhat irregularly spaced remain intact; the boulder may have also served as a pilaster. The kiva may have had six pilasters; the two inferred southernmost pilasters are not visible because of the collapsed south wall. A ventilator tunnel, extending south from the kiva interior, is evident underneath the rubble from the south wall. The top of the ventilator is missing and the bottom is filled with aeolian sand. The bench encircling the interior is made of hardpan with the masonry pilasters built on top. Patches of plaster still adhere to the front of the bench and pilasters. The masonry walls consist of red-brown mortar with small rock inclusions and tabular stones laid horizontally. Some of the stones appear to be minimally shaped. Evidence of the roof is absent.

None of the interior walls are sooted, except for the west end of the boulder incorporated into the east wall. Faint sooting is evident under the plaster on the pilasters. Also, patches of soot are on the rear of the shelter and on the stones in the rubble. The lack of soot, however, is probably the result of the substantial amount of weathering.

The west wall is apparently a double wall, although it is somewhat obscured by wall rubble. Wall fall and a bundle of juniper bark cover the southwest corner bench. Also, a metate rests on the southwest bench along with other wall slabs. The metate was probably incorporated into the construction of the south wall.

Near the overhang in the northwest corner, a wall parallels the exterior of the kiva's double wall. It is composed of horizontally laid stones and mud mortar. This wall, in conjunction with the east wall of Room B, creates a passageway leading behind
the kiva and into Room B. At some time, the entrance of the kiva in the wall behind the northwest bench was sealed with mortar, perhaps to completely restrict access to the kiva from the passageway. Concurrently, the entire wall behind the northwest bench is covered with mortar. Another short masonry wall extends from the rear of the shelter to the back of the northwest pilaster, restricting access from Room B and the passageway to the hardpan area behind the kiva. Two remaining vertical slabs frame the passageway at the rear of the kiva.

Room B

Room B is adjacent to the kiva. It is defined to the north by the rear of the shelter and to the west and south by a long continuous masonry wall. It is separated from the kiva by a passageway. This passageway serves as the only entrance to Room B from the outside. This room’s entire interior, including the shelter ceiling, interior masonry walls, and the wall of the passageway, is heavily sooted. The sooting on the overhang extends beyond the confines of the south wall and far up the overhang; therefore, smoke was able to escape from the room. The south wall extended further west than it does presently, as evidenced by mortar adhering to the overhang. Nevertheless, there may have been ventilation between the south wall and the shelter ceiling.

The heavily sooted west wall is thickly mortared and smooth on the interior. The exterior of the west wall shows alternating sections of large upright slabs and horizontally laid stones, which are built on top of bedrock and smoothed with mud. Despite its varied appearance, the west wall appears to be the product of a single construction event. Most of the south wall has collapsed, but the remnant of this wall is footed on upright slabs.
The rubble from the south wall consists of mortar heavily tempered with juniper bark and slabs suggesting that the wall may have been constructed of slabs and mud instead of horizontally laid stones.

Room C

Room C was perhaps a small habitation room, but the lack of visible attributes does not permit giving this room a functional assignment. A section of its masonry wall is footed by a large horizontal cottonwood beam. Weathering, resulting from runoff from the overhang, is responsible for the destruction of the walls. The center of the south wall and the inferred south entry are missing.

This room was built of irregular stones laid horizontally and mortared with much mud. Although the shelter ceiling and north shelter wall has sloughed off, patches of soot remain. A small natural niche in the interior of the northwest corner was plastered.

Cliff Dwelling GG C4-6

This shelter consists of three extant rooms. Contiguous Room B1 and B2 are located in close proximity to Room A (approximately 1 m). At some time, this bedrock shelter was occupied and used by perhaps one household. When Room A was remodeled into a granary, however, the function of the shelter was limited to storage. A vertical pinyon post built into the wall of Room B2 produced a non-cutting date of 1127±40B indicating that this room was built after A.D. 1127 (Table 12). How this room is
temporally related to the construction of Room A is unknown, but it was built some time after Room B1.

Table 12. Tree-ring Dates for Cliff Dwelling GG C4-6.

<table>
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<tr>
<th>Provenience</th>
<th>Field Number</th>
<th>Species</th>
<th>Inside Date</th>
<th>Outside Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room B2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post in wall</td>
<td>GRG-155</td>
<td>PNN</td>
<td>911</td>
<td>1127++GB</td>
<td>Large end burned; Surface weathered</td>
</tr>
</tbody>
</table>

Room A

Room A originally functioned as a habitation room, but was later remodeled to serve a storage function. This large space was originally used for habitation, as evidenced by a heavy amount of soot on the interior walls. Further, a mortar repair, which is similar in color as the original, changed the width of the south entry from 55 cm to 35 cm. This mortar shows no sooting and indicates that the room’s primary intended function probably changed from habitation to storage. A door slab, approximately the same width as the remodeled entry, is located just outside the room near the entry. The same mortar used to reduce the size of the entry was used to repair Room B1.

Another mortar repair job, done prior to the reduction of the entry, employed a sandier mortar. This mortar was applied to the top of the walls and on the west side of the entry. It is sooted as much as the interior walls indicating that this repair occurred before remodeling.

Although the southwest corner of the room has collapsed outward, the masonry walls enclosing this room appear to be continuously bonded. Its type 3 masonry wall
construction consists of horizontally laid long and angular stones that are faced on the interior.

Room B1

Room B1 is a very small circular room, enclosed by one short type 3 masonry wall, and situated under a low overhang. The absence of soot and its comparatively small size suggests that this room was probably primarily used for storage. The coursed masonry wall of irregular stones has upright sandstone slab footer. The mortar used for the upright slabs has a different appearance than the mortar used for the horizontal courses indicating this room was rebuilt. The top of the wall has been repaired with the same mortar used to reduce the entry of Room A. The room is filled with much aeolian sand. The rear of the shelter behind the room is heavily sooted suggesting a previous use of this space.

Room B2

Abutted to Room B1 is Room B2, a larger semi-circular type 3 masonry room which stretches further back under the overhang. Similar to Room B1, the overhang serves as the roof, but the rear of the shelter is not used as a back wall. This room is constructed of irregular stones and mortar. Most of the mortar has been eroded. The south wall is built on a large boulder. The northeast corner has incorporated an upright slab, a large rock, and a vertical post into its construction. The west side and the stone sill is what remains of the entry in the south wall. A thick coat of mortar frames the entry. Whether this same mortar was used in the construction of the room is
indeterminate, for the mortar is heavily weathered. This room was probably used as a granary as inferred from its raised door sill and mud coping around the entry.

Cliff Dwellings GG C6-3 and GG C6-7 (42SA5112)

These two neighboring sites are located on the same ledge (Figure 8). Hence, it is likely that both sites were occupied at the same time. Probably no more than one household would have used the two shelters. Habitation E at Cliff Dwelling GG C6-3 and Kiva C at Cliff Dwelling GG C6-7 are small indicating that occupation of the shelter was restricted to a small number of individuals. There is no direct access to the rim from both shelters, but access to the shelters from the canyon bottom could be achieved by means of a ledge east of Cliff Dwelling GG C6-7. A wall situated on the narrow ledge connecting the two shelters would have restricted access between the two sites. This wall, if defensive, was probably used to protect the occupants of both shelters from uninvited visitors, rather than the residents of Cliff Dwelling GG C6-3 from the residents of Cliff Dwelling GG C6-7.

Cliff Dwelling GG C6-3

This site consists of both masonry and slab-based jacal rooms. There is no midden visible; most of the trash was probably thrown over the ledge. The extant masonry rooms include two granaries (Rooms B, E), one habitation room (Room C), and two rooms of indeterminate function (Rooms A and F). The two granaries had
constructed roofs. The roof of Room E and Room A appear to have been dismantled. All that remains of Room A are two lines of wall rubble.

This site contains two components: Basketmaker and Pueblo. Rooms B, C, E, and F represent the Pueblo occupational phase. Feature D consists of three or four Basketmaker II or III period cists, built with coarse purplish mortar and upright slabs on top of the bedrock and against a boulder (Figure 8). The space between two overlapping boulders was used for storage, as indicated by the mortar outlines. The possibility cannot be ruled out, however, that these storage features were also used during the Pueblo occupation. Purplish mortar also adheres to the rear of the shelter in the spaces occupied by Room E and F. It is difficult to determine the construction sequence of the rooms due to their spatial isolation. However, all the rooms are of type 3 masonry, built with somewhat irregular courses and large irregular stones that are faced on the interior and/or exterior. Much mortar was used and there is a small amount of chinking. Room E is the most regularly coursed with a higher ratio of stone to mortar, and scabbling is evident on some of the stones.

Room A

Room A was built on bedrock in a space that receives much runoff. Its poor preservation does not permit its assignment to any functional type. Its two extant walls are very low (one to two courses high) and extend from the rear of the shelter (Figure 8). The maximum height of the wall is indeterminate; there are no traces of the original walls on the rear of the shelter. A few twigs are in the fill, but no other signs of roofing are evident. Likewise, no entry is visible in the wall rubble.
Figure 40. Plan view and profile map of Cliff Dwelling GG C6-3, Rooms B, C, E, and F and Feature D.
Room B

Room B was probably a granary, as evidenced by the sealed juncture between the masonry walls and shelter wall. It is enclosed by one short continuous masonry wall and the rear of the shelter (Figure 40). Much of the mortar has been weathered out and the southeast corner has collapsed. The maximum height of the walls was roughly 1 m, as indicated by a beam impression (6 cm) on top of the northeast corner of the masonry wall. A piece of mortar adheres to the shelter wall 10 cm above the beam impression indicating the height of the roofing mortar. A beam running parallel to the shelter wall probably supported wood members running perpendicular to it. A few twigs are in the fill. The room may have had a roof entry as none is indicated in the extant walls.

Room C

Room C is a small D-shaped habitation room. At some time, it had an attached storage room, as evidenced by a single upright slab set in mud at the rear of the shelter to the west of Room C (Figure 40). The heavily sooted shelter ceiling most likely served as the roof. There is a four-sided slab-lined hearth in close proximity to the south wall. The entry was most likely located in the missing portion of the south wall. Large vertical slabs (perhaps from an earlier construction phase) are incorporated into the south wall. The south and east walls are plastered on the interior and exterior, while the west wall is plastered only on the interior. The existing masonry walls are heavily sooted on the interior, as well as the exterior suggesting reuse of construction materials.

On the shelter ceiling within and outside the confines of Room C, there are mortar wall outlines. The mortar outlines show that two small rooms previously occupied this
area. Since the mortar outlines are not sooted, these rooms were probably used for storage. Heavy soot is evident within and above the confines of Room C. It extends to the west, beyond the slab fragment to the west of Room C, and to the right, beyond the east wall of Room C. Sections of the mortar outlines are sooted where there is an overlap in the soot and mortar outlines. This suggests that after the storage rooms were dismantled, this portion of the shelter later hosted activities involving the use of fire. Then, the extant Room C was built.

In the fill, there are many pieces of sooted mortar which have the impressions of wooden poles (8 cm in diameter). Some of these jacal wall fragments are 7-10 cm thick. There are also several large thin slabs present in the fill. It is likely that Room C was originally constructed of upright slabs with wood posts set between them.

Room E

Room E is a relatively well preserved D-shaped granary with coursed masonry horizontally laid on bedrock, and on vertical slabs in parts of the west wall (Figure 40). The walls and the rear of the shelter are entirely sooted, as is its intact roof. Nevertheless, this room is interpreted as a granary indicated by its small sealable entry, low ceiling and two wall peg holes.

Two beams running parallel to the rear of the shelter supported the roof. Split branches and twigs were laid across the beams, which were capped with a thick layer of mud. One primary cottonwood beam is still in situ, and beam impressions of another primary beam are on top of the east and west walls near the shelter wall. Split juniper shakes are lying in the floor fill.
A small, raised entry was built into the east wall. A mud collar characteristically frames the entry, probably to support a door slab. A possible door slab lies just outside the room. The stone slab sill has been shaped by scabbling. The lintel is composed of three juniper shakes tied together with twigs.

Before the construction of extant Room E, there existed a masonry or jacal room footed on upright slabs and mortared with coarse purplish mud. It is probably contemporaneous with the cists (Feature D), which were made with similar mud.

Room F

Room F is defined by the rear of the shelter and one long continuous masonry wall (Figure 40). The entire masonry wall, with the exception of the bottom three courses, has collapsed outward. As a result, the function of Room F is indeterminate. Based on the sooting of the shelter wall, however, Room F was possibly a habitation. The wall, built on bedrock, was constructed of coursed irregular sandstone blocks with mud mortar. A few stones are scabbled. The masonry wall probably extended all the way to the shelter ceiling. The shelter ceiling probably served as the roof for the rear of the room, but a roof must have been constructed for the front half of the room. Juniper bark is in the fill, but no beams are present. Room F does not appear to have been dismantled; the missing wall stones could easily have slid over the cliff face when the wall collapsed.

The prepared floor of Room F may have been partially composed of reconstituted mud from earlier rooms. Most of the floor was built with red mud, but the west part of the floor consists of the same purple mud used in the construction of Features D and the
foundation of Room E. Prior to the construction of Room F, a series of two or three
jacal or masonry rooms were built against the rear of the shelter, as evidenced by mud
outlines on the rear of the shelter.

*Cliff Dwelling GG C6-7*

This site consists of three masonry rooms and the remnants of at least one
masonry defensive wall. The rooms, built on bedrock and on sandstone boulders, are all
well protected under the shelter overhang, which accounts for their good preservation.
One previous use of the shelter is indicated by the plaster outline of a room on the shelter
wall within Room D. Another ghost structure is indicated east of Room D by slight
sooting of the rear of the shelter. Very few artifacts are present and no midden is visible
within the shelter.

Room B is a granary and Rooms C and D are small informal kivas. To the west of
Room B are a series of small holes (3 cm in diameter) that were drilled in the soft
sandstone at the edge of the ledge. Between the holes are a few pecked Moki steps,
which continue beyond the line of holes along the ledge to the defensive wall (Feature
A). The holes do not extend all the way to Feature A but appear to be anchoring holes for
poles, which supported a wall similar to Feature A.

**Feature A**

Feature A is a short wall on a narrow ledge, located to the west of the main site
area (Figures 8 and 41). The end of the ledge is just beyond the eastern edge of the wall.
Figure 41. Plan view and profile map of Cliff Dwelling GG C6-7.
Access to the ledge on which the rest of the site is located from this point is possible by crossing a couple of meters of Moki steps and natural steps in the bedrock cliff.

