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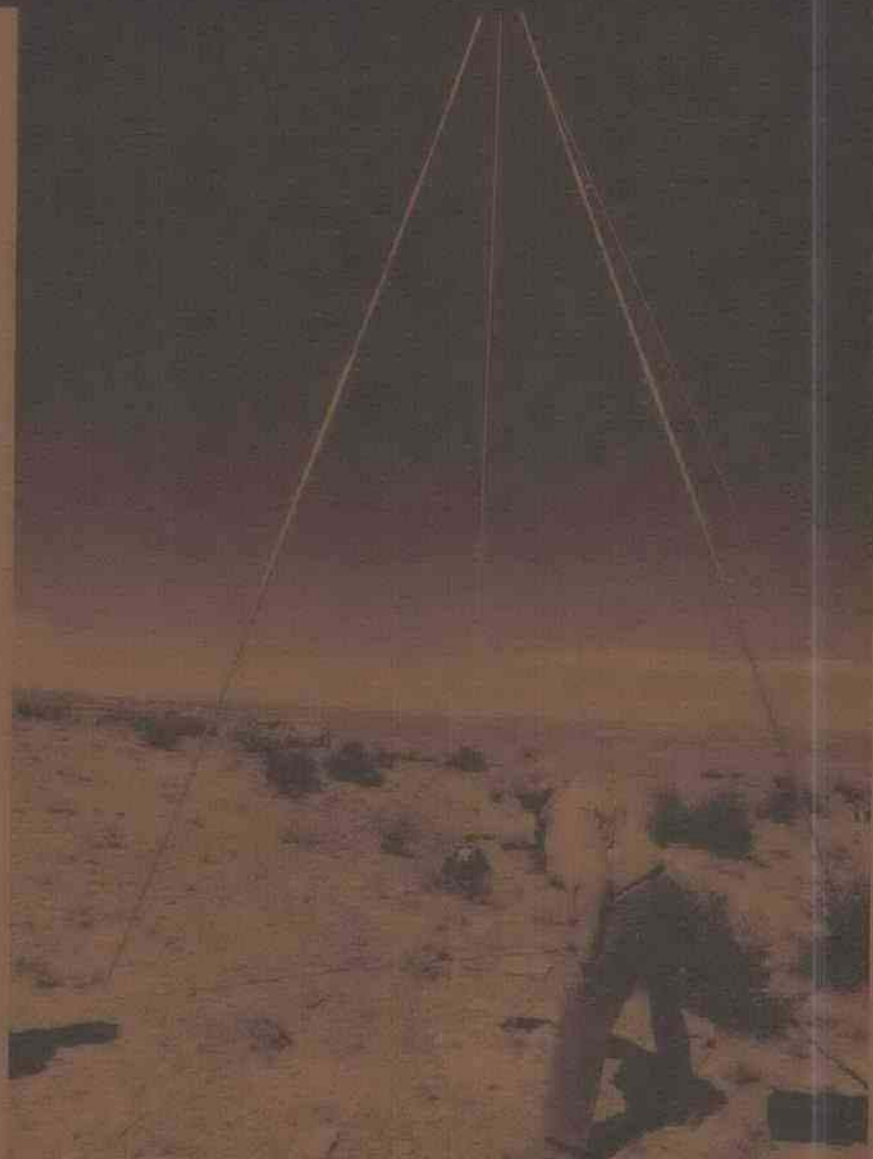

Excavations at 29SJ 633: The Eleventh Hour Site Chaco Canyon, New Mexico

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Excavations at 29SJ 633: The Eleventh Hour Site Chaco Canyon, New Mexico

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Reports of the Chaco Center
Number Ten

Excavations at 29SJ 633: The Eleventh Hour Site Chaco Canyon, New Mexico

edited by

Frances Joan Mathien

with contributions by

Peter J. McKenna
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BRANCH OF CULTURAL RESEARCH
U.S. Department of the Interior
National Park Service

Santa Fe, New Mexico
1991

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(Published as of 1991)

1. LYONS, THOMAS R., ED.

   1976 Remote Sensing Experiments in Cultural Resource Studies: Non-destructive Methods of Archeological Exploration, Survey and Analysis. Reports of the Chaco Center, No. 1. National Park Service and University of New Mexico, Albuquerque.

2. LYONS, THOMAS R., AND ROBERT K. HITCHCOCK, EDS.

   1977 Aerial Remote Sensing Techniques in Archeology. Reports of the Chaco Center, No. 2. National Park Service and University of New Mexico, Albuquerque.

3. POWERS, ROBERT P., WILLIAM B. GILLESPIE, AND STEPHEN H. LEKSON

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   1983 The Architecture and Dendrochronology of Chetro Ketl, Chaco Canyon, New Mexico. Reports of the Chaco Center, No. 6. Division of Cultural Research, National Park Service, Albuquerque.

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10. MATHIEN, FRANCES JOAN, ED.

1991 Excavations at 29SJ 633: The Eleventh Hour Site, Chaco Canyon, New Mexico. Reports of the Chaco Center, No. 10. Branch of Cultural Research, National Park Service, Santa Fe.

REPORTS OF THE CHACO CENTER

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In order to design and carry out intensive research on the prehistoric inhabitants of Chaco Canyon, New Mexico, the National Park Service and the University of New Mexico entered into a multidisciplinary research program. From 1971 through March 1986, this was housed on the university campus in Albuquerque. Effective April 1, 1986, the archeological staff moved to National Park Service facilities in Santa Fe; the collections and all their documentation (archival material) are curated at the Maxwell Museum of Anthropology in Albuquerque by curators from the National Park Service under an agreement between these two institutions.

Since its inception, participants in this project have worked under numerous managerial names; among them are Chaco Canyon Archeological Center (1969-1971), New Mexico Archeological Center (1971-1973), Chaco Center (1973-1976), Division of Cultural Research (1976-1985), and Branch of Cultural Research (1985-present). For the sake of clarity, the term "Chaco Project" will be used throughout this volume to encompass all work carried out during the entire period.

One of the most important contributions of the Chaco Project is dissemination of its research results to the professional community, the interested public, and Park Service managers and interpreters. Major reports of these results appear in either of two National Park Service series: Publications in Archeology or Reports of the Chaco Center. The latter was established in 1976 to provide economical and timely distribution of the more specialized research undertaken as part of the Chaco Project. This report is issued as the tenth of that series.

The National Park Service maintains an up-to-date listing of all published papers, reports, and monographs that include Chaco or Chaco-related research carried out under the general auspices of the Chaco Project, regardless of where they might be published. A list, entitled "Contributions of the Chaco Center," is available on request. Correspondence should be addressed to the General Editor, Branch of Cultural Research, National Park Service, P. O. Box 728, Santa Fe, NM 87504-0728.

FOREWORD

The 1978 investigations at 29SJ 633 represent the last site excavation initiated by the Chaco Project. Major goals fell into two categories: specific information desired on an early A.D. 1100s small site and tests of several remote sensing techniques. Marcia L. Truell (staff member of the Division of Cultural Research) and LouAnn Jacobson (staff member of the Division of Remote Sensing) worked together on the research design, remote sensing experiments, and excavation of one-and-a-half rooms, plus several tests, in the summer of 1978.

Research goals for the Chaco Project included investigations of the later Anasazi occupations in Chaco Canyon. Previously excavated sites around Casa Rinconada, an area where a number of sites dating up through the 1100s had been investigated during the 1930s and 1940s, lacked comprehensive reports even though the latest roomblocks currently visible to the researcher and visitor are illustrative of an 1100s occupation. Site 29SJ 633 in Marcia's Rincon was selected for excavation in order to better understand the early to mid 1100s time period as well as gain additional data in an area of the Chaco Culture National Historical Park that had been intensively explored through excavation of other Pueblo I through early Pueblo II sites by the Chaco Project staff. The presence of larger rooms and preplanned wall foundations at this site indicates similarities to Chaco Canyon greathouses that are not known for earlier small sites. Thus, the assumption of increased diversity in small site architecture through time is supported.

As in many projects, the unexpected materialized. Evidence for early Mesa Verde occupation that was found in the fill and on the upper floors at 29SJ 633 expanded the data base for that period and led to the restructuring of some of the concepts held about late Anasazi use of Chaco Canyon. This change in thought is discussed in Chapter 5 by Peter McKenna, and it provides the framework through which archeologists can view the results of the analyses of most of the material culture recovered from this site.

Several remote sensing techniques were evaluated for their nondestructive application to archeology. At the time, many investigators were beginning to use these methods, and the Chaco Project research at 29SJ 633 provided an opportunity for close cooperation between two divisions in the National Park Service. Among the techniques explored were seismic transects, magnetometer studies, bipod photography, and evaluation of aerial photographs to compile a vegetative cover map of the small area around this site in Marcia's Rincon.

Because more than a decade has passed since the initiation of this research, many of the remote sensing techniques have been more thoroughly evaluated by numerous investigators. Thus, the reader already knows much more about their usefulness than the staff did at that time. The remote sensing information included in this report, however, provides the necessary background for understanding the planning and excavation, as well as preparation of final reports, that included innovative research in Chaco Canyon at the time.

In addition, because this limited test at 29SJ 633 was the last one to be explored, the time remaining for many of the temporary staff archeologists was limited. Analysis of the various artifact types and write-up of the results had to take place within a very brief period.

Our commitment to publish the research results of the Chaco Project extends to the report on excavations at 29SJ 633. Unfortunately, more than 10 years have passed since the excavations at 29SJ 633, and the site excavators, Marcia L. Truell and LouAnn Jacobson, are no longer with the National Park Service. Currently, neither has sufficient time to complete this report. Consequently, the task of putting together the final version fell to the general editor, Dr. Joan Mathien, who has tried to maintain the initial goals, objectives, and interpretations of the site excavators by using the data and early reports of both. This report combines the efforts of many, yet represents Dr. Mathien's opinion, based on the field notes, maps, photographs, and other archival material compiled by the excavators. Excavation documentation is available through the National Park Service facility located at the University of New Mexico to anyone who wishes to review it.

In addition to the chapters included in this report, information on cultural remains from site 29SJ 633 appears in several other reports. Toll, Windes, and McKenna (1980) provide a discussion of late ceramics in Chaco Canyon; H. Toll (1984, 1985) discusses ceramics from small sites in relation to those from Pueblo Alto; and Toll and McKenna have prepared an overview of ceramics from all sites in Chaco Canyon, which will appear in a volume on the analysis of artifacts of Chaco Canyon in the near future. Akins (1984) noted temporal variation in faunal assemblages recovered in Chaco Canyon. Cameron (1984) and Cameron and Sappington (1984) discussed sources of chipped stone. Other overview reports that will appear in the artifact overview volume include chapters on chipped stone (Cameron 1982), chipped stone tools (Lekson 1985), abraders (Akins 1980), manos (Cameron 1985), axes and mauls (Breternitz 1976), metates (Schelberg n.d.), and ornaments (Mathien 1985). Human burial remains are included in the biocultural study of Chaco burials (Akins 1986). An overview of the macrobotanical remains (M. Toll 1985) includes information on site 29SJ 633. A brief summary of the architecture appears in McKenna (1986), and Truell (1986) places 29SJ 633 in the framework of small-site development in Chaco Canyon. A report on a magnetic survey (Bennett and Weymouth 1981) and results of eight transects of seismic data (Bandy 1980) appear elsewhere.

In summary, the data included in this site report add some new and interesting perspectives on the architectural similarities and differences between large and small house sites in Chaco Canyon at the end of the Bonito Phase. The report outlines some of the differences between the mid A.D. 1100s and the early A.D. 1200s (Mesa Verdean) occupations and is a valuable addition to our understanding of some of the changes in prehistoric adaptation in this area just before its abandonment by the Anasazi.

ACKNOWLEDGMENTS

Many people assisted with the excavations and tests at 29SJ 633. Some were members of the Chaco Project staff who were working at Pueblo Alto; others were Soil Conservation Service (SCS) or other volunteers. They are listed below.

Chaco Project Staff	SCS and Other Volunteers
Nancy J. Akins	Mary Benson
Cory D. Breternitz	Alice Billings
Robert Greenlee	Corrine Blouin
Stephen H. Lekson	Marty Brett
Peter J. McKenna	Thomas Chadderdon
B. Ratti	Carol Channing
John D. Schelberg	Diane Gelburd
Paul Tso	Sue Hueftle
H. Wolcott Toll	Michael Leon
Thomas C. Windes	Jo Moneghan
	Kate Sullivan
	Karen Wise

Special thanks go to Mollie S. Toll and Anne Cully who designed the grid sampling system for the collection of pollen and flotation remains and Mollie Toll who graciously analyzed material from the burned concentrations in Room 7. Anne Cully and Mollie Toll also compiled the vegetation map.

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RESEARCH ORIENTATION AT 29SJ 633

Chaco Canyon, located in the approximate center of the San Juan Basin of northwestern New Mexico (Figure 1.1), has been the focus of archeological research for nearly a century. Many large and small sites have been investigated. Figure 1.2 indicates the location of some of the large sites within and just outside Chaco Culture National Historical Park. Research carried out by the Chaco Project focused on the development of the Chaco Anasazi from the earliest appearance of man through the abandonment of the area. As a result, most of the sites excavated were the smaller ones. This report focuses on one such site that was built and used at the same time as the large pueblos.

Site 29SJ 633 is located in Marcia's Rincon on the south side of Chaco Canyon in an area across the Chaco Wash from the park's Visitors' Center and northwest of the confluence of the Chaco Wash and Fajada (Vincente) Wash (Figure 1.3). It is part of a larger settlement that shows continuity in use through time (Figure 1.4) (McKenna 1986; Windes 1978). The site consists of a 12-15-room Pueblo III house with three possible kivas, an earlier house offset to the west, and three trash areas located to the southeast, the south, and the southwest. A cist, possibly Navajo, was also found in the southwestern trash area (Figure 1.5).

Previous Research

Lloyd Pierson first recorded 29SJ 633 as Bc 187 during his archeological survey of Chaco Canyon in 1947 (Pierson's 1960 field cards in Chaco Archives). He described it as a Pueblo III roomblock. In 1972 the Chaco Project survey team assigned the Smithsonian's system number, 29SJ 633, to this site, which included a Pueblo I to early Pueblo II component downslope and west of the Pueblo III roomblock, and a Navajo hogan in this designation. This hogan was described as overlying what was designated Room 3 in the Pueblo III house; subsequently, it could not be relocated. Ceramic grab samples were collected during both surveys. In 1975 the Chaco Project staff returned to collect six intensive samples during the planning of the small site excavation program in Marcia's Rincon. In 1978, a joint investigation by the Division of Cultural Research and the Remote Sensing Division of the National Park Service (NPS) included limited exploration of this site. At that time, one-and-a-half rooms were excavated and several tests were placed in the Pueblo III roomblock; these indicated construction in the late A.D. 1000s-early 1100s and reoccupation in the early 1200s. Because this investigation was undertaken during the Chaco Project's last field season, it was named "the Eleventh Hour Site." The latest research carried out was in 1988 when Thomas Windes of the Chaco Project staff sampled the southwestern trash mound; material from it spans the A.D. 900s to mid 1000s occupation of this site.

