DOLORES ARCHAEOLOGICAL PROGRAM TECHNICAL REPORTS

Report Number: DAP-083

Excavations at LeMoc Shelter (Site 5MT2151), a multiple-occupation Anasazi site

by

Patrick Hogan

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Prepared for
Cultural Resources Mitigation Program: Dolores Project
Bureau of Reclamation, Upper Colorado Region
Contract No. 8-07-40-S0562

Under the supervision of
David A. Breternitz, Senior Principal Investigator

Final Submission

31 August 1983

EDITOR'S PREFACE

LeMoc Shelter (Site 5MT2151) was one of the sites excavated by the Dolores Archaeological Program during the first year of field operations in 1978. Intensive fieldwork was resumed the following year. Because investigation of the site spanned two field seasons during a time when excavation techniques and data recording methods were being modified and refined, some inconsistencies in the excavation data exist. Similarly, analysis of the materials recovered from LeMoc Shelter spanned 1978 and 1979, with reanalysis of selected materials being undertaken as late as 1982. During this time, the various analytic systems changed considerably; these changes are reflected in the material culture data presentation in this report. In addition, some of the material culture analyses (in particular, the botanical, pollen, and faunal studies) were incomplete when the site report was written; topic-specific appendixes have been included to provide information that was not available to the author.

The unusual archaeological complexity of the site dictated a special reporting format for LeMoc Shelter; as a result, the report organization differs from that of most Dolores Archaeological Program site reports. For instance, the "Correlation and Dating" section appears before detailed discussions of the architectural units at the site because many of the dating arguments are based on evidence presented in the immediately preceding discussion of stratigraphy. Such a format facilitates the understanding of temporal interpretations that are formulated primarily on the basis of stratigraphic relationships.

Although the author of the LeMoc Shelter report was no longer affiliated with the Dolores Archaeological Program when the manuscript was

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U.S. 230(3-78)
Bureau of Reclamation

TECHNICAL REPORT STANDARD TITLE PAGE

1. REPORT NO. DAP-083	2. GOVERNMENT ACCESSION NO.	3. RECIPIENT'S CATALOG NO.
4. TITLE AND SUBTITLE Excavations at LeMoc Shelter (Site 5MT2151), a multiple-occupation Anasazi site		5. REPORT DATE 31 August 1983
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Patrick Hogan		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS University of Colorado - DAP Rural Route 1, 17219 CR 26 Dolores, CO 81323		10. WORK UNIT NO.
		11. CONTRACT OR GRANT NO. Contract No. 8-07-40-S0562
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Bureau of Reclamation P.O. Box 11568 Salt Lake City, Utah 84147		13. TYPE OF REPORT AND PERIOD COVERED Contractual FY 1980
		14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

LeMoc Shelter (Site 5MT2151) is a small, stratified site on the south-facing slope of the Dolores River canyon. During excavation of the shelter by the Dolores Archaeological Program, the remains of five successive Anasazi occupations that date to between A.D. 750 and 950 were discovered. During the earliest documented occupation, which dates to the late Sagehill Subphase (A.D. 750-780), the shelter appears to have been occupied year-round by a nuclear family or small extended family. The next clearly defined occupation occurred during the late Dos Casas and early Periman Subphases--between A.D. 840 and 860. Again, the shelter appears to have served as a permanent residence. In this case, however, the simultaneous use of a pithouse and a surface habitation suggest that an extended family was the basic residential unit.

Following an occupation hiatus, the site was reoccupied sometime between A.D. 875 and 890--the Grass Mesa Subphase. During this period, the shelter apparently served as a seasonal farming station. Presumably, the main residence was located at Grass Mesa Village (Site 5MT23).

The last two occupational episodes suggest short-term use of the shelter as a camp from which wild resources were procured. Both of these episodes are assigned to the Cline Subphase and date to approximately A.D. 920-930 and A.D. 930-950, respectively. Between A.D. 950 and 1150, the shelter appears to have been used only rarely.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS--
Dolores Archaeological Program, SW Colorado, Anasazi, Archaeology

b. IDENTIFIERS--

c. COSATI FIELD/GROUP COWRR:

18. DISTRIBUTION STATEMENT Available from the National Technical Information Service, Operations Division, Springfield, Virginia 22161.	19. SECURITY CLASS (THIS REPORT) UNCLASSIFIED	21. NO. OF PAGES 361
	20. SECURITY CLASS (THIS PAGE) UNCLASSIFIED	22. PRICE

Excavations at LeMoc Shelter (Site 5MT2151), a multiple-occupation Anasazi Site

Report No.: DAP-083

by Patrick Hogan

Discussion of Agency Comments and explanations of changes not made in the text.

General Comments

1. The author did assume that the battleship curves were appropriate for both long- and short-term occupations. Appendix A does contain a discussion of the battleship curve and indicates that the approach may not be valid for some ceramic types. The date ranges given in the body of the report are then modified in the appendix to reflect information that has recently become available. The additive task specialist does not believe that duration of occupation should affect the technique at LeMoc Shelter.

2 and 3. These comments are acknowledged and appreciated.

Specific Comments

1 and 2. These two comments are related. It is stated throughout the report that the major Element 5 occupation occurred between A.D. 930 and 950, and that, based on the archaeomagnetic date and ceramic evidence, the shelter continued to be used sporadically until A.D. 1050-1100/1200. It would be misleading to assign a hard and fast date of A.D. 950 or 1050 or 1200 to this element; the distinction between "major deposition" and the occasional dropping of a pot would be lost. The situation is summarized in table B.1. In addition, we have rephrased several passages in text and have chosen a midpoint between A.D. 1100 and 1200 to make it a bit easier to read.

3. The measurements are not presented because they were not taken in the field. We have already explained this problem in the preface to the report. To explain the situation again in the text would add length to the report and would contribute little to the reader's understanding of the site.

31 August 1983

Albert H. Pfeifle
Contract Officer
Bureau of Reclamation
Upper Colorado Regional Office
P.O. Box 11568
Salt Lake City, UT 84147

THROUGH: Dana Hill, COR

Dear Mr. Pfeifle:

Attached please find the final draft of Excavations at LeMoc Shelter (Site 5MT2151), a multiple-occupation Anasazi site by Patrick Hogan, Report Number DAP-083, 1980 report series.

We request that this report be included in the series being published by the Technical Publication Branch.

All Agency comments have been incorporated in this report, with the exception of those listed on the attached sheet.

We hope that the Bureau of Reclamation finds this report to be acceptable. We would appreciate written notification within 120 days of the submission of the report.

Thank you.

Sincerely,

David A. Breternitz
Senior Principal Investigator

DAB/tak

Attachment

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edited, he contributed personal time towards resolving some discrepancies in the report.

From a program-wide perspective, LeMoc Shelter represents an important archaeological resource. Despite the remaining inconsistencies in the report, it contributes significantly to the understanding of the prehistory of the Dolores Archaeological Program area.

ACKNOWLEDGMENTS

Excavation at LeMoc Shelter during 1978 was conducted by University of Colorado and Youth Conservation Corps crews under the supervision of Washington State University personnel. The University of Colorado employees were Kyle Bauman, Gary Brown, Vickie Clay, Richard Glaser, Randy Harper, Jim Hampson, Patricia ~~Hendrick~~ HERRICK, Helen Hoy, Tim McEnany, and Kelly Salling. The Youth Conservation Corps crew consisted of David Davis, Michael Digle, Deborah McDonald, Allison Moss, and Andrew Pleasant; K.C. Lorenz and Michael Swernoff alternated as counselors. Washington State University employees Alice Emerson and Sarah Schlanger aided the author in supervising the investigation.

During 1979, excavation at LeMoc Shelter was conducted by rotating Washington State University field school and Youth Conservation Corps crews. The former included Mike Bartholomew, Harley Crain, Sharon Geil, Dean Pedersen, Peter Sims, and LuAnn Wandsnider. The latter included Gail Bash, Barney Carter, Curtis Cowan, Lori Kohler, Anthony Quintana, David Ptolemy, and Sean Olsen. In addition, Washington State University employees Jean Hudson, Randy Harper, and Richard Beatty participated in excavations.

Figure C.2, the line drawing of the netting fragment recovered from Room 1, was drafted by Sam Tubiolo. Dolores Archaeological Program Senior Staff review comments were provided by Christine K. Robinson.

ABSTRACT

LeMoc Shelter (Site 5MT2151) is a small, stratified site on the south-facing slope of the Dolores River canyon. During excavation of the shelter by the Dolores Archaeological Program, the remains of five successive Anasazi occupations that date to between A.D. 750 and 950 were discovered. During the earliest documented occupation, which dates to the late Sagehill Subphase (A.D. 750-780), the shelter appears to have been occupied year-round by a nuclear family or small extended family. The next clearly defined occupation occurred during the late Dos Casas and early Periman Subphases--between A.D. 840 and 860. Again, the shelter appears to have served as a permanent residence. In this case, however, the simultaneous use of a pithouse and a surface habitation suggest that an extended family was the basic residential unit.

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The last two occupational episodes suggest short-term use of the shelter as a camp from which wild resources were procured. Both of these episodes are assigned to the Cline Subphase and date to approximately A.D. 920-930 and A.D. 930-950, respectively. Between A.D. 950 and 1150, the shelter appears to have been used only rarely.

INTRODUCTION

LeMoc Shelter (Site 5MT2151) is a small, multiple-occupation Anasazi site located on the north slope of the Dolores River canyon, 13 km downstream from the town of Dolores, Colorado (fig. 1). The site is located in the NE 1/4 of the SW 1/4 of sec. 1, T38N, R16W, on the U.S. Geological Survey 7.5' 1965 Trimble Point Quadrangle. The Universal Transverse Mercator grid coordinates for the site are 4,161,700 mN and 714,830 mE, zone 12.

Excavation of LeMoc Shelter was given priority by the DAP (Dolores Archaeological Program) because, as a cave site, the shelter was expected to have stratified deposits and relatively good preservation of archaeological materials. LeMoc Shelter was selected over other cave sites in the project area because it was one of the first to be impacted by the construction of the McPhee Dam. Furthermore, based on the survey collections from LeMoc Shelter, the occupation of the site was believed to span the Pueblo I and Pueblo II periods, which are of particular interest in addressing some of the concerns of the DAP research design (Kane et al. 1981).

Work at LeMoc Shelter began the second week in July 1978. Excavation was undertaken by a YCC (Youth Conservation Corps) crew under the direction of WSU (Washington State University) personnel. Initially, emphasis was given to probing the midden and western half of the shelter for preceramic components. Unfortunately, as is often the case in multiple-occupation sites, it soon became apparent that any evidence of preceramic use of the shelter would have been obliterated by later occupations. However, during this first field season, evidence of earlier

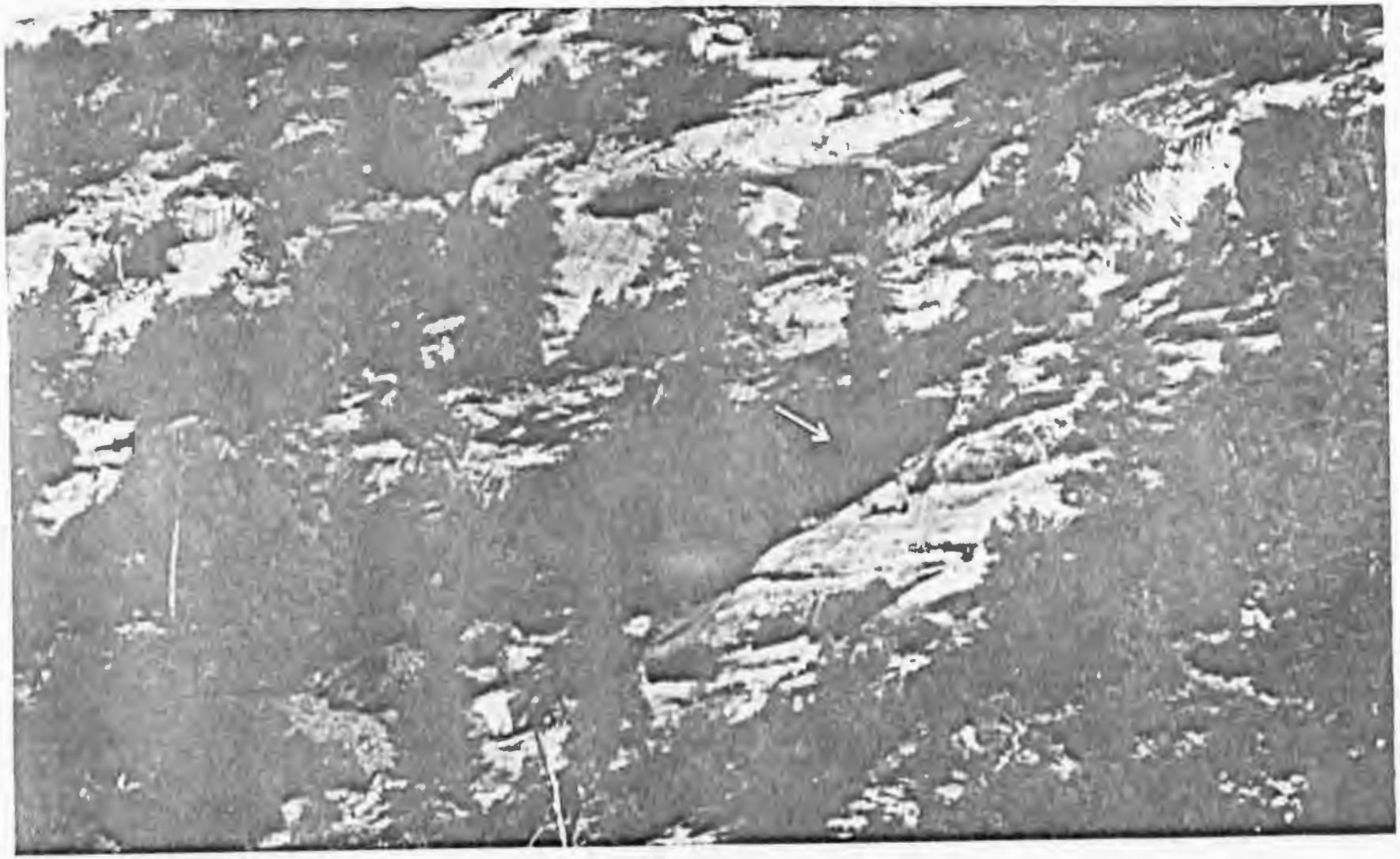


Figure 1. View of LeNoc Shelter and surrounding terrain; looking northwest. Arrow indicates location of cave (DAP 001116).

Pueblo I occupations proved to be more extensive and less disturbed than originally anticipated, and evidence of a Pueblo II component was encountered.

At the end of the YCC program in August 1978, the YCC crew was replaced by excavators employed by the University of Colorado, Boulder. By this time, it was evident that LeMoc Shelter contained a well-stratified series of deposits representing occupations that apparently spanned most of the Anasazi cultural sequence in Grass Mesa Locality. Excavation during this period was concentrated in front of the shelter, in the unconsolidated sediments filling Pithouses 1 and 2. The research strategy became one of stratigraphically isolating each occupation, determining the horizontal extent of the cultural units associated with these occupations, and recording the spatial relationships of the cultural units. With approximately 75 percent of the shelter excavated, winter storms forced closure of the site on 17 November 1978.

Sporadic vandalism during the winter months necessitated a short foray in early February to assess damage to the site, but full-scale work did not resume until 11 June 1979. The site was reopened by a joint crew of WSU and YCC personnel under the supervision of the author. During this second season, work focused on a complex of superimposed occupation levels in the western portion of the shelter. In addition, smaller excavation units were opened in several other areas to further clarify stratigraphic relationships noted during the 1978 field season. Isolating each occupation both temporally and spatially, in order to document the changing patterns of space utilization evident in the successive Anasazi occupations of the shelter, continued to be the primary excavation strategy.

NATURAL SETTING

LeMoc Shelter is situated roughly 30 m above the flood plain on a steep, south-facing slope of the Dolores River canyon (fig. 2). Here the river is entrenched into Mesozoic sedimentary rock and has cut a deep, v-shaped valley (fig. 3). On the canyon walls, the crossbedded Junction Creek Sandstone outcrops in sculptured cliffs, providing a dramatic counterpoint to the sandstones, mudstones, and conglomerates of the overlying Morrison, Burro Canyon, and Dakota Formations that contribute the bulk of the colluvial debris mantling the canyon side slopes. The valley floor is several hundred meters wide, although the river itself is confined to a narrow, meandering channel. Flood plain soils are typically weakly developed Fluvents overlying stream gravels. However, in the deeper alluvial deposits of remnant terraces and the small alluvial fans of tributary drainages, soils are somewhat better developed. These are classified as Otero fine sandy loam--a deep, well-drained Entisol--and Cheyenne sandy loam--a deep, well-drained Mollisol (Leonhardy and Clay 1979). These soils are considered adequate for agriculture, although the length of the growing season within the Dolores River canyon may have been influenced by the effects of cold air drainage.

The natural flow of the Dolores River is determined largely by surface runoff within its catchment basin, which results in an annual flow pattern characterized by high spring, moderate summer, and low fall and winter discharge. Within this general pattern, daily flow can vary erratically with summer thunderstorms or with changes in the rate of snowmelt. The water table of the valley also fluctuates seasonally because the shallow ground water system is recharged by the surface flow.

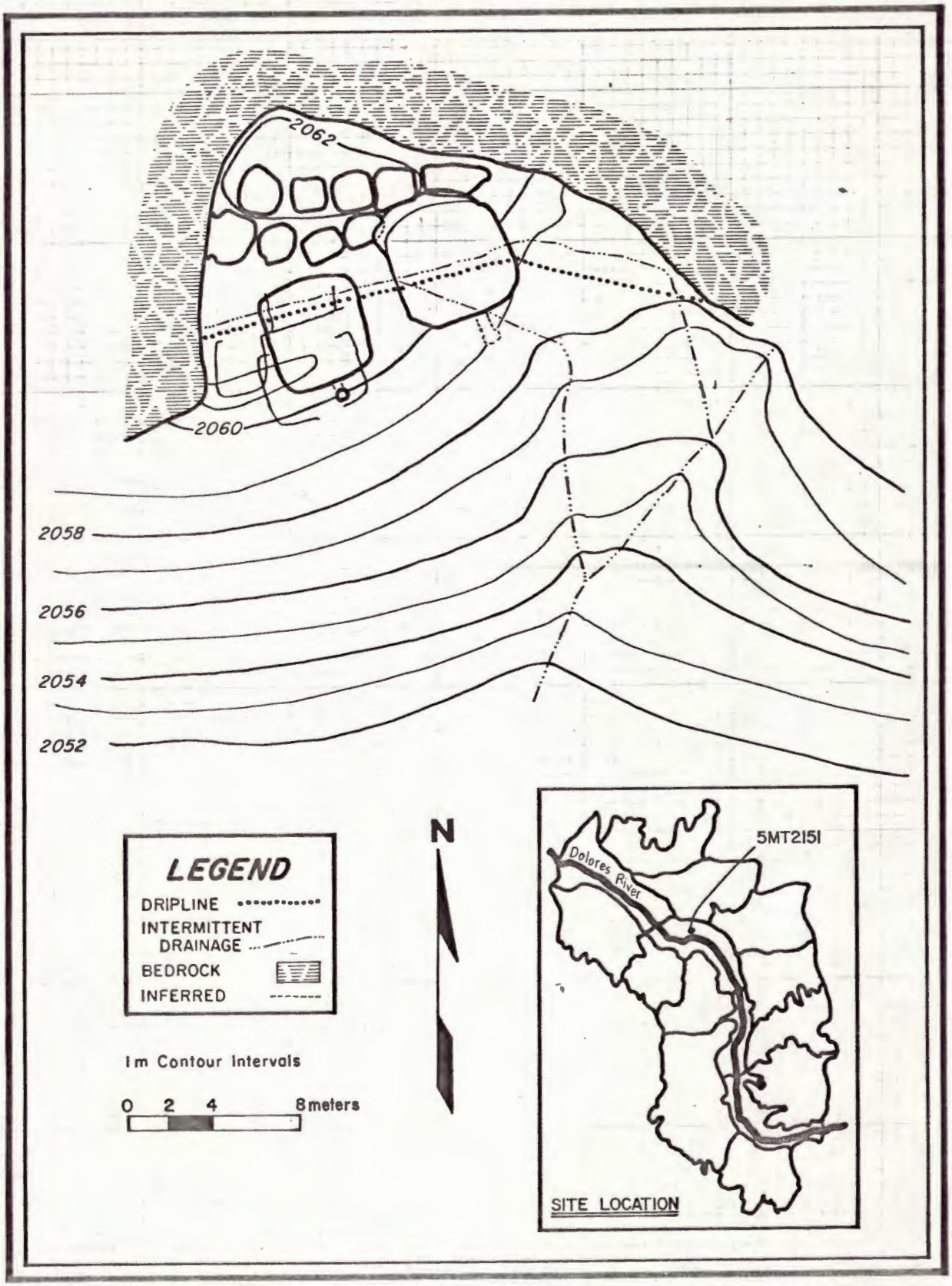


Figure 2. Topographic map of LeMoc Shelter and surrounding area. Contours within the shelter indicate configuration of the shelter floor prior to excavation. Note intermittent drainage in front of shelter.

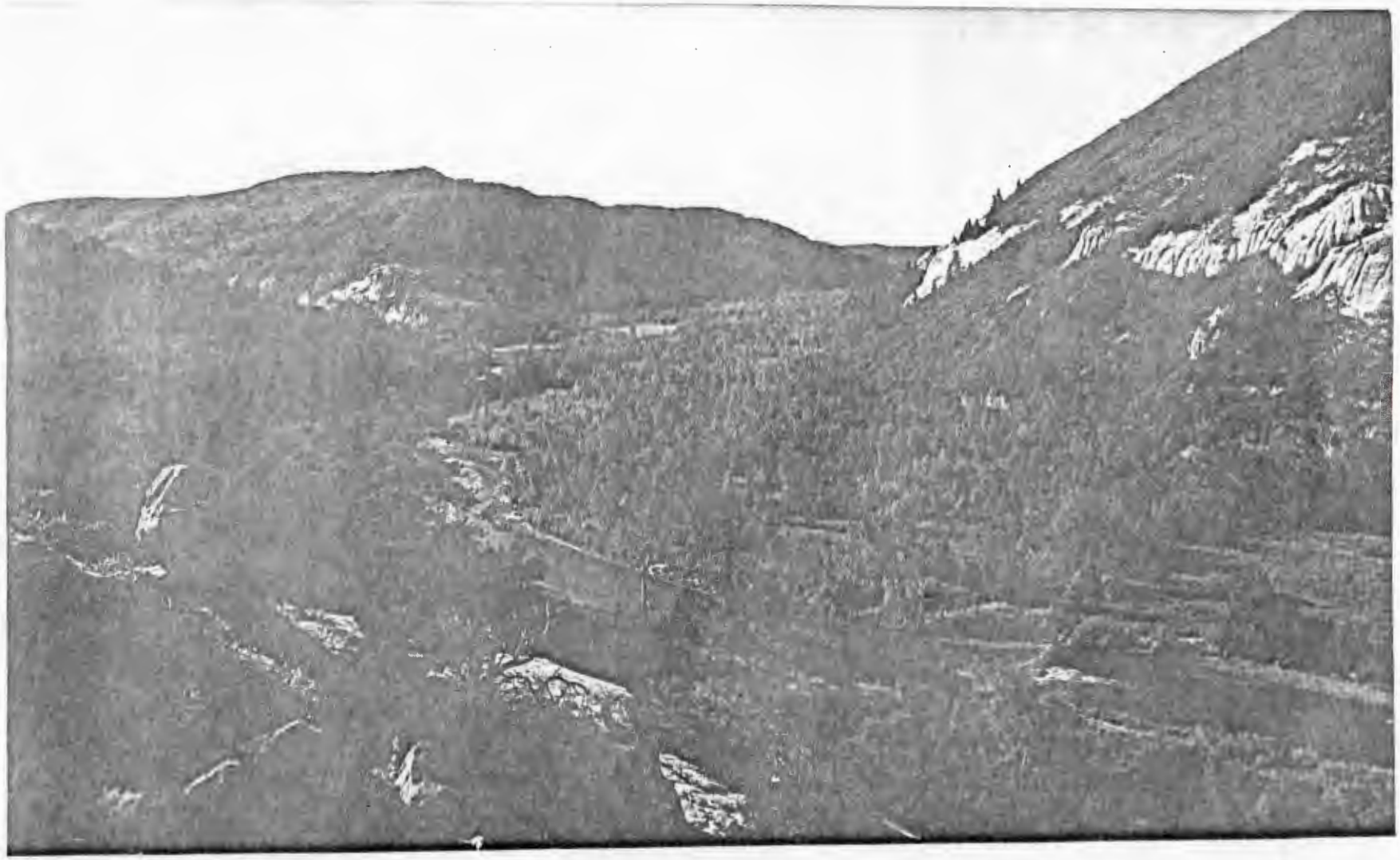


Figure 3. View of the Dolores River valley, looking upstream from LeMoc Shelter (DAP 010121).

The fauna present in the vicinity of LeMoc Shelter include a variety of mammals, birds, and reptiles. Mule deer (Odocoileus hemionus) and coyote (Canis latrans) are common, as are several smaller species such as porcupine (Erethizon dorsatum), skunk (Mephitis mephitis and Spilogale putorius), cottontail (Sylvilagus spp.), and squirrel and chipmunk (Sciuridae). Birds known to occur in the area include dove (Zenaida macroura), blue grouse (Dendragapus obscurus), a variety of songbirds (Passeriformes), and numerous raptors and scavengers (Falconiformes). Western rattlesnake (Crotalus viridis) and kingsnake (Lampropeltis spp.) are only two of many snake species known to inhabit the area. Refer to Emslie (1982) for a comprehensive discussion of the fauna of the project area.

The modern vegetation on the flood plain is typical of the regional riparian association at this elevation. Dense stands of cottonwood (Populus deltoides) and inland boxelder (Acer negundo) are interspersed with meadowlands composed of a variety of grasses and forbs. Thickets of willow (Salix spp.), marking the seasonally flooded areas of the active channel, line both sides of the river.

The relief of the canyon has induced a pronounced difference in the vegetation on the south-facing slopes and on the shaded slopes; it has also resulted in a weak, altitude-dependent zonation in the former areas. The shallow, sandy, colluvial soils of the hill slope surrounding LeMoc Shelter support a pinyon-juniper (Pinus edulis-Juniperus scopulorum) association with an understory of scrub oak (Quercus gambelii), Utah serviceberry (Amelanchier utahensis), and true mountain mahogany (Cercocarpus montanus). Broadleaf yucca (Yucca baccata), pricklypear cactus (Opuntia spp.), and several varieties of grass and annual forbs grow on open, rocky ground and on colluvial slopes.

On the lower slopes and river terraces, oak thickets predominate, giving way to more typical pinyon-juniper vegetation as the slope steepens. The pinyon and juniper give way in a similar manner near the canyon rim, and mountain shrubs gradually assume dominance. The uplands north of the shelter are a mosaic of open grassy meadows, thickets of mountain shrubs, and open stands of ponderosa pine (Pinus ponderosa). Ponderosa occurs on the lower slopes as well, especially as scattered isolates near the Junction Creek outcrops.

In the sheltered tributary canyons of Dry and Beaver Creeks, located approximately 1.3 km east of LeMoc Shelter, aspen (Populus tremuloides) groves are common, and Douglas-fir (Psuedotsuga menziesii) is found intermixed with ponderosa pine. Douglas-fir is also found near the valley floor on the north-facing canyon slopes, but it is rapidly replaced by an oak-dominated shrub association that covers most of the shaded slopes of the main canyon.

In assessing the potential vegetation of the area, Bye (1982) has argued that scrub oak may be a disturbance-related invader. Subtracting oak from the vegetation near LeMoc Shelter would result in vegetation characterized by a pinyon-juniper association on the south-facing slopes. The more protected north-facing slopes would support a Douglas-fir association. The uplands, which were disturbed by logging during the 1930's, probably would be an open ponderosa forest with some oak understory.

Although the potential vegetation probably gives a clearer picture of the aboriginal environment, it, too, is somewhat distorted because the effects of man, both prehistoric and historic, have been eliminated. For instance, the climax riparian association probably would not be much

different from the present vegetation of the valley floor, although grazing and some farming since early in the century have undoubtedly affected species composition in various ways. Anasazi land clearing and farming must have had a similar impact, though different in the particulars of its effect. Similarly, gathering wild foodstuffs and wood cutting for fuel and building materials would have subtly but profoundly altered the vegetation in all areas of the canyon.

Changes in the climate since the Anasazi period also must be taken into consideration in visualizing the aboriginal environment. Based on his analysis of timberline fluctuations in the spruce-fir forests of the La Plata Mountains, Petersen (1981) argues that warming temperatures fostered an upward advance of timberline beginning in the 6th century A.D. and culminating in the 12th century A.D. Expansion of the pinyon woodlands, due to an increase in monsoon rainfall, began about A.D. 700-900. This warm, moist climatic regime lasted until about A.D. 1150, when there was a dramatic decrease in summer rainfall and a lowering of summer temperatures. Cooler and drier conditions persisted into the early 20th century, profoundly affecting the regional vegetation pattern.

Since the A.D. 1850's, the climate has more closely approximated temperature and moisture conditions during the Anasazi period. However, although the response of plant species to this climatic change has been rapid, it is doubtful that the plant communities have yet stabilized. Discussion of human-environment interaction based on the modern distribution of vegetation, therefore, must be considered somewhat speculative and subject to future revision.

EXCAVATION METHODS AND OBJECTIVES

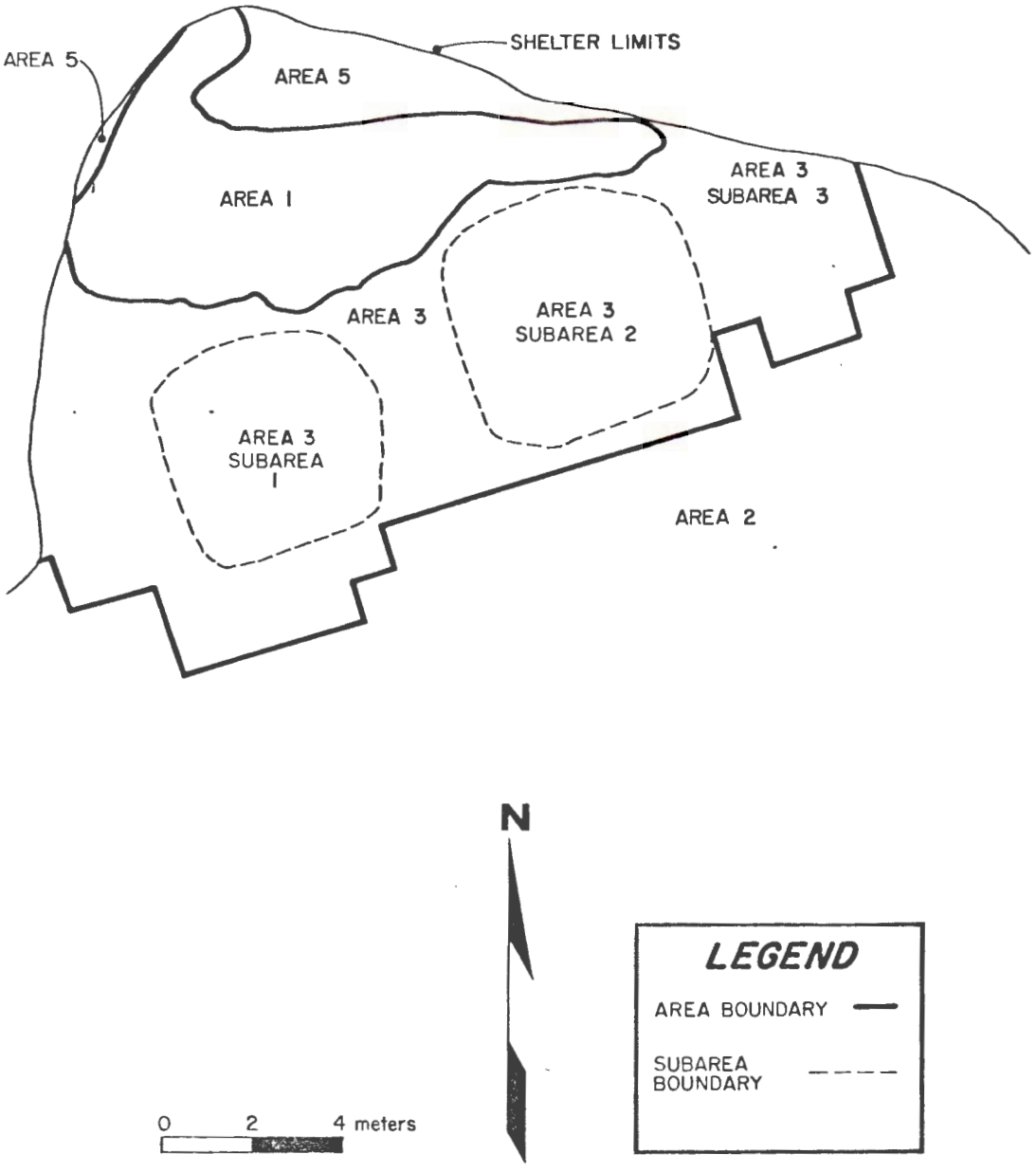
Prior to excavation, the most obvious cultural feature at LeMoc Shelter was a double row of rooms cut into the cave breccia deposits near the rear of the cave (figs. 4 and 5). The shelter had been vandalized--its walls were covered with the names of visitors and despoilers, and the cave floor and the rooms were obscured with the spoil dirt of some 30 years of indiscriminate digging. Several recent campfires, some lined with building stone and broken metates, had been made in the front of the cave; the garbage of years of picnicking was everywhere. Erosion within the shelter was limited to a shallow, east-west rill cut into the sediments in front of the roomblock and to some weathering of the cave breccia and shelter walls. However, slope wash and erosion had severely affected the midden deposits in front of the shelter: artifacts had been carried downslope almost to the valley floor.

For convenience, the site was divided into five areas (fig. 6). Area 1 corresponded to the roomblock and associated features located on the platform of exposed cave breccia. Area 2 was defined as the midden on the slope in front of the cave. Area 3 consisted of the sheltered area in front of the roomblock and included three subareas: Subarea 1 (the fill of Pithouse 2), Subarea 2 (the fill of Pithouse 1), and Subarea 3 (the eastern third of the shelter). Area 4 originally was defined as that portion of the slope between the dripline and the slope midden, but this designation was dropped when it became obvious that the boundary between Areas 3 and 4 crosscut several cultural features. This strip was then included as part of Area 3. Finally, Area 5 was defined to include the deposits located between the roomblock and the rear wall of the shelter.

Figure 4. View of LeMoc Shelter before excavation. View is looking west, across front of shelter. A portion of the roomblock is exposed at right (DAP 002411).

Figure 5. View of LeMoc Shelter during 1979 excavation, looking west (DAP 010117).

Figure 6. Locations of areas and subareas, LeMoc Shelter. Area 1 corresponds to the roomblock; Area 2 corresponds to the midden in front of the shelter (exact limits unknown); Area 3 corresponds to the sheltered area in front of the roomblock and includes three subareas: Subarea 1 (Pithouse 2), Subarea 2 (Pithouse 1), and Subarea 3 (eastern third of shelter). Area 4 was combined with Area 3 early in the investigation and is not shown. Area 5 corresponds to the area between the roomblock and the rear wall of the shelter.



Because of the extensive disturbance, no systematic surface collection was made. Work began with the clearing of the roomblock. As the spoil dirt was removed, artifacts from each area were bagged separately. The number assigned to each room was used for horizontal provenience control.

During the first stage of excavation, priority was given to probing for preceramic horizons. Test trench 1 (fig. 7) was opened on the slope in front of the shelter (Area 2) to establish the natural stratigraphy. The trench was then extended into the western portion of Area 3, where sediments were least eroded and largely undisturbed. After an exploratory auger transect of the midden in Area 2 in front of the shelter, trench 2 was opened where the cultural sediments appeared to be thickest (fig. 7). It was hoped that by sectioning the midden any preceramic horizons would be quickly identified.

The trenches were divided into 1-m units to maintain horizontal provenience control. In trench 1, vertical provenience control was based on natural stratigraphic units. The massive, steeply sloping midden deposits in trench 2, however, necessitated excavation in arbitrary 20-cm levels in all but the two units closest to the lip of the shelter. All fill from the roomblock and the two trenches was put through one-quarter-inch (6.4 mm) mesh screen.

An arbitrary 1-m grid was established in Area 3. Initial excavation in this area consisted of opening a trench near the center of the shelter to explore stratified deposits that were later found to be the fill of Pithouse 1. Artifacts and environmental samples were collected by grid square and natural stratigraphic unit.

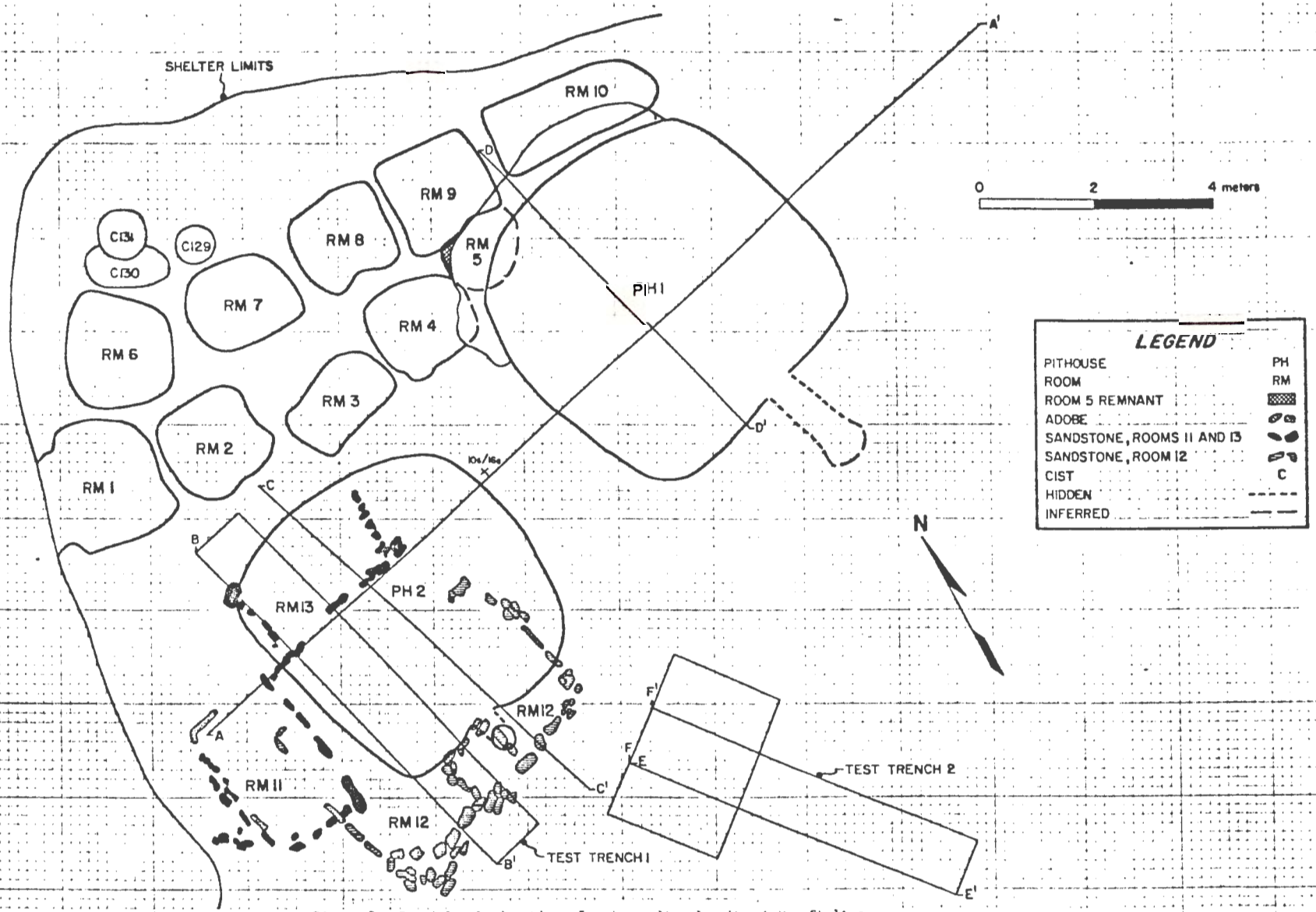


Figure 7. Spatial relationships of major cultural units, LeMoc Shelter. Profiles A, B, C, D, E, and F are shown in figures 9, 10, 11, 13, 15, and 15, respectively.

When extensive testing failed to reveal any evidence of occupation prior to the Pueblo I period, research goals and excavation strategies were modified. While early work had emphasized vertical exposures, the second stage of excavation concentrated on the exposure of individual cultural units in Area 3. Use surfaces identified in profile were exposed, and artifacts found in direct association with surfaces were assigned PL (point location) numbers. All features and PL's were mapped in an attempt to discern activity areas. The goal of the second stage of excavation was to reconstruct the occupational sequence of the shelter during the Anasazi period and to determine the nature of the settlement for each episode of use.

Dating and environmental sampling procedures were similarly refined. On use surfaces, bulk soil samples were taken in each grid square in order to recover macrobotanical remains. Pollen scrapings were also taken in areas where pollen preservation seemed likely. Archaeomagnetic samples were taken from all hearths and in situ burned areas.

Time and manpower limitations affected excavation strategy during the second stage of excavation. Screening was discontinued in postoccupational stratigraphic units to allow more time to investigate the major periods of habitation. Using this same rationale, screening of the fill of Pithouse 1 was halted after careful excavation of a control section comprising about one-third of the total fill.

By mid-September, what appeared to be the outline of a second pitstructure was encountered in the west half of the cave, and it was clear that work at LeMoc Shelter could not be completed during the 1978 field season. Therefore, priority was given to completing excavation of Pithouse 1, while work in the western portion of the shelter was limited

to discovering the depth of deposits there as an aid in planning research for 1979. The investigation of Pithouse 1 was nearly complete when rain and snowstorms forced closure of the site on 17 November 1978.

When the site was reopened in June 1979, the general work plan was to finish subfloor testing of Pithouse 1; to excavate Pithouse 2; and to open two test units in the rear of the shelter, one behind the roomblock and the second adjacent to a small seep located east of the roomblock. Based on the test units opened in 1978, the fill of Pithouse 2 was expected to be the same mixture of trash and sterile fill that had been encountered during the excavation of Pithouse 1. The plan was to strip away enough of the overlying deposits to outline the structure, section the fill north to south, and then remove the fill by natural stratigraphic units. Within a few days this straightforward approach was abandoned as excavations uncovered a complex sequence of structural debris, the result of repeated aboriginal occupation above Pithouse 2. Emphasis alternated between broad horizontal exposures and vertical probes in an attempt to explore the spatial extent of each occupation and the temporal relationships between components.

Also unexpected was the discovery of a midden behind the east wall of Pithouse 1. An east-west trench was excavated, bisecting these deposits, and the material was removed in natural stratigraphic units. The excavations were then expanded northward to explore the seep for cultural features.

The unexpected complexity of Pithouse 2 fill necessitated a number of less-than-ideal compromises in excavation methods if the site was to be completely investigated in the time allotted. Except for a 2-m-wide control section, screening of all postoccupational fill and structural

debris was discontinued. Furthermore, these deposits were removed in 2- by 2-m or 4- by 4-m blocks rather than in 1- by 1-m excavation units. This time-saving strategy permitted the continuation of the intensive excavation of individual occupation surfaces and cultural deposits, thereby ensuring the comparability of the information from these cultural contexts obtained during the two field seasons.

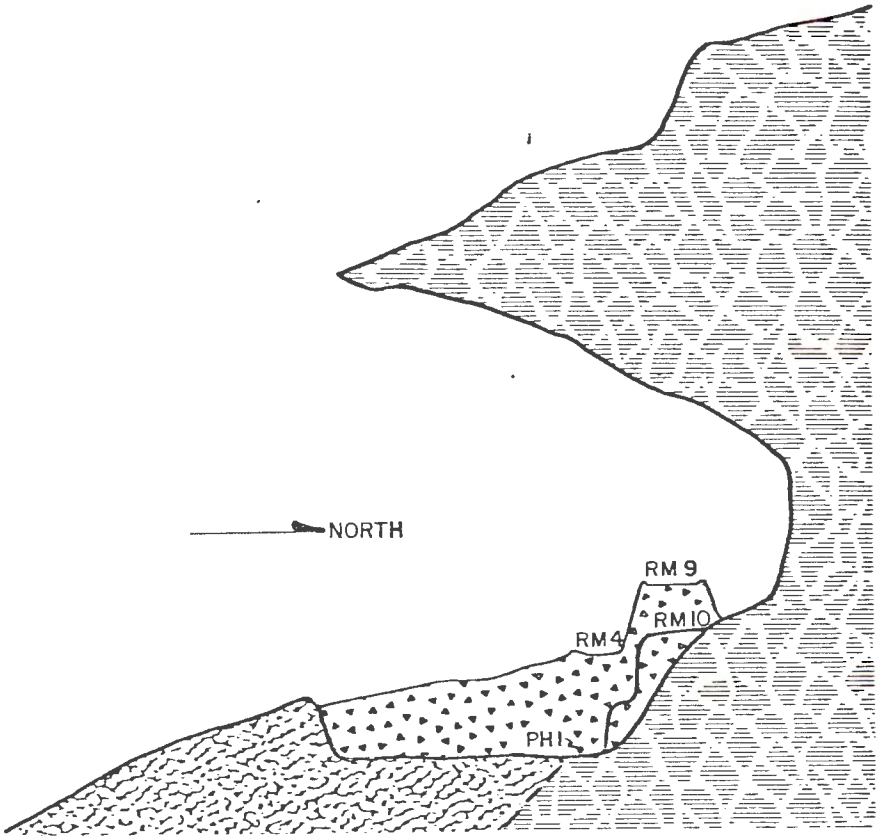
DEPOSITIONAL ENVIRONMENT

Shelter Formation

LeMoc Shelter appears to have been formed by differential erosion along the contact between high-angle and horizontal bedding planes near the base of a large Junction Creek Sandstone outcrop. Comparison with smaller, "younger" rockshelters in the area suggests that the formation of LeMoc Shelter was initiated by massive spalling of boulder- and cobble-sized fragments. Frost wedging, the result of meltwater seepage along the high-angle bedding planes of the lower rock stratum, was probably the dominant erosive force. The bedding planes of the upper stratum are more nearly horizontal, making it less susceptible to this process.

Viewed in cross section (fig. 8), the shelter is almost parabolic, with the bedrock floor sloping away steeply from the rear wall. In longitudinal section, the floor is more bowl shaped. The bedrock forms a level shelf along the west wall just below modern ground surface, dips below the pitstructure floors in the center of the shelter, and then rises to within 50 to 75 cm of modern ground surface in the eastern third of the shelter.

As the overhang developed, erosion apparently slowed, and fine-grained sediments began to accumulate in the rubble, eventually building a relatively level surface within the shelter. During this phase of development, mechanical weathering seems to have been limited largely to the exfoliation of small, scalelike fragments from the ceiling and walls of the shelter. Chemical weathering eventually assumed dominance in sculpting the overhang. Water percolating through the sandstone gradually dissolved the cement causing individual sand grains to fall to the shelter



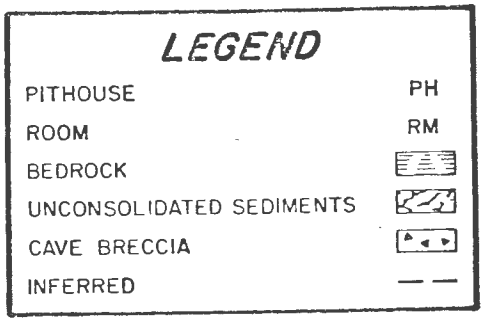


Figure 8. Schematic composite profile of LeMoc Shelter, looking west. Note the configuration of the shelter roof and the slope of the cave breccia relative to the hill slope outside of the sheltered area.

floor. At the same time, additional material was washed into the shelter from the west by a small rill flowing across the shelter, following the strike of the bedrock.

Much of this detritus was consolidated by compaction and carbonate precipitation into a well-cemented cave breccia. In the rear of the shelter, the breccia adheres to the steeply sloping bedrock and forms the platform on which the roomblock was built. The breccia deposits are shallow and poorly developed along the western wall in front of this platform and in the eastern third of the shelter where the bedrock is close to the surface. However, near the center of the shelter, these deposits are several meters deep. It is in this area that the two pitstructures were constructed using the cave breccia for all but the south walls and, in Pithouse 1, the east wall. The south walls of both pitstructures are backed by colluvial slope deposits that contact the truncated cave breccia at the dripline. This contact clearly demonstrates that the protected environment of the rockshelter was critical for the accumulation of the cave breccia.

Natural and Cultural Stratigraphy

The shelter's unconsolidated sediments are a combination of colluvium and cultural debris that has accumulated in the front of the shelter, primarily in the basins formed by the pitstructures. As such, the sediments filling each of the pitstructure depressions necessarily postdate the occupation of the respective structures. Since the structures were not occupied simultaneously, there is an inherent time lag in these depositional sequences. This, plus the physical barriers of the pitstructure walls, prevents any direct correlation of stratigraphy across

the site. Therefore, each stratigraphic sequence or unit will be described separately. Four such units were recognized--one in each pithouse, one to the east of Pithouse 1, and one in the midden deposit on the slope in front of the shelter. Within each unit, the strata are numbered sequentially beginning with the earliest deposit. A roman numeral preceding the stratum number indicates the particular stratigraphic unit in which the stratum occurs; these units are numbered sequentially across the site from west to east, with the addition of "IV" to designate the unit on the slope in front of the shelter. The descriptions of Stratigraphic Units I and II are based not only on the information provided by the stratigraphic profiles but on evidence gained from the complete excavation of the respective structures as well; therefore, some of the specific stratum characteristics described in text do not appear in the accompanying stratigraphic profiles. Correlation between units is made by relying primarily upon a comparison of the ceramic assemblages from each stratum. Consequently, a brief discussion of the ceramic assemblages, focusing on the ceramic types and their chronological implications, is included in these sections.

Within each unit, major architectural features and occupation surfaces are considered stratigraphically equivalent to sediment layers, although they are not numbered as part of the sequence. As Harris (1979:43) argues, these interfaces in archaeological sites correspond to bedding planes and unconformities in geological settings. As such, they indicate either an interface between strata or the destruction of strata, both of which are of stratigraphic and cultural importance. Detailed descriptions of these cultural features, however, are provided in the "Architecture" section.

Except for strata created by the collapse of architectural features, deposition within the shelter appears to have been the consequence of a fairly uniform process. The sediments were primarily sand or sandy loam; most appeared to have been transported by water cascading from the overhang or from slope wash flowing across the shelter, although some appeared to have been wind deposited. Present conditions suggest that most of the water-laid material was deposited during spring snowmelt, with less material being deposited during late summer thunderstorms. Within these colluvial sediments, stratification is detectable primarily on the basis of varying cultural inclusions. This suggests that natural deposition was an ongoing process throughout the shelter's history, subtly but certainly altering the context of the cultural materials.

Stratigraphic Unit I

This sequence (figs. 9, 10, 11, and 12) is a complex of ruined structures, midden, and natural sediments that accumulated within the depression off Pithouse 2, the earliest pitstructure at the site. Because it is the longest sequence, and because the western half of the shelter was the most intensively used area prehistorically, Stratigraphic Unit I provides the most complete and detailed record of the occupation at LeMoc Shelter.

Pithouse 2, Floor 1. With the construction of Pithouse 2, which was cut into the cave breccia, any evidence of earlier use of the shelter in Subarea 1 of Area 3 would have been destroyed. At the same time, a sediment trap that facilitated the rapid accumulation of sediments after abandonment of the pithouse was created. The occupation of Pithouse 2, therefore, is the first stratigraphic event in this sequence, and because this pithouse is the earliest structure at the site, it also marks the first episode in the site's cultural sequence.

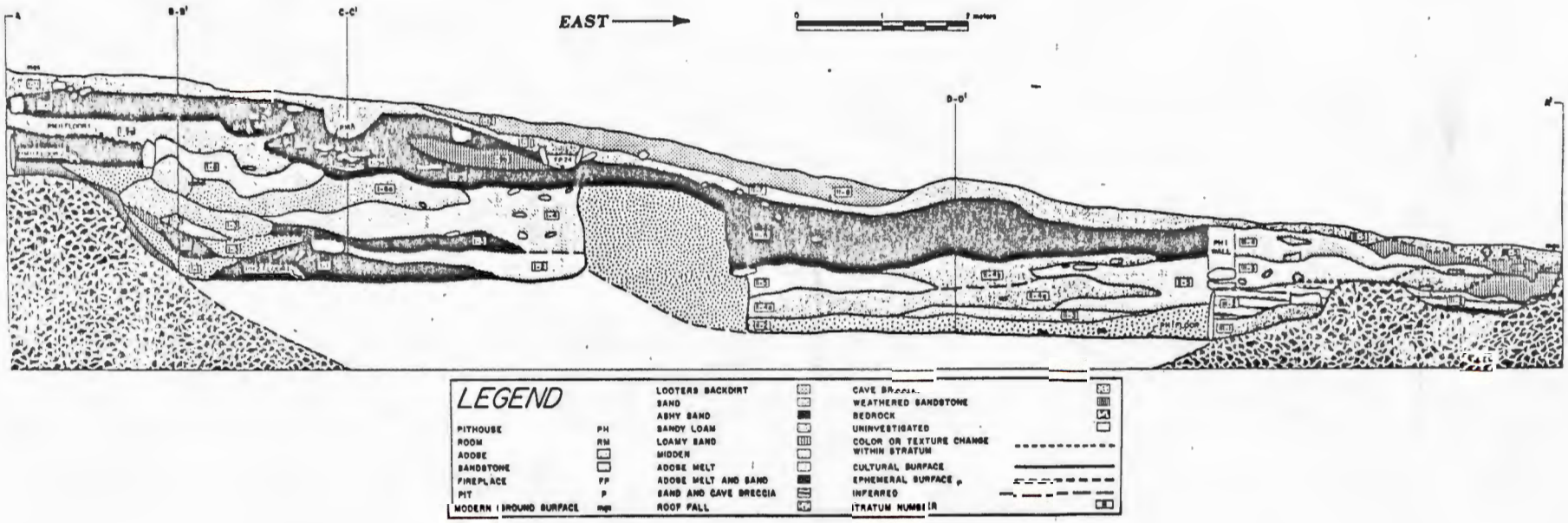
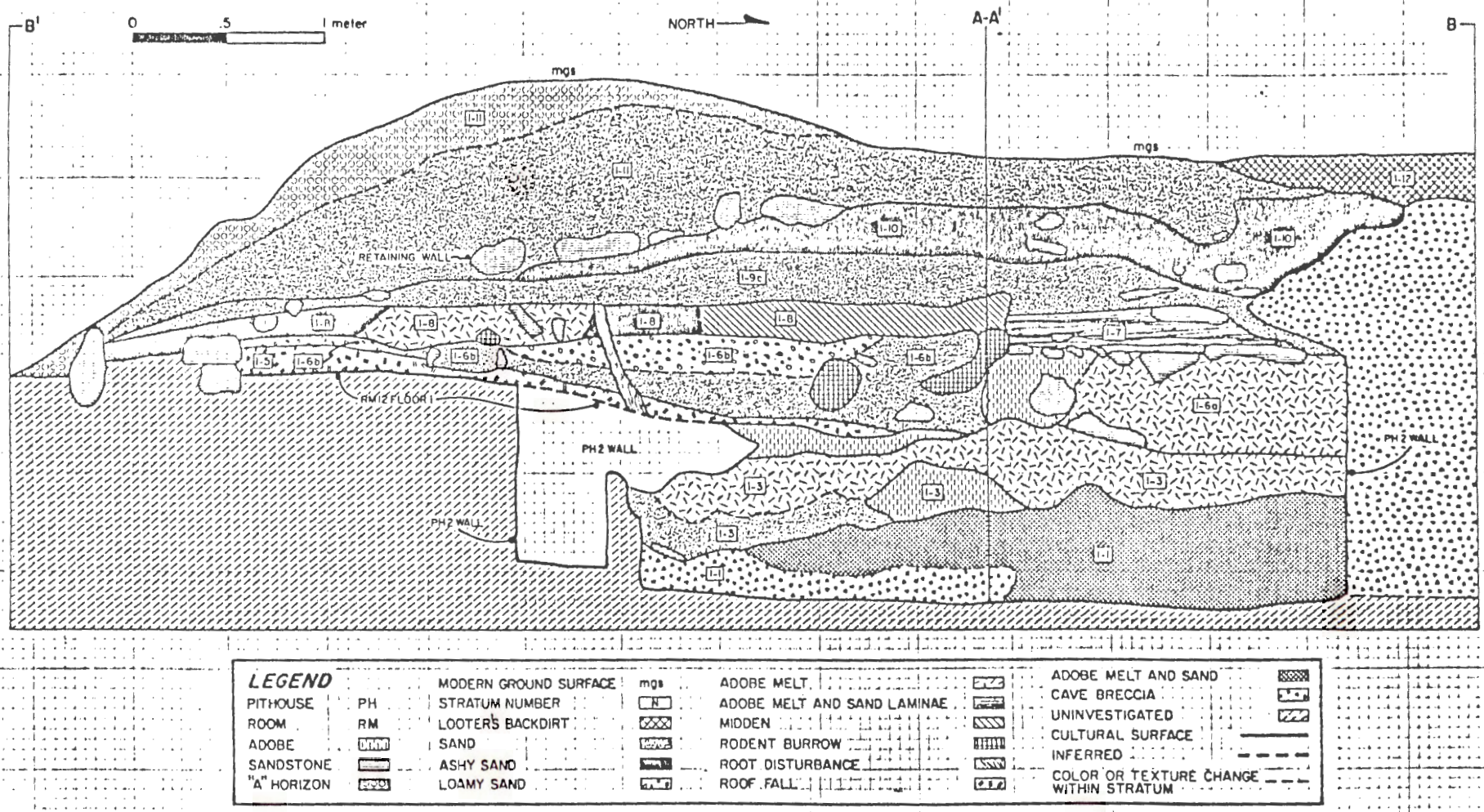
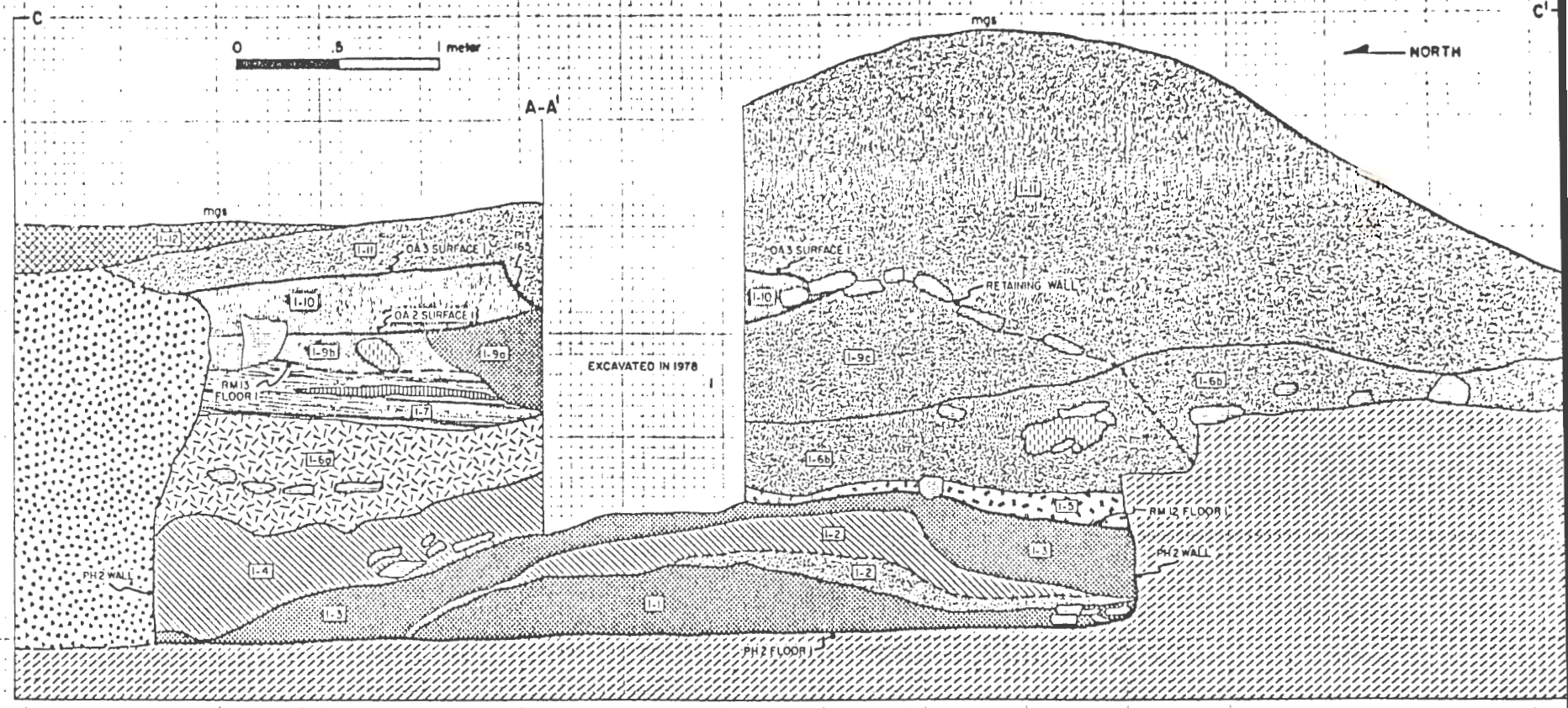


Figure 9. East-west stratigraphic profile of unconsolidated sediments at LeMoc Shelter. Note Stratigraphic Units I, II, and III, limits of Pithouses 1 and 2, and points of intersection with profiles B, C, and D. Profile A is located in plan in figure 7. Stratum II-1, beneath Pithouse 1, had not yet been exposed when this profile was drawn (DAP 135302).

Figure 10. North-south profile of Stratigraphic Unit 1, near west edge of Pithouse 2, LeMoc Shelter. Profile B is located in plan in figure 7. Note point of intersection with profile A.





LEGEND

PITHOUSE	PH	SAND		MIDDEN	
ROOM	RM	ASHY SAND		CAVE BRECCIA	
OCCUPATION AREA	OA	ADOBE MELT		CULTURAL SURFACE	
ADOBE		ADOBE MELT AND SAND		COLOR OR TEXTURE CHANGE WITHIN STRATUM	
SANDSTONE		ADOBE MELT AND SAND LAMINAE		INFERRED	
MODERN GROUND SURFACE	mgs	CARBONATE LENS		STRATUM NUMBER	
LOOTER'S BACKDIRT		ROOF FALL		UNINVESTIGATED	

Figure 11. North-south profile of Stratigraphic Unit 1, bisecting Pithouse 2, LeMoc Shelter. Profile C is located in plan in figure 7. Note point of intersection with profile A. Profile drawn before Room 12 was completely exposed.

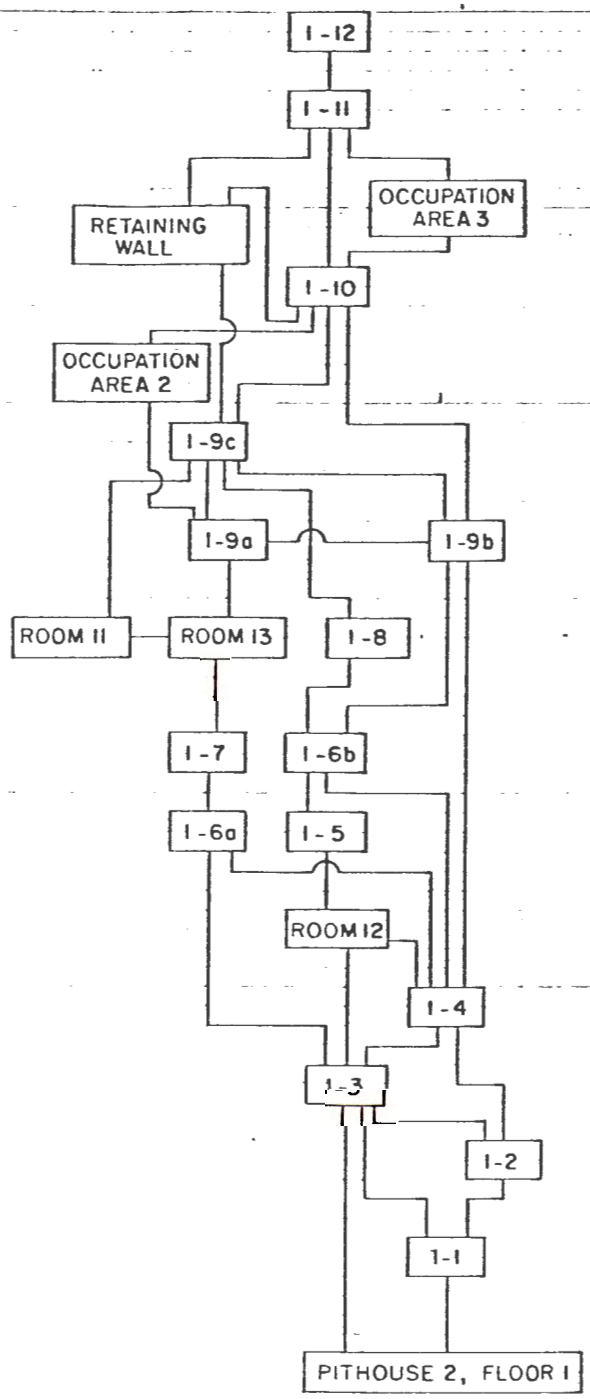


Figure 12. Schematic summary of relationships between cultural and stratigraphic units in Stratigraphic Unit I, LeMoc Shelter.

Stratum I-1. Stratum I-1 is a structurally massive, yellowish-brown (10YR 5/6) layer of sand and adobe that probably was deposited shortly after the pithouse was abandoned. This facies, which has a maximum thickness of approximately 50 cm, overlies most of the western two-thirds of the floor and is interpreted as being plaster melt from the west wall of the pithouse. Immediately north of the wingwall the melt surrounds a slump of cave breccia that had fallen from the west wall of the pithouse and coalesced with a sandy colluvium in the depression beyond the dripline.

Stratum I-2. The floor in the approximate eastern third of the pithouse was overlain by Stratum I-2, a brown (10YR 4/3) sand, massive in structure and mottled with charcoal and ash. The sediments appear to be a mixture of colluvial sand and midden materials thrown into the depression. The deposit is approximately 30 cm thick where it rests against the east wall, but it thins rapidly to the west as it overrides Stratum I-1, fills the irregularities in the underlying surface, and gradually lenses out.

Stratum I-3. Overlying both the lower strata, Stratum I-3 is the result of a second episode of slumping of the west face of the pithouse. Rotational slump blocks of cave breccia are clearly visible where they slid away from the bedrock. A wedge-shaped layer of yellowish-brown (10YR 5/6) loamy sand, presumably adobe plaster from the pithouse wall, reflects the gradual melting of the slump that flowed eastward and mixed with colluvial sediments. Near the north wall of the pithouse, this melt contacts the pithouse floor. The fact that Strata I-1, I-2, and I-3 all contact the floor is argument for these strata having been deposited in a fairly short time, probably within a few decades after the pithouse was abandoned.

The repeated mass wastage of the west wall evidenced by Strata I-1 and I-3 apparently was caused by the steep angle of the sandstone to which the breccia adhered and by the exposure of the contact to the seasonal flow of water into the shelter from the west. This inherent instability may have been one factor in the abandonment of the pithouse.

Stratum I-4. A second midden deposit, Stratum I-4, overlies Stratum I-3. This is a dark gray (10YR 4/1) sand flecked with ash and charcoal and containing numerous artifacts, chunks of adobe, and some boulder-sized fragments of tabular sandstone. Like Stratum I-2, Stratum I-4 is thickest near the east wall of the pithouse where it nearly fills the depression. Near the south wall of the pithouse, Stratum I-4 fills a concavity in Stratum I-3 with roughly 40 to 50 cm of sediments. In the center of the pitstructure, however, Stratum I-4 thins rapidly.

Room 12, Floor 1. The disappearance of Stratum I-4 in the center of the pitstructure appears to have resulted from the construction of Room 12 (figs. 10 and 11). Vertical slabs in this structure's east wall are supported by Stratum I-4 sediments, but no Stratum I-4 deposits are present within the room itself. Evidently, Room 12 was excavated through Stratum I-4, and the loamy sand adobe of Stratum I-3 was used to provide a firm foundation for at least its east wall and part of its floor.

The stratigraphic break marked by the construction of Room 12 is also reflected in the frequencies of pottery types collected from each stratum. The ceramic assemblages from Strata I-1 through I-4 are quite similar to one another but are distinct from those of the overlying strata (table 1). Chapin Gray constitutes 60 to 70 percent of the ceramics from Strata I-1 through I-4 that could be assigned to specific types. The

Table 1. Frequencies of ceramic types recovered from major stratigraphic and cultural units, LeMoc Shelter (Trade wares are not included in these counts)

	Chapin Gray		Moccasin Gray		Mancos Gray		Early Pueblo Gray		Mancos Corrugated	
	N	%	N	%	N	%	N	%	N	%
Stratum I-12	10	1.6	7	1.1	7	1.1	422	67.5	10	1.6
Stratum I-11	13	3.2	44	10.8	3	0.7	236	56.9	4	1.0
Stratum I-10	8	3.8	15	7.0	2	0.9	136	63.8	3	1.4
Stratum I-9	15	2.1	39	5.6	13	1.9	508	72.4	2	0.3
Stratum I-8	32	2.8	134	11.7	14	1.2	837	73.0		
Stratum I-7										
Stratum I-6	17	3.9	30	6.9	14	3.2	320	73.7		
Stratum I-5	16	6.7	9	3.8	1	0.4	180	75.6		
Stratum I-4	83	6.7	14	1.1			934	75.4		
Stratum I-3	14	5.2	3	1.1			202	75.1		
Stratum I-2	26	8.6	2	0.7			219	72.3		
Stratum I-1	36	8.1	3	0.7			297	66.6		
Pithouse 2*	25	4.8	4	0.8			468	89.5		
Stratum II-8				(see stratum I-12)						
Stratum II-7				(see stratum I-11)						
Stratum II-6	12	2.2	9	1.6	26	4.8	281	51.5	20	3.7
Stratum II-5	23	3.1	22	2.9	22	2.9	438	58.7	11	1.5
Stratum II-4	1	0.4	14	5.5	10	3.9	172	67.2	3	1.2
Stratum II-3										
Stratum II-2	14	3.5	28	7.0	8	2.0	311	77.8		
Pithouse 1*	6	3.1	19	9.9			147	77.0	1	0.5
Stratum II-1	2	6.5					26	83.9		
Stratigraphic Unit III	8	5.0	5	3.1	1	0.6	128	80.5		
Stratum IV-5	4	8.2					37	75.5		
Stratum IV-4	10	4.9	1	0.5	1	0.5	148	72.9		
Stratum IV-3							34	85.0		
Stratum IV-2	1	0.9					100	86.2		
Stratum IV-1										
Room 11*	1	11.1					7	77.8		
Room 12*	1	3.3	1	3.3	1	3.3	21	70.0		
Room 13*			9	18.0	2	4.0	38	76.0		
Occupation Area 1*			7	10.6	5	7.6	46	69.7		
Occupation Area 2*										
Occupation Area 3*	1	7.1					9	64.3		
Roomblock*	7	1.9	2	0.5	3	0.8	264	70.0	4	1.1
Area 5	11	7.1	5	3.2	1	0.6	110	70.5	2	1.3
Total	397		426		134		7076		60	

See footnote at end of table.

Table 1. Frequencies of ceramic types recovered from major stratigraphic and cultural units, LeMoc Shelter--Continued

	Dolores Corrugated		Mesa Verde Corrugated		Corr Body Sherds		Chapin B/W		Piedra B/W		Cortez B/W	
	N	%	N	%	N	%	N	%	N	%	N	%
Stratum I-12					102	16.3			1	0.2		
Stratum I-11			1	0.2	75	18.3			1	0.2	2	0.5
Stratum I-10					23	10.8			2	0.9	2	0.9
Stratum I-9					3	0.4					6	0.9
Stratum I-8					1	0.1					8	0.7
Stratum I-7												
Stratum I-6							1	0.2	2	0.5		
Stratum I-5												
Stratum I-4					1	0.1			1	0.1		
Stratum I-3									3	1.1		
Stratum I-2												
Stratum I-1												
Pithouse 2*												
Stratum II-8					(see stratum I-12)							
Stratum II-7					(see stratum I-11)							
Stratum II-6					135	24.7	1	0.2	3	0.5	7	1.3
Stratum II-5					130	17.4			1	0.1	10	1.3
Stratum II-4					24	9.4			1	0.4	2	0.8
Stratum II-3												
Stratum II-2					6	1.5			1	0.3	2	0.5
Pithouse 1*					1	0.5						
Stratum II-1												
Stratigraphic Unit III					5	3.1						
Stratum IV-5												
Stratum IV-4					10	4.9						
Stratum IV-3					3	7.5						
Stratum IV-2					2	1.7						
Stratum IV-1												
Room 11*												
Room 12*												
Room 13*												
Occupation Area 1*												
Occupation Area 2*					1	25.0					3	75.0
Occupation Area 3*					1	7.1						
Roomblock*					58	15.4			1	0.3		
Area 5	1	0.6			15	9.6	1	0.6				
Total	1		1		596		3		17		42	

See footnote at end of table.

Table 1. Frequencies of ceramic types recovered from major stratigraphic and cultural units, LeMoc Shelter--Continued

	Mancos B/W		Early Pueblo White		Late Pueblo White		Abajo R/O	
	N	%	N	%	N	%	N	%
Stratum I-12	2	0.3	40	6.4	4	0.6		
Stratum I-11	1	0.2	21	5.1			1	0.2
Stratum I-10			12	5.6	2	0.9		
Stratum I-9			66	9.4	1	0.1		
Stratum I-8			46	4.0				
Stratum I-7								
Stratum I-6			17	3.9			1	0.2
Stratum I-5			2	0.8				
Stratum I-4			35	2.8			6	0.5
Stratum I-3			8	3.0			1	0.4
Stratum I-2			4	1.3	1	0.3		
Stratum I-1			20	4.5			4	0.9
Pithouse 2*			7	1.3				
Stratum II-8			(see stratum I-12)					
Stratum II-7			(see stratum I-11)					
Stratum II-6	1	0.2	18	3.3	4	0.7	1	0.2
Stratum II-5			48	6.4	1	0.1	1	0.1
Stratum II-4			13	5.1			1	0.4
Stratum II-3								
Stratum II-2			14	3.5				
Pithouse 1*			9	4.7				
Stratum II-1			1	3.2				
Stratigraphic Unit III			3	1.9				
Stratum IV-5			5	10.2	1	2.0		
Stratum IV-4			13	6.4	1	0.5	1	0.5
Stratum IV-3					1	2.5		
Stratum IV-2			7	6.0			4	3.4
Stratum IV-1								
Room 11*			1	11.1				
Room 12*			1	3.3				
Room 13*								
Occupation Area 1*			4	6.1	2	3.0		
Occupation Area 2*								
Occupation Area 3*								
Roomblock*	3	0.8	27	7.2	2	0.6		
Area 5			6	3.8			1	0.6
Total	7		448		20		22	

See footnotes at end of table.

Table 1. Frequencies of ceramic types recovered from major stratigraphic and cultural units, LeMoc Shelter--Continued

	Bluff B/R		Early Pueblo Red		Late Pueblo Red		Deadmans B/R		Other		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Stratum I-12			18	2.9					2	0.3	625	100.0
Stratum I-11	1	0.2	10	2.4					2	0.5	415	100.0
Stratum I-10			7	3.3					1	0.5	213	100.0
Stratum I-9	5	0.7	43	6.1					1	0.1	702	100.0
Stratum I-8	8	0.7	60	5.2	2	0.2	1	0.1	3	0.3	1146	100.0
Stratum I-7											0	
Stratum I-6	9	2.1	19	4.4	2	0.5			2	0.5	434	100.0
Stratum I-5	1	0.4	29	12.2							238	100.0
Stratum I-4	28	2.3	136	11.0							1238	100.0
Stratum I-3	6	2.3	30	11.1	2	0.7					269	100.0
Stratum I-2	5	1.7	46	15.2							303	100.0
Stratum I-1	4	0.9	82	18.4							446	100.0
Pithouse 2*	2	0.4	17	3.3							523	100.0
Stratum II-8					(see stratum I-12)							
Stratum II-7					(see stratum I-11)							
Stratum II-6	3	0.5	25	4.6							546	100.0
Stratum II-5	9	1.2	28	3.8					2	0.3	746	100.0
Stratum II-4	5	2.0	10	3.9							256	100.0
Stratum II-3											0	
Stratum II-2	3	0.8	11	2.8					2	0.5	400	100.0
Pithouse 1*			8	4.2							191	100.0
Stratum II-1			2	6.5							31	100.0
Stratigraphic Unit III			9	5.7							159	100.0
Stratum IV-5			1	2.0					1	2.0	49	100.0
Stratum IV-4			8	3.9					10	4.9	203	100.0
Stratum IV-3			2	5.0							40	100.0
Stratum IV-2			2	1.7							116	100.0
Stratum IV-1											0	
Room 11*											9	100.0
Room 12*	1	3.3	4	13.3							30	100.0
Room 13*			1	2.0							50	100.0
Occupation Area 1*			2	3.0							66	100.0
Occupation Area 2*											4	100.0
Occupation Area 3*	2	14.3	1	7.1							14	100.0
Roomblock*			5	1.3					1	0.3	377	100.0
Area 5			3	1.9							156	100.0
Total	92		619		6		1		27		9995	

* Includes surfaces, features, and other contexts believed to be closely associated with the occupations of the respective structures and occupation areas.