The wall was apparently built at one time. The mortar was applied to the exterior of the wall to give it a smooth appearance. The wall stones and chinking stones were placed in somewhat haphazard courses. There is a gap (approximately 100 cm) between the east end of the wall and the rear of the bedrock shelter. The stones at the east end of the wall are more neatly faced on the exterior and interior than the stones in the other part of the wall, which suggests the present extent of the wall is its original extent. Moreover, the existing wall height is apparently its original height. A stick, less than 5 cm in diameter, projects 45 cm upward from the top of the wall. Two logs are located behind the wall and may have been used to periodically fill in the gap between the east end of the wall and the rear of the shelter.

The wall’s appearance is primarily defensive. The wall contains two loopholes that point northeast to the nearest access route, east of the main site area. The loopholes were probably used for observation. The wall does nothing to provide protection from advances made from the west. The wall was probably used to restrict access to Cliff Dwelling GG C6-3 and movement along the ledge and over the Moki steps between Cliff Dwellings GG C6-3 and GG C6-7.

Room B

Based on the absence of soot on the interior wall, numerous corncobs in the fill and copious amounts of mud at the juncture of the masonry walls and shelter wall, Room
B primarily functioned as a granary. This room consists of two wall stubs that abut the rear of the shelter at one end and a large boulder at the other end (Figure 41). The west wall stands about 75 cm above the soft bedrock floor. The east wall is missing, except for its upright slab footers. Unless the fill is covering wall rubble, the stones from the east wall were probably reused elsewhere. The west wall is built on top of upright slabs.

Beam impressions show that the roof was supported by at least one beam, which rested on the two walls. Based on the contents of the floor fill, branches were laid perpendicular to and over the beam, and were probably supported by the boulder. Small twigs, corncobs, and juniper bark formed part of the closing material. The upper surface of the roof seems to have been covered with a thick layer of mud, which differs slightly (more purplish) from the underlying reddish mud, which bears twig impressions. This purple mortar may have been used for repairs, since the red mortar has a flat surface on which the purple mortar was laid.

Room C (Kiva)

This kiva appears to have been built in one episode given its consistent masonry style. The latest tree-ring dates from Room C are 1258+G and 1258+B (Table 13). This is part of a cluster of four cutting dates that range from 1256+B to 1258+B. All are from either primary beams or cribbing logs, indicating that construction of Room C’s roof occurred in A.D. 1258 or shortly thereafter.

The builders incorporated several large boulders from previous rock fall into the room’s construction. The walls are double coursed (Figure 41). The bottom courses of the inner walls consist of large upright slabs with intervening layers of horizontally laid
stone. From 60 cm above the fill to the roof, the inner walls are composed of large pinyon and juniper timbers (i.e. cribbing logs) that are mortared with mud. The timbers are two courses wide in each wall; the inner beams served as space fillers above the base of the structure. These timbers are in a vertical plane with the base until they meet the primary roof beams. A continuous masonry wall was built around the perimeter of the room, completely enclosing the inner timber walls. Together, the two walls have an unusual thickness of 60-90 cm.

Table 13. Tree-ring Dates for Cliff Dwelling GG C6-7.

<table>
<thead>
<tr>
<th>Provenience</th>
<th>Field Number</th>
<th>Species</th>
<th>Inside Date</th>
<th>Outside Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room C Cribbing log</td>
<td>GRG-172</td>
<td>PNN</td>
<td>862fp</td>
<td>1046++vv</td>
<td>Large end broken; Surface weathered</td>
</tr>
<tr>
<td>Cribbing log</td>
<td>GRG-164</td>
<td>PNN</td>
<td>881</td>
<td>1077++G</td>
<td>Large end broken; Surface weathered</td>
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<tr>
<td>Cribbing log</td>
<td>GRG-177</td>
<td>PNN</td>
<td>874p</td>
<td>1106++vv</td>
<td>Large end axe cut; Surface weathered</td>
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<tr>
<td>Cribbing log</td>
<td>GRG-170</td>
<td>JUN</td>
<td>844</td>
<td>1124++B</td>
<td>Large end broken</td>
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<td>Spacer</td>
<td>GRG-167</td>
<td>PNN</td>
<td>899p</td>
<td>1124++B</td>
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<td>1131++G</td>
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<td>Cribbing Log</td>
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<td>875</td>
<td>1134++G</td>
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<td>Primary beam</td>
<td>GRG-183</td>
<td>JUN</td>
<td>969+p</td>
<td>1146++B</td>
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<tr>
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<td>GRG-179</td>
<td>JUN</td>
<td>1096±</td>
<td>1223++B</td>
<td>Large end axe cut</td>
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<td>Primary beam</td>
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<td>JUN</td>
<td>1096p</td>
<td>1235++B</td>
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<td>1188</td>
<td>1258+G</td>
<td>Large end axe cut</td>
</tr>
<tr>
<td>Primary beam</td>
<td>GRG-180</td>
<td>JUN</td>
<td>1177±p</td>
<td>1258+B</td>
<td>Large end broken</td>
</tr>
</tbody>
</table>

250
The roof allows for freestanding height over the main floor area, except in the southwest corner, where it is cribbed. The eight primary beams are covered by split timbers, which in turn are covered with mortar. At the top of the walls, beneath a layer of mortar and above the timbers, the edges of a layer of bark and branches are visible. The cribbing logs and the primary roof beams are of irregular length and shape. Some have cut ends and some have burned ends. Several of the timbers extend beyond the perimeter of the room, suggesting that the builders took whatever was available from other shelters or from the surrounding areas. The two wooden poles that were used as the uprights of a ladder are still in situ. Roof repair along the western edge of the roof is indicated by a 2-5 cm thick layer of mud on top of the original mud layer. The repair mortar is more reddish and has more caliche inclusions than the original mortar.

This room was probably primarily used for both domestic and ceremonial purposes. The interior is heavily sooted, which indicates a period of continuous occupation. Apart from the unusually thick wall, roof entry, partially cribbed roof, and natural vent, there are no other kiva characteristics. Its size is relatively small permitting use by only a small number of individuals. Perhaps the other nearby kiva, Room D, was built to allow greater occupancy for ritual activities in this area.

Room D (Kiva)

Built on bedrock, Room D is rectangular in plan and has rounded corners (Figure 41). Although loose rock and soil was probably removed to clear a level place for the floor, this room was not semi-subterranean. Large boulders of the old rock fall that predate both Rooms C and D are incorporated into the walls in several places. This room
probably has double coursed masonry walls, except where the large boulders were incorporated into the wall construction. The east and south inner walls are bonded. The inner south wall abuts the large boulder that is incorporated into the south wall; it does not extend all the way to the southwest corner of the room. The east outer wall is dry-laid and built directly against the inner wall. The south outer wall was apparently mortared and may have been fairly well faced on the outside. The west end of the south outer wall was built on top of the boulder and was also the only wall in front of the southern recess. The west wall incorporates several large boulders. The north segment appears to be a single course thick and was backed by sandy fill. The south segment appears to have been a double wall, with the inner one mortared and the outer one dry-laid. The inner west wall was either bonded or abutted to the outer south wall.

There is a small southern recess in the south wall. The ventilator tunnel in the south wall is about 33 cm wide and 45 cm high. The lintel sticks are peeled poles (approximately 3 cm in diameter). The ventilator tunnel would probably have been about 80 cm long and would have opened directly to the outside (no ventilator shaft). The south wall has partially collapsed above it.

There are two wall extensions, possibly small pilasters, which abut the shelter wall. The east pilaster is interlocked with the north end of the east wall and stands at the same height as the east wall. The west pilaster abuts the curving west wall and its top is 20 cm below the top of the extant west wall. Both pilasters have a small niche (approximately 25 cm wide and deep) with a rectangular opening. There is a sedimentary bench (15 cm deep) between the two pilasters. It may be natural, but was probably produced by excavating fractured purple sandstone along a natural seam.
The fill (approximately 30-40 cm deep) appears to have been composed of windblown sand, wall fall, and rocks from the ceiling of the shelter. There is no evidence of roofing in the fill, except for a cottonwood beam (approximately 11 cm in diameter). One end is resting in the fill and one is resting on the east wall of Room C. Both ends are stone axe cut. It is not sooted and is not long enough to have been a primary beam for this room. The way in which the walls are built suggests that the roof (if one existed) was not cribbed. None of the timbers in adjacent Room C seem long enough to have served as primary beams in Room D.

As mentioned above, the room may not have been completed, so assigning a function may be futile. Architecturally, it appears to be a kiva; however, no sooting is evident on the walls. Only a faint patch of soot is on the shelter wall. The shelter wall is weathered, but there should be more soot if the room was continuously occupied. The lack of soot supports the inference that this room’s construction was never completed.

**Cliff Dwelling GG C6-6 (42SA5111)**

This site is situated on a narrow ledge overlooking a wash, and is sheltered by a shallow and high overhang (Figure 9). As a result, the site (especially the west end) is exposed to the elements and is very weathered. Rock fall at the west end of the site may cover other rooms and features. The sandstone overhang is badly eroded and is slabbing off. The ledge, which is rapidly eroding away, may have been wider at one time, and thus better suited for occupation.
Although no smoke blackening is present at the site, this may be the product of extreme weathering. Extensive debris on a wide ledge immediately below the rooms suggest that this shelter was used for habitation. Presently, there are two sets of rooms at the site and three isolated wall stubs. Room A is interpreted as a habitation room, and Rooms B, C, and D make up a granary complex. The granaries are the products of several construction episodes. The approximately eight ghost rooms at the east end of the site were storage facilities suggested by the lack of soot. Further, the ledge on which they are situated is too narrow and vertically low to have accommodated larger types of rooms.

Room A

On the basis of the presence of a double wall and ventilator tunnel, this room may have had a ceremonial function. However, there are not enough preserved attributes to call this room a kiva. Hence, this room is interpreted to have been primarily used as a habitation room. Room A is a square room with three masonry walls constructed of large irregular stones and mortar. The walls were built on hardpan on the edge of the sheltered bedrock ledge. The masonry walls are continuously bonded, and thus built at one time. The south ends of the east and west walls abut the rear of the shelter. The extant walls stand no more than a meter high. The fill is composed of aeolian sand; on its surface are a juniper beam and a large cottonwood beam. The beams may have been part of the roof. One juniper beam, tree-ring dated at A.D. 1121+G, is lying on the ground near Room A (Table 14). Juniper bark to the south of the room may also be the remains of the roof.
Table 14. Tree-ring Dates for Cliff Dwelling GG C6-6.

<table>
<thead>
<tr>
<th>Provenience</th>
<th>Field Number</th>
<th>Species</th>
<th>Inside Date</th>
<th>Outside Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room A</td>
<td>GRG-159</td>
<td>JUN</td>
<td>920±</td>
<td>1121+G</td>
<td>Large end stone axe cut; Surface weathered</td>
</tr>
<tr>
<td>Beam on ground nearby</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room D</td>
<td>GRG-160</td>
<td>JUN</td>
<td>1089</td>
<td>1189++B</td>
<td>Cut to fit dimensions of room</td>
</tr>
<tr>
<td>Primary beam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The south wall is two courses thick. Rubble was used to fill the gap between the outer and inner walls. Because most of the east and west walls has collapsed, it is impossible to determine whether they were double coursed, as well. The ventilator tunnel opening in the south wall is largely filled with sand and rocks. A ventilator shaft is absent. If one existed, it would have fallen downslope, since the ledge slopes steeply down immediately south of the south wall. Wall fall is to the east and south of the room. Much of the wall rubble from the south wall has fallen downslope to the south of the room.

Rooms B, C, and D

These contiguous type 3 masonry granaries located at the east end of the shelter were built in three construction episodes. Room D abuts bonded Rooms B and C, and therefore Room D is the latest room in this complex. The first phase of construction is only evident in the bottom segment of the west wall of Room C. This segment of wall is narrower (20 cm) than the other walls (25-30 cm). It was constructed of horizontally laid elongated stones mortared with mud containing caliche particles.

The second construction episode was the building of Room B. Room B is defined to the east by the west wall of Room C and its south and west sides are defined by one
short continuous masonry wall. The latter wall stands at its maximum height of 110 cm. The wall consists of large irregular stones mortared with chinked sandy brown mud. The courses are slightly smoother on the interior than the earlier masonry style, but rougher on the exterior. At the same time Room B was built, the west wall of Room C was rebuilt using the same masonry style. The top 50 cm of Room B is bonded to the west wall of Room C.

The third construction phase involved the construction of existing Rooms C and D. Presently, Room C is defined by the rear of the shelter to the north and to the south, east, and west by a masonry wall that is continuously bonded on the top. The two earlier wall construction episodes are evidenced by the two earlier masonry styles apparent in its west wall. Room D is enclosed by the east wall of Room C and a continuously bonded masonry wall that was built over and under two large boulders. This wall abuts Room C. Nevertheless, Room D was most likely built at the same time as Room C, as indicated by their similar masonry styles. Room D and most of Room C were built of irregular stones with chinking stones haphazardly placed in between the evenly laid courses.

None of the roof beams remain in Room C, but much roofing mud is in the fill. The missing sections at the top of the east and west walls indicate that the main beam, which supported the perpendicular secondary beams, was probably removed. The three roof beams for Room D, running parallel to the rear of the shelter, are still intact. Split lengths, which are capped with mud, are still on top of the beams. One of the roof beams, which was cut to fit the dimensions of the room, yielded a noncutting date of 1189++B (Table 14). Based on beam impressions on the top of the walls, the roof of Room B was built with two beams running parallel to the rear of the shelter. Other roofing material is
not visible, except for one piece of branch above the beam impression that has been incorporated into the wall.

Sooting is not present in any of these rooms. The west entry of Room C is a typical granary entry with a raised entry (approximately 60 cm above floor level) and mud coping. The presence of wall peg holes on the interior walls of Rooms B and D indicate that these rooms were used as granaries. Also, many corncobs are in the fill of Room D. There are no signs of an entry in the walls of Rooms B and D. Perhaps the two rooms had roof entries, which are unusual for granaries.

Cliff Dwelling GG C7-1

This site, located on a bedrock ledge at the top of a talus slope, is moderately protected under a very high, shallow, and long overhang. Windblown rain has caused minimal weathering due to the proximity of the drip line to the rooms. Access is easy up a talus slope from the canyon bottom, and access to the rim is impossible in the immediate vicinity (Figure 2).