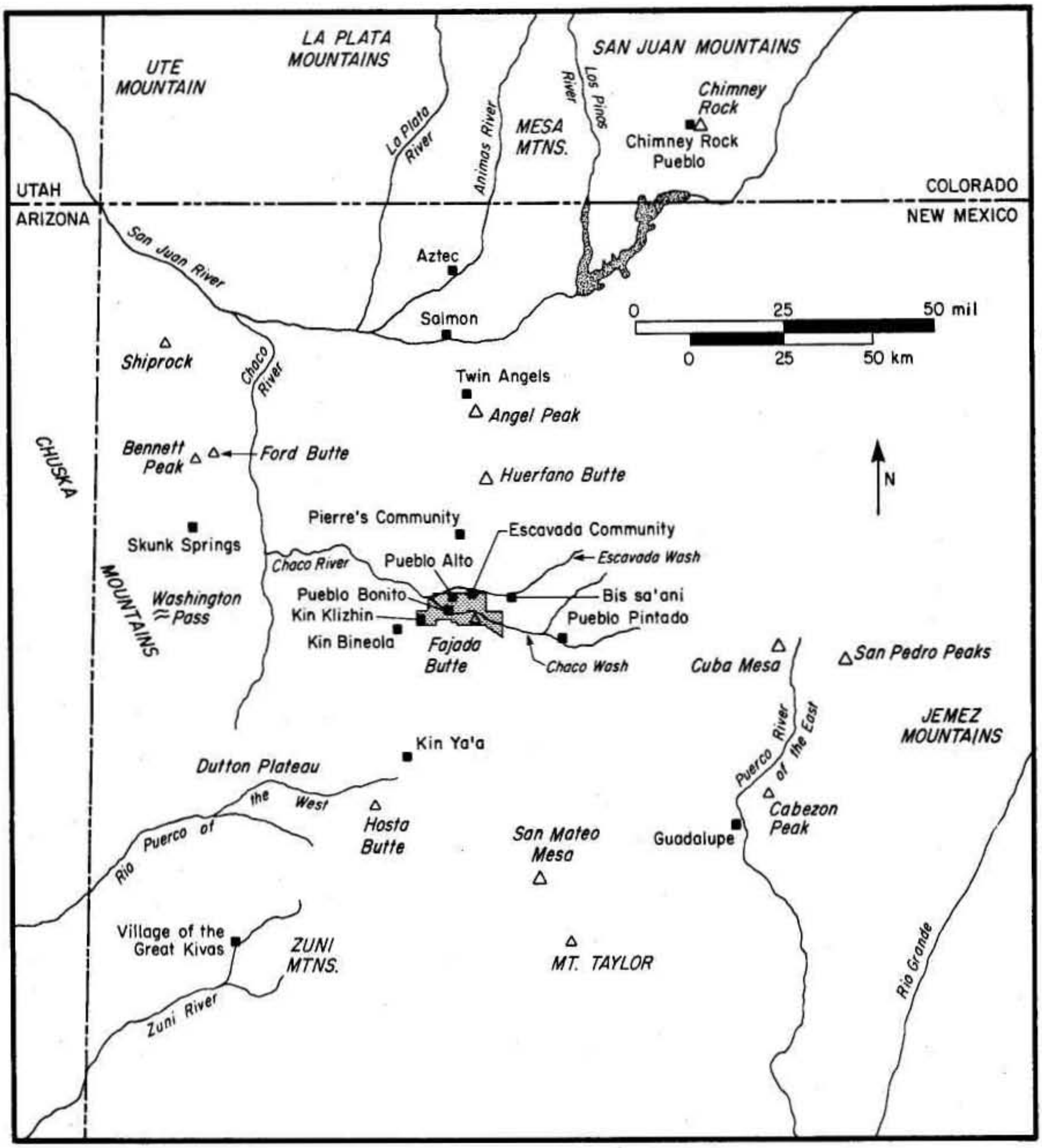


Figure 1.1. The central San Juan Basin and its immediate peripheries--Chaco Canyon is in the approximate center of the basin

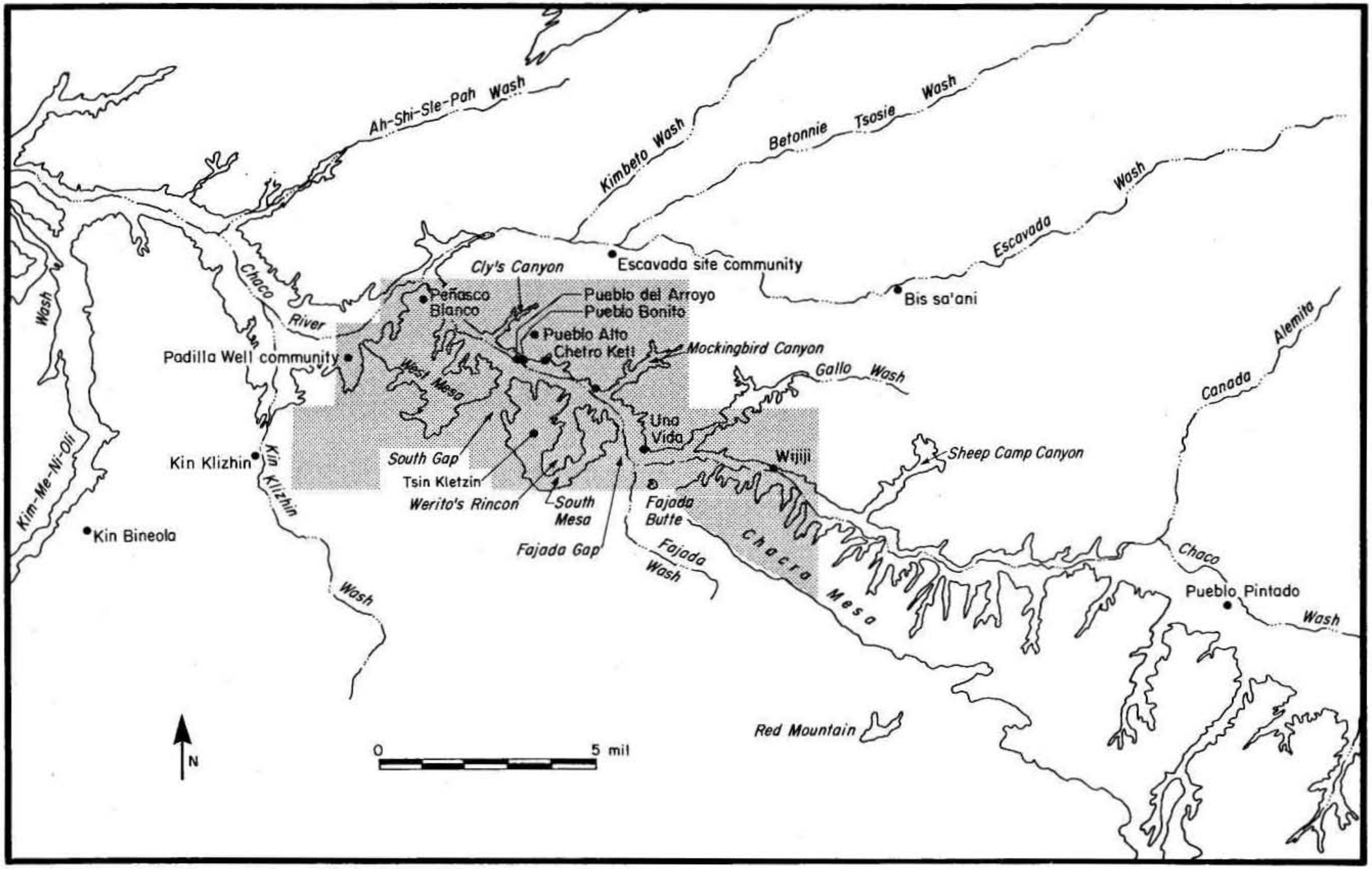


Figure 1.2. Chaco Canyon and the surrounding area--Chaco Culture National Historical Park is indicated by stippling

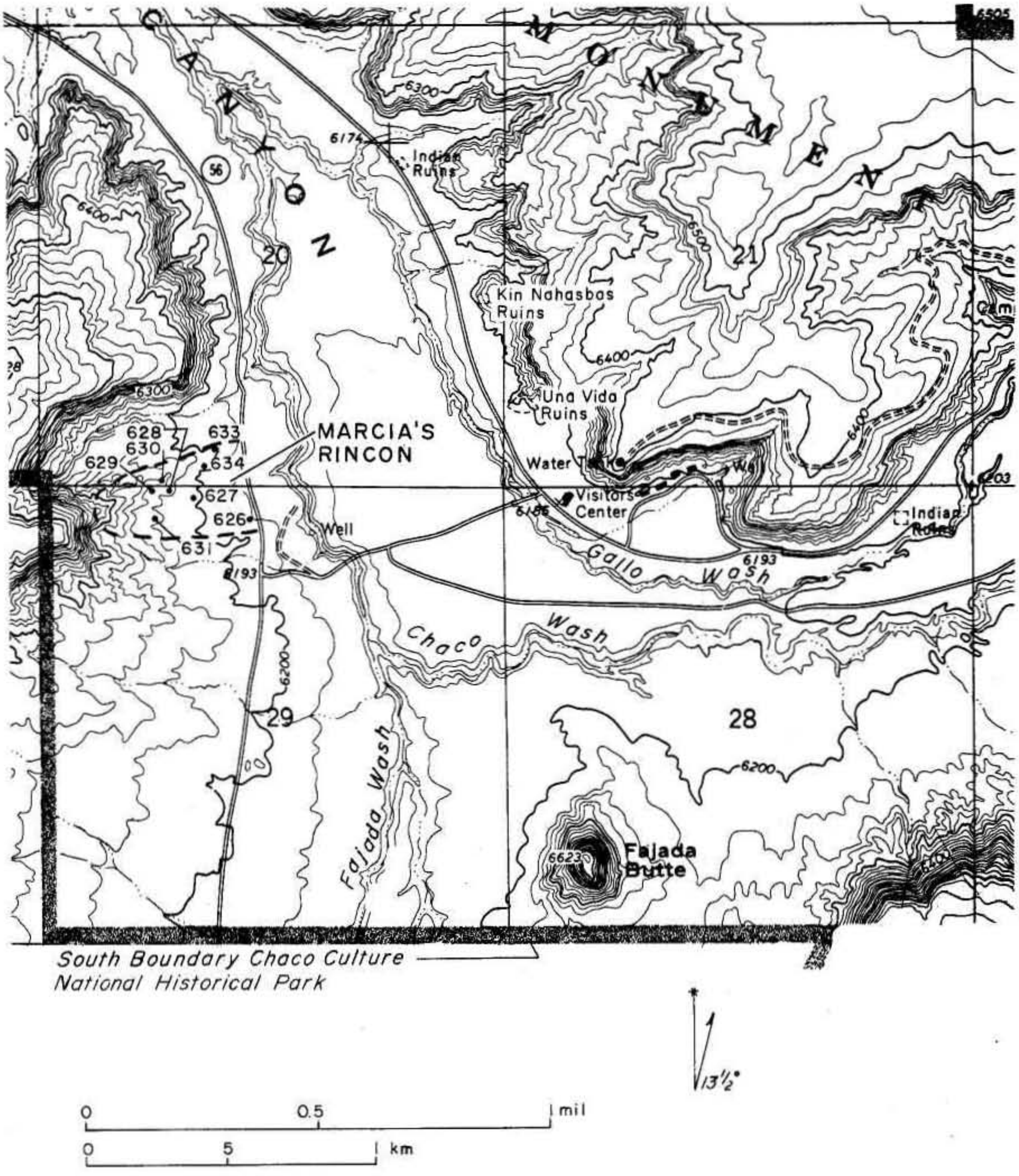


Figure 1.3. Location of Marcia's Rincon and site 29SJ 633

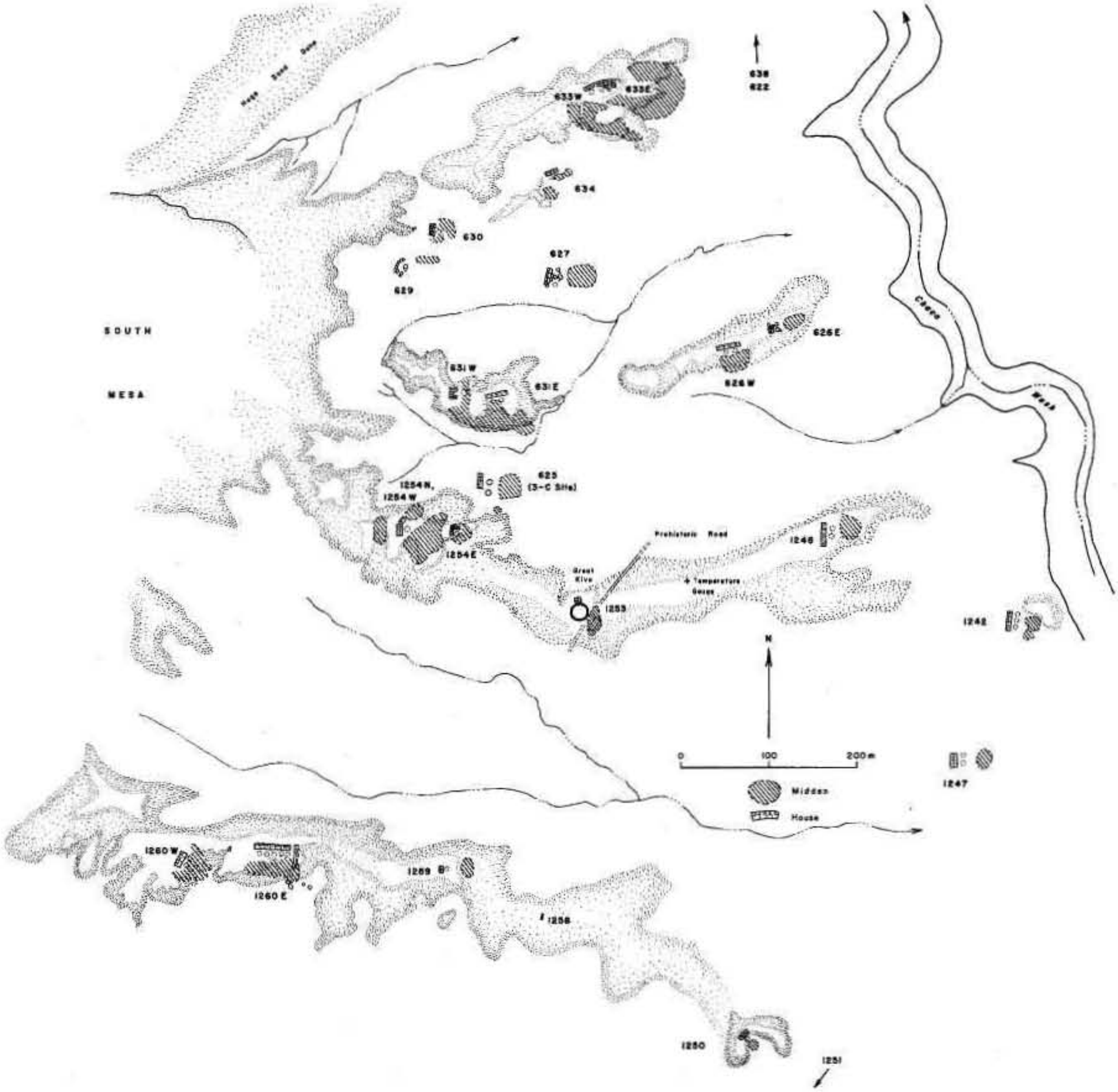


Figure 1.4. Small sites included in the Pueblo I-Pueblo III settlement in Marcia's Rincon