NOTES: Corr - Corrugated. B/R - Black-on-red.
R/O - Red-on-orange. B/W - Black-on-white.

painted wares are primarily Abajo Red-on-orange and Bluff Black-on-red. Although these constitute only a minor fraction of the sherds recovered from the pithouse floor, they make up 15 to 20 percent of the collection in the later strata. Early white wares are rare, constituting only 1 to 5 percent of the total assemblages from Strata I-1 through I-4. In contrast, the typeable ceramics in strata overlying Room 12 are predominantly Moccasin Gray. Mancos Gray also makes its first appearance, and the percentage of red wares declines as white wares become more frequent.

Stratum I-5. Stratum I-5 is a thin, discontinuous stratum of burned adobe and charcoal in a very dark gray (10YR 3/1), sandy matrix that overlies the floor of Room 12. The stratum is most apparent from where it abuts the southern wall of the pithouse depression to an irregular line roughly 2 m to the north, although it can also be traced as a diffuse ashy lens southward, over the edge of the pithouse depression. Its western edge corresponds to the western face of the depression and is quite distinct compared to the feathery eastern margin 2 to 3 m away. The stratum is interpreted as the collapsed roof of Room 12.

Stratum I-6. Stratum I-6 is comprised of two distinct facies. The first of these (I-6a) is a massive, mounded deposit of adobe melt and sandstone rubble, 15 to 50 cm thick, in the northern third of the depression. This facies consists of wall fall and melt, possibly associated with the decay of Room 12. The melt gradually diffuses into a pale brown (10YR 6/3), colluvial sand and loamy sand layer (Stratum I-6b), 5 to 50 cm thick, that overlies Stratum I-5. From the absence of trash lenses or midden material within this sand and the absence of cultural features, Subarea 1 seems to have been little used during the later part of the deposition of Stratum I-6b.

Stratum I-7. This stratum is a lens of fine-grained, laminated sediments that accumulated in a shallow basin formed by the wall fall of Room 12 in Stratum I-6a, the north wall of the pithouse depression, and Stratum I-4. The laminae are varicolored bands consisting ofhan alternating sequence of brown (7.5YR 5/4), oxidized sands; light yellowish-brown (10YR 6/4), adobe-like sands, sometimes mottled with ash; and very pale brown (10YR 7/3), calcareous sands. Apparently these bands were deposited during a period when water washed into the shelter, collected in the basin, and then evaporated. These sediments are deepest near the north wall of the pithouse at about the midline of the depression where the stratum is almost 50 cm thick. Stratum I-7 disappears to the east in a near-vertical contact with Stratum I-4, but to the west it thins gradually--the laminae become less distinct as the deposits blend with the adobe melt of Stratum I-6a.

It appears that the basin created by the collapse of Room 12 (represented by Stratum I-6a) was initially protected by the adobe barrier forming the basin's southern perimeter. As the deposits of Stratum I-6b raised the level of the shelter floor, however, runoff filled the basin, depositing the sediments of Stratum I-7. Therefore, Stratum I-7 appears to postdate the deposition of I-6a but be contemporaneous with the later deposits of I-6b.

Room 11, Floor 2 and Room 13, Floor 1. Following the occupational hiatus evidenced by the deposition of Strata I-6 and I-7, Room 13 was built in the northwest corner of the Pithouse 2 depression, and Room 11 was cut into the breccia shelf adjacent to the west wall of the rockshelter. Although Room 13 was largely destroyed by erosion and later occupations, it is clear that the earliest floor was located where

Strata I-6a and I-7 contact later strata. A corner shared by Room 13 and Room 11 suggests that both rooms were built simultaneously.

Stratum I-8. Stratum I-8 is a dark grayish-brown (10YR 4/2) sand, flecked with ash and charcoal, that overlies Stratum I-6b. In plan, Stratum I-8 is confined to an area of roughly 2 m^2, apparently filling a 20- to 35-cm-deep swale in Stratum I-6b. On the north, I-8 abuts the ruined south wall of Room 13. The contact is equally sharp to the west where Stratum I-8 abuts the vertical slabs of the east wall of Room 11. The lens can be traced south to the dripline, where it undergoes a sharp chroma change as the quantity of ash and charcoal in the sediments decreases. A decrease in the number of artifacts corresponds to this chroma change: within the shelter, Stratum I-8 is rich in cultural materials; beyond the shelter, the number of artifacts decreases. A similar change is observable along the east margin where a narrow, armlike extension of the stratum can be traced to a point roughly 1 m west of the west edge of the pithouse. This extension appears to be a secondary deposit of midden material and adobe melt along the course of a small rill that flows across the shelter beneath the edge of the overhang. Because of its abrupt contact with the walls of Rooms 11 and 13, Stratum I-8 is interpreted as postdating the construction of these rooms. Given this relationship, and the quantity of artifacts, ash, and charcoal in Stratum I-8, the most plausible interpretation is that this stratum is a midden associated with the occupation of Rooms 11 and 13.

Stratum I-9. Stratum I-9 is a complex, heterogeneous deposit with three discernible facies. Stratum I-9a is an adobe melt facies that contacts Stratum I-8. Stratum I-9a begins at the north wall of the pithouse and extends 2.5 m south; it is thickest near the center of the

pithouse depression. In cross section, Stratum I-9a appears trapezoidal and varies from 10 to 40 cm in thickness. The melt contains a pale brown (10YR 6/3) sand and incorporates a number of boulder-sized, tabular sandstone blocks. The rubble is interpreted to be a ruined wall of Room 13 and the adobe to be melted plaster and mortar from that wall.

To the east of Stratum I-9a, the melt is less consolidated and darkens to brown (10YR 5/3) due to an admixture of ash and charcoal from intercalated lenses of midden. This is the ashy sand facies (I-9b) of Stratum I-9. This deposit thins to the east, mantling the western half of the breccia balk separating the two pitstructures with a thin veneer of sediments. Additional collapsed materials from the east wall of Room 13 are embedded within Stratum I-9b, and above this rubble, the I-9b sediments are sandier, less consolidated, and decrease in color value.

The third facies (I-9c) of Stratum I-9 is a layer of pale brown (10YR 6/3), colluvial sand, 5 to 60 cm thick, that contacts the west edge of Stratum I-9a, covers Stratum I-8, and rides up over the west wall of the pithouse depression, burying the breccia platform and the ruins of Room 11. Like I-6b, this colluvium appears to have accumulated during a period when the western portion of the shelter was used sporadically. The sediments are mottled with some ash and charcoal that appears to have washed in from the rubble of Room 11.

The ceramics from Strata I-8 and I-9 are generally similar to those from Strata I-5 and I-6 (table 1). Moccasin Gray remains the most commongray ware type, with Chapin Gray and Mancos Gray each constituting between 15 and 20 percent of the typeable sherds. However, some changes are evident. White wares occur as frequently as red wares in Strata I-8 and I-9, and a few sherds of corrugated and late white wares were

recovered from Stratum I-9. Despite these differences, the overall similarity between the collections suggests only a short hiatus between the two occupations.

Occupation Area 2, Surface 1 and retaining wall. Occupation Area 2 is a use surface located in the northern portion of the Pithouse 2 depression at the interface between Stratum I-9 and the overlying Stratum I-10. Originating on the surface of Occupation Area 2 is the rubble of a retaining wall that extends from the west wall of the rockshelter to the southwest corner of Pithouse 1. Together, this complex marks the beginning of a third period of use of Subarea 1 by the Anasazi after the abandonment of Pithouse 2.

Stratum I-10. Overlying Occupation Area 2 and Stratum I-9, Stratum I-10 is a 20- to 50-cm-thick layer of dark grayish-brown (10YR 4/2), ashy sand. The deposit spreads eastward from the west wall of the shelter; dips slightly in the almost-filled Pithouse 2 depression; and, at the breccia balk separating the pithouses, merges with Strata I-9b and II-6. To the south, Stratum I-10 begins abruptly at the dripline behind the retaining wall and extends northward across the depression and onto the breccia platform in front of the roomblock.

The dark color of the stratum is due to abundant inclusions of ash, charcoal, and decayed organic matter, probably largely derived from several pits and fireplaces found at various levels within the stratum. This suggests that several occupations occurred during the deposition of Stratum I-10. Coupled with the density of artifacts and debris contained within Stratum I-10, this in turn suggests intensive, but probably only seasonal, use of the shelter as a campsite.

Occupation Area 3, Surface 1. A second definable use surface, Occupation Area 3, was noted at the interface between Stratum I-10 and Stratum I-11. Like Occupation Area 2, Occupation Area 3 is an area where sediments had been compacted by trampling. This occupation area was also the level of origin of several features. No architectural debris was evident.

Stratum I-11. A second period of sporadic use of the shelter, similar to that during the deposition of Stratum I-10, is evident in Stratum I-11, a 10- to 140-cm-thick layer of light yellowish-brown (10YR 6/4), colluvial sand. The stratum is thickest near the dripline where the collapsed rubble of the retaining wall acted as a sediment trap for material carried by runoff flowing from the overhang. The rubble appears to have contributed to the characteristic buildup of a mound of colluvial debris at the lip of the rockshelter. Once built up, this mound channeled runoff water into the shelter itself, and Stratum I-11 began to accumulate over the entire shelter floor. Several hearths, originating at various levels, had been dug into these sediments. The relative scarcity of artifacts recovered from Stratum I-11 suggests that use of the shelter during this depositional episode was infrequent and of a low intensity.

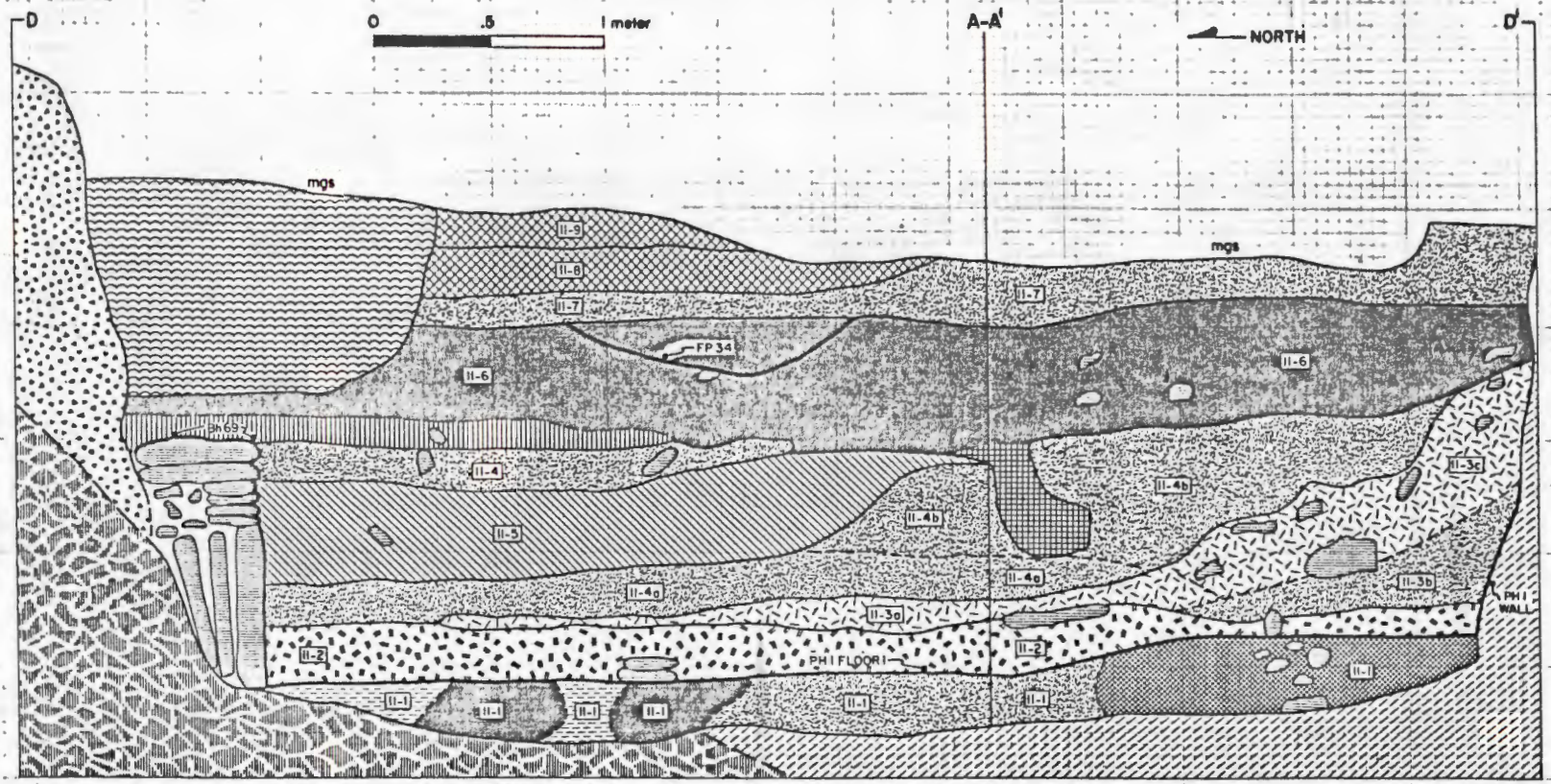
Strata I-10 and I-11 have ceramic assemblages in which Mancos Corrugated sherds make up a significant percentage of the typeable collections and in which corrugated sherds are abundant relative to earlier strata (table 1). Moccasin Gray remains the predominant pottery type, however, and both Chapin Gray and Mancos Gray are present in quantity. This suggests that, although these two strata evidence a much different pattern of utilization of the shelter, there was not a long hiatus between the deposition of Strata I-10 and I-11 and earlier strata.

Stratum I-12. Stratum I-12, the uppermost stratum in this sequence, appears to be a layer of looter's spoil dirt from the roomblock. It is a layer of coarsely mottled, brown (10YR 5/3) sand, approximately 10 to 20 cm thick. The stratum extends along the entire front of the roomblock in an apron 2 to 3 m wide, and its northern margin abutts the southern walls of the lower rooms. Between 30 and 40 percent of the deposit is undecayed organic matter; much of it is cultural. Apparently, the material in the roomblock area remained dry because the breccia platform is above the groundwater level.

Stratigraphic Unit II

Stratigraphic Unit II (figs. 9, 13, and 14) consists of the fill of Pithouse 1 and some of the deposits that straddle the breccia shelf between Pithouse 1 and Pithouse 2. Stratigraphic Unit II is composed primarily of superimposed middens interfingered with colluvial sand. Except for trash disposal, this portion of the shelter (Subarea 2) was little used after the pitstructure was abandoned. These sediments, therefore, were not greatly disturbed by human activities, and the stratigraphy is straightforward and uncomplicated. Unfortunately, this sequence does not include the earlier part of the shelter's occupation.

Stratum II-1. Stratum II-1 (fig. 13) designates a group of heterogeneous sediments revealed by a shallow (25 cm deep), exploratory trench dug through the Pithouse 1 floor along its north-south midline. Underlying the northern third of the floor is a coarse, white (10YR 8/2) sand, a product of the decomposition of the sandstone bedrock. Within this horizon are two lenses of grayish-brown (10YR 5/2), ashy sand flecked with charcoal. Beneath the central part of the floor, the white sand grades laterally into a pale brown (10YR 6/3) sand that is identical to



LEGEND								
PITHOUSE	PH	MODERN GROUND SURFACE	mgs	ASH		BEDROCK		
ADOBE MELT		CAVE BRECCIA		MIDDEN		UNINVESTIGATED		
SANDSTONE		LOOTER'S PIT		RODENT BURROW		STRATUM NUMBER		
BENCH	Bh	LOOTER'S BACKDIRT		ROOF FALL		CULTURAL SURFACE		
FIREPLACE	FP	SAND		SANDY CLAY LOAM		INFERRED		
		ASHY SAND		WEATHERED BEDROCK		COLOR OR TEXTURE CHANGE WITHIN STRATUM		

Figure 13. North-south profile of Stratigraphic Unit II, LeMoc Shelter. Profile D is shown in plan in figure 7. Note point of intersection with profile A. Profile was mapped before Pithouse 1 ventilator system was exposed.

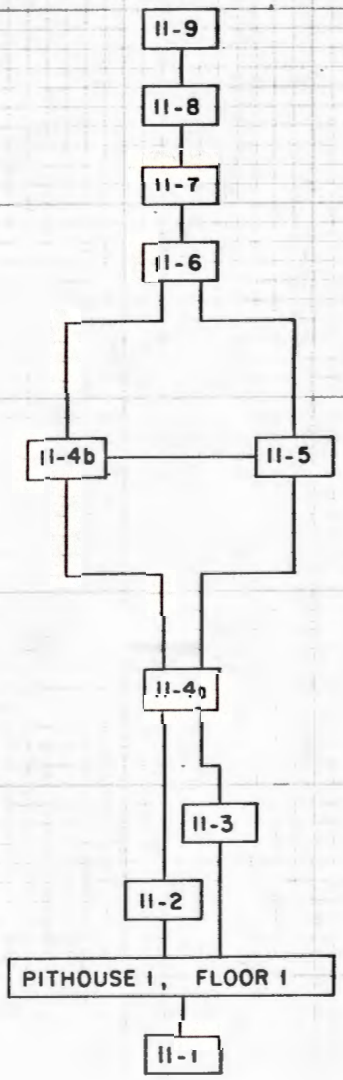


Figure 14. Schematic summary of relationships between cultural and stratigraphic units in Stratigraphic Unit II, LeMoc Shelter.

the many strata of colluvial sediments noted in the shelter deposits. This sand, in turn, grades into a finer-grained, sandy clay loam, at a point approximately 1.5 m north of the south wall of the pitstructure.

Too little of Stratum II-1 was exposed by the trench to fully characterize the sedimentary processes reflected in these deposits. Tentatively, the pale brown sand is interpreted as colluvium that had washed into the shelter. The sandy clay loam also appears to be primarily colluvial; the more fine grained fraction was probably introduced by water washing across the front of the shelter. The white sand, as mentioned, is clearly a product of in situ weathering of the bedrock. Although most of the deposit appears to be natural, the lenses of middenlike material within the white sand suggest that there may have been some preparation of a floor foundation. A full discussion of this possibility can be found in the "Architecture" section.

Pithouse 1, Floor 1. The aboriginal excavation of Pithouse 1 is a stratigraphic unconformity; any evidence of earlier use of Subarea 2 would have been destroyed by its construction. Furthermore, the pithouse floor marks a clear temporal break between the deposition of the sediments in Stratum II-1 and the overlying sediments of Stratigraphic Unit II.

Stratum II-2. Stratum II-2, the burned roof fall of Pithouse 1, is a layer of dark gray (10YR 4/1) sand mottled with charcoal and burned adobe; charred timbers are present as well, although not in great quantities. Roof fall, which overlies the pitstructure floor, varies in thickness from approximately 6 cm near the south wall to almost 40 cm in the east half of the depression. Little cultural material was found either on the pithouse floor or within roof fall, suggesting that the structure had been

abandoned before the roof burned. Although sterile sand filled most of the pits in the pithouse floor, there was no accumulation of naturally deposited sediments between the roof fall and the floor itself. This suggests that little time elapsed between abandonment and the burning of the roof. The sand fill of the cists may have been added by the inhabitants prior to abandonment of the structure.

Based on variations in the oxidation of the plaster facing the pitstructure walls, the fire seems to have only partially destroyed the roof. Burning appears to have been most intense in the northern half of the structure. Possibly, the southern portion of the roof was dismantled before the conflagration, and only the northern half of the roof actually burned and collapsed. Alternatively, if the structure only partially burned, usable timbers may have been salvaged from the rubble at some later date. In any case, neither differential preservation nor destruction by the fire seem sufficient to account for the scarcity of roofing material within this unit.

The ceramic assemblages from Stratum II-2 and from the floor of the pitstructure are similar and form a group distinct from the collections obtained from the overlying strata. Moccasin Gray appears as the dominant utilitarian type, and although Mancos Gray is present, it is not as abundant as in the later assemblages. Very few corrugated sherds were recovered from either of these two strata, and those that were recovered probably were introduced by recent bioturbation.

Stratum II-3. Stratum II-3 is a fan-shaped unit of adobe melt (II-3a), colluvial sand (II-3b), and adobe melt and sandstone rubble (II-3c) that varies in thickness from approximately 100 cm in the southwestern corner of the pitstructure to 10 cm near the center of the

depression. The three distinct facies within Stratum II-3 reflect the erosion of the pitstructure's south wall and the buildup of colluvium within the depression. A wedge-shaped deposit of adobe that overlies the roof fall at the base of the wall (Stratum II-3a) apparently was deposited as the plaster facing of the wall melted. This erosion is most evident at the juncture of the south wall and the cave breccia that forms the west wall. Here, a large block of adobe had slumped off. It is this slump that accounts for the greater thickness of the stratum in this area.

Overlying the adobe, and grading laterally into it, is a pale brown (10YR 6/3), colluvial sand (Stratum II-3b) washed in by runoff water coming over the roof of the shelter. Overlying this is a layer of adobe melt and sandstone rubble (II-3c), which reflects the collapse of the upper portion of the pitstructure's south wall. Although the wall collapsed into the pitstructure from the south, the rubble most prominently slopes downward from west to east following the configuration of the underlying deposits. Near the southwest corner of the pitstructure, therefore, the rubble is almost level with the top of the wall, while in the southeast quadrant of the depression, some of the stone rests on the pitstructure floor.

Prior to the collapse of the south wall, relatively little colluvial material was transported into the depression because the wall channeled all but a small part of the runoff onto the slopes in front of the shelter. When the wall collapsed, not only did more runoff flow into the depression, but the sediment load increased as material from colluvial deposits at the lip of the shelter and from the slope above the shelter were carried into the depression. The rubble probably was buried quickly, building a ramp that sloped into the depression from the south. The

increased depositional rate continued during the buildup of later strata.

Stratum II-4. Stratum II-4 is a massive, lightly mottled, very pale brown (10YR 7/4) sand that overlies Strata II-2 and II-3. The stratum varies in thickness from about 75 cm in the southern part of the depression to approximately 25 cm in the northern part. From this configuration, and from the character of the sediments, Stratum II-4 appears to be an accumulation of colluvial material. Sediment buildup is greatest beyond and below the dripline and least where material would be washed in only by very heavy runoff. Although Stratum II-4 was deposited primarily by natural processes, there are a few lenses of midden material; furthermore, artifacts, small bits of charcoal, and burned sandstone are dispersed throughout the stratum.

On the basis of a subtle stratigraphic distinction that was not recognized until late in the excavation, and on the basis of analysis of the ceramics from Stratum II-4, two substrata were defined subsequent to field operations. The lower 25 cm was designated Stratum II-4a; the remainder was designated Stratum II-4b. The boundary between the two strata is inferred in figures 9 and 13; the characteristics of their respective ceramic assemblages are described in the "Correlation and Dating" section of this report.

Stratum II-5. Stratum II-5 is a complex midden deposit composed primarily of mottled, brown (10YR 5/3) sand, varying in sedimentary structure from massive to weakly laminated. Within this matrix are lenses of pale brown (10YR 6/3), laminated sand and localized concentrations of sandstone fragments. The stratum is roughly 50 cm thick in the northern half of the pitstructure where it fills a swale in Stratum II-4a. In the southern half of the pitstructure depression, Stratum II-5 interfingers with II-4b, with which it was apparently contemporaneous. Stratum II-4a, however,

clearly predates Stratum II-5 and marks a period during which the depression was used only intermittently for refuse disposal. Somewhat later, more material began to be dumped into the depression. Natural filling of the southern half of the depression with colluvium continued during this period, resulting in the interfingering of the Strata II-4b and II-5 deposits.

The ceramic assemblages from Stratum II-5 and Stratum II-4 (a and b) reflect a temporal distinction (table 1). Stratum II-5 has a greater percentage of corrugated sherds than does II-4. Given the overall similarity of the two collections, however, it is likely that the two strata mark a period of continuous deposition over a period of no more than 100 years, and probably less. As suggested earlier, the most obvious differences in the ceramic collections from these strata, compared with those from the Pithouse 1 floor and Stratum II-2 (no sherds were recovered from II-3), are a slight increase in Mancos Gray and the appearance of corrugated sherds in quantity in Strata II-4 and II-5. This suggests that the break between the two assemblages occurred sometime between A.D. 900-950.

Stratum II-6. Stratum II-6 is a 70-cm-thick deposit of friable, pale brown (10YR 6/3), ashy sand overlying Strata II-4, II-5, and II-3. For the most part, the stratum is structurally massive, although some portions show weak laminae, and small lenses of ash and culturally sterile sand occur intermittently. Inclusions of sandstone, charcoal, adobe, and artifacts give it a finely mottled appearance. A fireplace, originates at the contact of this stratum with Stratum II-7.

Above the breccia balk separating the pitstructures, sediments from Stratum II-6 merge with materials from Strata I-9b and I-10. However, this interface does not provide a basis for stratigraphic correlation of

these deposits. The gradual blurring of the boundary between I-9b and I-10 as they feather into II-6 suggests that some material from these strata was transported by runoff and redeposited within II-6. If this is indeed the case, both Strata I-9b and I-10 must have been laid down before the deposition of II-6 began. Redeposition of sediments from Strata I-9b and I-10 alone could not have led to the buildup of II-6, however. Some of Stratum II-6 probably consists of refuse that was thrown into the pithouse depression, as suggested by the localized concentrations of charcoal, ash, adobe, and sandstone, the relative abundance of artifacts, and the general character of the sediments in this stratum. Perhaps of even greater significance in the buildup of Stratum II-6, however, was the redeposition of Stratum I-11 sediments in the Pithouse 1 depression. As indicated earlier, during the initial stage of the deposition of Stratum I-11, most of the sediments transported by runoff from the overhang were trapped in Subarea 1 by the rubble of the retaining wall that created a mound across the lip of the rockshelter. During this period, the sediments within the shelter in Subarea 1 were protected from erosion. In Subarea 2, however, after the collapse of the south wall of Pithouse 1, much of the runoff from the shelter roof was channeled into the pithouse depression. This resulted in a rapid buildup of sediments in Subarea 2. Later, as the mound at the shelter lip in Subarea 1 began to channel more runoff into the western portion of the shelter, some transport and redeposition of Subarea 1 sediments probably occurred.

The isolated lenses of midden contained within Stratum II-6 are consistent with the interpretation, initially postulated on the basis of Stratum I-11 characteristics, that the shelter was used as a campsite during this time. Furthermore, the ceramic collection from Stratum II-6

shows an increase in the percentage of Mancos Corrugated similar to that observed in Strata I-10 and I-11. Considered singly, none of these arguments is conclusive, but together they suggest that a correlation of Stratum II-6 with Stratum I-11 is the most plausible interpretation of the available evidence.

Stratum II-7. Stratum II-7 is a layer of light yellowish-brown (10YR 6/4) sand overlying Stratum II-6. The designation "II-7" is used here for convenience in describing the stratigraphic sequence, since this deposit is a continuation of Stratum I-11. This stratum contains few inclusions of charcoal and ash and appears to mark a fairly recent episode of colluvial deposition that postdates the burial of the cultural strata in Subarea 1 as well as in Subarea 2.

Stratum II-8. Stratum II-8 is a loose, brown (10YR 5/3) sand layer that contains a high percentage of organic debris, fecal pellets, and artifacts. This stratum is a continuation of Stratum I-12 and consists of looter's spoil dirt derived either from the roomblock or from the rear of the shelter.

Stratigraphic Unit III

To the east of Pithouse 1, the shelter becomes progressively shallower and less protected. Beyond the shelter, the dripline runoff flowing over the roof and the water flowing in a rill across the front of the shelter have acted in concert to erode the unconsolidated deposits. The sediments within the shelter cover a triangular area that measures roughly 5 m north-south along the east wall of Pithouse 1 and 6 m east from that wall. Since most of the strata in this portion of the site have been truncated by the construction of the pithouse and, therefore, cannot be correlated with deposits in other portions of the shelter, these sediments have been designated Stratigraphic Unit III (fig. 9).

The bedrock in this part of the shelter has nearly vertical bedding planes dipping toward the rear of the shelter. These planes have weathered to a jagged, downsloping stairstep of ledges and pockets. The bedrock is covered by a maximum of 1.5 m of stratified sediments. The strata are a mixture of midden, colluvium, and cave sediments, altered to varying degrees by an active seep emanating from the rear of the shelter. Water from the seep has accelerated chemical weathering; consequently, cultural materials are poorly preserved. Near the rear wall of the shelter, the decay of organic matter from the phreatophytic vegetation supported by the seep has introduced organic colloids into the sediments, forming characteristic clay loam lenses. Overall, the natural depositional pattern appears to be one of sandy colluvial sediments interfingering with the finer-grained, organic-rich sediments within the depositional environment of the seep. Cultural deposition is limited to a few lenses of refuse.

Stratum III-1. Stratum III-1 is a dark grayish-brown (10YR 4/2) sand deposited in a depression in the bedrock and truncated by the east wall of Pithouse 1. The sediment appears to be derived primarily from the weathered bedrock, although its dark color indicates the presence of decayed organic material and ash. The few artifacts found within the stratum suggest that some midden material may also be present.

Stratum III-2. Stratum III-2 is a dark grayish-brown (10YR 4/2) sand overlying Stratum III-1 (where the latter is present) and resting on bedrock at the eastern limit of the excavation. This deposit appears to be primarily colluvial in origin but contains some midden and organic material. Incorporated into Stratum III-2 are weathered blocks of cave breccia, the remnants of a narrow breccia shelf that once adhered to the steeply sloping rear wall of the shelter.

Stratum III-3. Stratum III-3 is a heterogeneous mixture of midden, colluvium (sand and sandy loam), and seep deposits overlying Stratum III-2. The midden deposits are primarily concentrated near the dripline adjacent to the east wall of Pithouse 1. The character of Stratum III-3 changes to the east in the vicinity of the seep. Here there is little midden material. The sediments are lighter in color, varying from light yellowish-brown to yellowish-brown (10YR 6/4-5/4), and have the familiar character of colluvial sediments. Laminae of organic material from the seep are present near the rear wall of the shelter where the stratum rests on bedrock.

Stratum III-4. Stratum III-4 is a midden deposit overlying Stratum III-3 and, nearer the rear of the shelter, Stratum III-1. As in Stratum III-3, the artifacts in Stratum III-4 are concentrated near the eastern wall of Pithouse 1. In the area of the seep, the deposit is nearly sterile but retains its dark grayish-brown (10YR 4/2) color due to organic material contributed by the seep and to ash apparently carried by runoff water from Stratum III-4 sediments to the west.

All of these strata are truncated by the east wall of Pithouse 1, indicating that their deposition predates the construction of that structure. Unfortunately, this stratigraphic evidence is only weakly supported by the small ceramic assemblage recovered from these strata (table 1). As was discussed earlier, the ceramic assemblage most closely associated with the occupation of Pithouse 1 is dominated by Moccasin Gray, with some Chapin Gray, Mancos Gray, and a few corrugated sherds. As noted, it is probable that the corrugated sherds from the lower pitstructure fill were introduced through bioturbation. This likelihood is even stronger for the three corrugated sherds found in the lower strata

of Stratigraphic Unit III; the deposits here are very close to the surface, and several rodent burrows were observed during excavation. Discounting the corrugated sherds for the moment, then, the ceramic assemblage from Strata III-1 through III-4 contains four sherds of Chapin Gray, five sherds of Moccasin Gray, and one sherd of Mancos Gray. The remainder of the collection consists of plain gray body sherds, and a few unidentifiable sherds of Early Pueblo White and Early Pueblo Red. This suggests, albeit weakly, that these deposits are generally contemporaneous with the occupation of Pithouse 1.

These two seemingly contradictory pieces of evidence suggest that the midden materials from Stratigraphic Unit III, notably from Strata III-3 and III-4, were deposited shortly before Pithouse 1 was built, possibly in a conscious effort to fill the irregularities in that part of the shelter. Trash may have been intentionally dumped in this area, or material from an existing midden may have been redeposited to assure a firm backing for a planned pitstructure. In either case, the cultural material in these strata would be broadly contemporaneous with the construction and occupation of Pithouse 1.

Stratum III-5. Stratum III-5 is a 10- to 40-cm-thick stratum of dark yellowish-brown to yellowish-brown (10YR 4/4-5/4) sand, sandy loam, and loamy sand overlying Stratum III-4. This stratum is a continuation of the colluvial sediments of Strata II-7 and I-11, and, therefore, is associated with the last sporadic occupation of the shelter. Since the upper surface of Stratum III-5 is the modern ground surface in this area of the shelter, the artifacts in the stratum were probably introduced by recent visitors to the cave. A small packrat midden within the stratum near the northeast corner of the Pithouse 1 depression indicates that rodents also introduced artifacts into Stratum III-5.

Stratigraphic Unit IV

Stratigraphic Unit IV is a midden deposit located on the steeply sloping hillside immediately in front of the shelter. This slope appears to have formed as sediments were washed over the roof of the rockshelter by runoff water from a large, slickrock basin above the site. As water dropped from the shelter roof, the suspended sediments were deposited, building a steep, fanshaped slope, with the front of the shelter as its apex.

The strata (fig. 15) of this fan were exposed by a trench (test trench 2) cut into the slope from southeast to northwest (fig. 7). The trench was oriented at this unusual angle because a preliminary probe of the midden indicated that a trench so positioned would cut through the deepest and best-stratified deposits. Trench 2 cuts the slope obliquely so that its headwall (profile F) is nearly parallel to the dominant slope angle, while the long axis of the trench (profile E) is oriented with the fan's flared side slope.

Because of the high slope angle (30°, as measured on the subsoil) and the exposure of the slope, these deposits have been greatly affected by postdepositional erosive agents, notably gravity and sheet runoff. Gravity seems to have been primarily responsible for the differential downslope movement of larger fragments of material, which accounts for the unusual scarcity of artifacts in the midden. Most of the artifacts once present now litter the canyon slope well below the site proper. Sheet runoff appears to have been responsible for blurring the stratigraphy of the midden. Auger transects indicate that distinct stratification is preserved only on the side slope of the colluvial fan where trench 2 was located.

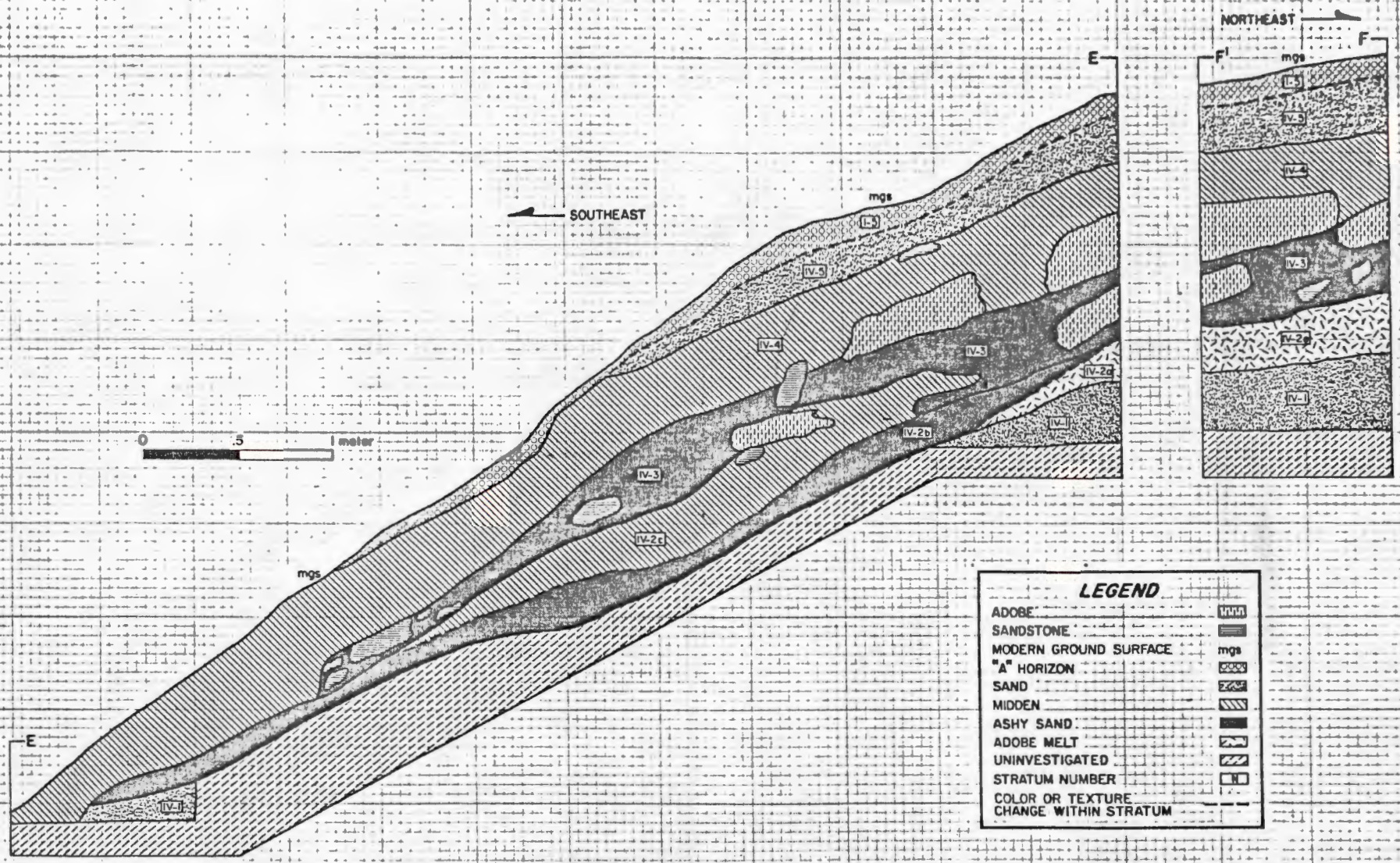


Figure 15. Northwest-southeast and northeast-southwest profiles of Stratigraphic Unit IV, LeMoc Shelter. Profiles E and F are located in plan in figure 7.

Vertical mixing of the strata, largely as a result of bioturbation, is also evident. The principal agent here seems to have been the root system of a thicket of scrub oak that covered the slope before being cleared at the start of excavations. Rodent burrowing is also evident, although less widespread.

Stratum IV-1. Stratum IV-1 consists of a structurally massive, compact, brown (7.5YR 5/4) sand layer lying between 50 and 150 cm below modern ground surface. The stratum contains few artifacts, has no organic material, and is believed to be the natural subsoil. This judgment was based on the observation of a seemingly identical stratum in the walls of several drainage channels within a 1-km radius of the site. The artifacts were found in the upper few centimeters of Stratum IV-1 and were probably introduced by pedoturbation.

Stratum IV-2. Stratum IV-2 is a yellowish-brown (10YR 5/6) loamy sand with varying structure and inclusions. At the top of the hill slope, Stratum IV-2 is structurally massive and tightly compacted and, by all appearances, consists of adobe melt (Stratum IV-2a). Further downslope, the melt grades into a deposit of weakly laminated bands of ashy sand with adobe and charcoal inclusions (Stratum IV-2b). The adobe melt appears to be the result of the erosion of a structure located near the shelter lip or the result of the dumping of debris cleared from a razed structure. In either case, sediments derived from the adobe were washed downslope and became mixed with midden material. A third facies, Stratum IV-2c, overlies these laminated sediments. This facies is a very dark grayish-brown (10YR 3/2) sand layer with a maximum thickness of 35 cm; it appears to be a refuse deposit.

Stratum IV-3. Stratum IV-3 is a layer of structureless, dark grayish-brown (10YR 4/2), ashy sand, with a maximum thickness of 40 cm. The stratum is distinguished from Stratum IV-2c by numerous inclusions of pebble- to cobble-sized sandstone fragments, boulder-sized tabular sandstone blocks, and, near the top of the slope, several large blocks of adobe. Despite its thickness, Stratum IV-3 appears to have been rapidly deposited, probably as the result of the collapse of the south wall of Pithouse 1.

Stratum IV-4. Stratum IV-4 is a stratum of dark grayish-brown (10YR 4/2) sand, massive in sedimentary structure and varying from 25 to 55 cm in thickness. The abundant ash and charcoal inclusions in the sandy matrix clearly indicate that this deposit is a midden. Near the top of the hill slope, Stratum IV-4 surrounds two large blocks of adobe that appear to be part of the rubble that comprises Stratum IV-3. This suggests that the deposition of Stratum IV-4 began soon after the deposition of Stratum IV-3. That Stratum IV-4 is continuous with the upper portion of Stratum II-6 indicates that its deposition dates to the later periods of the shelter's occupation.

Stratum IV-5. Stratum IV-5 is a surficial deposit of pale brown (10YR 6/3) sand overlying Stratum IV-4. The deposit varies in thickness from 5 cm at the base of the slope to 50 cm near the top of the slope. Where scrub oak grew, a weak soil horizon has formed. Stratum IV-5 is a continuation of Stratum II-7 (I-11 and III-5) and is largely a postoccupational deposit.

Surprisingly little information can be gleaned from the ceramics recovered from the hill slope midden. The total collection from the trench consists of only 408 sherds, and only 37 of these could be

classified to type. Furthermore, approximately half of the total collection (203 sherds) was recovered from a single stratum, Stratum IV-4. Consequently, the correlation of these strata with those representing the occupation of the shelter is tenuous. The upper two strata in Stratigraphic Unit IV are continuous with strata within the shelter. These two strata, the relative position of all strata within this unit, and the character of the sediments themselves remain the only basis for correlation.

Correlation and Dating

Considerable care was taken during the excavation of LeMoc Shelter to obtain samples for a variety of absolute dating techniques. Despite these efforts, however, only a weak and very fragmentary absolute chronology could be obtained. Consequently, correlation of strata among the four stratigraphic units relies heavily on comparisons of the ceramic assemblages from the strata and on assessments of relative similarities among strata. Dating of each successive occupation is based primarily on the temporal periods attributed to the various ceramic types. For both tasks, stratigraphic position is used whenever possible as an additional line of evidence. The equivocal evidence provided by the few absolute dates is useful primarily in establishing baseline dates for Stratigraphic Units I and II.

Chronometric Dates

Four tree-ring and three archaeomagnetic samples yielded dates for LeMoc Shelter (tables 2 and 3). The reliability of the tree-ring dates is diminished since there is no way to determine how far the dated ring is from the true outside ring in any of the samples. The problem with the

Table 2. Tree-ring sample results, LeMoc Shelter

Sample No.	Provenience	Taxon	Inside date (A.D.)	Outside date (A.D.)
10 (DAR-52)	Pithouse 1	Juniper	609fp	803+vv
23 (DAR-144)	Pithouse 2, Floor 1	Pinyon	407fp	482vv
25 (DAR-146)	Pithouse 2, Floor 1	Pinyon	562fp	700++vv
26 (DAR-147)	Room 12	Juniper	557	702vv

NOTE: DAR numbers, taxa, dates, and the following tree-ring symbols were provided by the Laboratory of Tree-ring Research, University of Arizona, Tucson:

No symbol - No pith ring present (inside date).
fp - The curvature of the inside ring indicates that it is far from the pith.
vv - There is no way of estimating how far the last ring is from the true outside.
\+ - One or more rings may be missing near the end of the ring series whose presence or absence cannot be determined because the specimen does not extend far enough to provide an adequate check.
++ - A ring count is necessary due to the fact that beyond a certain point the specimen could not be dated.

Table 3. Archaeomagnetic sample results, LeMoc Shelter

Sample No.	Provenience	Date (A.D.)
9	Room 1	1265 (± 55) 1050 (± 55)
12	Room 11	875 (± 50) 1060 (± 50) 1320 (± 50) 1440 (± 50)
13	Pithouse 2, Feature 58	690 (± 30) 755 (± 30) 880 (± 30) 930 (± 30)

archaeomagnetic dates is conceptually similar. (Refer to Hathaway and Eighmy [1982] for a discussion of archaeomagnetic dating.) The sandy sediments of the cave contain only a small amount of the clay-sized particles necessary to maintain a good magnetization (cf. Eighmy 1980). Consequently, the plotted positions of the 12 specimens that comprise each sample were only loosely clustered, resulting in an unusually high error range. The problem is further compounded because the areas defined by these clusters intercept the master curve at more than one point. Therefore, two or three possible dates must be ascribed to a single sample. Given these problems, few of the dates obtained from LeMoc Shelter can be accepted at face value. At best, they can be considered as supportive evidence for the ceramic dating.

Pithouse 2. Three of the seven samples that yielded dates were collected from Pithouse 2. The sample that yielded the earliest date, tree-ring sample DAR-144, was obtained from a small, charred timber found lying on the floor. The A.D. 482vv date for the outside ring is too early for the occupation of Pithouse 2, given the pitstructure's architectural style and the composition of its ceramic assemblage. However, the date does raise the intriguing possibility that the shelter was occupied during the Basketmaker II period and that the timber was later reused in the construction of Pithouse 2. If this were the case, all other evidence of occupation during that period has been destroyed during the course of later occupations. Consequently, the hypothesis can be accorded little weight. It is equally possible that an already dead tree was procured for use in the construction of Pithouse 2 or that the dated specimen was the inner core of a much larger log from which numerous outer rings had been lost.

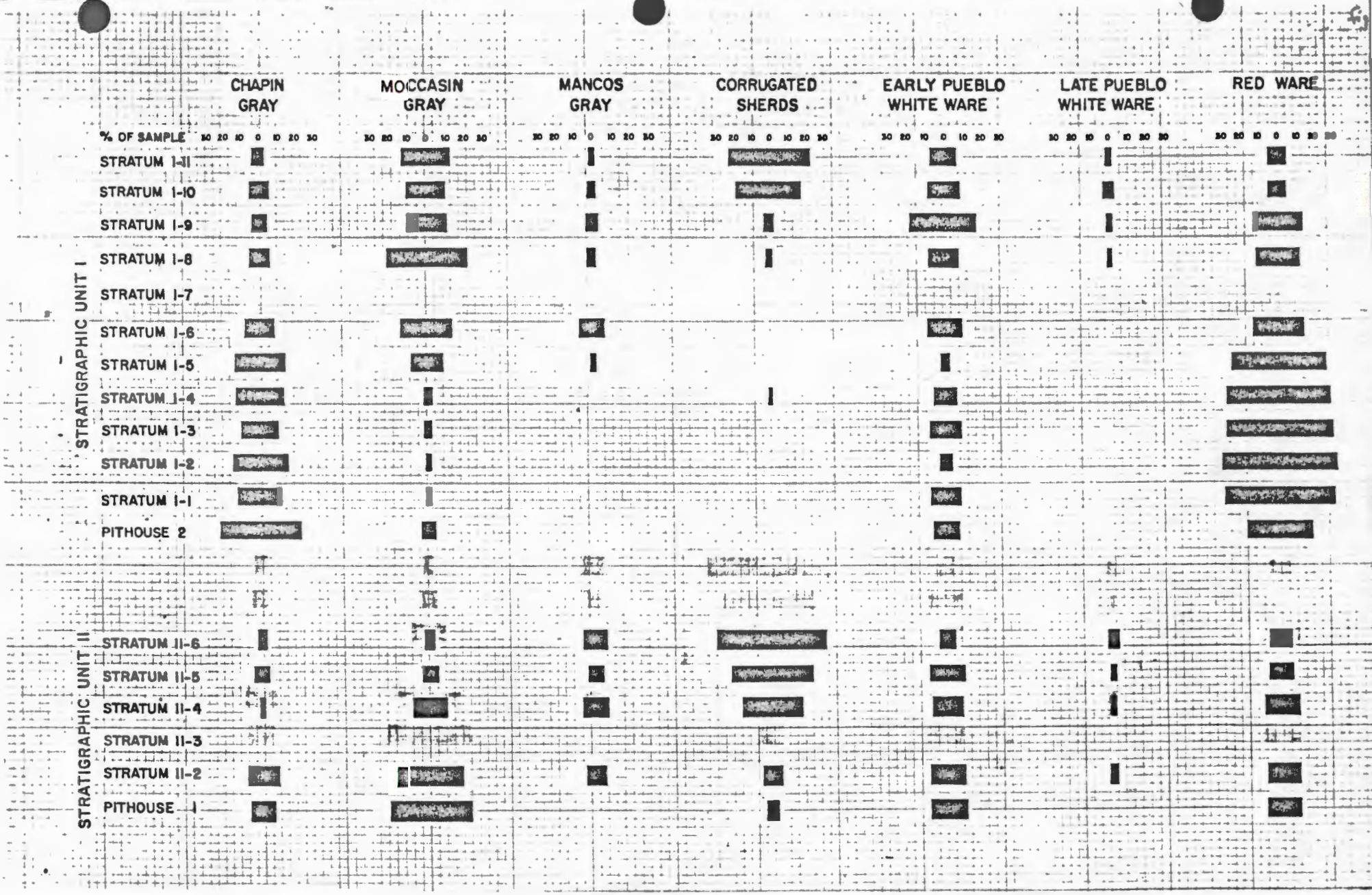
The second sample from Pithouse 2 (tree-ring sample DAR-146) was obtained from a charred timber lying on the floor near the east wingwall. The A.D. 700++vv date yielded by this sample appears more reliable than the date obtained for sample DAR-144. As discussed earlier, the ceramics found on the floor of the pitstructure were primarily Chapin Gray with a few sherds of Moccasin Gray. Early Pueblo White and Early Pueblo Red were present, with Bluff Black-on-red being the only specifically identifiable type. The appearances of Bluff Black-on-red and Moccasin Gray in the Dolores area are dated to A.D. 740 and A.D. 760, respectively. Since neither of these types is present in quantity in the assemblage from Pithouse 2, the occupation of the pithouse probably roughly overlaps with the introduction of these ceramic types. The A.D. 700 date for sample DAR-146, therefore, appears to be only slightly early. Given that an unknown number of outside rings were missing from this timber, the true cutting date would be somewhat later--possibly within the range indicated by the ceramic evidence.

An archaeomagnetic date of A.D. 755 $\pm$ 30 was yielded by archaeomagnetic sample 13, collected from the hearth in Pithouse 2; this date is most compatible with the ceramic dating. Since the ceramic assemblage remains essentially unchanged in the four strata immediately overlying the pithouse floor, it seems likely that the abandonment date falls within the upper range of the archaeomagnetic date. Based on a preliminary evaluation of DAP pitstructures, Lipe and Breternitz (1980) estimate that pitstructures in the Dolores area had use spans of one generation or less, or about 20 to 30 years. If this estimate is correct, the dating of the hearth suggests that the pithouse was probably occupied between A.D. 750 and 780.

Room 12. If the date estimated for the construction of Pithouse 2 is accepted, the A.D. 702vv tree-ring date obtained for a timber in the roof fall of Room 12 (tree-ring sample DAR-147) is much too early; stratigraphically, this structure clearly postdates the abandonment of Pithouse 2. The ceramic assemblages from the floor and roof fall (Stratum I-5) of Room 12 are characterized primarily by equal quantities of Chapin Gray and Moccasin Gray sherds. Although the collection is too small to yield a reliable ceramic date by itself, the ratio of these two types is consistent with the changes observed in the ceramic frequencies of Stratigraphic Unit 1 (fig. 16). In the Dolores area, Moccasin Gray is assigned a date range of A.D. 760-925. Assuming the popularity of this type follows a characteristic battleship curve, Moccasin Gray should become the dominant type between approximately A.D. 820 and 860. In relation to the tree-ring date, this implies that either a number of outside rings are missing from the dated timber or that the timber had been salvaged from an earlier building and was reused in Room 12.

Pithouse 1. A single tree-ring date of A.D. 803+vv was obtained for Pithouse 1 (sample DAR-52) from wood found lying horizontally within roof fall. The size of the fragment, and the fact that the tree from which it was obtained was probably considerably more than 200 years old when cut (based on the observation that the inside ring is far from the pith and that an unknown number of outside rings are missing), suggests that sample DAR-52 was originally part of a fairly large log. Both the size and provenience of the sample suggest that it was either a roof support post or a primary roof beam. If this reasoning is sound, the date should be associated with the initial construction of the pitstructure. Because the dated ring was not an outside ring, the construction of Pithouse 1 must postdate A.D. 803.

Figure 16. Distributions of major ceramic types and groups in Stratigraphic Units I and II, LeMoc Shelter. Note the general similarity of the plots to idealized seriation curves. Numbers of corrugated sherds are a summation of both body sherds and sherds that could be identified to type. Early white wares include Chapin Black-on-white, Piedra Black-on-white, and untypeable white ware ceramics that do not have sherd temper. Late white wares include Cortez Black-on-white, Mancos Black-on-white, and untypeable white wares with sherd temper. Percentages were calculated across the listed types to avoid constraint that would have been caused by the large numbers of untypeable gray ware body sherds.


CHAPIN GRAY
MOCCASIN GRAY
MANCOS GRAY
CORRUGATED SHERDS
EARLY PUEBLO WHITE WARE
LATE PUEBLO WHITE WARE
RED WARE
% OF SAMPLE
30 20 10 0 10 20 30
STRATIGRAPHIC UNIT I
STRATUM I-11
STRATUM I-10
STRATUM I-9
STRATUM I-8
STRATUM I-7
STRATUM I-6
STRATUM I-5
STRATUM I-4
STRATUM I-3
STRATUM I-2
STRATUM I-1
PITHOUSE 2
STRATIGRAPHIC UNIT II
STRATUM II-6
STRATUM II-5
STRATUM II-4
STRATUM II-3
STRATUM II-2
PITHOUSE 1

Moccasin Gray is the predominant utility ware in the ceramics recovered from the floor of the pitstructure, and except for two corrugated sherds, no later gray wares were present. Following the argument presented in the previous section, this suggests a beginning occupation date of roughly A.D. 840 for Pithouse 1. A somewhat later date is indicated by the ceramics recovered from roof fall (Stratum II-2). Included in this collection are a few Mancos Gray and Corrugated Body Sherds. The dates generally given for the appearance of these types are A.D. 860 and A.D. 900, respectively. Since neither of these types was present on the floor of the pitstructure, it seems likely that their presence in roof fall is a result of a mixing of Stratum II-2 with later strata or is a result of material having been dumped into the depression after the collapse of the roof. In either case, these sherds probably postdate the occupation of the pitstructure. Therefore, a date of A.D. 860 is postulated for the abandonment of Pithouse 1.

Room 11. A second archaeomagnetic sample was collected from a burned wall of Room 11 (sample 12). Four possible dates are given for this sample: A.D. 875, 1060, 1320, or 1440, all with an error range of ± 50 years. The two latest dates are clearly too late since the Dolores area appears to have been abandoned before A.D. 1100, and the entire Mesa Verde Region probably was abandoned around A.D. 1300. The A.D. 1060 date also seems too late to be associated with the abandonment of Room 11. Although the ceramic collection from Room 11 is too small to be totally reliable, Moccasin Gray appears to be the predominant gray ware, with both Chapin Gray and Mancos Gray also present. The composition of this assemblage is consistent with the stratigraphic position of Room 11, and together, these lines of evidence suggest that the structure was used between A.D. 860 and

890. Therefore, the earliest of the possible archaeomagnetic dates, A.D. 875, seems most likely for the occupation of Room 11.

Room 1. The third archaeomagnetic date for LeMoc Shelter was obtained from a sample (sample 9) collected from an oxidized area on the floor of Room 1. A lens of ash and charcoal overlay this oxidized area and was mounded against the south wall of the room. This deposit covered a posthole located in the south-central part of the floor, which suggests that the fire postdates the collapse of the room's superstructure. If this is indeed the case, this date is associated with a later period of the shelter's use rather than with the occupation of the room.

Two possible dates were obtained for archaeomagnetic sample 9: A.D. 1050 ± 55 and A.D. 1265 ± 55. Based on the ceramics found in the disturbed fill of Room 1, the earlier of these dates seems the most likely. As will be discussed, this date is probably tied to late, sporadic Anasazi use of the shelter.

Ceramic Dating[1]

Although ceramic data were used in the previous section to evaluate the absolute dates obtained for LeMoc Shelter, there are problems with ceramic dating that need to be discussed before appraising the remainder of the site. Perhaps the most vexing of these problems is that less than 10 percent of the sherds recovered from any stratum can be identified to type. Consequently, in dating a stratum or in associating it with another deposit, a judgment must often be made from, at most, a few dozen sherds. In most cases this means that only the gray wares can be used since very

[1]Subsequent to the preparation of this report, research has resulted in modifications of the ceramic dating of LeMoc Shelter. These modifications are reported in appendix A. A summary of the temporal assignments for LeMoc Shelter is presented in appendix B.

few of the red wares and white wares (which already constitute only a small fraction of the total collection) can be identified to type.

A second complication, precipitated by the repeated reoccupation of the shelter, is that earlier materials are constantly being incorporated into later deposits as structures are built, rebuilt, and remodeled. As a result, the presence of early types is significant only when later types are absent. Furthermore, the relative abundance of a given type is often misleading with regard to dating. This is particularly true of the last occupations of the shelter, which were of short duration and during which probably fairly small quantities of material (relative to those from the earlier periods) were introduced.

Although not as dramatic as the upward movement of material, the downward mixing of artifacts is a third problem. Here, natural rather than cultural processes seem to have been primarily responsible. Chief among these processes appear to have been faunal disturbance (especially rodent burrowing) and trampling. While the effects of pedoturbation are limited, the introduction of even a few pieces of a later ceramic type into a collection with only a small number of typeable sherds can be misleading; in some cases, this has made it impossible to unambiguously associate a stratum with any particular period of the shelter's occupation.

Given these complications, the most reliable ceramic dates for the LeMoc Shelter deposits are those based on the first occurrence of a ceramic type. Since some downward mixing was assumed for all deposits, however, the presence of a few sherds of the type in question was generally discounted unless there was supporting evidence that the sherds

could not have been introduced by mixing with later deposits. In all cases, dates were consistent with the relative chronologies evident in the stratigraphy and with the other ceramic types present in the collection.

The relative abundance of a type was used only to obtain approximate dates for strata that fell between dates for the appearances of types. In these cases, it was assumed that the popularity of a type rises and falls as a normal or battleship curve, reaching maximum popularity roughly midway through the dated range for each type. Some adjustments had to be made, however, for skewing caused by the intermixing of materials from both earlier and later occupations by various disturbance processes.

The initial occurrences of five ceramic types (Moccasin Gray, Bluff Black-on-red, Mancos Gray, Cortez Black-on-white, and Mancos Corrugated) proved useful for dating the occupations of the shelter. As discussed previously, the appearance of Moccasin Gray and Bluff Black-on-red seem to coincide with the abandonment of Pithouse 2, the earliest documented occupation of the shelter. In the Dolores area, the appearance of Moccasin Gray is dated to A.D. 760 and the appearance of Bluff Black-on-red to A.D. 740. These dates are in general agreement with the archaeomagnetic date obtained for the hearth in Pithouse 2; therefore, the abandonment of Pithouse 2 is estimated to have occurred about A.D. 780.

A single Mancos Gray sherd (an initial date of A.D. 860) was recovered from Stratum I-5, the roof fall of Room 12. Mancos Gray is not common until Stratum I-6. Based on this evidence and on the quantity of Moccasin Gray found in the ruined structure, the occupation of Room 12 is estimated to date to about A.D. 850.

The ceramic collections from deposits underlying Room 12 in Stratigraphic Unit 1 (Strata I-1 through I-4) show little change from the

assemblage from the floor of Pithouse 2 other than the increased popularity of red wares (fig. 16). The percentages of Moccasin Gray consistently remain at a low level, and Chapin Gray remains the dominant utility ware. This apparently contradicts the assumption that the popularity of a ceramic type will uniformly increase following its introduction. The sudden rise in the popularity of red wares in Stratum I-1 is surprising and somewhat anomalous, as is the consistently low percentage of Moccasin Gray, which does not significantly increase in popularity until Stratum I-5. These observations suggest that the model of the changing popularity of ceramic types is at fault; or, for some reason, is not applicable to this case; or, if the low percentage of Moccasin Gray is heavily weighted, it is possible that Strata I-1 through I-4 were deposited in a fairly short period and that there is a depositional hiatus between their deposition and the construction of Room 12. The last alternative seems most likely.

In Stratigraphic Unit 2, Mancos Gray first appears in Stratum II-2. As explained previously, these sherds, having been deposited as trash soon after the roof collapsed or having been mixed into Stratum II-2 from Stratum II-4 through soil perturbation, are assumed to postdate the abandonment of Pithouse 1. The ceramics from the pitstructure floor suggest an occupation date of about A.D. 850, based primarily on the predominance of Moccasin Gray in that assemblage. The abandonment of Pithouse 1, and, therefore, at least part of the occupation of that structure, appears to coincide with the occupation and abandonment of Room 12.

The third ceramic horizon is characterized by the appearance of Cortez Black-on-white, which is dated to A.D. 890. In Stratigraphic

Unit I, Cortez Black-on-white first appears in Stratum I-8 (table 1). As explained in the stratigraphic description, Stratum I-8 appears to postdate the construction of Rooms 11 and 13, since the deposits of Stratum I-8 are piled against the walls of the two structures. Stratum I-8 may be a small midden associated with the occupation of the two structures. The presence of Cortez Black-on-white in Stratum I-8 suggests that occupation of Rooms 11 and 13 may date to as late as A.D. 890. The presence of Cortez Black-on-white in Stratum I-9, which includes the collapsed rubble of Room 13 and the midden deposits associated with the room's occupation, supports this argument.

An initial date for the occupation of these structures can be estimated on the basis of stratigraphic relationships within Stratigraphic Unit I. The abandonment of Room 12 is dated to about A.D. 860 based on the occurrence of Mancos Gray in Stratum I-6. If this date is correct, the occupational hiatus indicated by the deposition of Strata I-6 and I-7 would push the initial occupation of Rooms 11 and 13 to within the A.D. 875-880 range, which corresponds well with the archaeomagnetic date obtained for sample 12 from Room 11.

The final ceramic horizon is marked by the appearance of Mancos Corrugated at about A.D. 900. In Stratigraphic Unit I, corrugated sherds first appear in quantity in Stratum I-10 following an occupational hiatus indicated by the deposition of the sandy facies (I-9c) of Stratum I-9. This hiatus, and the relatively high frequency of Mancos Corrugated in Stratum I-10, suggests that this occupation, which includes the Occupation Area 2 and 3 use surfaces, dates to somewhat later than A.D. 900.

Subsequent use of the shelter is represented by a few isolated late Pueblo ceramic types. Both Dolores Corrugated and Mesa Verde Corrugated

sherds were present, indicating occasional use as late as A.D. 1150. The rarity of these later types, however, indicates that this latest prehistoric use of the shelter was brief and infrequent.

The most abundant of the later ceramic types is Mancos Black-on-white, which first appears in the project area at about A.D. 1000. This date correlates reasonably well with the A.D. 1050 ± 55 archaeomagnetic date obtained for Room 1. By A.D. 1000, however, there should have been a predominance of corrugated over neckbanded ceramic types. Since this is not the case in Strata I-10 and I-11, these strata appear to date to prior to A.D. 975. It is possible, however, that relatively few sherds were introduced during these late occupations when the use of the shelter appears to have been light and seasonal. If this were the case, the earlier types introduced during the later occupation as the result of disturbance might overwhelm the later material, making the total assemblage appear older than it actually is.

It seems unlikely, however, that the minimal disturbance associated with occupation of the shelter for no more than a few weeks at a time would be sufficient to introduce so large a number of earlier sherds as would be needed to account for the number and relative percentages evident in Strata I-10 and I-11. Therefore, based on the ceramic assemblages and the archaeomagnetic date from Room 1, sporadic occupation of LeMoc Shelter is estimated to have continued until about A.D. 1050/1150.

In Stratigraphic Unit II, Mancos Corrugated first appears in quantity in Stratum II-4. As previously noted, however, this stratum appears to span two temporal periods, although this was not recognized until late in the excavation of the stratum. Consequently, material from the two

periods was mixed. Stratigraphically, the lower portion of Stratum II-4 (II-4a) is largely confined to the western third of Pithouse 1. In an effort to segregate the two components of Stratum II-4, the ceramics from this area were tallied separately from the rest of the stratum. The results (table 4) conformed closely to expectations. Moccasin Gray is the dominant type in Stratum II-4a, although Mancos Gray is also present and corrugated sherds make up only a small fraction of the collection. In contrast, Stratum II-4b has over 20 percent corrugated sherds, which is similar to the frequency of corrugated sherds in Stratum II-5. The A.D. 900 date associated with the appearance of corrugated ceramics, therefore, is believed to fall at the contact of Strata II-5 and II-4b with Stratum II-4a. Tentatively then, the occupation of Rooms 11 and 13 in Stratigraphic Unit 1 can be associated with the deposition of Stratum II-4a.

Table 4. Comparison of ceramic frequencies for Stratum II-4a and Stratum II-4b deposits, LeMoc Shelter

Ceramic types	Stratum II-4a		Stratum II-4b*	
	N	%	N	%
Chapin Gray			1	1.1
Moccasin Gray	13	7.7	1	1.1
Mancos Gray	8	4.7	2	2.2
Early Pueblo Gray	127	75.1	45	50.6
Mancos Corrugated	0	0	3	3.4
Corrugated Body Sherds	4	2.4	20	22.5
Early Pueblo White†	8	4.7	6	6.7
Cortez Black-on-white	1	0.6	1	1.1
Mancos Black-on-white	1	0.6	1	1.1
Red ware	7	4.1	9	10.1
Total	169	100.0	89	100.0

* Data presented for Stratum II-4b reflects some mixing of II-4b and II-4a materials.
† Includes Piedra Black-on-white.

The Cultural Sequence

Figure 17 is a schematic summation of the stratigraphic, ceramic, and chronometric information discussed in preceding sections. These data suggest that there were four and possibly five distinct occupations (elements) at LeMoc Shelter during the Anasazi period. At A.D. 750, the earliest clearly recognizable occupation is that of Pithouse 2. Although no other deposits can be clearly associated with this occupation, Stratum IV-2 in the slope midden may also date to this period. The evidence, however, is weak. Discounting the two corrugated sherds as having been introduced by pedoturbation, the assemblage of ceramics appears to be quite early, consisting primarily of plain gray, early white, and early red wares. With the exception of one Chapin Gray sherd, however, none of the gray wares could be identified. The tentative association of Stratum IV-2 with Pithouse 2 rests on the absence of later wares, on stratigraphic position, and on the presence of Abajo Red-on-orange, a red ware that dates to between A.D. 720 and 925 in the Dolores area.

Pithouse 2 was abandoned about A.D. 780. Between that date and the next recognizable occupation period, two layers of trash, Strata I-2 and I-4, were dumped into the depression of Pithouse 2, interfingering with strata of colluvial sediments and adobe melt slumped from the walls of the pitstructure (Strata I-1 and I-3). The ceramic assemblages from these strata are quite uniform and appear to be similar to the assemblage found on the floor of Pithouse 2, except for a cumulative increase in the quantity of red ware sherds. Assuming that after its introduction at about A.D. 760, Moccasin Gray steadily increased in popularity, the apparent dominance of Chapin Gray in these strata suggests that they probably were laid down before about A.D. 820.

	STRATIGRAPHIC UNIT I	STRATIGRAPHIC UNIT II	STRATIGRAPHIC UNIT III	STRATIGRAPHIC UNIT IV
MODERN	STRATUM I-12	STRATUM II-8		
A.D. 950	STRATUM I-11	STRATUM II-7	STRATUM III-5	STRATUM IV-5
	OCCUPATION AREA 3	STRATUM II-6		STRATUM IV-4
A.D. 925	STRATUM I-10			
	OCCUPATION AREA 2/RETAINING WALL	STRATUM II-5, STRATUM II-4b		
	STRATUM I-9			
A.D. 900	STRATUM I-8 ROOM 11, ROOM 13	STRATUM II-4a		
A.D. 875	STRATUM I-7			
	STRATUM I-6	STRATUM II-3		STRATUM IV-3
	STRATUM I-5	STRATUM II-2		
A.D. 850	ROOM 12, OCCUPATION AREA I	PITHOUSE I		
	STRATUM I-4	STRATUM II-1	STRATUM III-4	
	STRATUM I-3		STRATUM III-3	
	STRATUM I-2		STRATUM III-2	
	STRATUM I-1		STRATUM III-1	
A.D. 800	PITHOUSE 2			STRATUM IV-2
A.D. 750-780				STRATUM IV-1

Figure 17. Schematic summary of probable chronological, stratigraphic, and cultural correlations among the four stratigraphic units at LeMoc Shelter.

The Strata I-2 and I-4 middens present an interesting problem. These middens were deposited after the abandonment of Pithouse 2 but before the occupation of Pithouse 1; however, none of the domiciles found at LeMoc Shelter date to this period. The most plausible explanation is that some sort of domicile had been built in Subarea 2, all traces of which were destroyed during the construction of Pithouse 1. This interpretation is, of course, purely speculative. Nevertheless, the deposition of Strata I-2 and I-4 does indicate that use of the shelter continued after the abandonment of Pithouse 2 but before the occupation of Pithouse 1; however, if the estimated dates are correct, there may have been an occupational hiatus between A.D. 820 and 840.

The second recognizable element in the sequence at LeMoc Shelter appears to be marked by the occupation of Pithouse 1, and later, of Room 12, beginning about A.D. 840 and continuing until approximately A.D. 860. This latter date is fixed for both structures by the appearance of Mancos Gray in the strata immediately overlying the ruins of those structures, while the initial dates are estimates based on the predominance of Moccasin Gray within the ruined structures themselves. The cultural deposits from Stratum II-1 and from Strata III-1 through III-4 are tentatively associated with this occupation as well, based on the similarities of their ceramic assemblages and on stratigraphic evidence that they are associated with the construction of Pithouse 1. A second short occupational hiatus appears to have followed the abandonment of these structures, as inferred from the depositional character of the sandy facies of Strata I-6, I-7, and II-3. Stratum IV-3 in the slope midden also may have been deposited during this period, since the structural

debris comprising the stratum is most readily explained as resulting from the collapse of the south wall of Pithouse 1.

The third element at LeMoc Shelter is dated to sometime between A.D. 875 and 890; the latter date is based on the appearance of Cortez Black-on-white. In Stratigraphic Unit 1, this period is marked by the occupation of Rooms 11 and 13 and by the deposition of the Stratum I-8 midden. The deposition of Stratum I-8 appears to have continued after the abandonment of these structures, since the deposit partially covers adobe melt from both the east wall of Room 11 and the south wall of Room 13. Although there is no direct evidence for it, it seems plausible that this later deposition is associated with the brief occupation of Room 11 after it was remodeled or rebuilt.

In Stratigraphic Unit II, this period is represented by trash disposal in the lower portion of Stratum II-4 (II-4a). The intercalation of midden and colluvium in Stratum II-4a, the presence of small sterile sand lenses in Stratum I-8, and the size and character of the structure being occupied suggest a marked change in the use of the shelter from year-round habitation to seasonal occupation. This impression is further supported by the fact that all of the refuse apparently was dumped within the shelter, suggesting that less space was required for the activities conducted during this period.

This occupation apparently was followed by a period of infrequent use during which the colluvial sand and ashy sand facies of Stratum I-9 were deposited. Unfortunately, no deposit in Stratigraphic Unit II can be identified to unambiguously support this hypothesis. Rather, this period appears to be associated with the deposition of a portion of Stratum II-4 that reflects the accumulation of sand in only a part of the depression.

When trash was dumped there again during Element 4, the interfingering of midden and colluvial deposits typical throughout Strata II-4 and II-5 masked this specific event.

Element 4 includes Occupation Area 2, the retaining wall, Stratum I-10, and Occupation Area 3. As discussed earlier, the occupations after A.D. 900 are difficult to date precisely since no clear ceramic marker is available for bracketing these later deposits. However, if A.D. 1050/1150 is accepted as a terminal date for Anasazi use of the shelter, as was argued earlier, it should be possible to estimate dates for the last two elements by assuming a steady increase in the popularity of corrugated ceramics after their appearance at A.D. 900.

In Stratigraphic Unit 1, the abandonment of Rooms 11 and 13 is dated to about A.D. 890. By the time of the occupation marked by Stratum I-10, corrugated sherds accounted for about 12 percent of the total ceramic collection. In Stratigraphic Unit 2, this occupation is associated with Strata II-4b and II-5. Corrugated sherds constitute about 20 percent of the combined ceramic collection from these deposits. If the percentage of corrugated sherds is assumed to have been between 1 and 5 percent at A.D. 900 and between 60 to 70 percent by A.D. 1000, a date range between A.D. 920 and 930 is suggested for the Element 4 occupation.

Element 4 marks a second decrease in the frequency and intensity of the shelter's occupation. The only architectural feature associated with this element is the retaining wall built across the front of the shelter. Initial occupation during this period is marked by a use surface (Occupation Area 2, Surface 1) at the base of Stratum I-10, which is at about the same level as the basal course of the retaining wall. Several pits and slab-lined fireplaces originated at several different levels within

Stratum I-10. A second use surface (Occupation Area 3), preserved near the interface between Strata I-10 and I-11, probably marks the last occupation during this element. During this time, LeMoc Shelter probably was occupied for no more than a few weeks at a time and by fairly small groups. Since the locality had been abandoned by this time, it seems likely that the shelter was used as a resource procurement camp by people who were settled in the McPhee Village area located approximately 7 km south of LeMoc Shelter. The cave was probably used seasonally during this time.

The final element (Element 5) at LeMoc Shelter is marked by a few scattered hearths and artifacts within Stratum I-11 and by some light trash disposal in Strata II-6, II-7, and III-5. During this period, the shelter seems to have been used sporadically as a campsite, probably for no more than a few days at a time. Using the same rationale as that used to estimate a date for Stratum I-10, the occupation represented by the deposition of Stratum I-11 would date to between A.D. 930 and 950 based on the 18 to 29 percent of corrugated sherds in these strata. This corresponds well with the latest occupations of the McPhee area and the abandonment of the project area by the Anasazi. The archaeomagnetic date of A.D. 1050 for Room 1 and the presence of small amounts of later Anasazi ceramic types at the shelter suggest that this pattern of usage may have continued at a very low level until A.D. 1050, with infrequent use of the shelter as late as A.D. 1150. It seems likely, however, that after A.D. 950 use of the shelter was a rare occurrence.

The occupational history of LeMoc Shelter mirrors, in microcosm, the changing settlement system in Grass Mesa Locality. In terms of DAP temporal systematics (Kane 1981a), the Element 1 remains at LeMoc Shelter

are most characteristic of the late Sagehill Subphase (A.D. 700-780), although some Element 1 strata deposited subsequent to the abandonment of Pithouse 2 may date to as late as A.D. 820, which corresponds to the Dos Casas Subphase (A.D. 760-850). Element 2 is assigned to the late Dos Casas and early Periman Subphases (the latter corresponds roughly to the A.D. 850-900 time period), and Element 3 is assigned to the Grass Mesa Subphase (A.D. 880-925). The Cline Subphase (A.D. 900-975) is represented at LeMoc Shelter by Elements 4 and 5, although, based on the late Puebloan ceramics recovered from Stratum I-11 and on the archaeomagnetic date of A.D. 1050 for Room 1, occasional use of the shelter during Element 5 appears to have extended into the early Marshview Subphase (A.D. 1050-1125) as well. In terms of the Pecos classification, Elements 1, 2, and 3 fall within the Pueblo I period, and Elements 4 and 5 correspond to the Pueblo II period, with some overlap, in the case of the latter, into the early Pueblo III period.

ARCHITECTURE AND OTHER FACILITIES

This section describes the architecture and other cultural features associated with each element recognized at LeMoc Shelter. Although the primary purpose of the section is to describe the cultural units at the site, an effort is made to determine the aboriginal use of each unit and, through these interpretations, to determine the range of activities performed at LeMoc Shelter. Whenever possible, the evidence provided by portable artifacts found in association with the features is used as supplementary data. Finally, the relationships among the structures, features, and artifact distributions are used to reconstruct, as fully as possible, the spatial organization of activities within the confines of the shelter.

The Roomblock and Associated Facilities

Discussion of the temporal provenience of the roomblock has been deferred until now because it is the architectural detail, rather than stratigraphy or ceramics, that provides the most reliable evidence for dating this group of structures. Stratigraphically, the material mantling the roomblock is continuous with Strata I-12, II-8, and II-9. In fact, the presence of perishable material in these strata strongly suggests that they were originally part of the roomblock fill. Given the pattern of water flow and seepage within the shelter, the only sediments likely to remain dry enough to preserve organic materials would be those overlying the breccia foundation of the roomblock. Strata I-12 and II-8, and much of the material in Area 5, therefore, must have been recently redeposited in their current positions. As suggested earlier, this redeposition is

believed to have been the result of periodic looting of the shelter; therefore, the stratigraphic position of the roomblock fill provides little information concerning the age of the roomblock.

Despite the fact that the fill of the roomblock has been badly disturbed, the total ceramic assemblage from this material seems consistent with the depositional sequence evident in Stratigraphic Unit I. Approximately 15 percent of the collection consists of corrugated sherds, which suggests that part of the roomblock fill accumulated during the final elements of the cave's occupation. Since almost all of the sediments in the roomblock are spoil dirt, however, this assignment applies only to the artifacts themselves; it does not date the roomblock. Therefore, the architectural details of the rooms provide the only means of dating the roomblock. Similarly, functional interpretations must be made exclusively from architectural evidence.