The shelter includes a kiva (Room A) and two partially collapsed contiguous rooms (Rooms B and C). Room C apparently abuts Room B, and thus was built subsequent to Room B. Room B is a granary, but the function of Room C is obscured by roof and wall fall. Faint soot on the interior walls of the room suggests a habitation use. One household probably shared access to these three rooms with Room A being the primary habitation. The kiva has been excavated, as is evidenced by large backdirt piles on the ledge east of the kiva. A large slab from the overhang fell on Room B, probably
after the abandonment and the collapse of Room C. Rooms B and C appear to be structurally weak. The top courses of the walls remain well mortared, and are set on large stones, which have very little remaining mortar due to water seepage.

*Room A (Kiva)*

Room A is a semi-subterranean kiva, built partially within excavated hardpan. The north and east walls consist entirely of hardpan, the south wall is predominately masonry, and the west wall is the rear of the shelter. Room A appears to have been built at one time and never to have been repaired, remodeled, or replastered. Most of the one coat of plaster, which was directly laid over the hardpan, remains on the north and east walls. Only patches of plaster remain on the south wall. The floor is thickly plastered continuously with the walls. A thin layer of sandy fill (5-10 cm) remains in the room subsequent to its excavation.

There is no formal bench/pilaster arrangement, but the east wall has a recess creating a high shelf. This shelf could not have been used by the occupants because two vertical posts stand in front of it. The south wall also has a recess with a built in ventilator tunnel and a ventilator shaft outside the wall. A split shake serves as the lintel of the ventilator tunnel. A niche measuring 32 cm in diameter and 26 cm deep was built in the north wall near the floor.

Some soot is preserved on the shelter wall indicating the former height of the roof. The boundary of the soot curves up from the present height of the north wall, indicating that the north wall stands at its original height. The south wall, however, was originally 30 cm higher than its present height. The wall fall immediately south of the
masonry south wall accounts for the missing portions of the south wall. Rubble from the backdirt pile is falling on top of the south bench.

The south wall is constructed of large tabular sandstone mortared with mud. Most of the stones appear to have been selected for size and shape. Some smaller stones were used to fill in the gaps between the larger stones. The soot on the stones, similar to the rest of the room, has been eroded. A deflector, in front of the ventilator tunnel in the south wall, was constructed of the same masonry style as the south wall. A two-sided slab lined hearth just north of the deflector was dug into the hardpan floor.

The roof is cribbed. The three beams— one cottonwood and two juniper—constituting the first layer of the roof are in situ, and are supported by vertical juniper posts set into the east wall. The juniper logs forming the second layer were laid perpendicular to the first layer of beams. Then, more juniper beams were laid across the second layer in the same direction as the beams in the first layer. The remaining roof members are lying on top of the north wall and across the recess in the east wall. Most likely, the roof was not cribbed higher than the existing roof since it is sufficient for standing height in the room. The upper portion of the north juniper post is charred on front. The second and third level beams are sooted on their undersides. The latest tree-ringing date for Room A that was a non-cutting date of 1253+vv (Table 15) from a juniper beam lying on the ground nearby. An in situ cribbing log produced a probable cutting date of 1252+v, indicating that roof construction was probably in the 1250s, and no earlier than 1252 or 1253.
Table 15. Tree-ring Dates for Cliff Dwelling GG C7-1.

<table>
<thead>
<tr>
<th>Provenience</th>
<th>Field Number</th>
<th>Species</th>
<th>Inside Date</th>
<th>Outside Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam leaning on interior wall</td>
<td>GRG-203</td>
<td>JUN</td>
<td>1097±p</td>
<td>1207B</td>
<td>Most likely associates with roof</td>
</tr>
<tr>
<td>Cribbing log</td>
<td>GRG-196</td>
<td>JUN</td>
<td>1045fp</td>
<td>1215+G</td>
<td>Large end broken and charred</td>
</tr>
<tr>
<td>Cribbing log</td>
<td>GRG-198</td>
<td>JUN</td>
<td>1126+p</td>
<td>1215+B</td>
<td></td>
</tr>
<tr>
<td>Beam on ground nearby</td>
<td>GRG-204</td>
<td>JUN</td>
<td>1122fp</td>
<td>1238B</td>
<td>Large end stone axed cut; Surface weathered</td>
</tr>
<tr>
<td>Cribbing log</td>
<td>GRG-201</td>
<td>JUN</td>
<td>1133p</td>
<td>1238B</td>
<td></td>
</tr>
<tr>
<td>Cribbing log</td>
<td>GRG-197</td>
<td>JUN</td>
<td>1159fp</td>
<td>1245+G</td>
<td>Large end broken; Surface weathered</td>
</tr>
<tr>
<td>Cribbing log</td>
<td>GRG-202</td>
<td>JUN</td>
<td>1098fp</td>
<td>1252+v</td>
<td>Large end broken; Surface weathered</td>
</tr>
<tr>
<td>Beam on ground nearby</td>
<td>GRG-205</td>
<td>JUN</td>
<td>1192fp</td>
<td>1253+vv</td>
<td>Surface extremely weathered</td>
</tr>
<tr>
<td>Room B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary beam</td>
<td>GRG-188</td>
<td>JUN</td>
<td>1162±p</td>
<td>1247+GB</td>
<td>Large end broken</td>
</tr>
<tr>
<td>Beam lying in front of</td>
<td>GRG-187</td>
<td>JUN</td>
<td>1182</td>
<td>1254+B</td>
<td>Large end stone axe cut</td>
</tr>
</tbody>
</table>

**Room B**

Room B is a granary. The size of the room is indicated by the curvature of the east wall into the south wall. The entry in the east wall is small and has a door stoop. A large slab has fallen on Room B crushing the roof and the east wall. The large slab lies within the room covering wall fall and roofing debris (beams, twigs, mortar, and juniper bark). Its type 3 masonry walls consist of large unshaped tabular stones mortared with mud containing small chinking stones. The smooth sides of the stones face the interior, and the rough sides face the exterior. A large diagonal crack is evident in the north wall, which appears to be very unstable.
The original walls were probably a few centimeters higher than the extant walls. The top portions of the north and east walls have collapsed at the point where the roof beams were set into the walls. Four primary beams – one juniper and three oak- in the north wall have ends resting in beam holes, and the south ends rest in rubble under the fallen slab. Tree-ring cutting dates from the in situ juniper beam and a juniper beam lying on the ground in front of Room B indicate the construction of Room B was probably in the middle A.D. 1250s (Table 15).

Room C

Most of Room C, except for the north wall, has collapsed. The entire east wall of Room C has collapsed outward. Wall fall consists of pieces of sandstone and chunks of mortar. Roof material in the fill is composed of long twigs and mortar adhering to juniper bark. The roof collapsed after the east wall fell outward.

The remaining type 3 masonry north wall consists of large irregular stones and heavily weathered mortar with no chinking. The interior walls, the north side of the wall of Room B, and the rear of the shelter forming the back wall are sooted. The faint soot within the confines of this room is indicative of a habitation room, but due to the lack of other habitation features the function of this room remains unclear.

Cliff Dwelling GG C8-3

Located at the top of a talus slope under a relatively high and shallow overhang, this site is only partially sheltered from rain. Access to the site from the canyon bottom is
very easy, but access to the rim directly from the site is impossible. The three extant structures are built on and around large boulders that fell from the ceiling of the shelter before the shelter was occupied (Figure 10).

This shelter was perhaps occupied by one household. It consists of a masonry room (Room A) with an attached probable storage room (Room B), and remnant walls of a large rectangular feature (Room C), which may have abutted or been attached to Room A. Heavy soot on the interior walls of Room A indicates a possible habitation use. A circular depression to the north of these rooms may indicate the presence of a kiva. The rubble partially lining the depression, however, may not actually be associated with the underlying pit structure. A tree-ring non-cutting date from a pinyon log wall support from Room B dates the room's construction at some time after A.D. 964 (Table 16). The east wall of Room B abuts the middle of the north wall of Room A, indicating that Room B was the later of the two structures.

<table>
<thead>
<tr>
<th>Provenience</th>
<th>Field Number</th>
<th>Species</th>
<th>Inside Date</th>
<th>Outside Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam in wall fall of</td>
<td>GRG-206</td>
<td>PNN</td>
<td>866fp</td>
<td>938++vv</td>
<td>Surface heavily weathered; Large log roots</td>
</tr>
<tr>
<td>Room B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wall support in front of</td>
<td>GRG-207</td>
<td>PNN</td>
<td>848</td>
<td>964++vv</td>
<td>Surface heavily eroded; Large end broken</td>
</tr>
</tbody>
</table>

*Rooms A and B and Feature C*

A line of three boulders defines the edge of the ledge on which these three architectural features were built. The east walls of Rooms A, B and C are constructed on
pinyon log footers. The south wall of Room A is uniquely constructed of large upright sandstone slabs that are two courses thick. Fiber tempered mud was used to fill in the space between the outer and inner slabs. The east and north walls of both Rooms A and B were originally constructed of single upright slab and fiber tempered mud construction. The two non-cutting dates from the A.D. 900s (Table 16) may be associated with this early construction episode. At some time, Room B was rebuilt with irregular stones laid horizontally and mortared with mud. This masonry style is evident in the top three courses in the east wall of Room B and the wall shared by Rooms A and B. The remnant north wall of Feature C consists of upright slabs containing little mortar to match with the mortar used in the construction of Rooms A and B.

Room A originally had a high roof level of 375 cm above ground surface. The mortar outline of its roof still adheres to the shelter wall. The mortar type on the shelter wall is similar to that in the slab construction. There is no trace of mortar above Room B to indicate its height. There is sooting on the east wall of Room A and on the base of the north shelter wall, indicating the room was probably originally used for habitation. Evidence of sooting appears to have worn off on the rebuilt upper section of the north wall, except on one stone face.

Sooted twigs and juniper bark are the only roof remnants of Rooms A and B. There are no indications that Feature C was a roofed structure. The entry of Room A may have been in the south wall. Entries for Rooms A and B are not evident in the existing walls.
CHAPTER 7

CHRONOLOGY

Tree-ring Dating and Architecture

The method used here for interpreting the tree-ring dates of the Grand Gulch sites is that of Ahlstrom (1985), who built on Dean’s (1969) framework. Dean’s discussion on the logic of interpreting assemblages of tree-ring dates follows the approach of Bannister (1962). Richard Ahlstrom directed the collection of tree-ring samples from the Grand Gulch sites in 1974 and conducted the laboratory analysis of the samples at the University of Arizona Tree-Ring Laboratory. In addition, Ahlstrom (1985:501-507) analyzed some of the clusters of tree-ring dates from some of the Grand Gulch kivas in his Ph.D. dissertation, and my interpretations correspond with his conclusions.

Recognizing that tree-ring dates are not always a direct or absolute date for the construction of a structure is the first step to interpreting tree-ring dates. Often, the outermost growth ring date, or the year that the tree died, is not equal to the procurement date or the date the wood was used in constructing a structure (Bannister 1962). Ahlstrom (1985:57-59) outlined five assumptions regarding the interpretation of tree-ring dates, which can be summarized as follows:

1. Newly procured beams that were used in construction will produce clusters of cutting dates, which in turn provide evidence for construction dates.
However, reused beams or stockpiled beams used in construction will also produce date clusters, thereby giving a date earlier than the construction date.

2. Construction usually took place one or two years after procurement.

3. Clusters of noncutting dates, especially when mixed with cutting dates, can also provide evidence of construction and procurement dates. That is, there is a low probability that weathering, burning, or the shaping of timbers could remove roughly the same number of rings from a number of beams (Dean 1978:148).

4. Dates recognized as outliers in comparison to an inferred construction date come from beams that were eroded, reused, stockpiled, or used as repair timbers. The only outlying dates that follow construction dates are repair dates.

5. In the absence of date clusters, the latest date in the distribution may offer the best estimate of when construction took place. In addition, the last use of the structure must have occurred as late as or later than the latest date.

Ahlstrom (1985:62-63) proposes that using stem-and-leaf plots is an effective technique for presenting tree-ring date distributions. With a stem-and-leaf plot, the temporal relationships between cutting and noncutting dates within decades can be visualized. Second, the x-axis of stem-and-leaf plots is divided into single years, so the exact nature of the tree-ring date clusters is evident. Lastly, a good comparison between several tree-ring date distributions can be made using this approach. For these reasons,
stem-and-leaf plots are also used here to present the distribution of the tree-ring dates from the Grand Gulch study area.

I also use Ahlstrom’s (1985:59-60) method for describing tree-ring date distributions. Basically, a distribution is considered clustered when three or more dates fall within the same short time interval. A cluster can be either weak or strong, depending on the number of dates that form it. A weak cluster consists of three to nine dates, a strong one, of 10 or more. With regard to time span, a tight cluster falls within a period of five years or less, and a loose cluster covers more than five years. A tree-ring distribution with a long left tail and a terminal cluster of cutting dates indicates that beam procurement occurred only a few years before construction. For this reason, this type of distribution, with a primary date cluster and outlying early dates, is an ideal situation (Ahlstrom 1985:70-72). On the contrary, the “ideal” primary date cluster may not reflect the targeted construction date, if most of the beams were recycled from a single dismantled structure. Regardless, the dates forming the left tail are most likely from reused, stockpiled, dead and/or eroded wood. Dates that follow a primary date cluster and form a truncated right tail often represent the repair or remodeling dates of a particular structure. In some cases, however, the outlying late dates may indicate the construction date of interest if the terminal date cluster is from wood recycled from a single dismantled structure.

Of the 385 sampled beams from the Grand Gulch sites, 188 (49 percent) were crossdated. This low rate of crossdating can be attributed to the frequent use of weathered dead wood and cottonwood for construction. Although an effort was made in the field to avoid sampling cottonwood beams (which do not crossdate), 28 of the
collected beam samples were identified as cottonwood at the Laboratory of Tree-Ring Research. Juniper makes up 77 percent of the sampled beams, and was by far the most commonly used species at Grand Gulch. Juniper was probably frequently used because it dominates the surrounding mesa tops and is resistant to decay. Juniper was used for the main roof supports, as well as for door lintels, wall supports and tertiary filler material for roofs.

Out of the 188 crossdated beams, 46 (24 percent) are "cutting" or death dates (that is, those with a B, G and L symbol). Many of these dates are accompanied by the "+" symbol, which indicates that one or more rings may be missing near the end of the tree-ring series. Therefore, many of the cutting dates may be later than the true date, but by no more than five years. Twenty-five (13 percent) of the crossdated beams are "v" dates. Dates accompanied by a "v" symbol are often near (within a few years) or equal to cutting dates (Ahlstrom 1985:39). For this reason, "v" dates are also considered cutting dates in this analysis, even though these dates may not be as accurate and precise as the true cutting dates. Appendix B is a list of the suffixes that accompany the tree-ring dates, and an explanation of the suffixes.