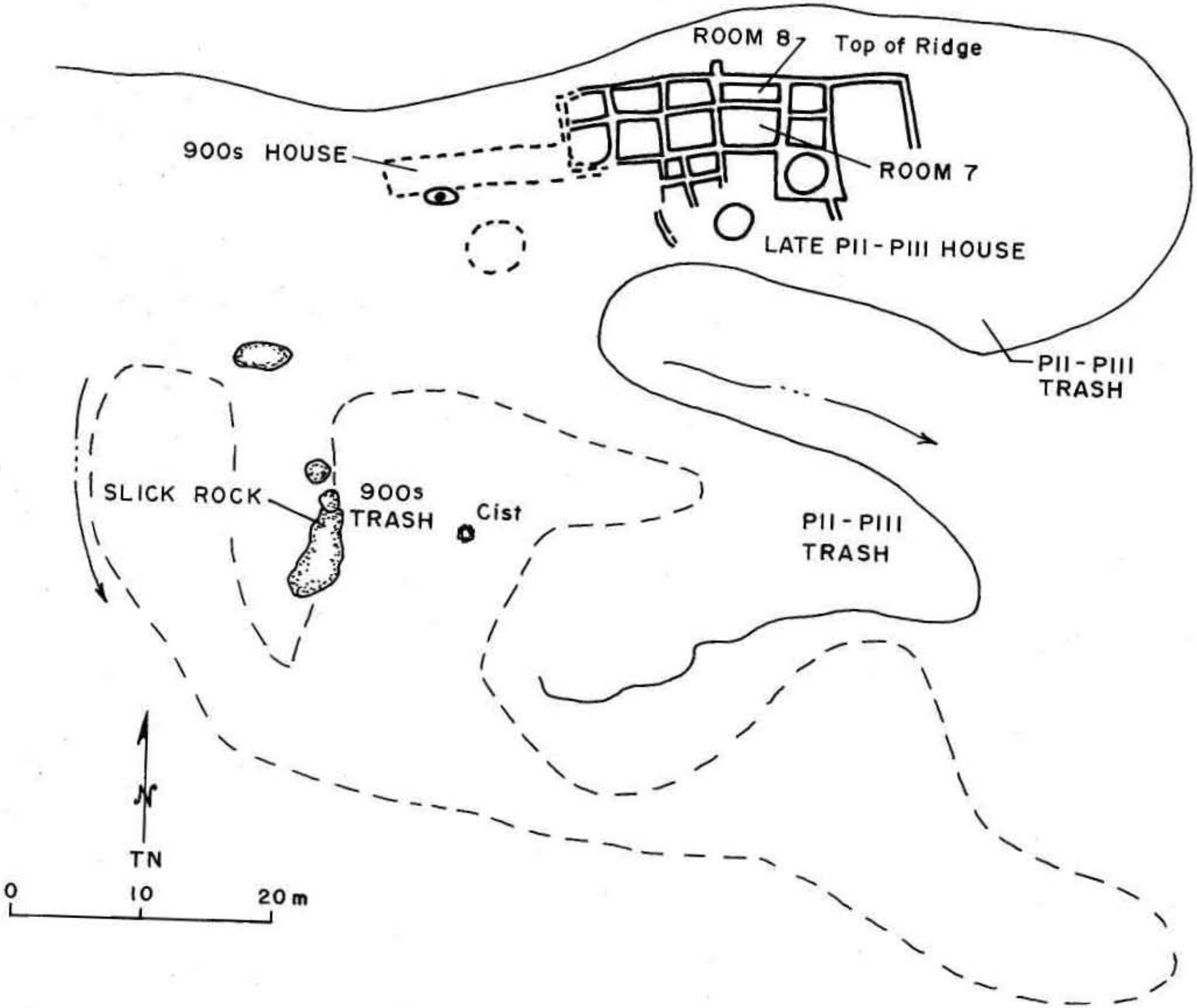


Figure 1.5. Map of 29SJ 633

Chaco Project Research Orientation

The Chaco Project examined small site development through time (Basketmaker III through Pueblo III) to study growth and change within and between small sites in three areas of Chaco Canyon (in Marcia's Rincon, at the mouth of Werito's Rincon, and north of the base of Fajada Gap) (Truell 1986:139) as well as between small sites and greathouses (Figure 1.6). Because of time constraints, excavations in two of these areas were curtailed before a sample that covered all periods could be investigated. Only in Marcia's Rincon has this approach been carried through; several sites that were excavated or tested (McKenna 1986) based on evidence obtained during a site survey include

- 29SJ 628—mid 600s-800s (Truell 1975);
- 29SJ 626--700s-900s (field notes);
- 29SJ 627—mid 800s-1100s (Truell 1980);
- 29SJ 629--mid 800s-1100s (Windes 1978);
- 29SJ 630—mid 1100s (field notes); and
- 29SJ 633--late 1000s-mid 1100s and late 1100s-early 1200s (this report.

Research Status—General Objectives in the Sampling of 29SJ 633

Selection of this site for restricted sampling was based on a need to fill a critical gap in our information on prehistoric small house construction during the period of large site expansion in the early to middle A.D. 1100s. The Chaco Project investigations disclosed much more formal complexity in small house form than had been apparent to previous Chaco Canyon researchers (Truell 1981; 1986:172-128, 140). Intersite diversity in small house spatial arrangement (layout and organization of intrasite use areas) appeared to increase gradually through time with periods of population expansion, particularly during the early to middle A.D. 1100s; this corresponded with a period of large site expansion (Lekson 1984:226; Truell 1986:309). Numerous small sites with periods of A.D. 1100s occupation had been excavated before the Chaco Project's involvement; a number of these were in the vicinity of Casa Rinconada where the University of New Mexico (UNM) and School of American Research field school sessions were conducted during the 1930s and 1940s (e.g., Brand et al. 1937; Dutton 1938; Kluckhohn and Reiter 1939). These showed some organizational differences not only between one another during contemporaneous use periods but from a number of the A.D. 500s through A.D. 1000s small sites that the Chaco Project had excavated. Formal diversity of small houses through time had been minimized and homogenized to compare and contrast them with large Chaco Canyon sites.

Carefully compiled records available to the Chaco Project staff on early to middle A.D. 1100s small house construction were limited. Questions addressed in this test of site 29SJ 633 were, first, would it repeat the spatial organization encountered in other small sites excavated in "Marcia's Rincon," which would indicate that this style of construction continued, or would it evidence marked, or any, changes?

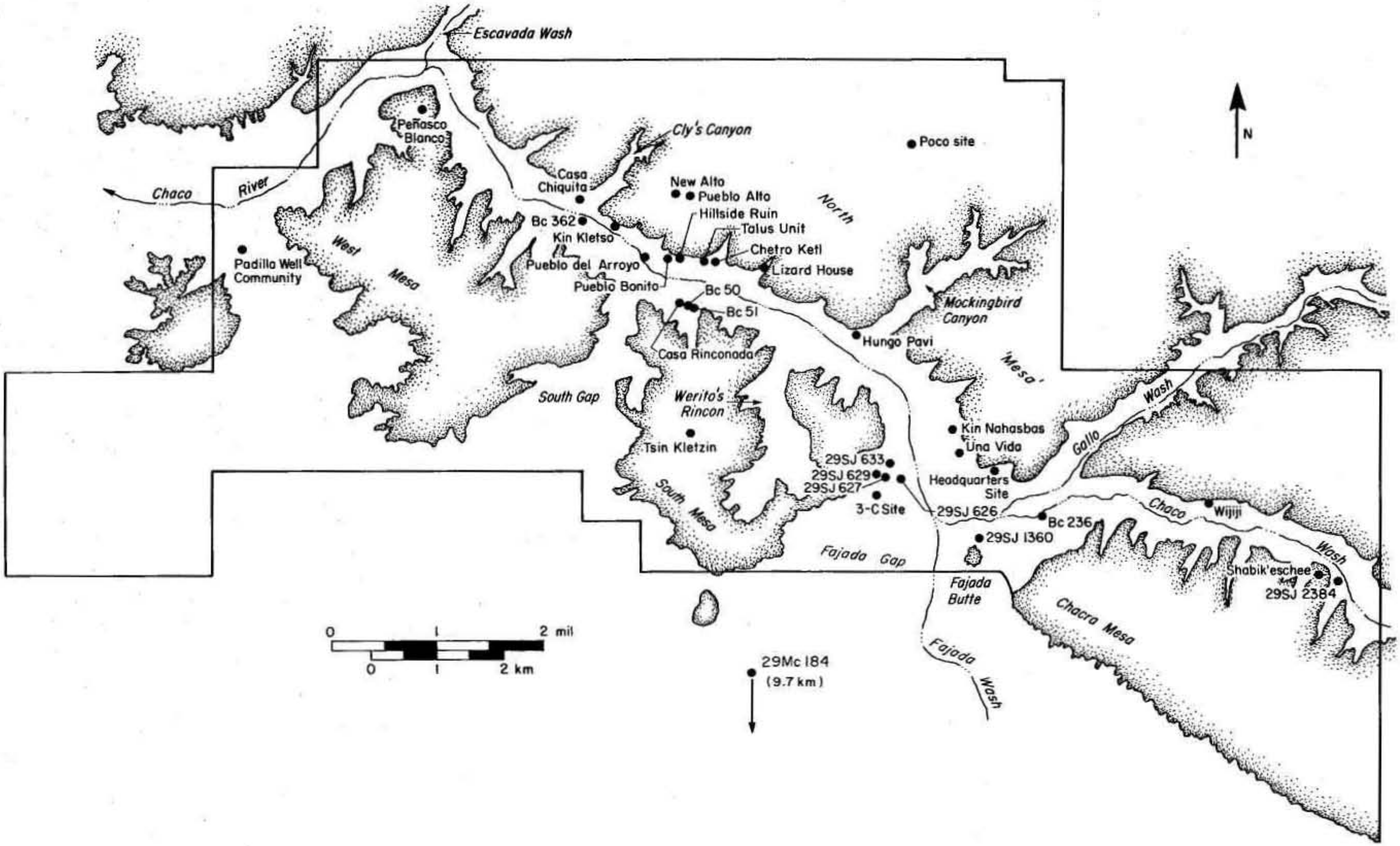


Figure 1.6. Map of Chaco Culture National Historical Park, which indicates the location of major landmarks, greathouses, and selected small house sites

Second, the degree to which large and small house interaction could be demonstrated on either a fixed or portable material cultural level had become important. Chaco Project personnel had started to recognize a continuum in small and large house structure and construction that argued for interaction rather than segregation. Was there a structural response in small houses that accompanied the A.D. 1100s large site expansion?

These questions were very important to even a preliminary understanding of Chaco Canyon prehistory, but very serious time constraints existed. The decision to test 29SJ 633 came very late in the course of the project, and the site was thus acrimoniously given the name "the Eleventh Hour Site." It became crucial to obtain well-dated proveniences in this limited test. To this end, the Remote Sensing Division was called upon to see what noninvasive techniques could be used to refine and speed decisions about testing locations. It was particularly important to locate burned adobe incorporated into the structure as firepits or floors suitable for archeomagnetic dating. These dates were also needed to refine our understanding of small site ceramic assemblages of this period, particularly in the late A.D. 1000s and early A.D. 1100s.

Selection of Excavation Sample

Specific objectives of the 1978 research were to excavate two datable rooms associated with the same room suite that were used, as nearly as possible, during the entire span of the roomblock occupation. The aim was to select one living and one storage room on the basis of our knowledge of small site structural organization in the rincon and in the canyon in general. A house of early A.D. 1100s period was the target (see above).

For the dating aspect, we enlisted the help of the Remote Sensing Division of the NPS. Proton magnetometer transects placed over the site generated a map locating magnetic anomalies that indicated potential burned areas (the following section and Appendices A and B). It was hoped that the burned areas, when excavated, would be cultural features such as hearths or burned floors.

One plaza-facing room and one non-plaza-facing room immediately north of the first, located in the central portion of the A.D. 1100s roomblock, were selected. In previously excavated small houses, the centrally located core group of rooms tended to be used for the longest period of time. Similarly, in our experience, plaza-facing rooms more frequently contained hearths or firepits, mealing areas, and small-volume storage facilities, indicative of their function as living rooms. In contrast, non-plaza-facing rooms located behind them frequently were featureless and were described as storage facilities, although sites of this period often have greater organizational diversity.

For these reasons, Room 7 and Room 8 (Figure 1.7) were selected. Both contained magnetic anomalies. Room 7 faced the plaza. Room 8, located directly north and, therefore, probably of the same room suite did not. The two were centrally located in the roomblock.

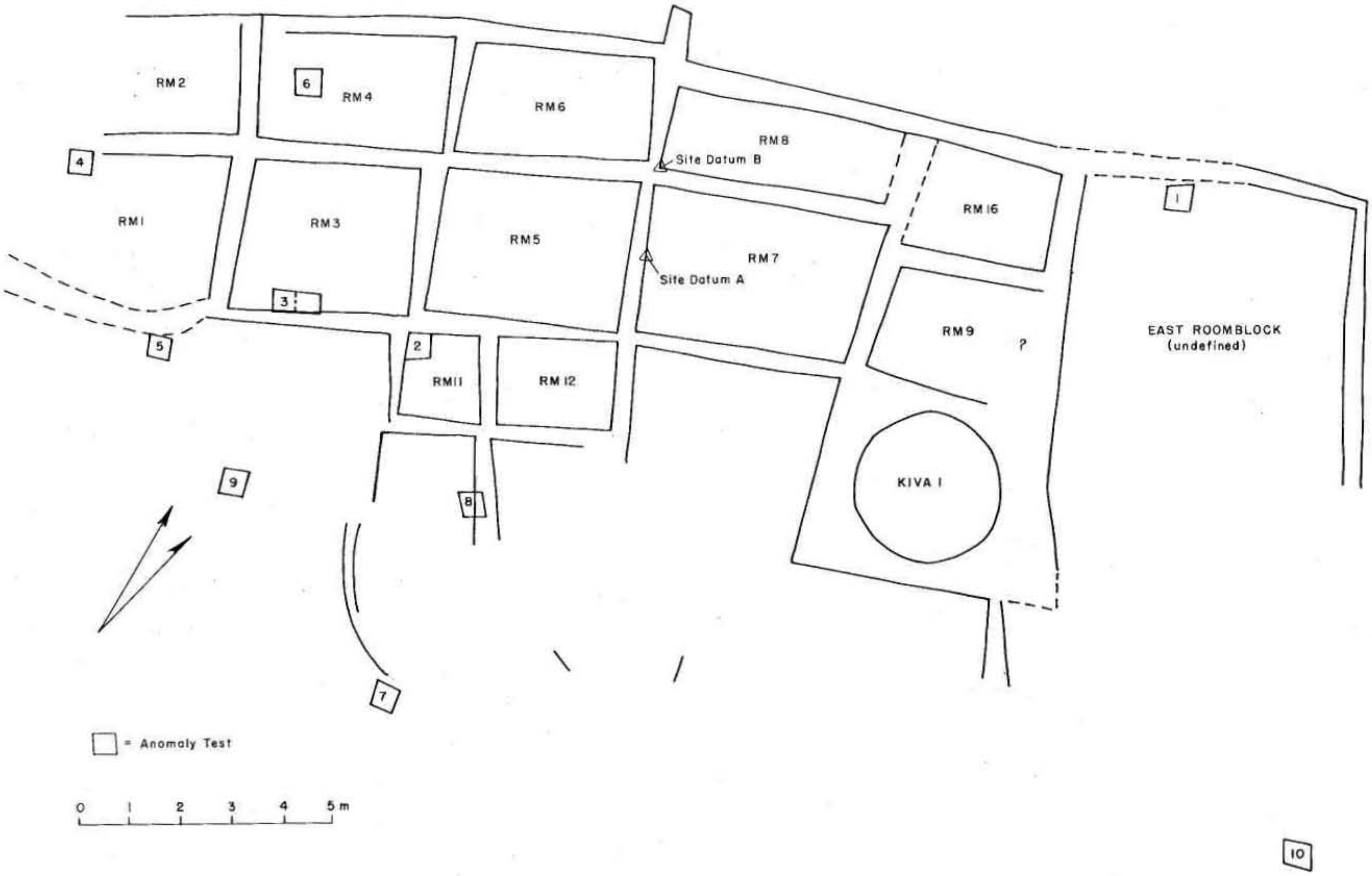


Figure 1.7. Plan view of the 29SJ 633 roomblock tested in 1978. The map indicates wall fall areas and may not accurately reflect the position of the actual walls

Because non-plaza rooms are frequently featureless, it was initially agreed to dig only half of Room 8. The eastern half, which contained the anomaly, was selected because, as noted, archeomagnetically datable proveniences were crucial.

Initially, a test in the pitstructure (Kiva 2) in the plaza area south of Room 7 was planned. Its location suggested a possible association with the two rooms, and such testing would provide valuable stratigraphic information. Test Trench 3, however, was the only excavation carried out to locate the upper walls of the feature.

Ten anomaly test pits (Chapter 4), each 50 by 50 cm in size and excavated in 15-cm levels, were placed in areas where proton magnetometer studies indicated high magnetic density.

Methods

In addition to the tests of remote sensing techniques, the following procedures were carried out at the site.

Surface Artifact Sampling

A surface analysis of cultural material (ceramics and lithics) was performed using noncollection techniques to determine the level of analysis that could be performed in the field and to outline the procedures involved. This technique, which is common during inventory survey today, is nondestructive as artifacts are left on the surface for evaluation by later researchers. It also alleviates curation problems and the associated investment in search and retrieval of these materials.

Site 29SJ 633 was stratified into three units: the main structure, early trash, and late trash. Four transects were laid out (Figure 1.8). Transects 1 and 2 crossed the roomblock. Transects 3 and 4 were placed in the eastern trash mound (Transect 3 on the north and Transect 4 on the southwestern area) and were separated by a drainage depression. Locations of these transects were designed so that they crossed each area generally in an east-west direction. In the roomblock, Transect 1 (2 m wide) was divided into 8 grids whereas Transect 2 (2 m wide) was divided into 3 grids; grids were 5 m long. Both transects through the trash mound were divided into 4 grids (1 by 5 m) each.