The roomblock is composed of 10 rooms arranged in two tiers (fig. 18). Five of the rooms were built atop a breccia platform near the back of the rockshelter. The remaining rooms are arrayed in an arc in front of the platform, using its face for their rear walls. Rooms are numbered from west to east beginning with the lower (front) tier.

The rooms are generally square to rectangular in outline, with an average area of about 2.8 m^2 (table 5). The floor of each room is the base of a depression dug into the cave breccia; the floors range in depth from a few centimeters to over half a meter below modern ground surface. In the lower tier of rooms, the face of the breccia platform was shaped to form the lower part of the rear walls and, to some extent, the side walls of the rooms. The lip of cave breccia around the perimeter of each room probably served as a footing for the walls. From the fragments of

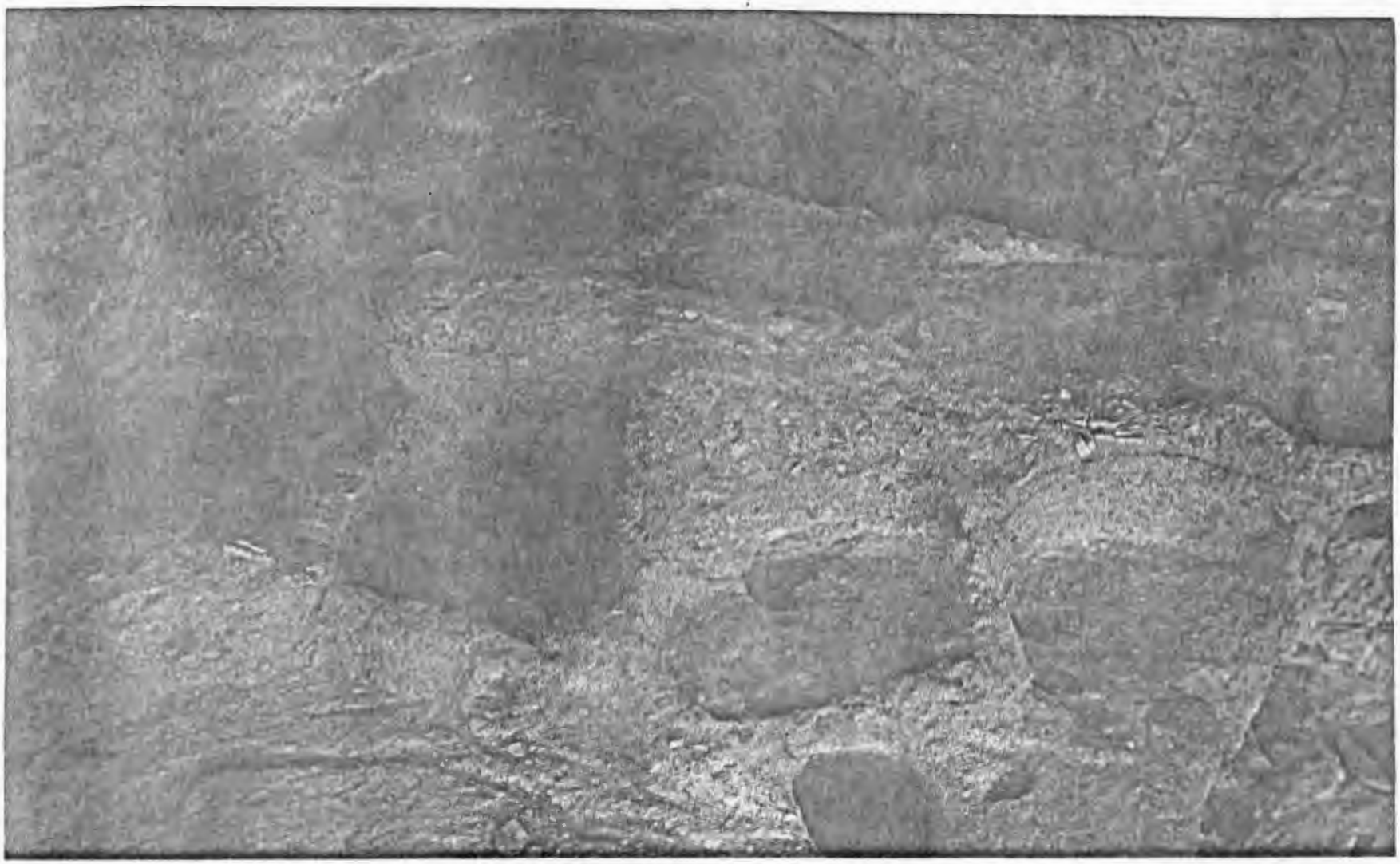


Figure 18. Overhead view of roomblock after excavation, LeMoc Shelter (DAP 015015).

building material noted during excavation, it appears that these walls were constructed of adobe with a binder of coarsely chopped grass and cornstalks. Some fragments of sandstone were incorporated into the adobe matrix, but no evidence of coursed masonry was observed. Although the walls of the rooms are believed to have been contiguous, most had been destroyed and were no longer visible; therefore, only the floors of Rooms 1 through 10 are shown in figure 19.

Table 5. Dimensions of Rooms 1 through 10, LeMoc Shelter

Room No.	Length (east-west) (m)	Width (north-south) (m)	Area (m^2)
1	2.30	2.15	4.94
2	1.72	1.60	2.75
3	1.90	1.15	2.18
4	1.85	1.30	2.40
5	1.35	Only 10 cm remaining	
6	2.05	2.05	4.20
7	1.75	1.34	2.34
8	1.85	1.50	2.77
9	1.70	1.60	2.72
10	2.90	1.25	3.63

The limited load-bearing strength of the type of wall used in the roomblock would have necessitated an interior roof support system; however, no consistent pattern is indicated by the postholes. The roof of Room 1 (fig. 19) was supported by four posts, one in each corner of the room. A fifth posthole just south of the center of the room was probably added later to support a sagging portion of the roof. The roofs of Rooms 2, 3, 4, and possibly 5 may have been supported by a frame of upright posts and crossbeams in the front that supported leaners socketed into the top of the rear wall. Unfortunately, erosion of the cave breccia has made it impossible to tell whether or not socket holes had, in fact, been dug into the face.

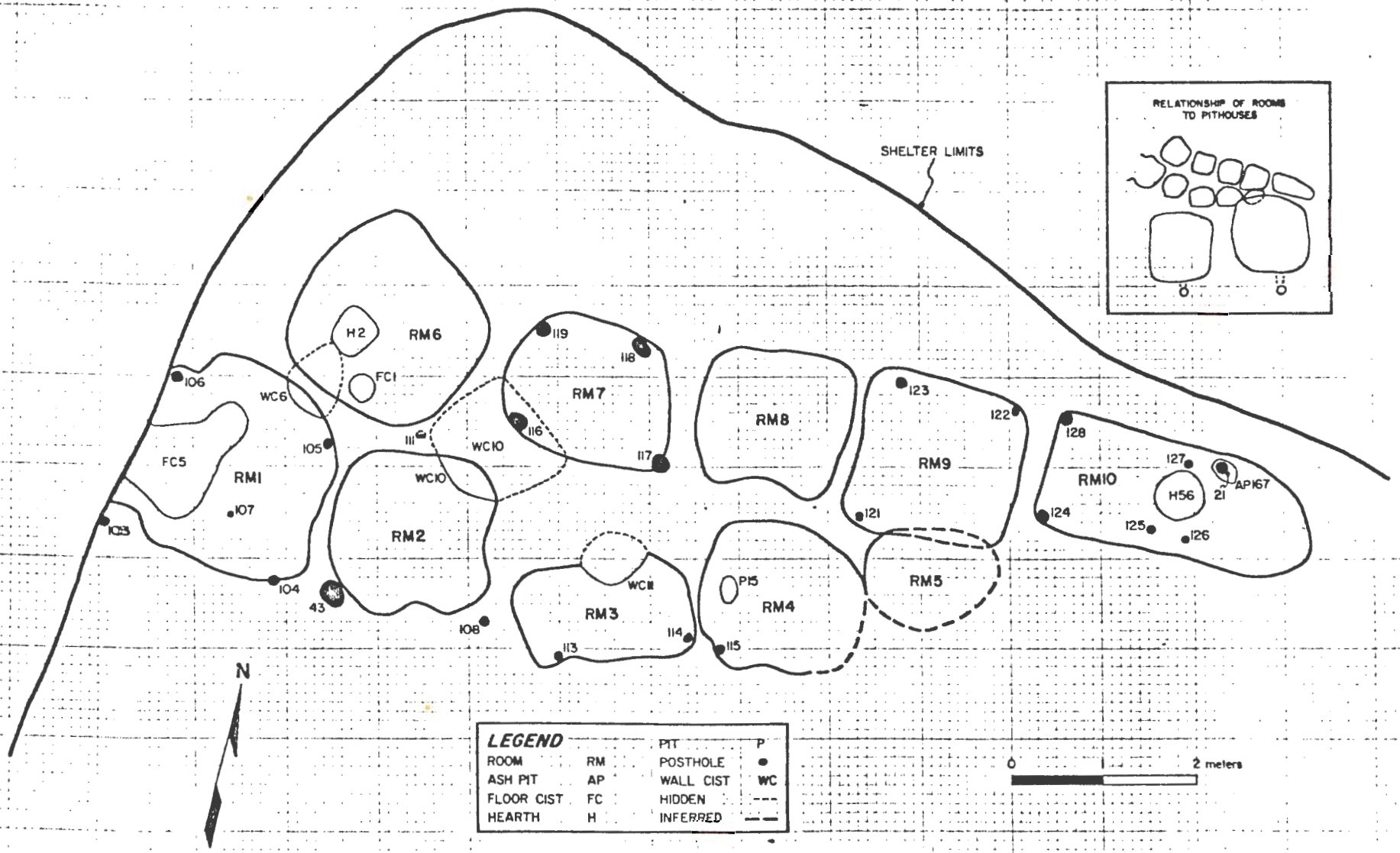


Figure 19. Plan map of roomblock (Rooms 1 through 10), LeMoc Shelter.

On the upper tier, Room 6 had no interior supports. The absence of postholes in Room 8 suggests that Rooms 7, 8, and 9 might have been roofed as a unit. Support for the roof could have been provided by posts in each corner of Rooms 7 and 9.

Surfaces were defined in all 10 rooms, although no artifacts were found in direct association with the surfaces. With the exception of the floors in Rooms 1 and 10, and a small portion of the floor in Room 2, all of the floors had been prepared, usually by means of spreading a layer of adobe over the breccia into which the rooms had been excavated.

The small size of the rooms and the techniques apparently employed in their construction suggest an early date for the roomblock. The roomblock at LeMoc Shelter closely resembles those of Sagehill Subphase sites in the DAP area, although surface rooms at most sites of this period tended to be less formally arranged and more widely spaced than the rooms at LeMoc Shelter. However, the limited space available within the shelter and the tendency of the builders to make maximum use of the structural properties of the cave breccia undoubtedly would have constrained the pattern in this instance. Tentatively, then, the construction of the roomblock is associated with the occupation of Pithouse 2. Support for this correlation is provided by the relationship of Rooms 4 and 5 to Pithouse 1. As will be discussed later, the southeast corner of Room 4 and most of Room 5 appear to have been destroyed by the construction of Pithouse 1. Consequently, at least these two rooms must predate the construction of Pithouse 1 during Element 2.

The general similarity of all the rooms suggests that they were built at about the same time. Most of the roomblock probably continued to be

used during Element 2 (the occupation of Pithouse 1) and possibly during Element 3. By Element 4, however, the nature of the occupation was such that few storage facilities were required. During the later occupations at LeMoc Shelter, the floors of the rooms probably served as open work areas, and a mantle of loose fill and rubbish gradually accumulated. It is this deposit that ultimately became the principal target of pothunters visiting the shelter. The small amount of structural debris in the roomblock suggests that the floor surfaces had been cleared of fallen wall and roofing material in order to open this area for use.

Room 1

The floor of Room 1 had been excavated roughly 20 cm into the cave breccia, leaving a shelf as a support for the south wall and a wide ridge as a support for the east wall. The north wall, which now stands 1.1 m high, was shaped from the breccia face. The bedrock of the shelter was used for the west wall. Bedrock also makes up the northwest quadrant of the floor, while the rest of the floor is a pale brown sand.

As shown in figure 19, the western half of the floor is dominated by a large, two-lobed floor cist (Feature 5). The southern lobe is irregular in plan and measures roughly 95 cm in diameter and 30 cm in depth. The west wall and base of this lobe are bedrock; the north and south walls are cave breccia; and the east wall consists of the sandy stratum that underlies most of the floor. Several small sandstone slabs were embedded along the eastern lip of the cist, possibly to reinforce the sandy sediments.

The north lobe, which appears in plan as an extension from the northeast edge of the south lobe, is approximately 45 cm in diameter and 47 cm deep. The difference in depth between the two lobes and the overall

regularity of the north lobe profile suggest that the north lobe was an earlier, circular floor cist that was incorporated into the later feature.

A second cist (Feature 6) had been dug into the room's north wall. This wall cist measures 85 cm long, 55 cm wide, and 60 cm deep. Plaster remnants on either side of its opening suggest that it once had an adobe collar, which possibly facilitated the sealing of the aperture. Aside from the cists, the only other features in Room 1 are five postholes, one in each of the corners (Features 103, 104, 105, and 106), and one in the south-central part of the floor (Feature 107).

Room 2

Room 2, a bowl-shaped depression cut into the cave breccia to the east of Room 1 (fig. 19), is roughly 60 cm deep. As in Room 1, the north wall is the face of the breccia platform. Shaped ridges of cave breccia appear to have been the supports for the other walls. A worn, plastered surface midway along the ridge between Rooms 1 and 2 suggests that there was an opening between these structures.

Room 2 is dominated by a large wall cist (Feature 10) in the northeast corner of the structure. The cist is oval to rectangular in plan and measures about 166 cm long, 121 cm wide, and 95 cm high. The cist opening is a triangular aperture approximately 91 cm wide at floor level, and 61 cm high. Remnants of daub around its perimeter suggest that at some point the opening may have been sealed. A small posthole (Feature 111) extending horizontally into the face of the breccia wall, may be associated either with the cist or with the roof support system. Postholes (Features 43 and 108) for roof supports were found near the southeast and southwest corners of the floor, just outside the limits of the room. As discussed earlier, this suggests that the roof was

constructed with the horizontal members socketed into the top of the north wall and supported by a cross beam laid between posts in each of the southern corners.

Room 3

Room 3 (fig. 19) was also dug into the cave breccia, in this case to a depth of 5 to 35 cm. The north wall was shaped from the face of the breccia platform, and breccia ridges were left as supports for the other walls. Postholes in the southwest and southeast corners of the room (Features 113 and 114, respectively) suggest a roof similar to that of Room 2. Other than the postholes, the room's only feature is an oval wall cist (Feature 11) in the north wall. The cist is roughly 43 cm deep with an opening that measures 70 by 60 cm.

Room 4

Room 4 (fig. 19) conforms to the same general plan as the other rooms on the lower tier. However, only one posthole (Feature 115) remains; this posthole is located in the southwest corner of the room. In the southeast corner of the room, the floor is truncated by Pithouse 1, suggesting that this corner was cut away, either by the construction or collapse of the pithouse. It therefore seems reasonable to assume that a second posthole might have been destroyed.

The second feature in Room 4 (Feature 15) is a small, saucer-shaped pit in the floor near the west wall. The feature is 32 cm long, 26 cm wide, and 15 cm deep. It was filled with what appeared to be sterile, colluvial sand overlying a thin lens of fine-grained sediments that contained several fragments of unburned corn kernels. The feature seems too small to have been used for storage; it may have been a pot rest or, as suggested by the presence of the corn, a receptacle for meal as corn was ground.

Room 5

The existence of Room 5 (fig. 19) is largely inferred from a characteristic scalloping and smoothing of the breccia face to the east of Room 4 that is identical to the contouring of the north walls of the rooms in the lower tier. An irregular shelf below the contoured face appears to be a remnant of the floor. It seems likely that Room 5, like the southeast corner of Room 4, was destroyed when Pithouse 1 was built. The breccia face below the floor remnant is broken and irregular, and there are several vertical furrows that may be the marks left by digging sticks as the breccia was dug away during the aboriginal excavation of the pitstructure.

If this interpretation is correct, Room 5 provides additional evidence that the roomblock was originally constructed during Element 1. Furthermore, if the encroachment of the pitstructure into Room 4 dates to the same period as the destruction of Room 5, then Room 4 also must have fallen into disuse, since the removal of one of the main roof supports would have ruined its structural integrity.

Room 6

Room 6 (fig. 19) is a saucer-shaped basin, 30 cm deep, that was cut into the top of the breccia platform near the west wall of the shelter. A hearth (Feature 2) is located slightly south and west of the center of the floor. This hearth is a shallow, oval depression, 62 cm long, 58 cm wide, and 15 cm deep. A second feature, a small, bell-shaped floor cist (Feature 1), is located near the southern margin of the room. The cist flares from approximately 30 cm in diameter at its opening to 40 cm at the bottom, approximately 65 cm below floor level. The presence of the hearth suggests that Room 6, unlike the rooms previously discussed, might have been a food preparation area rather than a storeroom.

There is no evidence for an interior roof support system in Room 6, suggesting that the roof was directly supported by the walls. An alternative hypothesis is that the area was never enclosed. Room 6 is located in the most protected part of the rockshelter, and because the area was not used for storage, a roof might have been superfluous. Unfortunately, there is no compelling evidence to favor either interpretation.

Room 7

Room 7, located east of Room 6, is roughly rectangular in plan (fig. 19). The floor had been cut 15 to 20 cm into the top of the breccia platform leaving the characteristic lip on the north, south, and west as footing for the walls. Postholes are present in each of the corners (Features 116, 117, 118, and 119), and a 3-cm-deep depression on the breccia ridge near the northwest corner of the room also may have served to socket a roof support post (the latter was not assigned a feature number). No other features are present.

Room 8

Room 8 is similar in form to Room 7, although it lacks any evidence of an interior roof support system (fig. 19). Interestingly, there is no ridge of cave breccia separating Rooms 7 and 8. Rather, there is an abrupt but rounded slope from the floor of Room 7 to the floor of Room 8. This suggests that although the two surfaces are readily distinguishable, they may not have been separated by a wall.

Originally, two features were defined in Room 8. These were irregular depressions in the central area of the floor. Both were filled with an ashy sediment, and in both some oxidation of the cave breccia was noted. However, the irregularity of the outlines of these depressions and

the roughness of their interior walls suggest that these were not aboriginal features of the room. Further, all of the fill in Room 8 was spoil dirt, and it is unlikely that any aboriginal sediments in these shallow depressions would have remained in situ given that degree of disturbance. For these reasons, the depressions and the fires built in them are believed to be modern. Room 8, consequently, appears to be devoid of any aboriginal features.

Room 9

The floor in Room 9, like the floors in Rooms 7 and 8, had been excavated into the breccia platform, leaving a ridge as footing for the walls (fig. 19). The room's only features are three postholes, one each in the southwest, northeast, and northwest corners (Features 121, 122, and 123, respectively). The southeast corner of the room has spalled off, but presumably there was a posthole there as well. The average diameter of the postholes is approximately 7 cm, making it doubtful that these posts were the sole support for the roof. The problem is complicated by the absence of any interior roof supports in the adjacent Room 8. Assuming that the adobe walls did not support the full weight of the roof, the roof of Room 8 would had to have been partially supported by the interior frameworks of Rooms 7 and 9. This would be particularly critical if, as is typical of surface structures during this period, entry into the rooms was through the roof.

Room 10

Room 10 (fig. 19) occupies something of a "split-level" position in relation to the rooms in the upper tier. It is situated on a breccia shelf at the east edge of the roomblock, approximately 1 m below the level of the floor in Room 9. Postholes are present in the northwest and

southwest corners of the room (Features 128 and 124). Four other postholes (Features 21, 125, 126, and 127) are arrayed in a rectangle enclosing a circular, basin-shaped hearth (Feature 56) located near the center of the room. The hearth is 57 cm in diameter and 5 cm deep. The position of the four grouped postholes in relation to the hearth makes it unlikely that they are part of any roof support system. Rather, they are interpreted as supports for some type of frame that would have been placed over the hearth, possibly for use in smoking meat or hides. The northeastern posthole in the group (Feature 21) shows some evidence of secondary use after the removal of the post. The hole was enlarged, forming a roughly oval pit, 33 cm long, 22 cm wide, and 20 cm deep. This enlarged pit was designated Feature 167. A lens of ash was found in the bottom of the pit and some fire-reddening of the walls was evident. This suggests that the feature may have been used as an ash pit or warming pit after the framework over the hearth was dismantled.

Although the activities just discussed seem incompatible with an indoor setting, remnants of plaster on the north wall indicate that the area was once enclosed. It seems likely, therefore, that the enclosure of the room predates the final use of the area for the hypothesized activities. One possibility is that Room 10 was originally larger but, like Room 4, was partially destroyed by the construction of Pithouse 1. Alternatively, the room may originally have been smaller than the observed use surface. The easternmost postholes (Features 21 and 126) may have been dug initially for roof supports posts and may have been paired with the postholes in the western corners of the room (Features 124 and 128). The second hypothesis seems to more plausibly account for the location of the observed postholes. The presence of the posthole in the southwest

corner would be particularly difficult to explain if Room 10 had originally been larger. If Room 10 had originally been smaller, however, it is clear that the hearth must postdate the dismantling of the walls enclosing this surface. The breccia shelf on which Room 10 is built is little more than 1 m wide. Given the position of the hearth, slightly more than 1 m^2 of floor space would have been available in the enclosed structure, too little space for any sustained activity. Since the only convenient access to the surface was from the south, it could have been usable as an open work area only during three periods: before the construction of Pithouse 1, while the roof of Pithouse 1 was intact, and after the pithouse depression had almost completely filled.

As discussed earlier, the construction and maintenance of the roomblock as a storage facility was probably limited to Elements 1 and 2, the occupation periods of Pithouses 2 and 1, respectively. The enclosure of Room 10 most likely dates to one of these elements. Reuse of the surface as an open work area, therefore, must date either to Element 2 or to the last aboriginal occupation of the shelter, Element 5; use during Elements 3 and 4 would have been difficult because the Pithouse 1 depression was not yet filled, impeding access to Room 10.

Features 129, 130, and 131

Features 129, 130, and 131 are three large cists that had been dug into the cave breccia immediately to the north of Room 6 (fig. 20). The largest of these (Feature 130) is oval, measuring 150 cm long, by 75 cm wide, and 50 cm deep. This cist was constructed around an earlier cist (Feature 131) dug slightly to the north. This second cist is circular, 80 cm in diameter, and 90 cm deep. The cave breccia in this area of the shelter is unusually friable, and it appears that the oval cist was

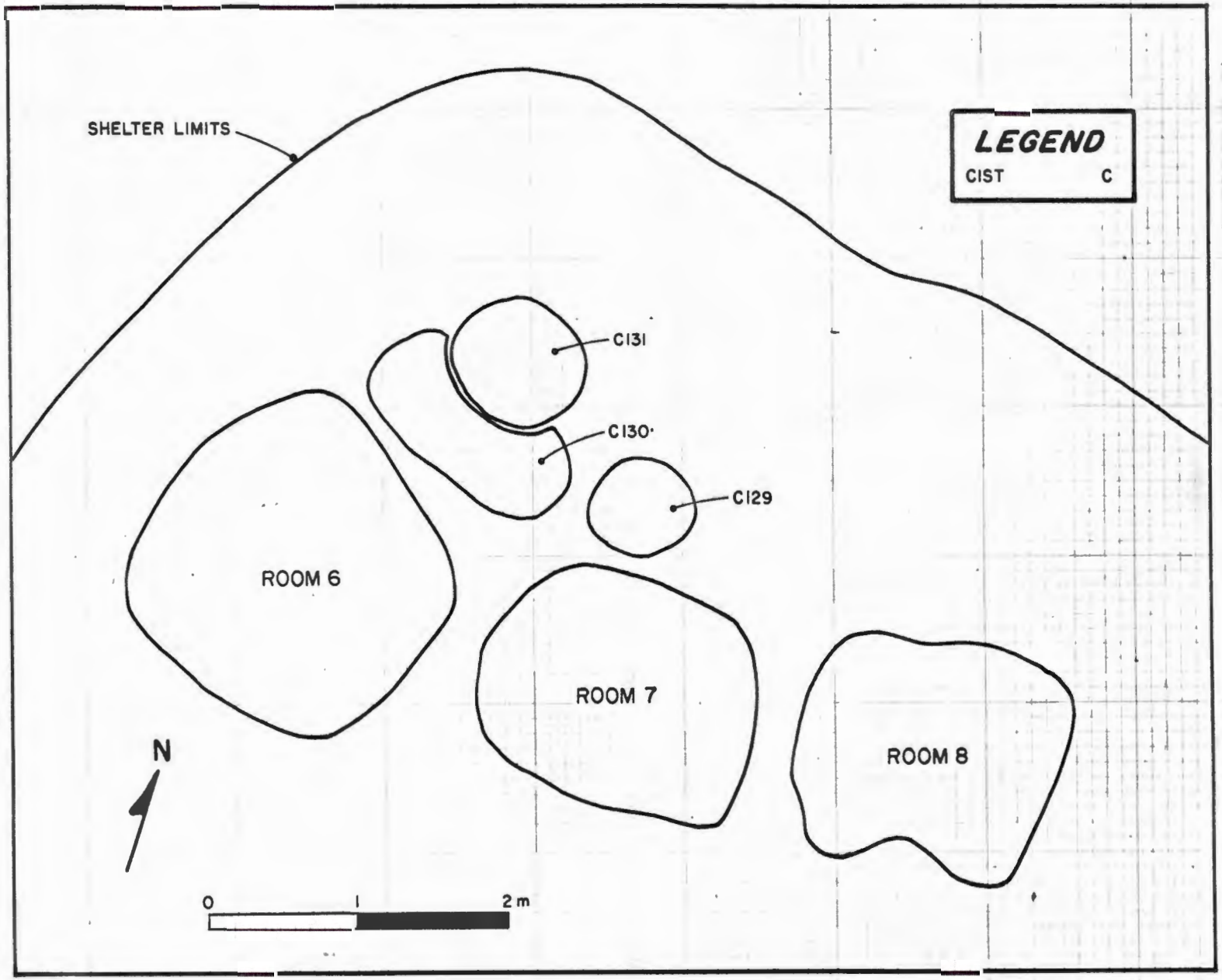


Figure 20. Plan map of Features 129 (cist), 130 (cist), and 131 (cist), LeMoc Shelter.

constructed around the circular cist after the latter had collapsed. The third cist (Feature 129), slightly to the east, is also circular, measuring 70 cm in diameter and 80 cm deep.

Like roomblock fill, the fill of these cists was spoil dirt; consequently, no clear determination can be made as to their function or probable date of construction. Lacking any dating evidence, it is assumed that, since the cists are similar to features within the rooms, they are roughly contemporaneous with the roomblock. Moreover, their proximity to Room 6 suggests that they may be associated with the use of that structure, possibly for short-term storage of foodstuffs or other materials.

Occupation Area 1

Occupation Area 1 (fig. 21) is an adobe surface lying immediately to the south of Rooms 3 and 4. The surface (Surface 1) is roughly triangular in plan, with the base of the triangle abutting the breccia ridge marking the south wall of the roomblock. The length of this side is approximately 2.3 m. The surface extends 1.3 m to the south onto the breccia balk separating the two pitstructures; the apex of the triangle is located at the northeast corner of Pithouse 2. The edge of the surface nearest Pithouse 1 is badly eroded, but it seems likely that Occupation Area 1 originally spanned the entire balk.

The dominant feature of Occupation Area 1 is a large, circular cist (Feature 25) that measures 101 cm long, 87 cm wide, and 117 cm deep; the feature is associated with the Element 2 occupation. The lower 65 cm of fill in the cist is an undisturbed postoccupational accumulation of colluvial sand and adobe melt. On the upper surface of these sediments is a slab-lined fireplace (Feature 166) filled with a mixture of sand and

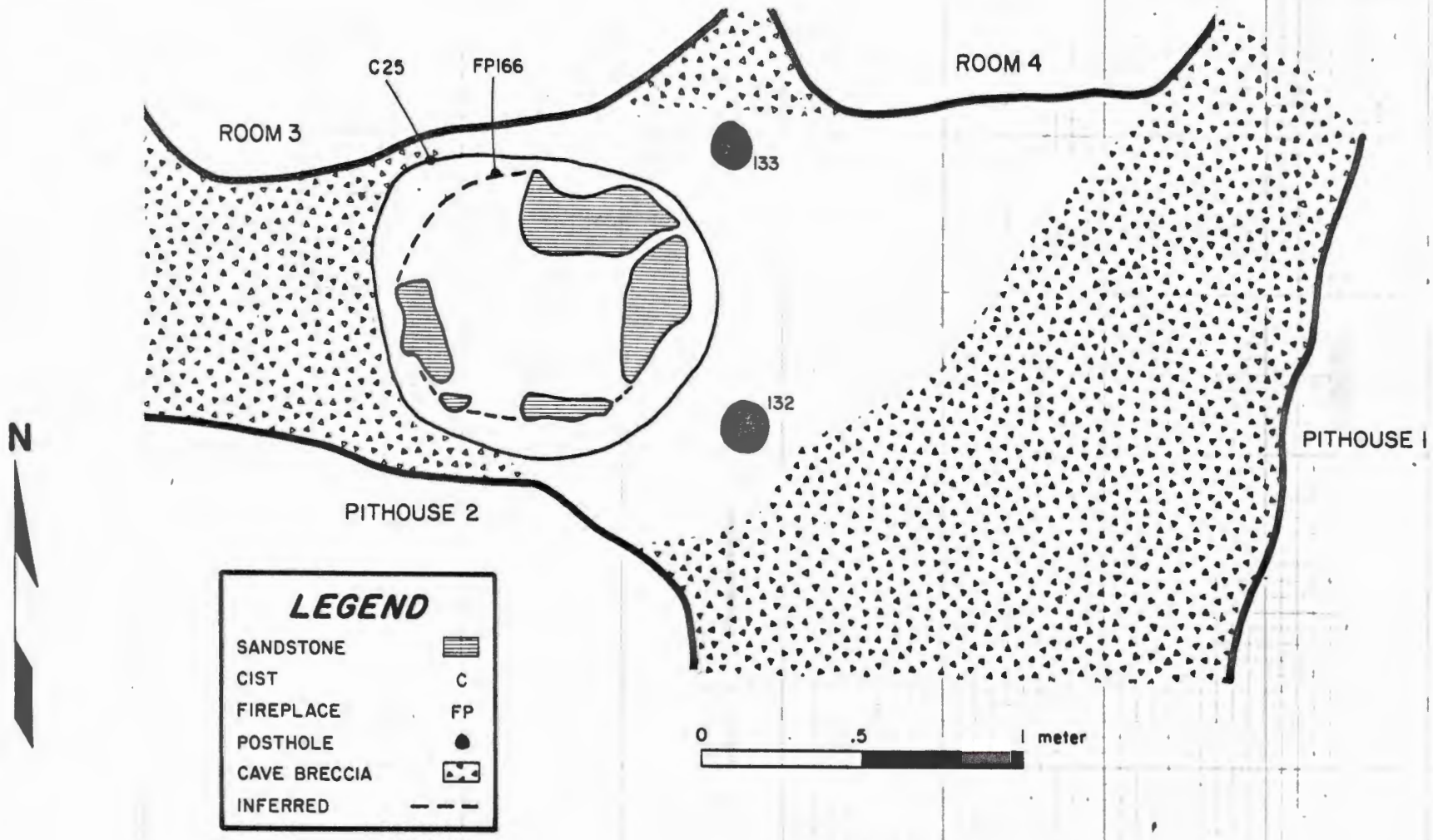


Figure 21. Plan map of Features 25 (cist), 132 (posthole), 133 (posthole), and 166 (fireplace) in Occupation Area 1, LeMoc Shelter. Refer to text for a description of occupation area boundaries. Feature 166, a fireplace located within Feature 25, is associated with a later occupation (Element 5).

charcoal and overlain by Stratum I-11 sand. This fireplace, which measures 60 cm long, 35 cm wide, and 25 cm deep, is associated with the Element 3 occupation of the site. Above Feature 166 is a 10-cm-thick stratum of colluvial sand, colored with ash, that sealed the underlying deposits. The remainder of the fill is spoil dirt, a part of Stratum I-12, which mantles the entire surface of Occupation Area 1.

Only 12 of the 66 sherds recovered from the nondisturbed sediments in the cist (Feature 25) were identifiable to type: 7 of these are Moccasin Gray, and the remaining 5 are Mancos Gray. Although any date based on such a small sample must be suspect, it is nevertheless the only dating evidence available. Since Mancos Gray is present, and because all of these sherds were recovered from postoccupational fill below the fireplace (Feature 166), use of the cist as a storage facility must date prior to A.D. 860. Furthermore, since no corrugated sherds were found in the fill of the fireplace or in the ashy sand overlying it, the fireplace must have been in use sometime between A.D. 860 and A.D. 900-910. Initial construction of the cist is clearly associated with the use of Occupation Area 1; consequently, A.D. 860 is also accepted as a terminal date for the construction of the occupation area. An estimate of an early bracketing date can be made by examining the relationship of Occupation Area 1 to Room 4.

The southern boundary of Room 4 is defined by a remnant ridge of cave breccia adhering to the west wall of the room. By analogy with the other rooms, it is assumed that the ridge originally extended across the front of the room, completely enclosing the floor. Part of the ridge was undoubtedly destroyed when the southeast corner of the room was demolished. As discussed, this event may be tied either to the construction or abandonment of Pithouse 1. Between this area of collapse and the remnant

of the south wall footing, there is a gap slightly less than 1 m wide where the ridge has been obliterated.

In this gap, the surfaces of Occupation Area 1 and the floor of Room 4 are continuous, although the average level of Occupation Area 1 is a few centimeters lower than the floor of Room 4. This suggests that, after the destruction of Room 4, Occupation Area 1 and the floor of Room 4 served as an open activity area, postdating the construction of Pithouse 1 at about A.D. 840. Since the abandonment of Pithouse 1 correlates ceramically with the estimated terminal date for use of Feature 25 as a storage cist, Occupation Area 1 is tentatively associated with Element 2. The fireplace in the cist, however, is associated with Element 3, indicating continued use of the area during this period.

Two postholes were found in Occupation Area 1. One (Feature 133) is located approximately 20 cm northeast of the cist, adjacent to the breccia ridge at the perimeter of the surface; the other (Feature 132) is located approximately 80 cm south of the first. In the absence of any other evidence, some type of post-supported framework can be inferred, but its form and function remain unknown.

Summary

In the preceding discussion of the roomblock, it has been argued that the rooms were initially constructed during Element 1, the time during which Pithouse 2 was occupied. Apparently, most of the rooms continued to be used during the occupation of Pithouse 1 (Element 2), although part of Room 4 and almost all of Room 5 were probably destroyed during the construction of Pithouse 1. Some of the rooms may have been used during Element 3, but after A.D. 900 it is doubtful that any of the surface structures were maintained. The absence of structural debris from the

roomblock, however, suggests that the breccia platform was cleared and used as an open work area.

Functionally, the lack of floor features other than pits and cists in the roofed rooms suggests that the roomblock served primarily as a storehouse. However, Room 6 is believed to have been used principally for food preparation, and during Element 2, Occupation Area 1 and the floor of Room 4 seem to have been used as an open work area. After the partial destruction of Room 10, which also may be associated with the construction of Pithouse 1, the floor of this room may have been used as an open activity area for the drying of meat, the preparation of hides, or for some other activity requiring a pole framework associated with a hearth. The remains associated with these activities cannot be precisely dated but must have been deposited either during Element 2 or Element 5.

Element 1

Pithouse 2

Dimensions:

North wall	
length:	4.40 m
height:	1.70 m
South wall	
length:	3.80 m
height:	0.95 m
East wall	
length:	4.25 m
height:	1.20 m
West wall	
length:	4.00 m
height:	not measured

Pithouse 2 (fig. 22) is a relatively large structure with a floor area of roughly 21 m^2. The floor is approximately 1.7 m below aboriginal ground surface. As indicated earlier, the structure is believed to have been

occupied between A.D. 750 and 780, making it the earliest documented occupation of the shelter. Although time limitations during excavation permitted only limited subfloor testing, no evidence was found to suggest either multiple occupations or extensive remodeling.

Construction. Pithouse 2 was dug into the cave breccia in the western half of the shelter. The north wall of the pithouse (fig. 22) is undercut so that the base of the wall is roughly 45 cm out of plumb with the top of the wall (fig. 23). The east wall exhibits this same belling but to a lesser degree. On the average, its base is 10 cm out of plumb. Seventeen small postholes, averaging 10 cm in diameter, were dug into the floor at the base of both of these walls (Features 147 through 163); these postholes may have served as shoring or auxillary support for this portion of the wall.

The west wall of the pithouse slopes outward from the floor. As discussed earlier, this seems to have been caused by the repeated slumping of the cave breccia from the sloping bedrock after the pithouse was abandoned. No postholes were spaced along the base of this wall.

Unlike the other three walls, the south wall is backed by compact, colluvial sediments. It is nearly vertical with no evidence of shoring or auxillary support. Both the west and south walls might have been plastered with adobe when the structure was in use, however.

The roof support is a typical four-post system (fig. 24). The northwest main support posthole (Feature 90) is located roughly 90 cm from the west wall and 65 cm from the north wall. It is 22 cm long, 18 cm wide, and was cut 42 cm into the bedrock underlying the floor in this quadrant. The northeast posthole (Feature 91) is 27 cm long, 23 cm wide, and was dug 82 cm through compact sand to bedrock. This posthole is located approximately 80 cm south of the north wall and 45 cm west of the

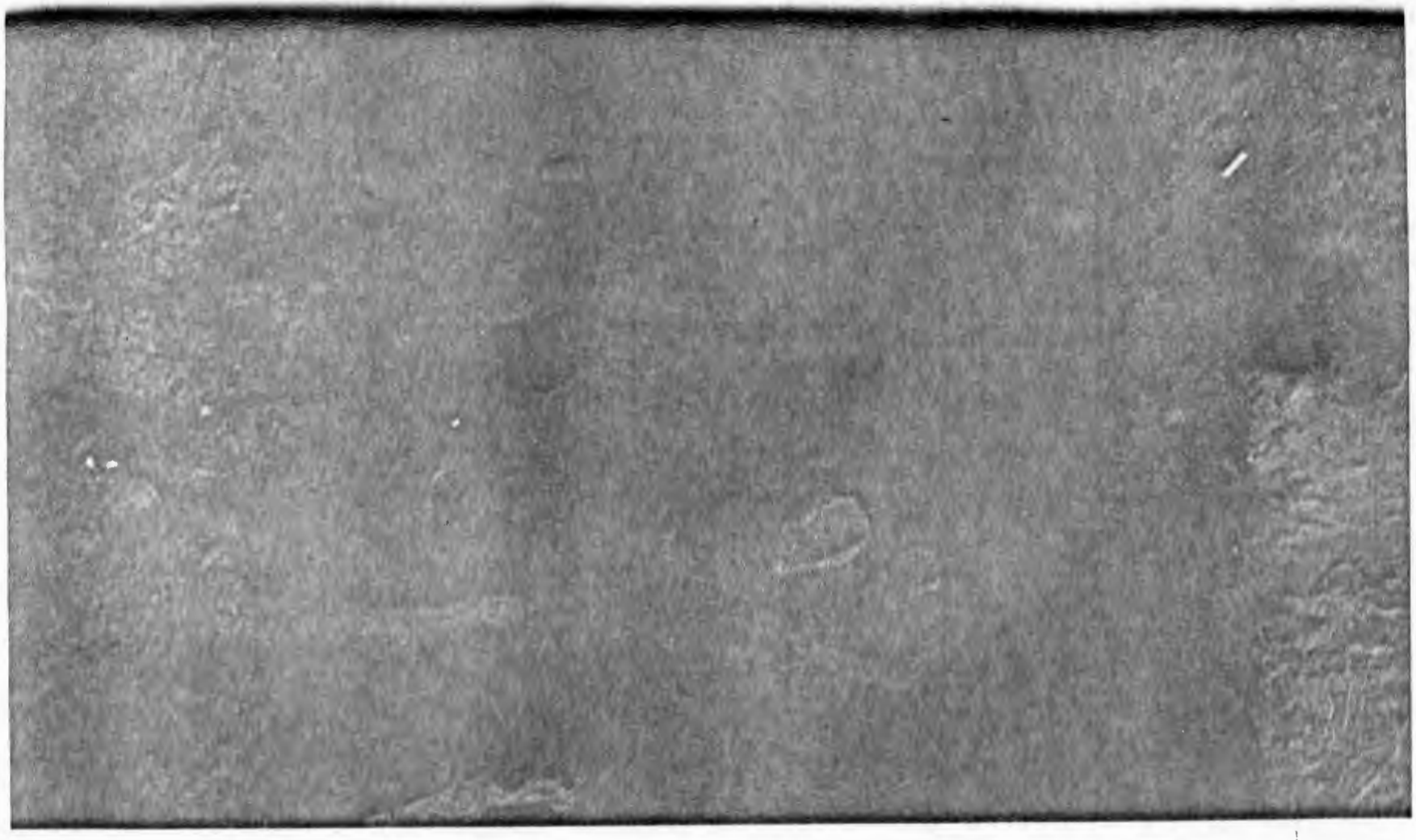
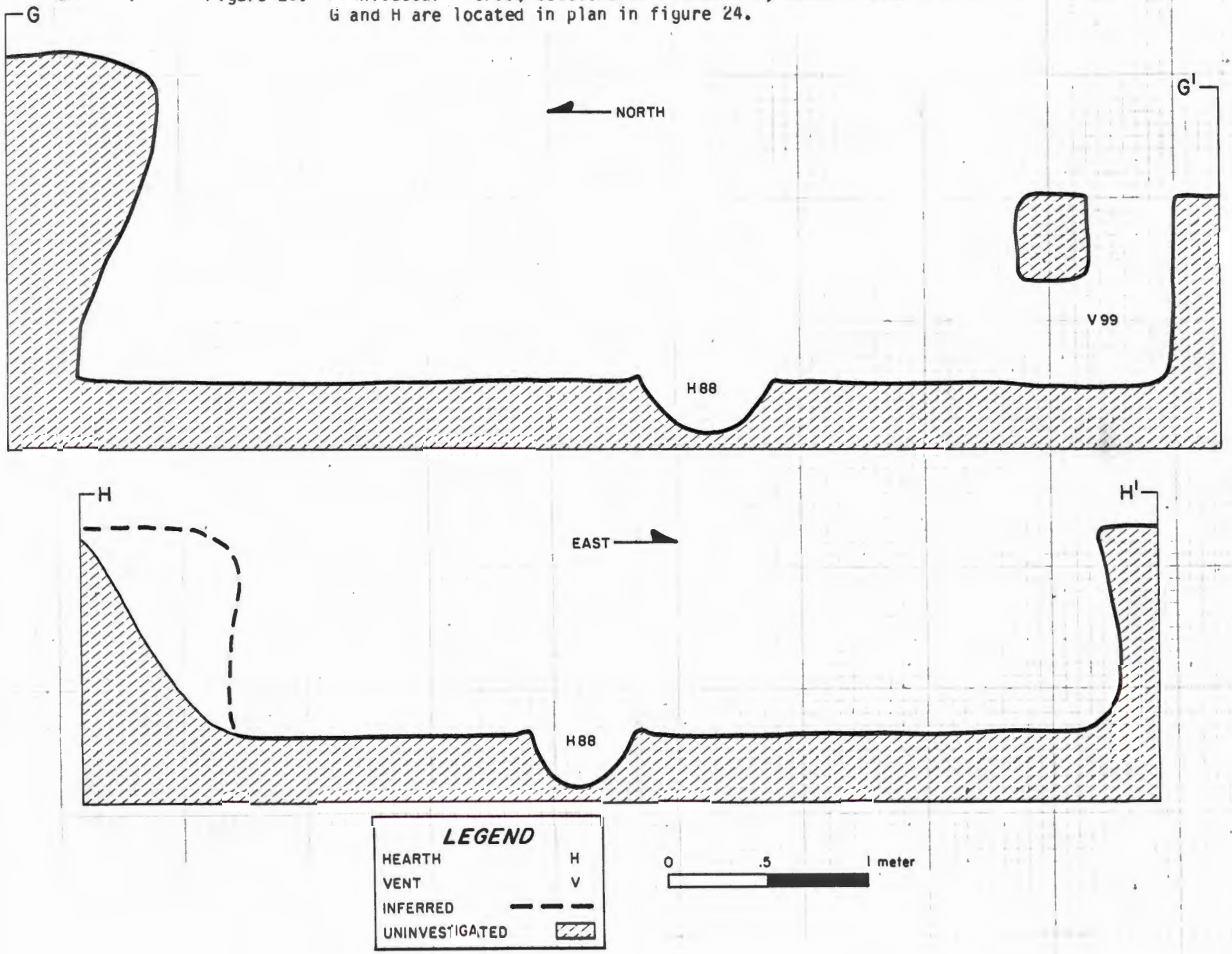


Figure 22. Overhead view of Pithouse 2 after excavation, LeMoc Shelter (DAP 015003).

Figure 23. Architectural cross sections of Pithouse 2, LeMoc Shelter. Profiles G and H are located in plan in figure 24.



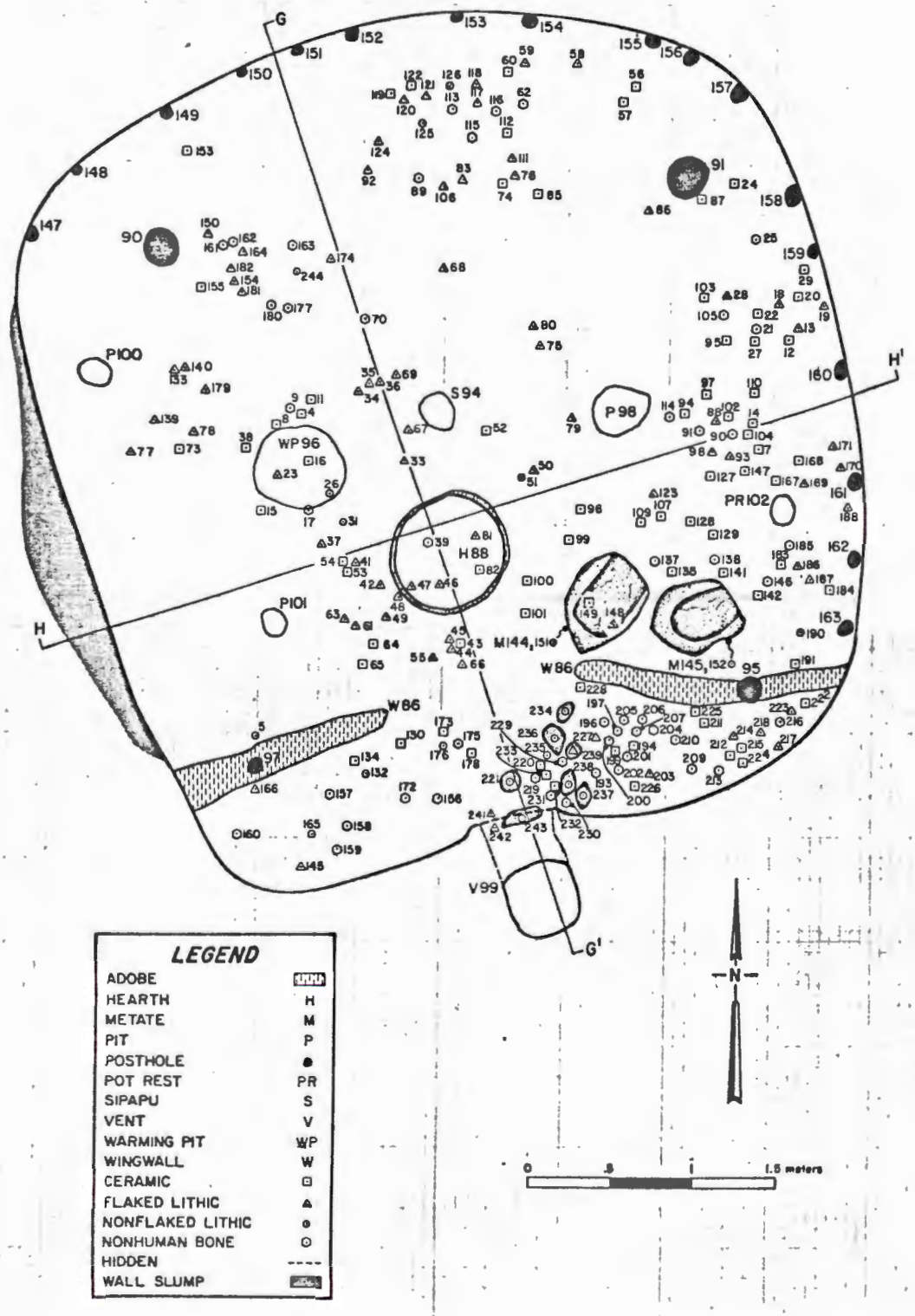


Figure 24. Plan map of Pithouse 2, Floor 1, LeMoc Shelter. Profiles G and H are shown in figure 23.

east wall. Both northern postholes were filled to within a few centimeters of the floor surface with a clean, culturally sterile sand. The remainder of their fill, like the fill in the southern postholes, was a mixture of colluvial sand and adobe melt. The southeast and southwest postholes (Features 95 and 97) are somewhat smaller, averaging about 12 cm in diameter. Both of these posts were incorporated into the wingwall. No remains of the uprights were found in any of these postholes.

The floor of the pitstructure is a level, prepared surface of puddled adobe, 2 to 5 cm thick. In the northwest quadrant the floor is built directly on bedrock, but in other areas it rests on unconsolidated sediments. These sediments seem to grade from a sand in the northern half of the pithouse to a loamy sand or sandy loam in the southern half. The differences in these deposits seem to be caused by natural depositional processes, however, and do not indicate any subfloor preparation.

Floor features. Table 6 presents a summary of the features found in Pithouse 2. The most obvious floor feature is the wingwall (Feature 86), which separates a small space in the south end of the structure from the main floor area (fig. 24). The west half of the wingwall extends 1.35 m straight out from the west wall at a point 90 cm north of the south wall of the pithouse. The east half of the wingwall originates in the southeast corner of the pithouse, encloses the roof support postholes, then arcs gradually to the northwest, coming into line with the west half of wingwall approximately 80 cm north of the south wall of the pithouse. Both halves of the wingwall average 15 cm in width and currently are 62 cm high. A row of vertical sandstone slabs set into the floor forms the footings for each wing. The slabs are plastered with adobe, and adobe was used to build up the remainder of the wall.

Table 6. Feature summary, Pithouse 2, LeMoc Shelter

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth (cm)
86	Wingwall	Complex	Rectangular	444	15	62
88	Hearth	Round	Basin	63	62	26
90	Posthole	Round	Cylindrical	22	18	42
91	Posthole	Round	Cylindrical	27	23	82
94	Sipapu	Round	Cylindrical	23	23	11
95	Posthole	Round	Cylindrical	14	14	17
96	Warming pit	Round	Cylindrical	55	50	19
97	Posthole	Round	Cylindrical	11	11	19
98	Pit:nfs	Irregular	Basin	34	29	10
99	Ventilator	Complex	Complex	78	54	94
100	Pit:nfs	Oval	Basin	20	14	8
101	Pit:nfs	Round	Cylindrical	20	20	17
102	Pot rest	Round	Basin	18	16	3
144	In situ metate (PL 151)	n.a.	n.a.	...	...	...
145	In situ metate (PL 152)	n.a.	n.a.	...	...	...
147	Posthole	...	...	...	...	...
148	Posthole	...	...	...	...	...
149	Posthole	...	...	...	...	...
150	Posthole	...	...	...	...	...
151	Posthole	...	...	...	...	...
152	Posthole	...	...	...	...	...
153	Posthole	...	...	...	...	...
154	Posthole	...	...	...	...	...
155	Posthole	...	...	...	...	...
156	Posthole	...	...	...	...	...
157	Posthole	...	...	...	...	...
158	Posthole	...	...	...	...	...
159	Posthole	...	...	...	...	...
160	Posthole	...	...	...	...	...
161	Posthole	...	...	...	...	...
162	Posthole	...	...	...	...	...
163	Posthole	...	...	...	...	...

NOTE: ... - Information not available.
nfs - Not further specified.
n.a. - Not applicable.

Between the two halves of the wingwall is a gap approximately 1 m wide. This opening would have allowed access to the southern portion of the pithouse and would have provided a conduit for air from the ventilator (Feature 99). The ventilator system has a 50-cm-square opening in the

center of the south wall at floor level. The tunnel opening has an adobe coping that presumably facilitated the closing of the vent with a cover. The tunnel extends 35 cm beyond the south wall where it meets a vertical shaft approximately 54 cm in diameter. Both the tunnel and shaft were filled with a pale brown colluvial sand containing small lenses of gravel. The shaft was truncated by the construction of Room 12, and its opening was sealed with adobe.

Ventilator tunnels in most Sagehill Subphase pithouses are larger than those found in pithouses dating to the later Dos Casas Subphase, and they usually open into an antechamber. Therefore, Pithouse 2, with its relatively small tunnel and vertical shaft rather than antechamber, is atypical. At Mesa Verde, Hayes and Lancaster (1975:182) document these changes in the ventilator system, along with the elimination of the bench and a tendency for the pithouses to be deeper, as significant in the transition from pitstructures as domiciles to pitstructures as specialized religious structures, or kivas. The architecture of Pithouse 2 is typical of what Hayes and Lancaster term "protokivas." The architecture appears unusual only in that there is no evidence of a deflector in the wingwall opening.

The hearth (Feature 88) is a circular, basin-shaped pit, approximately 62 cm in diameter and 26 cm deep. There is a low collar or molding of adobe 2 to 5 cm wide around its perimeter. The hearth is located near the center of the floor, slightly offset to the south. A thin veneer of charcoal and ash was found in the bottom of the basin and was covered by a pale brown, colluvial sand that apparently washed in after the pithouse was abandoned. Above this was a 5-cm-thick stratum of brown sand flecked with charcoal that was overlain by a second stratum of colluvial sand mixed with some ash, which sealed the feature.

Approximately 40 cm northwest of the hearth is a second circular pit (Feature 96). This pit measures 55 cm long, 50 cm wide, and 19 cm deep and was filled with a pale brown sand containing many fragments of charcoal. The charcoal and a slight oxidation of the north wall of the pit suggest that it may have served as a warming pit.

Approximately 55 cm east of the warming pit and almost directly north of the hearth is a small, circular, steep-sided pit (Feature 94). It is 23 cm in diameter and 11 cm deep. The pit was filled with a clean, pale brown sand. Its location suggests three possible uses: a small holding cist that was used during food preparation, a socket for a notched log ladder used to enter the pithouse, or a sipapu. Since the feature was not plaster lined, the first alternative seems least likely, and although notched log ladders were used, they are rare. Therefore, the feature is tentatively interpreted as a sipapu.

Another small pit (Feature 98) is located approximately 70 cm east-northeast of the hearth. This pit is pear-shaped in plan and is 34 cm long, with a maximum width of 29 cm. In cross section, the pit is asymmetrical with a maximum depth of approximately 10 cm where the basin is widest. From this point, the floor of the feature slopes gradually so that at its narrowest part it is between 4 and 6 cm deep. This unusual configuration, coupled with the proximity of the pit to two in situ metates (PL 151, also designated Feature 144; and PL 152, also designated Feature 145) found near the wingwall, suggests that this pit was part of a mealing complex. It may have functioned to collect meal being produced on a metate. The feature was filled with clean, pale brown sand and was sealed by a 1-cm-thick layer of adobe plaster.

Three additional features in Pithouse 2 are small basins located in the area north of the wingwall. The first (Feature 100) is a pit feature located approximately 30 cm from the west wall, near the northwest corner of the structure. The feature is oval and measures 20 cm long by 14 cm wide by 8 cm deep. It was filled with clean sand and was sealed by the adobe floor. The second feature (Feature 101) is a circular pit measuring approximately 20 cm in diameter. In cross section, it is steep sided, and it had been dug into bedrock to a depth of approximately 17 cm. Like many of these small pits, it was filled with a clean, brown sand and was sealed by the floor plaster. Feature 101 is located approximately 70 cm west of the hearth. The third feature (Feature 102) is a shallow basin 3 cm deep, 18 cm long, and 16 cm wide. It is located roughly 40 cm from the east wall of the pithouse and 85 cm north of the wingwall. The depression was filled with sediments from Stratum I-2, which covered this portion of the pithouse floor. The basin is too small to have been either a posthole or a storage cist and most likely served as a pot rest.

Refer to the preceding discussion of pithouse construction for descriptions of the main roof support postholes (Features 90, 91, 95, and 97) and the series of small postholes located around the periphery of the pithouse floor (Features 147 through 163).

Floor artifacts. During excavation of Pithouse 2, 715 individual artifacts, grouped into 241 PL's, were recovered in direct association with the floor (fig. 24 and table 7). Analysis of these artifacts provided little specific information concerning the patterning of activities for two reasons. First, because the floor artifacts were not sealed in context, it is impossible to determine which of these materials were introduced when postoccupational refuse was dumped onto the pithouse

Table 7. Point-located artifacts, Floor 1, Pithouse 2, LeMoc Shelter

PL No.	Material class	Item description
1	Ceramic	Chapin Gray jar sherds (3)
		Early Pueblo Gray jar sherds (35) (not mapped)
2	Ceramic	Early Pueblo Gray jar sherds (11) (not mapped)
3	Flaked lithic	Debitage (not mapped)
4	Ceramic	Early Pueblo Gray jar sherd
5	Nonflaked lithic	Minimally altered
6	Nonflaked lithic	Axe, notched (not mapped)
7	Ceramic	Chapin Gray jar sherds (4): vessel 11
		Early Pueblo Gray jar sherds (4)
8	Ceramic	Early Pueblo Gray jar sherd
9	Nonhuman bone	Artiodactyla
10	Ceramic	Chapin Gray jar sherds (4): vessel 11 (not mapped)
		Early Pueblo Gray jar sherds (3) (not mapped)
11	Ceramic	Chapin Gray jar sherd
12	Ceramic	Early Pueblo Red bowl sherd
13	Flaked lithic	Debitage
14	Ceramic	Chapin Gray jar sherd: vessel 11
15	Ceramic	Chapin Gray jar sherds (2)
		Early Pueblo Gray jar sherds (5)
		Chapin Gray jar sherds (2)
16	Ceramic	Early Pueblo Red bowl sherd
17	Nonhuman bone	Artiodactyla
18	Flaked lithic	Debitage
19	Flaked lithic	Debitage
20	Ceramic	Early Pueblo Gray jar sherd
21	Nonhuman bone	*Marmota flaviventris*
22	Ceramic	Slipped Red bowl sherd
23	Flaked lithic	Debitage
24	Ceramic	Slipped Red bowl sherd
25	Nonhuman bone	*Odocoileus hemionus*
26	Nonflaked lithic	Indeterminate
27	Ceramic	Chapin Gray jar sherds (3): vessel 11
28	Flaked lithic	Debitage
29	Ceramic	Early Pueblo Gray jar sherd
30	Ceramic	Bluff Black-on-red bowl sherd (not mapped)
31	Nonflaked lithic	Indeterminate
32	Flaked lithic	Debitage (not mapped)
33	Flaked lithic	Utilized flake
34	Flaked lithic	Debitage
35	Flaked lithic	Debitage
36	Flaked lithic	Debitage

NOTES: PL numbers not listed represent items later determined not to be associated with the floor. Refer to figure 24 for artifact locations.

(N) - Number of items.

Table 7. Point-located artifacts, Floor 1, Pithouse 2, LeMoc Shelter--Continued

PL No.	Material class	Item description
37	Flaked lithic	Debitage
38	Ceramic	Early Pueblo Gray jar sherds (2)
39	Nonhuman bone	Mammalia, large
41	Flaked lithic	Debitage (2)
42	Flaked lithic	Debitage (2)
43	Ceramic	Moccasin Gray jar sherds (2)
44	Flaked lithic	Debitage
45	Flaked lithic	Debitage
46	Flaked lithic	Debitage
47	Flaked lithic	Debitage
48	Flaked lithic	Debitage
49	Flaked lithic	Debitage
50	Flaked lithic	Debitage
51	Nonflaked lithic	Indeterminate
52	Ceramic	Early Pueblo Gray jar sherd
53	Ceramic	Early Pueblo Gray jar sherd
54	Ceramic	Early Pueblo Gray jar sherd
55	Flaked lithic	Debitage
56	Ceramic	Bluff Black-on-red bowl sherd
57	Ceramic	Early Pueblo Gray jar sherd
58	Flaked lithic	Utilized flake
59	Flaked lithic	Debitage
60	Ceramic	Early Pueblo Red bowl sherd
61	Flaked lithic	Utilized flake
62	Nonhuman bone	Sylvilagus spp. (4) Tetraonidae (3) Mammalia or Aves
63	Flaked lithic	Debitage
64	Ceramic	Early Pueblo Gray jar sherd
65	Ceramic	Early Pueblo Gray jar sherds (4)
66	Flaked lithic	Used core
67	Flaked lithic	Debitage
68	Flaked lithic	Debitage
69	Flaked lithic	Debitage
70	Nonhuman bone	Mammalia, small
71	Flaked lithic	Debitage (not mapped)
72	Ceramic	Early Pueblo Gray jar sherds (6) (not mapped)
73	Ceramic	Chapin Gray jar sherd Early Pueblo Gray jar sherds (25)
74	Ceramic	Early Pueblo Gray jar sherds (2)
75	Flaked lithic	Debitage
76	Flaked lithic	Debitage
77	Flaked lithic	Debitage (2)
78	Flaked lithic	Debitage
79	Flaked lithic	Debitage
80	Flaked lithic	Debitage
81	Flaked lithic	Debitage
82	Ceramic	Early Pueblo Gray jar sherds (3)

Table 7. Point-located artifacts, Floor 1, Pithouse 2, LeMoc Shelter--Continued

PL No.	Material class	Item description
83	Flaked lithic	Debitage
84	Nonhuman bone	Odocoileus hemionus--minimally altered (not mapped)
85	Ceramic	Early Pueblo Gray jar sherds (2)
86	Flaked lithic	Used core
87	Ceramic	Early Pueblo Red bowl sherd
88	Flaked lithic	Debitage
89	Nonhuman bone	Mammalia, medium
90	Nonhuman bone	Mammalia, small
91	Nonhuman bone	Mammalia, small--scapula
92	Flaked lithic	Debitage
93	Flaked lithic	Debitage
94	Ceramic	Chapin Gray jar sherds (74): vessel 11
95	Ceramic	Early Pueblo Red bowl sherd
96	Ceramic	Early Pueblo Gray jar sherd
97	Ceramic	Early Pueblo Red bowl sherd
98	Flaked lithic	Debitage
99	Ceramic	Early Pueblo Gray jar sherd
100	Ceramic	Early Pueblo Gray jar sherd
101	Ceramic	Early Pueblo Gray jar sherd
102	Ceramic	Chapin Gray jar sherds (6): vessel 11
103	Ceramic	Early Pueblo Gray jar sherd
104	Ceramic	Early Pueblo Gray jar sherd
105	Nonhuman bone	Mammalia, small
106	Flaked lithic	Debitage
107	Ceramic	Early Pueblo Gray jar sherds (7)
108	Ceramic	Mocassin Gray jar sherd (not mapped)
109	Ceramic	Early Pueblo Gray jar sherd
110	Ceramic	Early Pueblo Gray jar sherds (2)
111	Flaked lithic	Debitage (2)
112	Ceramic	Early Pueblo Gray jar sherd
113	Nonhuman bone	Odocoileus hemionus
114	Nonhuman bone	Odocoileus hemionus
115	Nonhuman bone	Aves (2) Sylvilagus spp. (5) Mammalia or Aves
116	Nonhuman bone	Odocoileus hemionus--simple awl
117	Flaked lithic	Debitage
118	Flaked lithic	Debitage
119	Ceramic	Early Pueblo Gray jar sherds (2)
120	Flaked lithic	Debitage
121	Flaked lithic	Debitage (33)
122	Ceramic	Early Pueblo Gray jar sherd
123	Flaked lithic	Debitage
124	Flaked lithic	Debitage
125	Nonflaked lithic	Indeterminate
126	Nonflaked lithic	Indeterminate
127	Ceramic	Chapin Gray jar sherds (3) Early Pueblo Gray jar sherds (15)

Table 7. Point-located artifacts, Floor 1, Pithouse 2, LeMoc Shelter--Continued

PL No.	Material class	Item description
128	Ceramic	Early Pueblo Gray jar sherds (4)
129	Ceramic	Early Pueblo Gray jar sherds (8)
130	Ceramic	Early Pueblo Gray jar sherds (6)
131	Flaked lithic	Debitage (not mapped)
132	Nonflaked lithic	One-hand mano
133	Flaked lithic	Debitage
134	Ceramic	Early Pueblo Red jar sherd
135	Ceramic	Early Pueblo Gray jar sherds (13)
136	Ceramic	Early Pueblo Gray jar sherds (19) (not mapped)
137	Nonhuman bone	Artiodactyla
138	Nonhuman bone	Mammalia, large
139	Flaked lithic	Debitage
140	Flaked lithic	Debitage
141	Ceramic	Chapin Gray jar sherds (2) Early Pueblo Gray jar sherds (30)
142	Ceramic	Chapin Gray jar sherds (2) Early Pueblo Gray jar sherds (11)
143	Ceramic	Early Pueblo Gray jar sherds (5) (not mapped)
144	Flaked lithic	Debitage (not mapped)
145	Flaked lithic	Debitage
146	Nonhuman bone	*Sylvilagus* spp. *Odocoileus hemionus*
147	Ceramic	Chapin Gray jar sherd
148	Flaked lithic	Debitage
149	Ceramic	Early Pueblo Gray jar sherd
150	Flaked lithic	Debitage
151	Nonflaked lithic	Trough metate
152	Nonflaked lithic	Trough metate
153	Ceramic	Moccasin Gray jar sherd
154	Flaked lithic	Debitage
155	Ceramic	Early Pueblo Gray jar sherd
156	Nonhuman bone	Mammalia, medium *Canis familiaris* (3)
157	Nonhuman bone	Mammalia, large (2) *Lepus californicus* *Canis familiaris*
158	Nonhuman bone	*Odocoileus hemionus* Mammalia, medium *Lepus californicus*
159	Nonhuman bone	Mammalia, large *Sylvilagus* spp. (2)
160	Nonhuman bone	*Odocoileus hemionus*
161	Nonhuman bone	Mammalia, large
162	Nonhuman bone	*Sylvilagus* spp.
163	Nonhuman bone	Artiodactyla
164	Flaked lithic	Debitage

Table 7. Point-located artifacts, Floor 1, Pithouse 2, LeMoc Shelter--Continued

PL No.	Material class	Item description
165	Nonflaked lithic	Generalized tool
166	Flaked lithic	Unused core
167	Ceramic	Early Pueblo Gray jar sherds (3)
168	Ceramic	Early Pueblo Gray jar sherds (3)
169	Flaked lithic	Debitage
170	Flaked lithic	Thick, endworked uniface
171	Flaked lithic	Thick, sideworked uniface
172	Nonhuman bone	*Canis familiaris* (3)
173	Ceramic	Early Pueblo Gray jar sherd
174	Flaked lithic	Debitage
175	Nonhuman bone	*Odocoileus hemionus*
176	Nonflaked lithic	One-hand mano
177	Nonhuman bone	Mammalia, medium
178	Ceramic	Early Pueblo Gray jar sherd
179	Flaked lithic	Debitage
180	Nonhuman bone	Mammalia, small
181	Flaked lithic	Debitage (2)
182	Flaked lithic	Debitage
183	Ceramic	Chapin Gray jar sherds (3)
		Early Pueblo Gray jar sherds (59)
184	Ceramic	Early Pueblo Gray jar sherd
185	Nonhuman bone	*Sylvilagus* spp.
186	Flaked lithic	Debitage
187	Flaked lithic	Debitage
188	Flaked lithic	Debitage
189	Nonhuman bone	Artiodactyla (not mapped)
		Mammalia, medium (not mapped)
190	Nonflaked lithic	Two-hand mano
191	Ceramic	Early Pueblo Red bowl sherd
192	Nonflaked lithic	Minimally altered (not mapped)
193	Nonhuman bone	*Odocoileus hemionus*
194	Ceramic	Early Pueblo Red jar sherd
196	Nonhuman bone	Mammalia, large
197	Nonhuman bone	Mammalia, large
		Ovis canadensis
198	Flaked lithic	Item misplaced (not mapped)
199	Ceramic	Chapin Gray seed jar sherd
200	Nonhuman bone	*Odocoileus hemionus*
201	Nonhuman bone	*Cervus elaphus*
202	Nonhuman bone	Mammalia, large
203	Flaked lithic	Thick biface
204	Nonhuman bone	Artiodactyla
205	Nonhuman bone	Mammalia, large
206	Nonhuman bone	Artiodactyla
207	Nonhuman bone	Artiodactyla
209	Nonhuman bone	Mammalia, large
210	Nonhuman bone	Mammalia, medium
211	Ceramic	Chapin Gray jar sherd
		Early Pueblo Gray jar sherds (6)

Table 7. Point-located artifacts, Floor 1, Pithouse 2, LeMoc Shelter--Continued

PL No.	Material class	Item description
212	Ceramic	Early Pueblo Gray jar sherds (2)
213	Nonhuman bone	Mammalia, large
214	Flaked lithic	Debitage
215	Ceramic	Early Pueblo Gray jar sherds (2)
216	Nonhuman bone	Sciuridae
217	Flaked lithic	Debitage
218	Flaked lithic	Debitage (2)
219	Nonhuman bone	Mammalia, large (2)
		Odocoileus hemionus
220	Ceramic	Early Pueblo Gray jar sherds (5)
221	Nonflaked lithic	Indeterminate
222	Ceramic	Early Pueblo Gray jar sherd
223	Flaked lithic	Thick uniface
224	Ceramic	Early Pueblo Gray jar sherds (2)
		Early Pueblo Red bowl sherd
225	Ceramic	Chapin Gray jar sherd
		Early Pueblo Gray jar sherds (4)
226	Ceramic	Early Pueblo Gray jar sherd
227	Flaked lithic	Debitage
228	Ceramic	Chapin Gray seed jar sherd
		Polished White bowl sherds (6)
229	Nonhuman bone	Mammalia, large
230	Nonhuman bone	Artiodactyla
231	Nonhuman bone	Mammalia, large
232	Ceramic	Early Pueblo Red jar sherd
233	Ceramic	Early Pueblo Gray jar sherd
234	Nonflaked lithic	Abrading stone
235	Nonflaked lithic	Abrading stone
236	Nonflaked lithic	Indeterminate
237	Nonflaked lithic	Two-hand mano
238	Nonflaked lithic	Two-hand mano
239	Flaked lithic	Used core
240	Ceramic	Chapin Gray jar sherd
		Chapin Gray bowl sherd
		Early Pueblo Gray jar sherds (12) (not mapped)
241	Flaked lithic	Cobble tool
242	Flaked lithic	Used core
		Unused core
243	Nonflaked lithic	Two-hand mano
244	Nonflaked lithic	Hammerstone

floor. Second, the disposal of trash by the inhabitants of Pithouse 2, both before and during the abandonment of the structure, seems likely to have obscured the artifact evidence for activity areas.

Recent ethnoarchaeological studies (refer to discussion of Pithouse 1 floor artifacts) have suggested that all but the smallest bits of debris created during any task--what Schiffer (1976:30) has termed "primary refuse"--will be removed from the activity area during periodic cleaning. This is particularly likely to be the case when space is limited and the area is used for a variety of purposes. Consequently, only small and usually undiagnostic fragments are likely to be recovered at their location of use.

When the abandonment of a structure is anticipated, however, some modification of this normal discard behavior can be expected. Although debris will continue to be removed from intensively used areas, the refuse may be dumped in lesser-used areas of the structure rather than removed entirely. As the structure is abandoned, Schiffer (1976:33) argues that the inhabitants will remove all usable implements except those that are too bulky to be transported easily or those light objects that can be readily replaced. Consequently, except in cases of catastrophic abandonment, the materials recovered from the structure floor will probably consist of small accumulations of domestic trash and a few commonplace implements. Only a small portion of this material is likely to be primary refuse.

The interpretation of floor artifacts is further complicated by the fact that these materials are generally indistinguishable from refuse dumped into the structure after its abandonment, unless they have somehow been sealed in context--for example, by the burning and collapse of the

structure roof soon after abandonment. Unfortunately, this was not the case in Pithouse 2. Midden deposits of Strata I-2 and I-4 overlie the eastern third of the floor, and the remainder is overlain by a mixture of colluvial sand and adobe melt from the west wall. Because of this, any interpretation of the floor artifacts from Pithouse 2 as either primary refuse or as de facto refuse (trash accumulations and artifacts left behind that reflect abandonment processes) must be suspect; some of these artifacts may be postoccupational secondary refuse.

The floor artifacts in the eastern third of Pithouse 2 are primarily a mixture of sherds, lithic detritus, and bone scrap. The number and uniform distribution of these artifacts, in contrast to those on the western part of the floor, strongly suggest that at least some of this material is derived from the overlying postoccupational midden deposits. Nevertheless, the large quantity of material behind the east wingwall and the concentration of artifacts in the main pithouse area near the east wall are consistent with the expectation that refuse would be allowed to accumulate in lesser-used areas of the structure immediately before abandonment. The only two artifacts that were certainly in situ were the two trough metates (PL's 151 and 152) located immediately north of the east half of the wingwall. Both of these metates are complete but were probably left behind because their transportation cost would be high relative to the labor involved in replacing them. The location of the metates suggests that the area to the east of the hearth was habitually used for food preparation. As discussed earlier, two of the floor features (Features 98 and 102) are also believed to be associated with this activity area. Feature 102 is believed to have been a pot rest; Feature 98 appears to have been a mealing receptacle with a shelf for supporting the base of the metate during grinding.

In the western and central areas of the pithouse, it is less likely that many of the floor artifacts are secondary refuse contaminants. As mentioned, the floor in these areas is overlain by a mixture of colluvial sand and adobe melt. While this indicates that the floor was not immediately sealed when the pithouse was abandoned, there are at least no obvious postoccupational refuse deposits.

The floor artifacts in the western and central parts of the pithouse are clustered in three areas: near the northwestern posthole, near the hearth and warming pit, and behind the west half of the wingwall. The cluster near the northwestern posthole consists primarily of lithic debitage and bone fragments; also in this cluster is a river cobble that might have been used as a hammerstone (PL 244). It is possible that this scatter is primary refuse indicating a work area for the construction and repair of lithic and bone tools. The debris near the hearth and warming pit includes sherds, debitage, and a few scraps of bone. Given the proximity of the hearth and warming pit to the cluster, these artifacts might be debris associated with food preparation and consumption. In such an intensively used area, frequent clean-up of debris would be expected, but this might have been suspended shortly before the structure was abandoned.

The materials concentrated behind the west half of the wingwall include two one-hand manos (PLs 132 and 176), a "generalized" nonflaked lithic tool that might be a notched axe (PL 165), an unused core (PL 166), several sherds, and numerous pieces of nonhuman bone. The bone includes mule deer, cottontail, black-tailed jackrabbit, unidentifiable mammal, and the skull and part of the skeleton of a dog. The quantity and variety of bone suggests that this debris is a refuse deposit, possibly associated

with the abandonment of the structure. Much of the debris behind the east half of the wingwall also could have accumulated in the same manner.

In summary, although some of the floor artifacts, especially in the eastern part of the pithouse, are probably postoccupational refuse, the overall distribution is consistent with the discard pattern expected when a structure has been abandoned. The most intensively used areas of the floor, as indicated by the feature locations, are relatively free of debris (with the exception of the artifact cluster around Feature 90). In contrast, refuse appears to have been allowed to accumulate in the lesser-used areas--behind the wingwalls, and along the east and northeast walls of the main chamber. The presence of the trough metates and a possible mealing cist north of the east wingwall is argument for this area having been habitually used for milling. Less certainly, the concentration of debris around Feature 90 in the northwest corner of the pithouse suggests that this area might have been a work area for tool production. Finally, the debris around the hearth and warming pit is consistent with the interpretation that food preparation and consumption were major activities in this area.

Despite the tenuous nature of the evidence, the range of activities represented, especially the presence of implements associated with women's tasks (e.g., mealing), seems sufficient to argue that Pithouse 2 was primarily a domicile and not a religious structure. However, if Feature 94 functioned as a sipapu (which seems likely, given its form and location), it can be inferred that the pitstructure periodically might have been the locus of ritual activity, or at least that certain mythological concepts were symbolized.

The fact that three of the floor features--Features 98, 100, and 101--were filled with sand and sealed by the floor plaster indicates that the need for facilities in the pitstructure was variable and that the use of space for particular activities changed through time. It also supports the interpretation that the pitstructure was occupied for several years, since it is unlikely that such remodeling would be evident in a structure that was only briefly used.

Element 2

Pithouse 1

Dimensions:

North wall	
length:	4.65 m
height:	1.65 m
South wall	
length:	4.80 m
height:	1.08 m
East wall	
length:	5.35 m
height:	1.21 m
West wall	
length:	5.00 m
height:	1.62 m

Pithouse 1 (fig. 25) is located in the eastern portion of the shelter, immediately to the south of Rooms 9 and 10. It measures approximately 5.7 m north-south by 5.5 m east-west, and the floor is roughly 1.65 m below aboriginal ground surface. As discussed earlier, the occupation of Pithouse 1 is believed to date to between A.D. 840 and 860. If these dates are correct, there appears to have been a hiatus of approximately 60 years between the abandonment of Pithouse 2 and the construction of Pithouse 1. However, midden deposits in the depression of Pithouse 2

Figure 25. View of Pithouse 1 after excavation, LeMoc shelter. View is looking southeast from Room 9. (DAP 001913).