After an examination of the 188 tree-ring dates, a spatial and temporal construction scenario can be proposed for each site and ultimately for the Grand Gulch study area as a whole. The identification of clusters from consideration of all 188 tree-ring dates proves useful in estimating the construction dates of sites and/or structures that have few tree-ring dates with no clustering. Construction dates for these poorly dated sites and/or structures can often be inferred to within at least a decade by projecting their tree-ring dates onto the tree-ring date clusters of well-dated sites and structures. Their
dates are more likely to reflect construction dates if they coincide with the majority of dates from the other sites. When their dates do not fall within a cluster, however, construction inferences become less plausible.

Figure 42 is a stem-and-leaf plot, which displays the distribution of all the Grand Gulch tree-ring dates, except for the 12 earliest ones. The distribution has a gradually sloping left tail from an early anomalous cutting date of A.D. 715 to approximately A.D. 1112. I infer that the left tail is composed of dates from weathered, reused and/or stockpiled construction timbers, and that a rapid increase in construction began in the Grand Gulch study area in the A.D. 1110s, perhaps with the construction of Room E at Cliff Dwelling GG C13-1.

The distribution contains two main date clusters, which indicate two major periods of wood procurement. One peaks in the 1120s and 1130s and the other in the 1230s through 1250s. Most of the beams contributing to the earlier cluster (A.D. 1112-1146) were used to construct Rooms A, B and I at Cliff Dwelling GG C4-1 (Sheep-on-a-Bicycle) (Figure 42). Construction and repair occurred almost continuously until A.D. 1146, after which a nearly uninterrupted gap in tree-ring cutting activity between A.D. 1146 and 1171 indicates a major slowdown in construction activity. An increasing number of dates between the 1170s and 1250s represent a continual cutting of beams for over 90 years, culminating in the final episode of construction in the Grand Gulch study area. A very short right tail consisting of two A.D. 1265 dates is indicate repair or remodeling events. Since these two dates are the latest in the distribution of the Grand Gulch dates, it is reasonable to infer that abandonment of the Grand Gulch study area occurred no later than the middle or late 1270s. This inference is based on Hantman's
Figure 42. Stem-and-leaf plot of the tree-ring dates for the Grand Gulch sites. Twelve dates earlier than A.D. 1030 have been omitted.
(1983) proposal that sites with abundant dates were most likely abandoned by 10 years after the latest date. Given the number and continuous distribution of tree-ring dates for the study area, it seems highly unlikely that if these sites were occupied later after the A.D. 1270s, some later construction timbers would not have been sampled and dated (Ahlstrom 1985; Lipe 1995). In addition to the good tree-ring date record of the Grand Gulch study area, the latest tree-ring date for the Moon House Complex in Mcloyd’s Canyon, in the eastern Cedar Mesa area is A.D. 1268 (Bloomer 1989).

In the remaining portion of this chapter, I provide additional stem-and-leaf plots to support my interpretations on the tree-ring data and to discuss room construction sequences for each of the Grand Gulch sites. In addition to the tree-ring data, bonding and abutment data are used as relative dating techniques to interpret construction sequences for contiguous rooms and individual rooms. Logic dictates that if two walls are bonded together and evidence of rebuilding is not apparent, then they were built during a single construction episode. Also, if one wall abuts another wall, the former is either later or contemporaneous with the latter (Wilcox 1975:134).

Cliff Dwelling UGG C23-1 (42SA3712)

A late Pueblo II construction period for Cliff Dwelling UGG C23-1 at approximately A.D. 1133 is evidenced by a weak terminal cluster between A.D. 1130 and 1133 from juniper beams at the base of Feature T (Wall) and a loose beam in Room N4 on the upper ledge (Figure 43). The residents may have reused the building materials from the lower ledge rooms for the construction of the upper ledge rooms. Most of the rooms on the lower ledge appear to have been dismantled, as suggested by the scarcity of
roof beams. In addition, the end of one of the Feature T beams is charred and the beam from Room N4 is smoke blackened on both sides. Hence, I propose that the upper ledge beams dating to the early A.D. 1130s are recycled beams from the extant structures on the lower ledge. Another possibility is that these beams may have been originally used in the construction of the several ghost rooms located on the lower ledge.

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Figure 43. Stem-and-leaf plot of the tree-ring dates for Cliff Dwelling UGG C23-1.

The latest dates in the distribution (the short right tail) are from two pieces of charcoal from the floor fill of Room O. These two noncutting dates of A.D. 1174 and 1175 indicate that at least the upper ledge was used later than A.D. 1175. The defensive character of the upper ledge construction may correlate with increased emphasis on defense throughout the Mesa Verde area in the A.D. 1200s. The earliest date in the distribution of 836vv from Room P2 likely represents the use of dead wood in construction.

Lower Ledge

Considering that five of the eight sampled beams from the lower ledge are cottonwood, it is not surprising that none of the sampled beams from the extant rooms on
the lower ledge produced dates. Due to the absence of tree-ring dates for the lower ledge
rooms, a site chronology is difficult. Nevertheless, on the basis of building styles and
wall junctures, a rough reconstruction can be attempted.

Rooms A-C2, situated at the west end of the shelter, were possibly constructed
concurrently, as evidenced by their common type 3 masonry style (Figure 19). Upright
sandstone slabs were used as footers, and the lower courses were constructed of blocky
stones. With the exception of Room B (Kiva), chinking stones were placed sometimes in
rows in between some of the masonry courses. Room A was constructed after Room B;
Room A was built on top of a layer of juniper that was incorporated into the upper
courses of Room B. Although Room C1 abuts the west wall of Room C2, the possibility
cannot be ruled out that the two rooms were built simultaneously.

Room E (Kiva) is also predominantly constructed of flat blocky stones, flat sides
facing the interior. Little chinking is present in the interior walls, but the pilasters have
horizontal rows of chinking pressed into the mortar. The interior walls and pilasters of
Room G (Kiva) show a masonry style similar to Room E, and are interpreted to have
been built at the same time. On the basis of masonry styles, it is also possible that these
two kivas were built contemporaneous with Rooms A-C2.

The west end of Room J2 is enclosed by the east wall of Room J1 indicating that
the construction of Room J1 predates Room J2 (Figure 21). However, both rooms share
a roof beam that is incorporated into the upper wall construction, evidence that the two
rooms were built at the same time. Room I3, built against the continuously bonded wall
defining contemporaneous Rooms I1 and I2, was a later addition to this complex of
granaries (Figure 20). The lower walls of remodeled Rooms H, I1, I2, J1, and J2 are
constructed of type 1 masonry, indicating the original construction of all these rooms was probably concurrent. That the bases of these rooms are of type 1 masonry construction probably indicates that the original construction of these rooms predates the construction of the other rooms at the shelter. Only one technique of masonry wall construction is evident above the lower type 1 wall remnants. This distinct masonry style is probably the result of one construction event: the replacement of the type 1 masonry walls with type 3 masonry walls. This reconstruction masonry using blocky stones and chinking is similar to the masonry of all the other rooms on the lower ledge. Therefore, it is possible that all the extant rooms on the lower ledge, which are of type 3 masonry may have been built concurrently.

Upper Ledge

All the extant rooms on the upper ledge and Feature T appear to have been constructed at roughly the same time (Figures 21 and 22). Purplish red mortar was used in the wall construction of all the rooms and Feature T, with the exception of the original walls of Room Q, which were constructed with tan mortar. The original Room Q, represented by the extant lower wall segments, appears to be the first architectural feature built on the upper ledge. That Rooms M1-5 and N2-4 and the reconstructed walls of Room Q were repaired with orange mud indicates contemporaneity in use.

Because the walls defining Rooms M1, M2, M4, and M5 abut the wall of Room M3, Room M3 was the first granary built in this set of contiguous rooms. Based on masonry styles, Rooms M4 and M5 are believed to be the latest granaries constructed in this complex of rooms. The walls of Rooms M4 and M5 were built with a smoother type
3 masonry style than the other rooms; more tabular stones were used than blocky stones, and chinking is abundant.

Room N1 was used concurrently with Rooms N2-N4. Its soot outline does not continue beyond the walls of Room N2; therefore, Room N2 was most likely roofed and was built before the hearth was extensively used and. Also, the top portion of Room N2 was dismantled after the use of the hearth ceased. Room N3 was the first room in this complex to be built, because the walls of Rooms N2 and N4 abut Room N3. Nothing in the architectural evidence indicates whether Room N2 predates or postdates Room N4.

Although all the rooms in the O-Q roomblock at one time were probably used concurrently, Rooms P1 and Room Q were built before Rooms P2 and O. Room P2 was built by enclosing the space between Rooms P1 and Q with one wall. The remnant wall of Room O was built against the southwest corner of Room P1. The south walls of Rooms S1 and S2 are bonded, and thus Room S1 and S2 were built simultaneously. Rooms S1 and S2 were built before abutting Rooms R and S3.

*Cliff Dwelling GG C2-1 (42SA5107)*

The only datable tree-ring sample from Cliff Dwelling GG C2-1 yielded a cutting date of A.D. 765. This date is clearly to early for Room A, considering its type 3 masonry wall construction; this suggests that old and/or recycled wood (perhaps from an early building episode in the area of Room B) was used in the construction of Room A. Also, this date is an outlier in the canyon-wide tree-ring date distribution. Regardless, Room A and contiguous Rooms C1-C3 are most likely roughly contemporaneous, for they share the same type 3 masonry style (Figure 39).
Cliff Dwelling GG C3-1 (42SA3714)

Discerning the temporal relationship between the rooms at this cliff dwelling is difficult because many of its structures lack datable wood. The distribution of dates for Cliff Dwelling GG C3-1 suggests that Room M (Kiva) was the last room to be constructed at Cliff Dwelling GG C3-1 (Figure 44). A weak terminal cluster between A.D. 1242 and 1249, produced by the secondary and primary roof beams from Room M, indicates construction of Room M during the late 1240s and early 1250s. Most likely, some of the other rooms were constructed at the same time as Room M, but Room M is the only room to have produced enough dates for a construction date to be confidently estimated. The three earliest cutting dates of A.D. 1173, 1179 and 1184 for Room M may represent timbers salvaged from another site or from other structures at Cliff Dwelling GG C3-1. Both the primary and secondary beams were not cut to fit the dimensions of Room M, lending support to the inference that recycled timbers were used (Figure 25). Thus, it is possible that the dated roof beams give an early bias for the construction of Room M. The last date for Room I (Kiva) of 1235vv, produced from a piece of charcoal in the floor fill, probably indicates that the room was in use after A.D. 1235. Hence, the residents may have used Rooms I and M at the same time. Whether Room L was remodeled and rebuilt concurrent with or prior to the construction of Room M is unknown.
Figure 44. Stem-and-leaf plot of the tree-ring dates for Cliff Dwelling GG C3-1.

Type 2 masonry Room B was built at the same time as type 3 masonry Room A, as indicated by the interlocked upper courses of their common wall (Figure 23). One juniper *in situ* primary roof beam of Room B was cored, producing a date of 1181B. The large end of the beam is set into the shared interlocked common wall. This single date is not very useful for estimating a construction date for Rooms A and B. It could indicate that the construction of Rooms A and B at about A.D. 1181. Alternatively, this date may result from the reuse of construction wood from elsewhere, giving an early biased date for the construction of Rooms A and B. However, there is no evidence indicating whether or not the roof beam was recycled.

The wall construction of Rooms E and F show that type 3 masonry of predominately regular elongated stones was used for the original wall construction. The stones were laid to expose their flat surfaces to the interior and exterior, and rows of chinking were placed between the courses as space fillers. The south walls of Rooms E
and F were repaired with type 2 masonry consisting of 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. Thus, the type 3 masonry using elongated stones and rows of chinking predates type 2 masonry at Cliff Dwelling GG C3-1.

Room E was constructed after Room F as indicated by the abutment of the south wall of Room E to the southwest corner of Room F (Figure 23). The relatively homogenous construction of these rooms indicates that they were built in a single event. The type 3 masonry west wall of Room E partially encloses Room D to the east indicating that the construction of Room D either postdated or was simultaneous with the construction of Room E. The type 2 masonry used to construct Room D is similar to the masonry used for repairing Rooms E and F. Therefore, Room D was probably constructed when Rooms E and F were repaired. One of the primaries of Room F, which is incorporated into the original wall construction, produced a date of A.D. 1203B, suggesting a construction date as early as the early 1200s. Ahlstrom’s 1974 notes, however, recorded the top surface of the primary as smoke blackened, indicating use of a recycled beam in the roof, which would produce an early biased date.

Room C was built of smooth chinked masonry similar to that used in the original wall construction of Rooms E and F suggesting Room C was built concurrent with Rooms E and F. Following this reasoning, type 2 masonry Rooms G and H are interpreted to have been built after type 3 masonry Rooms C, E, and F and at the same time as type 2 masonry Room D. Room O, adjacent to and postdating Room G, may
have been occupied concurrently with these rooms (Figure 24). However, the
dismantling of the room may have occurred before abandonment.

*Cliff Dwelling GG C4-1 (42SA5110)*

Cliff Dwelling GG C4-1 has by far the greatest number of tree-ring dates (58)
from a single site, with 28 from Room I (Kiva). The wide distribution of dates
throughout Cliff Dwelling GG C4-1 suggests that many of the beams used in construction
were recycled, stockpiled, and/or dead wood (Figure 45). The primary peak from A.D.
1120 to 1129 indicates a strong building episode at Cliff Dwelling GG C4-1 during the
1120s. In addition, the extended right tail is indicative of construction, repair or
remodeling events, and thus two later periods of beam procurement for Cliff Dwelling
GG C4-1, one between A.D. 1171 and 1185 and one between A.D. 1203 and 1214.

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**Key:**
- underlined = cutting date
- unmarked = noncutting date
- bold = Room I date
- ** = break in scale of y-axis

Figure 45. Stem-and-leaf plot of the tree-ring dates for Cliff Dwelling GG C4-1.
On the basis of the 28 tree-ring dates produced from the juniper roof beams, including crib logs, primary and secondary beams, and associated beams inferred to be from its roof, Room I (Figure 27) was initially built some time after A.D. 1171. A less plausible construction date at approximately A.D. 1130 is represented by a strong, tight cluster of A.D. 1128, 1129 and 1130 dates. Another possible construction scenario is that the kiva was built as late as the late 1140s indicated by a later date of 1146vv from the bottom cribbing layer. However, the majority of the construction beams dating to the A.D. 1120s, 1130s and 1140s were burned to fit the dimensions of the room. This suggests that primarily dead, dry wood was used in the roof construction of Room I. The latest date of A.D. 1171 was produced from a stone axe cut crib log in the second cribbing layer from the top of the roof. Based on the position of this dated beam, it was most likely not used for remodeling or repair and therefore provides the best approximate construction date for Room I.