LouAnn Jacobson and Peter J. McKenna performed the noncollection survey of these transects. All cultural materials were recorded on standard forms. Ceramic types and chipped stone materials were tallied in the same manner as was used in the laboratory for excavated materials with the following restrictions: artifacts were not cleaned, and only a 10X hand lens was used during identification of ceramic types or chipped stone materials. As a result, trachyte temper in ceramics was probably recorded more frequently than were other temper materials. Results of the ceramics survey are included in Chapter 7 and Appendix C.

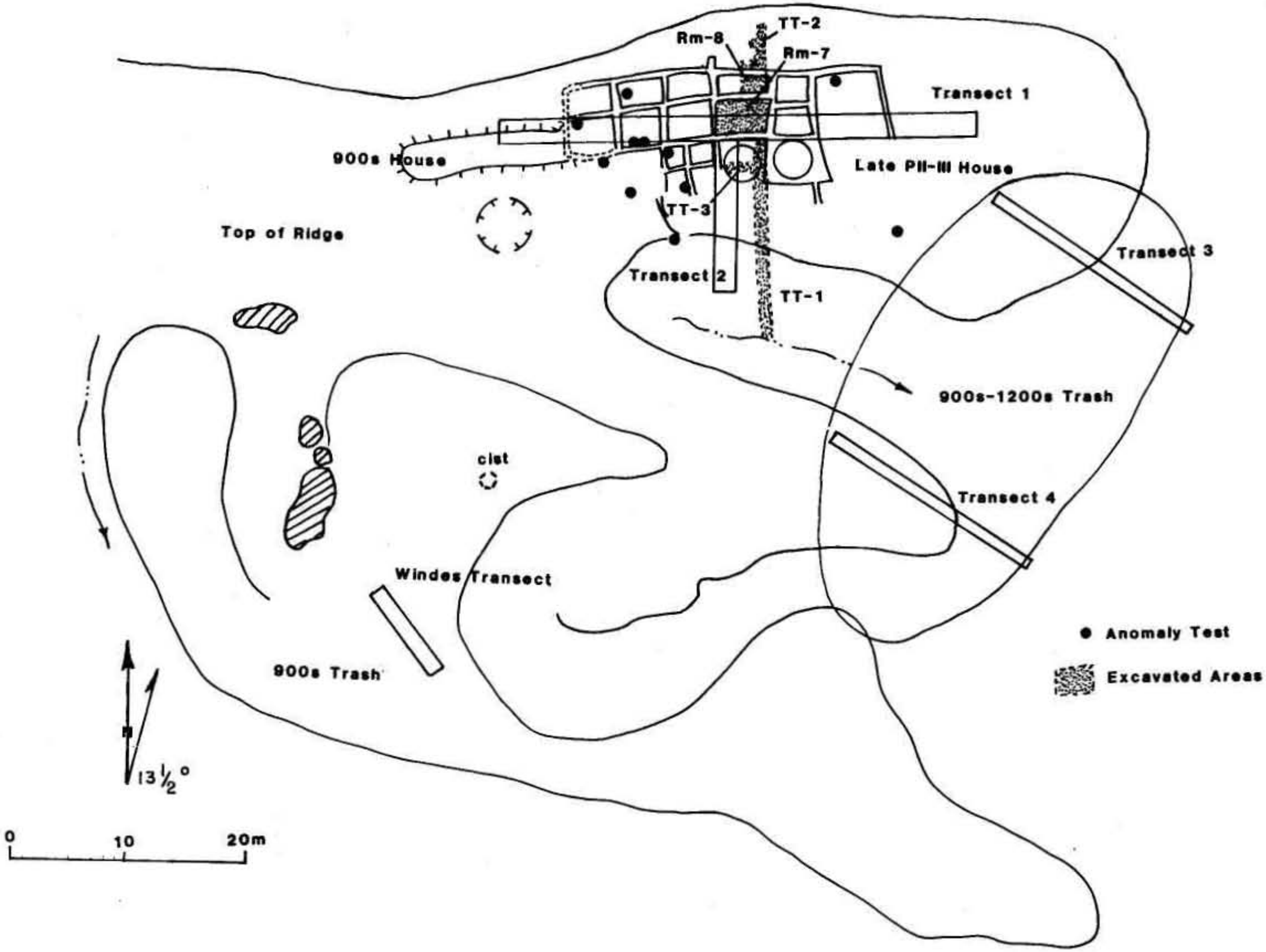


Figure 1.8. Map of 29SJ 633 that indicates locations of excavation areas (Rooms 7 and 8, anomaly tests, and test trenches) and artifact transects

Wall Clearing

In order to define the extent of the site, as well as the location and size of the rooms and kivas, a wall-clearing project was carried out. It was thought that deep tests in room corners, like those undertaken at Pueblo Alto (Windes 1987:148) to examine wall abutments and isolate roomblock additions, would be too destructive in a small site. In most cases, only the tops of the walls were uncovered; however, trenches had to be dug when walls were difficult to find, usually in downslope areas, particularly on the north side. As a result, our knowledge of wall abutments and roomblock additions was restricted to what was revealed in shallow wall clearing, which generally disclosed only damaged remains of wall tops. The irony of this was recognized by Truell and Jacobson when they realized that these conservation measures were completely overshadowed by the extremely destructive and stratigraphically invasive anomaly tests that were blindly sunk into good, extensively burned areas of the site with no understanding of context. This work was complemented by a door search in order to determine intrasite structural relationships.

Site Mapping

An alidade and plane table were used to prepare a map of the main roomblock after the walls were cleared. Using an alidade transit, additions to the map (anomaly test areas, an additional wall, and the kiva) were made after excavations had been completed. Initially this map was to be compared with the photogrammetric and bipod mosaic maps to determine discrepancies among the maps, to determine the information obtained that was unique to each method, and to prepare a composite map. The standard maps of rooms and those resulting from bipod photographs were not substantially different. As noted in Appendix A, the two photogrammetric maps did not provide the desired detail.

Excavation

Room 7 was divided into quarters as arbitrary excavation units. Because only half of Room 8 was excavated, the layers and levels were removed as a single unit until the upper level of floor fill was reached. At that time, the space was divided into quadrants and the excavation continued. Except for those areas disturbed during wall clearing and tests to confirm the presence of sterile soil beneath cultural levels, all soils removed were put through a 1/4-in.-mesh screen. Floor contact material, with the exception of samples collected for botanical examination, was put through 1/8-in.-mesh screen regardless of evidence of animal disturbance.

During the 1972 site survey, the site stake (Site Datum A) had been placed in the northwestern portion of Room 7 (Figure 1.7). Originally, this stake was used as the site datum with reference to surface artifact location and during the seismic and proton magnetometer surveys. When the decision to excavate this room was made, the site datum was moved to the southwestern wall junction in Room 8. The second site datum (Site Datum B) was used during and after excavation and as a panel marker during postexcavation aerial photography (Figure 1.7). Several room datums, located in the walls of Room 7 and Room 8, were used for all measurements taken for these two major proveniences (Chapter 4).

Unfortunately, the one mapping point used for Room 7 and Room 8 was designated Datum C in Room 7 and Datum B in Room 8. Room 7's Datum B is located in the southeastern wall junction of that room, and Room 8's Datum C is located in the unexcavated section of the room about midway between the north and south walls. In Room 7, the majority of elevations were measured with respect to Datum A and in Room 8 with respect to Datum B (Room 7's Datum C), which is 2 cm above Room 7's Datum A. The relationships in datum elevations are shown in Figures 1.9 and 1.10 as are their correspondences to the site datums.

Three test trenches were placed in the Pueblo III roomblock (Figure 1.8). Two of these, Test Trench 1 and Test Trench 2, were located so that they would yield information about the ridge composition and configuration. They were placed along one of the north-south seismic transect lines in order to crosscheck the results of the seismic survey. Test Trench 1 (Chapter 4) was hand-excavated in 2-4-m grids once it was determined that use of the backhoe would destroy the site. Test Trench 2 (Chapter 4), a north-south line on the northern edge of the site, had two shallow side spurs that ran off the western side. It was planned to link this trench with Test Trench 1, but time constraints made this impossible. Test Trench 3 was located south of Room 7 in a depression in the plaza to see whether or not a pitstructure would be located beneath the surface. It ran east-west and intersected Test Trench 1. Test Trench 3 was excavated in two arbitrary 25-cm layers; all material from the three test trenches was screened through 1/4-in. mesh.

Before excavation of the 10 anomaly test pits, a datum was chosen for each test, and the surface elevation was measured from the datum. These pits were dug until a burn, a first floor, a plaza surface, or sterile soil was reached. All materials were screened through 1/4-in. mesh. Stratigraphic and feature maps were drawn before backfilling the pits with clean sand. In addition to locating areas with burns suitable for archeomagnetic dating sampling, Jacobson wanted to examine the various factors and conditions responsible for the generation of these anomalies and the possible effects of these variables on the intensities registered on the magnetometer. Depth and size of a burn, the nature of the incinerated materials and the surrounding soils, depth of bedrock, and density of wall face material were monitored. Nickel (personal communication 1978) had previously observed that pockets of ash that were decomposing affected the minerals in the surrounding soils. The chemical byproducts of the breakdown process intensified the iron in the adjacent soil. It was hoped that additional data would be obtained during the excavation of these anomaly test pits.

A detailed presentation of the architecture and stratigraphy for all these excavations is presented in Chapter 4. Information obtained from them is incorporated in Chapter 5 on site occupation.

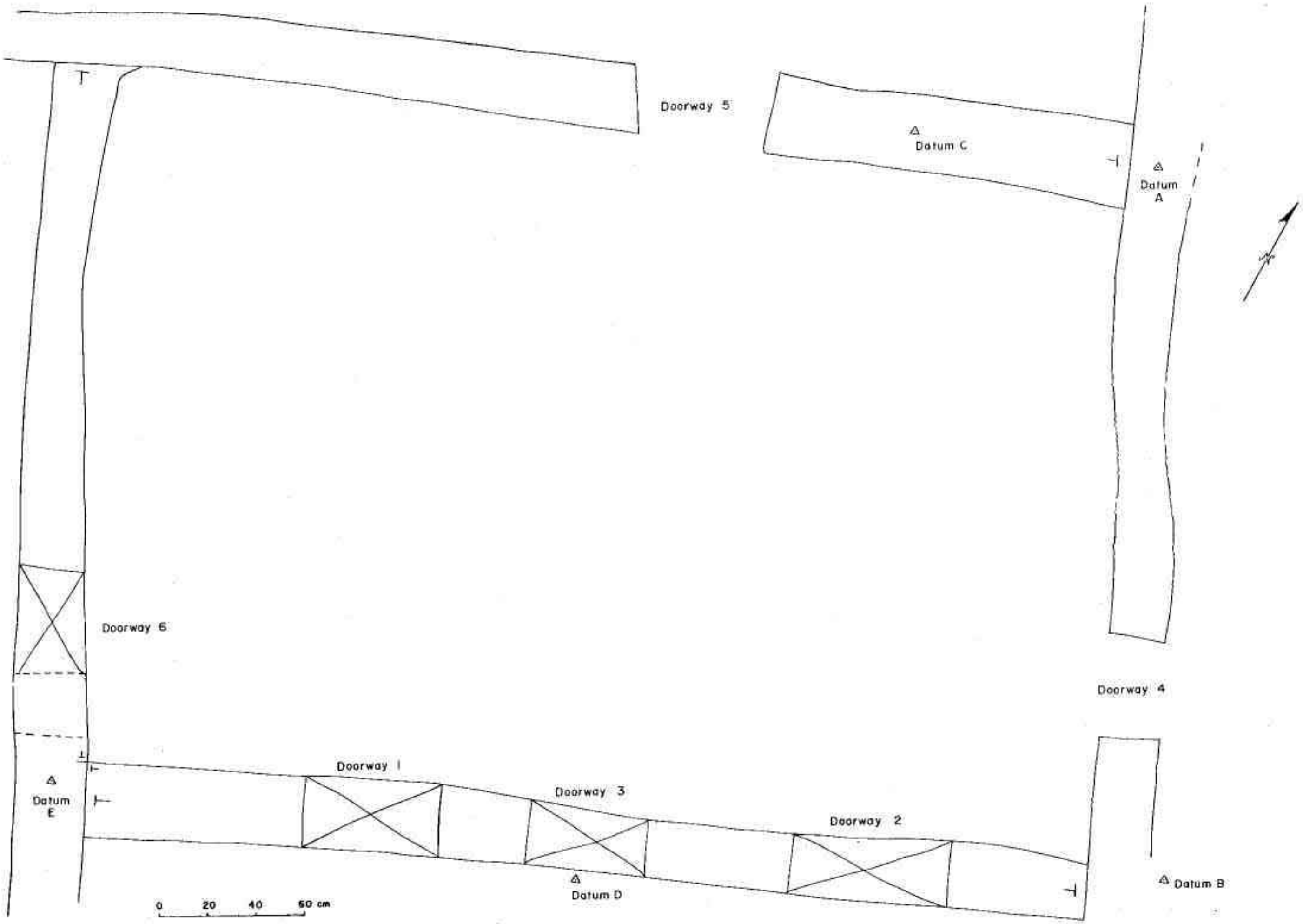


Figure 1.9. Plan view of Room 7 with location of datums and plugged and unplugged doorways

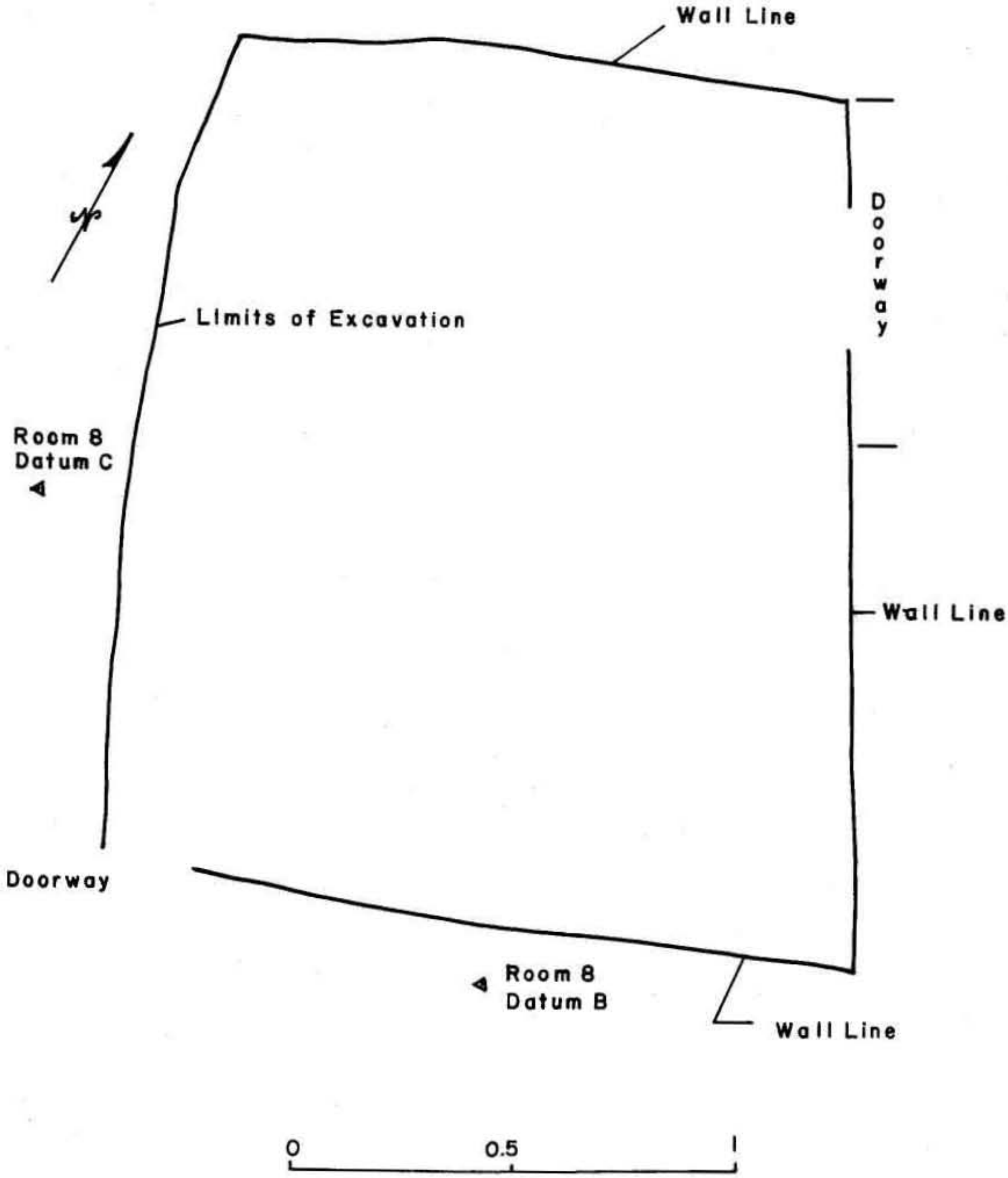


Figure 1.10. Plan view of Room 8 giving locations of datums and plugged and unplugged doorways

Samples

Archeomagnetic Samples

Archeomagnetic dating samples were taken by Thomas C. Windes, a member of the Chaco Project staff. After he inspected burns, he decided whether or not they would yield dates. Unfortunately, only three burns were deemed suitable, two from Room 7 and one from Room 8. All samples were sent to Dr. Robert DuBois of the Earth Sciences Observatory (ESO) at the University of Oklahoma.