(Strata I-2 and I-4) indicate that the shelter was occupied sometime during that interval, although no domicile dating to this period was found. Since the western half of the shelter was apparently being used as a trash dump, it seems reasonable to assume that the living area at the time was in the eastern half of the shelter. If so, all traces of that occupation were destroyed when Pithouse 1 was built. Some evidence of remodeling of the pitstructure in the form of adobe-capped subfloor features was found, but the scale of this remodeling is too small to suggest major rebuilding.

Construction. In its construction, Pithouse 1 exhibits the same opportunistic use of the cave breccia evident in the construction of Pithouse 2. Both the north and west walls were formed by shaping the breccia face. The south and east walls, however, are backed by unconsolidated sediments. Behind the south wall, these sediments are the colluvial subsoil of the slope in front of the shelter, but behind the east wall they are midden deposits that probably were intentionally placed shortly before the structure was built.

Architectural cross sections of Pithouse 1 are shown in figure 26. The south and east walls consist of crude coursed masonry--unshaped sandstone blocks and river cobbles set in a matrix of adobe--built on a footing of large, vertical sandstone slabs. Vertical slabs also face the lower 70 cm of the west wall, supporting a 1- to 2-cm-thick layer of adobe plaster adhering to the upper wall. In many places, the vertical slabs and/or masonry had fallen from the walls; as a result, they did not appear consistently in cross section. Along the north wall, three rows of vertical slabs were noted. The two outer rows support several courses of masonry. The space between this masonry and the breccia face is filled with rubble, and the entire feature is capped by horizontally laid slabs

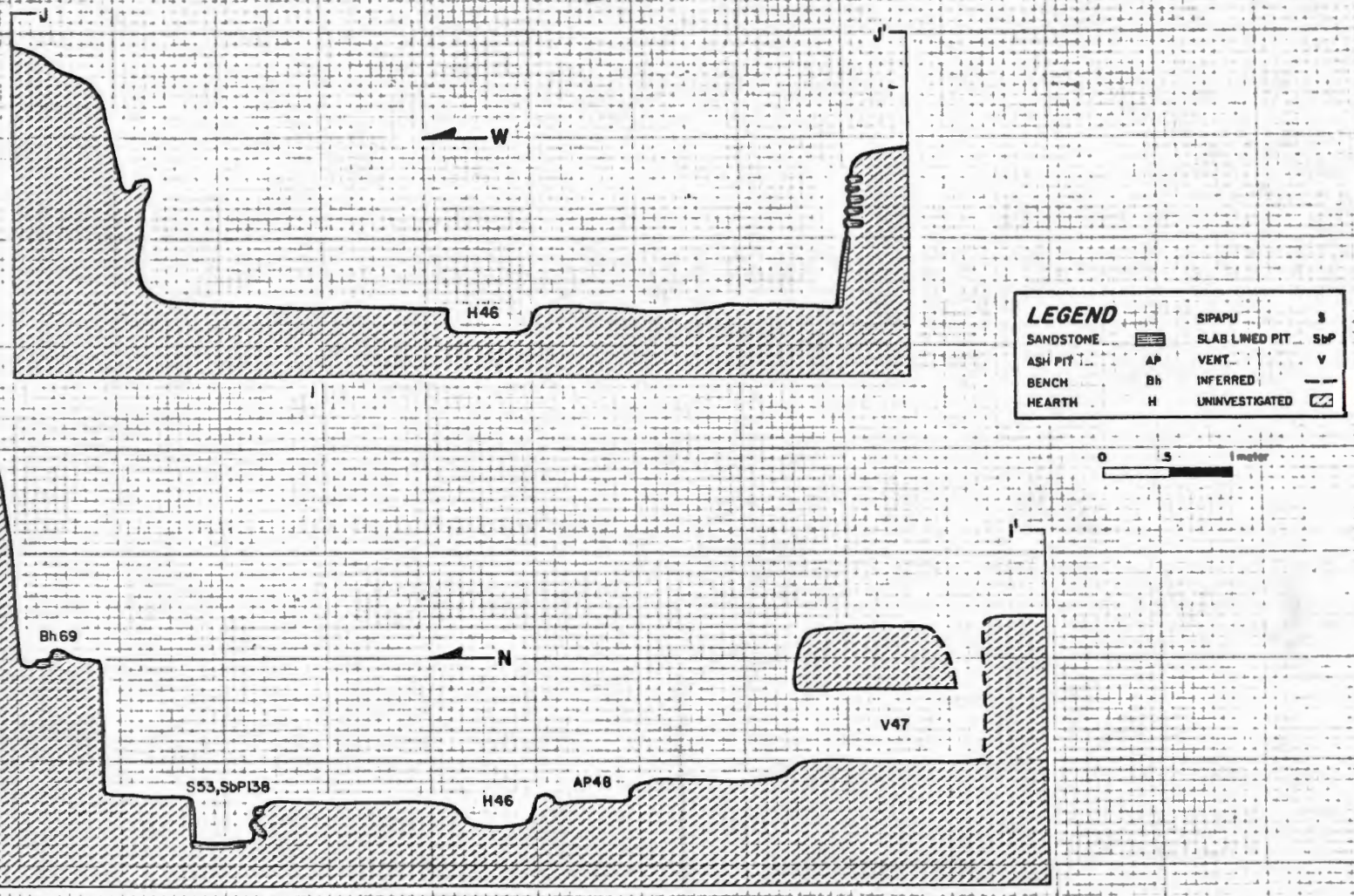


Figure 26. Architectural cross sections of Pithouse 1, LeMoc Shelter. Profiles I and J are located in plan in figure 27. Profile drawn prior to discovery of Feature 50 (pit).

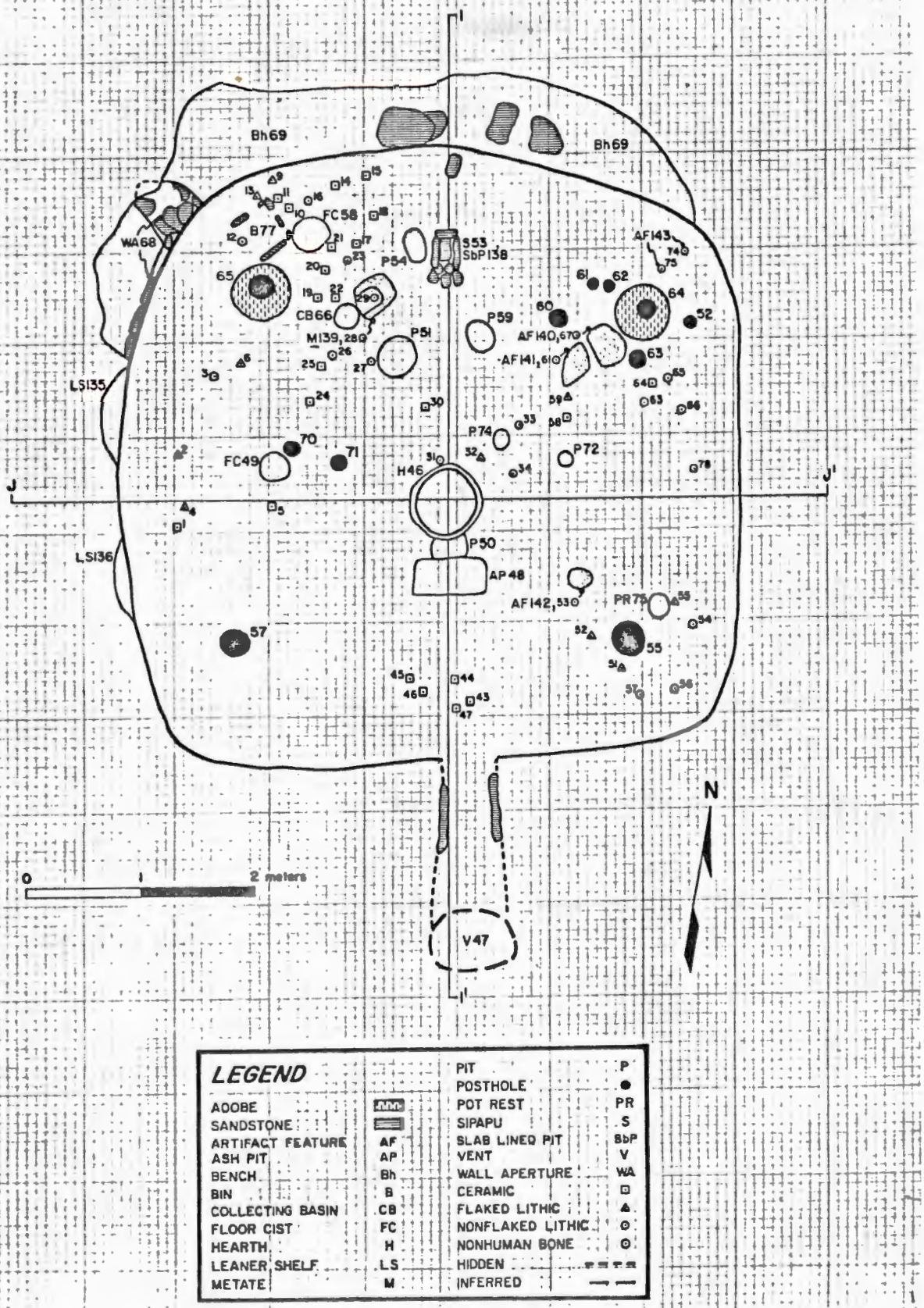
and mortar to form a bench (Feature 69) (fig. 13). This bench is approximately 105 cm high and 65 cm wide.

At the western end of the bench is a 30-cm-high block of cave breccia faced with thin stone slabs that forms one sidewall of a large wall aperture (Feature 68) cut into the breccia in the northwest corner of the structure. The oval opening into this aperture is 165 cm long and 86 cm high, with its base at the level of the top of the bench. The interior of the feature is divided into two compartments by a masonry partition. Both chambers appear to have been lined with adobe plaster, and a lip was built across the opening using a single course of sandstone blocks. Although no reliable artifact evidence upon which to base a functional interpretation was recovered, the configuration of the feature suggests that it probably was used as a storage facility.

The roof of Pithouse 1 was supported by four posts (Features 55, 57, 64, and 65), with one posthole set about 1 m out from each corner. Presumably, the posts in these postholes were linked by crossbeams, which in turn would have supported smaller poles laid horizontally. Finally, leaner poles would have been laid with one end supported by the crossbeams and the other end buried in the ground just outside the pit walls to form the sloping sides of the roof.

Some modification of this last step would have been necessary on the north and west sides, however, because of the height of the cave breccia. On the north side, the leaners might have rested on the bench. To the west, two leaner shelves (Features 135 and 136) gouged into the breccia just below the lip of the balk between Pithouses 1 and 2 appear to have provided the needed support. Each of the shelves is about 80 cm long and 15 to 25 cm wide. A small remnant of masonry and mortar on the northernmost of the shelves suggests that originally a lip of stone and adobe was

Figure 27. Plan map of Pithouse 1, Floor 1, LeMoc Shelter. Profiles I and J are shown in figure 26. Features 70, 71, 72, 74, 75, and 77 are subfloor features believed to have been used prior to the remodeling of Pithouse 1.



LEGEND			
		PIT	P
		POSTHOLE	●
ADOBE		POT REST	PR
SANDSTONE		SIPAPU	S
ARTIFACT FEATURE	AF	SLAB LINED PIT	SbP
ASH PIT	AP	VENT	V
BENCH	Bh	WALL APERTURE	WA
BIN	B	CERAMIC	⊡
COLLECTING BASIN	CB	FLAKED LITHIC	▲
FLOOR CIST	FC	NONFLAKED LITHIC	⊙
HEARTH	H	NONHUMAN BONE	⊙
LEANER SHELF	LS	HIDDEN	
METATE	M	INFERRED	

Figure 28. View of Feature 65 (posthole) in Pithouse 1, LeMoc Shelter (DAP 003223).

Figure 29. View of Feature 53 (sipapu) in Pithouse 1, LeMoc Shelter. Sipapu remodeled from earlier slab-lined pit (Feature 138) (DAP 003225).

present along the front of the shelves to help anchor the base of the leaners.

The underlying bedrock seems to have caused problems with the roof support framework. Both of the northern postholes for the roof supports (Features 64 and 65) were dug to bedrock but apparently were too shallow to adequately stabilize the upright posts. To compensate, the postholes were lined with gravel, and conical adobe collars approximately 50 cm in diameter and 25 cm high were placed around each of the posts (figs. 27 and 28) to provide additional support.

The floor of the pitstructure is a thin layer of adobe covering the heterogenous sediments labeled Stratum II-1. The compact, colluvial sand and sandy clay loam underlying the southern two-thirds of the floor was simply leveled before puddling the plaster, but in the northern third some subfloor preparation was evident (refer to Stratum II-I discussion). In this area, solid bedrock is approximately 25 to 35 cm below floor level and is overlain by a stratum of coarse white sand, the result of decomposition of the bedrock. It seems likely that this weathered sandstone was still partially consolidated when the pitstructure was being built and formed an irregular surface similar to that described for the base of Stratigraphic Unit III. The lenses of midden in the white sand appear to have been laid to fill these irregularities.

Floor features. As in most Anasazi pitstructures, Pithouse 1 is oriented around a true north-south axis that runs through the middle of the floor, bisecting the ventilator tunnel, ash pit, hearth, and sipapu. The dimensions of these and other features are listed in table 8.

Table 8. Feature summary, Pithouse 1, LeMoc Shelter

Feature No.	Type	Plan	Profile	Length (cm)	Width (cm)	Depth (cm)
46	Hearth	Round	Basin	62	60	15
47	Ventilator	Rectangular	Rectangular	150	45	50
48	Ash pit	Rectangular	Basin	59	34	9
49	Floor cist	Round	Cylindrical	33	33	23
50*	Pit	Oval	Basin	25	18	11
51	Pit	Round	Bell	34	34	30
52	Posthole	Round	Cylindrical	9	8	8
53	Sipapu	Rectangular	Rectangular	20	20	30
54	Pit	Oval	Basin	35	15	12
55	Posthole	Round	Cylindrical	35	35	32
57	Posthole	Round	Cylindrical	29	29	33
58	Floor cist	Round	Cylindrical	30	30	20
59	Pit	Oval	Cylindrical	34	27	34
60	Posthole	Round	Cylindrical	20	20	15
61	Posthole	Round	Cylindrical	10	9	16
62	Posthole	Round	Cylindrical	12	10	23
63	Posthole	Round	Basin	19	18	18
64	Posthole	Round	Cylindrical	20	20	34
65	Posthole	Round	Cylindrical	20	20	45
66	Collecting basin	Round	Basin	27	27	21
68	Wall aperture	Complex	Irregular	165	75	86
69	Bench	Irregular	Rectangular	480	65	105
70*	Posthole	Round	Cylindrical	13	13	29
71*	Posthole	Round	Cylindrical	13	13	29
72*	Pit	Round	Cylindrical	12	13	30
74*	Pit	Oval	Basin	16	14	15
75*	Pot rest	Round	Basin	18	17	4
77*	Storage bin	Square	Rectangular	40	40	28
135	Leaner shelf	...	...	80	25	...
136	Leaner shelf	...	...	80	15	...
138*	Slab-lined pit	...	...	40	40	...
139	Metate (PL 28)	n.a.	n.a.	...	...	...
140	Anvil stone (PL 67)	n.a.	n.a.	...	...	...
141	Anvil stone (PL 61)	n.a.	n.a.	...	...	...
142	Anvil stone (PL 53)	n.a.	n.a.	...	...	...
143	Anvil stone (PL's 74 & 75)	n.a.	n.a.	...	...	...

* Possibly associated with earlier occupation.

NOTE: ... - Information not available.
n.a. - Not applicable.

The ventilator system (Feature 47) opens into the pithouse as a square portal that measures 45 cm on each side and is approximately 15 cm above the pithouse floor in the center of the south wall. Vertically set sandstone slabs face the walls of the tunnel and support its roof, which is made of horizontal poles below a layer of sandstone slabs (not mapped). The air passage apparently was constructed by digging a trench, roofing it, and then backfilling over the roof. The tunnel is flared along its 1.5 m length to a width of 75 cm at the outside opening. Unfortunately, erosion of the hill slope in front of the shelter made it impossible to determine the precise configuration of the outside opening or to infer whether a short vertical shaft, such as that in Pithouse 2, had been present.

Feature 46 is the central hearth in Pithouse 1. It is round in plan and gently basined in cross section. The bottom and sides of the hearth are lined with clean sand; overlying this is a layer of sand mixed with ash and charcoal, which may be part of roof fall.

The ash pit (Feature 48) is a shallow, rectangular depression located immediately south of the hearth. The pit is filled with a mixture of ash, sand, and bits of charcoal; however, the absence of reddening of the pit walls suggests that the trough was not used regularly as a fireplace. Presumably, ash was temporarily placed in the feature when the hearth was cleaned. With ash in the pit, it could have served both as a convenient pot rest and as a refuse container. A shallow depression along the northern margin of the pit suggests that a deflector may have stood between the ash pit and the hearth, although no deflector slab was found and no feature number was assigned.

The term "sipapu" (Feature 53) is applied somewhat arbitrarily to an unusually complex pit lying along the north-south axis near the north wall

of the pithouse. The north, east, and west walls of the pit are formed by thin sandstone slabs, and a fourth slab lines the bottom. Intersecting this on the south is a shallow basin (Feature 138) approximately 40 cm in diameter, that originates below floor level. Set edgewise at the intersection are two rounded sandstone blocks and a fifth slab that dips to the north at a 45° angle. Three other small sandstone blocks lie in the basin itself (fig. 29).

The configuration of this feature is clearly more suggestive of a milling station, with the rocks in the basin supporting the metate and the slab-lined pit serving as a receptacle for the meal. The fact that the basin was sealed by the hard-packed floor leaving only the slab cubicle exposed, however, renders this interpretation suspect. During remodeling or reoccupation of the pithouse, the milling station appears to have been modified to serve as the sipapu. Interestingly, the slab cubicle resembles in form and general position, although not in size, the so-called "ceremonial boxes" found in large Periman Subphase pitstructures (Kane 1981a:103). Although no paho marks were noted in or around Feature 53, it is tempting to speculate that this may be a precursor of these later box features.

Excluding the three subfloor features (Features 70, 71, and 77), six small pits or cists (Features 49, 51, 54, 58, 59, and 66) are present in the north half of the floor (table 8). Feature 54 is a small, oval pit located about 10 cm west of the sipapu. Feature 58, a circular floor cist, lies about 20 cm to the northeast of the northwestern roof support. The fill consisted of ashy sand intermixed with bits of charcoal and adobe and might have been part of the roof fall. A small, crudely made pinch pot (vessel 14), eight plain gray ware sherds, one Abajo Red-on-orange

sherd, a hammerstone, and a polishing stone were recovered from the fill of this feature. Since the sherds were scattered throughout the pit fill, it is unlikely that they were stored intentionally.

Feature 59 is a broad, oval pit that lies about 37 cm southeast of the sipapu. Except for a small, tabular piece of sandstone standing upright on the southeast side, the fill consisted of sterile sand. Feature 51 is a circular pit located about 55 cm southwest of the sipapu. A few sherds and some debitage were found within the ashy sand that filled the pit, but again, these are probably associated with the roof fall rubble. To the northwest of Feature 51 is a trough metate (designated Feature 139 and PL 28) pedestaled on two cobbles, with one two-hand mano (PL 23) lying beside it and another (PL 29) lying on top of it. A small, circular collecting basin (Feature 66) is located at the opening of the metate trough and probably received the meal as it was ground. Because of its proximity to Features 66 and 139, Feature 51 also may have been associated with the milling station. This pit possibly provided temporary storage for the corn before it was ground or for the meal after it was produced. A second floor cist, Feature 49, is a small, circular pit located approximately 1 m west of the hearth. Like Features 54 and 59, it was filled with clean sand.

None of the pits or floor cists just discussed are large enough to have been of any benefit for long-term food storage. Rather, like Feature 58, they probably provided convenient, temporary storage for a variety of small items or, as Features 51 and 66 suggest, were part of the food preparation facility, functioning as receptacles to receive meal as it was ground or to hold provisions for a day or two.

Five small postholes (Features 52, 60, 61, 62, and 63) are clustered around the main roof support posthole in the northeast corner of the floor. While these might have accomodated additional support posts for the roof, it seems more likely that they served some other function. Features 52 and 63 might have held loom anchors, or perhaps the five postholes together were the supports for a frame used in the preparation of hides.

In addition to the metate (Feature 139), four other artifact features, all consisting of in situ anvil stones, were defined in Pithouse 1. These were assigned feature numbers 140, 141, 142, and 143 and correspond to PL numbers 67, 61, 53, and 74 and 75, respectively.

All of the floor features discussed so far were found during the initial excavation of Pithouse 1. With the exceptions noted earlier, all of these features were filled with a clean, pale brown sand, and all are believed to have been in use at the time the structure was abandoned. However, six additional features (Features 70, 71, 72, 74, 75, and 77), discovered during subfloor testing, had been sealed by the floor plaster. None of these are major floor features, and there was no evidence of an associated surface. It seems likely, therefore, that these features fell into disuse as Pithouse 1 was gradually remodeled. The features were probably sealed with adobe patches that gradually blended into the floor as they weathered.

Features 70 and 71 are identical postholes located roughly 100 cm and 60 cm west of the hearth, respectively. The sides of both these features are lined with adobe, and both were filled with a dark, ashy sand flecked with charcoal. These postholes possibly served as ladder rests. Feature 74 is a small, steep-walled pit located approximately 35 cm northeast of the hearth. Feature 72, another small pit, lies about 40 cm to the

southeast of Feature 74. A small gray ware bowl sherd was wedged in this feature, about 8 cm above the bottom of the pit. Both Features 74 and 72 were filled with a dark, ashy sand; no evidence was found in either of these features that suggests how they were used, nor were any unique formal characteristics noted that warrant speculation. Most likely, these were facilities constructed for some specific, one-time use, and when that activity was completed, they were filled in. The fifth subfloor feature, Feature 75, is a shallow basin located 15 cm northeast of the southeastern roof support.

The last subfloor feature (Feature 77) is a square storage bin lined with thin sandstone slabs. This bin is located near the northwest corner of the floor, between the post support and the wall of the pithouse. The bin closely resembles Feature 138 except that there are no stones on which a metate could have been placed. The bin was filled with a clean, pale brown sand, and a single hammerstone was found in the three-dimensional center of the feature.

In addition to the subfloor features and the modifications to Feature 53, one other feature, Feature 50, suggests the gradual remodeling of the floor of Pithouse 1. This small, oval pit is located between the hearth and the ash pit, partially undercutting the latter. Feature 50 was filled with ash and charcoal and was overlain by the southern arc of the hearth's adobe collar. While it was impossible to precisely determine the function of this pit, it seems likely that Feature 50 was either the original hearth of Pithouse 1 or an earlier ash pit. Refer to the "Construction" section for a discussion of the main support postholes (Features 55, 57, 64, and 65) in Pithouse 1.

Floor artifacts. Like the abandonment of Pithouse 2, that of Pithouse 1 appears to have been both purposeful and unhurried. The few artifacts left on the floor consist primarily of bone scrap, bits of pottery, and easily replaced stone artifacts (fig. 27 and table 9). In Pithouse 1, however, the floor artifacts are sealed in context by a distinct stratum of roof fall. These materials, therefore, are more likely to be primary refuse reflecting the variety of tasks performed while the structure was still in use. Even so, defining activity areas on the basis of this material is far from straightforward. In an effort to discern possible activity areas, the distribution of floor artifacts was studied for indications of spatial patterning. Four artifact clusters were noted on the floor of Pithouse 1: in the northwest quadrant of the floor, around the southeastern roof support posthole, around the northeastern roof support posthole, and between the ash pit and the ventilator tunnel.

Approximately half of the artifacts in the northwest quadrant are sherds. Most of these are classified as Early Pueblo Gray, but some Moccasin Gray and Early Pueblo White sherds are also present. The ground stone artifacts include three two-hand manos (PLs 23, 27, and 29), an in situ, pedestaled trough metate (PL 28), and three river cobbles. Also recovered was a flake that had been worked unifacially; this item is classified as a graver, beak, or perforator (PL 13). Several small splinters of artiodactyl bone were also recovered.

The artifact cluster around the southeastern roof support posthole consists of three used cores (PLs 51, 52, and 55); a fragmentary nonflaked lithic tool; a bone spatula (PL 54); and a large, flat river cobble that might have been used as an anvil (PL 53). North of the northeastern roof

Table 9. Point-located artifacts, Floor 1, Pithouse 1, LeMoc Shelter

PL No.	Material class	Item description
1	Ceramic	Early Pueblo Gray jar sherd
2	Flaked lithic	Debitage
3	Nonhuman bone	*Odocoileus hemionus*--simple awl
4	Flaked lithic	Debitage
5	Ceramic	Early Pueblo Gray jar sherd
		Mancos Corrugated jar sherd
6	Flaked lithic	Debitage
9	Flaked lithic	Debitage
10	Ceramic	Moccasin Gray jar sherd
11	Ceramic	Moccasin Gray jar sherds (4)
		Early Pueblo Gray jar sherds (14)
12	Nonhuman bone	Mammalia, large (2)
13	Flaked lithic	Graver
14	Ceramic	Early Pueblo Gray jar sherds (8)
		Polished White bowl sherd
15	Ceramic	Moccasin Gray jar sherds (2)
16	Nonflaked lithic	One-hand mano
17	Ceramic	Moccasin Gray jar sherd
18	Ceramic	Early Pueblo Gray jar sherd
19	Ceramic	Polished White jar sherd
20	Ceramic	Chapin Gray jar sherd
21	Ceramic	Early Pueblo Gray jar sherd
22	Ceramic	Early Pueblo Gray jar sherd
23	Nonflaked lithic	Two-hand mano
24	Ceramic	Early Pueblo Gray jar sherd
25	Ceramic	Early Pueblo Gray jar sherd
26	Nonhuman bone	Mammalia, large
27	Nonflaked lithic	Two-hand mano
28	Nonflaked lithic	Trough metate
29	Nonflaked lithic	Two-hand mano
30	Ceramic	Moccasin Gray jar sherd
31	Nonflaked lithic	Indeterminate
32	Flaked lithic	Thick uniface
33	Nonflaked lithic	Pestle
34	Nonflaked lithic	Anvil stone
43	Ceramic	Early Pueblo Gray jar sherd
44	Ceramic	Early Pueblo Gray jar sherd
45	Ceramic	Early Pueblo Gray jar sherd
46	Ceramic	Early Pueblo Gray jar sherd
47	Ceramic	Early Pueblo Gray jar sherd
51	Flaked lithic	Used core
52	Flaked lithic	Used core
53	Nonflaked lithic	Anvil stone

NOTES: PL numbers not listed represent items later determined not to be associated with the floor. Refer to figure 27 for artifact locations.

(N) - Number of items.

Table 9. Point-located artifacts, Floor 1, Pithouse 1, LeMoc Shelter--Continued

PL No.	Material class	Item description
54	Nonhuman bone	Mammalia, medium--spatula
55	Flaked lithic	Used core
56	Nonflaked lithic	Indeterminate
57	Nonflaked lithic	Indeterminate (2) Hammerstone
58	Ceramic	Moccasin Gray jar sherd
59	Flaked lithic	Debitage
61	Nonflaked lithic	Anvil stone
63	Nonhuman bone	Mammalia, large
64	Ceramic	Early Pueblo Gray jar sherd
65	Nonhuman bone	Mammalia, medium (2)
66	Nonhuman bone	*Lynx rufus*
67	Nonflaked lithic	Anvil stone
68	Nonflaked lithic	Indeterminate (not mapped)
69	Ceramic	Early Pueblo Gray jar sherd (not mapped)
70	Ceramic	Early Pueblo Gray jar sherd (not mapped)
72	Nonhuman bone	*Odocoileus hemionus* (not mapped)
73	Nonhuman bone	Mammalia, large (not mapped)
74	Nonflaked lithic	Anvil stone
75	Nonflaked lithic	Anvil stone
76	Nonhuman bone	Artiodactyla (not mapped)
77	Ceramic	Early Pueblo Gray jar sherds (2) (not mapped)
78	Nonflaked lithic	Two-hand mano
79	Ceramic	Early Pueblo Gray jar sherds (13) (not mapped)

support there is a second anvil stone (PL 75) and a hammerstone (PL 74). Two more anvil stones (PL's 61 and 67) lie to the southwest of this post-hole, and south of these is a scatter consisting of one piece of flaked lithic debitage and several bone fragments. The fourth artifact cluster, between the ventilator tunnel and the ash pit, consists of sherds from Early Pueblo Gray jars. In addition to these major artifact concentrations, there is a diffuse scatter around the hearth, which includes a stone pestle (PL 33), a unifacially worked flake (PL 32), and an anvil stone (PL 34).

Traditionally, activity areas have been defined on the basis of clusters of artifacts. Each cluster is assumed to mark an area where a task was performed. Once the clusters are identified, the artifacts in each are analyzed to determine the task that was being performed. Yellen (1977:96-97) states that two a priori assumptions that underlie this method are "that individual tasks are spatially segregated from one another" and "that objects found in association in an archaeological context are related to a single task or form part of a single tool kit." However, according to Yellen, recent ethnoarchaeological research refutes both of these assumptions. Many tasks tend to be performed in more than one place, and artifacts from several activities often can be found in the same area. Activities, and consequently the material evidence for those activities, tend to overlap spatially. Indeed, Yellen's observations of the spatial organization of Bushman camps has led him to reject the concept of activity areas.

Binford (1978:353), however, is less pessimistic: "Quite clearly there is a basis in 'reality' for seeking patterns in the archaeological remains which derive from spatial segregation of activities" (1978:353).

Based on his studies of the Nunamiut Eskimo, Binford argues that at any one time, the different activities being conducted simultaneously are independently organized in space. That organization, the spatial separation of activities, will vary with the number of activities being performed and with the nature of those activities. Over time, there is a statistical tendency for the individual activities to become localized in one area, although that area generally would not be reserved exclusively for one task.

A number of factors condition this spatial organization. Activities vary in the amount of space and time required for their completion, the number of participants, and the amount of debris or pollution (noise or odor) produced. Consequently, some activities will interfere with others, and the debris or pollution from some activities will disrupt or inhibit others. Some activities, therefore, will be consistently performed away from the central living/use areas. For example, Yellen (1977:92) reports that skins are dried outside of the Bushman hut circles because "this takes up a great deal of room" and because "such skins attract both vermin and carnivores." Among the Australian Aborigines, O'Connell (1979) notes that "car-repair" stations are segregated since vehicles often must stand idle for several months until the proper parts are obtained.

In multiple-use areas, although the activities themselves may be performed more or less harmoniously, the debris from one task can interfere with other use of the space. Consequently, these areas are generally cleaned up periodically, or, as at the Mask Site (Binford 1978), some debris is immediately tossed away from the use area. As Binford observed, these disposal patterns result in a distribution that essentially is inversely related to use intensity. Therefore, when the

intensively used space is limited, as on the floor of a pitstructure, cleaning up is likely to be a frequent activity.

In a study of discard locations using a sample from the Human Relations Area File, Murray (1980:492) found support for the hypothesis that "if a population is sedentary, relatively numerous, and uses permanent architectural structures as activity loci, then it will discard, outside their use locations, elements used in activities at those loci." Although the study was intended as an examination of the differences in discard locations between sedentary and mobile groups, her operationalization of the above hypothesis more closely relates to the removal of debris from the interior of architectural features. It seems likely, therefore, that the observed disposal patterns are less a consequence of sedentism than of intensive use of limited space for a variety of activities.

Although the findings discussed here seem to preclude the identification of artifact concentrations within structures as activity areas, this is not necessarily the case. At least two other processes appear to be at work to ensure that some record of an activity is preserved.

The first of these is size sorting of the refuse. It appears that only the larger pieces of debris are generally perceived as interfering with other activities. Consequently, smaller items frequently are left in place when an area is cleaned or debris is discarded. For instance, South (1979:218) notes that in historical sites "smaller sized artifacts are thrown around the yard adjacent to the house, whereas larger ones are usually on the periphery." O'Connell (1979) observed this same pattern in Aborigine camps, and at the Mask Site, size sorting is a significant factor in Binford's "toss zones" and "drop zones" (1978). Although no

systematic studies have yet been done, it seems likely that some of the smaller bits of refuse would have been ignored when a structure floor was cleaned, especially if the floor were earth or plaster rather than stone, wood, or some other unyielding substance. Nevertheless, the assumption made here that the smaller debris fragments on the pitstructure floor are likely to be primary refuse is untested. It is, however, consistent with what is currently known about discard behavior.

The second process contributing to the preservation of activity areas within structures is trampling. Debris dropped on a penetrable surface tends to be trampled into that surface by foot traffic. The floor becomes what Schiffer has termed an "artifact trap" (1976:32), although in this case, it is primary refuse that is trapped rather than lost artifacts. Under certain conditions the effects of trampling can be dramatic. For instance, Gifford (1978:81) recovered approximately nine times as many items (1953) from the subsurface layer as from the surface (200) of an African campsite that had been occupied for only four days.

Trampling, like discard behavior, effects a size sorting. In the case of the African campsite, the median size of the artifacts in the subsurface layer was slightly less than 3 cm. This is very close to the 1-in (2.54 cm) maximum size for items likely to become primary refuse discovered by Schiffer's students in studying modern refuse disposal (Schiffer 1978:244). Trampling, therefore, appears to be a mechanism whereby primary refuse may be preserved "through an out-of-sight-out-of-mind process" (Gifford 1978:83).

The relative importance of trampling in any single instance is conditioned by several factors. Probably the most important of these is

the penetrability of the substrate. Gifford's campsite had a fine sand substrate into which small items could be readily incorporated. Material is much less likely to be incorporated into the plastered surface of a pithouse floor. Or, more precisely, the average size of the materials incorporated into the floor will probably be smaller. Assuming that the "trampling force" is roughly constant, as the force-per-area needed to penetrate the subsurface increases, the size of the items incorporated into the substrate should decrease. The distance that trampled objects penetrate into the substrate can also be expected to decrease with increased compactness of the substrate.

If these hypotheses are valid, items of primary refuse trampled into the floor of Pithouse 1 probably will average somewhat less than 3 cm in size and are likely to be embedded in the plaster surface rather than to be incorporated into the underlying substrate. Testing of these hypotheses, however, has not yet been undertaken, which is unfortunate because these are the data most likely to yield the redundancies in spatial organization that Binford sees as the key to identifying activity areas. The material remaining on the floor may indeed be primary refuse, but the activities represented by this debris are not necessarily illustrative of the habitual organization of space when the structure was occupied. In fact, they are more likely a consequence of behavior during the abandonment of the site.

The nature of this de facto refuse is related not only to the activities performed but also to the conditions of abandonment. That is, the fact that a structure is being abandoned may alter the way in which activities are performed and, consequently, may affect the distribution of the material items left behind. "For example, if abandonment is

anticipated by a group, its members may begin to accumulate refuse in areas like house interiors, which usually would have been kept relatively free of debris. Such material might be considered primary refuse, but they really are formed by an abandonment, not normal, process" (Schiffer 1976:33-34).

How, then, are the artifacts from the floor of Pithouse 1 to be interpreted in light of the preceding discussion? First of all, it is clear from the relative paucity of complete implements that the pitstructure was not abandoned under catastrophic circumstances. Since abandonment was anticipated, the choice of materials left on the pithouse floor was undoubtedly strongly conditioned by the circumstances of that abandonment. Following Schiffer's arguments, it seems likely that most of the nonflaked stone artifacts--the lapstones, anvils, manos, and hammerstones--were left behind since they could be readily replaced with only a small labor investment. The same probably was true of the flaked stone tools and cores. The metate, on the other hand, was most likely left behind because of the high cost of transporting such an item.

These still-usable artifacts presumably were left either where they were last used or where they normally were cached. Consequently, their locations should reflect at least the spatial organization of activities immediately preceding the abandonment of the site. Furthermore, since the floor features represent a long-term allocation of activity space, it should be possible to make some judgments concerning the activity pattern in the pithouse by comparing the two lines of evidence. Finally, by examining the distribution of the sherds and bone scrap, which are believed to be primary refuse, some additional evidence of patterning may emerge.

The artifacts in the southeast corner of Pithouse 1 appear to constitute a flintknapper's tool kit, although the fact that no lithic detritus was found in the area suggests that no knapping was done immediately before the structure was abandoned. Rather, this seems to have been where the tools were stored. Nevertheless, the fact that the tools are scattered may indicate a lithic work area or an area where the flintknapper had sorted through his materials, tossing aside the items that were being left behind.

The placement of the two large anvils (PL's 61 and 67) near the northeastern roof support posthole seems to have been purposeful. Their presence, and that of the anvil stone north of the posthole (PL 75), suggests that this area may have been used for tool storage or possibly as a work area. This interpretation is seemingly contradicted, however, by the scatter of bone, stone, and ceramic debris in this area. If this material is accepted as being primary refuse, the predominance of bone fragments suggests that the anvils might have been used to break bone for the extraction of marrow or oil. While this interpretation is plausible, the presence of lithic detritus and sherds would be anomalous in this situation.

It seems more likely that these artifacts were refuse that was swept or tossed into this corner. Technically, therefore, this material is secondary refuse, probably from several activities. Normally, the final step would have been to clean up and remove this debris from the structure, but because the pithouse was being abandoned, the usual discard behavior apparently was suspended. It seems likely that this same process also accounts for many of the artifacts in the clusters south of the ash pit and in the northwest quadrant of the floor. Consequently, when

hypothesizing activity areas, these materials must be interpreted with caution, and relatively more weight should be given to the usable tools found in these concentrations.

Keeping these caveats in mind, the northwest corner of the floor is tentatively interpreted as having been a food preparation area. The tools present (two two-hand manos and a pedestaled trough metate) clearly indicate that milling was habitually conducted in this part of the pithouse, and the clustered floor features suggest that other food preparation activities were centered here as well. Using ethnographic data from observations of historic Hopi and Zuni food processing activities, Southward (1981) notes that there is some justification for using mealing areas as primary indicators of food processing. However, she also argues that food processing activities tend to include large areas that generally incorporate more than one feature-based focal point. Such a sequence often involves repeated use of a fire area and a mealing area. Consequently, while much of the food processing may have been concentrated in the northwest corner, the activity area required for the whole preparation process would have intermittently encompassed the entire northwest quadrant of the floor of the pitstructure.

To some extent, the debris in the northwest corner supports the interpretation of this area as a center for food preparation as well. The bone scrap, for example, is confined to the edges of the scatter as though tossed out of the way as meat was prepared. Similarly, some of the sherds may be primary debris from vessels broken during food preparation. The almost uniform distribution of the sherds over the area, however, is more characteristic of a secondary debris scatter than of the distribution of primary refuse in an activity area. More typical of the latter is a

concentration of refuse in arcs or lobes immediately outside of the actual work area. Consequently, at least a portion of this artifact concentration is likely to be secondary refuse.

The materials scattered around the hearth are generally too large to be primary refuse. With few exceptions, these artifacts are usable tools. In this instance, it is unlikely that they normally were stored in this area, since it is assumed that the areas around hearths or fires are intensively used for a variety of activities. The most plausible interpretation, therefore, is that these artifacts were set aside as some activity being performed shortly before abandonment was completed or interrupted. When the site was finally abandoned, the artifacts were left behind. These artifacts--a mano, a pestle, two anvil stones, a thin uniface, a utilized flake, and two stone cobbles--suggest that food preparation and possibly some last-minute repair or implement manufacture were the last activities performed in the central part of the pitstructure.

The open areas where few artifacts were found can be as informative as the artifact clusters. If the refuse found on the floor is accepted as evidence that normal discard behavior patterns were suspended in anticipation of abandoning the pitstructure, then these open areas may be explained as the product of one of two behaviors: intensive use or storage. Binford (1978:355) notes an inverse relationship between intensively used areas and areas of refuse disposal. This relationship implies that those areas relatively free of debris were the most intensively used loci on the pitstructure floor. Alternatively, some of these artifact-free areas might have been used primarily for storage (e.g., in bags or baskets). By definition, storage requires the use of

allotted space for an extended period, precluding use of that space for other activities. Since storage produces little or no debris, once the stores are removed, little evidence for that use of space is likely to remain.

Both behaviors probably account for the observed open areas on the floor of Pithouse 1. To some extent, however, the effects of intensive use and storage can be separated by reference to the locations of floor features, which, for Pithouse 1, suggest that there were two loci around which activities were structured. As indicated earlier, the floor artifacts and features concentrated in the northwest quadrant of the floor suggest that this area was used habitually, and possibly exclusively, for food preparation. The second focal point appears to have been the area around the hearth and ash pit. Binford's (1978), O'Connell's (1979), and Yellen's (1977) observations indicate that the hearth is generally the center for many activities beyond those tied to the feature itself. Besides maintenance of the fire for warmth and cooking, the hearth area was probably a focal point for eating, conversation, a variety of craft activities, and sleeping.

Allowing space for these activities and for a walk-space around the hearth and ash pit, the periphery of this central area appears to coincide roughly with a square drawn to connect the four roof support posts. Intensive use of this central area would tend to preclude any activity that required monopolizing any space for a long period of time or any activity that created large quantities of debris. Such activities were most likely relegated to outside work areas or, within the pitstructure, to the less-used spaces around the periphery. Concentrating the kitchen area in the northwest corner is apparently a consequence of this

competition for space in the center of the floor. This competition may also help explain the location of manufacturing areas in the eastern half of the structure.

Following this rationale, storage areas would also be located on the periphery. As discussed earlier, however, when a structure is abandoned in a leisurely manner, no artifact evidence of storage is likely to remain. Therefore, negative evidence, in this case the distribution of floor artifacts, must be used. Except for the scatter of secondary refuse in front of the ventilator tunnel, no artifacts were found in the peripheral areas of the southwest quadrant of the floor. Features that would allow this open area to be interpreted as an intensively used activity area were not encountered; consequently, it is reasonable to postulate that this area was reserved for storage. Because this interpretation is based on negative evidence, however, it remains tenuous. The most that can be said is that the southwestern periphery of the pithouse conforms to the expectations of a storage area.

To summarize, five areas of activity are tentatively identified in Pithouse 1. The first is a large, horseshoe-shaped, multiple-use activity area in the center of the floor surrounding the hearth and ash pit. The second is a food preparation area in the northwest quadrant, partially overlapping the hearth area. The third and fourth areas are both manufacturing loci, one centered around each of the eastern roof support postholes. Together these manufacturing loci suggest that the peripheral area to the east was used primarily for the limited production and maintenance of tools. The fifth activity area, tenuously defined on the basis of negative evidence, is a storage area along the periphery of the southwest quadrant of the floor.

Discussion. Typically, the floor plan in Anasazi subterranean structures is quite formal. In fact, it is the presence or absence of certain features that is the traditional basis for distinguishing subsurface domicilies (pithouses) from specialized religious structures (kivas). In its layout, Pithouse 1 conforms neither to the concept of a pithouse nor to that of a kiva; rather, it possesses an admixture of traits variously suggesting both.

The bench is confined to the northern end of the structure. In their studies at Mesa Verde, Hayes and Lancaster (1975:182) consider the elimination of the bench to be associated with the movement of families to surface structures, reserving the subterranean structures for religious functions. Replacement of the antechamber by a ventilator complex such as the one in Pithouse 1 is also considered by them to be indicative of this transition. Similarly, the absence of a wingwall has been cited as indicating that a structure has become reserved primarily for ceremonial uses (Lancaster et al. 1954:55).

In the Dolores area, a similar pattern is evident. During the Dos Casas Subphase, habitation sites typically consisted of small pueblos with three to six household clusters (Kane 1981a:67). Households were apparently centered in three-room surface apartments, and pitstructures appear to have been shared by multiple households. These "protokivas" are generally similar to Pithouse 1, although wingwalls are usually present. Following these criteria, therefore, Pithouse 1 should be classified as a protokiva.

The situation at LeMoc Shelter, however, is somewhat atypical. Except for Room 12, no surface structures served as domiciles during Element 2, although the roomblock continued to be used as a work and

storage area. Therefore, the shelter was used by, at most, two households, one of which resided in Pithouse 1.

Following Gillespie (1976:89), the absence of female activities in the pitstructure seems to be the best criterion for differentiating between a pithouse and a kiva. Specifically, a kiva should have no evidence of food preparation or plant food processing. As was illustrated, Pithouse 1 was clearly a locus for these activities and many others. Insofar as activity patterns have been reconstructed, they suggest occupation by a household group. Consequently, Pithouse 1 did not have a specialized religious or "kiva" function, although some ritual activities might have been performed there. The presence of a sipapu in the floor of the pitstructure does imply some ceremonial practices, or at least ritualistic symbolism.

Although Pithouse 1 was not a specialized ceremonial structure, it may have been the focal point for ritual activities. Since Room 12 lacks a sipapu, it seems likely that the two households, which were probably occupied by members of the same extended family, collectively performed ceremonies in the pitstructure, which presumably was the domicile of the senior household group.

Room 12

Dimensions:

North wall	
length:	3.60 m
height:	unknown
South wall	
length:	3.80 m
height:	unknown
East wall	
length:	2.50 m
height:	0.50 m

West wall

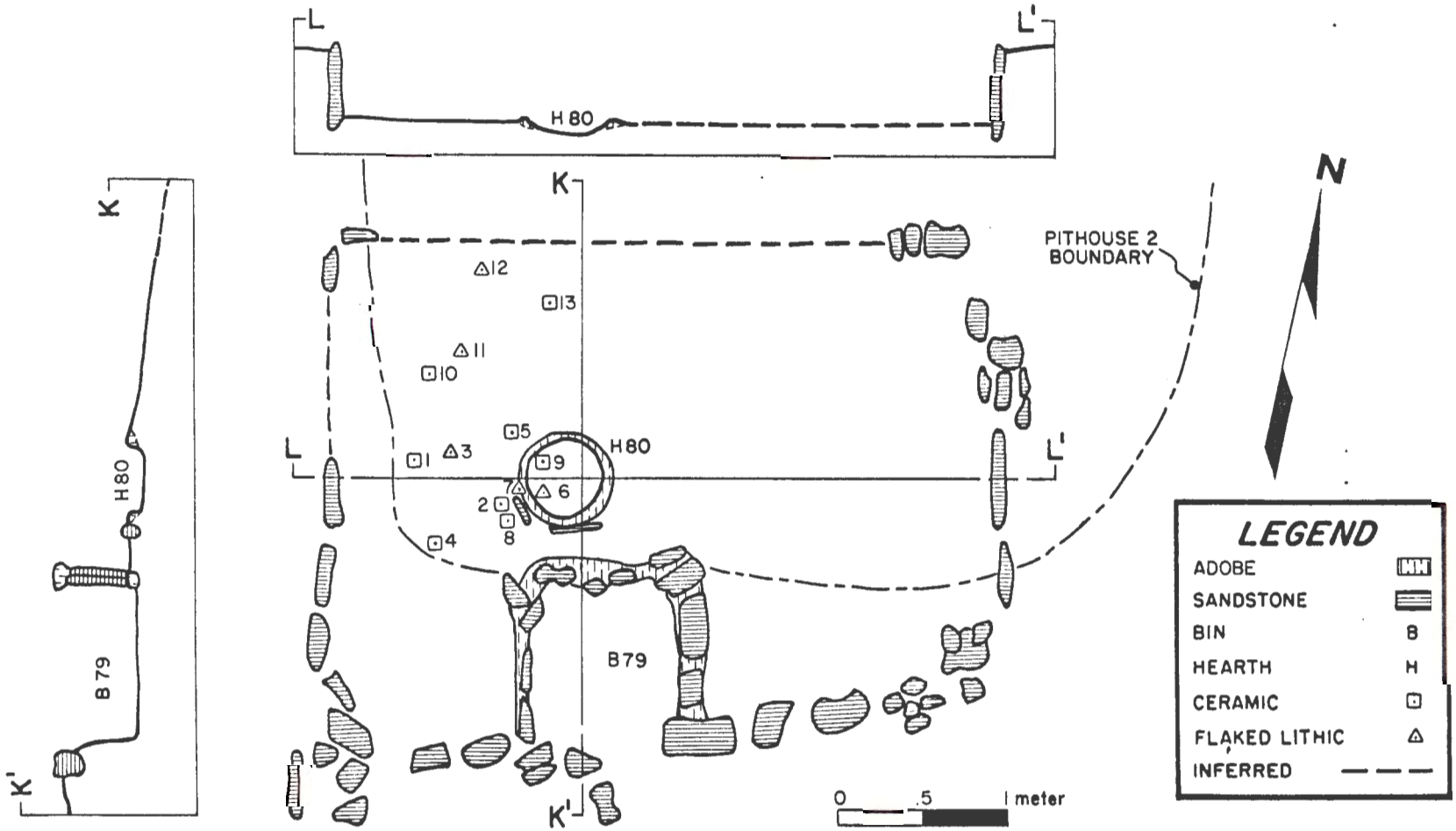
length:	3.10 m
height:	0.45 m

Room 12 (fig. 30) is a poorly preserved, surface living room located in the western half of the shelter, south of the roomblock. Most of the structure was built on the fill of Pithouse 2, although the room extends beyond the southern limit of the pithouse depression, past the dripline. The room is rectangular in plan, and measures an estimated 3.2 m along its north-south axis and 3.9 m along its east-west axis. As discussed earlier, the occupation of Room 12 is dated to between A.D. 850 and 875 on the basis of its stratigraphic position and the ceramic assemblage of its roof fall (Stratum I-5). It, therefore, is believed to be roughly contemporaneous with the occupation of Pithouse 1.

Construction. Little remains of Room 12 except for an outline of vertical sandstone slabs and masonry, the remnants of the structure's south, east, and west walls. The approximate location of the north wall was established based on two upright slabs (which apparently formed the northwest corner of the room), three sandstone blocks along that same line, and the northern limit of the roof fall. As discussed in the stratigraphic descriptions, Room 12 appears to have been built in a shallow depression excavated into the Stratum I-4 midden deposit in the depression of Pithouse 2. The vertical slabs appear to have rested against the sidewalls of the room depression to form the footings for the upper walls. From the little evidence available, the upper walls consisted of crude, coursed masonry similar to the east wall of Pithouse 1.

No evidence of any interior roof supports was found; however, too little of the floor remained to ascertain whether posts were, in fact,

Figure 30. Plan map and architectural profiles of Room 12, Floor 1, LeMoc
Shelter. PL 14 (debitage) not mapped.



absent or simply had not been preserved. Nor was any structural detail of the support system preserved in the roof fall except for a row of small (5 cm diameter) horizontal poles that apparently rested on the north wall. The thin and diffuse character of the roof fall suggests that usable timbers might have been robbed from the structure before it burned.

The plastered floor was preserved only in a 2 m^2 area in the northwest quadrant of the structure. In other areas of the room, the floor was recognizable only because of the sharp contact of the roof fall with the sediments in Stratum I-3.

Floor Features. Two floor features are present in Room 12. The more prominent is a bin (Feature 79) built against the center of the south wall. The bin is rectangular, measuring approximately 110 cm long, 100 cm wide, and 49 cm high. It is constructed of upright slabs set into the floor and is mortared and plastered with adobe. The fill of the bin is largely adobe melt, overlain by roof fall and sealed with colluvial sand. While there is no direct evidence as to its function, the bin is believed to have been a storage facility.

The second feature is a basin-shaped hearth (Feature 80) located near the center of the room, just north of the bin. It is 50 cm in diameter and approximately 7 cm deep. A raised adobe rim, reinforced on the south by two small upright slabs, surrounds its perimeter. The hearth was filled with an ashy sand flecked with charcoal.

Floor artifacts. Not surprisingly, the few in situ artifacts found in Room 12 were recovered from the remnant plaster surface (fig. 30 and table 10). Eight of the 14 floor artifacts are small sherds; the other 6 items are flaked lithic debitage. Given the character of these artifacts and the small size of the observable floor area, no analysis of activity

areas will be attempted. However, the inferred size of the room and the presence of the hearth suggest that Room 12 was a dwelling; a variety of household tasks, therefore, were likely to have been performed in the room.

Table 10. Point-located artifacts, Floor 1, Room 12, LeMoc Shelter

PL No.	Material class	Item description
1	Ceramic	Bluff Black-on-red bowl sherd
2	Ceramic	Early Pueblo Gray jar sherd
3	Flaked lithic	Debitage
4	Ceramic	Moccasin Gray jar sherd
5	Ceramic	San Juan Polished White bowl sherd
6	Flaked lithic	Debitage
7	Flaked lithic	Debitage
8	Ceramic	Early Pueblo Gray jar sherd
9	Ceramic	Mancos Gray jar sherd
10	Ceramic	Early Pueblo Gray jar sherd
11	Flaked lithic	Debitage
12	Flaked lithic	Debitage
13	Ceramic	Early Pueblo Gray jar sherd
14	Flaked lithic	Debitage (not mapped)

NOTE: Refer to figure 30 for artifact locations.

Interestingly, a second cluster of artifacts was found on the upper surface of the roof fall. This surface was not assigned a number and the artifacts were not designated PL's. Included in this concentration were one complete trough metate, two metate fragments, two two-hand manos, and a grinding/abrading stone. The significance of this concentration of ground stone artifacts is difficult to assess. On one hand, these materials may have been discarded when the site was temporarily abandoned. On the other hand, the large metate fragments still would have been serviceable grinding implements after being broken, so the scatter may be an in situ activity area. In the latter case, the location of the

artifacts could indicate either use of the roof of Room 12 as a milling area or use of this area as an open work space after the structure was destroyed. However, the ratio of manos to metates is much lower than would be expected for a use area of this type. Consequently, the first alternative--that the scatter is de facto refuse associated with the abandonment of the shelter at the end of Element 2--is favored.

Discussion. The interpretation of Room 12 as an isolated surface dwelling makes it something of an anomaly in the Dolores area. Although surface dwellings are common during this period, the general form is what Hayes and Lancaster (1975:182) term an "apartment"; that is, a large surface living room fronting one or two smaller storage rooms. Commonly, several contiguous apartments are arrayed in a line or arc to the north of the pitstructures.

Since LeMoc Shelter was probably never occupied by more than one extended family at one time, the absence of living apartments contiguous with Room 12 is understandable. And since use of most of the storerooms of the roomblock is assumed to have continued through Element 2, the absence of additional storage facilities contiguous with Room 12 also seems reasonable. Nevertheless, some evidence uncovered during excavation suggests that Room 12 may in fact have been a unit apartment.

The rubble of a fallen masonry wall is embedded in the adobe facies of Stratum I-6 (I-6a), which is thought to be roughly contemporaneous with the deposition of Stratum I-5 (the roof fall of Room 12). The rubble pile begins in the northwest corner of the pithouse depression and extends for approximately 2 m along the north wall. The scatter is about 125 cm wide and varies in thickness from 15 to 50 cm. The rock at the bottom of the the pile rests on a surface level with the floor of Room 12, which is about 90 cm below the top of the north wall of Pithouse 2.

Initially, this rubble was thought to be the collapsed north wall of the pitstructure. Had this been the case, however, the lower portion of the wall probably would have been preserved by the sediments already laid down in the depression (i.e., Stratum I-4). Since the rubble lay close against the north wall of the depression, the hypothesis that the rubble was wall fall from the roomblock to the north was also rejected. Given the pronounced undercutting of the pithouse wall, a wall falling into the depression from the north would land closer to the center of the depression and would not be mounded against its northern edge. Since the organization and orientation of the rubble clearly indicates wall fall and not merely a pile of rocks tossed into the depression, the most plausible explanation is that, during Element 2, there was a masonry wall built within the depression, near its northern margin. This wall, which would have been roughly 2 m north of the probable north edge of Room 12, could have been the back (north) wall of one or more storage structures.

As discussed earlier, the north wall line of Room 12 could be located only approximately. Unfortunately, the 1-m gap between this line and the southern edge of the wall fall was cut away by an early exploratory trench in Pithouse 2. No evidence of any north-south connecting walls was found during this probe, but given the poor preservation of Room 12 and the narrow perspective available when the trench was being dug, such evidence could have been overlooked.

In addition to the absence of crosswalls, no evidence of a surface was found beneath the Stratum I-6 wall fall rubble. Given that most of the floor of Room 12 to the north was recognizable only because of its sharp contact with the burned roof fall, this negative evidence is also equivocal. Consequently, although wall fall provides the only positive

evidence, the interpretation of the rubble as being the rear wall of one or two storage rooms associated with Room 12 remains the most plausible explanation of this otherwise enigmatic feature.

Element 3

A short occupational hiatus following the abandonment of Pithouse 1 and Room 12 marks a significant change in the use of the shelter. The structures built when the shelter was reoccupied in Element 3 are small and appear to have been used seasonally. The site probably served as a farming station occupied during the growing season rather than as a year-round habitation.

As discussed earlier, this occupation is separated from that marked by Room 12 by approximately 50 cm of sediments constituting Strata I-6 and I-7. Because Room 11 was perched on a shelf of cave breccia extending from the west wall of the rockshelter, however, this difference in elevation does not necessarily negate the possibility that Rooms 11, 12, and 13 were contemporaneous, given the relative positions of the three rooms. However, once it became clear that the Stratum I-6a wall fall that underlay Room 13 was most likely associated with the Element 2 occupation and not with the collapse of Pithouse 2, the distinction between the two occupations was evident.

Room 11

Dimensions:

North wall	
length:	1.40 m
height:	0.32 m
South wall	
length:	1.50 m
height:	0.33 m

East wall	
length:	2.66 m
height:	0.46 m
West wall	
length:	2.30 m
height:	0.20 m

Room 11 is a small, rectangular surface room originally built along the west wall of the rockshelter just beyond the present dripline. With the adjacent Room 13, Room 11 forms an L-shaped unit (fig. 31). After a brief occupational hiatus following the abandonment of both structures, Room 11 was rebuilt, and the shelter was reoccupied for a short time. Based on ceramic cross dating and stratigraphic position, Room 11 can be tentatively dated to approximately A.D. 875; however, separate dates could not be obtained for the individual occupations.

Construction. Little remains of Room 11 beyond an outline formed by the vertical-slab wall footings and remnants of the first course of masonry. When first built, Room 11 measured approximately 2.6 by 1.5 m. The earliest floor (Floor 2) appears to have been excavated approximately 25 cm below aboriginal ground surface, and the vertical slabs were set against the walls of the depression. The walls were then built up with courses of sandstone blocks mortared with adobe. The masonry of the north wall was extended beyond the east wall of the room to form the south wall of Room 13.

Since no evidence of any interior roof supports was found, the roof is presumed to have been wholly supported by the walls. There appears to have been no preparation of the floor. In the south half of the structure, where it is best preserved, the floor is a level, use-compacted surface, slightly stained with ash and organic residue.

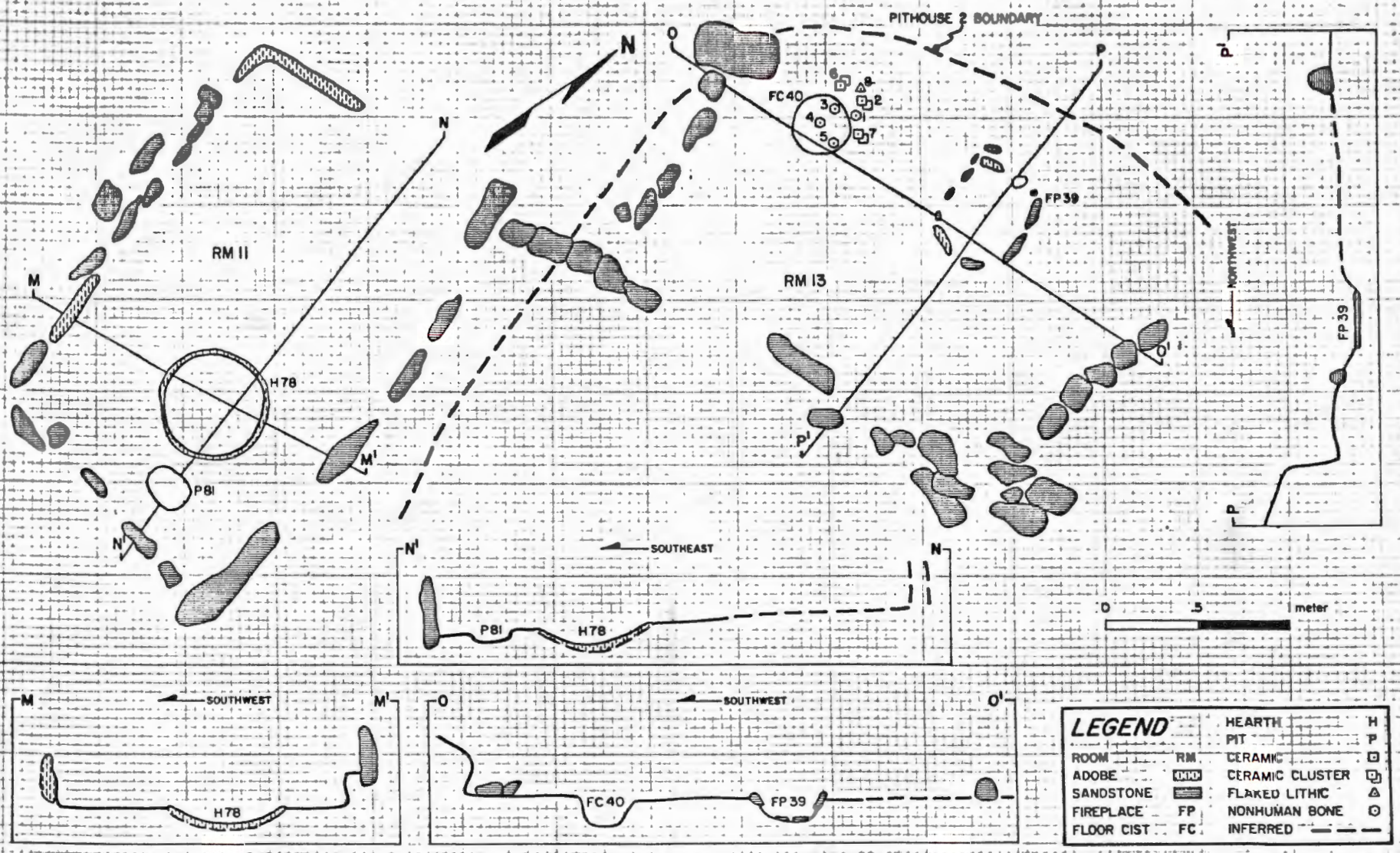


Figure 31. Plan map and architectural profiles of Room 11, Floor 2 and Room 13, Floor 1, LeMoc Shelter.

Floor 2 features. The major floor feature in Room 11 is a round hearth (Feature 78) in the south-central part of the floor, measuring 60 cm in length, 55 cm in width, and 21 cm in depth. The hearth is lined with adobe and has a narrow adobe collar around its perimeter. The lower portion was filled with clean sand; the upper portion consisted of ashy sand flecked with charcoal similar to the overlying fill. Although the feature is labeled a hearth, the adobe walls of the depression are only lightly oxidized. This suggests either that the hearth was used infrequently or that the basin served primarily as a container for embers or heated stones. The latter interpretation implies that the primary function of the feature may have been to heat the structure. In this case, activities generally associated wih a hearth were probably not performed in Room 11.

Immediately to the south of Feature 78, near the southeast corner of the room, is a small, oval pit (Feature 81), measuring 24 cm long, 16 cm wide, and 5 cm deep. Although this pit was filled with ashy sand, the shallowness of the feature suggests that it may have served as a pot rest. In the absence of any floor artifacts, these features provide the only available clues as to the room's function. Generally, both of these feature types are taken as evidence of domestic activities associated with a habitation; in this case, however, Room 11 is clearly too small to have been a dwelling. Rather, it is suggested that Room 11 was primarily a sleeping area, used by one or two people. The hearth probably was used primarily for heat and perhaps for the occasional preparation of a meal. The majority of activities generally performed in a dwelling were probably relegated to outside work areas.

Remodeling. As indicated earlier, Room 11 appears to have been rebuilt following its destruction and a temporary abandonment of the rockshelter. Abandonment of the original structure, and its subsequent collapse, is indicated by adobe melt from the west wall in the southwest quadrant of the floor and by a stratum of ashy sand mottled with charcoal and adobe overlying it and the rest of the lower use surface. This ashy sediment appears to be a mixture of burned structural rubble and midden, an interpretation supported by the artifacts recovered from it, including small bits of broken pottery, broken flaked and nonflaked lithic tools, lithic detritus, and bone scrap. Included in the bone scrap were several unarticulated hawk bones concentrated near the northwest corner of the room.

The upper contact of the ashy fill is a second use-compacted surface (Floor 1), the floor of the rebuilt room. This surface is bound on the south and west by the original walls of the structure, but to the north and east new walls were built (these walls were not mapped). The new structure was slightly smaller than the old, measuring 2.1 by 1.4 m. As in the original structure, the floor of the rebuilt room was below aboriginal ground surface. As suggested earlier, the sediments removed when this room was being dug appear to have been dumped just beyond the east wall, resulting in the deposition of Stratum I-8.

Like the original structure, the walls of the rebuilt structure appear to have been coursed masonry. Again, there was no evidence of interior roof supports, which suggests that the walls supported the entire weight of the roof. No artifacts were found in contact with the upper use surface, and there were no floor features. Consequently, it is possible that the rebuilt room may have been used as a storeroom rather than as a living area.

Room 13

Dimensions:

North wall:	absent
South wall	
length:	2.30 m
height:	unknown
East wall	
length (existing):	1.65 m
height:	unknown
West wall	
length (existing):	1.75 m
height:	unknown

Room 13, like Room 11, is inferred to be a small, rectangular surface room; it currently measures approximately 2.5 by 1.75 m (fig. 31). Room 13 is located in the north half of the Pithouse 2 depression and is oriented at a right angle to Room 11. As mentioned earlier, the two structures share a common corner. Based on the presence of Mancos Gray and Moccasin Gray sherds in Room 13, the structure is believed to have been occupied sometime between A.D. 860 and 910; this span encompasses the A.D. 875 date estimated for the construction of Room 11.

Because of its location in the most intensively used area of the shelter, Room 13 was almost totally obliterated by subsequent occupations. Besides the remnant of the south wall, all that remains of the walls are portions of the basal course of sandstone blocks and wall fall from the south and west walls. Similarly, only the northwest quadrant of the floor and the floor features adjacent to it are preserved.

Construction. From the available evidence, it is clear that the walls of Room 13 were built of courses of tabular sandstone blocks cemented with adobe mortar. Unlike Floor 2 in Room 11, Floor 1 in Room 13 was not excavated below ground level; consequently no vertical slabs were

used as wall footings. Since no interior postholes were found, the roof was presumably wholly supported by the walls. Floor 1, where preserved, is a level, use-compacted surface stained with ash.

Floor 1 features. Two features are associated with Floor 1 in Room 13. The more prominent of these is a slab-lined fireplace (Feature 39). The feature is roughly square, measuring approximately 50 cm on a side, and is 10 cm deep. The fill was a dark sand mixed with ash and charcoal from fires built in the hearth. The second feature is a small, circular floor cist (Feature 40) located in the northwest corner of the room. The cist is 30 cm in diameter and 15 cm deep. It was filled with a mottled, ashy sand containing 1 gray ware sherd, 10 small flakes, 20 small splinters of mammal bone, and 1 small bone awl. The dark fill is sealed by a 2-cm-thick layer of compact sand or adobe, which suggests that use of the cist was discontinued sometime before Room 13 was abandoned.

Despite the ashy fill, it is unlikely that this feature was a hearth since there was no oxidation of its sidewalls. Its small size also argues against this interpretation, and, for the same reason, it is unlikely to have been an ash pit. The most plausible interpretation seems to be that it was used for some sort of short-term storage. The fill was probably refuse dumped into the cist to fill it when the feature was sealed.

Floor 1 artifacts. As indicated earlier, only a small remnant of the most recent floor of Room 13 was preserved--an elongated rectangular patch covering an area of about 1 m^2 between the northwest corner of the room and the western edge of the hearth. Sixteen artifacts, grouped into eight PL's, were found on Floor 1; all were clustered on or around the sealed floor cist. These artifacts include four bone awls, three Moccasin Gray

sherds, and two Mancos Gray sherds (fig. 31 and table 11). Because so little of the floor was preserved, it is impossible to determine whether these artifacts were an isolated cluster or part of a larger scatter, most of which has eroded away. Consequently, the cluster cannot be analyzed as an activity area. Even if this were not the case, it seems unlikely that all of these artifacts were associated with a single activity. The sherds and flake show no evidence of modification, and it is doubtful that they could be primary refuse of any activity that also involved the awls. The most conservative interpretation, therefore, is that they are the debris of normal domestic activities, a remnant of the refuse scatter commonly found on most living surfaces.

Table 11. Point-located artifacts, Floor 1, Room 13, LeMoc Shelter

PL No.	Material class	Item description
1	Nonhuman bone	*Odocoileus hemionus*--awl
2	Ceramic	Mancos Gray jar sherds (2)
3	Nonhuman bone	*Odocoileus hemionus*--awl
4	Nonhuman bone	*Odocoileus hemionus*--awl
5	Nonhuman bone	*Odocoileus hemionus*--awl
6	Ceramic	Moccasin Gray jar sherds (3) Early Pueblo Gray jar sherds (2)
7	Ceramic	Early Pueblo Gray jar sherds (4)
8	Flaked lithic	Debitage

NOTES: Refer to figure 31 for artifact locations.

(N) - Number of items.

The awls are more difficult to interpret. Such tools generally are associated with basketmaking or with the working of hides. Their presence in Room 13 is strong evidence that one or both activities were performed at the site during this occupation. The puzzle is why they were left behind when the site was abandoned. All are complete and serviceable

tools that could easily have been transported, and, although they are readily replaceable, they do represent a moderate labor investment. Given Schiffer's (1976) discussion of de facto refuse, it seems unlikely that they would have been discarded. The most plausible explanation, therefore, is that they were deliberately left behind--cached by their owner in anticipation of a return to the site.

Remodeling. Besides the sealed floor cist, the only evidence for remodeling is an earlier use-compacted surface (Floor 2) found approximately 1 to 2 cm below the level of the upper floor. Floor 1 and Floor 2 were separated by a thin stratum of sterile, colluvial sand, except along the north edge of the room where the two joined and became the same surface. This suggests that the lower surface may be a remnant of the original floor of Room 13, and that after temporarily abandoning the structure, the shelter's inhabitants returned, laid a new floor, and reoccupied the room. Floor 2 was very ephemeral and was not visible in profile. No artifacts were recovered from this surface.

Although there is no direct evidence with which to correlate the remodeling of Room 13 with that of Room 11, it seems reasonable to assume that both structures were abandoned at the same time. As indicated earlier, there is some evidence that Room 11 burned either during or sometime after its initial occupation. Since some midden material was incorporated into fill after the room burned, it appears that the shelter was occupied shortly after Room 11 collapsed. It seems likely that Room 13 continued to be used during this time. When Room 11 was finally rebuilt, it does not appear to have been used as a living area. Again, this suggests that Room 13 was being used as the principal habitation area. Thus, Room 13 appears to have been occupied periodically throughout

Element 3, while Room 11 was used during only part of this period.

Feature 38

Feature 38 is an isolated fireplace located within the lower unit of Stratum II-6 in the northeast corner of the Pithouse 1 depression (fig. 32). Tentatively, the midden deposit that encloses Feature 38 is correlated with the occupation of Rooms 11 and 13. Consequently, this feature is interpreted as an open activity area used sometime during Element 3.

The feature is an oval basin measuring 110 cm long, 70 cm wide, and 25 cm deep. It was filled with a dark, sandy sediment that was heavily stained with ash and charcoal. The fill is sealed by a pile of fire-reddened, cobble-sized pieces of sandstone. Other fire-reddened sandstone cobbles are spread to the north and south of the depression.

Feature 38 is believed to have been used as an oven based on its relatively large size, its unusually dark fill that suggests a smoldering rather than an open fire, and the quantity of fire-reddened rock adjacent to the depression. Furthermore, the placement of the feature away from the main occupation area is analogous to the placement of earth ovens among the Bushman (Yellen 1977) and the Australian aborigines (O'Connell 1979).

Element 4

Following the abandonment of the shelter at the end of Element 3, there appears to have been an occupational hiatus of roughly 25 to 30 years, marked by the deposition of Stratum I-9. During this period, Rooms 11 and 13 collapsed and were largely buried by colluvial sand. The next major period of occupation, tentatively dated to about A.D. 920-930,

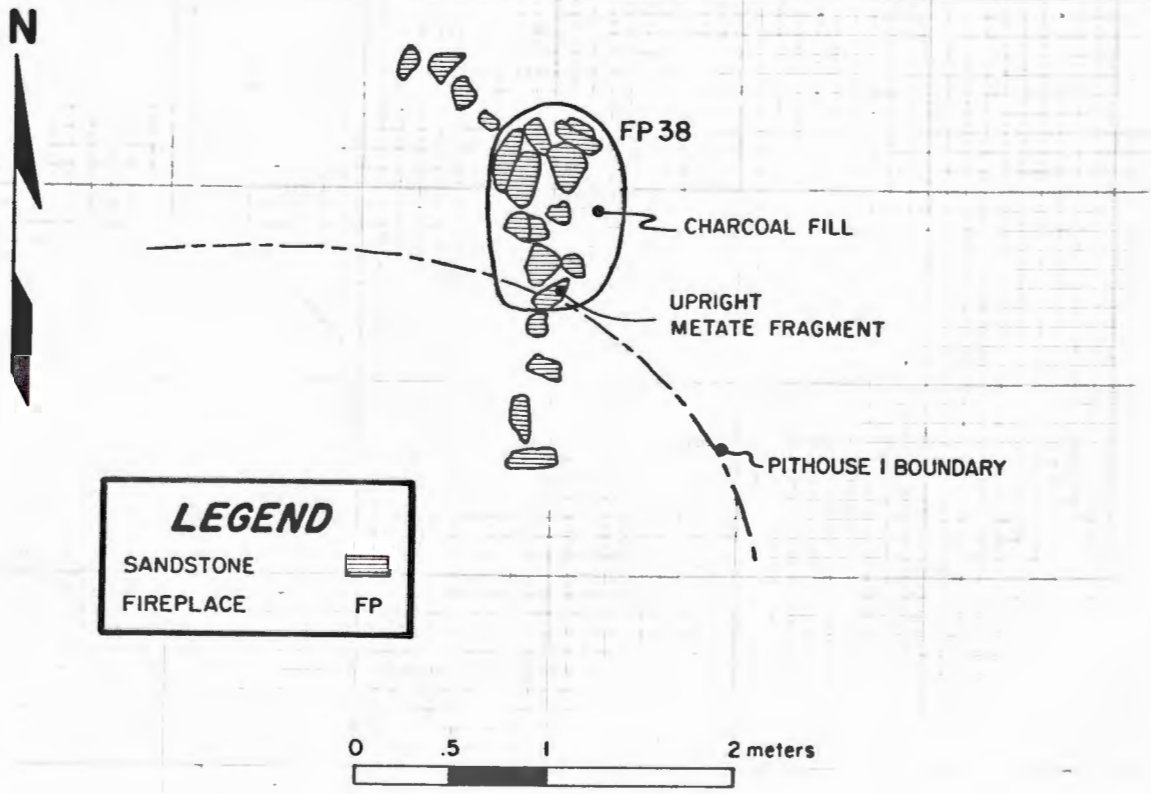


Figure 32. Plan map of Feature 38 (fireplace), LeMoc Shelter.

indicates a second decrease in the intensity of the use of the shelter. During Element 4, no rooms were built in the shelter, which seems to have been used as a base camp occupied sporadically for, at most, a few weeks at a time.

Retaining Wall

A low wall had been built across the front of the shelter at the beginning of the Element 4 occupation. The wall, located just inside the present dripline, extends from the west wall of the shelter to the southwest corner of Pithouse 1 (fig. 33). Originating at the upper surface of Stratum I-9, the wall was built to a height of approximately 1 m. The wall consisted of dry-laid masonry courses of tabular sandstone blocks between 25 and 100 cm in length. Material for the wall was undoubtedly procured from the surrounding slopes and from the ruined structures within the shelter. Judging by the amount of water that entered the shelter during late summer rain storms after the wall was removed during excavation, the primary purpose of the retaining wall was probably to divert runoff downslope, away from the living area.

Occupation Area 2

Occupation Area 2 consists of a use-compacted surface (Surface 1) at the contact between the sandy facies of Stratum I-9 and Stratum I-10, the level of origin of the retaining wall. It appears, therefore, to mark the first use of the shelter during Element 4. The surface, beginning just south of the roomblock, covers an area of approximately 9 m^2 in the western half of the shelter (fig. 34). A large, circular pit, Feature 20, is located near its southern edge. The pit is roughly 95 cm in diameter and 25 cm deep. Several blocky pieces of sandstone were stacked in the center of the depression. Below the rocks and filling the pit were sediments of Stratum I-10. The sides of the basin were unburned.