Based on the abutment sequence of Rooms A-C3, Room B was the first room of this roomblock to be constructed (Figure 26). Room A could have been built before or after the construction of Rooms C1-C3. Regardless, Room C1 was built before Rooms C2 and C3. Whether the collapsed roofs of Rooms A and B were part of the original wall construction could not be determined. Thus, the tree-ring dates from Rooms A and B date the roof construction and not the wall construction.

As mentioned above, a construction scenario for Rooms A and B is not obvious due to the wide distribution of dates. The tree-ring dates from the roof beams of Rooms A and B form a similar distribution as the dates from Room I, which perhaps indicates that
these three rooms may have been initially built and repaired/rebuilt roughly at the same time. A loose date cluster between A.D. 1124 and 1133 produced from the 17 tree-ring dates from Room A would seem to indicate a construction date either in the late 1120s or early 1130s. On the other hand, slightly later dates of A.D. 1137, 1141, and 1143 suggest that the roof of Room A may not have been built until the late 1130s or early 1140s. According to the 1974 architectural descriptive notes, some of the secondary beams do not fit the dimensions of Room A well and are sooted beyond the support wall. I suggest that the early cluster of dates represent the reuse of construction beams from other structures and/or the use of dead, dry wood. Two primary beams date to the early A.D. 1180s, and therefore indicate that the roof must have been constructed as late or later than A.D. 1183. The beams that produced the latest two dates (1203v and 1205+G) are secondaries, and are interpreted as roof repair beams. However, the possibility cannot be ruled out that these dates represent the construction date for the roof some time after A.D. 1205.

The 12 tree-ring dates from Room B range from A.D. 1106 to 1214. A weak cluster between A.D. 1119 and 1121 suggests roof construction in the early 1120s. Another equally plausible inference, supported by two later dates of A.D. 1129 and 1130, is that the roof was constructed in the early 1130s. Alternatively, a later date of A.D. 1145 may indicate construction as late as the mid-1140s, or that the roof was repaired during or after this time. The latest dates (1211G and 1214G) for Room B, however, were produced by a primary beam and a beam situated beneath and perpendicular to the primaries, running north-south across the bench. The top surface of the latter beam is burned indicating reuse. Therefore, the construction of the extant roof probably occurred
after the A.D. 1210s. As in Room A, the early cluster of dates was most likely produced from recycled and/or dead, dry wood.

Although the wall junctures indicate that Room B was built before Room A, the tree-ring dates tell a different story. The latest tree-ring date (1205+G) from Room A predates the latest tree-ring date (1214G) from Room B. One possible explanation for this contradiction is that the extant roofs of Rooms A and B were not part of the original wall construction. Perhaps the early cluster of dates for each room indicates the initial construction dates rather than the final roof construction dates for Rooms A and B. The date distribution for Rooms A, B and I may indicate initial wall construction in the early A.D. 1130s for all three of these structures. Or, the peak in dates may indicate a different site component involving the construction of different structures, some of which are represented by mud outlines on the upper ledge. In any case, the roof beams from these rooms dating to the A.D. 1210s are evidence for occupation of Cliff Dwelling GG C4-1 as late as or later than the A.D. 1210s. Based on the possible abutment of Rooms C1-C3 to Room B, this complex of rooms may have been constructed as late or later than the A.D. 1210s.

How the other architectural features at Cliff Dwelling GG C4-1 relate to the construction of Rooms A-C3 and I is unclear. Type 3 masonry Room D1 was built before or nearly at the same time as abutting type 2 masonry Room D2 (Figure 26). On the basis of the abutment sequences, Room G was built before Rooms E and F, and Room E was the latest addition to this set of contiguous rooms (Figure 27). Their type 3 masonry is similar to that of Rooms A and B, and thus these rooms were possibly built concurrent with Rooms A and B, i.e., in the early 1200s.
Cliff Dwelling GG C4-2

A construction date for Rooms A, B and C at Cliff Dwelling GG C4-2 is impossible to determine due to the absence of datable wood. Yet, their type 3 masonry construction suggests that their construction occurred at some time during the Pueblo III period.

Cliff Dwelling GG C4-6

A vertical post in the wall of Room B2 produced a noncutting date of 1127++GB, indicating that the construction of this structure may have been built in the A.D. 1120s and 1130s construction episode that is apparent in the canyon-wide tree-ring date distribution. Room B2 abuts Room B1; therefore, Room B1 was constructed before Room B2. Since Room A does not adjoin the other rooms, it is impossible to estimate its construction date.

Cliff Dwelling GG C6-3

The architectural features at this site have no tree-ring material and abut no dated rooms; thus, no construction dates can be determined for this site (Figure 8). All rooms, however, are of similar type 3 masonry suggesting possible coeval construction.

Cliff Dwelling GG C6-6 (42SA5111)

The remnant construction wood at this site (Figure 9) yielded only two tree-ring dates. A log lying on the ground near Room A produced a date of 1121+G, and an in situ
primary beam in Room D produced a date of 1189++B. Assuming the A.D. 1189 date represents an approximate construction date, Room D is inferred to have been built and used some time after A.D. 1189. Although Room D abuts bonded Rooms B and C, extant Rooms B and C share a similar masonry style with Room D, and thus may have been constructed near the same time as Room D. The A.D. 1121 cutting date indicates probable construction at the site – and possibly in Room A – during the A.D. 1120s canyon-wide construction component. The extensive rebuilding apparent in the wall construction of Rooms B and C indicates there were multiple construction periods at the site.

_Clip Dwelling GG C6-7 (42SA5112)_

Fourteen of the 26 tree-ring samples taken from the _in situ_ wall/crib logs and primary beams in Room C were crossdated. Ten of the 14 dates are noncutting dates, which form the extended left tail of the distribution (Figure 46). That all of the noncutting dates are earlier than the cutting dates suggests that much dead wood was used in the construction of Room C. The remaining four cutting dates form a tight terminal cluster in the A.D. 1250s, indicating construction at approximately A.D. 1258.

Due to the scattered distribution of the rooms (Figure 41), the temporal relationships are unclear. Room C probably predates Rooms B and D. The mortar used in the construction of Rooms B and D is similar to the roof repair mortar used in Room C, implying that Room C had been present for some time before Rooms B and D were built. It may be that Room D was never completed, roofed, and used. Although the wall stones and roofing timbers may have been removed and used elsewhere, the existing
walls do not appear high enough to support a suitable roof height. In addition, there are no signs of roofing mortar on the rear of the shelter and of substantial wall rubble. There is no clear evidence of remodeling at Room D, which reinforces the inference that it was never finished. Nevertheless, the construction of Rooms C and D may have been contemporaneous with only Room C having been completed.

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Key: underlined = cutting date
unmarked = noncutting date
** = break in scale of y-axis

Figure 46. Stem-and-leaf plot of the tree-ring dates for Cliff Dwelling GG C6-7.

Room B is spatially isolated from the other three architectural features. Its construction and use could either pre- or post-date Room D and Feature A (Wall). The Moki steps near Feature A may predate the building of the wall, and thus may have been the mode of access from this shelter to the structures at Cliff Dwelling GG C6-3.

Stylistically Feature A and Rooms B and D are most alike; they all employ large blocky stones with large pieces of chinking irregularly placed. The chinking stones of
Room D are more tabular with their smooth faces towards the interior. Room C is similar, using large regular blocky stones with the smooth sides facing the interior, but it is difficult to compare its masonry with the other rooms due to the numerous logs used in its construction. The outer walls of both Rooms C and D are not as regularly coursed as the inner walls. In summary, all four architectural features are more similar in construction to one another than they are different, and thus are all presumed to have been built and used during the late A.D. 1250s.

*Cliff Dwelling GG C7-1*

Remnant roof beams from Room A (Kiva) and Room B were cored for tree-ring dating. Five of the eight dates for Room A are from *in situ* crib logs from the top two layers of cribbing. The other three dates are from loose beams – two are lying on the ground near Room A and one is leaning on the interior wall of Room A. The ten dates for Cliff Dwelling GG C7-1 have a very weak terminal cluster in the early A.D. 1250s - none later than 1254 (Figure 47). The number of dates is small, but the terminal cluster suggests that Rooms A and B were built concurrently in the early to mid- A.D. 1250s, perhaps at about A.D. 1254. Alternatively, this terminal cluster may indicate repair or remodeling, but this is unlikely. Nothing in the architectural evidence indicates that the rooms were repaired, remodeled or replastered. Each individual room appears to have been built in one construction episode. The left tail consists of seven cutting dates, which are perhaps from construction timbers scavenged from other sites or dead wood. Room C apparently abuts Room B, and thus was built subsequent to Rooms A and B.
### Key:
- underlined = cutting date
- unmarked = noncutting date
- bold = Room A date
- ** = break in scale of y-axis

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Figure 47. Stem-and-leaf plot of the tree-ring dates for Cliff Dwelling GG C7-1.

**Cliff Dwelling GG C8-3**

The east wall of Room B abuts the middle of the north wall of Room A, indicating that Room B was built after or near the same time as Room A (Figure 10).

Two heavily weathered logs from Rooms A and B yielded two noncutting dates: 939+vv and 964++vv. The latter date was produced from a log used as a wall support for Room B, indicating that Room B was built and used after A.D. 964. Because these two dates do not conform with any date clusters from the other sites, it is believed that the construction date for the architectural features (Rooms A, B and Feature C) at this site date much later than the A.D. 960s, probably no earlier than the late Pueblo II period. However, their original masonry style consisting of upright slab and fiber tempered mud construction indicates that these initial architectural features could represent Pueblo I or early Pueblo II construction (William D. Lipe, personal communication). The walls of Room B were later rebuilt, probably during the late Pueblo II or Pueblo III period, with horizontally laid irregular stones and mortar, but an exact date for this rebuilding event is unknown.
Cliff Dwelling T C1-2 (42SA5114)

Together, the roof beams from Rooms H and O (Figures 28 and 30) yielded 23 of the 25 tree-ring dates for Cliff Dwelling T C1-2. Roofing beams from most of the structures that were once roofed were removed prehistorically. The floor fill of all the structures is too shallow to be concealing any beams. The date distribution shows a loose terminal cluster between A.D. 1242 and 1259 that is comprised of dates from both Rooms H and O and from two loose logs (Figure 48). One of the loose logs is in close proximity to Room R1, while the other loose beam is of unknown provenience. The extended left tail, consisting primarily of noncutting dates, suggests that dead wood was used in the construction of these two rooms.

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<td>1260s 126 55</td>
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Figure 48. Stem-and-leaf plot of the tree-ring dates for Cliff Dwelling T C1-2.
The dates from Room H provide good evidence that Room H was constructed in early 1250s. The beams that yielded the two latest dates of 1251+vv and 1252+B were used in the top layer of cribbing. The extant roof of Room O was constructed when the room was remodeled; therefore, the tree-ring dates indicate when the room was remodeled, not when its walls were first constructed. Thus, Room O was remodeled at approximately A.D. 1259, and then later repaired at about A.D. 1265. Secondary beams were not laid over the primary beams comprising the west half of the roof. One of the beams dating to A.D. 1265 was used as one of these primary beams and it is resting on top of the repaired upper portion of wall. The other primary beams in the west section of the roof are incorporated into the repaired upper portion of wall. Thus, the primary beam that dates to A.D. 1265 is interpreted as a repair. The other beam dating to A.D. 1265 is one of the secondary beams not incorporated into the wall construction; it is also likely to have been introduced during roof repair. Room P was also probably remodeled at the same time as Room O in the late A.D. 1250s or early 1260s; the same type of mud was used in the remodeling of both rooms. In addition, Rooms O and P were originally built simultaneously. All the masonry walls defining Rooms O and P are bonded.

Two mortar types were used in the construction of the structures at Cliff Dwelling T C1-2: reddish coarse mud tempered with trash (i.e. charcoal, sherds, sandstone and limestone chunks) and smooth tan mud with few inclusions. The tan mortar was often used in the remodeling and/or repair of rooms indicating that it postdates the red mortar. Most of the structures were constructed with the red mortar. Only Rooms B, L, and R3, as well as the remodeled Room K (Kiva) were constructed with the tan mortar, and thus were probably later additions (Figures 28, 29 and 30). Unfortunately, the mortar type
used in the wall construction of Room H was not recorded due to the amount of fill covering its walls and its poor wall preservation. That Rooms A, D, J, M1-P, R1 and R2 were constructed with the red mortar, but repaired and/or remodeled with the tan mortar, may indicate that they were used concurrently with Rooms B, K, L and R3. Thus, an inference is made that all the rooms built or repaired with the tan mud were occupied during the late 1250s and possibly into the A.D. 1260s. An estimated construction date for the rooms constructed with the red mortar is unknown.

Cliff Dwelling GG C9-I (42SA5115)

On the basis of their similar masonry styles, the structures on the bedrock ledge (Rooms A, B, C1, and C2) were possibly built at the same time, and the structures on the alluvial terrace (Rooms G, H, and I) are also inferred to have been built simultaneously with each other (Figure 13). Determining the construction sequence of Rooms D-F is more problematic because of their isolated locations and aberrant masonry styles. None of the beams sampled yielded tree-ring dates, and thus establishing coeval construction for most of the extant rooms is impossible. Rooms A-C2 are well protected on the upper bedrock ledge; hence, these rooms may have had a longer duration of use than the other rooms, given the alluvial situation.

On the basis of the wall construction sequences, extant Rooms G-I were built concurrently (Figure 32). Their walls were mortared with the same tan mud; however, the stones used in the construction of Room G are much smaller than those used in Rooms H and I. Room G was built first. The south wall of Room H was built against
Room G. The south wall of Room I appears to have abutted the southwest corner of Room H, and therefore it was the last room in this complex to be built.

*Cliff Dwelling GG C10-1 (42SA5116)*

None of the roofs of the extant structures are intact, but roofing debris is evident in the floor fill. Much roofing debris may have been buried by windblown sand. A horizontal log platform was built to support the front wall of Room II (Figure 34). The south part of the platform forms the top of the large “niche” in Room E/F. Two of the horizontal log supports yielded two cutting dates of 1068+G and 1156+G, which suggest the construction of Room II postdates A.D. 1156. The two logs were possibly dead wood, as indicated by the beetle galleries and the large broken ends. Therefore, these dates may give an early bias for the construction of Room II.