Pollen and Flotation Samples

For purposes of sampling the floor surfaces in Room 7 for botanical analysis, a pollen and flotation sampling scheme was devised by Mollie S. Toll and Anne Cully of the Castetter Laboratory for Ethnobotanical Studies at UNM. Figure 1.11 shows the grid pattern that was imposed on the quadrants. Only lettered grids were sampled. Where features interfered with the collection of surface contact samples, only feature fill was sampled.

The pollen and flotation samples were collected in pinch fashion (pinches taken from various parts of the area sampled until sufficient amounts were obtained) from the floor surfaces and features where there was no evidence of postoccupational disturbance. They were also collected in the same manner from each layer in the fill in the rooms. Pollen samples were approximately one cup in volume whereas flotation samples were equal to one liter or more. Where the fill in features did not equal one liter, combined pollen and flotation samples were taken from the available fill.

During excavation in both Room 7 and Room 8, layers of vegetal material were encountered. These were composed of burned corn kernels and parts of corn plants, as well as pieces of fiber and insect parts. Because water screening of the more fragile contents could destroy them, bulk samples of intact matrix approximately 10 by 6 by 4 in. in size were boxed carefully to preserve the full vertical extent of the sample from Room 7. These were retained for conservation and flotation analysis. Another portion of this material in Room 7 (the northeastern burn) was dry-screened through 1/16-in. mesh.

Soil Samples

Soil samples of approximately one cup were taken and the colors recorded using a Munsell Color Chart when it was available. Additional soil samples, each one liter in volume, were taken as conservation samples from each fill layer in Room 7, but none were taken from Room 8.

Artifacts

Although most artifacts were bagged and the bags numbered and taken to the laboratory for analysis, metates and other large pieces of ground stone found on the site surface were gathered into cairns on the site.

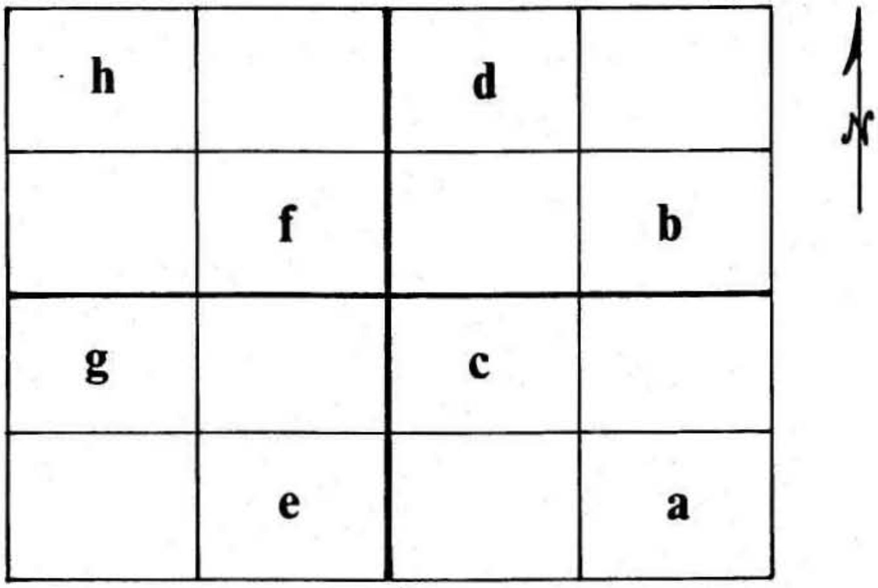


Figure 1.11. Grid pattern used for botanical samples from Room 7

They were analyzed in the field by John Schelberg and were left on the site after the work ceased.

Backfilling

Once investigations were terminated, the site was backfilled, but wall top alignments were left exposed. Material in Room 8 includes some Room 7 fill. Anomaly pits were backfilled with clean sand.

Remote Sensing Techniques

The various research goals indicated that a number of different methods could be tested at 29SJ 633. In some instances, the remote sensing techniques were not carried out (resistivity survey), were not successful (seismic survey), or have been tested, evaluated, and the results of similar evaluations published elsewhere (aerial photographic analyses, bipod photography, and resulting maps). Although these techniques are presented in more detail in Appendix A because they are an integral part of the research design, their results are not fully presented in this report; the reader is referred to Jacobson (1979) for details that, while interesting, do not increase our knowledge or understanding of this site. Jacobson also includes recommendations about improved methods, etc.

Recognizing the paucity of material available for tree ring dating and the necessity for obtaining dates from archeomagnetic samples, Robert Nickel of the Midwest Archaeological Center was enlisted to obtain proton magnetometer transect tests. Bennett and Weymouth, who performed the test, generated a map of anomalies over which the roomblock outline observed from wall clearing could be carefully superimposed (Figure 1.12). This effort made it possible to pinpoint well-burned hearth locations and allowed Nickel and Jacobson to explore related questions about magnetic anomalies in archeological sites. Two anomaly locations were selected for comprehensive excavation in the adjacent rooms described above. Additional small tests were made in areas where anomalies were indicated to verify the efficacy of this technique for locating burned areas. The results of these tests are described in detail in Chapter 4.

In addition, seismic transects were made by Phil Bandy under independent contract to NPS. Bandy hoped that refractive seismology would assist in locating and defining archeological features and architecture before excavation (Bandy 1980). Unfortunately, his report was unavailable at the time excavation began. Bandy's findings are also considered in Appendix A.

Before the site was disturbed, the house complex was photographed using a 17-ft-tall camera mount known as a bipod; it was designed by Julian Whittlesey specifically for photogrammetric mapping of archeological sites. A series of bipod photographs was taken, allowing 20% overlap in each frame so that a mosaic could be made showing the site surface. The objective of this time-consuming endeavor (124 shots had to be taken for full coverage) was to document the site's disposition and to locate surface artifacts, as well as to record the site's vegetation before the

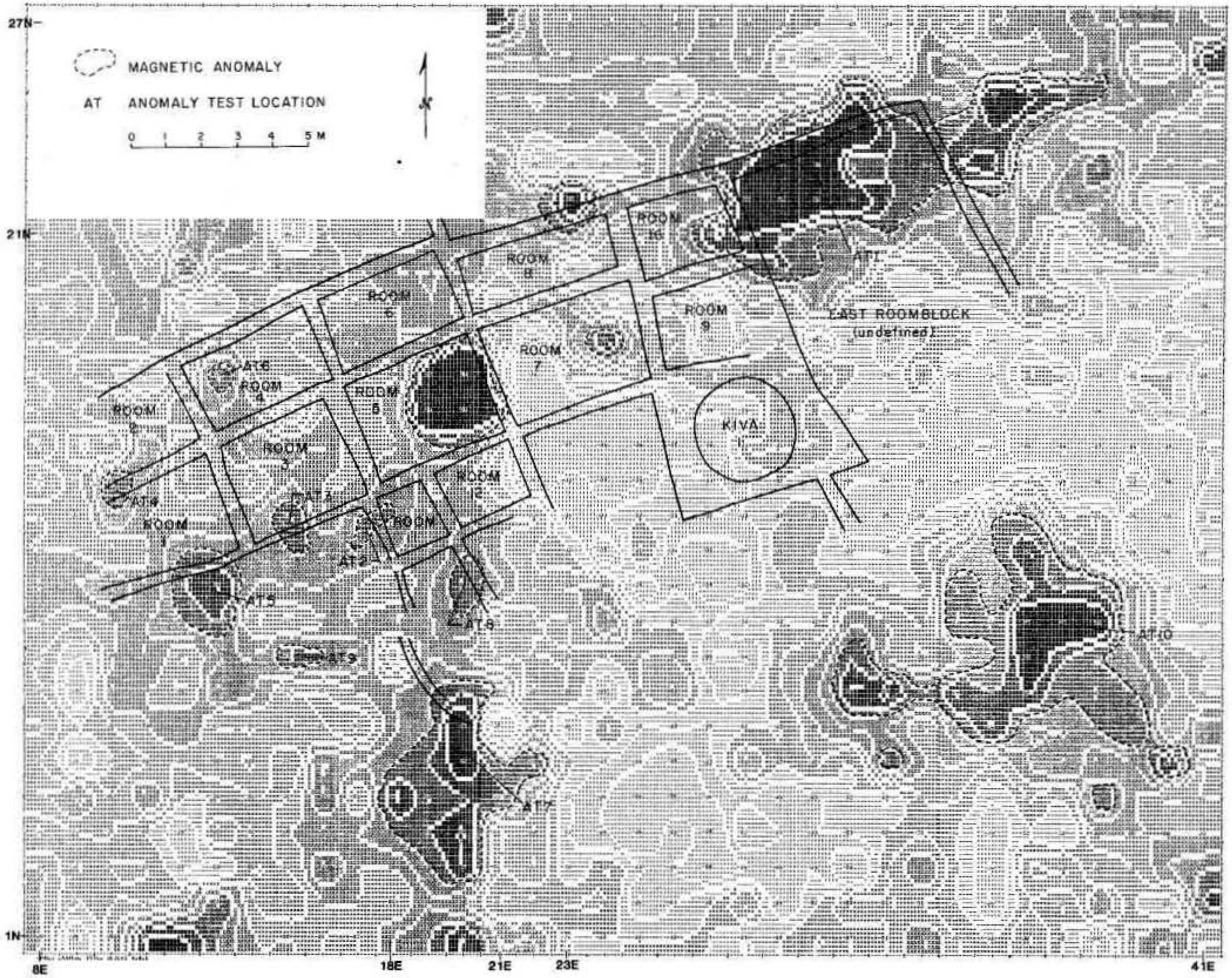


Figure 1.12. Map of main roomblock at 29SJ 633 superimposed over proton magnetometer survey results; anomalous areas are outlined

disruption of wall clearing and excavation. From this mosaic, a map or series of maps could be made of the pre-excavation appearance.

In addition, Jacobson used bipod photography to provide a record of excavation progress and to generate floor and feature maps. These maps were compared with triangulated maps that were generated by Truell and Jacobson during excavation. Mapping from bipod photographs is clearly faster than triangulation, but it requires immediate photoprocessing to ensure that satisfactory photographs are available before feature removal. It was encouraging that the bipod and hand-triangulated maps corresponded very closely.

Summary

The data gathered at 29SJ 633 are valuable because they add to our understanding of the early A.D. 1100s period even though any culture history reconstruction based on the excavation of only one and a half rooms, plus a few trenches and tests, must be evaluated carefully. The data do present a base on which to build, however.

The data obtained provide some new information on the architecture from the late A.D. 1000s-early A.D. 1100s. The large rooms and wall foundations, attributes found in the large greathouses but not in small sites, indicate that even more diversity in small site architecture occurred during the A.D. 1100s than was anticipated. Most of the artifacts recovered, however, pertain to the late A.D. 1100s-early A.D. 1200s (Mesa Verde Phase) occupation, which indicates a late use of the rooms (after a hiatus of an unknown length of time). This Mesa Verdean occupation is not well understood, as McKenna points out in Chapter 6; and although these data are limited, they do provide some insight into the last Anasazi use of Chaco Canyon.

In addition, the passage of time between field work and report writing (more than 10 years in this case) encompasses many changes in methods and technical expertise, especially in the area of remote sensing, which are only summarized here. Consequently, the remaining chapters do not address all of the results of all experiments carried out at this site. Instead, chapters are organized to present the information obtained in categorical fashion (environment, chronology, architecture and stratigraphy, occupational history, and various artifact and biological analyses). The final chapter will summarize the results of this work and make limited inferences about this site's place in the prehistory of Chaco Canyon and the Anasazi world.

2

THE NATURAL ENVIRONMENT AND ITS USE

Chaco Canyon, located close to the center of the San Juan Basin, is part of a semiarid environment of cold desert (Simons, Li and Associates 1982:2, 13). Several investigators have examined various data sets that indicate that there has been little change in climate over time, especially during and since the periods when the Anasazi made their homes in the canyon (Betancourt 1984; Rose et al. 1982).

> The elements of the San Juan Basin can be described as cool and semi-arid with high diurnal and yearly temperature variation, low humidity, occasionally strong winds, and generally low and variable precipitation. Rainfall is seasonal in distribution with a modal summertime peak in late July, August, and September, and a much lower peak in the winter and early spring. Drought periods occur in nearly every year in June and November [Gillespie 1985:14].

The reasons for the variability in rainfall patterns and overall climate are presented by Gillespie (1985:14-16) who indicates that general atmospheric circulation in the center of the San Juan Basin is affected by latitude, elevation, and geographical location in relation to circulation features and orographic barriers. As a result, early farmers in Chaco Canyon often faced more severe problems than did their neighbors who lived around the peripheries of the San Juan Basin.

During the past several decades, records have been kept of temperatures, rainfall, and the number of frost-free days, all variables that would affect Anasazi adaptations within Chaco Canyon. Summer precipitation averages 220 mm (8.5 in.) but has varied from 85-350 mm. Generally, August is the wettest month (35 mm), followed by July, September, and October. June tends to be the driest month with an average of 10 mm, but crops also are affected by winter and early spring moisture (Gillespie 1985:17-18). Considerable variation in temperatures occurs both daily and seasonally. The average temperature of 49.8° F (9.9° C) has reached average highs of 73.2° F (22.9° C) in July and lows of 29° F (1.7° C) in January. The variations around these means, however, are fairly large. Requirements for maize agriculture have been noted to be from 110-130 frost-free days; yet the average number in Chaco Canyon since 1968 is 100 (Gillespie 1985:19). Although there are problems with this estimate because of the way the data were gathered, regional climatic changes, and the recorded length of growing season versus the number of frost-free days, these parameters do indicate the marginality of this area for a successful farming adaptation.

Several climatic reconstructions, particularly one by Rose et al. (1982) who used tree-ring data, indicate that an extensive summer drought occurred between A.D. 1130-1180. The severity of this drought would have adversely affected agriculture for the people at 29SJ 633 between two occupations that are dated to the late A.D. 1000s-early 1100s and late

1100s–early 1200s. Drought would also have affected the localized resources available.

Recent experiments in growing corn in Chaco Canyon provide an indication of some of the problems faced by the local inhabitants (Toll et al. 1985). Although these archeologists admit they do not have the same expertise in agriculture as did the prehistoric farmers, the results of their work emphasize the difficulties and natural factors that affect success and failure. Their comparison of two dune plots in Marcia's Rincon (Plot 7--dune side and Plot 8--dune toe) indicate how even minor differences in location affect the growth rate of a crop. Although the amount of soil moisture and its time of occurrence are important, rodent and insect pests play a critical role in the success of crop production. Thus, the experiments underscore the narrow parameters for success, especially during drier periods.

Several local food resources were available to the inhabitants of site 29SJ 633. Modern vegetation maps that encompass Marcia's Rincon, where this site is located, have been prepared. Potter and Kelley (1980) emphasized correlations of physiography, soils, vegetational growth form, and species composition during their 1973 evaluation of 1:6000 color transparencies of the canyon. Site 29SJ 633 was included in an area coded AOS, which represents four-wing saltbush (Atriplex canescens), Indian ricegrass (Oryzopsis hymenoides), and sand dropseed (Sporobolus cryptandrus). The latter two species were food sources. This type of vegetation was considered an indication of recently blown, deep deposits of dune sand; such dune sands are common in the rincon. A more detailed vegetation map resulted from the research conducted at this site in 1978. Jacobson used the black-and-white aerial photographs taken in 1975 at a scale of 1:3000 to prepare a vegetation map that was then evaluated, ground-checked, and corrected by Mollie S. Toll and Anne Cully (Jacobson 1979). Figure 2.1 indicates this finer distinction among plants present in 1978; Table 2.1 lists these by zone.