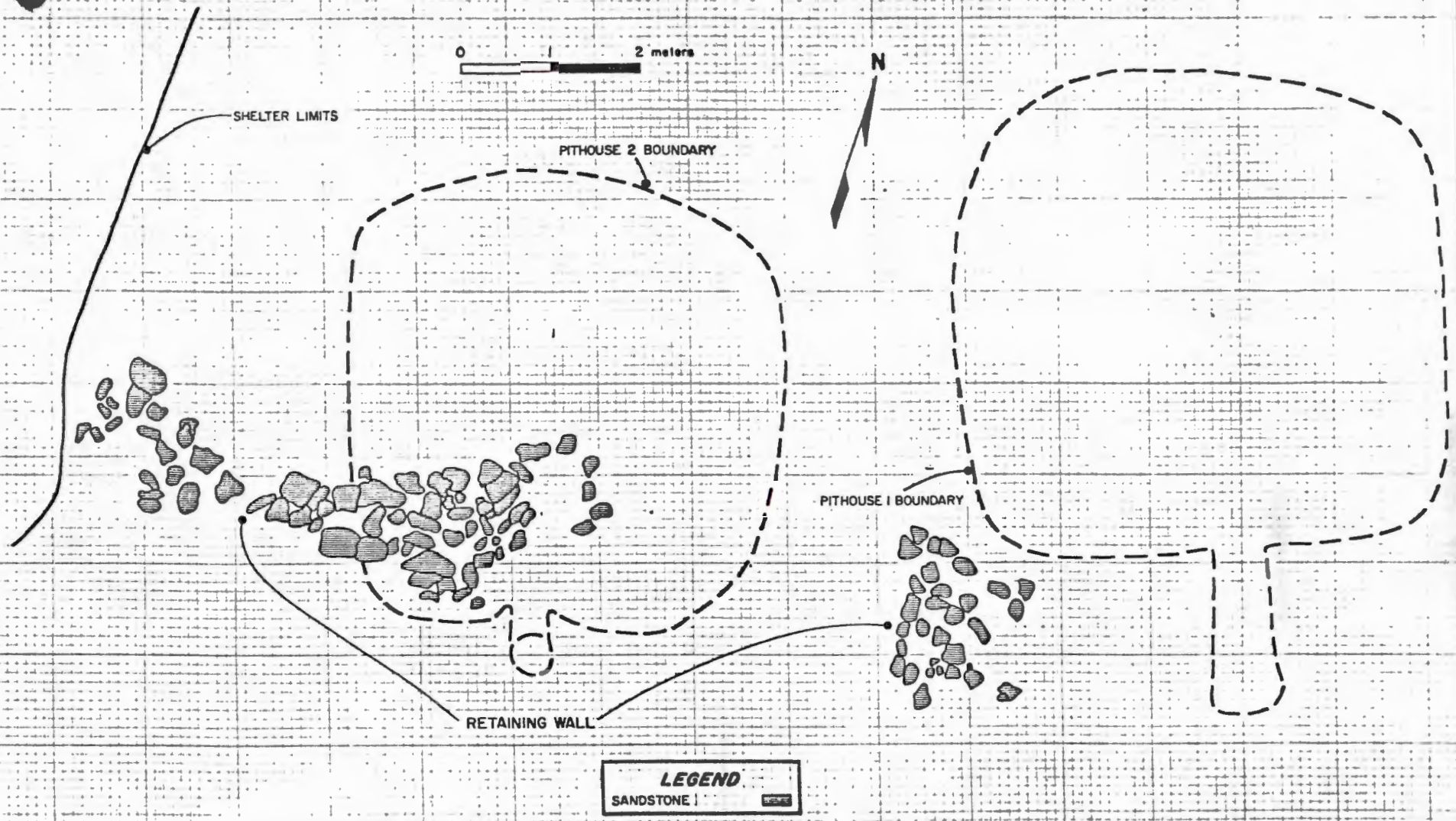


Figure 33. Plan map of retaining wall, LeMoc Shelter.

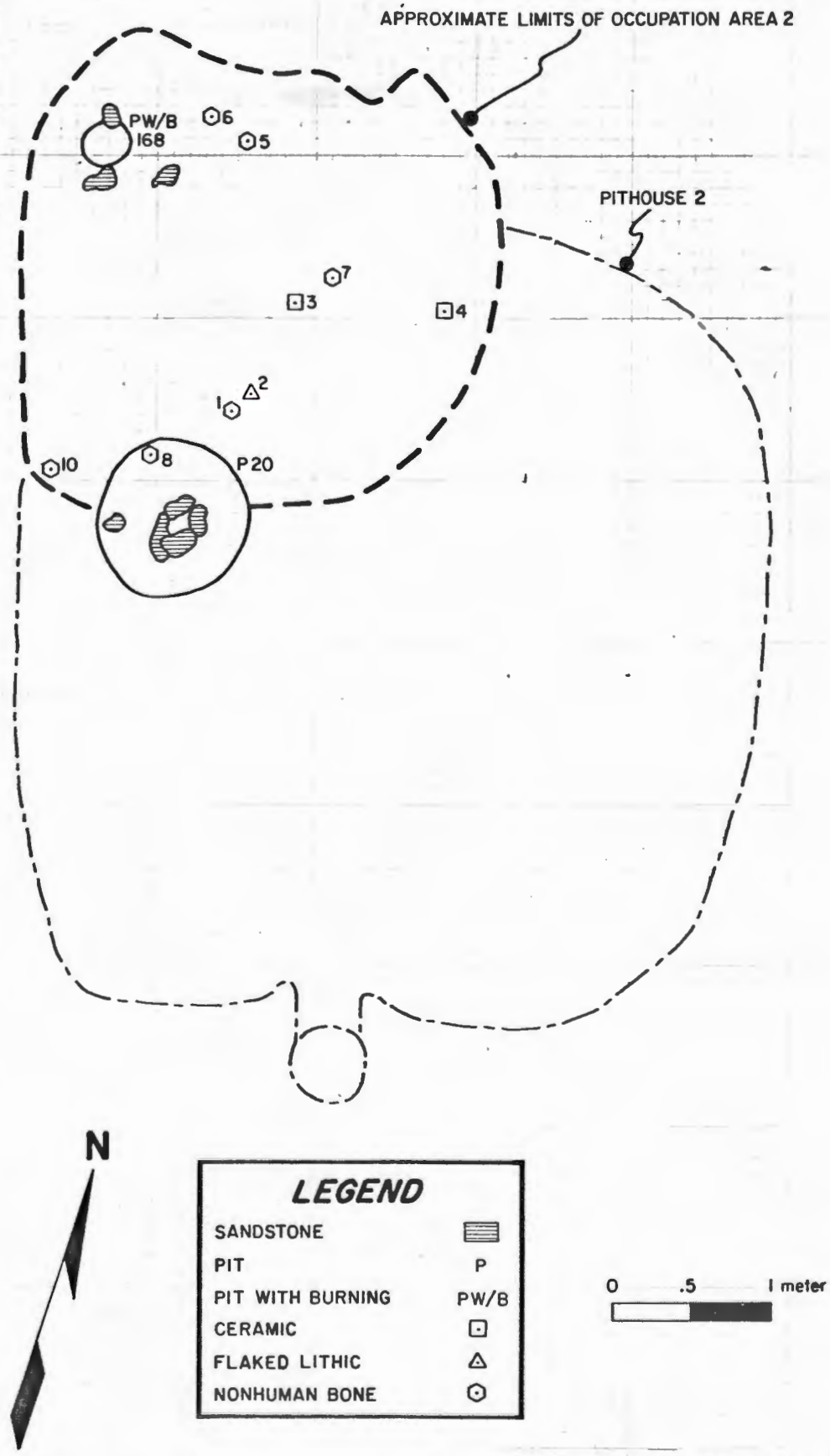


Figure 34. Plan map of point-located artifacts and Features 20 (pit) and 168 (pit) in Occupation Area 2, LeMoc Shelter. Refer to text for a description of occupation area boundaries.

A second pit feature (Feature 168) was found in the northwest corner of the occupation area. This feature is a roughly circular ash stain measuring about 30 cm in diameter and 2 to 3 cm in depth. Three sandstone rocks were found adjacent to the stain, which suggests that originally there may have been a rock ring at the perimeter of the stain. Whether or not this was true, the stain probably marks an area where a small surface fire was built. Unlike most of the features in the cave, it seems to represent a one-time usage rather than a permanent facility.

Several artifacts, grouped into 9 PL's, were found in direct contact with the Occupation Area 2 surface (fig. 34 and table 12). These were scattered in a broad arc bisecting the surface with no evident clustering. The most spectacular of these artifacts is a broken, but nearly complete, Cortez Black-on-white bowl (PL 3 and vessel 1; fig. 35) located near the center of the surface. Except for one thick biface (PL 2) and one corrugated jar sherd (PL 4), the remainder of the artifacts are bone fragments. Two of these fragments were identified as elk bone; the remainder were identified as belonging to large mammals.

Since no formal hearth was found associated with Occupation Area 2, it seems likely that this part of the shelter was a work area rather than a living area. Because few floor artifacts can be associated with the surface, and no functionally specific features are present, identification of the activities performed in Occupation Area 2 will not be attempted here. Rather, the overall paucity of information concerning this occupation necessitates deferring discussions of site structure until all of the evidence from the Element 4 occupation has been presented. Similarly, since the interpretation of site activities in this case rests exclusively on artifact evidence, discussions of this will be deferred until the "Material Culture" section.

Table 12. Point-located artifacts, Surface 1, Occupation Area 2, LeMoc Shelter

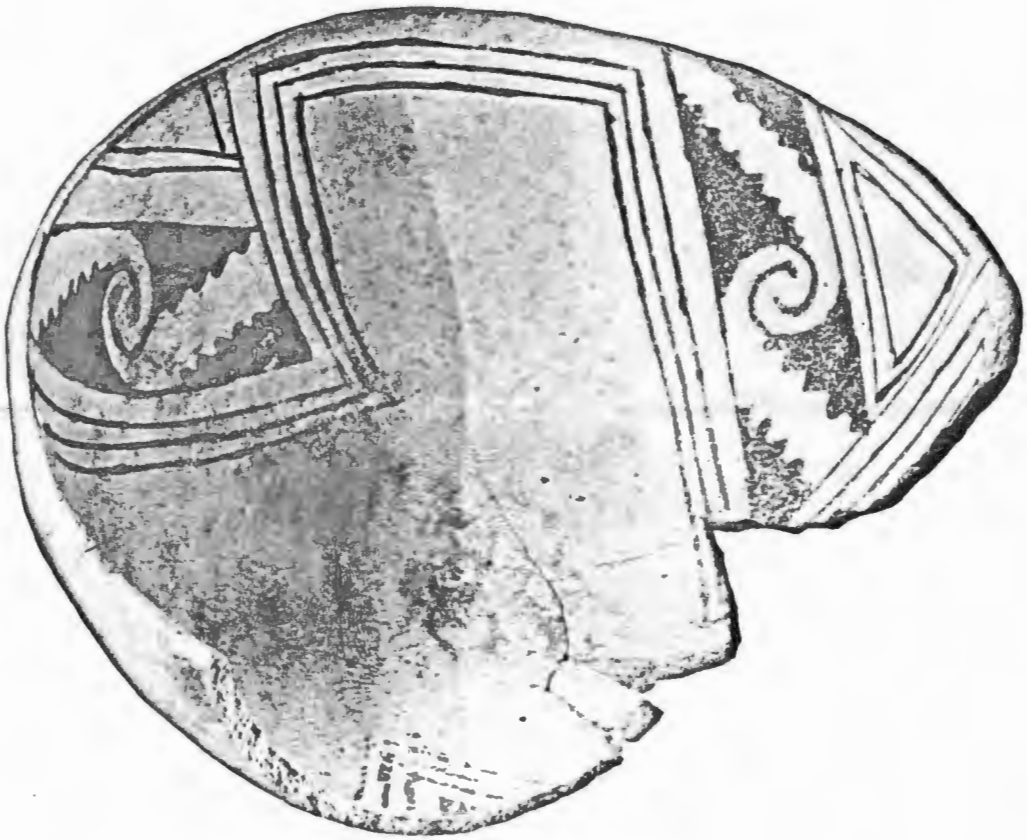
PL No.	Material class	Item description
1	Nonhuman bone	*Cervus elaphus*
		Mammalia, large
2	Flaked lithic	Thick biface
3	Ceramic	Cortez Black-on-white bowl sherds (3): vessel 1
4	Ceramic	Corrugated body jar sherd (not mapped)
5	Nonhuman bone	Indeterminate
		Mammalia, large
6	Nonhuman bone	Mammalia, large
7	Nonhuman bone	Mammalia, large
8	Nonhuman bone	*Cervus elaphus*
10	Nonhuman bone	*Cervus elaphus*

NOTES: PL 9 was later determined not to be associated with the occupation area surface. Refer to figure 34 for artifact locations.

(N) - Number of items.

Stratum I-10

As discussed earlier, Stratum I-10 is interpreted as an accumulation of debris from intensive but sporadic use of the shelter as an encampment. Morphologically, the sediments of Stratum I-10 are distinguishable from the colluvial sands of Strata I-9 and I-11 only because of an admixture of ash, charcoal, and other cultural inclusions in Stratum I-10. Because of its sandy texture, no individual occupation surfaces could be defined within the stratum. It seems likely that with each successive occupation, existing features were destroyed or altered. Hearths were apparently dismantled and their ashy fills scattered and incorporated into the sandy substrate. Similarly, artifacts were scuffed about and trampled into the sand, obscuring the spatial patterning of individual activities. Presumably, however, the Occupation Area 2 and 3 use surfaces are typical of this occupation.



0 10 cm

Figure 35. Cortez Black-on-white bowl (vessel 1 and PL 3) recovered from Occupation Area 2, Surface 1, LeMoc Shelter (UAP U36934).

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Occupation Area 3

In the central area of the western half of the shelter, the upper contact between Strata I-10 and I-11 is a second use surface, Occupation Area 3 (fig. 36). This surface (Surface 1) covers an area of about 10 m^2. The most prominent features on the surface are two fireplaces (Features 32 and 134) near the western edge. Feature 32 is roughly rectangular and measures 75 cm long, 50 cm wide, and 25 cm deep. Feature 134 is roughly circular, measuring 85 to 90 cm in diameter and 25 cm in depth. Both fireplaces are lined with vertical sandstone slabs and sandstone cobbles. The fill of both features is indistinguishable from the sediments of Stratum 1-10. However, oxidation of the rocks lining the pits indicates that they had been exposed to fire. A circular area located immediately south of Feature 134 and measuring approximately 80 cm in diameter is also fire-reddened, although it was not designated a feature. From these indications and from the morphology of the two features, it appears that Feature 32 was used as a hearth, and Feature 134 was an earth oven. The latter interpretation is based on the reddened area of the use surface, which probably was oxidized when the roasted material was uncovered.

A second, larger, reddened area covers the northeast quadrant of Occupation Area 3. Although it is possible that this larger stain is also associated with the use of Feature 32, the absence of ash and charcoal in the stained sediments argues against this interpretation. More likely, the oxidation was the result of one or more surface fires, although no hearths were found in this area. Since this portion of Occupation Area 3 is within 20 cm of modern ground surface, however, the features may have been destroyed during later aboriginal occupations or by recent visitors

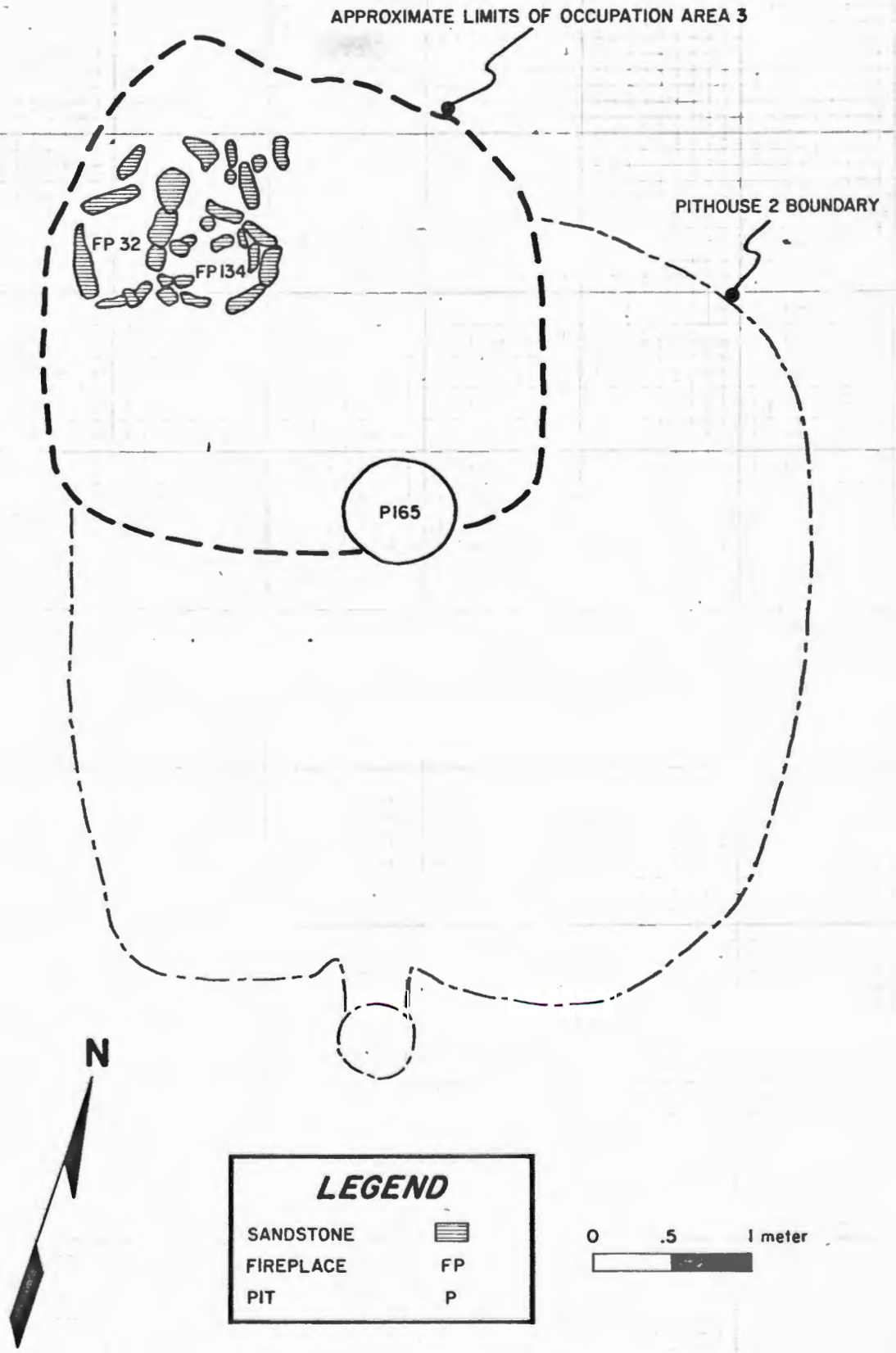


Figure 36. Plan map of Features 32 (fireplace), 134 (fireplace), and 165 (pit) in Occupation Area 3, LeMoc Shelter. Refer to text for a description of occupation area boundaries.

to the shelter. This area was not assigned a feature number.

The final feature associated with Occupation Area 3 is a circular pit (Feature 165) near the southeastern edge of the surface. The pit is approximately 65 cm in diameter and 35 cm deep. The cist was filled with the clean, colluvial sand of Stratum I-11, suggesting that it had been emptied and left open when the shelter was abandoned. Although there is no direct evidence as to its function, Feature 165 is presumed to have been a storage pit.

Feature 35

During Element 4, the depression of Pithouse 1 appears to have been used primarily as a refuse disposal area, marked by the deposition of the upper unit of Stratum II-4 and Stratum II-5. However, an isolated fireplace (Feature 35) was found near the north wall of the depression at the contact of Stratum II-4 with Stratum II-6 (fig. 37). The fireplace is a square, slab-lined depression measuring approximately 25 cm on a side and 16 cm deep. Fill consisted of dark ashy sand flecked with charcoal; it was distinct from the overlying sediments. Although technically falling within Element 4, the stratigraphic position of the fireplace and its location in the midden area suggest that Feature 35 postdates the major occupation during this period. Most likely, the hearth marks the overnight campsite of one or two individuals, rather than being an isolated feature associated with the use of the western half of the shelter.

Discussion

If one accepts the hypothesis that Stratum I-10 is composed of remnants of several activity areas generally similar to Occupation Areas 2 and 3, then Element 4 appears to have been a period when the shelter was

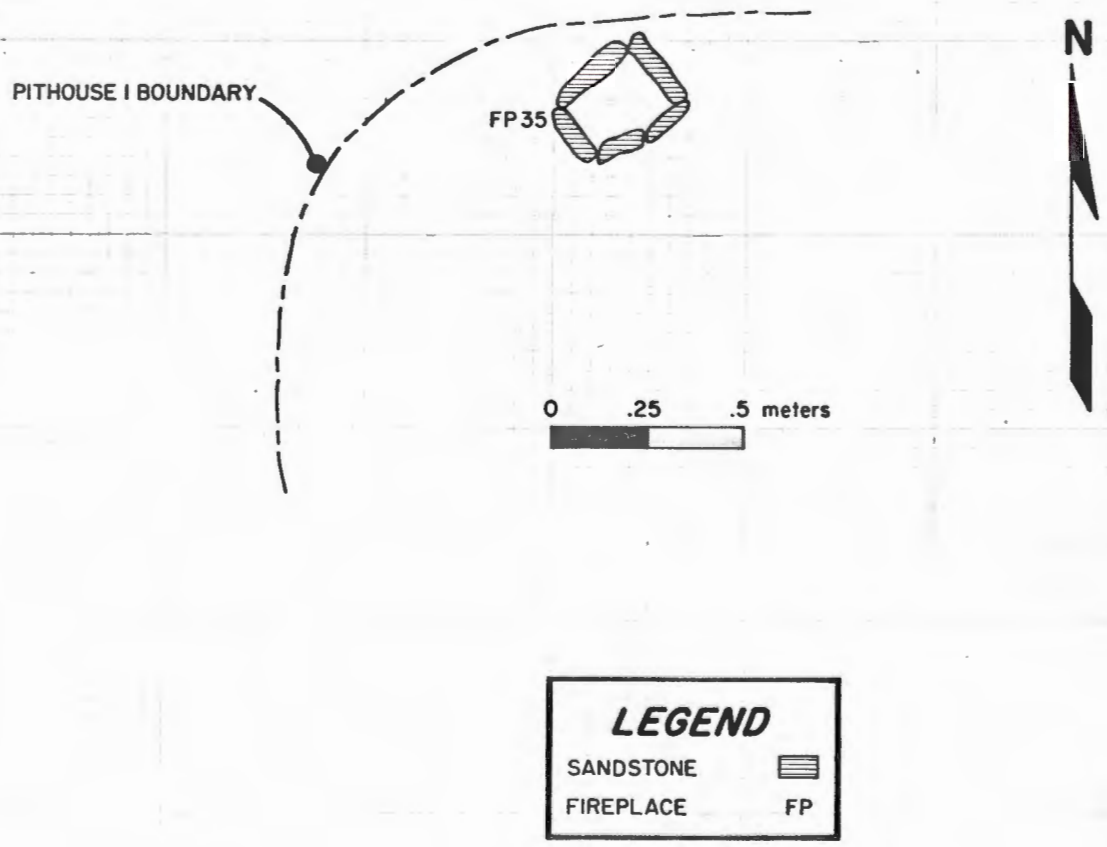


Figure 37. Plan map of Feature 35 (fireplace), LeMoc Shelter.

occupied sporadically for no more than a few weeks at a time. Judging from the evidence from Occupation Areas 2 and 3, the shelter was used primarily as a seasonal camp. Since there does not appear to have been any continuously occupied habitations in Grass Mesa Locality at this time, the shelter was probably a remote base camp from which locally available resources were procured. Because very few artifacts were found in situ on occupation surfaces, artifact evidence from Stratum I-10 and the Element 4 midden must be relied upon to determine what resouces were being procured and what activities were being performed at the shelter. This analysis, however, will be deferred until the "Material Culture" section, since comparison with the material from other occupations is central to this discussion.

Element 5

Use of the shelter during Element 5 appears to have been both short-term and irregular. Aside from artifacts, the evidence for this occupation consists of five fireplaces (fig. 38). Four of these fireplaces are located near the center of the shelter, originating either in Stratum I-11 or in redeposited sediments of I-10 that had washed in from the western part of the shelter. The fifth fireplace was found in the Pithouse 1 depression.

The colluvial sands that constitute Stratum I-11 apparently began accumulating immediately after the Element 4 occupation; these sands continue to accumulate today. Thus, although the occupation during Element 5 has been ceramically dated to approximately A.D. 940, sporadic use of the shelter probably continued for some time. There is no firm evidence on which to base the relative dates for use of the fireplaces.

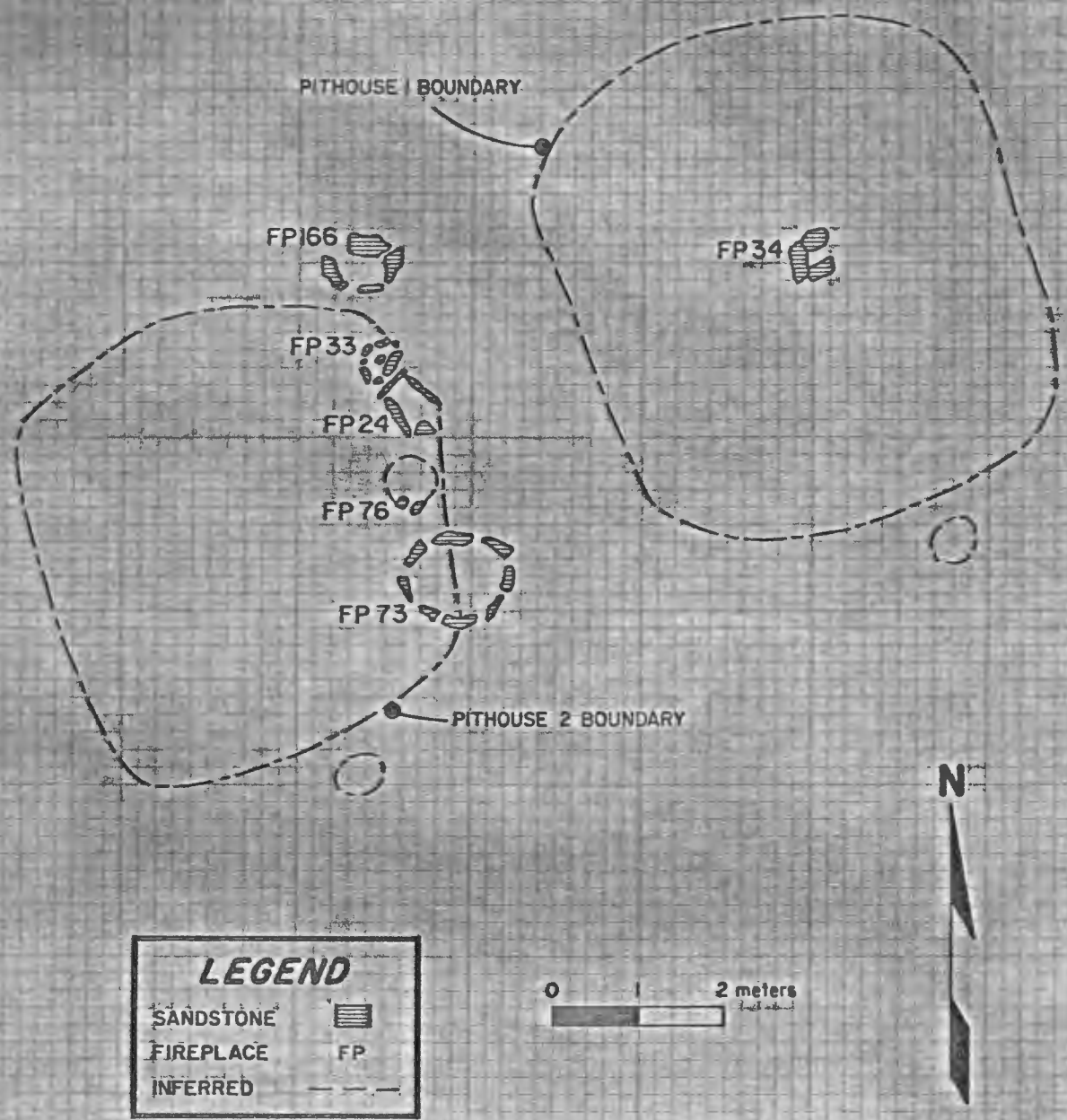


Figure 38. Plan map showing locations of Element 5 features, LeMoc Shelter.

Feature 24

Feature 24 is a rectangular, slab-lined fireplace located about 1 m south of the roomblock, above the breccia balk separating the two pitstructures. The long axis of Feature 24 is oriented north-south, and it measures 54 cm long by 32 cm wide by 15 cm deep. In contrast to the overlying sediments, the fill is a dark, ashy sand flecked with charcoal.

Feature 33

Feature 33 is a rectangular, slab-lined fireplace located immediately north of Feature 24. Feature 33 measures 50 by 27 cm, with its long axis angled slightly to the east, and is 23 cm deep. The feature was filled with sediments redeposited from the occupation areas to the west.

Feature 34

Feature 34 is a small fireplace located near the center of the Pithouse 1 depression, on the upper contact of Stratum II-6. Feature 34 consists of three large sandstone blocks and a fragment of adobe arranged to form three sides of a square measuring about 30 cm on a side and 25 cm high. The fire was built on the surface within this area; no basin was dug.

Feature 73

Feature 73 is a large, circular fireplace located just outside of the shelter, approximately 1 m south of Feature 76. Feature 73 averages about 107 cm in diameter and is 42 cm deep. The perimeter of the basin is ringed by vertical slabs, and slabs and cobbles had been used to line the sidewalls. The lower portion of the basin was filled with ash and charcoal, which was overlain by sediments from Stratum I-11.

Feature 76

Feature 76 is a badly deteriorated, slab-lined fireplace located

under the present dripline to the south of Feature 24. Only the south half of this feature was excavated. On the basis of the information gained from only partial excavation, this feature is inferred to consist of a circular basin approximately 50 to 55 cm in diameter and 20 cm deep. Only a few fragments of the several slabs presumed to have lined the basin remain. The fill, in contrast to the clean sand of the surrounding matrix, was a mixture of ash, sand, and charcoal.

Discussion

Discussion of the activities conducted at the shelter during Element 5, by necessity, must be based on the artifact assemblages of associated strata. The major point that can be made with reference to the features is that, since all are fireplaces, the shelter most likely was being used as a short-term camp. It is unlikely that these fireplaces were all in use at the same time, and since no ashy accumulation similar to that in Stratum I-10 was noted in Stratum I-11, the individual occupations were probably infrequent and of low intensity. During Element 5, the shelter was probably never used for more than a few days at any one time, and probably by no more than three or four individuals.

Other Features--Unassigned Contexts

Three features that cannot be associated with a specific element were encountered at LeMoc Shelter. Feature 83, a fireplace, and Features 84 and 85, both postholes, were found in the area between Pithouse 1 and the east wall of the rockshelter (fig. 39). The fireplace measures approximately 42 cm in length, 28 cm in width, and 19 cm in depth; the base of the pit had been excavated prehistorically to approximately 7 cm above

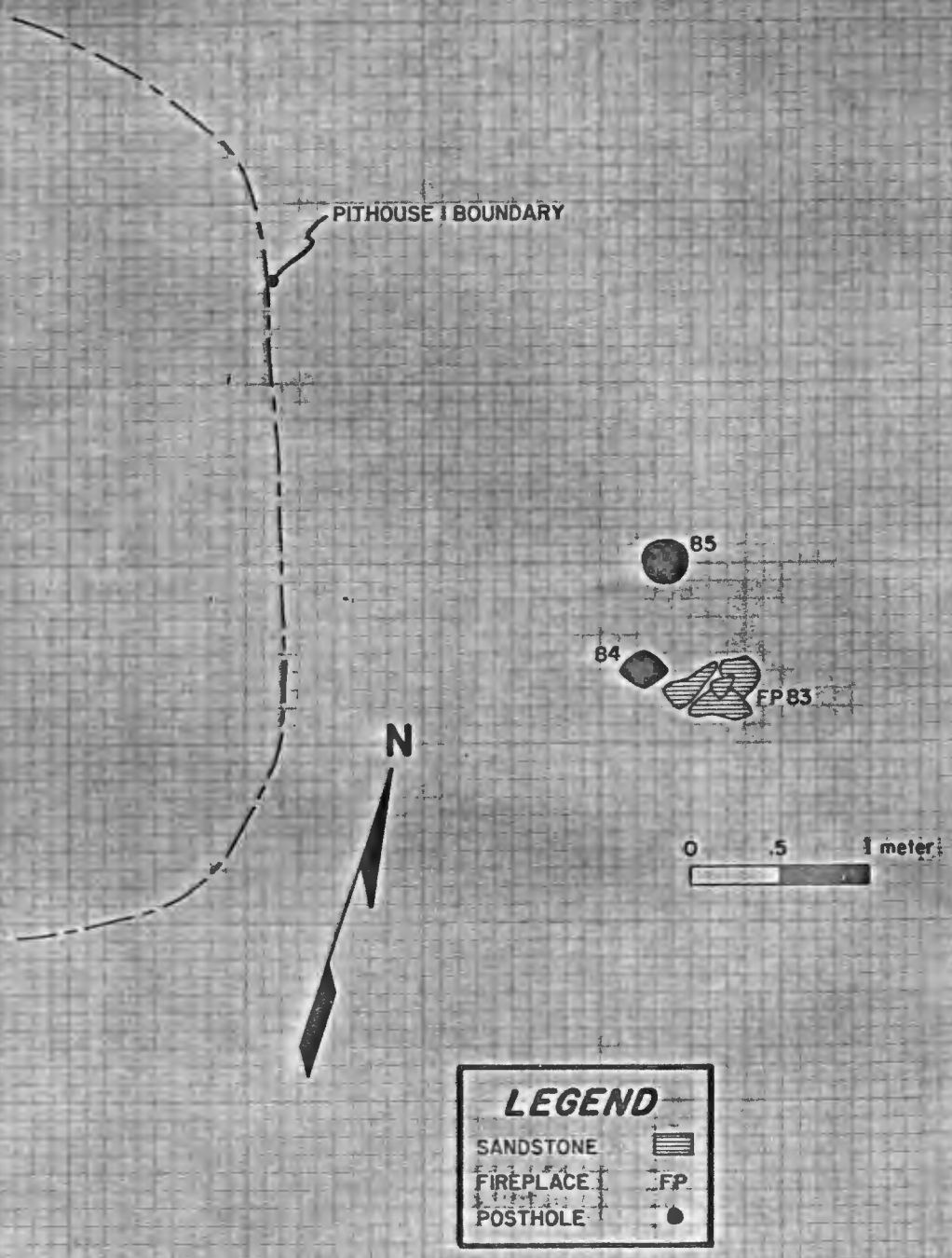


Figure 39. Plan map of Features 83 (fireplace), 84 (posthole), and 85 (posthole), LeMoc Shelter.

bedrock. Three stone slabs and one stone block are all that remain of this feature; one slab lines the base of the fireplace, and the remaining pieces appear to have lined the sides.

Features 84 and 85, located approximately 10 cm west and 45 cm north of Feature 83, respectively, are postholes that had been excavated into sandstone bedrock. Feature 85 is 16 cm in diameter and 25 cm deep. Feature 86 is 23 cm long, 19 cm wide, and 27 cm deep. It is not known whether these postholes served structural functions or were associated with the nearby fireplace.

MATERIAL CULTURE

This section will be limited to a discussion of intrasite variability as reflected in the artifact distributions at LeMoc Shelter. Specifically, an attempt is made to verify the successive changes in site function hypothesized from the analysis of architectural features and facilities. To some extent, an analysis of intrasite variability in artifact distributions was begun in the last section. In that attempt to define activity areas based on the distribution of floor artifacts, it was argued that competition for workspace within the structures necessitated the periodic cleaning of refuse from the floors. Consequently, the bulk of the material evidence for the activities being performed at the site would most likely be preserved in secondary refuse deposits instead of being preserved in situ on structure floors or in regularly used, open work areas. Therefore, the total artifact assemblage from a single occupation must be analyzed as a unit if the full range of aboriginal activities is to be recognized.

Since the purpose of this section is to assess artifact variability in terms of the changes in site function suggested by the changes observed in architectural features and facilities, the element is chosen as the the basic unit for artifact analysis. Assigning artifacts to elements entails a series of compromises that undoubtedly affects the interpretation of the data base. These problems and the variability evident in each major artifact category will be considered in turn.

The structures and strata included in each element are shown in table 13. It should be noted that these groupings do not include all of the artifacts recovered from the shelter. Materials from the midden

deposits in Stratigraphic Units III and IV were excluded because their association with a particular occupation period is, at best, tenuous. Similarly, artifacts from the dry sediments in the rear of the shelter, from the sediments mantling the roomblock, and from the upper deposits in front of the roomblock were grouped together and separated from the tabulations for the five elements. As discussed, these sediments are believed to have been badly disturbed by recent pothunting. One immediate effect of excluding these materials is that, except for some small lenses in the roof fall of Pithouse 1 and in the postoccupational sediments immediately overlying Room 12, no midden deposits are included in Element 2.

Table 13. Major element assignments for cultural and stratigraphic units used in intrasite artifact analyses, LeMoc Shelter

Element No.	Associated cultural and stratigraphic units
1	Pithouse 2 (Floor 1 and features) Strata I-1, I-2, I-3, and I-4
2	Pithouse 1 (Floor 1 and features) Room 12 (Floor 1 and features) Occupation Area 1 (exclusive of Feature 166) Strata I-5, I-6, I-7, II-1, II-2, and II-3
3	Room 11 (Floor 2 and features) Room 13 (Features) Feature 166 Strata I-8, I-9, and II-4
4	Occupation Area 2 Occupation Area 3 Strata I-10 and II-5
5	Strata I-11 and II-6
Disturbed sediments	Strata I-12 and II-8 Roomblock fill Area 5 fill Fill of Features 129, 130, and 131

A decision was made to include artifacts from postoccupational sediments in the tabulations for the occupation immediately preceeding their deposition. The rationale for this decision is based on the fact that most of the postoccupational strata consist of structural debris and colluvium. The artifacts that are present were most likely incorporated as the colluvial sediments mixed with the debris from the previous occupation.

An exception is the inclusion of material recovered from Strata I-2 and I-4 in the tabulations for Element 1. These strata are refuse deposits that appear to have accumulated shortly after the abandonment of Pithouse 2. In the absence of any further evidence that the shelter was occupied during this period, these deposits were grouped with Element 1 on the basis of the similarity of their ceramic assemblages to the collection found on the floor of Pithouse 2.

A third problem with the groupings is the assignment of Strata II-4 and II-5 to Elements 3 and 4, respectively. As discussed earlier, these strata are intercalated, suggesting that parts of each were laid down at about the same time. The temporal break between Element 3 and Element 4, consequently, does not coincide with the stratigraphic boundaries. This was not recognized until late in the excavation, when a full east-west profile of the Pithouse 1 deposits was finally obtained. Thus, no separation of the artifacts from these units was made in the field.

Although this situation can be partly rectified by regrouping the minimal provenience units used during excavation, the correction could not be completed in time for the new groupings to be used in preliminary artifact analysis. Each stratum, therefore, was analyzed as a discrete unit. Since the Stratum II-4 sediments constitute the bulk of the earlier

unit of this sequence, it was decided to tabulate the material recovered from this stratum as part of Element 3. Similarly, the artifacts from Stratum II-5, which is more prominent in the later unit, were included as part of Element 4.

Although none of these compromises seem likely to seriously distort the broader patterns revealed by the artifact distributions, some bias can be anticipated. Generally, adjacent units can be expected to appear relatively more similar than they actually are since none of the occupations are totally sealed by sterile deposits, and some mixing is inevitable. However, Elements 3 and 4 are especially likely to appear similar because of the problem of segregating Strata II-4 and II-5. To a lesser extent, the similarity between Element 1 and Element 2 may also be magnified by including Strata I-2 and I-4 as part of Element 1. Finally, since Element 2 contains little midden material, the frequencies of some artifact classes in this grouping are likely to be skewed.

In the following sections, ceramic, lithic, and unworked human and nonhuman bone materials from LeMoc Shelter are discussed in detail. Discussions of worked vegetal remains and worked nonhuman bone are presented in appendixes C and D, respectively.

Ceramics

For the preliminary description of the ceramic materials from LeMoc Shelter, the values for three variables are provided: traditional type, culture category, and vessel form. Since the observed variation in the frequencies of traditional types has already been discussed in sections of this report dealing with site chronology and stratigraphic correlation, the emphasis here will be on the remaining two variables. The

frequencies for both culture category and vessel form are shown in table 14.

Table 14. Ceramic frequencies for culture category and vessel form, by element, LeMoc Shelter

Culture category	Element 1		Element 2		Element 3		Element 4		Element 5	
	N	%	N	%	N	%	N	%	N	%
Mesa Verde	2,732	100.0	1,310	100.0	2,160	99.8	972	99.7	1,002	99.8
Cibola*	0	0.0	0	0.0	5	0.2	3	0.3	2	0.2
Total ceramics	2,732	100.0	1,310	100.0	2,165	100.0	975	100.0	1,004	100.0
Vessel form										
Jar	383	14.0	119	9.1	206	9.5	102	10.5	87	8.7
Bowl	2,335	85.5	1,178	89.9	1,948	90.0	865	88.7	912	90.8
Other†	14	0.5	13	1.0	11	0.5	8	0.8	5	0.5

* Includes both Cibolan sherds and quartz-sand-tempered sherds that may belong to either the Cibola or Kayenta Culture Categories.
† Includes minature jars and bowls as well as other forms.

Culture category is determined primarily by temper type and refers to the probable region in which the pottery was manufactured. The majority of the ceramics found at LeMoc Shelter appear to be of local manufacture, but some trade wares are present. The most prominent of these are the Mesa Verde Red Wares, which apparently were brought in from the Bluff-Blanding area of southeastern Utah. The frequencies of red wares in the shelter deposits suggest that ceramic exchange with the Bluff-Blanding area was strongest during the Element 1 occupation, although small quantities of red wares were recovered from all subsequent occupations.

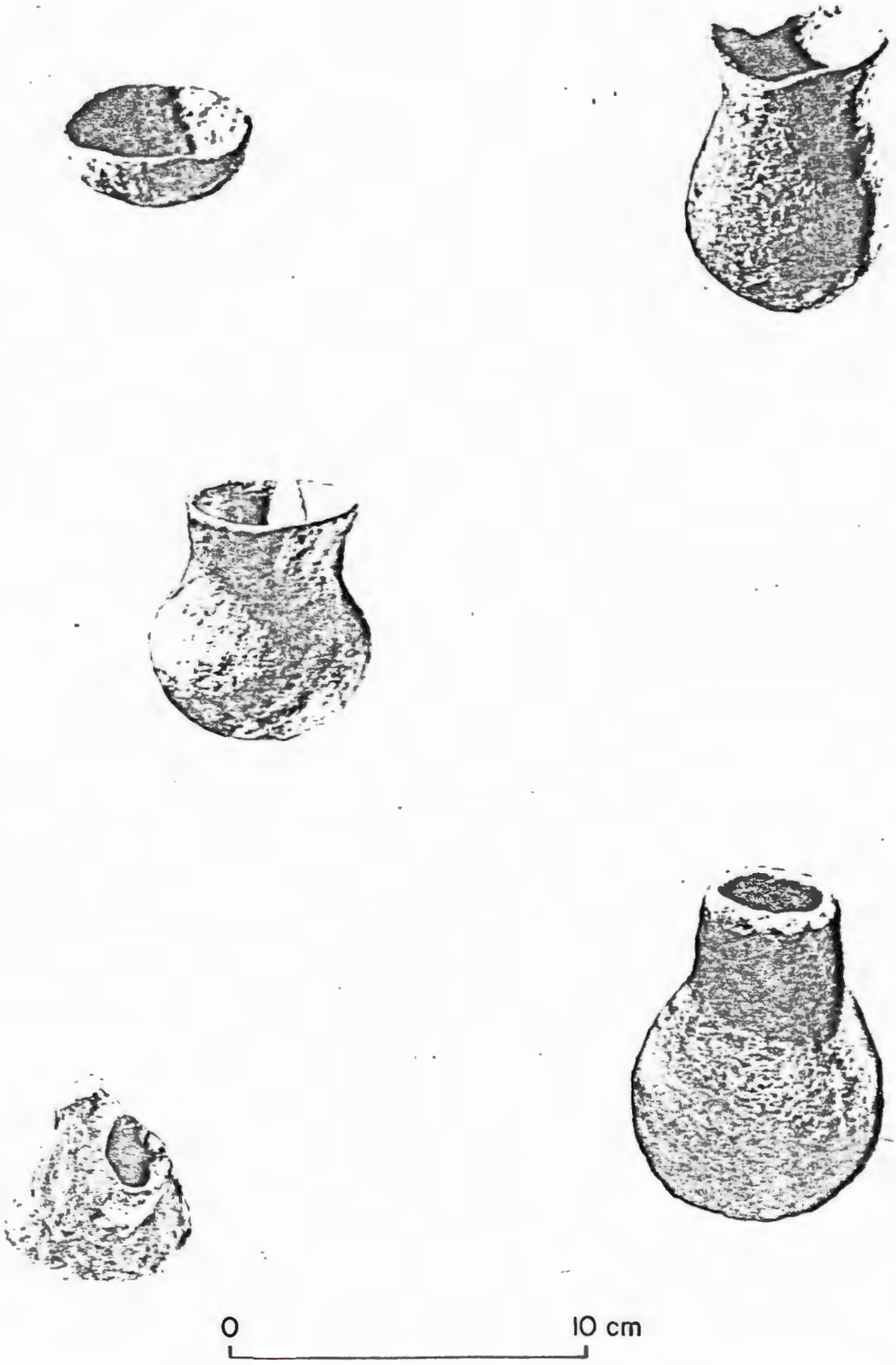
The only other trade wares recovered at LeMoc Shelter were nine sherds, all apparently from vessels manufactured in the Chaco-Cibola area of northwestern New Mexico. These trade wares first appear in Element 3 proveniences and are present in all later deposits. This suggests that ceramic exchange between the Dolores and the Chaco-Cibola populations

began about A.D. 870. A broader treatment of ceramic exchange is provided in appendix A.

Surprisingly little variation in vessel form is evident during the aboriginal occupations of LeMoc Shelter. In all of the elements, approximately 89 percent of the sherds are from jars, 10 percent are from bowls, and 1 percent are from other vessel forms. Although some of this similarity is undoubtedly due to the broad categories used to characterize vessel form and to the coarse provenience categories used in this analysis, more variation in the assemblages was expected given the differences in site function postulated for the various elements. Since this clearly is not the case, it would appear that those activities commonly associated with the use of ceramic vessels--food preparation, consumption, and storage--were constant during all phases of the shelter's use. As reflected by the ceramic assemblage, these activities seem to have varied only in their intensity.

The one exception to this generalization may be the use of miniature vessels, which were recovered primarily from deposits of the first two occupation periods. Five of these vessels are shown in figure 40. The implications of this distribution are unclear, however. The distribution may be temporally significant, or it may be related to the use of the pitstructures or to the use of the shelter by household units rather than by task groups. Currently, all of these alternative explanations are equally plausible. Further research is needed before any hypothesis can be favored over the others.

Figure 40. Miniature ceramic vessels recovered from LeMoc Shelter: (upper left) Chapin Gray pinch bowl from Room 12 fill (vessel 7); (upper right) Chapin Gray minature jar from Room 12 fill (vessel 2); (center) Chapin Gray miniature jar from Pithouse 2 fill (vessel 10); (lower left) gray ware pinch pot from Pithouse 1, Floor 1 (vessel 14; no PL number assigned); (lower right) unpainted white ware miniature jar from midden deposits east of Pithouse 1 (vessel 6) (DAP 133201).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10 cm

Flaked Lithic Tools

The flaked lithic technology of the Anasazi in the Dolores area is best described as expedient; that is, minimum energy was expended in the manufacture of most tools. At LeMoc Shelter, less than 20 percent of the implements evidence extensive thinning and shaping. In most cases, shaping is limited to preparation of the working edges, and flakes of appropriate size and shape frequently appear to have been used as tools without prior modification. It seems likely, therefore, that most flaked stone tools were manufactured as needed and discarded when the task for which they were needed was completed.

As stated in appendix D, the DAP system for the preliminary analysis of flaked lithic implements was designed to support broad inferences concerning technology. At this stage of research, the attribute is the basic unit of analysis. For preliminary description of the flaked lithic implements, values for several attributes were used. These attributes include dorsal thinning stage, ventral thinning stage, material grain size, and morpho-use form (table 15).

Thinning stage is primarily an indicator of the energy invested in the manufacturing process, in terms of both physical effort and technical skill. In this respect, the technology shows little change through time at LeMoc Shelter. There does appear to be an increase in the ratio of edged tools to unthinned flakes in Element 3. However, this difference is overshadowed by a continuing emphasis on shaping just the working edge rather than thinning and shaping the entire implement.

The emphasis on shaping just the edges should not be construed as an implication that the lithic technology was in any way primitive or crude.

Table 15. Frequencies of selected flaked lithic tool attributes, by element, LeMoc Shelter

	Element 1		Element 2		Element 3		Element 4	
	N	%	N	%	N	%	N	%
Total tools:	103	100.0	70	100.0	105	100.0	171	100.0
Tool morpho-use								
Indeterminate	0	0	0	0	0	0	0	0
Utilized flake	48	46.6	25	35.7	30	28.6	61	35.7
Core	20	19.4	8	11.4	25	23.8	28	16.4
Chopper/scraper	14	13.6	13	18.6	16	15.2	18	10.5
Thick uniface	11	10.7	8	11.4	14	13.3	19	11.1
Thin uniface	4	3.9	1	1.4	1	1.0	6	3.5
Specialized form	1	1.0	4	5.7	7	6.7	10	5.8
Biface	0	0	6	8.6	5	4.8	13	7.6
Projectile point	5	4.9	5	7.1	7	6.7	16	9.4
Grain size								
Coarse	0	0	4	5.7	1	1.0	7	4.1
Fine	7	6.8	5	7.1	3	2.9	3	1.8
Very fine	68	66.0	46	65.7	86	81.9	134	78.4
Microscopic	28	27.2	15	21.4	15	14.3	27	15.8
Dorsal face evaluation								
Indeterminate	0	0	0	0	2	1.9	0	0
Unmodified core	27	26.2	11	15.7	28	26.7	27	15.8
Unthinned flake, w/ cortex	55	53.4	17	24.3	25	23.8	51	29.8
Unthinned flake, w/o cortex	13	12.6	21	30.0	15	14.3	28	16.4
Edged flake, w/cortex	0	0	3	4.3	5	4.8	10	5.8
Edged flake, w/o cortex	1	1.0	3	4.3	14	13.3	13	7.6
Primarily thinned (blank)	0	0	0		2	1.9	3	1.8
Secondarily thinned (preform)	0	0	3	4.3	3	2.9	8	4.7
Shaped, not stylized	5	4.9	8	11.4	6	5.7	20	11.7
Shaped, stylized	2	1.9	4	5.7	5	4.8	11	6.4
Thinning index	2.32		3.66		3.29		3.74	
Ventral face evaluation								
Unmodified core	27	26.2	11	15.7	26	24.8	27	15.8
Unthinned flake, w/ cortex	5	4.9	3	4.3	3	2.9	3	1.8
Unthinned flake, w/o cortex	62	60.2	39	55.7	37	35.2	71	41.5
Edged flake, w/cortex	0	0	1	1.4	3	2.9	1	.6
Edged flake, w/o cortex	3	2.9	5	7.1	22	21.0	25	14.6
Primarily thinned (blank)	0	0	0	0	2	1.9	4	2.3
Secondarily thinned (preform)	0	0	3	4.3	2	1.9	8	4.7
Shaped, not stylized	4	3.9	4	5.7	5	4.8	21	12.3
Shaped, stylized	2	1.9	4	5.7	5	4.8	11	6.4
Thinning index	2.80		3.60		3.58		4.22	

Table 15. Frequencies of selected flaked lithic tool attributes, by element, LeMoc Shelter--Continued

	Element 5		Disturbed sediments		Total	
	N	%	N	%	N	%
Total tools:	272	100.0	347	100.0	1068	100.0
Tool morpho-use						
Indeterminate	0	0	4	1.2	4	0.4
Utilized flake	71	26.1	123	35.4	358	33.5
Core	71	26.1	59	17.0	211	19.8
Chopper/scraper	37	13.6	50	14.4	148	13.9
Thick uniface	34	12.5	34	9.8	120	11.2
Thin uniface	7	2.6	6	1.7	25	2.3
Specialized form	25	9.2	29	8.4	76	7.1
Biface	11	4.0	22	6.3	57	5.3
Projectile point	16	5.9	20	5.8	69	6.5
Grain size						
Coarse	7	2.6	27	7.8	46	4.3
Fine	15	5.5	8	2.3	41	3.8
Very fine	217	79.8	263	75.8	814	76.2
Microscopic	33	12.1	49	14.1	167	15.6
Dorsal face evaluation						
Indeterminate	0	0	0	0	2	0.2
Unmodified core	76	27.9	60	17.3	229	21.4
Unthinned flake, w/ cortex	40	14.7	89	25.6	277	25.9
Unthinned flake, w/o cortex	58	21.3	65	18.7	200	18.7
Edged flake, w/cortex	13	4.8	20	5.8	51	4.8
Edged flake, w/o cortex	34	12.5	25	7.2	80	8.4
Primarily thinned (blank)	0	0	3	0.9	8	0.7
Secondarily thinned (preform)	6	2.2	3	0.9	23	2.2
Shaped, not stylized	33	12.1	62	17.9	134	12.5
Shaped, stylized	12	4.4	20	5.8	54	5.1
Thinning index	3.50		3.89			
Ventral face evaluation						
Unmodified core	75	27.6	60	17.3	226	21.2
Unthinned flake, w/ cortex	5	1.8	16	4.6	35	3.3
Unthinned flake, w/o cortex	108	39.7	159	45.8	476	44.6
Edged flake, w/cortex	1	0.4	2	0.6	8	0.7
Edged flake, w/o cortex	41	15.1	38	11.0	134	12.5
Primarily thinned (blank)	1	0.4	3	0.9	10	0.9
Secondarily thinned (preform)	6	2.2	2	0.6	21	2.0
Shaped, not stylized	23	8.5	47	13.5	104	9.7
Shaped, stylized	12	4.4	20	5.8	54	5.1
Thinning index	3.52		4.11			

As shown in table 16, the proportion of specialized cores increases through time, suggesting that morphology increasingly was being controlled by regulating the shape of flakes as they were struck from the core. The most common core form in all elements is an unspecialized form from which flakes were removed in several directions, with no more than two or three flakes being struck from a single platform. In the more specialized forms, the typical core shows bidirectional flake removal, with four to six flakes struck from a single, prepared platform. Seen from this perspective, the rudimentary form of the finished implement is the end product of a rather sophisticated, pragmatic technology aimed at minimizing the input of time and physical energy into the manufacturing process.

Table 16. Frequencies of core classes, by element, LeMoc Shelter

	Element 1		Element 2		Element 3		Element 4		Element 5	
	N	%	N	%	N	%	N	%	N	%
Unspecialized	3	15.0	6	75.0	18	72.0	19	67.9	43	60.6
Specialized	0	0	1	12.5	5	20.0	8	28.6	25	35.2
Stylized	1	5.0	0	0	1	4.0	0	0	2	2.8
Indeterminate	16	80.0	1	12.5	1	4.0	1	3.6	1	1.4
Total	20	100.0	8	100.0	25	100.0	28	100.0	71	100.0
Total specialized & stylized	1	5.0*	1	12.5	6	24.0	8	28.6	27	38.0

* Value for Element 1 is probably too low. Most of the cores recovered from this unit were unclassifiable fragments.

This particular manufacturing strategy seems well suited to the lithic raw materials being used, which are of serviceable quality but are not ideal for knapping. As shown in table 15, very fine grained stone was the material class most commonly used for tool manufacture in all

elements. Microscopic-grained material is the next most frequently used class, especially during Elements 1 and 2. Fine- and coarse-grained stone together constitute only about 10 percent of the total collection of implements.

Tentative hand specimen identifications suggest that 81 percent of the coarse-grained material is orthoquartzite, with some igneous rock and sandstone also grouped into this category. In the fine-grained material class, 60 percent of the material is siltstone and 40 percent is orthoquartzite. Ninety-nine percent of the very fine grained material is orthoquartzite, and the remaining 1 percent is hornfels. Except for nine pieces of obsidian, all of the nongranular material is chert, chalcedony, or jasper.

Although only 9 percent of these materials were identified in analysis as coming from known sources, it is believed, based on the author's personal observation of the material recovered from LeMoc Shelter and materials recovered from nearby source areas, that most of the stone used at the shelter was procured locally. Most of the artifacts from LeMoc Shelter were processed during the first few months of laboratory operations, before the inventory of local source areas could be completed. Consequently, many source-specific identifications were not possible at that time.

Of the 123 artifacts that did receive source-specific identification, 109 are Morrison Green quartzite, 8 are coarse-grained orthoquartzite from the Burro Canyon and Dakota Formations, 1 is chert from the Burro Canyon Formation, and 5 are various materials from sources located outside the project area. The Morrison, Dakota, and Burro Canyon Formations outcrop on the hill slope immediately above the cave and would have been readily

accessible to the inhabitants of LeMoc Shelter. The lithology of these formations is quite varied, and together they include almost the full range of materials suitable for lithic tool manufacture found at the site. Specifically, the local sources now identified include green and purple cherts and fine- to medium-grained quartzites and siltstones from the Morrison Formation, as well as chert and a coarse- to fine-grained orthoquartzite from the Burro Canyon and Dakota Formations.

As indicated, the very fine grained materials appear to have been favored for lithic tool manufacture; microscopic-grained materials were the next most favored. This preference, however, is reversed with projectile points. For this artifact class, microscopic-grained materials were used for 66 percent of the artifacts, and very fine grained orthoquartzites were used for 34 percent. Presumably, the superior workability of the microscopic-grained stone was the principal factor in material selection in this instance. This preference, however, also implies that the selection of very fine grained materials for all of the other tool classes was intentional, since cherts are available locally and could have been used exclusively.

The final flaked lithic tool attribute to be discussed, morpho-use category, is based on traditional artifact classification. As such, these categories are both a descriptive short-hand and a preliminary best-guess as to how the artifacts were used. It should be emphasized, however, that this is a provisional classification because the functional implications of these groupings are, in most cases, unverified.

Overall, there is surprisingly little variation in the frequencies of the various tool types among the shelter's elements. Unifaces, particularly, seem to exhibit little variation, and except for Element 4,

projectile point frequencies are uniform. The other morpho-use categories show more variability, but no systematic pattern is discernible. In fact, much of that variability seems to be due to purely mechanical factors. For instance, the variation in the frequencies of utilized flakes seems to be correlated with variations in the frequencies of other tool types. Their high value in Element 1 seems to be related to the near absence of bifaces and specialized tools, and the lower values in Elements 3 and 5 seem to be a result of increased frequencies of cores. The actual use of unmodified flakes as tools, consequently, appears to have remained relatively constant throughout the use of the shelter. Similarly, the low frequency of cores in Element 2 seems constrained by a minor variation in the numbers of choppers/scrapers and bifaces; this is amplified by the relatively small number of artifacts recovered from those deposits.

If the effects of constraint are factored out, the evident variation in the assemblage is reduced, but some differences remain. In Element 1, the relative paucity of bifaces and specialized tools is notable. In Element 3 there appears to be a higher frequency of cores, and in Element 4 there is a slight increase in the number of projectile points and a corresponding decrease in the frequency of choppers/scrapers. (Selected projectile points recovered from LeMoc Shelter are shown in figures 41-44.) Finally, Element 5 has a relatively high frequency of cores and of specialized tools. Despite these differences, however, the assemblages are remarkably similar, given the varying character of the shelter's occupational episodes evident in the architectural features.

As discussed earlier, some of this apparent similarity may have been introduced when the excavation units were grouped into elements. While these groupings were necessary to obtain collections large enough to

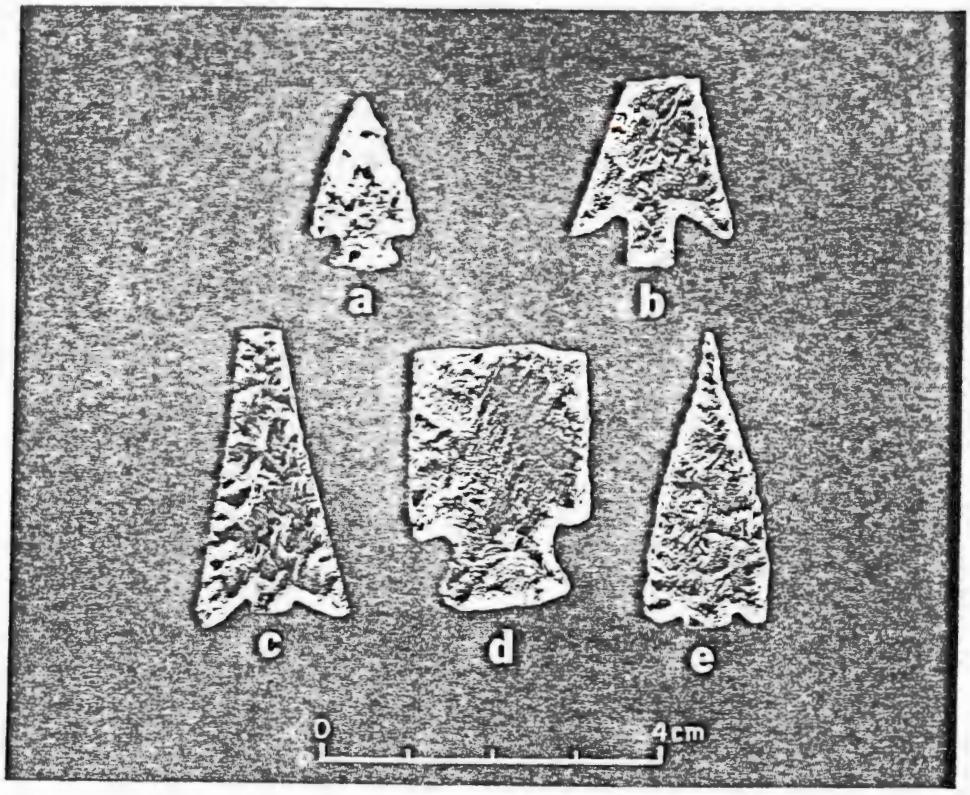

Figure 41. Selected projectile points recovered from Element 2 proveniences, LeMoc Shelter: (a, c) Room 6, Feature 2 (hearth); (b, d, e) Pithouse 1 fill (DAP 130503).

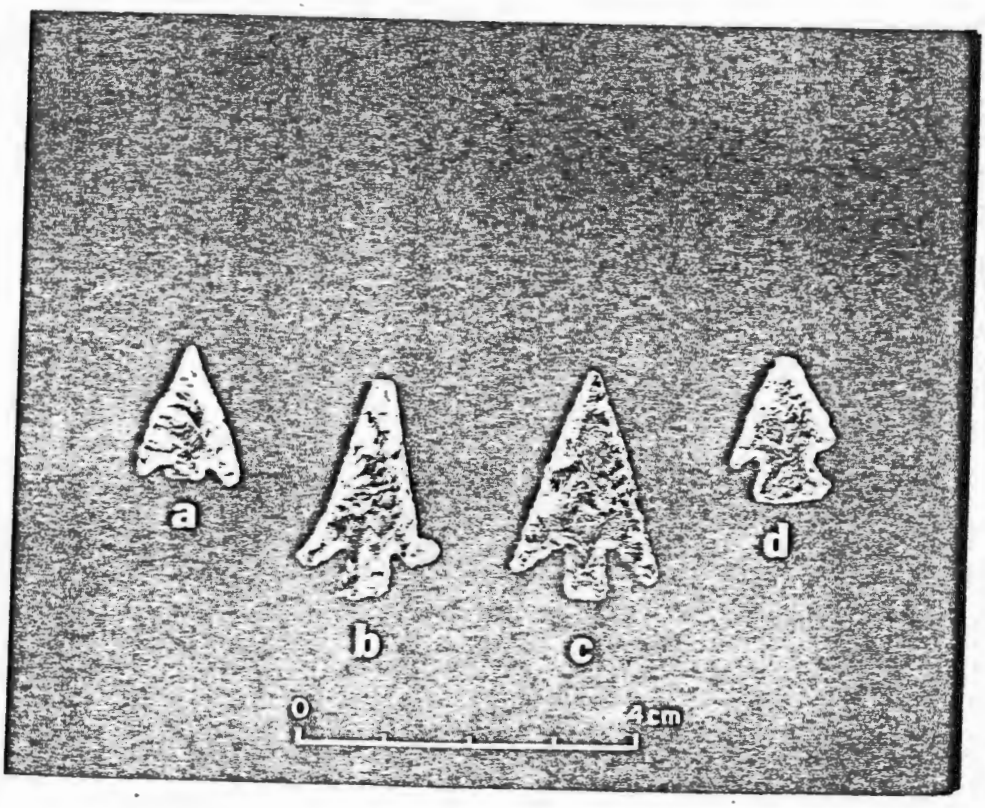

Figure 42. Selected projectile points recovered from Element 3 and Element 4 proveniences, LeMoc Shelter. Element 3: (a) 1- by 1-m grid 8S/11E; (b) 1- by 1-m grid 10S/11E. Element 4: (c) Pithouse 1 fill; (d) 1- by 1-m grid 9S/11E (DAP 130504).

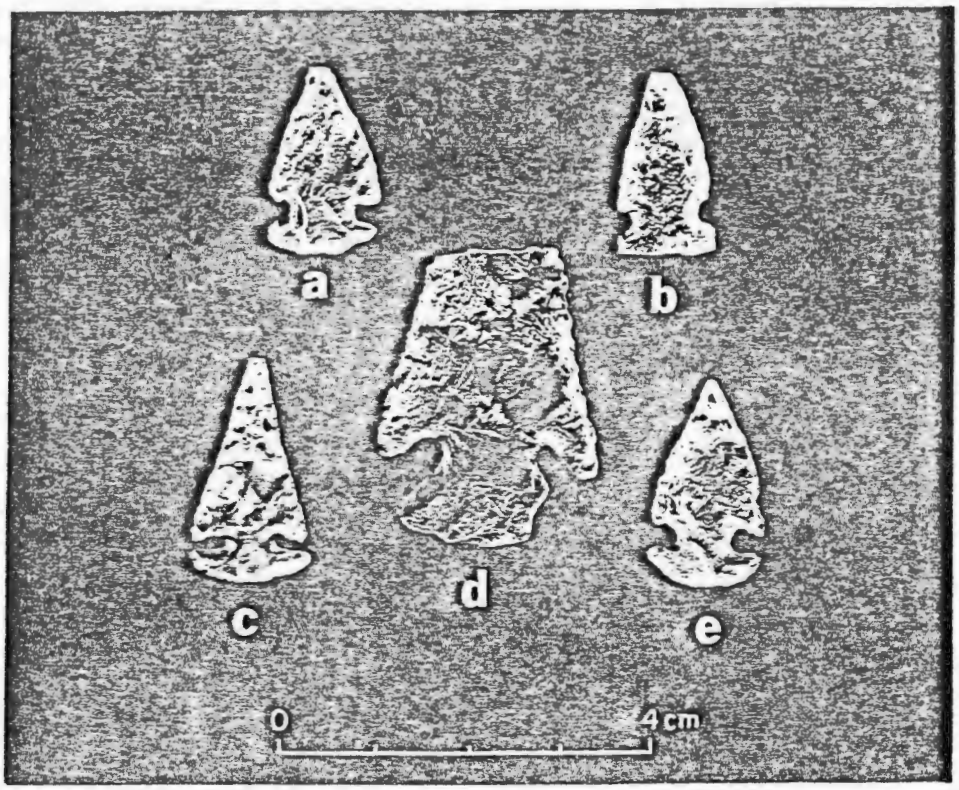

Figure 43. Selected projectile points recovered from Element 5 proveniences, LeMoc Shelter: (a-d) Pithouse 1 fill; (e) 1- by 1-m grid 9S/16E (DAP 133101).

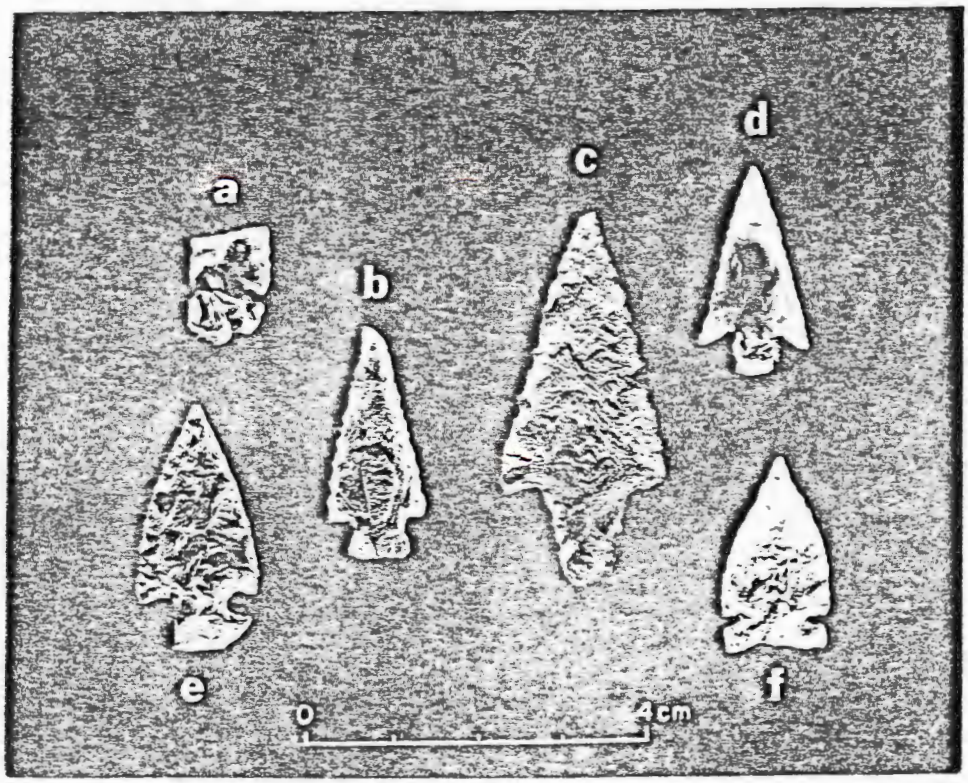

Figure 44. Selected projectile points recovered from proveniences not assigned to element, LeMoc Shelter: (a) Room 1 fill; (b) 1- by 1-m grid 7S/11E; (c) midden east of Pithouse 1; (d) Room 4 fill; (e) Room 3 fill; (f) Room 1 fill. Note hafting material on (a) and (d) (DAP 133102).

permit meaningful comparisons, some differences between occupations may have been obscured. The fact that the ceramic assemblages exhibit sufficient variation to allow elements to be defined, however, does suggest that wholesale mixing across element boundaries has not occurred. The broadness of the morpho-use categories does not seem to have induced the apparent homogeneity of these materials, although some stylistic variation might have been masked. With the exception of the specialized tool category, each grouping consists of artifacts that share the same technological attributes. It appears, therefore, that the postulated variation in site function exhibited by the architecture cannot be verified by a qualitative analysis of the flaked lithic implements. The differences in site utilization involving these implements apparently were not in the range of activities performed but in the frequency and intensity of those activities.

Flaked Lithic Debitage

During preliminary analysis, no attempt was made at an exhaustive study of flaked lithic debitage. Instead, a number of attributes (material grain size, presence of a platform, presence of cortex, and mean flake weight) were selected to indicate broad technological features (table 17 and appendix D).

Material grain size refers to both a class of lithic raw materials and a relative index of the suitability of the material for flaked lithic tool manufacture. In increasing order of grain size, these classes are microscopic, very fine, fine, and coarse. The percentage of flakes in each class is presumed to provide a relative index of raw material preferences. However, there is a danger that some fragments that are not

Table 17. Frequencies of selected flaked lithic debitage attributes, by element, LeMoc Shelter

	Element 1		Element 2		Element 3		Element 4	
	N	%	N	%	N	%	N	%
Total debitage by grain size class								
Coarse	39	2.8	74	7.7	91	5.0	330	8.9
Fine	591	42.6	472	49.1	1,201	66.1	2,474	66.8
Very fine	542	39.0	306	31.8	392	21.6	684	18.5
Microscopic	216	15.6	105	10.9	122	6.7	204	5.5
Total	1,388	100.0	957	100.0	1,806	100.0	3,692	100.0
Debitage with striking platforms with grain size								
Coarse	11	1.4	37	6.7	66	5.2	261	8.0
Fine	358	44.8	270	48.9	878	69.4	2,310	70.7
Very fine	305	38.5	181	32.8	237	18.7	526	16.1
Microscopic	125	15.6	63	11.4	81	6.4	165	5.0
Total	799	100.0	551	100.0	1,262	100.0	3,262	100.0
Debitage with cortex by grain size class*								
Coarse	16	41.0	20	27.0	21	23.1	98	29.7
Fine	64	10.8	79	16.7	227	18.9	465	18.8
Very fine	198	36.5	67	21.9	81	20.7	242	35.4
Microscopic	89	41.2	24	22.9	24	19.7	75	36.8
Total	367	100.0	190	100.0	353	100.0	880	100.0
Mean weight per flake by grain size class								
Coarse	24.5		10.5		16.8		12.9	
Fine	9.7		7.2		9.6		12.7	
Very fine	12.2		12.5		7.1		6.7	
Microscopic	13.6		8.6		7.7		6.0	
Total	11.7		9.3		9.3		11.2	

See footnote at end of table.

Table 17. Frequencies of selected flaked lithic debitage attributes, by element, LeMoc Shelter--Continued

	Element 5		Disturbed sediments		Total	
	N	%	N	%	N	%
Total debitage by grain size class						
Coarse	363	7.3	477	11.0	1,374	8.2
Fine	3,293	65.9	2,008	46.2	10,039	60.2
Very fine	1,072	21.4	1,307	30.1	4,303	25.8
Microscopic	212	4.2	428	9.8	1,287	7.7
Total	4,940	100.0	4,220	100.0	17,003	100.0
Debitage with striking platforms, by grain size						
Coarse	301	7.5	428	11.3	1,104	8.0
Fine	2,657	65.9	1,825	48.4	8,298	60.6
Very fine	894	22.2	1,174	31.1	3,317	24.2
Microscopic	171	4.2	334	8.9	939	6.9
Total	4,023	100.0	3,761	100.0	13,658	100.0
Debitage with cortex by grain size class*						
Coarse	133	36.7	246	51.6	534	38.9
Fine	580	17.6	608	30.3	2,023	20.2
Very fine	321	29.9	679	52.0	1,588	36.9
Microscopic	45	21.2	150	35.0	407	31.6
Total	1,079	100.0	1,683	100.0	4,552	100.0
Mean weight per flake by grain size class						
Coarse	12.9		18.6		15.3	
Fine	9.8		11.4		10.7	
Very fine	8.0		9.3		8.9	
Microscopic	7.4		5.3		7.6	
Total	9.6		10.9			

* Percentages given are percentages of total flakes in each material class that retain cortex.

byproducts of knapping were included in these tabulations, thereby giving a somewhat distorted picture of material preference. For this reason, a second tabulation was made using only those flakes that exhibit a recognizable striking platform. Since approximately 78 percent of the debitage recovered from LeMoc Shelter exhibited striking platforms, the distortion is minimal in this case; nevertheless, the more conservative frequencies derived from the second tabulation will be used as the basis for this discussion.

These figures indicate a clear shift, beginning in Element 3, toward increased use of fine-grained stone and a corresponding decrease in the quantities of very fine and microscopic-grained debitage. Yet materials of this grain size were used for only 4 percent of the flaked lithic implements recovered from these units.

One possible explanation for this difference lies in the heterogeneity of the local siliceous raw materials. In nearby source areas, single nodules contain stone ranging from very fine grained to fine grained. Given the evident preference for very fine grained materials in tool manufacture, the predominence of fine-grained debitage may have resulted from the removal of extraneous fine-grained stone from the core to expose the very fine grained material.

The number of items with cortex is believed to be a measure of the amount of effort expended to remove the cortex from the finished implement. Also, since the cortex tends to be removed early in the reduction process, a low frequency of cortex on both implements and debitage would indicate that preliminary reduction was done at some offsite location.

For Elements 1 through 5, the percentages of implement faces (excluding cores) retaining some cortex are 39.5, 20.3, 23.4, 22.6, and 15.1, respectively. For Element 1, this figure is higher than the percentage of debitage with cortex; for Elements 2, 3, and 4, the percentages are about the same; and for Element 5, the percentage of implements with cortex is slightly lower than the percentage of debitage with cortex. This suggests that little effort was expended during tool production on the removal of cortex from the finished tools. Furthermore, the overall percentage of lithic material retaining some cortex suggests that preliminary reduction was conducted largely at the shelter, which lends support to the hypothesis that most of the lithic raw materials were procured locally.

Some variation in the frequencies of debitage with cortex does occur within the material grain size categories. In all of the elements, the percentage of fine-grained material with cortex is relatively small. This suggests that some reduction of these materials might have been performed at the resource procurement area before these were brought back to the shelter. The frequencies of items with cortex vary noticeably between elements for the other three grain size categories, but within each element, the frequencies for each of these classes are similar. This suggests that there may have been some technological variation in the reduction process, possibly related to site use. Again, a more detailed analysis is needed.