*Cliff Dwelling GG C12-1 (42SA5117)*

Only four of the tree-ring samples from Room B were crossdated: 954+vv, 1035+v, 1036++G, and 1083v. The latest date was produced from a beam fragment in the fill. Unfortunately, these dates are not very useful for estimating the date of construction, but it seems likely that the roof of Room B was built after A.D. 1083. The masonry wall of Room C2 was built at the same time as the construction of the roof of Room B. The roof beam, which ran across the west end of the kiva, was incorporated into the lower courses of the masonry wall of Room C2 (Figure 35). The south wall of Rooms C1 and C2 are bonded; hence, Rooms B, C1, and C2 were probably built contemporaneously. The masonry style of Room A is roughly similar to Room B, which
employs large tabular blocks with large chinking stones. Thus, although the preservation of Room A is poor, it is inferred to also have been used concurrently with Room B.

The original Room G was constructed of type 1 masonry, and thus may predate the other rooms at the shelter. The walls of Rooms C, H, I, J1, and J2 were built with horizontal courses of large tabular blocks and decorative lines of chinking, similar to the type 3 masonry used to remodel Room G. Thus, these rooms were probably built at the same time. Room E is unique in that small stones were used in the wall construction and no chinking is present; hence, how this room fits in the construction sequence at the shelter is unclear.

_Criff Dwelling GG C13-1 (42SA5118)_

The distribution of the 39 tree-ring dates produced by Rooms B, E, F, G1, G2, J, K, S and Feature O (Wall) indicates two main periods of construction at Cliff Dwelling GG C13-1 (Figure 49). The first building period occurred in the A.D. 1110s, as evidenced by a weak cluster of cutting dates between A.D. 1114 to 1122. This cluster is composed of beams (crib logs, primaries and secondaries) used in the roof construction of Room E (Kiva). Although this cluster consists of the latest dates from Room E, the possibility that Room E’s roof was constructed of recycled beams cannot be excluded. The second indicated building period is evidenced by a terminal cluster culminating between A.D. 1234 and A.D. 1239. The dates comprising this cluster are from Rooms G1, G2 and J. The structures on the upper ledge (Figure 16) were probably built during the second construction period, as evidenced by the dates of 1205++B and 1243v. An _in situ_ secondary beam from Room S produced the former date and a stone axe-cut beam
lying on the ground near Feature O produced the latter date. The same mortar is evident in the wall construction of all the rooms on the upper ledge indicating that they were built contemporaneously. A brief construction episode for the rooms on the upper ledge is indicated by the evidently hasty construction of their walls.

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Key: underlined = cutting date
unmarked = noncutting date
bold = Room E date
** = break in scale of y-axis

Figure 49. Stem-and-leaf plot of the tree-ring dates for Cliff Dwelling GG C13-1.

The site could have been abandoned and then reoccupied between the two building periods. A 35-year gap in the distribution of tree-ring dates between A.D. 1133
and 1168 supports this inference. The extended left tails before the two date clusters primarily represent the use of beams recycled from structures elsewhere and the use of dead wood in construction.

A loose beam lying on the wall of Room B (Kiva) (Figure 36) produced a date of 1168+B. This beam, however, is most likely dead and/or recycled wood, because both of its ends are burned and broken. This suggests that Room B was probably constructed later than the A.D. 1160s. The construction of Room F (Figure 37 and 38) could have occurred as early as A.D. 1132, as evidenced by a date of 1132+B that was produced from its door jamb, which is stone axe cut. If the loose beam near Room K (Figure 16), tree-ring dating to 1175+B, was originally part of Room K, then it represents the latest cutting date for Room K. The ends of this beam are burned and therefore Room K could have been constructed much later than the mid- A.D. 1170s. It is plausible that Rooms B, F and K were built as late as the A.D. 1230s, at the same time as Room G1, G2 and J.

As mentioned above, the roof beams from Room E (Figure 37 and 38) produced a cluster of dates that suggest this room was constructed at about A.D. 1119. Another possibility is that Room E was constructed as late as A.D. 1122, as evidenced by a cutting date of 1122GB produced from one of the secondaries from the roof’s top layer. However, all the tree-ring dated roof beams have broken ends, which indicates that the roof was probably built with old wood. Therefore, Room E could have been constructed much later than A.D. 1122. A date of 1133vv from an in situ secondary beam from Room D (Figures 37 and 38) suggests a possible construction for this room during or after the early 1130s. In sum, the construction of Rooms E, D, and F evidently predates
the construction of Rooms B and K, and the construction of all these rooms possibly predates the construction of Room G1, G2, J, and the structures on the upper ledge.

On the basis of the tree-ring date distribution, Rooms J, G1, and G2 were the last rooms to be constructed on the lower ledge (Figures 37 and 38). Loose roof beams associated with Room J yielded five tree-ring dates indicating possible construction as early as the late A.D. 1220s, but most likely in the mid-1230s. The wall construction of Rooms G1 and G2 shows that these two rooms were built concurrently. Most of the roof beams from these two rooms are incorporated into the wall construction. Based on the weak terminal cluster formed by the dates from the secondary and primary roof beams of Room G1, this room could have been constructed at approximately A.D. 1239. However, a late cutting date of 1249G from one of the primary beams suggests that Room G1 was constructed as late or later than A.D. 1249. The five tree-ring dates from the roof beams of Room G2 indicate that Room G2 was built as late or later than A.D. 1255. The two latest dates of 1243v and 1255+B for Room G2 were produced from two secondary beams incorporated into the wall construction. Since the wall construction of Rooms G1 and G2 indicates simultaneous construction, I suggest that both rooms were constructed as late or later than A.D. 1255. If this were the case, then abutting Features G3, G4 and G5 were constructed later or at nearly the same time as Rooms G1 and G2.
Isolated Storage Structures

Cliff Dwelling K C2-1

This site, located in Kane Gulch, consists of a D-shaped isolated granary. Its typical small and high granary entry and the absence of sooting support this functional inference. It was constructed of tabular stones set in a substantial amount of mud. It is spatially isolated and has no tree-ring material; a construction date for this room cannot be determined.

Cliff Dwelling GG C4-4 (42SA23687)

This shelter is composed of one extant granary (Room A) constructed of upright slabs and mud (Figure 7). Horizontally laid stones were used to fill in the gaps around the upright slabs. A raised slab serves as the door sill for its small entry. Wall outlines of several more rooms are apparent on the shelter wall. Based on the absence of sooting, they were probably used for storage. When Room A was constructed is indeterminate due to the absence of datable wood.

Cliff Dwelling GG C4-5

Four poorly preserved granaries (Rooms A-D) make up this site, as well as two small circular features (E1 and E2) of unknown function (Figure 7). Two pieces of pinyon from the floor fill of Room C yielded two noncutting dates: 1107±B and 1131±G. If the pinyon was part of the construction of Room C, then this room was probably constructed some time after A.D. 1131. Room B abuts Room C and therefore
was probably also constructed later than A.D 1131. In addition, Room A apparently abuts Room B, and may have been the last room built at the site. All that remains of Room D is wall rubble, so whether Room C abutted Room D is difficult to determine.

Cliff Dwelling GG C6-4

This site is comprised of an isolated granary. It is within view of Cliff Dwellings GG C6-3, GG C6-6 and GG C6-7. Access to the granary is easy from the canyon bottom but impossible from the rim. A few irregular stones are visible under the thick layers of plaster on the interior and exterior; they appear to create a smooth interior and exterior wall surface. No wood is present for tree-ring dating, and thus this structure cannot be directly dated.

Cliff Dwelling T C3-2 (42SA5048)

This high, well-protected shelter contains 21 extant granaries and storage rooms, which may be related to mesa top agriculture (Figure 12). The eastern portion of the site is separated from the western portion by a wall (Feature O) built on a narrow part of the ledge. This wall would have functioned to restrict access between the two areas. The site has two components. The earlier component is probably Basketmaker III, and it is represented by sooting on the rear of the shelter and number of outlines of mud-walled structures. In addition, many of the extant structures are built on an upright slab base employing much mud with large quantities of fiber temper, and possibly date to the late Basketmaker III or early Pueblo I Period (William D. Lipe, personal communication). There also are the extant masonry and jacal structures, which represent a later Pueblo
component. None of the extant structures are sooted, but some are large enough to have been possibly used as habitations, as well as storage rooms. Some of the mud outlines on the shelter wall could represent Pueblo period structures that were demolished prior to site abandonment. There are two small, stratified midden areas, perhaps dating to the late Basketmaker III Period.

Most structures show extensive repair, rebuilding, or remodeling. Three (presumably Pueblo) masonry styles are evident in the extant structures. A masonry type 2 style of irregular coursed and faced stones is the earliest. The latest masonry is a type 3 variety consisting of evenly coursed stone, smooth faces towards the interior and exterior. Another type 3 masonry variety using much mud predates this style.

Three of the 5 tree-ring samples yielded dates: 715 GB, 746 G, and 953 vv. The tree-ring dates give an early bias for the construction of the extant rooms. The date of A.D. 715 was produced from a beam built into the rebuilt portion of the wall of Room F. A weathered lintel from Room Q produced the A.D. 746 date. These two dates are anomalously early given their association with type 3 masonry, which suggests that either construction wood from the late Basketmaker III-Pueblo I structures were reused in later construction episodes and/or weathered dead wood was used. The A.D. 953 date was produced from a beam built into the repaired portion of the wall of Room H. This beam is probably dead wood given its very weathered surface and broken ends.

Cliff Dwelling GG C9-3

This site consists of an isolated granary located on a ledge that can be easily accessed from the canyon bottom. It is constructed of irregular stones laid horizontally in
mortar and on top of an upright slab base. No tree-ring material is present; a construction
date for this room cannot be determined.

Cliff Dwelling GG C9-4

This isolated granary is located on a ledge directly above Cliff Dwelling GG C9-1, which was possibly built and used concurrently. The granary was built of type 3 masonry similar to the masonry used in the construction of Rooms G, H and I at Cliff Dwelling GG C9-1. Hence, use of the shelter for storage purposes may have been restricted to the residents of Cliff Dwelling GG C9-1. Approximately 10 mud outlines on the rear of the shelter east and west of the extant granary show a previous and extensive use of the shelter for storage. No wood is present for tree-ring dating.

Cliff Dwelling GG C11-3

This isolated granary is built of well-laid tabular stones forming a dry wall across the mouth of a small cave. The wall’s exterior is thickly plastered. Access to the granary is only possible from the canyon bottom. Assigning a construction date to this room is impossible, for there is no tree-ring material.

Summary and Conclusions

A.D. 1120s-1140s Construction

Many beams were cut during the earliest period of beam procurement between A.D. 1112 and 1146. Over 75 percent of these beams were used in the construction and
repair of Rooms A, B, and I at Cliff Dwelling GG C4-1 and Room E at Cliff Dwelling GG C13-1. Room E at Cliff Dwelling GG C13-1 is the only structure that yielded multiple tree-ring dates that might have been constructed – in its present form – during the late A.D. 1110s or early A.D. 1120s. However, it was more likely constructed later with old or re-used wood. The majority of beams from the study area dating to the A.D. 1110s and early 1120s, however, appear to be weathered dead wood that was collected and used in the roof construction of Rooms A, B and I at Cliff Dwelling GG C4-1. This interpretation is supported by the high frequency of “++” dates and by the number of weathered beams recorded in the 1974 tree-ring sample field notes. The string of dates between A.D. 1128 and 1130 were produced from roof beams of Room I, and may represent three years in which construction timbers were stockpiled for the construction of early component structures at Cliff Dwelling GG C4-1.

Construction during the A.D. 1130s was apparently not confined to Cliff Dwelling GG C4-1. Beams dating to the A.D. 1130s were also used in the construction of rooms at Cliff Dwellings UGG C23-1, GG C13-1 and GG C4-5. Construction at Cliff Dwelling UGG C23-1 during this period took place on the lower ledge. This interpretation is based on the short range of four cutting dates between A.D. 1130 and 1133 from Feature T and Room N4 on the upper ledge. The beams producing these dates show evidence of reuse, and were most likely scavenged from the rooms on the lower ledge. A construction date for Room F at Cliff Dwelling GG C13-1 may be inferred from a single cutting date of 1132+B. On the basis of a single noncutting date of 1131++G, the construction of Room C at Cliff Dwelling GG C4-5 may have also occurred during this decade.
Four of the six beams dating to the A.D. 1140s were used in the roof construction of Rooms A, B and I at Cliff Dwelling GG C4-1. The presence of beams dating this decade may suggest the continual use of Cliff Dwelling GG C4-1 into the mid-1140s, or these beams may be dead wood or recycled wood from structures elsewhere. The other two dates in the A.D. 1140s are from weathered old wood used in the construction of Room C at Cliff Dwelling GG C6-7 and Room H at Cliff Dwelling T C1-2, which are part of the A.D. 1230s-1250s construction component.

A.D. 1230s-1250s Construction

The second major indicated building period occurred between A.D. 1233 and A.D. 1259. A sharp peak in beam procurement during this period is not apparent in this date cluster. The number of beams cut during this time period is relatively equal during any one year or decade. The tree-ring dates that form this latest cluster directly date the initial construction of eight rooms from five of the Grand Gulch sites. They are Rooms J, G1 and G2 at Cliff Dwelling GG C13-1, Room M at Cliff Dwelling GG C3-1, Room H at Cliff Dwelling T C1-2, Rooms A and B at Cliff Dwelling GG C7-1, and Room C at Cliff Dwelling GG C6-7. In addition, the roof construction date for remodeled Room O at Cliff Dwelling T C1-2 falls within this time period. A single date of 1243v from a beam lying on the ground near Wall O on the upper ledge of Cliff Dwelling GG C13-1 could possibly represent a near-construction date for Wall O and the other structures on the upper ledge. Alternatively, the beam may have been used for repair and may present a late bias for the construction of these structures.
Dated beams from Rooms J, G1 and G2 at Cliff Dwelling GG C13-1 fall within the mid- and late A.D. 1230s, and thus largely contribute to the cluster of dates in the A.D. 1230s. However, Room G1 and G2 were most likely built during the A.D. 1250s. One explanation for the cluster of dates in the A.D. 1230s is that the beams dating to this time period were reused from structures elsewhere. Yet, the A.D. 1230s roof beams for Rooms G1 and G2 appear to have been cut to fit the dimensions of the rooms and there are no signs of reuse. The other dated beams falling within this decade are represented in the roof construction of Room M at Cliff Dwelling GG C3-1, Room A at Cliff Dwelling GG C7-1, and Room O at Cliff Dwelling T C1-2.