Although a number of pollen and flotation samples were collected from this site, only the results of analysis of some of the macrobotanical corn have been published (M. Toll 1985). It is expected, however, that a number of other plant resources were used because they are found in the samples taken from other sites in Chaco Canyon (Cully 1985; M. Toll 1985), have been used ethnohistorically (Cully 1985; M. Toll 1985), and appear in coprolites recovered from Chaco Canyon sites (Clary 1983, 1984, 1987). Oryzopsis (ricegrass) and Sporobolus (dropseed) were used as foods whereas Atriplex (four-wing saltbush) and Sarcobatus (greasewood) were common fuels.

The corn recovered from 29SJ 633 included 34 cobs from the Gallup/Late Mix period (late 1000s–early 1100s) and 40 from the Mesa Verde occupation. Whereas the earlier period had a greater proportion of 10-rowed cobs (56%), the later period had more 12-rowed cobs (63%). Data from several small and large sites within the San Juan Basin indicated that there were several changes in cob sizes through time and by location. M. Toll (1985:261) indicates that the slightly higher raw numbers and larger

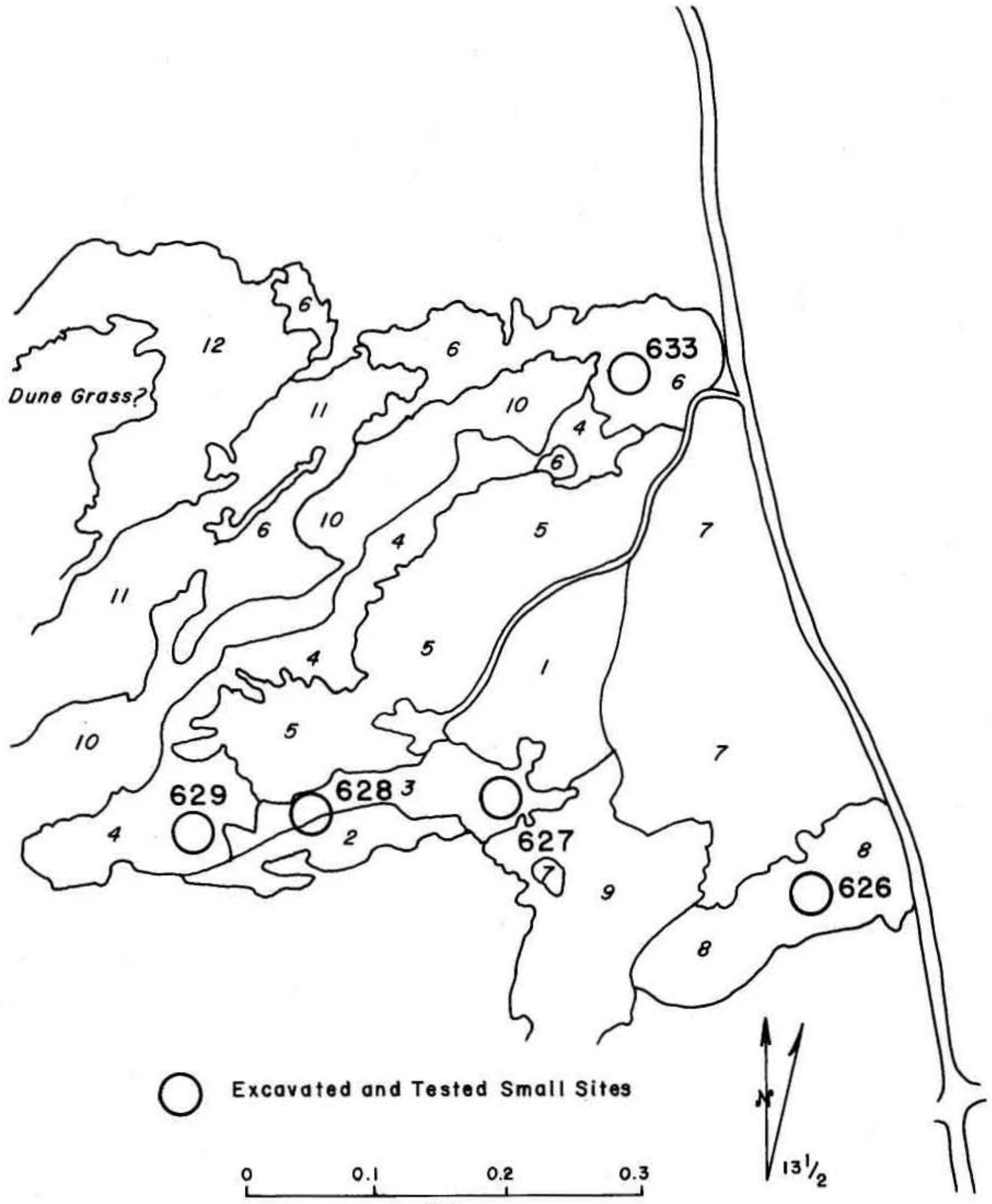


Figure 2.1. Vegetation zones in Marcia's Rincon. Key to numbered zones is presented in Table 2.1

Table 2.1. Vegetation in zones delineated in Figure 2.1[a]

	Scientific Name	Common Name
1.	Atriplex canescens[b]	four-wing saltbush
2.	Tetradymia canescens	horse brush
	Atriplex confertifolia	shadscale
	Eurotia lanata	winterfat
3.	Disturbed, annuals	
4.	Atriplex confertifolia	shadscale
	Eriogonum	buckwheat
	Chrysothamnus	rabbitbrush
	Artemisia nova	sagebrush
5.	Grasses (including)	
	Sporobolus sp.[c]	dropseed
	Hilaria Jamesii	galleta grass
	Oryzopsis hymenoides[d]	Indian ricegrass
	Annual Atriplexes	saltbush
	Atriplex canescens	four-wing saltbush
6.	Atriplex canescens	four-wing saltbush
	Sarcobatus vermiculatus	black greasewood
	Sporobolus sp.	dropseed
7.	Sarcobatus vermiculatus	black greasewood
	Sporobolus sp.	dropseed
	Sitanion hystrix	bottlebrush
	Hilaria Jamesii	galleta grass
	Oryzopsis hymenoides	Indian ricegrass
	Small Atriplex confertifolia	shadscale
8.	Atriplex canescens	four-wing saltbush
	Eurotia lanata	winterfat
9.	Grass including Bromus tectorum	cheatgrass
	Descurania pinnata	pinnate tansy mustard
	Mentzelia albicantis	stickleaf
10.	Evenly dispersed (and thick) grasses (including)	
	Sporobolus sp.	dropseed
	Hilaria Jamesii	galleta grass
	Oryzopsis hymenoides	Indian ricegrass
	Atriplex confertifolia	shadscale
11.	Undisturbed annuals	
	Descurania pinnata	pinnate tansy mustard
12.	Artemisia filifolia	sand sagebrush
	A. dracunculoides (very green)	false tarragon
	Perennials	

[a]Defined by A. Cully and M. Struever in Marcia's Rincon, June 12, 1979.
[b]Seeds ground and mixed in corn mush (Cully 1985).
[c]Midsummer crop responds to spring or summer precipitation (Toll 1985).
[d]Late May-early June crop responds to winter moisture (Toll 1985).

cob sizes recovered from some greathouses in Chaco Canyon may reflect importation of corn from better-watered areas of the San Juan Basin during the Bonito Phase, but she presents no inferences regarding the differences in rows and sizes between that period and the Mesa Verde period evidence at 29SJ 633. Although he is cautious in his presentation because of the limited available data, McKenna (Chapter 6) summarizes these changes and other evidence from the Mesa Verde Phase; he proposes that different types of corn were grown in different sites and environments, depending on local or temporal differences in precipitation patterns, and that corn recovered from Chaco Canyon sites follows a regional pattern.

In addition to flora, there is evidence for hunting at this site. Gillespie (1981, Chapter 10 this volume) analyzed the remains recovered, most of which are assigned to the Mesa Verde use of the site. Faunal remains from all sites are included in Akins' (1985:Tables 7.2 and 7.3) synthesis of material from all sites excavated by the Chaco Project. (See Table 10.1 for a list of species recovered at 29SJ 633.) As in other sites in Chaco Canyon, Sylvilagus (cottontail rabbit) was the basic food item, followed by Lepus californicus (jackrabbit), Cynomys (prairie dog), and Meleagris gallopavo (turkey).

During the Mesa Verde Phase, artiodactyls were scarce, as were carnivores. With regard to change through time at this site, turkey was more prevalent in the Mesa Verde Phase in contrast to canids and artiodactyls, which were more abundant during the Late Bonito Phase, a trend documented by Akins (1985). The age and size of the faunal remains also pointed to procurement of various species during summer months, but Gillespie cautions that this does not preclude winter occupation of the site. He also suggests that faunal resources may have suffered from stress during the late occupation, a condition not unexpected after a period of 50 years of drought between A.D. 1130-1180.

In summary, the inhabitants of 29SJ 633 depended on a number of resources (both flora and fauna) that occurred naturally in the area. They grew corn in this environment that was marginal for agriculture because of its sporadic rainfall and limited amounts of precipitation. Hunting in the local area, raising turkeys, and excursions of some distance for other meat sources are documented, but the Mesa Verde Phase inhabitants may have been constricted by an already stressed set of faunal resources. Or, the data may reflect a wider Anasazi adaptation, as discussed by McKenna in Chapter 6.

3

DATING SITE 29SJ 633

Evidence for the placement of Site 29SJ 633 in the Chaco Canyon chronological sequence is derived from several dating techniques. It relies most heavily, however, on ceramic data, followed by archeomagnetic dating techniques, stratigraphic analyses, masonry styles, and burial data. Each of these lines of evidence will be discussed briefly; the reader should examine other chapters in this volume for complete details and logical arguments pertinent to this data base.

Ceramic Evidence

Chapter 7 presents the detailed analysis of the ceramic sample from the excavations at 29SJ 633. McKenna and Toll also include a summary of other ceramic surveys and samples obtained throughout the years beginning in 1947 with Pierson's survey and ending in 1988 with Windes' re-evaluation of one trash area. Data from these surveys indicate that the site had been occupied from the A.D. 900s through 1200s (Table 7.1). The trash deposits to the southwest of the roomblock contained ceramics dating predominantly from the A.D. 900s to the mid 1000s. This midden was associated with the early roomblock located west of the one tested in 1978 (Figure 1.5). The southeastern midden had evidence for mid through late A.D. 1000s; but the ceramics were mixed, and the midden undoubtedly was used throughout the site occupation.

Within the roomblock and from the areas beneath Floor 1 in Room 7 and Room 8, there were few ceramics. The 6 cm of fill between Floors 1 and 2 contained only a few sherds. The bulk of the material on or above Floor 1 in the two rooms is assigned to the early A.D. 1200s. There was a considerable amount of material above the plastered floors and in the plaza area. "Gallup and Mesa Verde Black-on-white assemblages were associated with the lower and upper floors respectively. The association of lower floors, initial foundations, and Gallup complex ceramics with native ridge soils indicates that 29SJ 633 was at least partially constructed in the 1100s" (McKenna 1986:95). Marcia Truell, who was responsible for the excavation of this site, believes the upper and lower floors of these rooms reflect two separate components, possibly by two different families or groups of people. Whether or not there is a hiatus at the site between ca. A.D. 1150-1175 is difficult to evaluate without knowing more about the occupation in the remaining rooms

Archeomagnetic Samples

Because this site was the last one excavated as part of the Chaco Project, expedience in obtaining information was recognized during the planning stage. The map of proton magnetometer anomaly locations (Figure B.1 in Appendix B) (Bennett and Weymouth 1981) was useful in planning several excavations and tests that were placed in various areas of the site with the hope that suitable material would be uncovered. The results of these tests are reported in Chapter 4 and Appendices A and B; unfortunately, only three areas in excavated Room 7 and Room 8 were judged appropriate for archeomagnetic sampling by Thomas C. Windes.

This dating method has several problems that are being evaluated and corrected. Windes (1987:220-234) reviewed the dates obtained from Pueblo Alto, a greathouse in Chaco Canyon (Figure 1.6). He noted the following correlations and discrepancies (Windes 1987:232):

Archeomagnetic Sample	Ceramic Sample
A.D. 1070-1100	A.D. 1030-1050
A.D. 1130-1180	A.D. 1050-1100
A.D. 1180-1220	A.D. 1100-1140
A.D. 1380-1400	A.D. 1300s

Although the dates fell together consistently, they were often separated by a 40-100-year difference. Part of the problem, a revision of the archeomagnetic curve, is currently being addressed by several investigators (Eighmy et al. 1980; McGuire and Sternberg 1982), including Robert DuBois at the University of Oklahoma where the samples from 29SJ 633 were run (Table 3.1). Whether this problem occurs only at Pueblo Alto or at all other Chacoan sites as well has not been determined. Windes (1987: 231) noted that similar 50-75-year discrepancies were found at Bis sa'ani, a Chacoan greathouse located along the Escavada Wash just northeast of Chaco Canyon (Breternitz 1982), but not at Salmon Ruin, another Chacoan greathouse located on the San Juan River near Bloomfield, New Mexico, some 70 km distant (Figure 1.1).

Table 3.1. Archeomagnetic dates from 29SJ 633

Sample Number[a]	Provenience	Original Date 1979 (A.D.)	Revised Date 1989 (A.D.)
ESO 1649	Room 8, Floor 1, floor burn	not available	1190 $\pm$ 28
ESO 1672	Room 7, Floor 1, Firepit 1	1250 $\pm$ 28	1170 $\pm$ 28
ESO 1676	Room 7, Floor 2, Firepit 1	1180 - 1190[b]	1120 $\pm$ 26

[a]Earth Sciences Observatory (ESO) at the University of Oklahoma.
[b]Estimated.

The initial results of the three archeomagnetic dating samples at 29SJ 633 have been published by McKenna (1986:Table 1.23). Since that time, DuBois has revised his curve. In addition, the sample from Room 8, Floor 1, which did not date during prior analysis, is now estimated. Truell thinks that the latter date is suspect. The two new dates from previously dated samples are approximately 60-80 years earlier (Table 3.1). This is about the same span of difference Windes noted between ceramic and archeomagnetic dates at Pueblo Alto in the post-A.D.-1050 period. Truell is not comfortable with the A.D. 1170s date for the upper floor of Room 7; architectural attributes suggest an earlier construction date (Truell 1986:316). Instead, she places construction of the rooms in the early to middle A.D. 1100s, with occupation extending for an unknown period of time. Reoccupation occurred in the early A.D. 1200s.

Radiocarbon Sample

One sample (FS 184) from the burned concentration in Room 7, Layer 4, was collected in the field. It was never sent to a laboratory for dating.

Dendrochronology

Although numerous pieces of charcoal were collected from the fill, trash, floors, and subfloor material from Rooms 7 and 8, none of these was sent to the Laboratory of Tree-Ring Dating at the University of Arizona because they were too small or incomplete.

Architecture and Stratigraphy

Samples of masonry exposed at 29SJ 633 were too small and inconsistent to determine stylistic attributes. Chapter 4 contains detailed maps of these walls, and photographs of wall segments (with superimposed scale grids) exist in the Chaco Project photographic collection. In both rooms it was evident that stones from nearby small house sites had been incorporated into the walls. Some dark, indurated sandstone and a large number of reused ground stone artifacts from the wall fall attest to this practice. These are combined with the light-colored friable sandstone (the majority of the stones incorporated in the Room 7 walls); this material is readily available at the base of the talus slopes in Marcia's Rincon.

A number of the greathouse architectural characteristics (core-and-veneer masonry, multiple stories, and Bonito-style kivas) that make their appearance in small sites do so in the early A.D. 1100s (Truell 1986:316). The presence of wall foundations beneath the walls in Room 7 and Room 8 at 29SJ 633, however, is the only example of this type of construction that has been documented in small sites. These features have been described at large sites in Chaco Canyon by Akins and Gillespie (1979), Lekson (personal communication), and Windes (1987:144). Although adobe footings have been recorded at numerous small sites--29SJ 629 and 29SJ 1360 in the middle 900s-middle 1000s and at Bc 53, Bc 362, Lizard House (Bc 193), and Bc 54 in the late 1000s-middle 1100s--in general, these run only beneath a single wall where reinforcement was needed, or they are wall stubs from an existing earlier house found beneath the later walls. The sample at 29SJ 633 suggests that wall foundations were laid for the entire pueblo before any upper wall construction began (Chapter 4). Although these may exist beneath other A.D. 1100s small sites, there are no records of them. Their presence at 29SJ 633 probably places the construction of this site sometime in the early A.D. 1100s, or later, when other large site attributes began to appear in small sites (Truell 1986:316).