The final debitage attribute, mean flake weight, is the single best indicator of flake size currently available. Based on the material grain size and the nature of the technology, the mean flake weight of coarser materials can be expected to be relatively larger than the mean flake weight of the finer-grained materials, unless some cultural selection is

at work. This expectation seems to hold in Elements 1, 3, 4, and 5, but in Element 2, the average size of the very fine and microscopic-grained flakes is significantly larger than expected. In part, this appears to be due to the greater quantity of very fine grained materials used in tool production during these periods. Since the lithic technology used at LeMoc Shelter seems to be based largely on the production and selection of suitably sized flakes that were only minimally modified, some larger flakes would undoubtedly have been produced intentionally. However, larger flakes would also be present from the initial preparation of the core; therefore, the higher mean weight may indicate more primary reduction of very fine grained materials during these periods. In this same context, the mean weight of microscopic-grained flakes in Element 1 suggests either that more material in this size class was available during this occupation, thereby allowing its use for a wider-than-normal range of tool types, or that more primary reduction of this material was being performed at the shelter. Finally, the mean flake weights in Element 4 for very fine and microscopic-grained materials are relatively low, and the mean weight for fine-grained material is unusually high. This may reflect primary processing of the fine-grained materials, concomitant with minimal use of finer-grained materials. The debitage from these latter materials may be byproducts of tool maintenance rather than byproducts of the entire manufacturing process.

Nonflaked Lithic Tools

The attributes coded for the nonflaked lithic implements during preliminary analysis describe both technological and functional features of the collection (appendix D). Again, the attribute rather than the

artifact is the basic analytical unit. The four attributes used in analysis are item completeness, production evaluation, morpho-use category, and material class (table 18).

Item completeness refers to whether a tool is broken or whole. At LeMoc Shelter, the majority of nonflaked lithic implements recovered from Elements 1 and 2 are complete tools. In Element 3, the percentage of partial implements increases, although the majority of artifacts are still complete. In Elements 4 and 5, however, most of the implements are fragments. Although this may indicate that most of the complete implements were removed when the shelter was abandoned after these later occupations, it seems more likely that the increase in fragments is due to secondary use of fragmentary tools from the earlier elements as building stone. The number of metate fragments found in the rubble of the retaining wall supports this hypothesis. The production evaluation variable, like the flaked lithic thinning variables, is a general measure of the cultural energy invested in the manufacturing process. Throughout all the occupations of LeMoc Shelter, that investment appears to have been minimal. The overwhelming majority of nonflaked lithic artifacts are simply nodules of rock that exhibit some evidence of use. Where shaping is evident, it is generally confined to improving the functional quality of the tools. Chipping of troughs in metates and of the edges and hafting grooves in axes are examples of this minimal shaping. The greater investment in cultural energy seems to have been expended in the selection of raw materials that naturally possessed the desired morphology. In this context, it should be noted that the high frequencies of indeterminate codings for this attribute in Elements 4 and 5 appear to be a function of the large number of fragmentary tools in those units and do not reflect a breakdown in this manufacturing strategy.

Table 18. Frequencies of selected nonflaked lithic tool attributes, by element, LeMoc Shelter

	Element 1		Element 2		Element 3		Element 4	
	N	%	N	%	N	%	N	%
Total tools:	71	100.0	90	100.0	88	100.0	91	100.0
Tool morpho-use								
Indeterminate	5	7.0	8	8.9	22	25.0	44	48.3
Unhafted tool	33	46.5	33	36.7	23	26.1	20	22.0
Hammerstone	3	4.2	9	10.0	7	8.0	1	1.1
Mano	15	21.1	24	26.7	19	21.6	13	14.3
Slab metate	0	0	1	1.1	1	1.1	0	0
Trough metate	5	7.0	8	8.9	7	8.0	5	5.5
Metate fragment	2	2.8	2	2.2	6	6.8	6	6.6
Hafted implement	3	4.2	2	2.2	1	1.1	2	2.2
Specialized form	5	7.0	3	3.3	2	2.3	0	0
Grain size								
Indeterminate	6	8.4	4	4.4	3	3.4	0	0
Coarse	9	12.7	22	24.4	15	17.0	29	31.8
Medium	7	9.9	20	22.2	39	44.3	36	39.5
Fine	47	66.2	43	47.8	29	32.9	25	27.5
Microscopic	2	2.8	1	1.1	2	2.3	1	1.1
Item condition								
Broken								
Small fragment	0	0	0	0	0	0	2	2.2
Partial implement	10	14.1	23	25.6	38	43.2	75	82.4
Complete/nearly complete	61	85.9	67	74.4	50	56.8	14	15.4
Production evaluation								
Indeterminate	1	1.4	1	1.1	1	1.1	31	34.0
Natural (unmodified)	53	74.6	67	74.4	61	69.3	42	46.1
Minimally modified	13	18.3	20	22.2	21	23.9	16	17.6
Well shaped	4	5.6	2	2.2	5	5.7	2	2.2
Stylized								

Table 18. Frequencies of selected nonflaked lithic tool attributes, by element, LeMoc Shelter--Continued

	Element 5		Disturbed sediments		Total	
	N	%	N	%	N	%
Total tools:	126	100.0	138	100.0	604	100.0
Tool morpho-use						
Indeterminate	68	54.0	84	61.0	231	38.2
Unhafted tool	20	15.9	21	15.2	150	24.8
Hammerstone	5	4.0	3	2.2	28	4.6
Mano	18	14.3	11	8.0	100	16.6
Slab metate	0	0	1	0.7	3	0.5
Trough metate	4	3.2	5	3.6	34	5.6
Metate fragment	1	0.8	9	6.5	26	4.3
Hafted implement	6	4.8	3	2.2	17	2.8
Specialized form	4	3.2	1	0.7	15	2.5
Grain size						
Indeterminate	4	3.2	2	1.4	19	3.1
Coarse	34	27.0	41	29.7	150	24.8
Medium	34	27.0	61	44.2	197	32.6
Fine	51	40.5	32	23.2	227	37.6
Microscopic	3	2.4	2	1.4	11	1.8
Item condition						
Broken						
Small fragment	2	1.6	0	0	4	0.7
Partial fragment	106	84.1	125	90.6	377	62.4
Complete/nearly complete	18	14.3	13	9.4	223	36.9
Production evaluation						
Indeterminate	38	30.2	44	31.9	116	19.2
Natural (unmodified)	70	55.6	74	53.6	367	60.7
Minimally modified	10	7.9	18	13.0	98	16.2
Well shaped	7	5.6	2	1.4	22	3.6
Stylized	1	0.8	0	0	1	0.2

The morpho-use categories are based on traditional Southwestern typologies and, as such, have both morphological and functional implications. Because the functions of many of these traditional categories have not been systematically verified, many of the more specific types were grouped into more general descriptive categories during preliminary analysis. Consequently, the unhafted, hafted, and specialized categories all subsume artifacts that presumably had a number of different functions.

Fortunately, not all of the artifact types that constitute these categories were recovered from the shelter's deposits; therefore, the functional implications, in some cases, can be narrowed. For instance, 92 percent of the unhafted implements are what are generally referred to as polishing or grinding/abrading stones; that is, they are unmodified, pebble- to cobble-sized stones that exhibit wear patterns such as polishing or smoothing of one or more faces and, in some cases, show evidence of battering. Within the hafted implement category, 75 percent of the artifacts are axes, and the other 25 percent are mauls. The majority of the specialized implements are ornaments, but mortars and pestles, pallets, and shaped sandstone slabs also are included in this category.

Referring back to table 18, it can be seen that the percentages for the various morpho-use categories in Elements 3, 4, and 5 are constrained by the large numbers of indeterminate codings. If these are excluded and the percentages of the remaining categories are recalculated (table 19), the frequencies of each tool type remain surprisingly uniform throughout the shelter's occupational history. This implies that all of the activities that involved the use of these implements were performed during

each of the occupations, a pattern also indicated by the distribution of the ceramics and flaked lithic implements. Minor variations in the percentages of the nonflaked implements do suggest that the intensity of individual activities did vary, however.

Table 19. Nonflaked lithic tool morpho-use frequencies, excluding items classified as "indeterminate," LeMoc Shelter

	Element				
	1 %	2 %	3 %	4 %	5 %
Tool morpho-use:					
Unhafted tool	50	40	35	43	34
Hammerstone	4	11	11	2	9
Mano	23	29	29	28	31
Metate	11	14	21	23	9
Hafted implement	4	2	1	4	10
Specialized form	8	4	3	0	7
Total	100	100	100	100	100

As indicated earlier, the interpretation of these variations is complicated by the diversity of tool types grouped into the morpho-use categories. Even if the narrow definition of unhafted implements is accepted, a variety of activities is still suggested. Such implements could have been used for resurfacing grinding stones or for manufacturing pottery or stone, bone, or wooden tools. As mentioned, the functional implications of the specialized tool category are even more ambiguous. Consequently, interpretation of activity patterns based on fluctuations in the frequencies of these categories is inadvisable at this preliminary stage of artifact analysis.

Fluctuations in the percentages of hammerstones cannot be directly interpreted because approximately half of the cores recovered at LeMoc

Shelter showed evidence of secondary use as hammerstones. The frequencies of nonflaked hammerstones, therefore, do not reflect the total number of artifacts used for this purpose. Also, like the unhafted tools, the hammerstones were undoubtedly used in a variety of activities.

Because the use of grinding stones and hafted implements is more task-specific, fluctuations in these categories are more readily interpreted. The frequency of metates seems to increase gradually through Element 3, decreases somewhat during Element 4, and drops off sharply during Element 5. This suggests that during the shelter's last occupation, relatively little milling was done. This interpretation is strengthened by the fact that many of the metates recovered from Element 5 contexts were being used to line pits and hearths and not being used as mealing stones.

This secondary use of metates as building stone was even more striking in Element 4 when most were incorporated into the retaining wall built during this period. It appears that very few metates were actually being used for their primary purpose. The gradual increase in the percentage of metates through time, therefore, seems to be a function of the gradual increase in the number of spent metates and metate fragments available for reuse as building stones.

The Element 5 assemblage is also unusual in that a relatively high percentage of hafted implements, all of which are axes, was recovered. Since fewer of these artifacts were recovered from earlier, more intensive occupations, woodcutting appears to have been a major activity during this occupation.

Codings for material type are essentially the same general grain size categories as those used for the flaked lithic implements. Tentative hand

specimen identifications suggest that the majority of these materials were most likely procured locally. Of the artifacts coded as coarse grained, 89 percent are diorite river cobbles that were probably gathered from the Dolores River flood plain, 6 percent are orthoquartzite, and 4 percent are sandstone. Similarly, 82 percent of the medium-grained materials are sandstone and 17 percent are orthoquartzite. Fifty-four percent of the tools in the fine-grained category are orthoquartzite, 37 percent are sandstone, and 8 percent are siltstone. The microscopic-grained materials include a wide variety of cherts, and a few pieces of exotic materials, notably, obsidian and turquoise.

Unlike the flaked lithic implements, the grain size categories for nonflaked implements cannot be related to the workability of the stone. Rather, they reflect the texture and durability of the rock, presumably as they relate to function. For example, sandstone was the favored material for metates in all of the elements. Both medium- and fine-grained stone was used, but the ratios of these two textures vary. In Elements 1 and 3, fine-grained metates are predominant, but in Elements 4 and 5 there are more medium-grained metates. However, given the secondary use of metates as building stone in these later elements, the significance of this difference is uncertain.

A wider variety of materials was used for manos. Sandstone is the major rock type, but manos of orthoquartzite and diorite are also common. In all elements, coarse-, medium-, and fine-grained manos were in use, although the ratios vary. It should be noted, however, that the coarse-grained materials do not necessarily imply a coarsely textured grinding surface. Most of the coarse-grained manos are diorite river cobbles that have a hard, smooth surface despite the grain size of their

mineral constituents. It appears, therefore, that fine- to medium-textured materials were favored for the manufacture of both manos and metates.

Hardness, more than texture, probably accounts for the apparent preference for orthoquartzite in making hammerstones and hafted implements. This hypothesis is supported by the fact that diorite, another hard rock, was the second most frequently used material. Unhafted implements, on the other hand, were made from the full range of available materials. Most likely this is a reflection of the variety of functional tool types subsumed by this category.

Human Skeletal Remains[2]

Fewer than 30 human bones were recovered from LeMoc Shelter (table 20). All were isolated finds rather than actual burials; many were recovered from disturbed deposits associated with looter's pits. Due to the small size of the collection and the fragmentary nature of many of the bones, little can be stated concerning these remains. The one subadult and two adult tibia fragments recovered from Feature 68 in Pithouse 1 represent at least two individuals. The third molar of the adult mandible recovered from the fill of Pithouse 1 appears to be slightly impacted, and the incisor recovered from Room 4 shows signs of attrition and calculus formation. No other signs of disease or abnormality were noted in the collection.

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[2]The discussion of human skeletal remains presented in this section is based on data provided by Louisa Beyer Flander and Ann Lucy Weiner, both of the University of Colorado, Boulder.

Table 20. Human skeletal remains, LeMoc Shelter

Provenience	Element	Observations
Pithouse 1, fill	Mandible	Adult; right third molar apparently impacted; second premolar and first and second molars worn on occlusal surface
Pithouse 1, Stratum 3	Ulna (L)	Shaft fragment
Pithouse 1, Stratum 11	Tibia (R)	Shaft fragment
Pithouse 1, Floor 1	Fibula	Shaft fragments; rodent gnawed
Pithouse 1, Feature 55	Long bone	Fragment
Pithouse 1, Feature 68	Tibia	Fragments (3) (1 subadult, 2 adult)
Room 4, Stratum 1*	Tibia	Fragments (3)
Room 4, Stratum 2	Incisor, maxillary central (L)	Advanced attrition and calculus formation
Occupation Area 1, Feature 25	Metatarsal	Fragments (2); proximal ends missing
Test Trench 1	Rib	Fragment
Test Trench 2	Metacarpal	
1- by 1-m grid, 9S/16E Stratum 13*	Phalanx	Foot
1- by 1-m grid, 8S/16E Stratum 13*	Hamate (R) Metacarpal	Fragment
Disturbed deposit behind roomblock	Phalanx	Probably hand (2)

* Disturbed deposits.

NOTE: (N) - Number of items.
(R) - Right.
(L) - Left.

Unworked Nonhuman Bone[3]

The preliminary description of the nonhuman bone from LeMoc Shelter is limited to the number of bones assignable to each taxa (table 21). Nevertheless, the percentages based on these tabulations should serve to reveal broad patterns of faunal resource exploitation during the successive occupations at LeMoc Shelter. To aid in pattern recognition, the diverse nonhuman bone assemblage was retabulated using order as the primary taxonomic unit for mammals and class as the primary unit for birds, fish, and amphibians (table 22). In this table, unidentifiable bone and unidentifiable mammal bone fragments are included in the "unidentified" category.

The frequency of unidentified bone in all of the elements is undoubtedly due in part to natural bone attrition, but cultural factors, such as butchering practices, bone-marrow extraction, and processing of bone for grease, may emerge as more significant once detailed analysis is completed. For purposes of assessing the relative importance of the various taxa in the overall subsistence system, however, the quantity of bone fragments serves only to obscure changes in the other categories. Consequently, a second set of percentages was calculated for the identified bone after excluding this material (table 22). An assumption is made that, since the bone preservation at LeMoc Shelter was generally good, no taxa will be seriously underrepresented by excluding these materials.

If these last percentages do, in fact, represent the general pattern of aboriginal faunal procurement, some changes in hunting practices are

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[3]The data and conclusions presented in this section are based on analysis of only a portion of the nonhuman bone assemblage from LeMoc Shelter. Since this report was written, analysis of the remainder of the assemblage has been completed; results are reported in appendix E.

Table 21. Frequencies of nonhuman bone, by element, LeMoc Shelter

Taxon	Element										Disturbed sediments		Total	
	1		2		3		4		5					
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Unidentifiable	38	5.4	2	1.0	31	5.5	26	2.7	10	1.4	137	6.3	244	4.7
Mammalia														
Indeterminate	327	46.5	145	70.0	349	61.8	731	76.3	383	67.7	1,586	72.6	3,521	67.9
Lagomorpha														
Indeterminate	0	0	1	0.5	28	5.0	0	0	2	0.4	2	0.1	33	0.6
Sylvilagus spp. cottontail	47	6.7	9	4.3	17	3.0	51	5.3	36	6.4	158	7.2	318	6.1
Lepus spp. jackrabbit	29	4.1	5	2.4	35	6.2	2	0.2	1	0.2	16	0.7	88	1.7
Rodentia														
Indeterminate	7	1.0	6	2.9	5	0.9	11	1.1	4	0.7	27	1.2	60	1.2
Sciuridae	7	1.0	1	0.5	4	0.7	3	0.3	8	1.4	27	1.2	50	1.0
Cynomys gunnisoni Gunnison's prairie dog	6	0.9	0	0	1	0.2	0	0	2	0.4	0	0	9	0.2
Spermophilus spp. ground squirrel	7	1.0	0	0	3	0.5	6	0.6	1	0.2	4	0.2	21	0.4
Marmota flaviventris yellow bellied marmot	15	2.1	1	0.5	1	0.2	3	0.3	1	0.2	3	0.1	24	0.5
Cricetidae	0	0	0	0	0	0	0	0	1	0.2	8	0.4	9	0.2
Microtus spp. vole	0	0	1	0.5	1	0.2	1	0.1	0	0	1	<.1	4	0.1
Neotoma spp. woodrat	4	0.7	0	0	1	0.2	1	0.1	7	1.2	5	0.2	18	0.3
Thomomys spp. pocket gopher	1	0.1	0	0	0	0	0	0	0	0	2	0.1	3	0.1
Erethizon dorsatum porcupine	1	0.1	1	0.5	3	0.5	6	0.6	1	0.2	4	0.2	16	0.3
Castor canadensis beaver	0	0	1	0.5	0	0	3	0.3	0	0	5	0.2	9	0.2
Carnivora														
Indeterminate	3	0.4	0	0	1	0.2	1	0.1	0	0	8	0.4	13	0.3
Canidae	0	0	0	0	1	0.2	3	0.3	4	0.7	8	0.4	16	0.3
Canis spp. dog, coyote, wolf	119	16.9	2	1.0	5	0.9	2	0.2	5	0.9	4	0.2	137	2.6
Vulpes spp. fox	1	0.1	0	0	1	0.2	5	0.5	1	0.2	10	0.5	18	0.3
Mustelidea	0	0	1	0.5	0	0	0	0	4	0.7	4	0.2	9	0.2
Felidae	0	0	1	0.5	0	0	2	0.2	0	0	3	0.1	6	0.1
Lynx rufus bobcat	0	0	2	1.0	3	0.5	4	0.4	3	0.5	6	0.3	18	0.3
Artiodactyla														
Indeterminate	20	2.8	23	11.1	15	2.7	33	3.4	68	12.0	48	2.2	207	4.0
Cervus elaphus American elk	0	0	1	0.5	9	1.6	28	2.9	5	0.9	5	0.2	48	0.9
Odocoileus hemionus mule deer	21	3.0	3	1.4	24	4.2	12	1.3	9	1.6	34	1.6	103	2.0

Table 21. Frequencies of nonhuman bone, by element, LeMoc Shelter--Continued

Taxon	Element										Disturbed sediments		Total	
	1		2		3		4		5					
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Ovis canadensis bighorn	1	0.1	0	0	3	0.5	4	0.4	4	0.7	16	0.7	28	0.5
Antilocapra americana pronghorn	0	0	0	0	0	0	1	0.1	0	0	2	0.1	3	0.1
Aves														
Indeterminate	34	4.8	0	0	5	0.9	11	1.1	2	0.4	35	1.6	87	1.7
Falconiformes														
Indeterminate	0	0	0	0	16	2.8	1	0.1	2	0.4	2	0.1	21	0.4
Galliformes														
Indeterminate	0	0	1	0.5	0	0	1	0.1	0	0	1	<.1	3	0.1
Meleagris gallopavo turkey	1	0.1	0	0	0	0	1	0.1	1	0.2	3	0.1	6	0.1
Tetraonidae	14	2.0	0	0	3	0.5	2	0.2	1	0.2	3	0.1	23	0.4
Passeriformes														
Indeterminate	0	0	0	0	0	0	0	0	0	0	5	0.2	5	0.1
Amphibia														
Indeterminate	0	0	0	0	0	0	1	0.1	0	0	0	0	1	0.1
Osteichthyes														
Indeterminate	0	0	0	0	0	0	2	0.2	0	0	4	0.2	6	0.1
Total assemblage	703	100.0	207	100.0	565	100.0	958	100.0	566	100.0	2,186	100.0	5,185	100.0

Table 22. Frequencies of taxonomic orders and classes of nonhuman bone, by element, LeMoc Shelter

Taxon	Element 1	Element 2	Element 3	Element 4	Element 5	Disturbed sediments	Total
Order							
Lagomorpha							
Count	76	15	80	53	39	176	439
% of total	10.8	7.2	14.2	5.5	6.9	8.0	
% of ID'd	22.5	25.0	43.2	26.4	22.5	38.0	
Rodentia							
Count	48	11	19	34	25	86	223
% of total	6.8	5.3	3.4	3.5	4.4	3.9	
% of ID'd	14.2	18.3	10.3	16.9	14.5	18.6	
Carnivora							
Count	123	6	11	17	17	43	217
% of total	17.5	2.9	1.9	1.8	3.0	2.0	
% of ID'd	36.4	10.0	5.9	8.5	9.8	9.3	
Artiodactyla							
Count	42	27	51	78	86	105	389
% of total	6.0	13.0	9.0	8.1	15.2	4.8	
% of ID'd	12.4	45.0	27.6	38.9	49.7	22.7	
Class							
Aves							
Count	49	1	24	16	6	49	145
% of total	7.0	0.5	4.2	1.7	1.1	2.2	
% of ID'd	14.5	1.7	13.0	8.0	3.5	10.6	
Amphibia and Osteichthyes							
Count	0	0	0	3	0	4	7
% of total				0.3		0.2	
% of ID'd				1.5		0.9	
Unidentified*							
Count	365	147	380	757	393	1723	3765
% of total	51.9	71.0	67.2	79.0	69.4	78.7	
Total	703	207	565	958	566	2186	5185
Total identified	338	60	185	201	173	463	1420

* Includes unidentified mammal bone and other unidentified fragments.

NOTE: ID'd - Identified.

apparent, although the frequencies for some of the categories are not always directly interpretable. For instance, in Element 1, the frequencies are skewed by the quantity of carnivore bone. With the exception of one bone, all of this material is identified as Canis and was recovered from a single scatter in the southern end of Pithouse 2. This bone probably is the remains of only one or two individuals whose carcasses were dumped into the pithouse depression at some point after its abandonment. Consequently, the frequencies for Element 1 were again recalculated after factoring out the Canis bone to better reveal the pattern of faunal exploitation (table 23).

Table 23. Frequencies of nonhuman bone (excluding Canis bone), Element 1, LeMoc Shelter

Taxon	%
Order	
Lagomorpha	35
Rodentia	22
Carnivora	<1
Artiodactyla	20
Class	
Aves	23
Amphibia and Osteichthyes	0

The figures in table 23 suggest a similar emphasis on a number of taxa during this period, with a slight preference for lagomorphs. In this context, the percentage of bird bone seems surprisingly high, especially since very little of it seems to be turkey. The data in table 21 suggest that grouse was the primary avifauna being hunted. Of the artiodactyls, deer appears to have been the most important game species. Preference for

lagomorphs, however, is split between cottontail (62 percent), and jackrabbit (38 percent).

The significance of the rodents is more difficult to assess since some bone may have been introduced into the deposits when animals died in their burrows. This is particularly likely to be the case with wood rat and, to a lesser extent, with ground squirrel. It appears, therefore, that during Element 1 the inhabitants of LeMoc Shelter exploited a variety of faunal species including deer, cottontail, and possibly ground squirrel, all of which are available in the immediate vicinity of the shelter today. Also used were species such as jackrabbit, grouse, prairie dog, and pocket gopher, which are more common in more open areas, and marmot, which is generally found in upland settings. Barring major environmental change, the presence of these latter species suggests frequent forays to other portions of the project area for game. It is also conceivable that with intensive farming of the river valley, an open ground microenvironment was created in the canyon that could have supported many of the species not commonly seen in the area today.

In Element 2, the small quantity of identifiable bone recovered makes interpretation of the frequencies of individual taxa especially tentative. It appears, however, that there was an increasing emphasis on the hunting of artiodactyls, with a corresponding deemphasis on the procurement of gamebirds and rabbits during this period (table 22). The frequency of rodent bone remains about the same, but too few bones from this group were recovered to determine if these were likely to have been intentionally hunted.

During Element 3, rabbit again appears to have been the most frequently taken game, with jackrabbit the dominant species recovered. The apparent increase in bird bone is due to the discovery of a partial

hawk skeleton in the fill of Room 11. No gamebirds were present. Taking into account the constraint caused by the inflated percentage of Aves, the frequency of artiodactyl bone is probably comparable to that in Element 1 or possibly is a bit higher. Deer is the most frequently identified species, but elk and mountain sheep were also being taken. The frequency of rodent bone seems low compared to the frequencies of rodent bone in the two earlier occupations, but except for fewer marmots, the species composition seems similar.

In Element 4, artiodactyls appear to have been the favored game (table 22). Elk was the most frequently recovered species, but a significant amount of deer bone was found also. The number of elk bones, however, may exaggerate the importance of this species since most of this bone was recovered from Stratum II-4 and probably represents only 2 to 3 individuals. Lagomorph bone frequencies are at about the same level as in Elements 1 and 2, but almost all of this bone is from cottontail. Rodent bones were also recovered at about the same frequency; marmot, beaver, porcupine, and ground squirrel all apparently were being used for food.

In Element 5, artiodactyls, including deer, elk, and mountain sheep, remained the principal game (tables 21 and 22). Lagomorphs remain the next most frequently recovered group, and, as in Element 4, nearly all of these are cottontail. The frequency of rodent bone remains constant, but there is an increase in the number of smaller species. The number of wood rat bones is particularly high, possibly because the shelter was being used by this species and only occasionally by humans during this period. Also, since these deposits are near ground surface, more bone of shallow-burrowing species is likely to have been naturally introduced.

Because the above interpretations are based solely on the raw frequency of bone, their tentative nature bears reemphasis, especially when the relative importance of various species is being discussed. At a more general level, however, greater confidence is probably warranted, and at this level some interesting patterns emerge. The broad spectrum of taxa apparently hunted during Element 1 is not unexpected given the year-round occupation of the shelter during this period. The high frequency of artiodactyl bone in Element 2 is somewhat surprising in this same context, but it should be remembered that very little midden is included in the Element 2 deposits, and very little identifiable bone was recovered. Consequently, little weight can be accorded to the figures from this unit.

The predominance of lagomorphs in Element 3 may support the interpretation of this occupation as a seasonally used field house, especially since most of this bone is jackrabbit (table 21). As discussed earlier, jackrabbits are better adapted to open country where their strategy of flight to avoid predators is most effective. In general, the canyon terrain, with its relatively heavy ground cover, is better suited to cottontail, a species that relies on hiding to avoid predators. The prevalence of cottontail in all other elements may indicate that a setting similar to modern times was also characteristic of the aboriginal period. An artificially created microenvironment of open ground may have been created during aboriginal times, however, as more fields were cleared and planted. It therefore seems plausible that the quantity of jackrabbit in Element 3 is the result of field hunting, both to obtain meat and to protect crops. In a site occupied year-round, this seasonal emphasis would be masked by the inclusion of game procured during other seasons,

but in a seasonally occupied site, the pattern would be preserved. Additional support for this hypothesis is provided by the paucity of jackrabbit in Elements 4 and 5 (table 21). Both of these occupations appear to postdate the general abandonment of Grass Mesa Locality. Consequently, the microenvironment created when the valley was being farmed probably would have disappeared. Therefore, cottontail would have reemerged as the most common lagomorph available in the vicinity of the shelter. The predominance of artiodactyl bone in Elements 4 and 5 (tables 21 and 22) suggests that big game hunting may have been a major activity during these occupations, with supplemental hunting of small game, possibly for camp meat.

In this discussion, little has been said about the quantity of bone recovered from the disturbed sediments, since these materials cannot be correlated with any of the shelter's occupations. Nevertheless, because the bone from these sediments constitutes 46 percent of the total collection, some comment is warranted. The large quantity of bone recovered from the disturbed sediments suggests that most of this deposit was probably midden originally deposited in the abandoned roomblock and in the rear of the rockshelter. As such, these sediments may have accumulated throughout the span of the shelter's aboriginal occupation. However, the percentage of Lagomorpha in the disturbed sediments is higher and that for Artiodactyla is lower than would have been predicted by averaging the bone from the five elements. This suggests that the bulk of the disturbed sediments may have been deposited during the earlier three elements.

Miscellaneous Items

A variety of materials that, to date, have not been included in any of the DAP analyses, was recovered from LeMoc Shelter. Included in these materials are dung, fur, hair, feathers, petrified wood, numerous worked and unworked shell items, and several pieces of jacal, both with and without impressions (table 24). Although some of these materials are certainly associated with the prehistoric occupation of the shelter, the cultural origin of other items is questionable; detailed analysis is required to determine the possible significance of the items that comprise this assemblage.

Discussion

As stated at the beginning of the "Material Culture" section, the aim of the intrasite analysis of artifact distributions was to test the interpretations of site function postulated on the basis of architectural features against an independent data base. Generally, the evidence from the artifacts seems to support those preliminary interpretations, but the distinctions among the artifact assemblages from the different elements are far from clear-cut. This seems largely due to the fact that the bulk of the collections from all of the elements consists of implements associated with housekeeping activities. The various occupation periods, therefore, differ not so much in the activities that were conducted as in the intensity of occupation--the frequency and duration of use. Tabulations of the frequencies of artifact types, unfortunately, are targeted at detecting qualitative rather than quantitative differences in the occupation periods. Without the information necessary to determine volumetric measures of the strata and without a knowledge of sedimentation

Table 24. Miscellaneous items recovered from LeMoc Shelter

Provenience	Material description
Square 6S/9E, Stratum 13	Petrified wood
Square 6S/9E, Stratum 14	Fossil Pelecypod
Square 7S/14E, Stratum 14	Jacal with gravel and grass inclusions (2) (3014.7 g)
Square 8S/16E, Stratum 13	Jacal (1.9 g)
Square 11S/15E, Stratum 11	Pebble/gravel
Square 12S/14E, Stratum 11	Sandstone
	Limonite
Test trench 2, Stratum 4	Gastropod shell (0.1 g)
Test trench 2, Stratum 6	Dung
Room 1, Stratum 1	Fur or hair
	Dung
	Jacal with impressions (4) (599.0 g)
	Mollusc shell; indeterminate (0.1 g)
Room 2, Stratum 1	Olivella shell bead (0.4 g)
Room 4, Stratum 1	Jacal with impressions and grass (20.0 g)
Room 6, Stratum 1	Dung
	Jacal (18.2 g)
Room 6, Surface 1, Feature 1	Jacal (31.5 g)
Room 6, Surface 1, Feature 2	Dung
	Caliche (2) (1.2 g)
	Feather
	Wall plaster with vegetal and rock inclusions (1346.0 g)
Room 8, Stratum 1	Sandstone (4.5 g)
Room 12, Stratum 1	Pebble/gravel
Room 12, Stratum 2	Hematite
Room 13, Surface 1, Feature 40	Fossil mollusc
Pithouse 1, fill	Caliche (5) (3.7 g)
	Gypsum (7.0 g)
	Jacal with impressions (2) (921.9 g)
Pithouse 1, Stratum 8	Hematite
Pithouse 1, Stratum 11	Drilled mollusc shell; indeterminate (0.1 g)
	Mollusc shell bracelet fragment; indeterminate (2.0 g)
Pithouse 2, fill	Jacal (9) (391.3 g)
	Dung
Pithouse 2, Stratum 6	Fossil Pelecypod (5.2 g)
	Fossil mollusc shell

NOTE: (N) - Number of items.
(g) - Weight in grams.

Table 24. Miscellaneous items recovered from LeMoc Shelter--Continued

Provenience	Material description
Midden east of Pithouse 1	Gypsum
	Weathered rock
	Mollusc shell; indeterminate
Disturbed deposits	Olivella shell bead (3) (0.6 g, 0.4 g, 2.7 g); 1 burned
	Feather (3)
	Jay feather
	Feather bundle (0.5 g)
	Dung (2)
	Jacal with impressions (8) (1166.9 g)
	Jacal (46.2 g)
	Gypsum (2)
	Gastropod shell (0.7 g)

rates and implement uselife, occupational intensity is difficult to measure from artifact data alone. Consequently, the energy invested in the construction of facilities (i.e., architectural features) is the only available measure of this factor.

The kinds of facilities in use during each occupation must also bear the greater burden of proof for the range of activities performed at the shelter during each element. Theoretically, it should be possible to factor out the artifacts associated with the various housekeeping tasks and to use the residuals to determine site function. In practice, however, this effort is confounded by the generalized, multifunctional character of the Anasazi tool technology, which precludes the identification of task-specific tool kits. The best that could be achieved was to find some broadly supportive evidence that suggested successive changes in site function through time.

The most broadly significant of these lines of evidence is the distribution of trough metates, the presence of which is taken as evidence that maize was being consumed. Since wear patterns were not examined during the preliminary analysis of nonflaked lithic tools, trough metates provide the only certain evidence of the specialized back and forth motion discussed by Woodbury (1954:66) as indicative of maize grinding. As discussed earlier, trough metates are common in all elements; however, those in Elements 4 and 5 were being used secondarily as building stone. Use of metates as grinding stones, therefore, appears to have been heaviest in the first three elements and minimal in the last two occupation periods. This, coupled with the increased ratio of nonflaked lithic tool fragments to complete tools in the later elements, seems to support the idea that the shelter was less intensively occupied during the

later periods and that, although the site was being used for agriculture-related activities during Element 3, it was not being used for such activities during Elements 4 and 5.

Since Grass Mesa Locality appears to have been largely abandoned by the Anasazi before these last two occupations of the shelter, it is assumed that the shelter was being used by work groups coming into the area to procure locally available resources. The relatively high frequency of projectile points and the quantity of artiodactyl bone from Element 4 deposits suggest that hunting was a major activity. The effort expended on building the retaining wall further suggests that the shelter was used repeatedly and fairly regularly as the base camp for these forays.

Use of the shelter during Element 5 seems to have been more sporadic, which may account for the wider range of activities suggested by the artifacts. The quantity of bone, especially artiodactyl bone, suggests that hunting again was a major activity. However, the relatively high frequency of cores suggests that lithic raw materials also may have been procured during this period. Also, the number of axes present in these deposits indicates that woodcutting may have been an important activity. Given the transport distances involved, it seems doubtful that firewood was being cut. More likely, ponderosa pine and Douglas-fir were being procured for roof supports to be used in sites in the McPhee area. Since the features associated with this occupation period are small, isolated fireplaces, it seems likely that, during Element 5, the shelter was being used irregularly as a short-term camp by small task groups engaged in one or another of these resource procurement activities.

In contrast to these later occupations, use of the shelter during Element 3 appears to have been directed more toward agricultural activities, although some lithic raw material may have been processed, as well, as suggested by the relatively high frequency of cores. Apart from the presence of grinding stones, the most significant feature of this artifact assemblage is the relatively high frequency of jackrabbit bone. As suggested earlier, this may indicate that faunal procurement was largely focused on hunting within an open microenvironment, perhaps one created by agricultural fields.

APPLICABILITY OF SITE DATA TO DOLORES ARCHAEOLOGICAL PROGRAM RESEARCH DESIGN

The primary focus of this report has been descriptive, with interpretations limited to perceptions of the evident intrasite variability. The narrowness of this focus has been intentional, since the purpose of the individual site reports in the scheme of the DAP research effort is to provide a contextual basis for more synthetic reports. By adopting a regional focus, the myopia that too often characterizes interpretive site reports can perhaps be avoided. Nevertheless, some interim synthesis of the information obtained during the course of these excavations is a useful aid in the development of more broadly based research. The following discussion, therefore, is an attempt to interpret the information obtained at LeMoc Shelter within the framework of the five problem domains of the DAP research design: Economy and Adaptation, Paleodemography, Social Organization, Extraregional Relationships, and Cultural Process.

Economy and Adaptation

The frequency with which corn, bean, and squash remains were recovered from the shelter's dry deposits (see appendixes F and G) leaves little doubt that agriculture was the basis of the subsistence system for the inhabitants of LeMoc Shelter. Based on Kohler's discussion (1983:13), only about 7 percent of the canyon soils appear to be even marginally arable. Nevertheless, this would have been sufficient to support a reasonably large population. Stephen (1936:954-955) reports that in 1892 the Hopi were farming 3 to 4 acres/capita, with 55 percent of the land in

corn; 30 percent in beans, squash, and other vegetables; and 15 percent in fruit trees. This estimate agrees with the figure of 3 acres/capita obtained by Hack (1942:10) 45 years later. Assuming that this figure approximates aboriginal requirements, the estimated 82.2 hectares (223 acres) of arable land within a 1-km radius of the shelter could have supported roughly 74 people--far more than could ever have lived there.

Direct precipitation would not have been as critical to agricultural success in the canyon as it would have been in other portions of the study area, since the river effectively concentrates precipitation from a large catchment area. Unless the river was deeply entrenched, the water table in the valley would have remained within reach of the roots of crops planted in the pockets of deep alluvium that dot the flood plain. Fields on the alluvial fans of the small tributary drainages also would have benefited from the concentration of rainfall from a wider catchment area. In addition, the loose colluvial soils near the base of the canyon side slopes are able to retain much of the moisture obtained from sheet slope runoff. Temperature, rather than moisture, appears to have been the more critical factor in the success or failure of the harvest. Kane (1981b:14) states that there was an annual average of 124 consecutive frost-free days between 1964 and 1975 at Yellow Jacket, Colorado, which is at about the same elevation as the valley floor in Grass Mesa Locality. However, cold air drainage in the canyon can profoundly shorten the frost-free period. Bye and Shuster (1981:242) report that an early frost on 21 August 1980 killed maize, bean, and squash plants in an experimental garden planted in the river valley. The frost-free season at this lower garden was only 67 days in contrast to a 98 day frost-free season for a second experimental garden planted in the upper Sagehen area.

Bradfield (1971:6) indicates that Hopi maize requires 115 to 130 frost-free days to mature. If, as hypothesized by Petersen (1981:153), the climate during the Anasazi occupation was similar to that of the present, then maize agriculture would have been feasible, but cold air drainage in the canyon would have made crop failures and low yields frequent.

In an early survey of the Dolores River canyon, Toll (1977) suggests that the rich biotic diversity within the canyon would have favored the adoption of a more mixed subsistence strategy than is generally thought typical of the Anasazi. Although it is unlikely that a population as large as the population that occupied the canyon during the Anasazi period could have been supported without an agricultural subsistence base, the probability of frequent crop failures does suggest some reliance on wild food resources. (Refer to appendixes F and G for a discussion of the wild botanical resources that may have been used by the inhabitants of the shelter.) The quantity of bone scrap recovered from the shelter, however, does suggest a reliance on hunting by the Anasazi occupying this area.

The diversity of the canyon environment also appears to have permitted many of the extracting and processing tasks generally performed at satellite camps to be performed at the shelter. Evidence from the excavation indicates that both plant and animal resources were processed at the site. The site was also the locus for most manufacturing tasks. Several unfired sherds indicate that pottery was being made and fired near the shelter; the range of lithic detritus suggests that stone was being gathered locally and that all subsequent manufacturing stages were being performed at the site. The building materials appear to have been locally procured as well. In summary, between the late Sagehill and early Periman

Subphases it appears that the hamlet at LeMoc Shelter was economically self-sufficient, with the inhabitants seldom ranging more than a few kilometers from the site to procure any raw materials or food.

By about A.D. 860, the shelter had been abandoned as a year-round habitation, but it continued to serve during the late Periman Subphase as a seasonal locus. Based on the architectural features and on the presence of a substantial number of grinding stones, the site appears to have been a farming station occupied by a group primarily engaged in tending the crops. From the variety and quantity of materials recovered from the Element 3 deposits, it seems likely that the group may have been a household unit, possibly from the village on Grass Mesa (Site 5MT23). After harvesting the crops, the group probably returned to the village for the winter. Thus, although the occupation of the shelter during Element 3 appears to indicate a change in Anasazi residence patterns, no change in the local subsistence pattern is evident.

DAP survey records for Grass Mesa Locality indicate that after A.D. 925 there were no permanent habitation sites in the immediate area. The canyon seems to have been abandoned, although Anasazi sites continued to be occupied in other portions of the study area. Elements 4 and 5, consequently, appear to mark a change in the focus of local resource exploitation. With the depopulation of the lower river valley, farming was probably no longer attempted in this part of the canyon. Procurement of wild food and mineral resources by groups residing elsewhere appears to have been the purpose of the temporary occupations of the shelter. During Element 4, hunting might have been the major activity. The energy invested in the construction of the retaining wall suggests that the site might have been used for this purpose repeatedly and at regular intervals.

By Element 5, use of the site appears to have been more infrequent and sporadic. Hunting still may have drawn some work parties into the area, but other work parties appear to have been gathering lithic raw materials and possibly cutting building timbers. Use of the shelter appears to have continued until about A.D. 1050/1150, but with decreasing intensity.

Paleodemography

At LeMoc Shelter, the most readily applied index of population size is one based on a ratio of individuals to living area. As discussed in Casselberry (1974:117), Clark's estimate of one person for every 3 m^2 of floor space, derived from Pueblo dwellings, seems most appropriate for the Dolores area Anasazi. Because Clark's ratio applies only to dwellings, the surface rooms that are believed to be storage structures are excluded from these calculations. The estimate for Element 1, therefore, is based on the floor area of Pithouse 2, which is 21.25 m^2. This yields an estimated population of seven individuals, which suggests that the pithouse was a single-family (i.e., nuclear or biological family) dwelling.

During Element 2, both Pithouse 1 and Room 12 were occupied. Pithouse 1, with a floor area of 31.1 m^2 (including the bench), would have been used by approximately 10 people, according to Clark's estimate. Room 12, with a floor area of approximately 11 m^2, yields an estimate of an additional four people, which brings the total for Element 2 to 14. The difference between the estimates for Element 1 and Element 2, plus the presence of at least two habitation structures in Element 2, suggests a change in the demographic structure of the shelter beyond a simple

increase in the number of occupants. The difference in floor area between Pithouse 1 and Room 12 suggests the possibility that the shelter was used by an extended family. Pithouse 1 originally might have been occupied by a nuclear family, with Room 12 built later to house the family of a married child. Pithouse 1 may have continued to be used for some activities by the extended family as a group. One of the implications of this hypothesis, given the single family farmsteads typical of the preceding period, is that no vacant farm land would have been available in the canyon at which to establish a new "homestead."

For Element 3, population estimates are not as easily calculated. Rooms 11 and 13 have floor areas of 3.75 m^2 and 3.5 m^2, respectively, yielding an estimate of one person per structure if Clark's figures are used. However, the quantity and variety of artifacts recovered suggests that the site was being occupied by more than just one or two individuals during Element 3. It is possible that the number of occupants at the site varied through the growing season; perhaps only one or two people tended the crops much of the time while additional workers were required during harvest. Rooms 11 and 13 may have provided shelter for the one or two occupants during the "slow" season; the cave itself would have provided sufficient protected area to house additional workers when necessary. Assuming that the basic productive unit of Anasazi society was the household, it seems likely that these periods of more intensive activity resulted in the varied artifact assemblage.

During Elements 4 and 5, the composition of the groups using the shelter seems to have changed. As discussed earlier, during these periods the shelter probably was used as a camp by groups based outside Grass Mesa Locality. Hunting, the procurement of lithic raw materials, and possibly

timber cutting seem to have been the major purposes of these forays. By analogy with the San Juan Pueblo Indians (Ford 1968:179), it seems probable that because these tasks were probably being conducted at some distance from the main habitation, they probably were being performed by all-male groups. Using Clark's formula, the 20 m^2 area of the shelter occupied during these components suggest a group of 6 to 7 individuals. Since no structures are associated with either of these elements, it is difficult to assess the accuracy of this estimate. Subjectively, it would appear to be a reasonable maximum; although during any one episode of use, especially during Element 5, a smaller party may have been involved.

Social Organization

In the preceding section, it was argued that, during Element 1, LeMoc Shelter was being occupied by a single household group, probably a nuclear family. Although this group was largely independent in terms of resource procurement and subsistence, membership in a larger social network would have been necessary to provide marriage partners as the children came of age. This need, coupled with the adaptive advantages of membership in an interhousehold exchange system, argues strongly for the existence of some social unit beyond the household. Not surprisingly, no direct evidence either supporting or refuting this hypothesis was uncovered at LeMoc Shelter. The very nature of the problem demands an intersite perspective.

Currently, occupations roughly contemporaneous with Element 1 have been documented in Grass Mesa Locality at Prince Hamlet (5MT2161) and at Grass Mesa Village (5MT23). It seems likely that, as research progresses, other components dating to this period will be found. It is suspected that these households probably constituted a larger social network

organized around kin ties. Whatever the nature of this system, however, it appears to have had little significance in the realm of daily economic pursuits, unless, as Sahlins (1972) has argued, an elaborate social superstructure forced household production beyond the minimum requirements of the domestic group.

Beginning in Element 2, a change is evident in both the residential unit at LeMoc Shelter and in the social structure of Grass Mesa Locality. As discussed, the residential group at the shelter during this period consisted of two household groups, which probably represented an extended family. This tendency towards multihousehold sites is even more apparent at Prince Hamlet (5MT2161) where as many as five nuclear families may have been in residence. Survey records suggest that several sites similar to 5MT2161 were present in Grass Mesa Locality during this period. By A.D. 875, residential aggregation had progressed to the point where most, if not all, of the locality's residents were living in Grass Mesa Village. Progressive removal of the residence from the vicinity of the agricultural fields established a need for seasonal sites from which the crops could be more conveniently tended. The occupation of the shelter during Element 3 may reflect this need.

The population aggregation during this period would have neccessitated an elaboration of the social organization to deal with the inevitable problems arising from the increased social interaction brought on by such a process. To a large extent, this probably was accomplished by formalizing and extending existing social ties. New elements also appear to have been added. The presence of a "great kiva" at Grass Mesa Village and at some other villages in the study area may be significant in this regard. The influx of Chaco-Cibola trade wares that begins at this

time suggests that the community was also participating in an interregional exchange network. Precisely how this participation affected the local social organization has yet to be established, but an increase in social interaction above the community level is definitely implied.

With the abandonment of the canyon during the late McPhee Phase, use of the area seems to have been limited to occasional forays to procure local resources. During Elements 4 and 5, the shelter was used as a base camp for these activities. Conceivably, the inferred all-male work groups could have been composed of individuals belonging to a clan or to some other kin-based cooperative, or they may have been working together merely because of mutual familiarity and common need. The limited evidence from the site, however, precludes any discussion of the larger social organization during this period.

Extraregional Relationships

As discussed earlier, the vast majority of resources needed by the Anasazi living in the vicinity of LeMoc Shelter were readily available locally. Despite this potential for self-sufficiency, however, the inhabitants of the shelter seem to have been participating in an interregional exchange network as early as the Element 1 occupation. The primary evidence of this exchange network is the presence of small quantities of nonlocal lithic materials and ceramic wares within the shelter deposits. However, source identification of lithic raw materials is still in the early stages of research. Consequently, the sparse detail available concerning these networks is based primarily on the ceramic data.

Based on ceramic evidence, it is believed that, by the Sagehill Subphase, exchange relations were maintained between the Dolores Anasazi and the inhabitants of southeastern Utah. This hypothesis is based on the presence of quantities of red wares in Dolores area sites that appear to have been manufactured in the Bluff-Blanding area. The intensity of this exchange appears to be greatest during Element 1 with a slight decline in Element 2.

A small number of sherds from Element 3, 4, and 5 contexts apparently had been traded in from the Cibola area of eastern New Mexico, possibly through intermediaries in the Chaco area. The presence of these sherds in contexts associated with the later three occupations of the shelter seems to indicate a shift of the interregional exchange network from the west to the south.

Cultural Process

In order to study cultural process in the Dolores area, the temporal variability in the local prehistoric sequence must first be identified. Because LeMoc Shelter is a stratified site, the information obtained from its excavation is particularly useful for this purpose. For this reason, the evidence of culture change has been a major emphasis throughout this discourse. In general, the successive occupations of the shelter appear to reflect, in microcosm, the changes in the Anasazi settlement pattern of Grass Mesa Locality.

During Element 1, the shelter was occupied year-round by a single family that farmed the canyon and supplemented their diet by hunting and foraging. By A.D. 850 (Element 2), the site was being used by an extended family, which possibly is an indication that little vacant farmland was

left in the canyon. The process of population aggregation seems to have accelerated until, during Element 3, the shelter was being used only as a seasonally occupied farming station, presumably by residents of Grass Mesa Village.

Permanent habitations in this part of the river valley appear to have been abandoned by about A.D. 925, but it appears that during Element 4 the canyon was still being exploited for wild resources by small task groups. The features associated with this occupation, notably the retaining wall, and the relative intensity of use suggest that the shelter was being used regularly as a base camp. It, therefore, seems likely that these task groups were based nearby, probably in Sagehen Flats area sites such as McPhee Village. In Element 5, however, the evidence suggests more sporadic use of the shelter, possibly because the Anasazi population center had again shifted farther south.

APPENDIX A

DATING AND INTRAREGIONAL EXCHANGE INFERENCES BASED ON LEMOC SHELTER CERAMICS

by

Eric Blinman

Ceramic Dating

Distributions of ceramic types were the primary means of dating the various occupations at LeMoc Shelter. Both the occurrence of specific types and the relative frequencies of types were used to estimate absolute date ranges for each defined element. Estimates were based in part on the assumption that the popularity of specific types would increase linearly to a maximum and then decrease linearly as new types became popular. Research carried out subsequent to the writing of the body of this report indicates that this assumption may not have been appropriate for some ceramic types in the DAP sequence. This new information has prompted the following minor revisions of the absolute date estimates for some elements of the site.

Pithouse 2 and the postoccupational fill strata that accumulated shortly after abandonment of the structure have been assigned to Element 1. The high ratio of Chapin Gray to Moccasin Gray sherds (table 1 in the site report) associated with the pitstructure was used by Hogan to argue that this structure was occupied between A.D. 750 and 780. This ratio decreased slightly in the fill strata, and the linear assumption was used to estimate a terminal date of A.D. 820 for the element. Concurrent with the changing gray ware ratio was an increase in red ware frequency from about 4 percent to over 15 percent of the total assemblage.

Ceramic data from six DAP tree-ring-dated assemblages are presented in table A.1. These assemblages span the time period from A.D. 760 through A.D. 860 and reveal considerable variability in assemblage composition. Chapin Gray remains more abundant than Moccasin Gray from the first appearance of the latter type through at least A.D. 810. By A.D. 850, however, the ratio is reversed, and Moccasin Gray is

predominant. Red ware frequencies also fluctuate, with the highest frequency between A.D. 800 and 810. Compared with the ceramic type frequencies for Pithouse 2 and Element 1 as a whole (table A.2), these data suggest a more conservative and slightly later date range for the element than was presented in the site report. The presence of Moccasin Gray on the pithouse floor and the relatively low frequency of red ware ceramics places the abandonment of Pithouse 2 between A.D. 770 and 800. The increasing abundance of red wares in the fill matches the general trend in the project area for the A.D. 780's through the early ninth century, and the persistence of Chapin Gray as the dominant gray ware type suggests that the termination of Element 1 predates A.D. 830. Thus, the material associated with the element probably dates to sometime between A.D. 770 and 830. Construction of the pithouse may predate A.D. 770, but if so, no ceramic assemblage can be correlated with its initial occupation.

Table A.1 Selected tree-ring-dated ceramic assemblages from the Dolores River valley

Site	5MT2193		5MT2193		5MT4644		5MT2848		5MT4644		5MT4725	
Structure association	Pitstr 1		Pitstr 2		Pitstr 2		Pitstr 1		Pitstr 1		Pitstr 1	
Construction date (tree-ring) (A.D.)	ca. 760		770		776		784		ca. 800		845	
Decade represented by ceramics (A.D.)	760-770		780-790		780-790		790-800		800-810		850-860	
	N	%	N	%	N	%	N	%	N	%	N	%
Ceramic type												
Chapin Gray	40	3.6	24	3.2	7	1.9	14	4.4	62	3.9	4	0.7
Moccasin Gray	0	0	3	0.4	4	1.1	3	0.9	0	0	39	6.6
Early Pueblo Gray	1,024	92.2	684	91.8	274	74.2	294	92.2	1,155	73.0	537	91.2
Mesa Verde White Ware	44	4.0	24	3.2	5	1.4	0	0	46	2.9	5	0.8
Mesa Verde Red Ware	3	0.3	3	0.4	59	16.0	8	2.5	319	20.2	3	0.5
Other	0	0	7	0.9	20	5.4	0	0	0	0	1	0.2
Total	1,111	100.0	745	100.0	369	100.0	319	100.0	1,582	100.0	589	100.0

NOTE: Pitstr - Pitstructure.

Table A.2 Frequencies of ceramic types, by element, LeMoc Shelter

Culture category: Ware / Type	Element 1		Element 2		Element 3		Element 4		Element 5		Other		Total	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Mesa Verde:														
Gray ware														
Chapin Gray	142	5.2	50	3.8	49	2.3	32	3.3	25	2.5	155	4.0	453	3.8
Moccasin Gray	26	1.0	88	6.7	196	9.1	37	3.8	59	5.9	70	1.8	476	3.9
Mancos Gray	0	0	24	1.8	39	1.8	24	2.5	34	3.4	163	4.2	284	2.4
Early Pueblo Gray	2,123	77.7	996	76.0	1,562	72.1	583	59.8	545	54.3	2,670	68.8	8,479	70.2
Dolores Brown	0	0	1	0.1	0	0	0	0	0	0	0	0	1	*
Mancos Corr	0	0	1	0.1	5	0.2	14	1.4	24	2.4	27	0.7	71	0.6
Dolores Corr	0	0	0	0	0	0	0	0	0	0	1	*	1	*
Mesa Verde Corr	0	0	0	0	0	0	0	0	1	0.1	1	*	2	*
Corr Body Sherds	1	*	7	0.5	28	1.3	155	15.9	210	20.9	286	7.4	687	5.7
White ware														
Chapin B/W	0	0	1	0.1	0	0	0	0	1	0.1	6	0.2	8	0.1
Piedra B/W	4	0.1	3	0.2	3	0.1	1	0.1	4	0.4	7	0.2	22	0.2
Cortez B/W	0	0	2	0.2	16	0.7	15	1.5	9	0.9	2	0.1	44	0.4
Mancos B/W	0	0	0	0	0	0	0	0	2	0.2	10	0.3	12	0.1
Painted White	1	*	4	0.3	2	0.1	2	0.2	1	0.1	2	0.1	12	0.1
Polished White	73	2.7	39	3.0	123	5.7	57	5.8	36	3.6	186	4.8	514	4.3
Slipped White	0	0	1	0.1	0	0	2	0.2	4	0.4	2	0.1	9	0.1
Sherd White	1	*	1	0.1	1	*	2	0.2	4	0.4	12	0.3	21	0.2
Red ware														
Abajo R/O	11	0.4	1	0.1	1	*	1	0.1	2	0.2	13	0.3	29	0.2
Bluff B/R	45	1.6	14	1.1	18	0.8	11	1.1	4	0.4	65	1.7	157	1.3
Dolores Red	0	0	0	0	0	0	0	0	1	0.1	0	0	1	*
McPhee B/R	0	0	0	0	1	*	0	0	0	0	0	0	1	*
Deadmans B/R	0	0	0	0	1	*	0	0	0	0	0	0	1	*
Early Pueblo Red	294	10.8	71	5.4	113	5.2	35	3.6	35	3.5	192	4.9	740	6.1
Slipped Red	9	0.3	1	0.1	1	*	1	0.1	1	0.1	8	0.2	21	0.2
Sherd Red	2	0.1	2	0.3	1	*	0	0		0	0	0	5	*
Unclassifiable red	0	0	2	0.2	0	0	0	0		0	2	0.1	4	*
Cibola:†														
Gray ware														
Early Pueblo Gray	0	0	0	0	1	*	0	0	0	0	4	0.1	5	*
Late Pueblo Gray	0	0	0	0	0	0	0	0	0	0	1	*	1	*
White ware														
Escavada B/W	0	0	0	0	1	*	1	0.1	1	0.1	0	0	3	*
Gallup B/W	0	0	0	0	1	*	2	0.2	0	0	0	0	3	*
Early Pueblo White	0	0	0	0	1	*	0	0	0	0	0	0	1	*
Late Pueblo White	0	0	0	0	1	*	0	0	1	0.1	0	0	2	*
Indeterminate:														
Gray ware	0	0	1	0.1	0	0	0	0	0	0	2	0.1	3	*
White ware	0	0	0	0	0	0	0	0	0	0	1	*	1	*
Total	2,732	100.0	1,310	100.0	2,165	100.0	975	100.0	1,004	100.0	3,888	100.0	12,074	100.0

* Less than 0.05 percent.

† Includes two quartz-sand-tempered sherds that may be affiliated with either the Cibola or Kayenta Culture Categories but are assumed to be Cibolan in this case.

NOTE: B/W - Black-on-white. B/R - Black-on-red.
R/O - Red-on-orange. Corr - Corrugated.

The units assigned to Element 2 include Pithouse 1, Room 12, and associated strata. The element was dated in the report to A.D. 840-860 based on a predominance of Moccasin Gray and a lack of Mancos Gray in association with the pitstructure. This inference is plausible given the Pithouse 1 assemblage (table 1 in the site report), but the amount of Mancos Gray associated with the element as a whole (table A.2) suggests that it includes post-A.D. 860 ceramics as well. Some contamination of the deposits as the result of later disturbance is evident, but the proportion of Mancos Gray in Element 2 is equivalent to that in Element 3, which purportedly dates to A.D. 875-890. To accomodate the presence of the Mancos Gray sherds, the estimated date range for Element 2 should be shifted to encompass the period A.D. 850-875.

In keeping with the previous suggestions for dating revisions, the date range for Element 3 may span A.D. 900. The stratigraphic break between Element 2 and Element 3 indicates that the initiation of Element 3 should postdate A.D. 875. Whether from contamination or not, corrugated ceramics are rare, indicating deposition prior to the A.D. 910's. The strongest argument for placement within this range is the abundance of Cortez Black-on-white (table A.2). Although present in the project area in the A.D. 880's, Cortez Black-on-white does not become the dominant white ware until after A.D. 890. Thus, the Element 3 occupation probably occurred sometime between A.D. 890 and 910 rather than between A.D. 875 and 890.

Dating estimates for Elements 4 and 5 cannot be revised based on current knowledge of DAP ceramic chronology. Too few independently dated proveniences exist within the project area to calibrate ceramic change for the A.D. 900-1200 time period, but the absence of McElmo Black-on-white

suggests that it is unlikely that occupation of LeMoc Shelter extended beyond A.D. 1150. However, it is more likely that one or both of the last elements postdates A.D. 1000 than that both fall in the 10th century.

Intraregional Exchange

Culture categories are used to label the broad geographical/cultural affiliations of DAP ceramics and in the body of this report were used as the basis for a discussion in the body of this report of interregional exchange. Ceramics that are classified as belonging to the Mesa Verde Culture Category can be used to discuss intraregional exchange as well, using paste characteristics as a basis for inference. In the Mesa Verde ceramic assemblage from LeMoc Shelter, five paste attributes are currently recognized by the DAP. These are assumed to correspond to broad manufacturing tracts within the Mesa Verde region, each of which can be distinguished by the use of distinctive raw materials in pottery manufacture. These tracts probably do not represent discrete or contiguous areas, and their exact geographic correlates have not been established. However, analyses of survey and excavation collections from outside of the project area have confirmed a geographic reality for the tracts (Lucius 1981, 1982).

The frequencies of ceramics assigned to the various tracts are ordered by element in table A.3. The Dolores Tract refers to all gray and white ware sherds that are tempered with a particular variety of crushed igneous rock. Presence of this temper in unfired clay samples from DAP sites is the justification for the label, but indistinguishable crushed igneous rock temper was also used over large areas of the Mesa Verde region. Thus, Dolores Tract ceramics are those that cannot be identified as nonlocal on the basis of temper alone. Presence of crushed

conglomerate rock or multilithic sand defines the Cahone tract, and the presumed origin of these ceramics lies to the west of the DAP area. Varieties of sandstone temper were also used and are also assumed to have originated to the west or southwest of the project area. Blanding Tract ceramics encompass all of the Mesa Verde Red Wares and are identified by a distinctive red-firing clay rather than by a specific suite of tempers. Red-firing clays are rare in southwestern Colorado, and red wares are assumed to be imported from the Blanding-Bluff area of southeastern Utah (Lucius and Breternitz 1981:106). Finally, another variety of crushed igneous rock temper can be used to identify gray and white wares of the San Juan Tract. This tract is presumed to be somewhere to the south and southeast of the project area.

Table A.3 Manufacturing tract frequencies of Mesa Verde ceramics, by element, LeMoc Shelter

Manufacturing tract	Element										Other		Total	
	1		2		3		4		5					
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Dolores Tract	2,328	85.2	1,192	91.2	1,985	91.9	873	89.8	908	90.6	3,516	90.6	10,802	89.6
Cahone Tract	11	0.4	5	0.4	3	0.1	9	0.9	4	0.4	27	0.7	59	0.5
Sandstone Tract	16	0.6	6	0.5	1	*	7	0.7	3	0.3	11	0.3	44	0.4
Blanding Tract	361	13.2	89	6.8	136	6.3	48	4.9	43	4.3	279	7.2	956	7.9
San Juan Tract	16	0.6	15	1.1	35	1.6	35	3.6	44	4.4	49	1.3	194	1.6
Total	2,732	100.0	1,307	100.0	2,160	100.0	972	100.0	1,002	100.0	3,882	100.0	12,055	100.0

* Less than 0.05 percent.

The most obvious trend in these data is the presence of intense exchange with the Blanding Tract. Unfortunately, this impression is spurious for Elements 4 and 5 due to the contamination of these elements with sherds from earlier deposits. The red ware types present in these

elements (Abajo Red-on-orange and Bluff Black-on-red) had ceased being manufactured by about A.D. 900 (Breternitz et al. 1974:50, 54), and their exchange or continued use in the later 10th and early 11th centuries is doubtful. Although the trend in Elements 1, 2, and 3 may also reflect some disturbance, it mirrors the pattern of temporal change seen in other DAP sites and therefore seems valid. Blanding Tract red wares first appear in the project area shortly after A.D. 725, and they commonly comprise over 10 percent of ceramic assemblages dating to sometime between A.D. 780 and 840 (as in Element 1). Red ware exchange then appears to decline (Elements 2 and 3) until their production ceases. Thus, the inhabitants of LeMoc Shelter participated in a region-wide exchange network that was strongly oriented to the west.

Given the intensity of red ware exchange, it is not unusual for frequencies of both Cahone and Sandstone Tract sherds to follow the same pattern for Elements 1, 2, and 3. However, unlike the production of Mesa Verde Red Wares, use of Cahone and Sandstone Tract temper types did not lapse, and their greatest frequency occurs in Element 4. This suggests that changing demand for, or availability of, red wares is not an adequate explanation for the changes in the westward-oriented exchange network. The decline seen in Element 3 and the resurgence seen in Element 4 may be related to the broader pattern of population movement that characterizes southwestern Colorado during early Pueblo II times.

The final trend in exchanged ceramics at LeMoc Shelter is a slow increase in the proportion of San Juan Tract sherds through time. San Juan temper occurs disproportionately in white wares, and this increase parallels an increase in white ware frequencies in Elements 1 through 4, perhaps compensating for the restricted access to red wares. This

southern shift in the intraregional exchange network is directionally equivalent to the shift already noted for the interregional exchange network, and suggests that both Mesa Verde and non-Mesa Verde ceramics were being exchanged as part of the same distribution system.

APPENDIX B

TEMPORAL SUMMARY, LEMOC SHELTER

compiled by

Mary C. Etzkorn

Subsequent to the preparation of the LeMoc Shelter site report, additional ceramic research (refer to appendix A) resulted in a reassessment of the temporal placement of the various occupations, or elements, at the site. Table B.1 is a summary of the temporal divisions currently recognized at LeMoc Shelter, including a comparison of the original and revised dates based on ceramic evidence. The table is organized by element and by the cultural units that serve as the primary focal points for each element. Also included in this table are the DAP phase and subphase designations for each major occupation; although these designations are intended to reflect suites of formal characteristics rather than absolute chronological divisions, they can be roughly correlated with broad time periods.

Table B.1 Temporal summary, Elements 1 through 5, LeMoc Shelter

Element	Major spatial unit assigned to element	Original dates (A.D.) estimated on basis of ceramic evidence	Revised dates (A.D.) estimated on basis of ceramic evidence	DAP final phase/subphase designation
1	Pithouse 2	750-780 (with sporadic activity as late as A.D. 820)	770-830	Sagehen Phase/ Sagehill and Dos Casas Subphases
2	Pithouse 1, Room 12, Occupation Area 1	840-860	850-875	Sagehen Phase/ Dos Casas Subphase & McPhee Phase/Periman Subphase*
3	Room 11, Room 13	875-890	890-910	McPhee Phase/ Grass Mesa Subphase
4	Occupation Area 2, Occupation Area 3	920-930	No revision possible	McPhee Phase/ Cline Subphase
5	Stratum I-11, Stratum II-6	930-950 (with sporadic activity as late as A.D. 1050/ 1150)	No revision possible	McPhee Phase/ Cline Subphase & Sundial Phase/Marshview Subphase

* Although the material culture associated with the abandonment of Pithouse 1 dates to the A.D. 850-875 time period, the architectural style and a tree-ring date of A.D. 803+vv suggest that the pithouse may have been constructed during the first few decades of the ninth century. For this reason, Element 2 is assigned to both the Dos Casas and Periman Subphases, possibly reflecting a fairly lengthy period of occupation.

APPENDIX C

PERISHABLE ARTIFACTS FROM LEMOC SHELTER

by

Linda P. Hart and Eric Blinman

The uniformly dry condition of some of the deposits at LeMoc Shelter resulted in the preservation of a variety of usually perishable artifacts.[1] Unfortunately, most of these materials were recovered from the upper levels of the shelter, and historic looting had destroyed their stratigraphic associations with the various occupations. Only one artifact, a fragment of a twilled Yucca sp. leaf mat (RV 18[2]), can be attributed to one of the defined elements (Element 4). The remainder of the perishables can only be assumed to be contemporaneous with some portion of the Anasazi occupation of the shelter.

Plaited strips of yucca leaf (probably Yucca baccata) constituted the majority of the woven materials. (Refer to Adovasio [1977] for clarification of the technical terms used in this appendix.) Fragments from two simple plaited (1/1 interval) yucca leaf sandals were recovered. RV 1 is a heel fragment showing extreme wear. RV 32 (fig. C.1) includes both a heel and a probable toe fragment. Minor wear is evident on the toe selvage, and the selvages of both sandals are the 90° fold self-selvage type. The heel selvage on RV 32 is reinforced by wrapping, and a yucca strip is spliced into the toe fragment at a location that suggests use as a toe strap. Two other probable sandal fragments were recovered (RV's 20 and 31). Both are twilled (2/2 interval), both have 90° fold self-selvages, and one has two yucca strips joined by a square knot near the selvage (not a splice). Another small, twilled fragment (RV 18; 2/2 interval) with a 90° fold self-selvage was recovered, but it may have been

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[1]All nonarchitectural worked vegetal items and all worked faunal materials, with the exception of worked bone, are reported in this appendix; refer to appendix D for a discussion of nonhuman bone tools and ornaments from LeMoc Shelter.

[2]RV numbers are inventory numbers that are assigned to worked vegetal and other selected perishable artifacts.

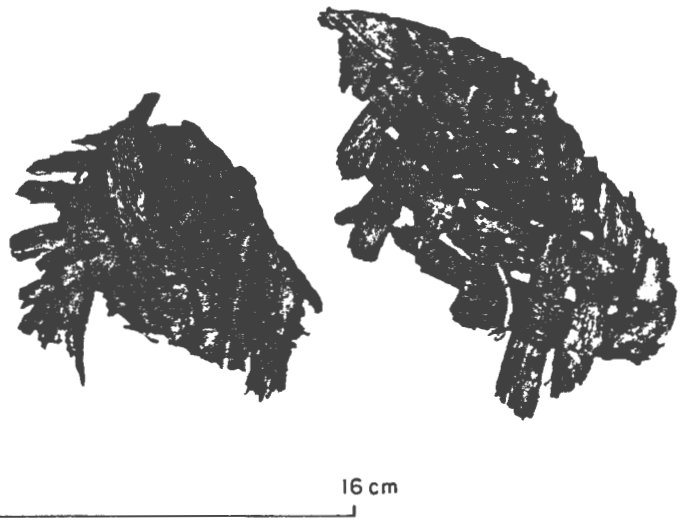

Figure C.1 Plaited sandal fragments (RV 32) recovered from 1- by 1-m grid 7S/15E, LeMoc Shelter (DAP 129504).

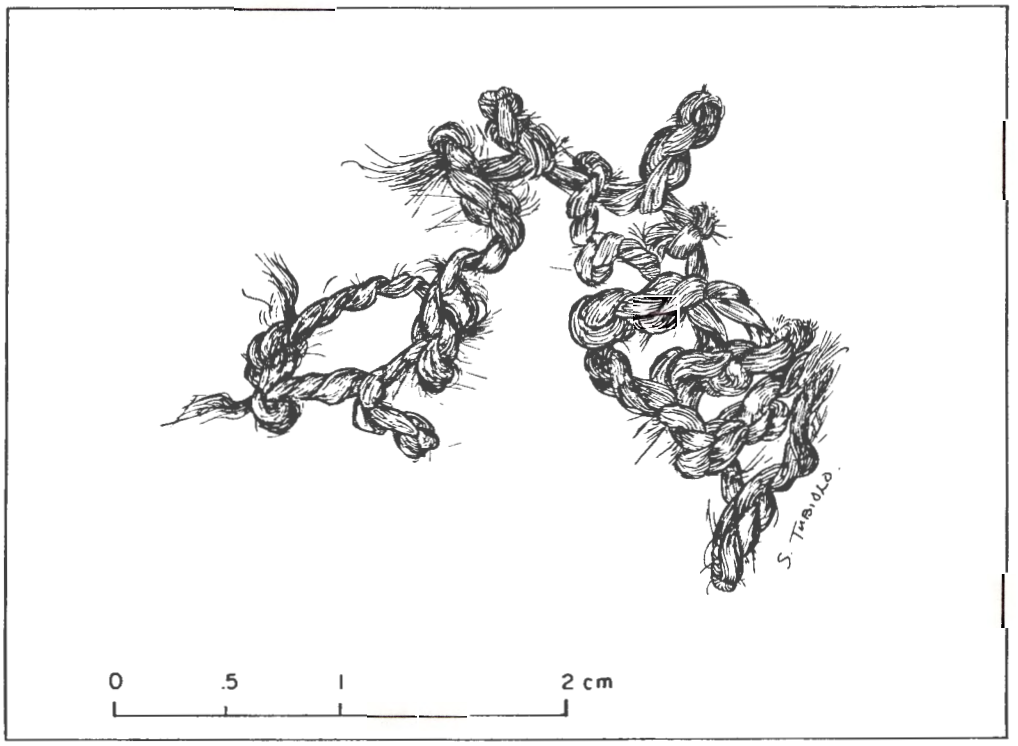

Figure C.2 Knotless netting (RV 11) recovered from Room 1 fill, LeMoc Shelter.

a mat or sandal. Several altered (cut, split, or unusually bent) yucca leaves have been recorded as basketry construction materials (RV's 30, 35, 36, 38, and 40) because they exhibit stages in the preparation of items such as those described above.

Other woven materials were made of either animal fibers or combinations of animal and vegetal materials. A small and extremely fine fragment of knotless netting (RV 11; fig. C.2) was made of an unidentified animal fiber. The piece is extremely flexible and was probably a portion of a bag or garment. One or more feather blankets or garments are represented by three small fragments (RV's 5, 12, and 23). In each case, the unidentified feathers were bound to a yucca fiber cord with thin strips of yucca leaf. RV 12 is shown in figure C.3.

Binding materials were relatively common and consist of both yucca fiber cordage and knotted yucca leaf strips. Two-ply cordage is represented by RV's 15 and 16; both have a Z-spin and S-twist, and they range in diameter from 2.0 to 3.5 mm. RV 14 is a thin (1.75 mm) piece of three-ply cordage with a Z-spin and S-twist (fig. C.4). Yucca leaves or leaf strips were identified as binding materials if they were knotted. Eight strips (RV's 4, 10, 24, 27, 28, 33, 34, and 51) were tied with square knots, and two of these (RV's 33 and 34; fig. C.5) were knotted to form loops. RV 9 (fig. C.4) is also looped; however, this item is tied in a figure-eight knot.

An assortment of worked wood, wooden implements, and wood chipping debris was collected. RV's 49 and 53 are possible bow fragments. RV 53 (fig. C.6) is a 13-cm-long, slightly curved piece of Populus sp. wood that is broken at one end and tapers to a blunt point at the other. It is oval throughout its length in cross section, and its size at the broken end is

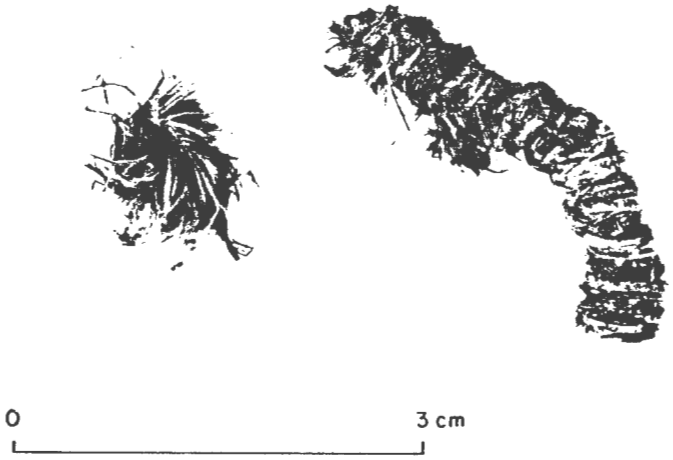

Figure C.3 Feather blanket or garment fragments (RV 12) recovered from disturbed deposits behind roomblock, LeMoc Shelter (DAP 125313).

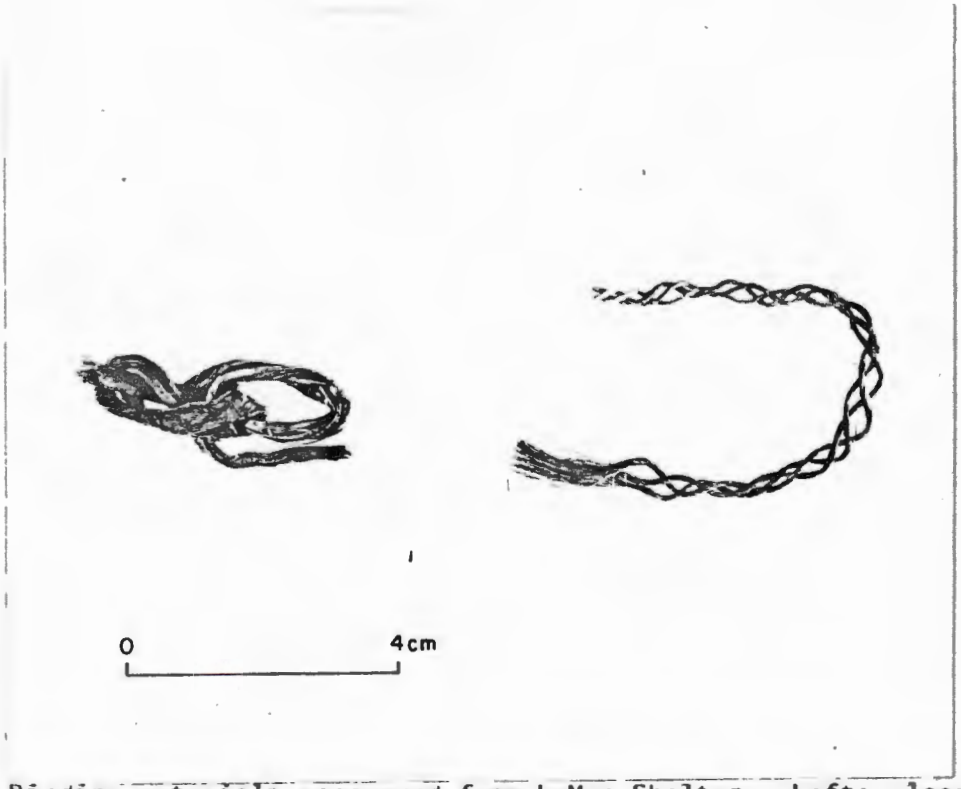

Figure C.4 Binding materials recovered from LeMoc Shelter. Left: looped yucca strip with figure-8 knot (RV 9) from Room 1 fill. Right: Three-ply yucca fiber cordage (RV 14) from disturbed deposits behind roomblock (DAP 125316 and 125312).