Most of the beams dating to the A.D. 1240s were used in the roof construction of Room M at Cliff Dwelling GG C3-1 and Room H at Cliff Dwelling T C1-2. On the basis of their latest tree-ring dates, the construction of these two rooms occurred during the late A.D. 1240s or early A.D. 1250s. Some of the beams used in the roof construction of Rooms G1 and G2 at Cliff Dwelling GG C13-1 and in the roof construction of Rooms A and B at Cliff Dwelling GG C7-1 also date to this decade.

Most of the beams dating to the A.D. 1250s were used in the initial construction of Room C at Cliff Dwelling GG C6-7 and in the latest roof construction of Room O at Cliff Dwelling T C1-2. The latest tree-ring dates for both of these rooms indicate a similar construction date at about A.D. 1259. Rooms B and D and Feature A at Cliff Dwelling GG C6-7 probably date to this decade, for their wall construction is similar to that of Room C. Rooms A and B at Cliff Dwelling GG C7-1 were also built during this time period, on the basis of their latest dates of 1253+\textsuperscript{v}\textsuperscript{v} and 1254+\textsuperscript{v} respectively.
Occupation and Abandonment

The Grand Gulch study area appears to have been occupied at some scale from the A.D. 1110s through the A.D. 1260s. The fluctuations in the number of tree-ring dates and thus in the amount of construction throughout this time period may indicate population fluctuations rather than alternating periods of abandonment and reoccupation. A sharp decline in dates following the earliest date cluster suggests a lower use of the study area between A.D. 1146 and A.D. 1171. However, a single cutting date of 1156+G from a support beam for Room II at Cliff Dwelling GG C10-1 indicates that at least part of the architectural complex may have been constructed during this period of little tree-ring cutting activity. In addition, the latest cutting date for Room B at Cliff Dwelling GG C13-1 is A.D. 1168, which also indicates that building activity and occupation of Grand Gulch may have occurred in the A.D. 1160s.

An increase in tree-ring dates at A.D. 1171 is evidence for an increase in beam procurement and use of the canyon. Half of the beams dating to the A.D. 1170s were used in the construction of Room M at Cliff Dwelling GG C3-1 and Room H at Cliff Dwelling T C1-2. A single cutting date of 1171B for Room I at Cliff Dwelling GG C4-1 is evidence for repair or at least occupation of the shelter during this time period. Two noncutting dates produced from charcoal may represent the occupation of Cliff Dwelling UGG C23-1 during or after the mid-1170s. A construction date of A.D. 1175 is inferred for Room F at Cliff Dwelling GG C13-1 from its latest date.

Beams dating to the A.D. 1180s were used in the roof construction of Rooms A and B at Cliff Dwelling GG C4-1. A single cutting date of 1181B for Room B at Cliff Dwelling GG C3-1 may indicate its date of construction and thus the earliest construction
at the site. The tree-ring distribution shows a decline in tree-ring cutting activity in the 1190s followed by a dramatic increase in beam procurement. Most of the beams dating to the A.D. 1200s and 1210s were used in the construction of rooms built in the 1230s, 1240s and 1250s. However, the beams dating to the 1200s and 1210s from Rooms A and B at Cliff Dwelling GG C4-1 probably indicate the roof construction date for these rooms and thus the occupation of Cliff Dwelling GG C4-1 during that time period. Further, a single cutting date of 1203B possibly suggests the construction of Room F at Cliff Dwelling GG C3-1 and/or the occupation of Cliff Dwelling GG C3-1 in the early 1200s.
CHAPTER 8
CONCLUSIONS

To gain an understanding of social organization and integration in the Grand Gulch study area during the late Pueblo II and Pueblo III periods, I analyzed the architecture of 24 cliff dwellings and described the spatial relationships among the functionally distinct structures within the sites to infer prehistoric interaction networks. Establishing the age of the structures and sites was the first step towards determining these relationships (Chapter 7).

The frequent use of dead trees and recycled wood as building timbers made identifying room construction dates problematic. Variation in the number of dated tree-ring samples from particular structures meant that some Grand Gulch architectural features and sites are better dated than others. Many architectural features lacked datable wood, while some rooms such as Room I (Kiva) at Cliff Dwelling GG C4-1 yielded several tree-ring dates. Many of the poorly dated architectural features are isolated, which makes them difficult to date relative to other structures using the bond-abutment principle.

Yet, some detailed intersite chronological relationships can be identified in the study area. Examination of distributions of the tree-ring dates from the sites presented in Chapter 7 reveals that some multiple-household habitations, clusters of dwelling units, and some single household habitation sites (isolated residences) were occupied during the A.D. 1240s and 1250s. The construction of eight rooms from five single- and multiple-household habitations can be directly dated within these two decades. Similarity of
architectural styles suggests that some poorly dated rooms were built about the same time as the well dated rooms within the same site. I propose that most of the existing rooms in the study area were simultaneously used at some time during the A.D. 1240s and 1250s and represent the latest community organization in the study area. If the extant architectural features were used about the same time, then the latest Pueblo occupation of the canyon represents a period of regional population increase, but on a much smaller scale than what occurred in the A.D. 1200s in the central part of the Mesa Verde culture area farther east (Varien et al. 1996).

The cluster of dates falling between A.D. 1112 and 1146 indicates an earlier period of intensive use of the canyon during the late Pueblo II period. The abundance of ghost structures and remnant rooms throughout the study area may date to this earlier occupation period. The late Pueblo II occupation was followed by a period of little use of the canyon, as evidenced by the paucity of tree-ring dates for this period. A large increase in cutting dates in the A.D. 1200s suggests that the majority of the Grand Gulch sites reached their maximum size during the A.D. 1200s, although they were probably established earlier.

**Population Estimates**

Archaeologists have used several methods for estimating site population that are based on architectural data. One common method involves counting the number of habitation rooms or dwelling units, and multiplying the total by an assumed average number of individuals per household. The problem with this method is that it assumes a standard number of individuals per household and also that the archaeological correlate
of a household can be consistently recognized. Another method is based on the relationship between roofed floor area and population. Both methods for estimating population make assumptions about the longevity of site occupation, the contemporaneity of dwelling units, and the integrity of the archaeological record. As a result, these methods may under- or overestimate total population of a study area.

Naroll (1962), after conducting a worldwide ethnographic study, found that an average of 10 m² of roofed floor space was required per person. Brown (1987) did a cross-cultural restudy of “Naroll’s Constant” and proposed a constant of 6 m² per person, a figure that concurs with Castleberry (1974), who also reexamined Naroll’s population predictor. Following Brown (1987), I divided the total estimated, roofed dwelling floor area of 581.5 m² from 63 of the 182 Grand Gulch rooms (including kivas) by the factor of 6 m², which yielded an estimated late occupation population of 96.9 persons for the Grand Gulch study area. The roofed floor area of all granaries (n=96) and of rooms less than 4 m² (n=11) was not included in the total dwelling floor area because these small areas most likely did not provide living space but rather storage space. In addition, the floor area of 12 poorly preserved rooms, 3 of which are interpreted as probable habitation rooms, could not be calculated and therefore were excluded from the total (see Appendix A).

Dohm (1990), in her study of the variability of house size between Historic Period Pueblo and non-Pueblo settlements, found that the amount of roofed space per person strongly correlated with architectural aggregation. Dohm proposed that the need for privacy increases with heightened aggregation and results in an increase in house size. Dohm measured roofed space per person for nineteenth- and twentieth century Navaho
settlements. The average roofed space per person for Navaho settlements occupied year round was 9.7 m², a figure that approaches “Naroll’s Constant”. Haase (1983:9) proposed that the historic Navajo settlement pattern provides the best analog for the dispersed Pueblo settlement pattern on Cedar Mesa; therefore, Dohm’s figure may provide a reasonable basis for estimating Grand Gulch population. Applying this factor produces an estimated population of 59.9 persons in the Grand Gulch study area. The average amount of roofed space per person for the Grand Gulch residential sites may lie between the cross-cultural and Navaho estimates offered by Brown and Dohm, respectively. Hence, these estimates could be used to arrive at an estimated total population range of 59.9 to 96.9 persons. Adler (1990), using cross-cultural data, reported maximum populations of 1500 to 1200 people for politically nonstratified communities. Whether or not my population estimate is conservative, it is well below Adler’s cross-culturally derived population limit for community size.

The method used above to estimate total population does not consider the average population of the study area at any one time during the Pueblo occupation. Average momentary population estimates (Matson et al. 1988) take into account the use-life of habitation sites, the length of time a study area was occupied and the number of rooms in use at any one time during an occupation period. The tree-ring data supports the inference that the Pueblo occupation of the study area lasted for approximately 150 years from about 1120 to 1270. During this 150-year period, the population in the study area fluctuated. For example, a peak in building activity in the A.D. 1240s and 1250s indicates intensive use of the canyon at this time, while population was most likely low during the A.D. 1150s and 1160s, as evidenced by the paucity of beams dating to these
decades. Matson et al. (1988) following Schlanger (1985) estimated that the use-life of mesa top pithouses varies from 3 to 20 years. I suggest that the use-life of the Grand Gulch masonry rooms range from 20 to 40 years based on their protected location in dry shelters as opposed to open areas. This estimate is probably conservative given the extent of repair and remodeling evident in the architecture, which would have increased the use-life of certain structures. On the other hand, structures may have been used sporadically, rather than continuously.

To estimate the average population of the study area at any one time, the length of the occupation (150 years) is divided by the use-life of a Grand Gulch masonry room (average of 30 years). Then, the total estimated population (ca. 59.9-96.9 persons) is divided by the resulting factor of 5, which gives an average population of between 12.0 and 19.4 persons. This estimate would change if the use-life estimates were adjusted either up or down. Hence, if the last main period of construction and use of the recorded structures occurred across a 150-year time span, then the average momentary population of the study area falls between about 8 and 26 persons (Figure 50).

On the other hand, it is likely that most of the extant habitation rooms (including kivas) were built or extensively remodeled during the last main period of construction and use, from about 1230 to 1270. If this 40-year period is divided by a 30-year assumed structure use-life, a factor of 1.33 results. Dividing the total population estimates based on floor area by this factor results in average momentary estimates of about 45 persons (using the Dohm constant) and 73 (using the Brown constant). These estimates would be adjusted either up or down if longer or shorter structure use-life estimates were used, as shown in Figure 51. The abundant evidence at many of the sites for repeated use and
Figure 50. Average momentary population estimates for the Grand Gulch study area, assuming a total occupation period of 150 years. Brown’s (1987) constant is 6.0 m² of floor area per person and Dohm’s (1990) constant is 9.7 m².
Figure 51. Average momentary population estimates for the Grand Gulch study area, assuming a total occupation period of 40 years. Brown’s (1987) constant is 6.0 m² of floor area per person and Dohm’s (1990) constant is 9.7 m².
remodeling supports use of relatively long use-life estimate (e.g., 30 years) for structures and a continuous occupation of the shelters for years at a time. The relative scarcity of artifacts at most of the sites, however, suggests either brief use or repeated short occupation episodes. This information would indicate a shorter estimated use-life or total time of use for habitation rooms, with a consequent reduction in average momentary population estimates.

Another approach to estimating population is by counting the number of households represented in a particular period. Varien (1999) and Lipe and Varien (1999) argue that in the Pueblo III period in the central Mesa Verde region, each kiva served as the main room in an architectural complex that housed a single nuclear-family or extended family-based household. Twenty-one kivas were recorded in the Grand Gulch study area, and as previously discussed, there was evidence that these kivas typically had residential as well as ritual functions. If households ranged from 5 to 10 persons in size, the 21 kivas would indicate a total population of 105 to 210 persons. If all the kivas were in use at some time during the last main period of occupation, from approximately A.D. 1230 to 1270, and a 30-year use-life is assumed, then average momentary population would be between approximately 79 and 158 persons. Again, these estimates would go up if a longer use-life (or total number of use-years, even if discontinuous) is assumed for the household architectural complex, and would go down if a shorter use-life is assumed.

Extremely small average momentary population estimates, such as those produced by assuming that the use of the recorded structures was evenly distributed across a 150-year time span, imply that the Grand Gulch study area was always only a part of a dispersed community in which the majority of members lived on the adjacent mesa tops.
It is probably more realistic, however, to assume that the structures recorded in this study primarily represent the last main period of occupation, probably from about A.D. 1230 to 1270. Even though there is substantial evidence that these sites were also used at other times, especially in the early A.D. 1100s, the extant structures mainly represent the last period of occupation; hence, population estimates can most reliably be made for that period. If this approach is taken, the population estimates that result from several types of inference yield numbers large enough – e.g., 50 or more individuals – to suggest that the study area was the core habitation area for a small community.

**Community Organization**

Archaeologically, communities are defined by the spatial proximity of residential sites, by presence of a single aggregated site, and/or by spatial distribution of small habitations around a community integrative structure such as a great kiva. Murdock (1949) regarded a community as a clustered group of people who had regular face-to-face contact, as well as social and economic ties. Adler (1996: 5) agreed with Murdock’s definition but also added that communities define, secure and provide necessary natural resources (e.g., food and marriagable partners) both locally and regionally. Similarly, Varien et al. (1996:100) maintained that the community also functions as a suprahousehold “decision-making entity” that provides its members with a common identity and social unity. Following Murdock’s definition, Rohn (1971: 40) inferred that, based on the proximity of their dwellings, the Mug House residents were part of one community. He also concluded that the inhabitants of the nearby contemporaneous
dwellings belonged to the Mug House community. Likewise, Dean (1969:192) suggested that the large residential Tsegi phase sites, Betatakin and Kiet Siel, together with their neighboring small residential sites, each constituted a community, because the inhabitants would have had a high frequency of interaction.