Burials

The single adult burial recovered from this site (Burial 3, Floor 1, Room 7) is more like other adult burials from the Mesa Verde period in Chaco Canyon in its lack of goods and its alignment (see Chapter 11; Akins 1986:105-107). Although this sample is small, it does fit with other data obtained from this site to place 29SJ 633 into its proper time frame. The ceramics associated with all four burials also indicate their placement in the Mesa Verde Phase (Chapter 11).

Summary

The ceramic evidence indicates there was no break in the ceramic patterning at this site. The earliest use was the roomblock and midden on the western end of the ridge. Because of the limited excavation in the eastern roomblock, however, it is not possible to determine whether there was continuous occupation through the A.D. 1200s. Initially, Truell (1986:283) placed the first construction of Rooms 7 and 8 in the late A.D. 1000s-middle 1100s, with a reoccupation in the early A.D. 1200s. Although the archeomagnetic dating curve has been recalibrated since the earliest reports on material from this site appeared (McKenna 1986; Toll et al. 1980; Truell 1986), the change in the curve does not greatly alter the use of the rooms or the placement of the site within a general time frame.

> Two distinct components were evident [from the excavations]: a lower floor suggested a mid-1100s construction and an upper floor associated with a later Mesa Verde phase reoccupation...the distinctness of the two occupational components is suggested by two [now three] archaeomagnetic samples dating approximately 70 [now 50-70] years apart, and by the dichotomy of floor associated ceramics which strongly suggests both a hiatus and a reoccupation [McKenna 1986:89-95].

Because there were few sherds beneath the floors in the two rooms and because the 6-cm fill layer was thin and lower floors were much disturbed, the duration of time between the two components is not clear. At best, Truell places the initial construction and occupation of this roomblock around the late A.D. 1000s-early A.D. 1100s, with use extending for an undetermined period of time. The break between this and the later component is clear, even though its duration is not. Reoccupation in the early A.D. 1200s is suggested. Only additional research at this site will determine its precise occupation span.

4

DETAILED STRATIGRAPHIC AND ARCHITECTURAL DESCRIPTIONS

The details included in this chapter form the basis from which the interpretation in Chapter 5 was drawn. Because that chapter focuses on site use, these additional data allow the reader to evaluate the interpretation and to use basic site information for other analytical purposes. The material is organized into three major categories: rooms, test trenches, and anomaly tests. For each major feature, the stratigraphic details are presented by layer, beginning from the top down; contents of architectural features associated with particular layers or on floors are discussed with their associated floor. Details about walls, foundations, and wall features are presented toward the end of each major section. Refer to Figure 4.1 for location of the areas discussed.

Rooms

Room 7

Room 7 is located adjacent to a plaza area in the central portion of the Late Pueblo II-Pueblo III house. Its large size (4.22 m for the north and south walls, 2.74 m and 3.00 m for the east and west walls, respectively, and an estimated floor area of 12.11 m^2) is more comparable to living rooms recorded for Chacoan greathouses than it is for small sites in Chaco Canyon (Lekson 1984:40; Truell 1986:Table 2.37). Doorways were noted in all four walls of the room but not all were in use at the same time (Figure 4.2). An open doorway in the north wall links this room to a storage room (Room 8), while another open doorway in the east wall provides entrance into an unexcavated room whose function has not been determined. Excavation through 11 natural strata and 2 floors indicates that size and, possibly, function did not change through time even though two discrete habitation periods are postulated.

Excavation Strategy

Room 7 was divided into quarters before excavation (Figure 4.3). The northeastern room quadrant was excavated in arbitrary 15-cm levels to expose the natural stratigraphy above the first floor. The fill of the other three quadrants was removed in natural layers until the same depth was reached. All material was screened through 1/4-in. mesh. Measurements of layers or levels, artifacts, and features were taken from several datum points, which are also indicated in Figure 4.2. The configuration of the 11 natural strata and 2 occupational surfaces is shown in the perpendicular cross sections drawn along the excavation quadrant limits (Figures 4.4 and 4.5).

Fill

Layer 1 (topsoil). The uppermost fill layer was a thin stratum of brown, sandy topsoil. The original configuration of the upper portion of

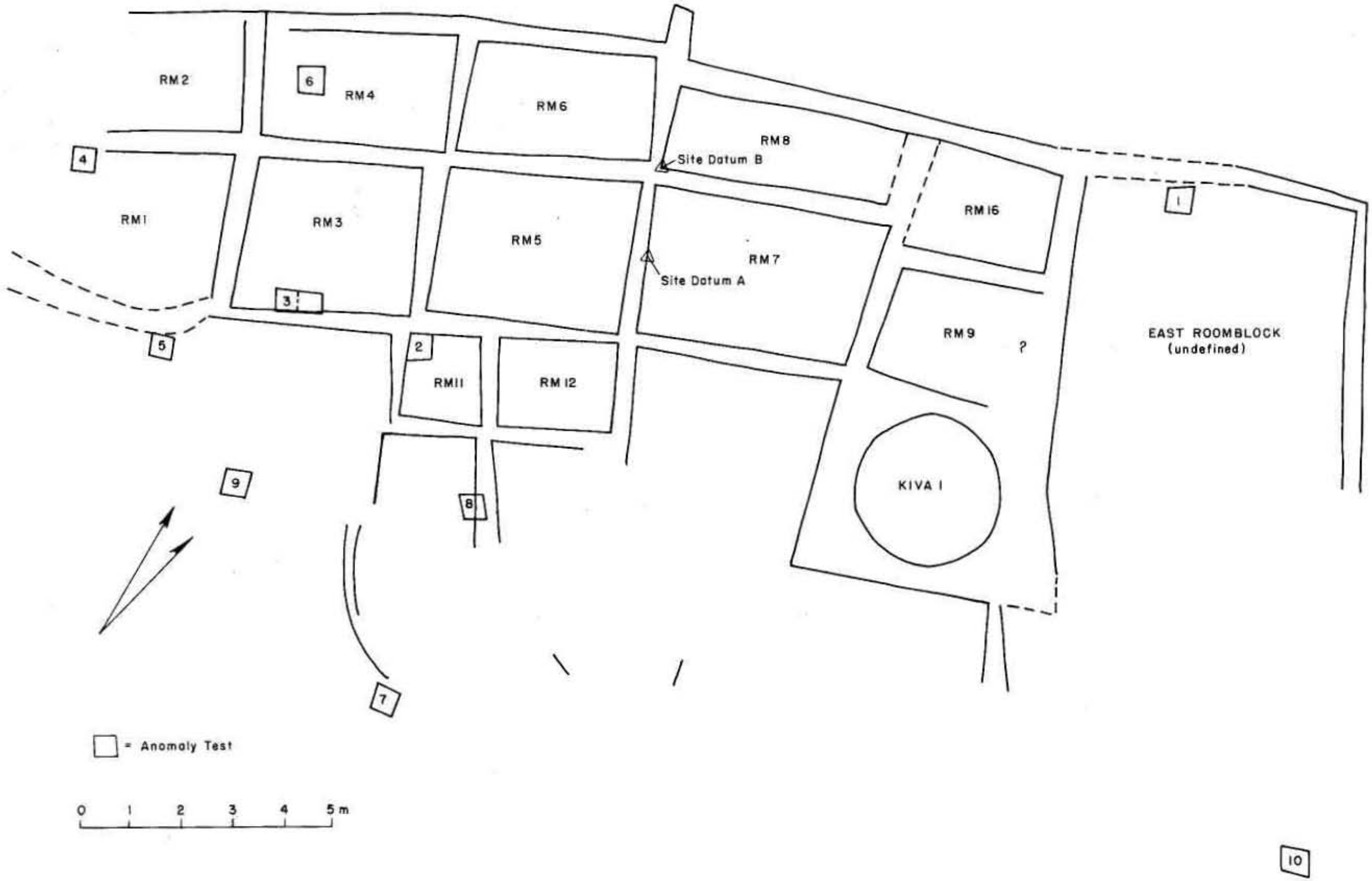


Figure 4.1. Plan view of the 29SJ 633 roomblock tested in 1978. It is based on wall clearing data and includes the total extent of the wall fall; thus, it may not reflect the exact position of the walls

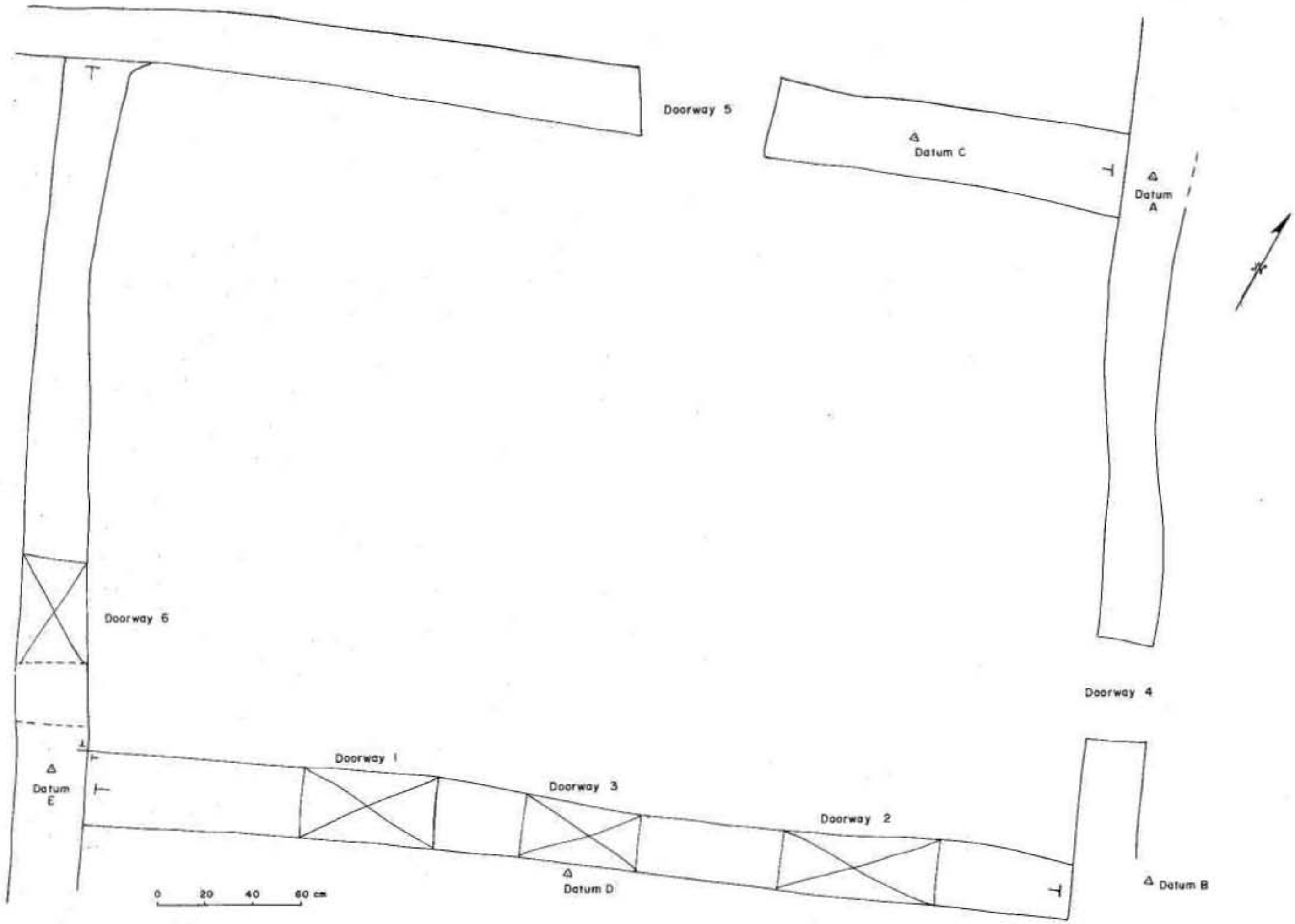


Figure 4.2. Plan view of Room 7 with location of datums and plugged and unplugged doorways