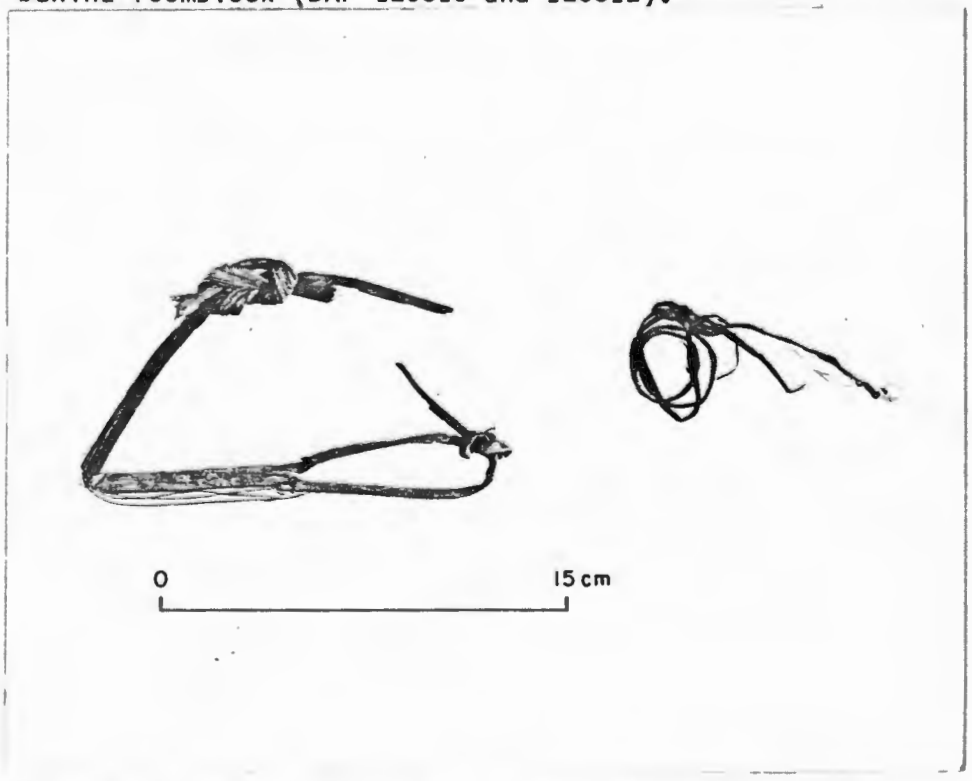

Figure C.5 Binding materials recovered from LeMoc Shelter: looped yucca strips with square knots (RV 33 and RV 34) from 1- by 1-m grid 7S/14E (DAP 129514 and 129509).

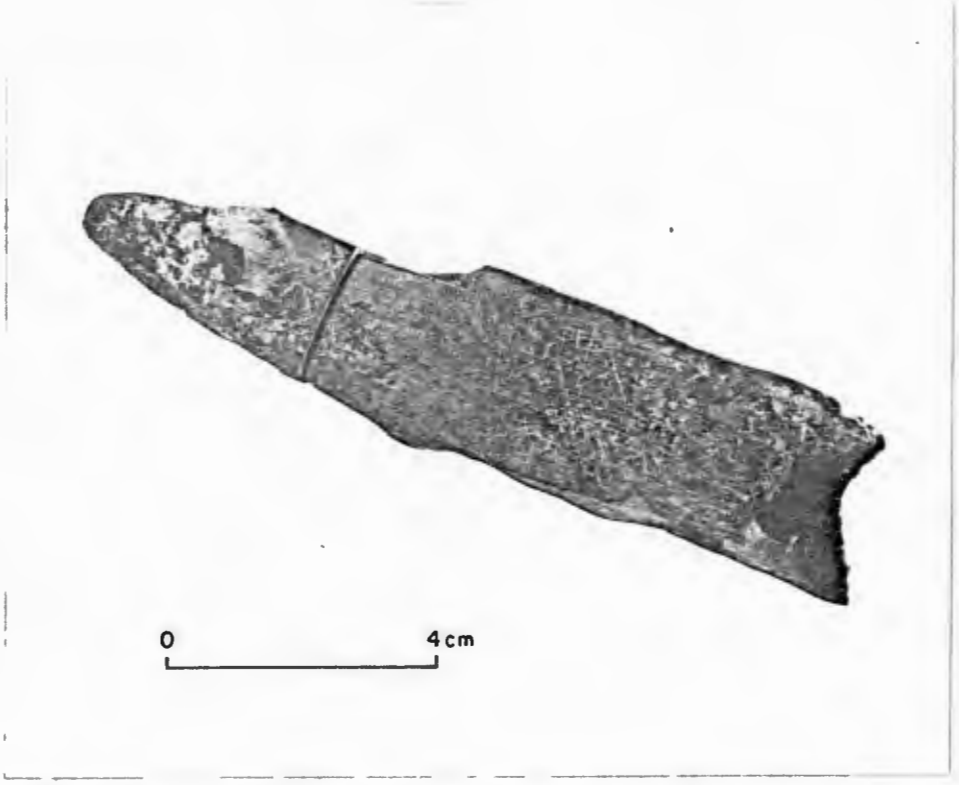

Figure C.6 Possible bow fragment (RV 53) recovered from midden deposits in front of shelter, LeMoc Shelter (DAP 129531).

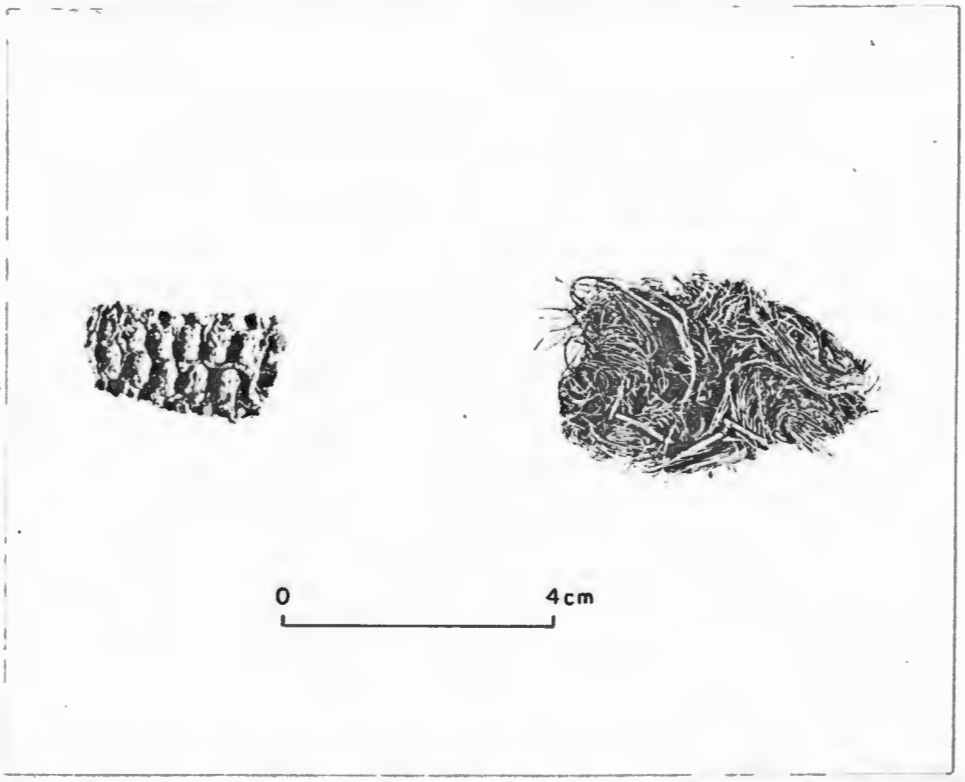

Figure C.7 Miscellaneous perishable materials recovered from LeMoc Shelter. Left: corn cob impaled on cut gymnospermae wood (RV 45) from disturbed deposits behind roomblock. Right: quid (RV 41) from disturbed deposits behind roomblock (DAP 129522 and 129518).

2.9 by 1.3 cm. About 2 cm from the tapered end, the piece constricts abruptly for about 0.5 cm. Except for the broken end, the surface is smooth and well finished. The size and morphology of the piece are appropriate for the end of a bow, and the constriction is interpreted to be the point at which a bow string might have been attached. RV 49 is a short fragment (6.1 cm) of scrub oak wood (Quercus gambelii) that is oval in cross section and broken at both ends. Its surface is smooth and well finished, and its similarity in shape to RV 49 suggests that it is a medial fragment of a bow. Miscellaneous wooden items include a "peg" that is a short (3 cm), decorticated stick that is cut at both ends (RV 47); a very small charred stick that has been abraded to a fine point (RV 52); chipping debris (RV's 25, 39, and 46); and pieces that show some evidence of human modification by cutting, abrasion, or some other technique (RV's 7, 8, 13, 26, 29, 42, 43, 44, 47, 48, and 50). These latter items consist of a variety of wood, including Quercus gambelii, Populus sp., Pinus sp., Juniperus sp., Salicaceae, Gymnospermae, and Dicotyledonae.

Three other types of items were recovered from LeMoc Shelter. These include a Yucca sp. fiber quid (RV 41, fig. C.7), masses of shredded and sometimes twisted juniper bark (RV's 2, 6, 17, and 19), and a corn cob that is impaled on a cut piece of Gymnospermae wood (RV 45, fig. C.7). Apart from the quid, the functions of these items are unknown.

APPENDIX D

LITHIC ARTIFACTS AND WORKED NONHUMAN BONE FROM LEMOC SHELTER

by

Thomas H. Hruby

LeMoc Shelter is a rockshelter overlooking the Dolores River valley and affording easy access to the valley bottom and the uplands immediately north of the valley. Five distinct occupations, or elements, were recognized at LeMoc Shelter. Element 1 is defined in the site report as the habitation of a single household and has been assigned to the Sagehill and Dos Casas Subphases. The Element 2 occupation of the site is believed to have been the habitation of an extended family during the late Dos Casas and early Periman Subphases. Element 3 is interpreted to be a seasonal locus, probably a field house associated with the farming activities of a household group; this element represents the Grass Mesa Subphase. During Element 4, which has been assigned to the Cline Subphase, the site is interpreted in the body of the report to have functioned as the base camp of cooperative groups engaged in foraging and hunting. Similarly, during Element 5 the site is stated to have served as a base camp for the exploitation of local resources; timber cutting, hunting, and flaked lithic tool production are believed to have been carried out during the sporadic Element 5 occupations. The temporal affiliation of Element 5 is problematic because of the sporadic nature of the occupations, but use of the site appears to have ended sometime during the early Marshview Subphase.

The DAP Reductive Technology Group is responsible for the analysis and interpretation of flaked lithic tools and debitage, nonflaked lithic tools, and worked bone. The reductive technology preliminary analysis systems are primarily attribute-oriented systems that focus on the types and amounts of technological input invested in the manufacture of the various tools. The flaked lithic tool morpho-use classification is technological in orientation; a separate analysis is being conducted to establish the functions of these tools. Unfortunately, the results of

this analysis are not available at this time. The nonflaked lithic and worked bone morpho-use typologies are more functional in orientation, as the functions of these tools are more easily established. Refer to Phagan (1982) for a discussion of the various DAP reductive technology analysis systems.

Lithic Artifacts

Preliminary analysis of lithic materials from LeMoc Shelter was completed immediately after the 1978 and 1979 field seasons. In 1980, several changes were instituted in the analysis systems; in particular, knowledge of local raw materials increased significantly, necessitating a reanalysis of materials excavated in previous years. Although most sites were entirely reanalyzed, the large amount of material from LeMoc Shelter precluded reanalysis of the entire assemblage. Instead, only contexts that could be confidently placed within the five elements were reanalyzed. Although the lithic tables included in this appendix differ from those presented in the site report, the interpretations are consistent with the new data.

The Kolmogorov-Smirnov two-sample test (Siegal 1956:127-136), a nonparametric test, was used to see if the distributions of morpho-use types in selected DAP assemblages are statistically similar to each other. The Kolmogorov-Smirnov test requires ordinal-level data. To meet this requirement, flaked lithic and nonflaked lithic morpho-use classifications were ranked by the amount of technological input believed to have been invested in the manufacture of the various tool forms. The flaked lithic tool ranking is probably adequate for this test, but the nonflaked lithic tool system reflects a weak ordinal ranking. Although

statistical analysis is appropriate for measuring some differences between assemblages, a qualitative assessment of assemblage variability was also used. The lithic assemblages from the various elements at LeMoc Shelter are compared to those from other temporally similar sites in the project area. Comparisons are made on an assemblage basis, and general conclusions pertaining to tool function are drawn when appropriate.

The flaked lithic tool totals from LeMoc Shelter are presented in table D.1. A quick review of the profiles for the various elements suggests that there are very few technological differences between the assemblages from the different elements. This is statistically demonstrated by the results of the Kolmogorov-Smirnov tests presented in table D.2. Although some differences are apparent in the various LeMoc Shelter assemblages, these differences do not appear to be statistically significant. The assemblages from LeMoc Shelter consist predominantly of utilized flakes, cores, cobble tools, and thick unifaces. This is characteristic of most Anasazi assemblages in the Dolores area. It is surprising that the limited site functions postulated for Elements 4 and 5 are not reflected in the flaked lithic tool profiles. Perhaps this can be accounted for by the multiple occupations at the site and by the mixing of assemblages. However, a general increase in the number of high-technological-input tools through time, as evidenced by increasing percentages of thinned, shaped, and stylized items, is noted in the LeMoc assemblages. The dorsal face evaluation and the relatively large number of thin bifaces and projectile points suggest that hunting and related activities might have been important activities throughout the occupation of the site, except perhaps during the Sagehill Subphase (Element 1).

Table D.1. Flaked lithic tools, by element, LeMoc Shelter

	Element 1		Element 2		Element 3		Element 4		Element 5	
	N	%	N	%	N	%	N	%	N	%
Total tools:	99	100.0	66	100.0	97	100.0	171	100.0	273	100.0
Tool morpho-use										
Indeterminate	0	0	1	1.5	0	0	1	0.6	4	1.5
Utilized flake	42	42.4	24	36.4	24	24.7	59	34.5	78	28.6
Core	10	10.1	3	4.5	10	10.3	18	10.5	29	10.6
Used core/cobble tool	11	11.1	6	9.1	16	16.5	9	5.3	34	12.5
Thick uniface	18	18.2	13	19.7	16	16.5	30	17.5	55	20.1
Thin uniface	4	4.0	1	1.5	2	2.1	5	2.9	5	1.8
Specialized form	2	2.0	5	7.6	7	7.2	8	4.7	22	8.1
Thick biface	7	7.1	4	6.1	11	11.3	13	7.6	22	8.1
Thin biface	0	0	5	7.6	4	4.1	11	6.4	7	2.6
Projectile point	5	5.1	4	6.1	7	7.2	17	9.9	17	6.2
Grain size										
Medium and coarse	0	0	2	3.0	1	1.0	4	2.3	2	0.7
Fine	7	7.1	6	9.1	11	11.3	20	11.7	24	8.8
Very fine	73	73.7	49	74.2	71	73.2	125	73.1	216	79.1
Microscopic	19	19.2	9	13.6	14	14.4	22	12.9	31	11.4
Item condition										
Indeterminate	1	1.0	2	3.0	0	0	1	0.6	2	0.7
Broken										
Unidentifiable	0	0	1	1.5	1	1.0	4	2.3	6	2.2
Distal present	0	0	0	0	2	2.1	6	3.5	0	0
Proximal present	1	1.0	4	6.1	1	1.0	1	0.6	3	1.1
Medial & lateral present	0	0	0	0	2	2.1	2	1.2	6	2.2
Complete/nearly complete	97	98.0	59	89.4	91	93.8	157	91.8	256	93.8
Dorsal face evaluation										
Indeterminate	0	0	0	0	0	0	0	0	2	0.7
Core	18	18.5	7	10.6	26	26.8	27	15.8	57	20.9
Unworked with cortex	60	61.8	22	33.3	30	30.9	65	38.0	79	28.9
Unworked w/o cortex	12	12.4	19	28.8	12	12.4	22	12.9	58	21.2
Thinned with cortex	2	2.1	5	7.6	4	4.1	13	7.6	24	8.8
Thinned without cortex	0	0	3	4.5	12	12.4	10	5.8	23	8.4
Primarily thinned	0	0	0	0	2	2.1	3	1.8	1	0.4
Secondarily thinned	0	0	3	4.5	2	2.1	8	4.7	5	1.8
Well shaped	3	3.1	3	4.5	4	4.1	12	7.0	12	4.4
Highly stylized	2	2.1	4	6.1	5	5.2	11	6.4	12	4.4

NOTE: w/o - Without.

Table D.2 Statistical intrasite comparisons of flaked lithic tool morpho-use forms, LeMoc Shelter

Site (element)	p*	Remarks
5MT2151(1) vs 5MT2151(2)	.502	Similar
5MT2151(1) vs 5MT2151(3)	.092	Some evidence for differences
5MT2151(1) vs 5MT2151(4)	.142	Some evidence for differences
5MT2151(1) vs 5MT2151(5)	.215	Probably similar
5MT2151(2) vs 5MT2151(3)	.507	Similar
5MT2151(2) vs 5MT2151(4)	1.000	Similar
5MT2151(2) vs 5MT2151(5)	.899	Similar
5MT2151(3) vs 5MT2151(4)	.495	Similar
5MT2151(3) vs 5MT2151(5)	.968	Similar
5MT2151(4) vs 5MT2151(5)	.581	Similar

* The probability that the two samples were drawn from the same population, based on the Kolmogorov-Smirnov two-sample test.

Flaked lithic tool intersite statistical comparisons were used when appropriate site types and assemblages were available for study. Element 1 at LeMoc Shelter was compared to four other Sagehill Subphase habitations excavated by the DAP (table D.3). Three of these assemblages are very similar to Element 1 at LeMoc Shelter, suggesting that Sagehill habitations are roughly comparable on a technological basis. The flaked lithic tool assemblage from Element 1 at Site 5MT2194, however, provides evidence for technological and perhaps functional differences between this site and Element 1 at LeMoc Shelter. The profile for Element 1 at Site 5MT2194 differs in that only 27.3 percent of the assemblage consists of utilized flakes. Cores and high-energy-input tools are well represented at Site 5MT2194; this pattern is similar to that observed for Element 2 at LeMoc but is different from that observed for Element 1 at LeMoc. These differences are probably well within the variability of small habitations in the Dolores area.

Table D.3 Statistical intersite comparisons of flaked lithic tool morpho-use forms, LeMoc Shelter and selected DAP sites

Site (element)	p*	Remarks
5MT2151(1) vs 5MT2194(1)	.023	Good evidence for differences
5MT2151(1) vs 5MT2198(1)	.959	Similar
5MT2151(1) vs 5MT4613(1)	.752	Similar
5MT2151(1) vs 5MT4614(2)	.933	Similar
5MT2151(2) vs 5MT2854(2)	.225	Probably similar
5MT2151(2) vs 5MT2192(1)	.987	Similar
5MT2151(2) vs 5MT4671(2)	.516	Similar
5MT2151(2) vs 5MT4650(1)	.034	Good evidence for differences
5MT2151(3) vs 5MT2191(1)	.999	Similar

* The probability that the two samples were drawn from the same population, based on the Kolmogorov-Smirnov two-sample test.

The flaked lithic tool morpho-use forms recognized in the Element 2 assemblage at LeMoc Shelter were compared to the morpho-use forms identified in the tool assemblages from four similar late Dos Casas or early Periman Subphase habitations (table D.3). The results of these test suggest that Element 2 is technologically comparable to most other similar habitations located in the Dolores area. Again, the assemblage from one site was judged to be significantly different from the LeMoc Shelter assemblage. At Site 5MT4650, the Element 1 assemblage differs from the Element 2 assemblage at LeMoc in that the former has a much greater frequency of cores and cobble tools. Perhaps this indicates that stone working and other building activities are better represented at Site 5MT4650 and that the household at Site 5MT2151 used tools from the earlier occupation as building materials.

Only one excavated seasonal habitation from the DAP area has a sample size large enough to compare to the seasonal locus (Element 3) at LeMoc

Shelter. At Site 5MT2191, Element 1 is dated to the Periman Subphase;[1] the morpho-use profile for the flaked lithic tool assemblage from this component is very similar to that from Element 3 at LeMoc Shelter (table D.3), suggesting that roughly the same maintenance and production activities took place at these two sites.

The results of the flaked lithic debitage analysis are presented in table D.4. The flaked lithic debitage assemblages for the five elements are remarkably similar. One trend, apparent through time and mentioned in the site report, is the decreasing use of microscopic-grained lithic materials. This trend is also found, but to a lesser extent, in the flaked lithic tool assemblage. The shift from microscopic-grained materials to fine-grained materials (primarily Morrison Formation orthoquartzites) could represent an increased selection for material that is local and most easily procured. Alternatively, it is possible that the microscopic-grained raw materials (primarily from the Burro Canyon and Dakota Formations, which occur most abundantly in the House Creek area) had a more restricted use through time and were increasingly "expensive" to procure. It is tempting to speculate in this instance that the decline in frequency of these microscopic-grained materials is related to increasing competition, making the local fine-grained Morrison materials more cost effective; however, there is no direct evidence to support such an interpretation.

The nonflaked lithic tool totals for LeMoc Shelter are presented in table D.5. A number of technological and functional differences between

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[1]The Periman Subphase (A.D. 850-900) overlaps temporally with the Grass Mesa Subphase (A.D. 880-925); the two are distinguished primarily on the basis of location, with the latter being used to designate only those sites that are located in the vicinity of Grass Mesa Village (5MT23). Therefore, the comparison of a Periman Subphase seasonal site with Element 3 at LeMoc Shelter is appropriate.

Table D.4. Flaked lithic debitage, by element, LeMoc Shelter

	Element 1			Element 2			Element 3			Element 4			Element 5		
	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)	N	%	Mean wt(g)
Flakes/flake frags:															
Grain size															
Medium	34	2.5	27.0	78	8.1	8.8	90	5.1	14.8	315	8.7	13.2	363	7.2	12.9
Fine	585	42.8	9.7	498	51.6	7.5	1,189	67.9	9.6	2,439	67.1	8.7	3,321	66.1	9.8
Very fine	543	39.7	12.5	283	29.3	11.7	368	21.0	7.5	678	18.6	6.9	1,104	22.0	7.8
Microscopic	206	15.1	13.5	107	11.1	8.0	103	5.9	6.9	204	5.6	6.0	213	4.3	7.4
Total flakes/ flake frags	1,368	100.0	11.8	966	100.0	8.9	1,750	100.0	9.3	3,636	100.0	8.5	5,001	100.0	9.5
Items with cortex	440	32.1	...	179	18.5	...	330	18.8	...	874	24.0	...	1,084	21.6	...
Whole flakes	792	57.9	...	559	57.9	...	1,226	70.0	...	3,088	84.9	...	4,099	81.6	...
Nonlocal items	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NOTE: frags - Fragments.
... - Information not available.

Table D.5 Nonflaked lithic tools, by element, LeMoc Shelter

	Element 1		Element 2		Element 3		Element 4		Element 5	
	N	%	N	%	N	%	N	%	N	%
Total tools:	58	100.0	66	100.0	78	100.0	92	100.0	128	100.0
Tool morpho-use										
Indeterminate	18	31.0	12	18.2	27	34.6	56	60.9	84	65.6
Miscellaneous	9	15.5	12	18.2	8	10.3	6	6.5	5	3.9
Hammerstone	6	10.3	12	18.2	14	17.9	9	9.8	16	12.5
Mano fragment, nfs	0	0	2	3.0	2	2.6	0	0	2	1.6
One-hand mano	4	6.9	3	4.5	3	3.8	3	3.3	0	0
Two-hand mano	11	19.0	13	19.7	13	16.7	4	4.3	8	6.3
Metate fragment, nfs	1	1.7	1	1.5	4	5.1	4	4.3	1	0.8
Trough metate	4	6.9	9	13.6	6	7.7	5	5.4	3	2.3
Hafted item	3	5.2	1	1.5	1	1.3	3	3.3	6	4.7
Ornament	2	3.4	1	1.5	0	0	2	2.2	3	2.3
Grain size										
Indeterminate	20	34.5	40	60.6	31	39.7	44	47.8	76	59.4
Coarse	1	1.7	2	3.0	0	0	3	3.3	1	0.8
Medium	9	15.5	11	16.7	34	43.6	35	38.0	34	26.6
Fine, very fine, microscopic	28	48.3	13	19.7	13	16.7	10	10.9	17	13.3
Item condition										
Indeterminate	6	10.3	0	0	0	0	0	0	0	0
Broken										
Unidentifiable	0	0	2	3.0	0	0	5	5.4	6	4.7
Identifiable	10	17.2	18	27.3	36	46.2	70	76.0	103	80.5
Complete/nearly complete	42	72.4	46	69.7	42	53.8	17	18.5	19	14.8
Production evaluation										
Indeterminate	7	12.1	0	0	3	3.8	33	35.9	40	31.3
Natural (unmodified)	35	60.3	46	69.7	50	64.1	44	47.8	67	52.3
Minimally modified	12	20.7	18	27.3	20	25.6	12	13.0	13	10.2
Well shaped	4	6.9	2	3.0	5	6.4	2	2.2	7	5.5
Stylized	0	0	0	0	0	0	1	1.1	1	0.8

NOTE: nfs - Not further specified.

the assemblages from the different elements at LeMoc Shelter are apparent; these differences are statistically significant as indicated by the Kolmogorov-Smirnov test results presented in table D.6. Although Elements 1, 2, and 3 are very similar to each other in that a major component of the nonflaked lithic items are food processing tools such as manos and metates, Elements 4 and 5 have low frequencies of food processing tools. Tools from these limited activity elements are predominantly fragmentary, low-technological-input tools whose morpho-use forms could not be determined.

Table D.6 Statistical intrasite comparisons of nonflaked lithic tool morpho-use forms, LeMoc Shelter

Site (element)	p*	Remarks
5MT2151(1) vs 5MT2151(2)	.688	Similar
5MT2151(1) vs 5MT2151(3)	.815	Similar
5MT2151(1) vs 5MT2151(4)	.007	Good evidence for differences
5MT2151(1) vs 5MT2151(5)	.000	Good evidence for differences
5MT2151(2) vs 5MT2151(3)	.215	Probably similar
5MT2151(2) vs 5MT2151(4)	.000	Good evidence for differences
5MT2151(2) vs 5MT2151(5)	.000	Good evidence for differences
5MT2151(3) vs 5MT2151(4)	.024	Good evidence for differences
5MT2151(3) vs 5MT2151(5)	.000	Good evidence for differences
5MT2151(4) vs 5MT2151(5)	.824	Similar

* The probability that the two samples were drawn from the same population, based on the Kolmogorov-Smirnov two-sample test.

The nonflaked lithic tool assemblage from the seasonal locus or field house (Element 3) is similar to those from the habitations (Elements 1 and 2) in both quantitative and qualitative terms. This is interpreted in the site report as indicating that, just as habitations in the Escalante Sector were used by households, so too was the field house at LeMoc Shelter. Although architecturally similar to other field houses, the data

presented here suggest that the full range of household activities are represented at this field house. It is also possible that a significant amount of artifact mixing has occurred at LeMoc Shelter and has masked any cultural or functional differences between these site types.

Intersite comparisons of nonflaked lithic tool morpho-use forms suggest that the Element 1 and 2 assemblages are statistically similar to those from contemporaneous habitations in the DAP area (table D.7). Element 3 at LeMoc Shelter was compared to a temporally similar field house (5MT2191), and the assemblages were found to be statistically similar (table D.7). (Of the sites excavated by the DAP, Site 5MT2191 is the only other field house that has a lithic assemblage large enough to compare using the selected statistical test.) The assemblages from the field house components at Site 5MT2191 and LeMoc Shelter have the full range of household tool classes. Thus, these assemblages differ from most other DAP field house assemblages where a more limited range of tool classes are present. It is possible that two types of field houses are present in the DAP area: field houses occupied by households and field houses occupied by groups smaller than households. Alternatively, the differences between the two types of tool assemblages could reflect duration of occupation.

Worked Bone Artifacts

The results of worked bone analysis are presented in table D.8, and selected bone artifacts are shown in figures D.1 through D.4. The majority of the identifiable tool forms from LeMoc Shelter are awls. Although a number of differences are apparent in the worked bone profiles, they are probably accounted for by the small sample sizes for the various

Figure D.1 Selected bone awls recovered from LeMoc Shelter. Awls recovered from (top, left to right) midden east of Pithouse 1; Pithouse 2 fill; Pithouse 1 fill; Pithouse 2, Floor 1 (no PL number assigned); Pithouse 2 fill; Room 11 fill; and (bottom) Pithouse 2 fill (DAP 126814).

Figure D.2 Selected bone awls recovered from LeMoc Shelter. Awls recovered from (top, left to right) Pithouse 1 fill; Pithouse 1 fill; 1- by 1-m grid 11S/10E; Pithouse 2 fill; Pithouse 2; Floor 1 (PL 116); and (bottom) Room 12 fill (DAP 126819).

Figure D.3 Selected bone tools recovered from LeMoc Shelter. Top, left to right: spatula from Pithouse 1, Floor 1 (PL 54); gouge/scraper from Room 3 fill; pointed tool from Pithouse 1 fill. Bottom: gouge/scraper from Room 13 fill (DAP 126824).

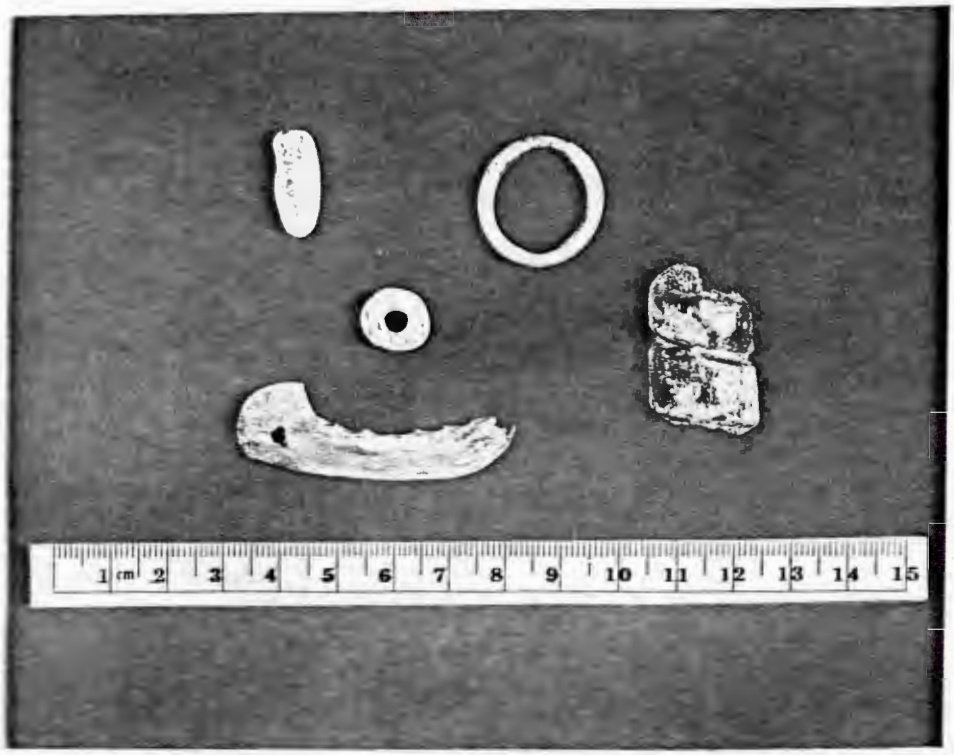

Figure D.4 Selected bone ornaments recovered from LeMoc Shelter. Items recovered from (clockwise, from upper left) 1- by 1-m grid 10S/13E; Pithouse 1 fill; Pithouse 2 fill; 2- by 2-m grid 10S/14E; and (center) disturbed deposits behind roomblock. The functions of these items are not known; most, however, reflect a fairly high labor investment (DAP 126829).

Table D.7 Statistical intersite comparisons of nonflaked lithic tool morpho-use forms, LeMoc Shelter and selected DAP sites

Site (element)	p*	Remarks
5MT2151(1) vs 5MT2191(1)	.773	Similar
5MT2151(1) vs 5MT2198(1)	.696	Similar
5MT2151(1) vs 5MT4613(1)	.186	Probably similar
5MT2151(1) vs 5MT4614(2)	.152	Some evidence for differences
5MT2151(2) vs 5MT2854(2)	.943	Similar
5MT2151(2) vs 5MT2192(1)	.551	Similar
5MT2151(2) vs 5MT4671(2)	.143	Some evidence for differences
5MT2151(2) vs 5MT4650(1)	.233	Probably similar
5MT2151(3) vs 5MT2191(1)	.497	Similar

* The probability that the two samples were drawn from the same population, based on the Kolmogorov-Smirnov two-sample test.

elements. The morpho-use forms for many of the worked bone items could not be determined, indicating that many of the bone artifacts are fragmentary, were never completed, or consist of debris from the manufacture of tools. In addition to awls, other piercing tools, such as needles and pins, are well represented in the assemblage. Ornaments are present only in the habitation elements (Elements 1 and 2). As is clearly indicated in table D.8, a large percentage of the worked bone cannot be confidently included in any element with confidence. Of the tools that can be identified in these proveniences, most are awls. Because of the relatively low frequencies of bone tools, it is difficult to draw any functional conclusions for the LeMoc Shelter assemblage.

Other variables shown in table D.8 include blank type, item condition, and production evaluation. As indicated by the values listed for the blank type variable, the use of split bone (bone that is engraved and split along the grain) decreases through time. As the frequency of split bone decreases, the frequency of broken bone increases. A comparison of the values recorded for the item condition variable

Table D.8 Worked nonhuman bone, by element, LeMoc Shelter

	Element 1		Element 2		Element 3		Element 4	
	N	%	N	%	N	%	N	%
Total tools:	19	100.0	14	100.0	24	100.0	19	100.0
Taxon								
Aves	0	0	0	0	1	4.2	0	0
Aves/Mammalia	0	0	0	0	0	0	0	0
Mammalia, indt	0	0	0	0	0	0	0	0
Mammalia, small	1	5.3	1	7.1	0	0	0	0
Mammalia, medium	2	10.5	3	21.4	2	8.3	4	21.1
Mammalia, large	8	42.1	6	42.9	12	50.0	13	68.4
Artiodactyla	6	31.6	4	28.6	9	37.5	1	5.3
Lagomorpha	1	5.3	0	0	0	0	0	0
Rodentia	0	0	0	0	0	0	0	0
Carnivora	1	5.3	0	0	0	0	1	5.3
Tool morpho-use								
Indeterminate	8	42.1	6	42.9	7	29.2	10	52.6
Awl	6	31.6	3	21.4	14	58.3	4	21.1
Piercing tool	1	5.3	2	14.3	1	4.2	2	10.5
Spatulate	0	0	2	14.3	2	8.3	2	10.5
Flaker	1	5.3	0	0	0	0	1	5.3
Ornament	3	15.8	1	7.1	0	0	0	0
Blank type								
Indeterminate	12	63.2	10	71.4	16	66.7	11	57.9
Broken bone	3	15.8	0	0	4	16.7	6	31.6
Split bone	3	15.8	3	21.4	4	16.7	1	5.3
Cut bone	1	5.3	1	7.1	0	0	1	5.3
Item condition								
Indeterminate	2	10.5	0	0	0	0	2	10.5
Broken								
Orient unknown	6	31.6	5	35.7	5	20.8	7	36.8
No orientation	0	0	0	0	0	0	0	0
Distal present	0	0	0	0	0	0	1	5.3
Proximal present	1	5.3	0	0	1	4.2	1	5.3
Medial present	0	0	1	7.1	4	16.7	3	15.8
Proximal & medial present	0	0	1	7.1	3	12.5	1	5.3
Distal & medial present	2	10.5	2	14.3	2	8.3	1	5.3
Complete/nearly complete	8	42.1	5	35.7	9	37.5	3	15.8
Production evaluation								
Indeterminate	2	10.5	0	0	1	4.2	1	5.3
Some evidence	7	36.8	8	57.1	10	41.7	12	63.2
Not shaped	1	5.3	0	0	1	4.2	0	0
Minimally shaped	3	15.8	1	7.1	4	16.7	3	15.8
Moderately shaped	1	5.3	2	14.3	6	25.0	3	15.8
Well shaped	4	21.1	1	7.1	1	4.2	0	0
Completely shaped	1	5.3	2	14.3	1	4.2	0	0

NOTE: indt - Indeterminate.
Orient - Orientation.

Table D.8 Worked nonhuman bone, by element, LeMoc Shelter--Continued

	Element 5		Other		Total	
	N	%	N	%	N	%
Total tools:	11	100.0	73	100.0	160	100.0
Taxon						
Aves	0	0	1	1.4	2	1.3
Aves/Mammalia	0	0	3	4.1	3	1.9
Mammalia, indt	0	0	2	2.7	2	1.3
Mammalia, small	0	0	1	1.4	3	1.9
Mammalia, medium	0	0	7	9.6	18	11.3
Mammalia, large	8	72.7	43	58.9	90	56.3
Artiodactyla	2	18.2	10	13.7	32	20.0
Lagomorpha	0	0	4	5.5	5	3.1
Rodentia	0	0	1	1.4	1	0.6
Carnivora	1	9.1	1	1.4	4	2.5
Tool morpho-use						
Indeterminate	9	81.8	42	57.5	82	51.3
Awl	1	9.1	19	26.0	47	29.4
Piercing tool	1	9.1	3	4.1	10	6.3
Spatulate	0	0	2	2.7	8	5.0
Flaker	0	0	0	0	2	1.2
Ornament	0	0	7	9.6	11	6.9
Blank type						
Indeterminate	4	36.4	50	68.5	103	64.4
Broken bone	5	45.4	17	23.3	35	21.9
Split bone	1	9.1	4	5.5	16	10.0
Cut bone	1	9.1	2	2.7	6	3.8
Item condition						
Indeterminate	3	27.3	8	11.0	15	9.4
Broken						
Orient unknown	5	45.5	30	41.1	58	36.3
No orientation	0	0	3	4.1	3	1.9
Distal present	0	0	2	2.7	3	1.9
Proximal present	1	9.1	0	0	4	2.5
Medial present	0	0	7	9.6	15	9.4
Proximal & medial present	0	0	1	1.4	6	3.8
Distal & medial present	1	9.1	8	11.0	16	10.0
Complete/nearly complete	1	9.1	14	19.2	40	25.0
Production evaluation						
Indeterminate	4	36.4	11	15.1	19	11.9
Some evidence	5	45.5	43	58.9	85	53.1
Not shaped	2	18.2	4	5.5	8	5.0
Minimally shaped	0	0	4	5.5	15	9.4
Moderately shaped	0	0	4	5.5	16	10.0
Well shaped	0	0	4	5.5	10	6.3
Completely shaped	0	0	3	4.1	7	4.4

demonstrates that Elements 1, 2, and 3 have high percentages of complete items, but Elements 4 and 5 have very low percentages of complete items. It is possible that deposits from the latter have been disturbed. The production evaluation variable indicates a general trend toward lower production input through time. The overall trend observed in the worked bone profiles indicates an increasingly expedient worked bone technology, where piercing tools such as awls, needles, and pins are the predominant tool types.

Conclusions

The summaries presented in this appendix indicate that similarities and differences exist between LeMoc Shelter and other Anasazi sites in the DAP area. Perhaps most noteworthy are the similar flaked lithic tool and flaked lithic debitage profiles for the different site types. It is suggested that similar activities, such as hunting, lithic procurement, and other manufacturing and maintenance activities took place throughout the occupational sequence at the rockshelter. Of particular interest is the relatively high percentage of high-technological-input tools (e.g., bifaces and projectile points), which suggests that hunting and related activites were important during all of the identified occupations.

The nonflaked lithic tool profile appears to be the best indicator of different site types. The low percentages of food processing tools from Element 4 and 5 contexts suggest that these elements are limited activity loci where food processing was not a significant activity. Of particular interest is Element 3, which was identified as a field house in the site report. The lithic assemblage, however, indicates that the activities conducted during this occupation were those of a self-sufficient household.

APPENDIX E

FAUNAL REMAINS FROM LEMOC SHELTER

by

Sarah W. Neusius

Introduction

The faunal assemblage from LeMoc Shelter (Site 5MT2151) is one of the largest from a single DAP site. A total of 6964 pieces of NHB (nonhuman bone) have been identified to date. This assemblage is particularly important in assessing the role of hunting in Dolores Anasazi subsistence because, as discussed in the site report, LeMoc Shelter may have served as a year-round habitation, a summer field house, and a short-term extractive camp at different points during the 200 years spanned by the Anasazi occupations.

This appendix supplements the discussion of fauna contained in the site report in two ways. First, it provides an up-to-date description of the faunal assemblage. Since the report was prepared, approximately 1800 additional bone fragments have been examined, and all preliminary identifications have been finalized. Second, this appendix presents information on habitat utilization and on small- versus large-game procurement. These topics are particularly important to the assessment of site function and to the synthetic analyses being undertaken by the DAP.

Recovery and Analytic Procedures

All of the NHB described in this appendix was recovered during the course of normal excavation; no special sampling procedures were employed. Although bone fragments were recovered in bulk soil samples, preliminary analysis of these materials has not yet been undertaken. Furthermore, fish remains and microtine rodent remains were forwarded to a specialist, and the results of these special identifications are not yet available for study. Therefore, in the LeMoc Shelter assemblage, there is an unknown degree of bias against the smallest faunal remains.

Nearly three-fourths of the NHB from LeMoc Shelter was collected by dry-screening sediments through one-quarter-inch (6.4 mm) mesh screen (table E.1). Although the percentage of remains collected by screening varies among Elements 1 through 5 and the unassigned proveniences, a large proportion has been screened in each case. Therefore, the faunal assemblage described here probably is fairly representative of the macrofaunal remains preserved at LeMoc Shelter.

Table E.1 Collection modes for nonhuman bone, LeMoc Shelter

	Collection mode										Total	
	Dry screen 1/4" mesh		Trowel		Shovel & trowel		Shovel		Inapplicable/ unknown			
	N	%	N	%	N	%	N	%	N	%	N	%
Element 1	332	6.5	0	0.0	341	36.4	16	8.9	0	0.0	689	100.0
Element 2	201	3.9	83	28.8	2	0.2	0	0.0	1	0.2	287	100.0
Element 3	234	4.6	34	11.8	198	21.1	6	3.3	16	3.8	488	100.0
Element 4	1,027	20.0	19	6.6	116	12.4	10	5.6	48	11.5	1,220	100.0
Element 5	369	7.2	5	1.7	76	8.1			42	10.0	492	100.0
Unassigned	2,977	57.9	147	51.0	204	21.8	148	82.2	312	74.5	3,788	100.0
Total	5,140	100.0	288	100.0	937	100.0	180	100.0	419	100.0	6,964	100.0

Preliminary analysis has been completed for virtually all macrofaunal remains recovered from the shelter. Although the sample sizes vary, all five elements are represented in the assemblage described here. Unfortunately, some of the LeMoc Shelter deposits, including midden, sheet trash, and disturbed deposits, cannot be assigned to an element. Over half of the fauna in the assemblage was recovered from these unassigned deposits.

Initially, the identification of the LeMoc Shelter faunal assemblage was undertaken under the direction of Steven D. Emslie of the Center for Western Studies, Flagstaff, Arizona. All macrofaunal remains were washed or dry-cleaned and cataloged. A preliminary sort was made and results were provided to the excavation crew chief. Subsequently, final identifications were made using comparative skeletons belonging to either the Anasazi Heritage Center or the Center for Western Studies. In some instances, other collections were consulted as well. Fish and the microtine rodent remains were forwarded to a specialist along with similar materials from other DAP sites. The results of these special identifications are not yet available for study.

In 1982, new procedures were instituted under the direction of S. Neusius (Peterson et al. 1982). These procedures did not greatly affect analysis of the assemblage from LeMoc Shelter, as the identification of bone was nearly complete; however, editing and reorganization of the computer file did result in some minor changes in the data record.

Only the number of individual specimens (Payne 1975) from each taxon is given in this appendix. Data on minimum number of individuals and body part representation are not presented; it is hoped that such topics will be addressed in future intensive studies.

Description of the Faunal Assemblage

Because the occupations of LeMoc Shelter spanned approximately 200 years and apparently represent several uses of the site, it is not appropriate to describe this assemblage as a single unit. Instead, the assemblages from the unassigned contexts and each of the five elements discussed in the site report are described separately. Further

subdivision of the assemblage has not been attempted for this appendix. The sample size of each of the elements is already small. Subdivision of the asse blage from unassigned contexts probably would have proven informative but was too time-consuming to be undertaken during preliminary analysis.

Element 1

According to the site report, the initial occupation of LeMoc Shelter corresponds primarily to the construction and occupation of Pithouse 2 and the roomblock. Tentative dates for the occupation of the pithouse are A.D. 750-780, which corresponds to the late Sagehill Subphase. During that time the shelter apparently was a year-round habitation at which a variety of extractive and maintenance activities were performed.

The faunal data from Element 1 are presented in tables E.2 and E.3. Although the majority of bone in most archaeological faunal assemblages is unidentifiable (Payne 1975), this is not the case for the assemblage from Element 1: an extremely large percentage (54.6) of this assemblage is identifiable to order, family, genus, or species. One factor in this high percentage of identifiable bone is the inclusion of 145 bones from a single immature dog (c.f. Canis familiaris) in Pithouse 2. A second factor is the relatively large amount of small mammal bone. In DAP faunal assemblages, small mammal bones are usually more easily identified than large mammal bones. Bird bones also appear to be easy to identify. Whether this is due to Anasazi processing and disposal practices, to the types of contexts excavated, or to a preponderance of highly diagnostic rabbit and grouse remains is unclear. However, it is clear that both the indeterminate and the identifiable portions of DAP assemblages need to be examined.

Table E.2 Composition of the total faunal assemblage, Element 1, LeMoc Shelter

	Indeterminate remains			Identifiable remains*			Total		
	N	%class	%total	N	%class	%total	N	%class	%total
Bird	9	100.0	2.9	21	100.0	5.6(9.1)	30	100.0	4.4(5.5)
Bird/mammal	19	100.0	6.1				19	100.0	2.8(3.5)
Indeterminate mammal	0	0	0	3	0.9(1.4)	0.8(1.3)	3	0.5(0.6)	0.4(0.6)
Small mammal	58	20.4	18.5	156	43.9(74.3)	41.5(67.5)	214	33.4(43.2)	31.1(39.3)
Medium mammal	123	43.2	39.3	†157(12)	44.2(5.7)	41.8(5.2)	†280(135)	43.8(27.3)	40.6(24.8)
Large mammal	104	36.5	33.2	39	11.0(18.6)	10.4(16.9)	143	22.3(28.9)	20.8(26.3)
Total assemblage	313		100.0	376(231)		100.0(100.0)	689(544)		100.0(100.0)

* Assignable to order, family, genus, or species.
† Includes 145 bones from immature dog found in Pithouse 2 fill.

NOTE: Figures in parentheses represent counts and percentages when dog skeleton from Pithouse 2 is excluded.

Table E.3 Composition of the identifiable faunal assemblage, Element 1, LeMoc Shelter

Taxon	N	%class	%total
Birds:			
Tetraonidae			
grouse	19	90.5	5.1(8.2)
Meleagris gallopavo			
turkey	1	4.8	0.3(0.4)
Asio sp.			
long-eared or short-eared owl	1	4.8	0.3(0.4)
Total birds	21	100.0	5.6(9.1)
Mammals:			
Lepus californicus			
black-tailed jackrabbit	42	11.9(20.0)	11.2(18.2)
Sylvilagus spp.			
cottontail rabbit	50	14.1(23.8)	13.3(21.7)
Rodentia			
rodent	3	0.9(1.4)	0.8(1.3)
Sciuridae			
squirrel	6	1.7(2.9)	1.6(2.6)
Marmota flaviventris			
yellow bellied marmot	21	5.9(10.0)	5.6(9.1)
Spermophilus variegatus			
rock squirrel	13	3.7(6.2)	3.5(5.6)
Spermophilus lateralis			
golden-mantled ground squirrel	6	1.7(2.9)	1.6(2.6)
Cynomys gunnisoni			
Gunnison's prairie dog	10	2.8(4.8)	2.7(4.3)
Thomomys spp.			
pocket gopher	1	0.3(0.5)	0.3(0.4)
Cricetidae			
New World rats and mice	1	0.3(0.5)	0.3(0.4)
Neotoma spp.			
wood rat	3	0.9(1.4)	0.8(1.3)
Neotoma cinerea			
bushy-tailed wood rat	1	0.3(0.5)	0.3(0.4)
Neotoma mexicana			
Mexican wood rat	1	0.3(0.5)	0.3(0.4)
Erethizon dorsatum			
porcupine	2	0.6(1.0)	0.5(0.9)
c.f. *Canis familiaris*			
domestic dog	152*(7)	42.8(3.3)	40.4(3.0)
Vulpes vulpes			
red fox	2	0.6(1.0)	0.5(0.9)
Martes americana			
marten	1	0.3(0.5)	0.3(0.4)
Lynx rufus			
bobcat	1	0.3(0.5)	0.3(0.4)
Artiodactyla			
even-toed ungulates	15	4.2(7.1)	4.0(6.5)
Cervus elaphus			
American elk	1	0.3(0.5)	0.3(0.4)
Odocoileus hemionus			
mule deer	22	6.2(10.5)	5.9(9.5)
Ovis canadensis			
bighorn	1	0.3(0.5)	0.3(0.4)
Total mammals	355(210)	100.0(99.8)	94.8(90.5)
Total assemblage	376(231)		100.0(99.6)

* 145 bones from immature canine skeleton in Pithouse 2 fill.

NOTES: Figures in parentheses represent counts and percentages when dog skeleton from Pithouse 2 is excluded.

c.f. - Compares favorably.

Tables E.2 and E.3 demonstrate that mammals are particularly common in the faunal assemblage from Element 1. The proportion of medium mammal bones has been inflated by the partial immature dog skeleton. These remains were located near the east wall of Pithouse 2; the dog appeared to have been placed in the pithouse either during or after abandonment of the structure. In tables E.2 and E.3, the numbers in parentheses indicate the composition of the Element 1 assemblage, exclusive of these bones.

Twenty-five taxonomic categories have been recognized among the identified remains (table E.3). Most of the bird bones are from grouse (Tetraonidae). A wide variety of mammalian taxa are represented as well. Rabbit (Lagomorpha) is the most common mammal (43.8 percent), and cottontail (*Sylvilagus* spp.) is slightly more common than jackrabbit (*Lepus californicus*). Artiodactyl bones make up 18.6 percent of the identifiable mammal remains. The most common artiodactyl is mule deer (*Odocoileus hemionus*), although elk (*Cervus elaphus*) and bighorn (*Ovis canadensis*) are present as well. The next most common group of mammals is the squirrel family (Sciuridae), including yellow-bellied marmot (*Marmota flaviventris*), rock squirrel (*Spermophilus variegatus*), golden-mantled ground squirrel (*Spermophilus lateralis*), and Gunnison's prairie dog (*Cynomys gunnisoni*).

Most of the species present in the Element 1 assemblage would have been found in the vicinity of the shelter, particularly in the brush and woodland zones[1] on the slope and mesa tops above the shelter. The marten (*Martes americana*) is an exception (Armstrong 1972). This animal usually

[1]Although Bye's (1982) treatment of potential vegetation serves as the basis for the vegetation discussion in the site report, the zones used in this appendix are based on more recent research by Petersen (1983).

is found at higher elevations and must have been brought to the shelter from some distance.

As noted above, small mammals are more common than large mammals in the Element 1 assemblage. This is due to the fairly high percentages of rabbit and squirrel. The greater proportion of small mammal is evident among the indeterminate remains as well.

Element 2

Element 2 is associated with the construction and use of Pithouse 1 and Room 12; the surface rooms built during the Element 1 occupation probably were used at this time as well. Element 2 dates to sometime between A.D. 840 and 860, which corresponds to the late Dos Casas and early Periman Subphases. This element apparently represents a year-round habitation similar to that represented by Element 1.

The faunal data from Element 2 are presented in tables E.4 and E.5. Only 287 fragments of nonhuman bone were recovered from contexts assigned to Element 2. Approximately one-third of these fragments were identifiable to order, family, genus, or species (table E.4). This lower

Table E.4 Composition of the total faunal assemblage, Element 2, LeMoc Shelter

	Indeterminate remains			Identifiable remains*			Total		
	N	%class	%total	N	%class	%total	N	%class	%total
Bird	3	100.0	1.6	2	100.0	2.1	5	100.0	1.7
Bird/mammal	1	100.0	0.5	0	0	0	1	100.0	0.4
Indeterminate mammal	0	0	0	2	2.2	2.1	2	0.7	0.7
Small mammal	10	5.3	5.2	36	39.1	38.3	46	16.4	16.0
Medium mammal	109	57.7	56.5	10	10.9	10.6	119	42.4	41.5
Large mammal	70	37.0	36.3	44	47.8	46.8	114	40.6	39.7
Total assemblage	193		100.0	94		100.0	287		100.0

* Assignable to order, family, genus, or species.

Table E.5 Composition of the identifiable faunal assemblage, Element 2, LeMoc Shelter

Taxon	N	%class	%total
Birds:			
Buteo sp.	1	50.0	1.1
Tetraonidae grouse	1	50.0	1.1
Total birds	2	100.0	2.1
Mammals:			
Lagomorpha hares and rabbits	1	1.1	1.1
Lepus californicus black-tailed jackrabbit	6	6.5	6.4
Sylvilagus spp. cottontail rabbit	17	18.5	18.1
Rodentia rodent	2	2.2	2.1
Sciuridae squirrel	2	2.2	2.1
Marmota flaviventris yellow bellied marmot	3	3.3	3.2
Spermophilus variegatus rock squirrel	2	2.2	2.1
Peromyscus sp. white-footed mice	1	1.1	1.1
Neotoma spp. wood rat	3	3.3	3.2
Erethizon dorsatum porcupine	5	5.4	5.3
Canis latrans coyote	2	2.2	2.1
Vulpes vulpes red fox	1	1.1	1.1
Mustela frenata long-tailed weasel	1	1.1	1.1
Lynx rufus bobcat	2	2.2	2.1
Felis concolor mountain lion	1	1.1	1.1
Artiodactyla even-toed ungulates	14	15.2	14.9
Cervidae deer	1	1.1	1 1
Cervus elaphus American elk	2	2.2	2.1
Odocoileus hemionus mule deer	24	26.1	25.5
Ovis canadensis bighorn	2	2.2	2.1
Total mammals	92	100.0	97.9
Total assemblage	94		100.0

percentage of identifiable remains is attributable to the smaller amount of small mammal relative to medium and large mammal in this assemblage.

Most of the assemblage is mammalian, as was the case for Element 1. Even though no complete or nearly complete, intact skeletons are included in this assemblage, the proportion of medium mammal is high. Small mammal makes up only 16.0 percent of the assemblage. However, there is considerable contrast between proportions of small and medium mammal in the indeterminate and identifiable components of the assemblage (table E.4).

Twenty-two taxonomic categories have been recognized in the identifiable assemblage from Element 2. The diversity of the mammalian remains is almost as great as in Element 1. Artiodactyls rather than rabbits are most common (46.8 percent). Mule deer is the most common artiodactyl; elk and bighorn occur as well. Some fragments are identifiable only to family (Cervidae) or order (Artiodactyla). Only 25.6 percent of the assemblage is rabbit. However, compared to Element 1, black-tailed jackrabbit occurs much less frequently than cottontail. Bones from the squirrel family remain common, but porcupine (Erethizon dorsatum) occurs more frequently (5.4 percent) than in Element 1.

As was the case for the Element 1 assemblage, most of the taxa recovered from Element 2 contexts represent animals potentially found in vegetation zones near the site. In particular, fauna from the woodland and brush zones upslope from LeMoc Shelter are very common. No high altitude species were identified.

The principal difference between the faunal assemblages from Elements 1 and 2 is that large mammals, notably artiodactyls, are more common in Element 2 contexts than in Element 1 contexts. Since both

elements apparently are year-round habitations, this difference is difficult to explain. It is possible that the small sample size for Element 2 makes the relative proportions unreliable; alternatively, it is possible that the differences observed stem from temporal or functional factors.

Element 3

In contrast to the first two elements, the third recognizable occupation of LeMoc Shelter is not associated with a pitstructure. Rooms 11 and 13 apparently belong to this element. Element 3 is dated to approximately A.D. 875-890 and has been assigned to the Grass Mesa Subphase. In the site report, this occupation is interpreted as a field house occupied seasonally to facilitate summer agricultural activities.

The faunal data for Element 3 are presented in tables E.6 and E.7. A total of 488 bones have been examined. Of these, 30.1 percent have been identified to order, family, genus, or species. Mammals make up most of the assemblage. Large mammal remains occur most frequently among both the indeterminate and the identifiable components of the assemblage. However, medium mammal is next most common among the indeterminate remains, and small mammal is almost as common as large mammal among the identifiable remains.

Twenty-one taxa have been recognized in the identifiable assemblage from Element 3. Artiodactyla make up 42.5 percent of the mammalian remains. Mule deer is still the most common artiodactyl (19.2 percent), but elk occurs more frequently than in earlier occupations (10.3 percent). Bighorn is present as well. Rabbit constitutes 33.6 percent of the assemblage. Black-tailed jackrabbit is twice as common as cottontail, which is a reversal of the proportions found in the faunal assemblages from Elements 1 and 2. Porcupine and squirrel continue to be present but

carnivores, including coyote (Canis latrans), bobcat (Lynx rufus), and red fox (Vulpes vulpes), are more common.

Table E.6 Composition of the total faunal assemblage, Element 3, LeMoc Shelter

	Indeterminate remains			Identifiable remains*			Total		
	N	%class	%total	N	%class	%total	N	%class	%total
Bird	4	100.0	1.2	1	100.0	0.7	5	100.0	1.0
Bird/mammal	4	100.0	1.2	0	0	0	4	100.0	0.8
Indeterminate mammal	0	0	0	1	0.7	0.7	1	0.2	0.2
Small mammal	38	11.4	11.1	60	41.1	40.8	98	20.5	20.1
Medium mammal	101	30.3	29.6	22	15.1	15.0	123	25.7	25.2
Large mammal	194	58.3	56.9	63	43.2	42.9	257	53.7	52.7
Total assemblage	341		100.0	147		100.0	488		100.0

* Assignable to order, family, genus, or species.

The habitat types represented probably occurred in the vicinity of LeMoc Shelter. Most of the species prefer woodland or brush habitat types. There are no taxa that necessarily represent long-distance procurement.

The Element 3 assemblage is diverse, as are the assemblages from Elements 1 and 2. As in the Element 2 assemblage, large mammals, most of them artiodactyls, are more common than small mammals such as rabbits. No change in procurement strategies is evident from this assemblage. Such a change might be expected in conjunction with the presumed change in site function from year-round habitation to field house.

Element 4

Architectural evidence for a fourth element at LeMoc Shelter is lacking, but occupation areas and various deposits indicate that the

Table E.7 Composition of the identifiable faunal assemblage, Element 3, LeMoc Shelter

Taxon	N	%class	%total
Birds:			
Accipitridae	1	100.0	0.7
Total birds	1	100.0	0.7
Mammals:			
Lepus californicus black-tailed jackrabbit	33	22.6	22.5
Sylvilagus spp. cottontail rabbit	16	11.0	10.9
Sciuridae squirrel	3	2.1	2.0
Marmota flaviventris yellow bellied marmot	1	0.7	0.7
Spermophilus variegatus rock squirrel	4	2.7	2.7
Cynomys gunnisoni Gunnison's prairie dog	1	0.7	0.7
Castor canadensis beaver	1	0.7	0.7
Cricetidae New World rats and mice	1	0.7	0.7
Neotoma spp. wood rat	1	0.7	0.7
Erethizon dorsatum porcupine	6	4.1	4.1
Canis latrans coyote	6	4.1	4.1
Vulpes or *Urocyon* sp. fox	1	0.7	0.7
Vulpes vulpes red or gray fox	4	2.7	2.7
Ursus sp. bear	1	0.7	0.7
Lynx rufus bobcat	5	3.4	3.4
Artiodactyla even-toed ungulates	14	9.6	9.5
Cervidae deer family	1	0.7	0.7
Cervus elaphus American elk	15	10.3	10.2
Odocoileus hemionus mule deer	28	19.2	19.1
Ovis canadensis bighorn	4	2.7	2.7
Total mammals	146	100.0	99.3
Total assemblage	147		100.0

shelter was reoccupied after A.D. 900. Element 4 has been dated to sometime between A.D. 920 and 930 and has been assigned to the Cline Subphase. Apparently, this element represents short-term use of the shelter. Since the Grass Mesa Locality was abandoned by this time, residents of the McPhee Village area might have used the shelter as a camp while extracting both biotic and abiotic resources in the vicinity.

The faunal remains recovered from contexts assigned to Element 4 are presented in tables E.8 and E.9. Considerably more bones (1220) are included in this assemblage than in the other three assemblages described thus far. Because the ratio of small mammal to large mammal is low, only 20.6 percent (251) of these bones have been identified to order, family, genus, or species. The increase in sample size probably is responsible for the recovery of indeterminate vertebrate and fish bones. The fish bones may belong to members of the sucker family (Catostomidae), since most of the DAP fish identified to date have belonged to this family. The greater number of bird bones also may be due to sample size. Grouse occur

Table E.8 Composition of the total faunal assemblage, Element 4, LeMoc Shelter

	Indeterminate remains			Identifiable remains*			Total		
	N	%class	%total	N	%class	%total	N	%class	%total
Unidentifiable vertebrate	6	100.0	0.6	0	0	0	6	100.0	0.5
Fish	3	100.0	0.3	0	0	0	3	100.0	0.3
Bird	6	100.0	0.6	15	100.0	6.0	21	100.0	1.7
Bird/mammal	2	100.0	0.2	0	0	0	2	100.0	0.2
Indeterminate mammal	0	0	0	5	2.1	2.0	5	0.4	0.4
Small mammal	62	6.5	6.4	91	38.6	36.3	153	12.9	12.5
Medium mammal	271	28.5	28.0	57	24.2	22.7	328	27.6	26.9
Large mammal	619	65.0	63.9	83	35.2	33.1	702	59.1	57.5
Total assemblage	969		100.0	251		100.0	1,220		100.0

* Assignable to order, family, genus, or species.

Table E.9 Composition of the identifiable faunal assemblage, Element 4, LeMoc Shelter

Taxon	N	% class	% total
Birds:			
Branta spp. goose	1	6.7	0.4
Accipiter striatus sharp-shinned hawk	2	13.3	0.8
Buteo jamaicensis red-tailed hawk	1	6.7	0.4
Tetraonidae grouse	7	46.7	2.8
Meleagris gallopavo turkey	2	13.3	0.8
Bubo virginianus great horned owl	1	6.7	0.4
Pica pica black-billed magpie	1	6.7	0.4
Total birds	15	100.0	6.0
Mammals:			
Lepus californicus black-tailed jackrabbit	4	1.7	1.6
Sylvilagus spp. cottontail rabbit	55	23.3	21.9
Rodentia rodent	4	1.7	1.6
Sciuridae squirrel	6	2.5	2.4
Marmota flaviventris yellow bellied marmot	4	1.7	1.6
Spermophilus variegatus rock squirrel	10	4.2	4.0
Cynomys gunnisoni Gunnison's prairie dog	2	0.9	0.8
Caster canadensis beaver	4	1.7	1.6
Neotoma spp. wood rat	7	3.0	2.8
Neotoma mexicana Mexican wood rat	1	0.4	0.4
Erethizon dorsatum porcupine	21	8.9	8.4
Canis latrans coyote	9	3.8	3.6
c.f. *Canis familiaris* domestic dog	1	0.4	0.4
Vulpes or *Urocyon* sp. red or gray fox	1	0.4	0.4

NOTE: c.f. - Compares favorably.

Table E.9 Composition of the identifiable faunal assemblage, Element 4, LeMoc Shelter--Continued

Taxon	N	% class	% total
Vulpes vulpes fox	12	5.1	4.8
Mustela frenata long-tailed weasel	2	0.9	0.8
Taxidea taxus badger	3	1.3	1.2
Lynx rufus bobcat	7	3.0	2.8
Felis concolor mountain lion	1	0.4	0.4
Artiodactyla even-toed ungulates	9	3.8	3.6
Cervidae deer family	1	0.4	0.4
Cervus elaphus American elk	43	18.2	17.1
Odocoileus hemionus mule deer	15	6.4	6.0
Ovis canadensis bighorn	14	5.9	5.6
Total mammals	236	100.0	94.0
Total assemblage	251		100.0

most frequently, but waterfowl, raptors, and Passeriformes are present as well.

Mammals comprise over 90.0 percent of the Element 4 assemblage. Large mammal remains are most common among the indeterminate remains, but among the identifiable remains, small mammals occur most frequently. The proportion of medium mammal remains does not change greatly between the indeterminate and the identifiable components.

Among the identifiable mammal remains, Artiodactyla contribute 34.7 percent. Elk, rather than mule deer, is the principal artiodactyl. Bighorn is present as well. Of the identifiable mammal remains, 25.0 percent are rabbit. Cottontail is much more common than jackrabbit, as was the case for Elements 1 and 2 but not Element 3. Porcupine contributes 8.9 percent. Squirrels and carnivores also occur fairly frequently. A single fragment has been identified as domestic dog (c.f. Canis familiaris).

Most of the taxa recovered represent species found in the vicinity of the shelter. The presence of fish may be a sign that the aquatic zone was used more than previously, but a strong case cannot be made based on three fragments. None of the taxa necessarily represent long-distance procurement.

As has been the case in all but the Element 1 assemblage, large mammals, mostly artiodactyls, occur more frequently than small mammals, including rabbits. This is true even though slightly more of the identifiable remains are from small mammals than from large mammals. The relatively high frequency of elk as opposed to mule deer is the only anomaly in this assemblage.

Once again, the shift in site function proposed in the site report leads to the expectation that the faunal assemblage from Element 4 will

differ from those previously described. However, this assemblage is similar to those from the other elements. The larger size of this assemblage may also raise questions about the interpretations given in the site report. Unfortunately, until relative volumes can be calculated, the significance of the sample size will remain unclear.

Element 5

The fifth and final element recognized at LeMoc Shelter is represented by scattered hearths and artifacts. According to the site report, Element 5 dates to sometime between A.D. 930 and 950 and has been assigned to the Cline Subphase. This coincides with the last occupations of the McPhee Village area and, like Element 4, may represent use of LeMoc Shelter as an extractive camp by people from McPhee Village. Sporadic use of the shelter after this period may be represented as well.

The faunal remains recovered from contexts assigned to Element 5 are listed in tables E.10 and E.11. The assemblage from Element 5 includes 492 fragments, 35.4 percent of which are identifiable. This figure is

Table E.10 Composition of the total faunal assemblage, Element 5, LeMoc Shelter

	Indeterminate remains			Identifiable remains*			Total		
	N	%class	%total	N	%class	%total	N	%class	%total
Fish	1	100.0	0.3	0	0	0	1	100.0	0.2
Bird	0	0	0	7	100.0	4.0	7	100.0	1.4
Indeterminate mammal	0	0	0	3	1.8	1.7	3	0.6	0.6
Small mammal	15	4.7	4.7	71	42.5	40.8	86	17.8	17.5
Mecium mammal	104	32.8	32.7	23	13.8	13.2	127	26.3	25.8
Large mammal	198	62.4	62.3	70	41.9	40.2	268	55.4	54.5
Total assemblage	318		100.0	174		100.0	492		100.0

* Assignable to order, family, genus, or species.

Table E.11 Composition of the identifiable faunal assemblage, Element 5, LeMoc Shelter

Taxon	N	%class	%total
Birds:			
Accipitridae	1	14.3	0.6
Buteo spp.	3	42.9	1.7
Tetraonidae grouse	2	28.6	1.2
Meleagris gallopavo turkey	1	14.3	0.6
Total birds	7	100.0	4.0
Mammals:			
Lepus californicus black-tailed jackrabbit	8	4.8	4.6
Sylvilagus spp. cottontail rabbit	38	22.8	21.8
Rodentia rodent	1	0.6	0.6
Sciuridae squirrel	3	1.8	1.7
Marmota flaviventris yellow bellied marmot	1	0.6	0.6
Spermophilus variegatus rock squirrel	6	3.6	3.5
Cynomys gunnisoni Gunnison's prairie dog	2	1.2	1.2
Cricetidae New World rats and mice	1	0.6	0.6
Neotoma spp. wood rat	3	1.8	1.7
Neotoma cinerea bushy-tailed wood rat	8	4.8	4.6
Caster canadensis beaver	2	1.2	1.2
Erethizon dorsatum porcupine	3	1.8	1.7
Canidae dog family	2	1.2	1.2
Canis latrans coyote	4	2.4	2.3
Vulpes vulpes red fox	8	4.8	4.6
Mustela frenata long-tailed weasel	1	0.6	0.6
Taxidea taxus badger	3	1.8	1.7
Lynx rufus bobcat	3	1.8	1.7
Artiodactyla even-toed ungulates	9	5.4	5.2
Cervus elaphus American elk	6	3.6	3.5
Odocoileus hemionus mule deer	50	29.9	28.7
Ovis canadensis bighorn	5	3.0	2.9
Total mammals	167	100.0	96.0
Total assemblage	174		100.0

consistent with the identifiable percentages from the Element 2, 3, and 4 assemblages.

Fish and birds are present, but mammals still constitute over 98 percent of the assemblage. Overall, large mammal is most common (54.5 percent), followed by medium mammal (25.8 percent), small mammal (17.5 percent), and indeterminate mammal (0.6 percent). However, large and small mammal occur in approximately equal percentages (40.2 percent and 40.8 percent) among the identifiable remains.

Twenty-six taxonomic groups are represented in the Element 5 faunal assemblage. The mammalian assemblage consists of a variety of taxa. Artiodactyla make up 41.9 percent of the assemblage. Mule deer (29.9 percent) occur more frequently than elk (3.6 percent). Five bones were identified as bighorn. Slightly less than one-third (27.6 percent) of the mammalian assemblage is rabbit, with cottontail being five times as common as jackrabbit. Sciurids contribute 7.2 percent of the assemblage, and wood rat contributes 6.6 percent. Several carnivore species are present as well.

The taxa recovered probably represent species that would have been found in the vicinity of the shelter, particularly in the woodland and brush zones upslope from the site. The presence of a single fish bone does suggest some use of aquatic zones, but a general shift in habitat focus cannot be assumed. None of the species recovered are likely to represent long-distance procurement.

Large mammals, most of them artiodactyls, occur most frequently, but small mammals, particularly rabbits, are present as well. In diversity and composition, this assemblage is similar to those from the other four elements. This similarity and perhaps the presence of fish suggest that the activities performed during the Element 5 occupation were not

different from those performed during the other four occupations.

Unassigned Contexts

A variety of midden deposits and disturbed deposits cannot be assigned to any of the elements recognized at LeMoc Shelter. Over half of the faunal remains were recovered from these deposits. Although subdivision of this assemblage into gross temporal units may be possible eventually, it cannot be accomplished at this time; therefore, all of these materials are considered as a single assemblage in this appendix.

Tables E.12 and E.13 present the faunal data from these unassigned contexts. In this assemblage of 3788 pieces of bone, 26.0 percent are identifiable to order, family, genus, or species. As has been the case for the element assemblages, this figure appears to be related to the proportion of mammal types recovered.

Table E.12 Composition of the total faunal assemblage, unassigned contexts, LeMoc Shelter

	Indeterminate remains			Identifiable remains*			Total		
	N	%class	%total	N	%class	%total	N	%class	%total
Fish	2	100.0	0.1	0	0	0	2	100.0	0.1
Reptile	0	0	0	1	100.0	0.1	1	100.0	<0.1
Bird	20	100.0	0.7	83	100.0	8.4	103	100.0	2.7
Bird/mammal	53	100.0	1.9	0	0	0	53	100.0	1.4
Indeterminate mammal	0	0	0	21	2.3	2.1	21	0.6	0.6
Small mammal	263	9.6	9.4	410	45.6	41.7	673	18.6	17.7
Medium mammal	368	13.5	13.1	128	14.2	13.0	496	13.7	13.1
Large mammal	2,098	76.8	74.7	341	37.9	34.7	2,439	67.2	64.2
Total assemblage	2,804		100.0	984		100.0	3,788		100.0

* Assignable to order, family, genus, or species.

A single reptile bone and two fish bones are included in this assemblage. Birds continue to contribute a small percentage, and

Table E.13 Composition of the identifiable faunal assemblage, unassigned contexts, LeMoc Shelter

Taxon	N	%class	%total
Reptiles:			
Sceloporus undulatus elongatus northern plateau lizard	1	100.0	0.1
Total reptiles	1	100.0	0.1
Birds:			
Accipitridae	15	18.1	1.5
Accipiter gentilis goshawk	1	1.2	0.1
Accipiter striatus sharp-shinned hawk	5	6.0	0.5
Buteo spp.	2	2.4	0.2
Buteo jamaicensis red-tailed hawk	1	1.2	0.1
Galliformes	1	1.2	0.1
Tetraonidae grouse	24	28.9	2.4
Meleagris gallopavo turkey	19	22.9	1.9
Bubo virginianus great horned owl	1	1.2	0.1
Glaucidium gnoma pygmy owl	1	1.2	0.1
Asio otus long-eared owl	1	1.2	0.1
Colaptes auratus common flicker	1	1.2	0.1
Corvidae jay, magpie, and crow	1	1.2	0.1
Cyanocitta stelleri Steller's jay	6	7.2	0.6
Aphelocoma coerulescens scrub jay	2	2.4	0.2
Pica pica black-billed magpie	1	1.2	0.1
Lanius excubitor northern shrike	1	1.2	0.1
Total birds	83	100.0	8.4
Mammals:			
Lagomorpha rabbit and hare	1	0.1	0.1
Lepus spp. hare and jackrabbit	2	0.2	0.2
Lepus americanus snowshoe hare	1	0.1	0.1

Table E.13 Composition of the identifiable faunal assemblage, unassigned contexts, LeMoc Shelter--Continued

Taxon	N	%class	%total
Mammals (cont.):			
Lepus californicus black-tailed jackrabbit	46	5.1	4.7
Sylvilagus spp. cottontail rabbit	245	27.2	24.9
Rodentia rodent	14	1.6	1.4
Sciuridae squirrel	9	1.0	0.9
Marmota flaviventris yellow bellied marmot	16	1.8	1.6
Spermophilus sp. ground squirrel	1	0.1	0.1
Spermophilus variegatus rock squirrel	32	3.6	3.3
Spermophilus lateralis golden-mantled ground squirrel	4	0.4	0.4
Cynomys gunnisoni Gunnison's prairie dog	6	0.7	0.6
Thomomys spp. pocket gopher	4	0.4	0.4
Castor canadensis beaver	18	2.0	1.8
Cricetidae New World rats and mice	4	0.4	0.4
Peromyscus spp. white-footed mice	1	0.1	0.1
Neotoma spp. wood rat	23	2.6	2.3
Neotoma cinerea bushy-tailed wood rat	7	0.8	0.7
Neotoma mexicana Mexican wood rat	1	0.1	0.1
Erethizon dorsatum porcupine	25	2.8	2.5
Carnivora carnivores	3	0.3	0.3
Canidae canids	3	0.3	0.3
Canis familiaris domestic dog	4	0.4	0.4
Canis latrans coyote	15	1.7	1.5
Canis lupus gray wolf	1	0.1	0.1
Vulpes vulpes red fox	37	4.1	3.8
Urocyon cinereoargenteus gray fox	3	0.3	0.3

Table E.13 Composition of the identifiable faunal assemblage, unassigned contexts, LeMoc Shelter--Continued

Taxon	N	%class	%total
Mammals (cont.):			
Ursus spp.			
bear	5	0.6	0.5
Ursus americanas			
black bear	1	0.1	0.1
Bassariscus astutus			
ringtail	1	0.1	0.1
Mustelidae			
mustelids	1	0.1	0.1
Mustela frenata			
long-tailed weasel	2	0.2	0.2
Taxidea taxus			
badger	4	0.4	0.4
Spilogale putorius			
spotted skunk	4	0.4	0.4
Lynx rufus			
bobcat	22	2.4	2.2
Felis concolor			
mountain lion	1	0.1	0.1
Artiodactyla			
even-toed ungulates	100	11.1	10.2
Cervidae			
deer family	8	0.9	0.8
Cervus elaphus			
American elk	35	3.9	3.6
Odocoileus hemionus			
mule deer	150	16.7	15.2
Antilocapra americana			
pronghorn	1	0.1	0.1
Ovis canadensis			
bighorn	39	4.3	4.0
Total mammals	900	100.0	91.5
Total assemblage	984		99.8

95.9 percent of the bone is mammal. Large mammal contributes 67.2 percent of the mammal remains. Small (18.6 percent) and medium (13.7 percent) mammal contribute less, and indeterminate mammal represents an insignificant proportion. However, among the identified materials, small mammal is most common, followed closely by large mammal.

Sixty taxonomic groupings are recognized in this assemblage. This richness is attributable to sample size. Among the birds, grouse (28.9 percent) and turkey (22.9 percent) are the most common avian taxa. A concentration of hawk (Accipitridae) limb bones in the fill of Room 11 accounts for 18.1 percent of the avian remains.[2] It is not clear whether these bones represent an intentional burial or merely a partial carcass discarded in the trash.

The mammalian assemblage is 37.0 percent Artiodactyla, with mule deer (16.7 percent) being the most common species. Elk, bighorn, and pronghorn (Antilocapra americana) are present. Rabbit is second in frequency at 32.7 percent. Most of the rabbits are cottontail (27.2 percent), but both snowshoe hare (Lepus americanus) and black-tailed jackrabbit (Lepus californicus) are present as well. Squirrels comprise 7.6 percent and carnivores 11.6 percent of the mammalian assemblage.