The spatial relationships between the Grand Gulch sites provide clues on how the inhabitants were integrated into communities. Dwelling units are clustered together, and if contemporaneous, formed hamlets or multiple household habitations. Coeval with the hamlets are small isolated habitations, which continued to be used during the middle A.D. 1200s occupation of the canyon. The single household habitations were occupied by possibly one household, and probably had social, political, or religious ties with the hamlets to form part of a dispersed community. Grand Gulch had a relatively small population and the dispersed multiple household habitations and the community as a whole lacked integrative features such as great kivas. The absence of such features would indicate that the households, although part of a community, were fairly independent social units. It is possible, however, that the community did contain integrative features that are not architecturally evident. Compared to settlements in the central Mesa Verde region to the east, Grand Gulch clearly had a relatively dispersed multiple household community organization throughout the Pueblo III period. Based on the clustering of residential units at some of the Grand Gulch sites, it is clear that a modest trend towards aggregated settlement took place during the late Pueblo III period. Unlike communities to the east, however, the habitations did not group together to form village-sized aggregates of more than 50 rooms (e.g. Varien et al. 1996).
The habitations within the study area were not likely part of more than one Cedar Mesa community. In other words, it is doubtful that the residents of Cliff Dwelling GG C13-1 were affiliated with a different community than the residents of Cliff Dwelling UGG C23-1 approximately three miles to the north (see Figure 2). The close proximity of all the residential sites in the study area and the relative lack of habitations, both upstream and downstream from the study area, suggest that they were most likely part of one community. Adler (1996:6) noted that the dispersed communities recorded by southwestern archaeologists are not widespread; the distance from the center of a community cluster to the farthest sites in the cluster ranges between one and five miles. Adler proposed that the distance to agricultural fields and the amount of energy spent moving goods are factors that determined the geographical range of a community.

Undoubtedly, some of the residents on the adjacent mesa tops belonged to the same community as the canyon residents, but the exact nature of the relationship between the mesa top residents and the canyon residents is difficult to assess. Mesa top habitation persisted in late Pueblo times. The canyon residents continued to farm the mesa tops, while the mesa top residents used canyon shelters for storage (Matson et al. 1988). Sites such as Cliff Dwelling T C1-2 are not located near concentrations of alluvium and the occupants were probably mesa top farmers. A few sites such as Cliff Dwelling GG C2-1 could only have been accessed from the mesa top; they were most likely primarily used as dry shelters for storage by mesa top farmers.

Explanations for why the Cedar Mesa Anasazi lacked public architecture such as great kivas and lacked aggregation into villages relative to those exhibited by the eastern Anasazi have been offered. Benson (1984) proposed that small-scale aggregation and
disaggregation were probably adaptive strategies of residents for coping with changing environmental conditions. Organized into a dispersed community, the Grand Gulch households would have been able to respond and move rapidly and effectively to changing environmental and social circumstances (Dean 1996). In addition, by maintaining a low level of social integration, the Cedar Mesa population had the flexibility to locate settlements with respect to natural resources and arable soil, thereby maximizing access to arable land on the adjacent mesa tops and canyon bottom (Matson et al. 1988). These explanations are plausible given the patchy distribution of arable soil and the marginal environment for maize agriculture on Cedar Mesa.

Why did population aggregation not occur in the Grand Gulch study area and what was the key function of the Grand Gulch community? The uniform association of storage structures with a dwelling unit or hamlet in the study area suggests that agricultural production, the construction of domestic structures, and the distribution of resources were organized at the household level, and not at the community level. Adler and Varien (1994) and Varien et al. (1996) have argued that dispersed communities in the Mesa Verde region played a role in the regulation and allocation of land and other resources. Disputes over land use and ownership occur when population density and agricultural intensification increases. Cross-culturally, all non-stratified communities alleviate this problem by creating and maintaining land tenure rights for community members within the broader regional system (Adler and Varien 1994:84). Based on the defensive position of some residences in the mid-thirteenth century, Haas and Creamer (1996) have proposed that clustering of households could be partially a result of raiding or some type of conflict. Their view stresses the importance of the correlation between
conflict, community organization, and the environment. Social integrative networks serve as a buffer against food shortages during stressful environmental conditions. Eventually the resources are depleted, which causes one group to raid another group for food. In response to the threat of conflict, a trend towards aggregation occurs again as a defensive measure. This strategy, according to Haas and Creamer, is maladaptive in that it eventually leads to a pattern of warfare.

Many of the Grand Gulch residential sites are located in elevated and defensive positions, where access is limited to one or two protected routes. For example, Cliff Dwelling T C1-2 is located on top of a sheer wall rising up over 50 meters above the wash. Access to the site could be achieved by either walking along a ledge to the east that was controlled by a set of low masonry walls or by climbing a ladder to the west. The need for protection is a reasonable explanation for why people would live at Cliff Dwelling T C1-2 and isolate themselves from arable land and water sources. Cliff Dwellings UGG C23-1, GG C3-1, GG C6-7, GG C12-1 and GG C13-1 are other well-dated Pueblo III sites in the study area that have habitations on an elevated ledge with low defensive walls strategically placed adjacent to the point of entry. Although a small amount of residential aggregation is seen in Grand Gulch in the A.D. 1200s, the sites remain small by regional standards. Evidence of defensive locations or architecture at some of these sites indicates that warfare may have been a significant problem even in the absence of high population density or significant settlement aggregation.
Household Organization

Households are defined by a high density of shared activities (Wilk and Netting 1984); hence, they often are readily definable in the archaeological record. On the contrary, social units defined by kinship relations may be extremely difficult to recognize in the archaeological remains. Clans and lineages, the products of the systems of rules of marriage and residence, do not reflect patterns of behavior, since they are a “cognitive phenomenon” (Lowell 1991:4). In other words, activities conducted by a lineage such as regulating inheritance and ownership procedures (Netting et al. 1984:xvi) do not necessarily leave discernible spatial patterns in the archaeological record. Hence, the household can be studied in the archaeological record without determining the family type (nuclear, extended, patrilocal, matrilocal). Members of a household may not be the equivalent of a single family, but rather households may represent all or part of one or several families (Wilk and Rathje 1982).

Southwestern archaeologists (e.g. Dean 1969; Hill 1970; Rohn 1965) have commonly relied on the identification of room function as a first step towards defining the living quarters of households. In addition, doorway access between rooms and whether or not clusters of rooms open onto a common courtyard have traditionally been used to understand prehistoric social interaction (Dean 1969; Rohn 1965; Wilcox 1975). These sources of data are helpful in architectural studies of large cliff dwellings with clusters of rooms. The rooms that constitute the Grand Gulch cliff dwellings, however, are for the most part dispersed. As a result, assessing the relationships of the rooms to social groups is difficult. Yet, the configuration and size of the architectural spaces in the
Grand Gulch study area still reflect the size and relationships of the social groups who built, occupied and used those spaces.

In the Grand Gulch study area, the hamlets or multiple household habitations are composed of more than one dwelling unit. A dwelling unit consists of one or more habitation room and/or kiva, separate or attached storage structures, and an outdoor area. I discussed in Chapter 4 that a low kiva to surface room ratio of 1:7 indicates that kivas served as residential as well as religious structures. A household, perhaps corresponding to a nuclear family, might have occupied each dwelling unit. However, cross-cultural studies indicate that household members that cooperate economically on a daily basis do not necessarily live under a single roof (Wilk and Rathje 1982). Therefore, an entire multiple household habitation in the study area could have been occupied by one large household. If this was the case, designating these larger residential sites as multiple household habitation is erroneous. According to Wilk and Rathje (1982: 631-32), small households are effective “instruments for adaptation” in regions of limited resources because they are mobile and can make intensive use of the limited resources through linear scheduling of labor. Assuming Wilk and Rathje’s hypothesis is correct, I propose that households in the Grand Gulch study area were primarily of the nuclear family type, since large labor groups were most likely not required for the procurement of resources.

The dwelling units within the shelters are dispersed, indicating that the multiple household habitations were composed of relatively autonomous, economically equivalent households. That the majority of storage structures are attached or at least associated with habitation rooms and kivas indicates that the control of storage was conducted at the level of the household. If so, then production activities such as farming and the
allocation of resources may have been organized by individual households. Although domestic activities such as production, storage and consumption were shared by members of a household, other activities must have cross-cut the household boundaries. The limited aggregation of households that occurred functioned as a way to increase personal safety and the defense of resources during periods of environmental stress. The construction of defensive walls and other architectural features exhibiting a defensive nature would have required cooperation between households. For example, the construction of the rooms, defensive wall, and ladder on the upper ledge of UGG C23-1 would have required a suprahousehold level of organization that involved decision-making, planning, and cooperation.
REFERENCES CITED

Aasen, Diane K.

Adams, Charles E.

Adler, Michael A.


Adler, Michael A., and Mark D. Varien

Agenbroad, Larry

Ahlstrom, Richard V.N.

Ahlstrom, Richard V.N., Charlotte Benson, and Donald R. Keller
1974 Tree-ring Sample Field Notes. Ms. on file, Department of Anthropology, Washington State University, Pullman.

Bannister, Bryant
Benson, Charlotte


Blackburn, Fred M. and Ray A. Williamson

Bloomer, William W.

Brew, John O.

Brooks, Dan

Brown, Barton McCaul

Camilli, Eileen


Castleberry, Samuel E.

Cater, John and Mark Chenault
Chisholm, Brian and R.G. Matson

Ciolek-Torrello, Richard

Cordell, Linda

Creel, Darrell, and Austin Long

Dean, Jeffrey S.


Dohm, Karen M.


Eighmy, Jeffrey L.

Farwell, Robin E.
Fewkes, Jesse W.

Fiero, Kathleen

Gillespie, William B.

Guernsey, Samuel J., and Alfred Vincent Kidder

Haas, Jonathan, and Winifred Creamer

Haase, William R.

Hack, John T.

Hantman, Jeffrey L.

Harner, M.
1954 Archaeological Reconnaissance in the Grand Gulch Area, San Juan County, Utah. Ms. on file at the Museum of Northern Arizona, Flagstaff.

Hayes, Alden C. and James A. Lancaster

Hegmon, Michelle

Hill, James N.


Jorgenson, Julia

Keller, Donald R.

Kidder, Alfred V.

Lekson, Stephen


Lepofsky, Dana
1986  Preliminary Analysis of Flotation Samples from the Turkey Pen Ruin, Cedar Mesa, Utah. Ms. on file, Laboratory of Archaeology, University of British Columbia, Vancouver.

Lightfoot, Ricky R.

Lipe, William D.

1979  Archaeological Research at the Turkey Pen Site, Grand Gulch Primitive Area, San Juan County, Utah. Ms. on file, Department of Anthropology, Washington State University.


Lipe, William D. and Ruby Buick
1974  Notes for Ambitious Recorders of Pueblo Structures. Ms. on file at Department of Anthropology, Washington State University, Pullman.

Lipe, William D., and Michelle Hegmon

Lipe, William D., and R.G. Matson


Lipe, William D., R.G. Matson and Margaret Powers

Lipe, William D., and Mark D. Varien

Lowell, Julie

1991  Prehistoric Households at Turkey Creek Pueblo, Arizona. University of Arizona

Matson, R.G.


Matson, R.G., and Brian Chisholm

Matson, R.G., and William D. Lipe

1977 Seriation of Pueblo Ceramic Assemblages from Cedar Mesa, Southeast Utah. Ms. on file at Department of Anthropology, Washington State University, Pullman.


Matson, R.G., William D. Lipe, and William R. Haase
n.d. Human Adaptation on Cedar Mesa, Southeastern Utah (preliminary title). Ms. on file at Department of Anthropology, Washington State University, Pullman.

Matson, R.G., William D. Lipe, and William R. Haase

McGuire, Randall H., and Michael B. Schiffer

Mindeleff, Victor

Murdock, George P.
Naroll, Raoul  

Nelson, Nels C.  
1920  Outline of Early Explorations in Grand Gulch and Neighboring Canyons of Southeastern Utah. Ms. on file at the American Museum of Natural History, New York.

Nelson, Reid J.  

Netting, Robert McC., Richard R. Wilk, and Eric J. Arnould  

Parks, James A. and Jeffrey S. Dean  

Prudden, T. Mitchell  


Rohn, Arthur H.  


Salkin, Phillip M.  
1974  *The Malacology of the Kane Spring Column and Its Relationship to Prehistoric Adaptation on Cedar Mesa, San Juan County, Utah*. Unpublished M.A. Thesis, University of Wisconsin, Madison.

1975  The Malacology of the Kane Springs Column and Its Relationship to Prehistoric Adaptation on Cedar Mesa, San Juan County, Utah. *Four Corners Geological Society Guidebook, 8th Field Conference, Canyonlands*, 1975, pp. 73-79.
Farmington, NM.

Schiffer, Michael B.


Schlanger, Sarah H.


Shafer, Harry J.

Sharrock, Floyd W.

Smith, Watson

Steward, Julian H.

Sullivan, Alan P., III

Varien, Mark D.
1999 *Sedentism and Mobility in a Social Landscape: Mesa Verde and Beyond.* University of Arizona Press, Tuscon.

Varien, Mark D. and Ricky Lightfoot
Varien, Mark D., William D. Lipe, Michael A. Adler, Ian M. Thompson, and Bruce A. Bradley

West, Gerald

Wilcox, David

Wilk, Richard R. and Robert McC. Netting

Wilk, Richard R., and William L. Rathje
APPENDIX A

Floor Areas and Use Class Assignments for Grand Gulch Architectural Features
<table>
<thead>
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<th>Architectural Feature</th>
<th>Function</th>
<th>Floor Area (sq m)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cliff Dwelling K C2-1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Granary</td>
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</tr>
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<td><strong>Cliff Dwelling UGG C23-1</strong></td>
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<tr>
<td>A</td>
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<tr>
<td>B</td>
<td>Kiva</td>
<td>13.5</td>
</tr>
<tr>
<td>C1</td>
<td>Granary</td>
<td>2.2</td>
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<tr>
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<td>Granary</td>
<td>3.2</td>
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<tr>
<td>D</td>
<td>Windbreak (?)*</td>
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</tr>
<tr>
<td>E</td>
<td>Kiva</td>
<td>15.6</td>
</tr>
<tr>
<td>F</td>
<td>?*</td>
<td>—</td>
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<tr>
<td>G</td>
<td>Kiva</td>
<td>15.9</td>
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<tr>
<td>H</td>
<td>Storage (?) (top story)/Habitation (bottom story)</td>
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<td>3.6 (?)</td>
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<td>Granary</td>
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<td>K</td>
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<td>L</td>
<td>Platform*</td>
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<td>Wall*</td>
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Cliff Dwelling GG C13-1

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APPENDIX B

Laboratory of Tree-ring Research Explanation of Symbols
Laboratory of Tree-Ring Research Explanation of Symbols

The following suffixes are associated with the Grand Gulch samples:

The symbols used with the inside date are:

year - no pith ring present

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 to it

±   - the innermost ring is not the pith ring and an absolute date cannot be assigned to it

The symbols used with the outside date are:

B   - bark present

G   - beetle galleries are present on the surface of the specimen

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 a cutting date

vv  - there is not 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