The habitat types represented by the faunal assemblage from unassigned contexts are similar to those represented by the element assemblages. Woodland and brush zones upslope from the shelter are

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[2]In the site report, the author includes materials from postoccupational sediments in the element assignments for the preceding occupation; as a result, the hawk remains are included in the Element 3 tabulations. A more conservative approach was used in writing this appendix--only proveniences for which a confident element assignment could be made were included in the tabulations for specific elements. The hawk bones, therefore, have been placed in the "unassigned contexts" category in this discussion.

represented most strongly; some aquatic utilization is indicated by the presence of fish. The snowshoe hare represents habitats usually found at higher elevations, while the pronghorn represents open grassland probably found only to the southwest of the project area (Armstrong 1972).

This assemblage is characterized by diversity and slightly more artiodactyl and other large mammals than rabbit and other small mammals. This has been true for all the element assemblages. Thus, although some taxa not represented in the element assemblages are found in the unassigned assemblage, the latter corresponds to what would be expected for midden and disturbed deposits associated with the five recognizable occupations of LeMoc Shelter.

Discussion

The preceding section provides a basic description of the taxonomic composition of the macrofaunal assemblage from LeMoc Shelter. Although further work with the LeMoc Shelter faunal assemblage must be undertaken in conjunction with intensive studies of DAP fauna, several topics of analytic interest can be addressed preliminarily in this appendix. First, what activities are represented by this faunal assemblage? Second, is there evidence for utilization of a special microenvironment created by agricultural fields? Finally, are the interpretations of site function made in the text supported by the faunal data?

The interpretation of activities performed at LeMoc Shelter is dependent on a more thorough study of the faunal assemblage than has been completed as yet. Nevertheless, some understanding of procurement strategies can be gained from the description of taxa recovered.

First, the possibility of intrusive fauna must be considered. This is a difficult problem in any archaeological site, but is particularly difficult at cave and shelter sites such as LeMoc. Many of the species recovered might have made their home in the shelter itself. The soft, organic, archaeological deposits at the site might have attracted burrowing species. Furthermore, many species prefer rocky talus slopes, which must have existed in the vicinity of the shelter.

Species whose presence might be suspect include rodents such as ground squirrel (Spermophilus spp.), pocket gopher (Thomomys spp.), wood rat (Neotoma spp.), and marmot (Marmota flaviventris). Carnivorous species, especially the felids (Lynx rufus and Felis concolor) and bear (Ursus spp.), are known to inhabit caves. Caution is necessary when examining the assemblage from unassigned contexts.

Nevertheless, the ethnographic record indicates that most of the species listed here were procured by Pueblo Indians for food and raw materials (Gnabasik 1981). Furthermore, other indications of intrusion, such as skeletal completeness (Thomas 1971), are lacking. Only two partial skeletons were recovered from LeMoc Shelter. These consist of an immature dog and a hawk. Neither is necessarily a burial. Thus, although conclusive evidence is lacking, most of the fauna recovered probably represent sources of food or raw material. Future studies of body-part representation and of bone condition may shed more light on this topic.

The wide variety of taxa found at LeMoc Shelter suggests that faunal procurement was largely opportunistic. Preference for individual taxa is not evident, although artiodactyls and rabbits consistently occur in the largest proportions. Furthermore, the most heavily used habitat types are those that would have occurred in the immediate vicinity of LeMoc

Shelter; only a few fragments in the assemblage might indicate hunting over longer distances. This suggests that the protein requirements of the inhabitants of LeMoc Shelter were easily met in the vicinity of the site through generalized collecting and hunting.

The ethnographic record indicates that a variety of techniques might have been used to procure the species recovered (Gnabasik 1981; Henderson and Harrington 1914). These include snaring, bow and arrow hunting, and driving. The lack of large concentrations of particular taxa may argue against communally organized hunting such as rabbit driving. However, procurement techniques cannot be ascertained using the faunal assemblage alone.

The second question of concern is whether or not a particular microenvironment associated with agricultural fields was important to the occupants of LeMoc Shelter. In the site report, the importance of this environment has been suggested; however, the habitat preferences of the taxa recovered at LeMoc do not necessarily suppport this interpretation. The initial impression given by the assemblage is that woodland and brush zones, rather than disturbed habitats and croplands, are the preferred habitats.

In an effort to quantify this impression, recent Latilong studies by the Colorado Division of Wildlife (Bissell 1978; Hammerson and Langlois 1981; Kingery and Graul 1978) were used to determine those habitat types in which the taxa recovered might have been found. Nine main habitat types that occur in southwest Colorado today were of interest (fig. E.1). The Douglas-fir zone may not have occurred in the project area per se during the occupation of LeMoc Shelter, but it is included because isolated trees do occur today in the vicinity of the site. The

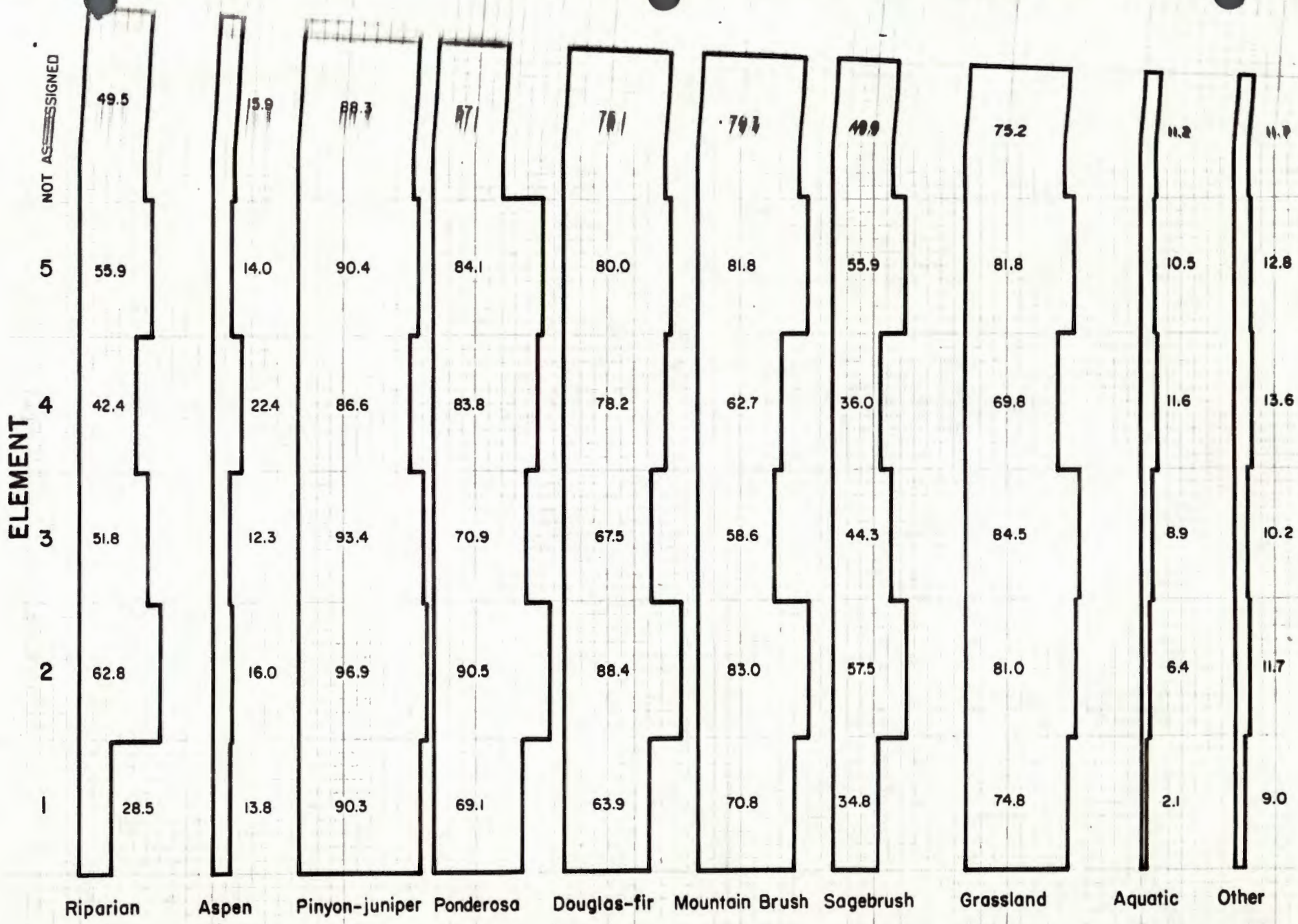

Figure E.1 Percentage of faunal taxa by vegetation zone, LeMoc Shelter.

category "other" includes a variety of types, most importantly, agricultural fields, shelter belts, and habitat-altered (cleared) areas.

The percentage of each assemblage that might have been found in each zone was determined by summing the proportions for each taxon that occurs in that zone. This information is summarized in figure E.1. The percentages in this table do not sum to 100.0 percent because most taxa are found in more than one zone.

The most important habitats appear to be the pinyon-juniper, ponderosa pine, Douglas-fir woodland, mountain (oak) brush, and grassland zones. Sagebrush and riparian woodland vegetation is less well represented, and the proportions of faunal remains from aspen, aquatic, and other zones are extremely small. Figure E.1 supports the impression that intensive use of a special agricultural microenvironment does not occur. However, the data in the Latilong studies on agricultural fields, shelter belts, and habitat-altered areas appear to be sketchy, and some underrepresentation may be occurring. Thus, only further research will conclusively answer the question of habitat preference.

Considerable variation in site function among the elements has been postulated in the site report. During Elements 1 and 2, LeMoc is believed to have functioned as a small, year-round habitation. During Element 3, the site is believed to have been a field house, and during the last two elements, the site is believed to have served as an extractive camp.

The Element 1 faunal assemblage meets expectations for small, single- or double—household Anasazi habitations. Opportunistic procurement would be expected for groups with such small labor forces. A slight emphasis on small animals such as rabbits might be expected of agriculturalists

engaged in garden hunting. However, it is still unclear why the assemblage from Element 2, a similar occupation, does not conform as well with the second of these expectations.

The assemblage from Element 3, a field house, would be expected to reflect the greatest emphasis on small mammals such as rabbits. Nevertheless, it differs little from Elements 1 and 2 in diversity and, like Element 2, suggests a slight preference for artiodactyls rather than rabbits. Furthermore, there is little evidence of the special microenvironment created by agricultural fields.

The Element 4 assemblage is distinctive because of the presence of fish and because elk rather than deer is the principal artiodactyl. This does not correspond to expectations for a large-game-hunting camp, but it may indicate the extraction of a variety of resources. On the other hand, the composition of the Element 4 assemblage may suggest that food was being collected while using the shelter for the extraction of abiotic resources. Study of body-part representation would provide additional insights into site function.

The assemblage from Element 5 also might be expected to show more evidence of large-game hunting. However, except for the fact that mule deer is the most common artiodactyl from Element 5 contexts, the Element 4 and 5 faunal assemblages are quite similar. Again, a broader range of extractive activities than is usually associated with a hunting camp is suggested, and body-part analysis is required.

In general, the similarity of all the faunal assemblages argues against great change in procurement activities through time at LeMoc Shelter. Either some mixing of these assemblages has taken place or assumptions about the activities performed at different Dolores Anasazi

site types need revision. A final possibility is that LeMoc Shelter represents a unique site type.

Summary

The faunal assemblage from LeMoc Shelter consists of 6964 pieces of nonhuman bone belonging to five cultural elements and numerous unassigned contexts. A wide variety of taxa representing small and large mammals from habitats that occur in the vicinity of the site today have been recovered. Even preliminary analysis indicates that the LeMoc Shelter assemblage will be important in assessing the exploitation of fauna by the Dolores area Anasazi. Several of the working assumptions being used by the DAP may not apply to LeMoc Shelter, which may indicate a need to revise these assumptions, or may indicate that LeMoc Shelter is a unique site deserving of detailed analysis. In any case, further analysis of the LeMoc Shelter faunal assemblage should be undertaken.

APPENDIX F

THE MACROBOTANICAL ASSEMBLAGE FROM LEMOC SHELTER

by

Meredith H. Matthews

Introduction[1]

The macrobotanical assemblage from LeMoc Shelter consists of a diverse and well-preserved array of botanical remains. Twenty-two families were recognized during preliminary analysis; within these families, 30 genera, some of which could be identified to species level, were recognized (table F.1). It is assumed that a major factor contributing to the diversity and condition of taxa from LeMoc Shelter is the greater preservation potential of the shelter compared to open-air sites. In a dry site situation, many of the pedoturbative and destructive processes that affect open-air sites (Keepax 1977; Wood and Johnson 1978) are either not active or their deleterious effects are minimized. Macrobotanical remains from LeMoc Shelter are separated into two categories on the basis of size and mode of collection. Small-scale macrobotanical remains, e.g., seeds and fruits, were recovered from bulk soil flotation samples. Macrobotanical remains that were more readily visible, e.g., *Zea mays* cobs, *Cucurbita* seeds, and wood fragments, were recovered as artifacts during excavation; herein such materials will be referred to as vegetal remains.

Bulk soil samples at LeMoc Shelter were collected from stratigraphic profiles, trash deposits, structure fills, surfaces, and features. Collection of samples during the 1978 field season was at the discretion of the site supervisor; collection of samples during the 1979 field season was carried out in accordance with a standardized, project-wide biotic sampling design (Litzinger 1979). Vegetal remains were arbitrarily collected from a range of proveniences.

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[1]Tables for this appendix were compiled by Carol Brandt, Botanical Studies Group, Dolores Archaeological Program.

Table F.1 Taxa represented in the macrobotanical assemblage, LeMoc Shelter

Family Genus species	Element No.					Unassigned contexts
	1	2	3	4	5	
Amaranthaceae						
Amaranthus sp.		x				x
Anacardiaceae						
Rhus aromatica	x					
Cactaceae						
Opuntia sp.		x				x
Opuntia fragilis						x
Capparidaceae						
Cleome serrulata						x
Chenopodiaceae						
Chenopodium sp.	x	x				x
"Cheno-am"	x					x
Compositae	x					x
Artemisia sp.						x
Chrysothamnus sp.						x
Helianthus sp.						x
Helianthus annuus						x
Cruciferae						
Descurainia sp.	x					x
Cucurbitaceae						
Cucurbita sp.				x	x	x
C. pepo						x
Cupressaceae						
Juniperus sp.	x				x	x
J. osteosperma	x					x
J. scopulorum	x					
Cyperaceae		x				x
Scirpus sp.						x
Equisetaceae						
Equisetum sp.						x
Fagaceae						
Quercus gambelii	x	x	x	x	x	x

NOTE: x - Present.

Table F.1 Taxa represented in the macrobotanical assemblage, LeMoc Shelter--Continued

Family Genus species	Element No.					Unassigned contexts
	1	2	3	4	5	
Gramineae						
Phragmites sp.		x				x
Zea mays	x	x	x		x	x
Leguminosae		x				
Phaseolus sp.						x
Lilaceae						
Yucca sp.				x		
Yucca baccata				x	x	x
Pinaceae						
Picea pungens					x	
Pinus sp.	x	x	x	x	x	x
P. edulis	x	x	x	x	x	x
P. ponderosa	x	x	x	x		x
Pseudotsuga menziesii	x	x				
Portulacaceae						
Portulaca sp.		x				x
Rosaceae	x	x	x			x
Amelanchier sp.						x
Cercocarpus sp.		x		x		x
Peraphyllum ramosissimum						x
Purshia tridentata						x
Salicaceae	x	x				
Populus sp.		x	x		x	x
Populus angustifolia						x
Scrophulariaceae						x
Solanaceae						
Nicotiana attenuata	x					x
Physalis sp.						x
Typhaceae						
Typha sp.						x

The results of macrobotanical analysis are presented in tables F.1 through F.11. The taxa identified for each element and for proveniences that were not assignable to an element are listed in table F.1. Results of analysis of vegetal remains and bulk soil samples are combined in this table. Tables F.2 through F.11 provide more detailed descriptions of the remains identified from each study unit within an element and are separated into bulk soil and vegetal remains categories.

Before discussing the results of analysis, several factors that have created problems in interpreting the macrobotanical assemblage should be presented. Contamination of a macrobotanical assemblage can easily bias interpretations. Awareness of pedoturbative processes and excavation techniques has led some analysts (cf. Keepax 1977; Minnis 1981) to view noncharred botanical remains from open-air sites as probable contaminants that are not directly associated with the prehistoric occupation of a site. However, due to the preservation potential of the situation, noncharred remains in a cave shelter cannot be as easily categorized as contaminants. Therefore, one could categorically assume that all botanical remains recovered from a shelter were associated with the prehistoric occupation unless they were obviously modern (e.g., introduced genera) or were from obviously disturbed areas of the site (e.g., rodent burrows). The contemporary vegetation associated with the site, the provenience of the remains, and the condition of the associated remains must be considered when identifying potential contaminants.

As tables F.2 through F.11 illustrate, both charred and noncharred macrobotanical remains were recovered from LeMoc Shelter. Except for the Citrus sp. seeds from disturbed deposits in Area 3 (table F.11), the cultigens are not considered to be contaminants regardless of condition or provenience, because cultigens are dependent upon human manipulation. It

Table F.2 Bulk soil sample results, Element 1, LeMoc Shelter

Family Genus species Plant part	Pithouse 2, Floor 1								
	BS 262	BS 256	BS 257	BS 260*	BS 261†	BS 265	BS 266	BS 289§	BS 293**
Anacardiaceae *Rhus aromatica* seed									
Cactaceae spine									
Chenopodiaceae *Chenopodium* sp. fruit									
"Cheno-am" fruit									
Compositae fruit									
Cruciferae *Descurainia* sp. seed									
Cuppressaceae *Juniperus* sp. wood *J. osteosperma* scale *J. scopulorum* scale	<1g/C			<1g/C	<.1g/C				
Fagaceae *Quercus gambelii* wood	<.1g/C				<1g/C				
Gramineae fruit *Zea mays* cupule	1/C	x/C		x/C	1/C	x/C			
Pinaceae *Pinus* sp. bark wood *Pinus edulis* fascicle needle wood *Pinus ponderosa* needle wood *Pseudotsuga menziesii* needle	<1g/C 2.1g/C	<1g/C	1/C	<1g/C <1g/C <1g/C	<1g/C <1g/C <1g/C	<.1g/C			
Rosaceae wood					<1g/C				
Salicaceae wood					<1g/C				
Solanaceae *Nicotiana attenuata* seed	1/N			1/N	13/N				
Dicotyledoneae bark leaf wood	x/N		<1g/C						<1g/C
Gymnospermae branch wood	<1g/C		<1g/C		<1g/C	<1g/C	<1g/C	<1g/C	<1g/C

* Sample 250 taken from Pithouse 2, Floor 1, at the open end of trough metate (PL 151).
† Sample 261 taken from Pithouse 2, Floor 1, beneath trough metate (PL 151).
§ Sample 289 taken from Pithouse 2, Floor 1, in association with (south of) Feature 88 (hearth).
** Sample 293 taken from Pithouse 2, Floor 1, in association with (east of) Feature 88 (hearth).

NOTE: #/ - Number present.
g/ - Weight in grams.
x/ - Seed fragments present; no count possible.
/N - Noncharred.
/C - Charred.
frg - Fragment.
BS - Bulk soil sample.
F - Feature.
PL - Point location.

Table F.2 Bulk soil sample results, Element 1, LeMoc Shelter--Continued

Family Genus species Plant part	Pithouse 2, features					
	F88 (hearth) Stratum 1 BS 281	F88 (hearth) Stratum 2 BS 282	F88 (hearth) Stratum 3 BS 283	F88 (hearth) Stratum 4 BS 284	Feature 96 (warming pit) BS 288	F88 (hearth) Level 2 Lower control sample BS 308
Anacardiaceae *Rhus aromatica* seed				frg/C		
Cactaceae spine	2/C					
Chenopodiaceae *Chenopodium* sp. fruit				1/C		
"Cheno-am" fruit	3/C			1/C		
Compositae fruit			1/C			
Cruciferae *Descurainia* sp. seed	47/C			21/C		
Cuppressaceae *Juniperus* sp. wood *J. osteosperma* scale *J. scopulorum* scale	<.1g/C +5/C +5/C			4/C	+5/C	
Fagaceae *Quercus gambelii* wood	<1g/C	<1g/C	<1g/C	<1g/C	<1g/C	
Gramineae fruit *Zea mays* cupule	frg/C 1/C		7/C			
Pinaceae *Pinus* sp. bark wood *Pinus edulis* fesicle needle wood *Pinus ponderosa* needle wood *Pseudotsuga menziesii* needle	<1g/C 1.6g/C x/C <1g/C x/C <1g/C frg/C	<1g/C <1g/C x/C x/C <1g/C	<1g/C <1g/C x/C x/C	<1g/C <1g/C 3/C x/C x/C <1g/C	<1g/C	<.1g/C
Rosaceae wood	<1g/C				<1g/C	
Salicaceae wood		<.1g/C				
Solanaceae *Nicotiana attenuata* seed						
Dicotyledoneae bark seed wood	<1g/C 1/C <1g/C	<1g/C		2/C	1/C	
Gymnospermae branch wood		1.9g/N			<1g/C	<1g/C

Table F.3 Vegetal remains, Element 1, LeMoc Shelter

Family Genus species Plant part	Stratum I-3	Pithse 2 Floor 1	1 x 1 m grid 10S/13E Stratum I-4	2 x 2 m grid 10S/14E Stratum I-4
Gramineae *Zea mays* cupule inflorescence (cob)	 1/C 2frg/C			
Pinaceae *Pinus* sp. wood			<1g/C	
Dicotyledoneae rachis bark		frg/N		<1g/N

NOTE: #/ - Number present.
g/ - Weight in grams.
/N - Noncharred.
/C - Charred.
frg - fragment.
Pithse - Pithouse.

Table F.4 Bulk soil sample results, Element 2, LeMoc Shelter

Family Genus species Plant part	Room 12			Pithouse 1				
	Floor 1 (south of FBO) BS 221	Floor 1 (north of FBO) BS 223	FBO (hearth) BS 225	Floor 1 BS 111	UC BS 124	Floor 1 BS 112	Floor 1 BS 114	Floor 1 BS 126
Amaranthaceae								
Amaranthus sp.								
seed				1/C			3/C	
Chenopodiaceae								
Chenopodium sp.								
fruit						1/C		
"Cheno-am"								
fruit							4/C	
Compositae								
fruit								
Cyperaceae								
fruit								
Fagaceae								
Quercus gambelii								
wood	<.1g/C				<1g/C			
Gramineae								
fruit			1/C	3/C			6/C	
Zea mays								
cupule	x/C	2/C	7x/C		1/C	1/C		x/C
infior (cob)								1frg/C
kernel		1/C	<1g/C					
Phragmites sp.								
stem								
Leguminosae								
seed								
Pinaceae								
Pinus sp.								
bark	<1g/C	<1g/C	<1g/C					
wood		<1g/C	<1g/C	<1g/C		<1g/C	4.3g/C	<1g/C
Pinus edulis								
cone								
needle		x/C		x/C	1/C	x/C	x/C	
wood	<1g/C	<1g/C			<1g/C		<1g/C	
Pinus ponderosa								
needle				x/C	1/C	1/C	x/C	1g/C
wood	<1g/C	<1g/C	<1g/C					
Pseudotsuga menziesii								
needle					1/C			
Portulacaceae								
Portulaca sp.								
seed								
Rosaceae								
wood			<.1g/C					
Cercocarpus sp.								
wood				1.2g/C			<1g/C	
Salicaceae								
wood			<1g/C	<1g/C		1g/C		
Populus sp.								
wood			<1g/C					
Dicotyledoneae								
bark	<1g/C							
seed		1/C	1/N					
wood	<1g/C				<1g/C			
Gymnospermae								
bark						<1g/C		
wood						<1g/C	<1g/C	<1g/C

NOTE:
- #/ - Number present.
- g/ - Weight in grams.
- x/ - Seed fragments present; no count possible.
- /N - Noncharred.
- /C - Charred.
- frg - Fragment.
- BS - Bulk soil sample.
- UC - Upper control sample.
- F - Feature.
- infior - Inflorescence.

Table F.4 Bulk soil sample results, Element 2, LeMoc Shelter--Continued

Family Genus species Plant part	Pithouse 1							
	Floor 1 BS 141	F72 (pit) BS 204	F74 (pit) BS 207	F49 (cist) BS 151	F46 (hearth) BS 148	F48 (ash pit) BS 150	F53 (sipapu) BS 154	F66 (collecting basin) BS 164
Amaranthaceae *Amaranthus* sp. seed	1/C				1/C			
Chenopodiaceae *Chenopodium* sp. fruit	1/C				1/C			
"Cheno-am" fruit								
Compositae fruit					1/C			
Cyperaceae fruit			1/C					
Fagaceae *Quercus gambelii* wood		<1g/C	<1g/C	<1g/C	<1g/C			
Gramineae fruit *Zea mays* cupule infior (cob) kernel *Phragmites* sp. stem		7/C		1/C <1g/C	1/C		1/C <1g/C	1/C
Leguminosae seed					1/C			
Pinaceae *Pinus* sp. bark wood *Pinus edulis* cone needle wood *Pinus ponderosa* needle wood *Pseudotsuga menziesii* needle	<1g/C <1g/C x/C <1g/C x/C 1/C		<1g/C 1/C	 frg/C x/C		<1g/C <1g/C x/C	<1g/C x/C	1/C 1/C
Portulacaceae *Portulaca* sp. seed								1/C
Rosaceae wood *Cercocarpus* sp. wood	<1g/C	<1g/C <1g/C				<1g/C		<1g/C
Salicaceae wood *Populus* sp. wood		1g/C	<1g/C					
Dicotyledoneae bark seed wood		<1g/C	1/C	1/C <1g/C	<1g/C	<1g/C	<1g/C	
Gymnospermae bark wood		<1g/C	<1g/C	<1g/C	<1g/C	<1g/C	<1g/C	<1g/C

Table F.5 Vegetal remains, Element 2, LeMoc Shelter

Family Genus species Plant part	Pithouse 1			Occupation Area 1	
	Stratum II-2	Floor 1	Feature 64 (posthole)	F25(cist) Stratum 1	F25(cist) Stratum 3
Cactaceae					
Opuntia sp.					
seed		1/N			
Cuppressaceae					
Juniperus sp.					
bark				<1g/N	
Fagaceae					
Quercus gambelii					
fruit		1/N			
Pinaceae					
Pinus sp.					
bark	<1g/C				
Pinus edulis					
branch	4.9g/C				
needle	100x/C				
seed				X/N	2/N
Pinus ponderosa					
needle	100x/C				
wood			14.1g/P		
Salicaceae					
Populus sp.					
wood	57.1g/C	12.8g/C			

NOTE: #/ - Number present.
g/ - Weight in grams.
x/ - Seed fragments present; no count possible.
/N - Noncharred.
/C - Charred.
/P - Partially charred.
F - Feature.

Table F.6 Bulk soil sample results, Element 3, LeMoc Shelter

Family Genus species Plant part	Room 11		
	Floor 2 BS 210	Floor 2 BS 211	Feature 78 (hearth) BS 208
Gramineae			
Zea mays			
fruit	<1g/C		
cupule	x/C	6/C	2/C
Pinaceae			
Pinus sp.			
wood		<1g/C	<1g/C
Pinus edulis			
wood		<1g/C	
Dicotyledoneae			
wood			<1g/C
Gymnospermae			
wood	<1g/C	<1g/C	

NOTE: #/ - Number present.
g/ - Weight in grams.
x/ - Seed fragments present; no count possible.
/C - Charred.
BS - Bulk soil sample.

Table F.7 Vegetal remains, Element 3, LeMoc Shelter

Family Genus species Plant part	Pithouse 1 Stratum II-4	1 x 1 m grid 9S/11E Stratum I-8	1 x 1 m grid 10S/12E Stratum I-8
Fagaceae			
Quercus gambelii			
fruit		x/N	
wood	<1g/C		
Gramineae			
Zea mays			
inflorescence	6frg/C		
Pinaceae			
Pinus sp.			
wood	<1g/C		
Pinus edulis			
seed	1/N		
wood	9.6g/C		
Pinus ponderosa			
wood			4.3g/C
Rosaceae			
wood			<1g/C
Salicaceae			
Populus sp.			
wood	3g/N		

NOTE: #/ - Number present.
g/ - Weight in grams.
x/ - Seed fragments present; no count possible.
/C - Charred.
/N - Noncharred.
frg - Fragments.

Table F.8 Vegetal remains, Element 4, LeMoc Shelter

Family Genus species Plant part	Pithouse 1 Stratum II-5	Occupation Area 3		Pithse 2 Stratum I-10	1 x 1 m grid 9S/13E Stratum I-10
		Surface 1	Surface 1 PL 1		
Cucurbitaceae					
Cucurbita sp.					
seed				1/N	
Fagaceae					
Quercus gambelii					
fruit	x/N				x/N
wood	2g/C				
Liliaceae					
Yucca sp.					
leaf	x/C		w/N		
Yucca baccata					
leaf	x/C				
Pinaceae					
Pinus sp.					
bark	<1g/C				
wood	1.5g/C	<1g/C	<1g/C	3.5g/C	
Pinus edulis					
seed	1/N				2/N
wood	7g/C; 2.4g/N				
Pinus ponderosa					
wood	20g/C				
Rosaceae					
Cercocarpus sp.					
wood	1g/C				
Dicotyledoneae					
branch	2.3g/N				
Gymnospermae					
wood	<1g/c				

NOTE:
- #/ - Number present.
- g/ - Weight in grams.
- x/ - Seed fragments present; no count possible.
- /N - Noncharred.
- /C - Charred.
- w/ - Worked vegetal item.
- PL - Point location.
- Pithse - Pithouse.

Table F.9 Vegetal remains, Element 5, LeMoc Shelter

Family Genus species Plant part	Pithouse 1		Occupation Area 1	Pithouse 2 Stratum I-11
	Stratum II-6	Stratum I-11	Feature 166 (fireplace)	
Cucurbitaceae				
Cucurbita sp.				
seed				
Cuppressaceae				
Juniperus sp.				
wood	<1g/C			
Fagaceae				
Quercus gambelii				
cupule				19/N
fruit		1x/N		5/N
wood	<1g/C	1/N		
Gramineae				
Zea mays				
fruit	<1g/C			
Liliaceae				
Yucca baccata				
seed				
Pinaceae				
Picea pungens				
cone		1/N		
seed		2/N		
Pinus sp.				
wood	<1g/C			<1g/N
Pinus edulis				
branch	3.0g/N			
seed	x/N	4x/N		
wood	3.1g/C			
Salicaceae				
Populus sp.				
wood	<1g/C			
Dicotyledoneae				
leaf				x/N
bark			1.0g/N	

NOTE: #/ - Number present.
g/ - Weight in grams.
x/ - Seed fragments present; no count possible.
/N - Noncharred.
/C - Charred.

Table F.9 Vegetal remains, Element 5, LeMoc Shelter--Continued

Family Genus species Plant part	1 x 1 m grid 9S/16E Stratum II-6	1 x 1 m grid 9S/16E Stratum I-11
Cucurbitaceae *Cucurbita* sp. seed	1/N	
Cuppressaceae *Juniperus* sp. wood		
Fagaceae *Quercus gambelii* cupule fruit wood		
Gramineae *Zea mays* fruit		
Liliaceae *Yucca baccata* seed	8/N	
Pinaceae *Picea pungens* cone seed *Pinus* sp. wood *Pinus edulis* branch seed wood	x/N	x/N
Salicaceae *Populus* sp. wood		
Dicotyledoneae leaf bark		

Table F.10 Bulk soil sample results, unassigned contexts, LeMoc Shelter

Family Genus species Plant part	Room 4		Room 6	Pithouse 1
	F15 (pit) Stratum 1 BS 14	F15 (pit) Stratum 2 BS 15	F12 (hearth) BS 11	F35 (fireplace) BS 84
Amaranthaceae *Amaranthus* sp. seed	29/N	3/N		
Capparidaceae *Cleome serrulata* seed	2/N			
Chenopodiaceae *Chenopodium* sp. fruit	7/N		4/N	
"Cheno-am" fruit	6/N	2/N		
Compositae *Artemisia* sp. wood *Chrysothamnus* sp leaf wood *Helianthus annuus* fruit		X/N	4/N	<1g/C
Cruciferae *Descurainia* sp. seed	+500/N	+150/N	1/N	
Cuppressaceae *Juniperus* sp. bark scale *J. osteosperma* scale	<1g/N +1000/N,52/C	12/N	128/C 16/C,278/N	8/C
Cyperaceae achene				1/C
Fagaceae *Quercus gambelii* wood	<1g/N,<4g/C			
Gramineae fruit *Zea mays* cupule leaf	frg/N	X/N	2/N	

NOTE: #/ - Number present.
x/ - Seed fragments present; no count possible.
g/ - Weight in grams.
/N - Noncharred.
/C - Charred.
BS - Bulk soil sample.
F - Feature.

Table F.10 Bulk soil sample results, unassigned contexts LeMoc Shelter--Continued

Family Genus species Plant part	Room 4		Room 6	Pithouse 1
	F15 (pit) Stratum 1 BS 14	F15 (pit) Stratum 2 BS 15	F12 (hearth) BS 11	F35 (fireplace) BS 84
Pinaceae				
Pinus sp.				
bark	<1g/N			
stamen	1/N		<1g/C	10.2g/C
wood	1.5g/N			
Pinus edulis				
needle	3/N		1/C	X/C
seed	frg/N			
wood	<1g/N			
Pinus ponderosa				
branch	<1g/N			
needle	X/N	X/N	1/N	
Portulacaceae				
Portulaca sp.				
seed	11/N	12/N	1/C	
Rosaceae				
wood			<1g/C	
Cercocarpus sp.				
wood				<1g/C
Purshia tridentata				
leaf	1/N			
Salicaceae				
twig				<.1g/C
wood	<1g/N,<1g/C		<1g/C	<1g/C
Scrophulariaceae				
fruit	3/N			
Solanaceae				
Nicotiana attenuata				
seed	3/N	2/N		
Physalis sp.				
seed	11/N,1/C	9/N		
Dicotyledoneae				
spine	1/N			
leaf	X/N			
wood			<1g/C	
Gymnospermae				
bark			<1g/C	<1g/C
wood	<1g/N,<1g/C	<1g/C	<1g/C	<1g/C
Monocotyledoneae				
stem	<1g/N			

Table F.11 Vegetal remains, unassigned contexts, LeMoc Shelter*

Family Genus species Plant part	General site and Rooms 1-10	Pithse 1	Occ Area 1 & F129-131	Test trench 2 Stratum IV-1	Stratum IV-4	Stratum IV-5	Strat IV-6	Disturbed deposits	Deposits N of Rooms 7 and 8	RDA's and 1 x 1 m grids
Amaranthaceae										
Amaranthus sp.										
seed			3/N							
Cacteceae										
flower	1/N									
spine	1/N									
Opuntia sp.										
spine					1/N					
fruit			2/N							
stem	<1g/N,1.4g/P		38.2g/N		<1g/N			<1g/N		
Opuntia fragilis										
stem			22.5g/N							
Compositae										
Artemisia sp.										
bark	<1g/N									
wood										3.5g/N
Helianthus sp.										
fruit			1/N							
Cucurbitaceae										
pericarp								frg/N		x/N
Cucurbita sp.										
peduncle	1/N									
pericarp	x/N		x/N,x/C			frg/N		x/N		
seed	27/N,frg/P	frg/N	9/N,1/C					4/N		5N,frg/P
Cucurbita pepo										
peduncle										1/N
Cuppressaceae										
Juniperus sp.										
bark	1.8g/N		w/N,2.8g					<1g/N		w/N,6.0g/N
scale	1/C									
seed	2/N									
wood	<1g/N,7.8g/C, 22.2g/P	<1g/C	w/N	<1g/C			1.2g/C	<1g/N		
J. osteosperma										
seed	5/N		1/N					3/N		
Cyperaceae										
Scirpus sp.										
stem	<1g/N									
Equisetaceae										
Equisetum sp.										
stem	<1g/N		<1g/N							
Fagaceae										
Quercus gambelii										
cupule	7/N	21/N	3/N	6/N	6/N			2/N		12+x/N
fruit	57+x/N	2+x/N	18/N	x/N	2/N					
seed	x/N									
wood	24.6g/N, 2.5g/C		8.5g/N, 1g/C	<1g/C		<1g/C		w/N,<1g/N, <1g/C		w/N,5.4g/N, 8.0g/C
Gramineae										
leaves	x/N		<1g/N							x/N
stem	<1g/N		<1g/N					<1g/N		<1g/N
Phragmites sp.										
stem	3.2g/N		<1g/N, <1g/P, <1g/C					<1g/N	<1g/N	<1g/N
Zea mays										
cupule	4/N,3/C		12/N,17/C					11/N,9/C		2/N,5/C
fruit	2.8g/N,2.3g/C		1.1g/N, <1g/P, 4.4g/C					<1g/N, 1.3g/C		
inflor (cob)	107frg/N, 8frg/P, 59frg/C		58frg/N, 8frg/P, 88frg/C					w/N, 81frg/N, 1frg/P, 69frg/C		
infructescence										
leaf	1/N							2/N		frg/N
stem	<1g/P,<1g/N		<1g/N					<1g/N		

* Macrobotanical information was collapsed into gross study unit categories, if the deposits from which material was collected were disturbed.

NOTE:
- #/ - Number present.
- g/ - Weight in grams.
- x/ - Seed fragments present; no count possible.
- /N - Noncharred.
- /C - Charred.
- /P - Partly charred.
- w/ - with.
- frg - Fragment.
- RDA - Recently disturbance area.
- Pithse - Pithouse.
- Occ Area - Occupation area.
- Inflor - Inflorescence.
- Strat - Stratum.

Table F.11 Vegetal remains, unassigned contexts, LeMoc Shelter*--Continued

Family Genus species Plant part				Test trench 2						
	General site and Rooms 1-10	Pithse 1	Occ Area 1 & F129-131	Stratum IV-1	Stratum IV-4	Stratum IV-5	Strat IV-6	Disturbed deposits	Deposits N of Rooms 7 and 8	RDA's and 1 x 1 m grids
Leguminosae										
Phaseolus sp.										
cotyledon			6/C					1/N		
fruit			frg/N							
seed	1/N,1/C		1/C					8/N		
Liliaceae										
Yucca sp.										
stem					<1g/N					
fruit	1frg/N							1/C,1/N		
leaf	w/N,x/N		w/N,x/N					w/N,x/N		x/N,frg/N
leaf fiber	w/N		w/N					w/N		
seed	17/N				1/N			1/N		2/N
Yucca baccata										
leaf	w/N,4+x/N							x/N		w/N,x/C
pericarp	frg/C		frg/N							
seed	22/N,2/C		26/N					21/N		1/N
Pinaceae										
Pinus sp.										
bark	<1g/N							<1g/N		<1g/N,<1g/C
cone	frg/N		3/N					frg/N		
wood	<1g/N,2.0g/P 18.5g/C	<1g/C	<1g/N, 12g/P, <1g/C	1.1g/N, 257.6 g/P		<1g/N	1.1g/	21.1g/N, <1g/C		w/N,32.5g/NC 41.1g/P, <1g/C
Pinus edulis										
cone								1/N		
needle	x/N		4/N							
seed	50+x/N	10+x/N	44/N	frg/C				33+x/N		30+x/N,x/C
wood	w/N,40.1g/N, 4.6g/P, 12.9g/C			4.4g/C	<1g/N	<1g/N	5.9g/C	10.1g/N, 3.5g/P, 7.5g/C		7.3g/C
Pinus ponderosa										
bark	<1g/N	<1g/N	5.7g/N, <1g/P					324.3g		<1g/N
cone	5/N	1/N		frg/N, frg/P	1/N			frg/N		
seed	46/N			1/N				1/N		
wood	<1g/C		7.3g/N	198.1g/						4g/N
needle					1/N					6/N
Rosaceae										
wood	<1g/N		<1g/N							
Amelanchier sp.										
wood				<1g/C						
Cercocarpus sp.										
wood	16.4g/P									<1g/C
Peraphyllum ramosissimum										
wood	<1g/C									
Rutaceae										
Citrus sp.										
seed								2/N		
Salicaceae										
wood	<1g/N,<1g/C		w/N, 1.5g/N, <1g/P							
Populus sp.										
wood	w/N,11.8g/N, <1g/C						w/N			3.5g/N, 3.2g/C
Populus angustifolia										
bark	<1g/N									
Scophulariaceae										
fruit			1/N							
Typhaceae										
Typha sp.										
stem	<1g/N		<1g/N							
Dicotyledoneae										
bark	<1g/N		<1g/N, <1g/P		<1g/N			1.6g/N, 3.1g/C		2.5g/N
leaf	x/N			frg/N		x/N				
wood	w/N,1.8g/N, 4.3g/P, <1g/C						w/N			2.8g/N
Gymnospermae										
wood	101.0g/N		w/N, 7.6g/N, <1g/C	11.3g/C 22.6g/P	w/N	<1g/N		w/N, 3.6g/N 12g/P		5.5g/N
Monocotyledoneae										
indeterminate plant part									<1g/N	

is macrobotanical remains sucn as noncharred Chenopodium sp. fruits, Descurainia sp. seeds, or Pinus edulis and Quercus gambelii nuts and seeds that prove problematic. Most of the taxa recovered from LeMoc Shelter could have occurred close to the site prehistorically, and all of the taxa, except for Phragmites sp., occur on or close to the site at present. Therefore, it is possible that some of the noncharred material was brought into the site and was intermixed with the cultural strata after the site was abandoned.

Extensive human and faunal disturbance was noted at LeMoc Shelter. Approximately 63 percent of the proveniences from which vegetal remains were collected were identified as disturbed deposits (tables F.10 and F.11). Although some of the better-preserved macrobotanical remains were recovered from these deposits, the interpretative value of the noncharred remains is less than that of noncharred remains from undisturbed cultural deposits. The looter's spoil dirt deposits cannot be assigned to an element, which precludes using the macrobotanical information from these contexts on more than a general level.

If a particular taxon is recovered only in a charred condition, it is assumed to have been associated with the site occupation. If a taxon is represented in only a noncharred condition, it is considered suspect, unless it is a plant part that could have been used as a construction element or is a plant part that is consistently recovered from secure cultural proveniences. The recovery of both charred and noncharred remains, especially from the same deposit, enhances the cultural association of the noncharred remains, although disturbance factors still must be taken into account.

The bulk soil sampling design initiated in 1979 is based on a

vertical control system to aid in the recognition of contaminants within cultural deposits. If remains from a sample collected from above the cultural stratum (i.e., an "upper control" sample) are the same as those recovered from the cultural stratum itself, then it is assumed that some sort of contamination has occurred and very little can be stated about the macrobotanical remains from the cultural deposit. Since a similar control system has not been established for the collection of vegetal remains, interpretation of this class of macrobotanical material is dependent upon the factors already discussed.

Results

Tables F.2 through F.11 are organized by element and are subdivided into the major spatial units associated with each element. When priority bulk soil samples were selected for analysis, information permitting the correlation of secure proveniences with specific elements was not available; thus, some of the elements, e.g., Elements 4 and 5, are not represented by bulk soil analysis. As previously mentioned, because vegetal remains were arbitrarily collected, this class of materials is not equally represented in the macrobotanical assemblage.

Element 1

Macrobotanical remains from Element 1 proveniences were recovered from Pithouse 2 and from strata associated with Pithouse 2 (tables F.2 and F.3). It has been suggested that the occupants of the shelter during Element 1 were subsistence agriculturalists who occupied the shelter year-round. The macrobotanical assemblage does not reflect this dependence on agriculture, as the only evidence of domesticates are a few cupule and cob fragments of *Zea mays*. These fragments are from the floor

and central hearth (Feature 88) of Pithouse 2, as well as from a trash deposit associated with the occupation of the structure (Stratum I-4). It is difficult to assess the integrity of the corn remains from the floor of Pithouse 2 (bulk soil samples 256, 260, 261, and 265) because the upper control sample (sample 262), taken from the roof fall/postoccupation deposit above the floor samples, also contained a maize cupule. The paucity of domesticates from this element could be due to collection bias, poor preservation, or destruction during later occupations. In addition, the occupants during Element 1 might not have been dependent upon agriculture alone, but possibly relied more on a mixed agricultural/hunting-gathering subsistence strategy. This hypothesis is supported by the recovery of ruderal plant remains from Element 1 deposits. Three of the four bulk soil samples from the four strata within the central hearth of Pithouse 2 (samples 281, 283, and 284) yielded evidence for the probable use of Rhus aromatica, Chenopodium sp., Descurainia sp., Cactaceae, and Compositae. Although the occurrence of a single seed or fruit within a genus is not strong evidence for exploitation, the occurrence of 68 charred Descurainia sp. seeds from this feature does seem significant.

Macrobotanical materials were also recovered from a possible warming pit (Feature 96) in Pithouse 2 (sample 288). The botanical remains from this feature appear to have been used as fuel rather than having been associated with food processing activities.

The most frequently occurring taxa of wood recovered from Element 1 deposits are Quercus gambelii and Pinus sp. The other commonly identified woody plants are Juniperus sp., J. osteosperma, J. scopulorum, Pinus edulis, and P. ponderosa. The more ubiquitous occurrence of these genera

compared to other woody genera suggests that the Element 1 occupants of LeMoc Shelter preferred to use the pinyon-juniper woodland and ponderosa pine-oak forest vegetation zones to the riparian woodland or Douglas-fir/ mountain shrubland zones for the gathering of fuel and construction resources.

Element 2

For purposes of artifact analysis, Element 2 is defined to include Feature 25 in Occupation Area 1, and the floors, features, and associated strata of Pithouse 1 and Room 12. It is postulated in the site report that the number of people occupying the shelter increased and that an extended rather than a nuclear family occupied the site year-round. The occupants of the shelter are believed to have been subsistence agriculturalists.

In general, the macrobotanical assemblage from Element 2 (tables F.4 and F.5) does not differ greatly from that from Element 1; this suggests a similar interpretation of a mixed agricultural/hunting-gathering subsistence strategy. The only evidence of domesticates consists of fragments of *Zea mays* recovered from the floors and hearths of both structures. Once again, the paucity of domestics was surprising considering the year-round habitation of the site by agriculturalists. Possibly the cultigens would have been better represented had more trash deposits been sampled. The major difference in bulk soil contents between Elements 1 and 2 was the occurrence of two different genera of ruderal plants, *Amaranthus* sp. and *Portulaca* sp., and the absence of *Descurainia* sp. seeds in the Element 2 assemblage.

Of the wood remains recovered from Element 2 deposits, those of the Pinaceae family appear most frequently. The recovery of a variety of charred wood from the surfaces of the structures is indicative of use as

contruction material, and charcoal fragments from Features 46 and 80 (hearths) are considered representative of fuel resources. Although more wood plant remains from the Douglas-fir/mountain shrubland and riparian woodland vegetation zones were recovered from Element 2 proveniences than were recovered from Element 1 proveniences, it appears that the pinyon-juniper woodland and ponderosa pine-oak forest vegetation zones continued to provide the preferred fuel and construction resources.

Element 3

LeMoc Shelter is believed to have been seasonally occupied as an agricultural station during Element 3. As indicated in tables F.6 and F.7, only three bulk soil samples and a few vegetal remains were assigned to this element and a limited diversity of taxa are represented. Other than *Zea mays*, the fill of Feature 78, the central hearth in Room 11, did not yield evidence for possible food resources. The fragments of *Zea mays* from bulk soil samples collected from Floor 2 in Room 11 (samples 210 and 211) could be interpreted as general debris, evidence of a food processing area, or, since wood charcoal was intermixed, as part of roof fall debris inadvertantly collected with material from the floor.

The genera of wood charcoal recovered were less diverse than those found within deposits from Elements 1 and 2. Genera within the Pinaceae family predominate in the assemblage. The noncharred *Quercus gambelii* fruit fragments and the noncharred *Pinus edulis* seed are probably intrusive because they are noncharred and are favored food of rodents.

Elements 4 and 5

Elements 4 and 5 are the last prehistoric occupations recognized at LeMoc Shelter. Both elements are characterized as sporadic occupations, during which the shelter was used as a resource procurement base camp or short-term campsite. Vegetal remains associated with these two elements

were collected from stratigraphic units or use surfaces (tables F.8 and F.9). It should be noted that the cultural integrity of these proveniences is questionable due to disturbance of some of the deposits. No bulk soil samples collected from Element 4 and 5 contexts were analyzed.

Interestingly, it is from deposits associated with Elements 4 and 5 that a second domesticate type, squash (Cucurbita sp.), was recovered. It is surprising that the remains of neither squash nor beans (Phaseolus sp.) were recovered from the first three elements of occupation, as these earlier occupations were associated with agricultural activities. Although there is no reason why the occupants of the shelter during Elements 4 and 5 would not have used squash as a subsistence item, the remains that were recovered could also be refuse from the previous occupation intermixed with the later deposits.

Also, Yucca sp., Y. baccata, and Picea pungens occur for the first time in the Element 4 and 5 assemblages. Direct evidence for the use of yucca is provided by some noncharred yucca leaf matting on a use surface (Occupation Area 3; Element 4). The other taxa are similar to those found in the assemblages for the previous three elements.

Unassigned Contexts

The macrobotanical materials from deposits that were not assignable to a particular occupation period are listed in tables F.10 and F.11. The purpose of presenting this material is to illustrate the full range of diversity in the macrobotanical assemblage from LeMoc Shelter. Except for Rhus aromatica, Juniperus scopulorum, Picea pungens, and Pseudotsuga menziesii, all of the genera found within the five elements also occur in these mixed deposits, although a greater variety of plant parts and worked vegetal material were recovered from the mixed deposits.

Approximately 75 percent of the vegetal remains from the mixed deposits are noncharred. At LeMoc Shelter, the noncharred remains of cultigens or worked vegetal items are unquestionably associated with the prehistoric occupation of the site, but other types of noncharred remains are not as easily categorized. Some deposits contain potentially intrusive, noncharred genera mixed with charred or noncharred material, such as corn, that is believed to be associated with the prehistoric occupation. An extreme example is the vegetal material from the disturbed deposits; in these deposits, noncharred citrus seeds, obviously intrusive, were recovered with charred wood, cultigens, worked vegetal material, and noncharred oak fruit and juniper bark that may or may not have been introduced into the site after abandonment. Given the disturbed nature of the deposits from which the botanical remains were retrieved, and the lack of temporal assignment, it is considered impractical to attempt to isolate the contaminants from the culturally significant debris without inadvertantly biasing interpretations of subsistence resources and procurement strategies.

Discussion

Given the interpretation that LeMoc Shelter was occupied through time by a range of socioeconomic groups, i.e., subsistence agriculturalists and mobile resource procurement groups, one would expect significant differences in the macrobotanical assemblages from Elements 1, 2, and 3 compared to the assemblages from Elements 4 and 5. It would be expected that a greater variety of cultigens would occur more frequently and in greater quantities in the earlier occupations. The later two occupations would be characterized by a decrease in the frequency of cultigens and

possibly by an increase in the frequency of ruderal and/or wild plant resources. In reviewing the results of analysis, an obvious trend or change in the macrobotanical assemblage relevant to subsistence/ exploitation patterns is not apparent.

Two factors may have obscured exploitation patterning in the data. As mentioned before, bulk soil samples from deposits associated with Elements 4 and 5 were not analyzed. One purpose of bulk soil sampling is to recover small-scale remains such as the seeds and fruits of ruderal and/or wild plants, which may have been especially important to mobile procurement groups. Since bulk soil samples were not collected from Element 4 and 5 deposits, there is a bias in the data base. Also, the tremendous amount of disturbance to the site limited information retrieval and skewed interpretation of those remains that were recovered. Not only is a high percentage of the vegetal remains from looter's spoil dirt, but deposits associated with the later three elements, and especially Elements 4 and 5, are of questionable cultural significance due to disturbance. Therefore, if a particular genus or plant part was restricted to a specific element of occupation, the indication of cultural preference or specialized procurement strategy would probably be obscured. If the macrobotanical remains that were recovered from nonelement deposits could be assigned to the appropriate element, then a clearer picture of the subsistence regime for each element could be formulated. Because such assignments are not possible, exploitation patterns must be discussed in general terms.

It is assumed that the present-day vegetation zones that have been delineated around LeMoc Shelter (Bye 1982) existed in a fairly similar state during the prehistoric occupation of the site. Therefore, the ubiquitous occurrence of *Pinus* sp., *P. edulis*, *P. ponderosa*, and *Quercus*

gambelii in the macrobotanical assemblage indicates a preference for the pinyon-juniper woodland and ponderosa pine-oak forest vegetation zones, at least for fuel and construction resources. Also, many of the small remains recovered are representative of the understory vegetation within these zones: Chenopodium sp., Descurainia sp., Opuntia sp., and Yucca baccata. Plants from the upland Douglas-fir/mountain shrubland zone (e.g., Pseudotsuga menziesii, Picea pungens, Amelanchier sp., Cercocarpus sp., and Peraphyllum ramosissimum) and from the riparian woodland and Douglas-fir/mountain shrubland zones (e.g., Typha sp., Scirpus sp., Equisetum sp., Phragmites sp., Nicotiana attenuata, and Populus sp.) were recovered from LeMoc Shelter as well. However, as demonstrated in table F.11, most of the genera from these two zones were recovered from nonelement deposits; therefore, any indication of zone-specific exploitation patterns for any particular element are obscured. Nonetheless, since LeMoc Shelter is located in what is assumed to have been a rich biotic resource area, it was expected that a cross section of vegetation zones would be represented in the macrobotanical assemblage.

Remains of the three domesticates typically found in Anasazi sites (Zea mays, Cucurbita sp., Phaseolus sp.) were recovered from LeMoc Shelter, although only in Element 5 did any two cultigen types occur simultaneously. Considering that the occupants of the shelter during Elements 1, 2, and 3 are presumed to have been subsistence agriculturalists, it is unusual that remains of beans and squash were not recovered from these elements. Disturbance, preservation, and collection bias may be partially responsible for this discrepancy. Although arable land is located near the site, the agricultural potential of these soils has not been fully assessed. As Shuster (1981) has pointed out, however, cold

air drainage would have been the major limiting factor for agriculture in the valley bottom.

Given a nutritional need and probably a desire for a varied diet, the occupants of LeMoc Shelter hunted game and gathered ruderal and/or wild plant resources. It is evident from a review of the ethnobotanical literature for the Greater Southwest (cf. Castetter 1935; Castetter and Bell 1942; Elmore 1944; Harrington 1967; Niethammer 1974; Pennington 1963, 1969; Stevenson 1915; Whiting 1939) that all genera in the macrobotanical assemblage from LeMoc Shelter have some sort of economic use attributed to them, although not all are referred to as food resources. Some are cited as being used for construction, ceremonial, craft production, and medicinal purposes. Most of the small-scale remains recovered are from plants commonly used for their greens and/or fruiting parts: Amaranthus sp., Chenopodium sp., Descurainia sp., Cleome serrulata, Portulaca sp., and Yucca baccata. Other plants, such as Phragmites sp., Typha sp., Scirpus sp., and Yucca sp., are used for matting, basketry, or roofing. Wood charcoal may represent fuel resources or construction materials. Many genera of plants have several different economic parts; for example, Pinus edulis has been exploited for its wood, pitch, and nuts. Caution must be exercised when using ethnobotanical information to interpret macrobotanical assemblages. Preparation techniques affect the visibility of remains, and the part recovered is not necessarily the part that was used (Dennell 1976:232).

As previously mentioned, several factors have created problems in interpreting the macrobotanical remains from LeMoc Shelter, especially in distinguishing between the remains of plants that were used prehistorically and those that are intrusive. Most of the remains from the deposits

not assignable to an element are noncharred materials that were recovered from disturbed deposits and only rarely from cultural deposits with a high integrity. Some plant remains, such as Pinus edulis nuts, Quercus gambelii seeds, and cupules and seeds of Nicotiania attenuata, were recovered only in a noncharred condition; however, they were usually found in context with cnarred material. Although these noncharred remains cannot be totally discounted as contaminants, there is limited confidence in their direct prehistoric association. Some of the noncharred plant remains may represent ruderal varieties that thrived in the disturbed habitat of the site area and persisted after abandonment of the site, accidentally becoming incorporated into the site deposits. Others may represent plants that were never associated with the prehistoric occupations but were incorporated into the site through contemporary bioturbative processes. Of course, some of the noncharred remains may be directly indicative of prehistoric exploitation.

In summary, the macrobotanical assemblage from LeMoc Shelter shows that both cultivated and gathered plant resources were used, although the proportions used during each element cannot be assessed. It appears that the pinyon-juniper woodland and ponderosa pine-oak forest vegetation zones were preferred for resource exploitation, while other vegetation zones were of lesser importance. The problems with disturbance, collection bias, and preservation preclude describing subsistence patterns for each occupation period because these factors obscure patterning that may have at one time existed in the macrobotanical assemblage.

APPENDIX G

POLLEN REPORT FOR LEMOC SHELTER

by

Linda J. Scott

LeMoc Shelter (Site 5MT2151) is located on the north side of the Dolores River canyon in Grass Mesa Locality. Two pithouses, a 10-room roomblock, three individual surface structures, and various occupation areas were identified at the site. Five occupations, or elements, spanning the Sagehen, McPhee, and Sundial Phases were identified at LeMoc Shelter. The first two elements are believed to have been year-round habitations; the third, a field house; and the fourth and fifth, base camps for the procurement of local resources.

Of the 49 pollen samples collected at LeMoc Shelter, 20 of the highest priority samples were selected for analysis (table G.1). The taxa observed in these samples are listed in table G.2; the relative frequencies of the taxa are provided in table G.3. The large amount of disturbance (the result of recent pothunting) makes paleoenvironmental reconstruction very tenuous. Pollen samples known to be from undisturbed contexts will be noted individually in this discussion.

Sample 2 was taken from a posthole (Feature 21) in Room 10; this posthole contained a mixture of ash and sand. Because much of the floor of this room was fire reddened, the accumulation of the ash might have been coincidental. The pollen sample from this feature yielded a high percentage of arboreal pollen (53.5 percent), comprised primarily of pine pollen (33.3 percent). The nonarboreal pollen percentages from sample 2 are fairly low when compared with samples from sites in the Sagehen Flats area. The frequency of Gramineae pollen (13.1 percent) in sample 2, however, is much larger than that observed in other samples from LeMoc or from any other DAP site previously examined. No economic pollen types were noted in sample 2.

Table G.1 Pollen samples, LeMoc Shelter

Provenience	Comments	Sample No.	Pollen count
Element 1:			
Pithouse 2			
Fill	From possible paint-grinding stone (V)	30	198
Floor 1	East of hearth (Feature 88)(D)	33	100
Floor 1	Beneath inverted metate (PL 151) (J)	34	100
Floor 1	Associated surface at open end of metate (PL 151)(A)	35	98
Floor 1	Associated surface east of metate (PL 152)(D)	36	100
Floor 1	Associated surface between the two metates (PL 151 and PL 152)(D)	38	100
Floor 1	Associated surface north of metate (PL 152)(B)	39	204
Floor 1	Under canine skull, behind west wingwall (Y)	40	72
Feature 88 (hearth)	Stratum 1, north half (F)	41	188
Feature 88	Stratum 3, north half (F)	42	103
Feature 88	Stratum 4, north half (F)	43	201
Feature 96 (warming pit)	Inside wall (W)	44	I
Feature 100 (pit)	(F)	46	I
Element 2:			
Pithouse 1			
Floor 1	(S)	6	I
Feature 72 (pit)	Sample taken from two gray ware bowl sherds (vessel 15)(F)	11	I
Element 3:			
Room 11			
Feature 81 (pit)	Southeast 1/4 of pit (F)	19	103

NOTE: I - Insufficient pollen for analysis.
A - Feature-associated sample from floor south of feature.
B - Feature-associated sample from floor west of feature.
D - Feature-associated sample from floor east of feature.
F - Sample from feature fill.
J - Sample from beneath metate.
S - Sample scraped from floor or bottom of feature.
V - Sample from artifact surface.
W - Sample from feature wall.
Y - Sample from beneath cranium.

Table G.1 Pollen samples, LeMoc Shelter--Continued

Provenience	Comments	Sample No.	Pollen count
Element 5:			
Pithouse 1			
Fill	Pollen wash from corrugated jar (vessel 8)(V)	48	221
Fill	Fill from corrugated jar (vessel 8)(V)	49	104
Unassigned contexts:			
Room 10			
Feature 21 (posthole)	(F)	2	99
Room 6			
Floor 1	Floor plaster (S)	5	200

Table G.2 Pollen taxa observed at LeMoc Shelter

Scientific name	Common name
Arboreal pollen:	
Abies	Fir
Alnus	Alder
Juniperus	Juniper
Picea	Spruce
Pinus	Pine
Quercus	Oak
Salix	Willow
Nonarboreal pollen:	
Chenopodiaceae and *Amaranthus*	Cheno-am; pigweed and members of the goosefoot family
Cleome	Beeweed
Artemisia	Sagebrush
Low-spine Compositae	Members of the sunflower family that include ragweed, burweed, etc.
High-spine Compositae	Members of the sunflower family that include sunflower, aster, daisy, rabbitbrush, snakeweed, etc.
Liguliflorae	Members of the sunflower family that include dandelion, false dandelion, lettuce, etc.
Cruciferae	Mustard family
Cyperaceae	Sedge family
Ephedra nevadensis-type	Mormon tea including Nevada ephedra, green ephedra, etc.
Gramineae	Grass family
Liliaceae	Lily family
Sphaeralcea	Globemallow
Onagraceae	Evening primrose family
Cactaceae	Cactus family
Eriogonum	Buckwheat
Polygonum sawatchense-type	Sawatch knotweed
Rosaceae	Rose family
Umbelliferae	Parsley or carrot family
Cucurbita	Gourd, squash
Zea mays	Maize; corn

Table G.3 Results of analysis of selected pollen samples, LeMoc Shelter

Taxon	Sample No.							
	2		5		19		30	
	N	%	N	%	N	%	N	%
Arboreal pollen:								
Abies								
Alnus	1	1.0						
Juniperus	10	10.1	16	8.0	5	4.9	18	9.1
Picea								
Pinus	33	33.3	24	12.0	46	44.7	98	49.5
Quercus	9	9.1			3	2.9	6	3.0
Salix							1	0.5
Nonarboreal pollen:								
Cheno-am	5	5.1	84	42.0	7	6.8	16	8.1
Cleome			1	0.5	7	6.8	7	3.5
Artemisia	17	17.2	17	8.5	9	8.7	17	8.6
Low-spine Compositae			3	1.5	1	1.0	4	2.0
High-spine Compositae	6	6.1	25	12.5	12	11.7	12	6.1
Liguliflorae			1	0.5				
Cruciferae								
Cyperaceae								
Ephedra nevadensis-type	1	1.0			2	1.9	1	0.5
Gramineae	13	13.1	1	0.5	2	1.9	2	1.0
Liliaceae								
Sphaeralcea							1	0.5
Onagraceae								
Cactaceae			1	0.5				
Eriogonum	1	1.0			1	1.0		
Polygonum sawatchense-type			1	0.5				
Rosaceae							1	0.5
Umbelliferae							2	1.0
Cucurbita								
Zea mays			1	0.5	1	1.0	5	2.5
Indeterminate								
Poorly preserved	3	3.0	25	12.5	7	6.8	7	3.5
Total pollen	99	100.0	200	100.0	103	100.0	98	100.0

NOTE: Only those samples that yielded adequate pollen counts are reported here.

Table G.3 Results of analysis of selected pollen samples, LeMoc Shelter--Continued

Taxon	Sample No.							
	33		34		35		36	
	N	%	N	%	N	%	N	%
Arboreal pollen:								
Abies								
Alnus								
Juniperus	2	2.0	5	5.0	4	4.1	2	2.0
Picea								
Pinus	27	27.0	7	7.0	56	57.1	51	51.0
Quercus	2	2.0	2	2.0	4	4.1	4	4.0
Salix								
Nonarboreal pollen:								
Cheno-am	31	31.0	50	50.0	8	8.2	18	18.0
Cleome			7	7.0	1	1.0	5	5.0
Artemisia	10	10.0	8	8.0	7	7.1	5	5.0
Low-spine Compositae	4	4.0	2	2.0	2	2.0	4	4.0
High-spine Compositae	8	8.0	5	5.0	3	3.1	3	3.0
Liguliflorae								
Cruciferae								
Cyperaceae								
Ephedra nevadensis-type	1	1.0						
Gramineae	3	3.0	1	1.0	2	2.0		
Liliaceae								
Sphaeralcea								
Onagraceae								
Cactaceae								
Eriogonum	1	1.0						
Polygonum sawatchense-type								
Rosaceae					2	2.0		
Umbelliferae					1	1.0		
Cucurbita								
Zea mays	3	3.0						
Indeterminate								
Poorly preserved	8	8.0	13	13.0	8	8.2	8	8.0
Total pollen	100	100.0	100	100.0	98	100.0	100	100.0

Table G.3 Results of analysis of selected pollen samples, LeMoc Shelter--Continued

Taxon	Sample No.							
	38		39		40		41	
	N	%	N	%	N	%	N	%
Arboreal pollen:								
Abies	1	1.0						
Alnus			1	0.5			2	1.1
Juniperus	3	3.0	20	9.8	8	8.0	2	1.1
Picea			1	0.5			1	0.5
Pinus	17	17.0	102	50.0	19	19.0	59	31.4
Quercus	2	2.0	16	7.8	2	2.0	7	3.7
Salix								
Nonarboreal pollen:								
Cheno-am	29	29.0	16	7.8	10	10.0	9	4.8
Cleome	11	11.0	5	2.5	29	29.0	1	0.5
Artemisia	12	12.0	15	7.4	6	6.0	14	7.4
Low-spine Compositae	3	3.0	6	2.9	2	2.0	3	1.6
High-spine Compositae	9	9.0	4	2.0	4	4.0	50	26.6
Liguliflorae							1	0.5
Cruciferae								
Cyperaceae								
Ephedra nevadensis-type			1	0.5	1	1.0	2	1.1
Gramineae					1	1.0	6	3.2
Liliaceae			2	1.0				
Sphaeralcea								
Onagraceae			1	0.5				
Cactaceae								
Eriogonum	1	1.0	2	1.0				
Polygonum sawatchense-type								
Rosaceae			1	0.5				
Umbelliferae							3	1.6
Cucurbita								
Zea mays			1	0.5	2	2.0	15	8.0
Indeterminate								
Poorly preserved	12	12.0	10	4.9	16	16.0	13	6.9
Total pollen	100	100.0	204	100.0	100	100.0	188	100.0

Table G.3 Results of analysis of selected pollen samples, LeMoc Shelter--Continued

Taxon	Sample No.							
	42		43		48		49	
	N	%	N	%	N	%	N	%
Arboreal pollen:								
Abies								
Alnus								
Juniperus			7	3.5	26	11.8	12	11.5
Picea								
Pinus	69	67.0	109	54.0	136	61.5	51	49.0
Quercus	1	1.0	3	1.5	19	8.6	21	20.2
Salix								
Nonarboreal pollen:								
Cheno-am	1	1.0	9	4.5	12	5.4	2	1.9
Cleome			11	5.4	1	0.5	1	1.0
Artemisia	8	7.8	11	5.4	7	3.2	2	1.9
Low-spine Compositae	2	1.9	8	4.0	5	2.3		
High-spine Compositae	6	5.8	3	1.5	8	3.6	2	1.9
Liguliflorae			1	0.5				
Cruciferae			1	0.5				
Cyperaceae			1	0.5				
Ephedra nevadensis-type			1	0.5				
Gramineae	1	1.0	6	3.0	4	1.8	6	5.8
Liliaceae								
Sphaeralcea								
Onagraceae								
Cactaceae								
Eriogonum					1	0.5		
Polygonum sawatchense-type								
Rosaceae			1	0.5			1	1.0
Umbelliferae			14	6.9				
Cucurbita			2	1.0				
Zea mays	6	5.8	8	4.0			2	1.9
Indeterminate								
Poorly preserved	9	8.7	6	3.0	2	0.9	4	3.8
Total pollen	103	100.0	202	100.0	221	100.0	104	100.0

Pollen sample 5 was taken from the floor plaster in Room 6. There is much less arboreal pollen in this sample than in sample 2; however, the cheno-am pollen frequency in sample 5 is 42.0 percent. Since the samples from this site generally contain very low frequencies of cheno-am pollen, it is less likely that its high frequency in this sample is the result of wind transport. Rather, the large amount of cheno-am pollen in sample 5 may indicate that vegetable materials were being stored or prepared. Small amounts of Cleome pollen (0.5 percent) and Zea pollen (0.5 percent) were also observed in this sample.

Pollen sample 19 was taken from a pit (Feature 81) in Room 11, which is one of three surface rooms that had not been disturbed by pothunter. This pollen sample has a high frequency of arboreal pollen (52.5 percent) consisting primarily of Pinus pollen. Sample 19 is very similar to sample 2 in terms of the frequencies of arboreal and nonarboreal pollen and in terms of the types of nonarboreal pollen noted. The primary difference between samples 2 and 19 is that the latter does not contain a large amount of Gramineae pollen. Also, Zea pollen comprises 1.0 percent and Cleome pollen 6.8 percent of sample 19. The presence of both Cleome and Zea pollen in this sample suggests that Feature 81 might have been used in the preparation of food for consumption or for storage.

Pollen sample 11 was taken from the interior of a partial ceramic bowl (vessel 15) found in a pit feature (Feature 72) in Pithouse 1. Although the amount of pollen recovered in this sample was insufficient for a complete analysis, the material was scanned in an effort to ascertain whether or not economic pollen was present in the sample. Evidence of both Cleome and Zea pollen was noted in this sample, although no frequency estimates were made.

Pollen samples 48 and 49 were taken from a large corrugated jar (vessel 8) found in the fill of Pithouse 1. Sample 48 consisted of a pollen wash from the interior surface of this vessel; sample 49 was taken from jar fill. Both samples yielded an extremely high frequency (81.9 percent and 80.7 percent, respectively) of arboreal pollen. Most of the nonarboreal pollen frequencies from these two samples are similar to one another, the exception being that Zea pollen makes up 1.9 percent of the pot fill sample, but is absent in the pot wash sample. The pollen evidence from samples 48 and 49 suggests that the vessel was not used in the preparation or serving of vegetal food containing pollen, since the only other economic pollen noted in the samples was Cleome pollen (0.5 percent in sample 48; 1.0 percent in sample 49). It is probable that most of the pollen observed in both the pot-fill and pollen-wash samples was derived from deposition after the site was abandoned.

The remainder of the analyzed pollen samples at LeMoc Shelter were taken from Pithouse 2. Pollen sample 30 was taken from a possible paint-grinding stone in the northwest corner of Pithouse 2. This sample yielded a relatively high frequency of arboreal pollen (62.1 percent), composed primarily of Pinus pollen. The nonarboreal pollen frequencies within this sample were very small. Possible economic pollen noted within this sample includes Cleome pollen (3.5 percent), Sphaeralcea pollen (0.5 percent), Umbelliferae pollen (1.0 percent), and Zea pollen (2.5 percent). The presence of economic pollen in this sample suggests that this portion of the pithouse might have been used for storing or preparing vegetal materials.

Pollen samples 33, 41, 42, and 43 are associated with the hearth (Feature 88) in Pithouse 2. Pollen sample 33 was taken from the pithouse

floor just east of the hearth, and pollen samples 41, 42, and 43 were taken from the first, third, and fourth strata of the hearth, respectively. Strata 1 and 3 apparently consist of sediments that were deposited by natural processes. Interpretations of samples 41 and 42 will be made based on the assumption that they represent postoccupational fill. However, the lowest stratum, represented by pollen sample 43, contains charcoal and ash directly associated with the use of the feature.

Sample 33 contains the smallest amount of arboreal pollen of any of the samples associated with the hearth. It does, however, exhibit a high frequency of cheno-am pollen (31.0 percent) and some Zea pollen (3.0 percent). The large amount of cheno-am pollen in this sample is probably of economic significance, as most of the samples from this site contain less than 10 percent cheno-am pollen.

Sample 43 was taken from the lowest stratum of the hearth fill, which contained charcoal and ash. This sample has a relatively high frequency of arboreal pollen, and it contains the only evidence of Cyperaceae pollen from this study. Zea pollen was noted as 4.0 percent, Cleome pollen as 5.5 percent, and Umbelliferae pollen as 7.0 percent of the total pollen. Several clumps of Umbelliferae pollen were noted in this sample, which would probably occur only if a flower (or whole plant) had been deposited in the hearth. The presence of Zea, Cleome, and Umbelliferae pollen in this sample may indicate that Zea, Cleome, and Umbelliferae were cooked in this hearth.

Pollen samples 41 and 42 from the upper fill of the hearth also contain evidence of economic pollen. Sample 42, from Stratum 3, directly above the charcoal and ash sample, contains more arboreal pollen than

sample 43. Zea pollen constitutes 5.8 percent of the total pollen from this sample. Sample 41, from the uppermost stratum, contains less arboreal poller than either of the other samples and also contains Cleome (0.5 percent), Umbelliferae (1.6 percent), and Zea (8.0 percent) pollen. The presence of the economic pollen types in these postoccupational deposits in the hearth is probably indicative of their presence in the soil that washed into the hearth after abandonment of the pithouse.

Pollen samples 34 through 39 were taken in association with two metates (PL's 151 and 152) in Pithouse 2. Sample 34 was taken from beneath the large, inverted metate (PL 151), and sample 35 was taken from the open end of the same metate. Sample 38 was taken from the associated surface between the two metates, and sample 39 was taken from the associated surface to the north of the smaller metate (PL 152).

Pollen sample 34 contains a relatively small amount of arboreal pollen. The frequency of cheno-am pollen (50.0 percent) is much higher than that observed in any of the other samples associated with the two metates. It also contains Cleome pollen (7.0 percent), but it did not yield Zea pollen. This metate may have been used to grind cheno-am and Cleome seeds.

Sample 35 was expected to yield pollen frequencies similar to those for sample 34 because vegetal remains processed on a metate might be expected to fall off the open end of the trough. The frequencies for these two samples, however, differ radically. Pollen sample 35, taken from the open end of the large metate (PL 151) contains a high frequency of arboreal pollen (65.3 percent), comprised primarily of Pinus pollen (57.1 percent). The frequency of cheno-am pollen in this sample is very low compared to that in the sample taken from beneath the inverted

metate. Furthermore, sample 35 contains 1.0 percent Cleome pollen, while this particular pollen type constitutes 7.0 percent of sample 34.

The pollen sample taken from the associated surface between the two metates (sample 38) more closely resembles the pollen sample taken from beneath the inverted metate. However, it does contain a slightly higher frequency of arboreal pollen and a smaller frequency of cheno-am pollen (29.0 percent) than does the sample beneath the inverted metate. Sample 38 also contains 11.0 percent Cleome pollen.

The two samples (samples 36 and 39) taken from the floor east and north of the smaller metate (PL 152) yielded high frequencies of arboreal pollen similar to that noted at the open end of the large metate. Again, most of the nonarboreal pollen frequencies are relatively low. Zea pollen was noted as only 0.5 percent of the pollen taken from the north of the smaller metate (sample 39). The samples taken from the open ends of the large metate and from the north and east of the smaller metate are very similar to other samples taken in this pitstructure and probably represent ambient pollen. Only samples 34 and 38 differ significantly from other pollen samples from this pitstructure. Pollen sample 34 contains large quantities of cheno-am pollen and a moderate amount of Cleome pollen, suggesting that both cheno-am and Cleome seeds might have been ground on the associated metate. This supposition is supported by the higher frequencies of cheno-am and Cleome pollen found in most of the samples associated with the metates.

Pollen sample 40 was taken from beneath a canine skull (PL 172) located behind the west wingwall in Pithouse 2. This pollen sample contains a relatively small amount of arboreal pollen and typical amounts of most of the nonarboreal pollen types. The only exception is the very

large frequency of Cleome pollen observed (29.0 percent). Zea pollen was also noted (2.8 percent). It is possible that the Cleome was used in association with the burial; however, it is more probable that the Cleome and Zea pollen were deposited in the area during food preparation or storage, making the association of these economic types with the canine remains incidental.

The pollen record from this site indicates that the prehistoric environment of LeMoc Shelter contained the following plants, some of which might have been exploited by the inhabitants of the shelter: Alnus, Juniperus, Pinus, Quercus, Salix, low-spined Compositae, Artemisia, high-spined Compositae, cheno-am, Cleome, Cruciferae, Cyperaceae, and Umbelliferae. Zea pollen is noted consistently in the samples from LeMoc Shelter in frequencies varying from 0.5 percent to 8.0 percent. In addition to the cultigen Zea, cheno-am, Cleome, and Umbelliferae pollen appear to have been used at the site. High frequencies of cheno-am pollen were noted in Room 6 and in the vicinity of two in situ metates. The concentration of cheno-am pollen in these locations is probably indicative of food preparation and possibly of storage of cheno-am at this site. The largest quantity of Cleome pollen was noted in the sample taken from beneath the canine cranium behind the west wingwall in Pithouse 2. In Pithouse 2, moderate amounts of Cleome pollen were noted in the lowest stratum of the hearth, under the large, overturned metate, between the two metates, and to the east of the smaller metate. A moderate amount of Cleome was also noted in the sample from Room 11. The presence of Cleome pollen in these contexts is probably indicative of the preparation or cooking of Cleome in each of the proveniences. Umbelliferae pollen was

noted in the sample from the lowest stratum of the hearth in Pithouse 2 and probably indicates that Umbelliferae was either cooked or prepared near the hearth.

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