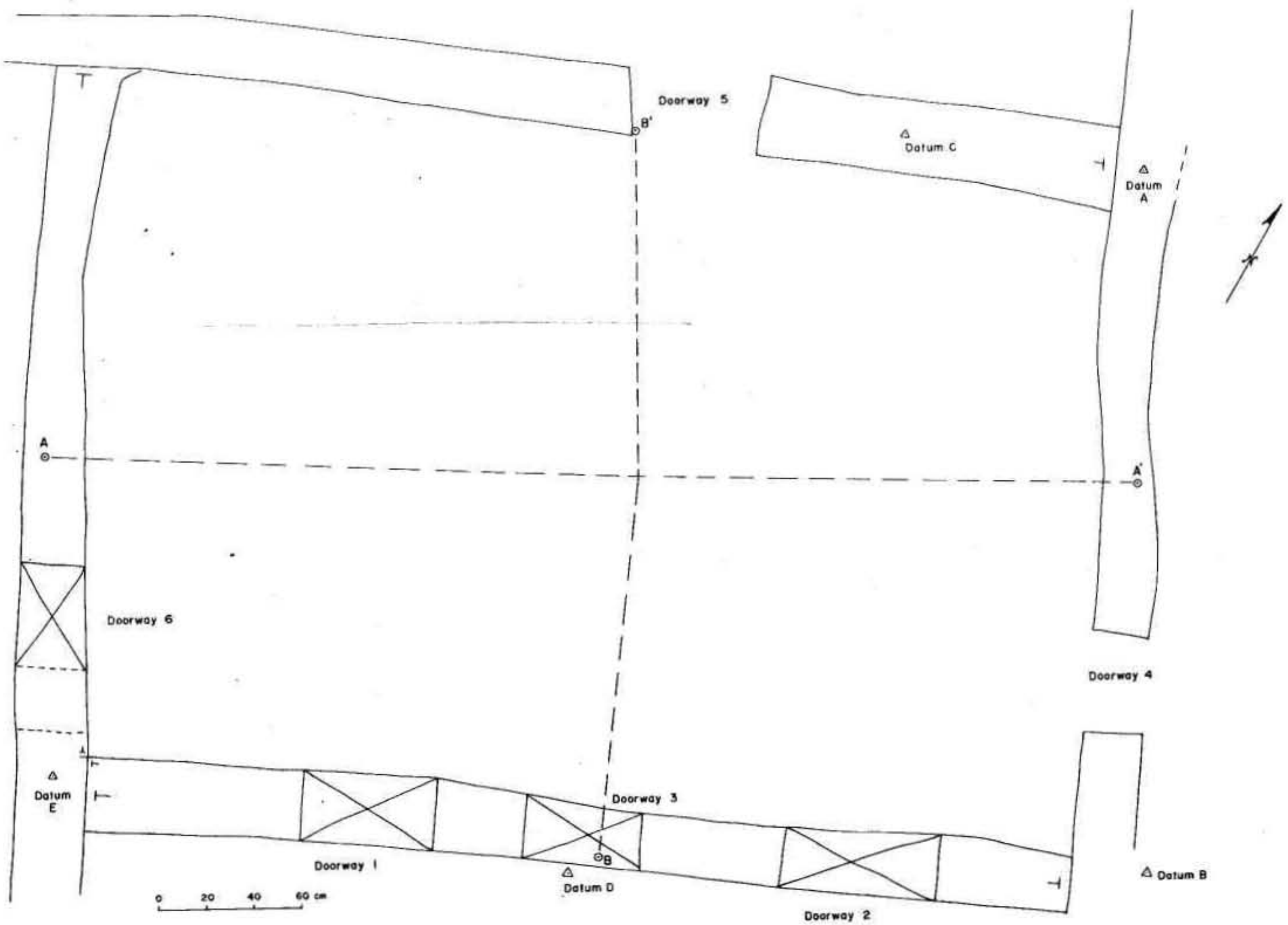


Figure 4.3. Location of Room 7 stratigraphic profiles

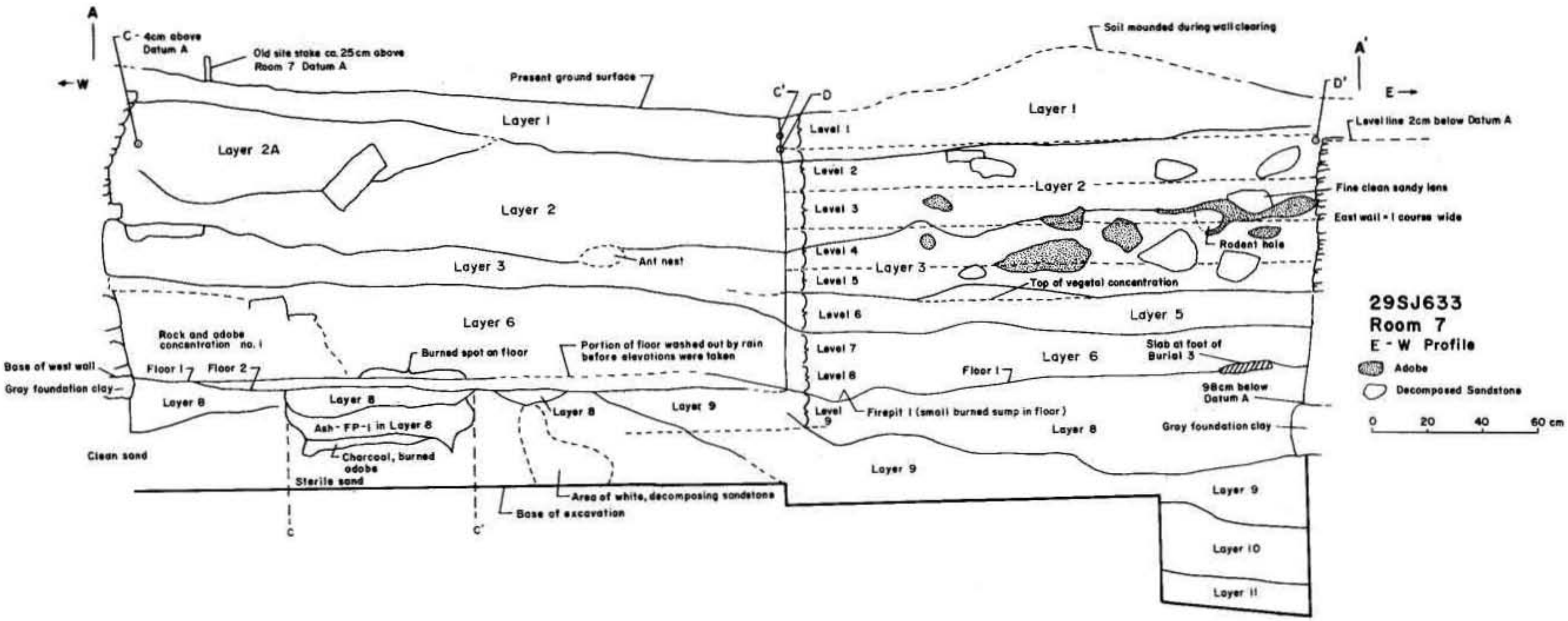


Figure 4.4. Room 7 east-west stratigraphic profile

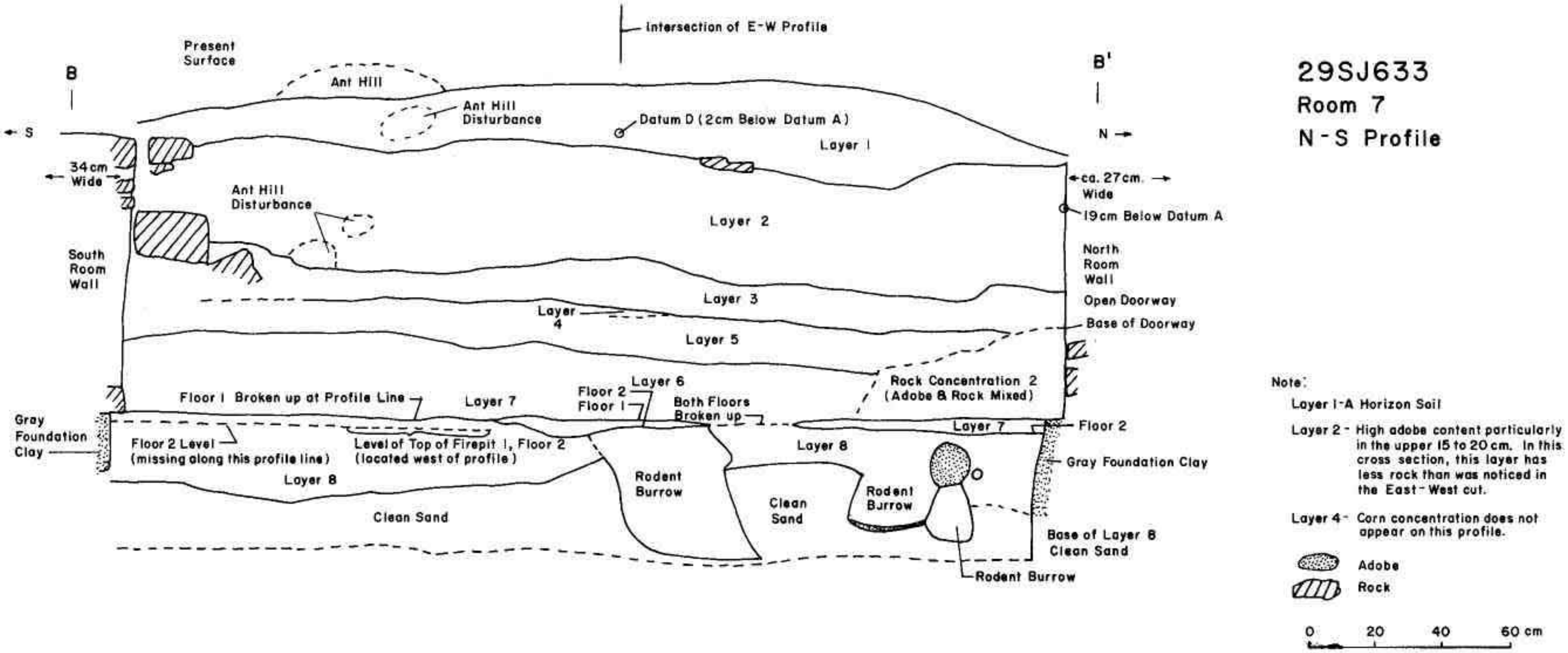


Figure 4.5. Room 7 north-south stratigraphic profile

this unit was disturbed when soil removed during wall clearing was piled in the center of the room. After this loose debris was cleared, 8-16 cm of this layer remained and were systematically removed during the excavation. The base of the topsoil (Layer 1) was mixed with wall fall and refuse.

Layer 2 (wall fall, trash, and some natural deposits). A hard, white-gray layer began about 15 cm below the ground surface. In this second layer, at the base of the topsoil, quantities of sandstone building blocks and chinking material were intermixed with gray-brown, melted adobe mortar and sand that contained little apparent organic material. The rocks in Layer 2 were concentrated adjacent to the east and west walls; the north wall had collapsed northward into Room 8, and the south wall southward onto the plaza surface. This wall fall, however, was also mixed with very dense artifactual material that averaged 200 sherds, 20 pieces of chipped stone, and 50 pieces of bone per cubic meter. (A total of 799 sherds, 96 pieces of chipped stone, and about 200 bones was collected in the 35-cm-thick layer.) Some laminated sand lenses were noted in the upper portion of this layer; they represent episodic accumulations during the period of wall collapse. The largest of these sand lenses was 26 cm thick and was found along the west wall. It is designated Layer 2A (Figure 4.4).

Layer 3 (dense trash and some construction debris). A moist, brown, sandy soil with considerable amounts of charcoal, adobe, and dense concentrations of artifacts made up Layer 3, which stretched across the entire room. As in Layer 2, there was little variability in artifact density per cubic meter of soil; artifacts averaged 214 sherds, 43 pieces of chipped stone, and 103 bones per cubic meter. Mixed among the trash was some construction debris, particularly adobe chunks. Very little naturally deposited material was mixed in this layer, which was 8-32 cm thick. The adobe chunks at the bottom of this layer had evidence of burning from the vegetal materials that lay beneath them.

Layer 4 (burned vegetal concentrations). Three concentrations of burned vegetal material, consisting primarily of corn kernels and portions of corn plants, were found beneath the trash deposits in Layer 3. Figure 4.6 indicates the location of these concentrations with respect to the room walls. The tops of these concentrations ranged from 25-40 cm above the first floor, and the concentrations were from 14-18 cm thick. Profiles of the northeastern and southeastern deposits are also shown in Figure 4.6. No cross section of the one in the southwestern quadrant was drawn. Three blocks of matrix were retained intact for later sorting, but the remainder of the material was screened through 1/16-in. mesh.

In most cases, this material was thoroughly burned and in extremely fragile condition. Instances were noted where high heat had fused some kernels together to form clumps. Fire-reddened areas on the south wall adjacent to the southeastern concentration of this material, plus burned soil beneath all three concentrations, indicate that this material had either burned in place or was burning when it was thrown into the room. The localized nature of these deposits may favor the former suggestion.

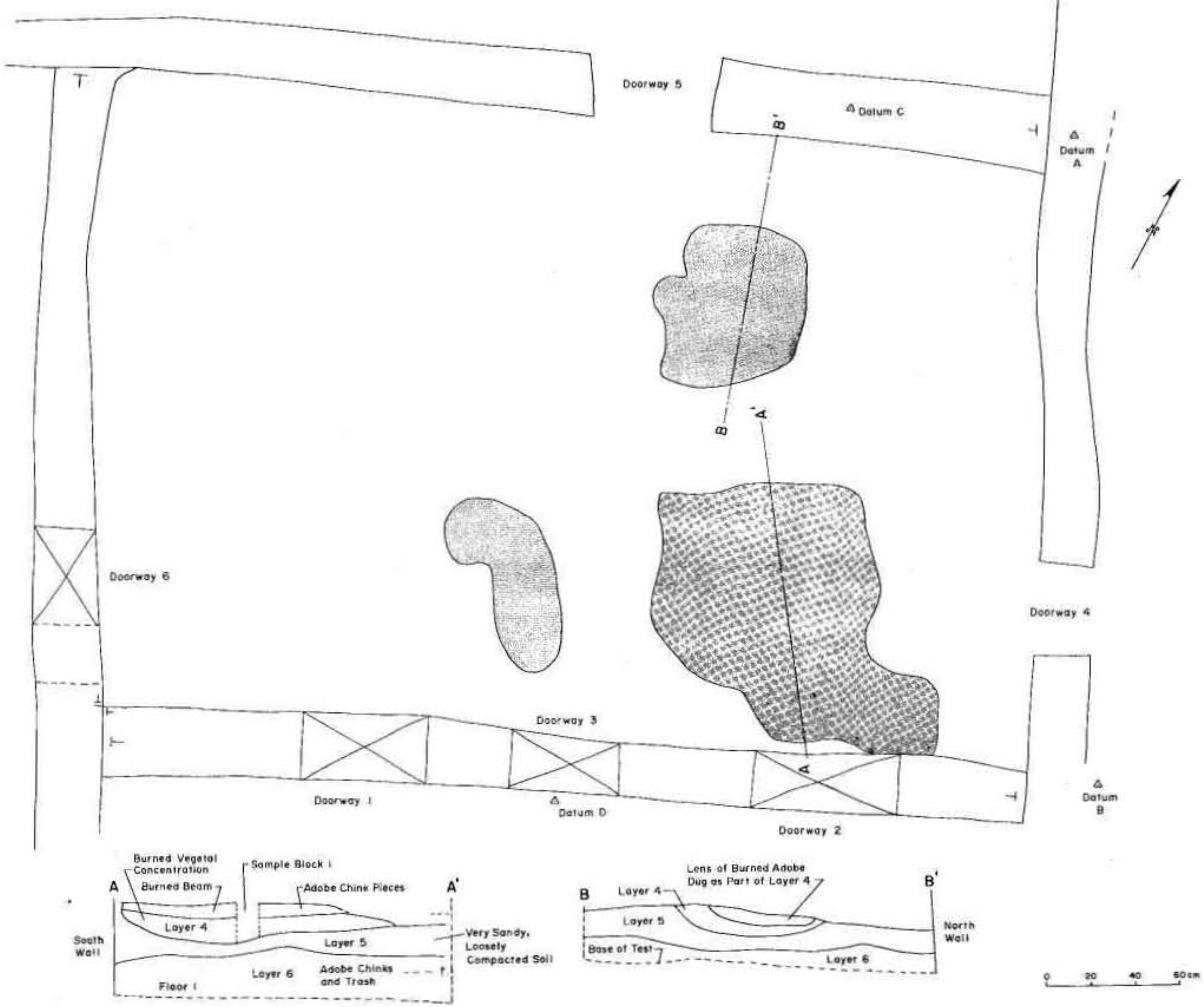


Figure 4.6. Room 7, Layer 4, burned corn concentration

Scattered adobe chunks that overlaid the corn were also burned; thus, the material probably was still burning when at least a portion of the overlying material was deposited. The only ash found in conjunction with this material was found in the southeastern and northeastern concentrations where very thin layers were found between the overlying adobe and the corn. In the southeastern concentration, the ash lay directly beneath a completely decomposed charred beam, which was too disintegrated to collect as a dendrochronology sample; nor was the burned adobe suitable for archeomagnetic dating (Windes, personal communication, 1978). A radiocarbon sample taken from the northeastern burned concentration has not been processed.

During excavation, materials from these concentrations were tentatively identified as corn kernels, cobs and stalks, corn silk, twine, pieces of burned gourd rind, burned insects, and other charred seeds. Some of these samples were analyzed by M. Toll (1985:247-277); others remain intact for future analysis.

Layer 5 (intentionally deposited sand). Layer 5 consisted of a tan, sandy soil, which contained very little cultural material and no evidence of lensing, laminae, or structure that indicates natural deposition. The 14-16-cm-thick layer was discontinuous; it was thickest on the eastern side of the room but pinched out in the western half about 22 cm west of the north-south profile line (Figures 4.4 and 4.5). Near the south wall, the contact between Layers 3 and 5 could not be traced because of wall fall. Similarly, Layer 5 runs up against a rock concentration along the north wall; this concentration extended from the upper floor of the room to the top of Layer 5. The sandy fill of Layer 5 appears to have been intentionally placed in the room.

Layer 6 (adobe and trash). The adobe and trash layer that overlaid the upper floor surface was concentrated in the southwestern portion of the room where it was 26-36 cm thick. In the northern and eastern section, it tapered off to 14 or 15 cm in thickness (Figures 4.4 and 4.5). Because Layer 6 contained concentrations of adobe that were denser than those found in the overlying Layer 3 trash, it was grayer in color. This color distinction was quite clear where the two layers met in the western half of the room. In the eastern half of the room, however, part of Layer 5 was accidentally mixed with the upper portion of Layer 6 so that artifact densities could not be calculated accurately. The western section of Layer 6 averaged 80 sherds, 7 pieces of chipped stone, and 197 bones per cubic meter. Although the ceramics and, in particular, the chipped stone counts were much lower in this layer than they had been in Layer 3, the bone counts were somewhat higher. Most of the bone in Layer 6 was recovered in the southeastern quadrant of Level 8, a 5-7 cm level directly overlying the Floor 1 surface, which was excavated separately in order to segregate floor contact materials. There was little evidence of burning in any of this material.

Floor 1 and Associated Features

Rock Concentrations on Floor 1. Two large rock concentrations were found on or just above the upper floor surface. Both probably resulted from wall fall immediately after the removal of the roof.

Rock Concentration 1. This concentration was found in the southwestern corner of Room 7 (Figure 4.7). It directly overlaid a small child's burial (Burial 4) found in a pit in Floor 1 (see the discussion of possible associations in Chapter 5). It extended northward along the west wall as far as the southern end of a walled storage area (Storage Bin 1). The base of Rock Concentration 1 extended 3-5 cm above the surface of Floor 1 and rested on a small amount of adobe and trash from Layer 6. The top of this concentration corresponded closely to the top of Layer 6 (between 24 and 33 cm above Floor 1). The rocks in this pile lay in a haphazard fashion with quantities of melted adobe clay among them, and they resembled wall fall. A number of ground stone artifacts, most of which were partial or damaged specimens, formed part of this concentration. The total artifacts in Rock Concentration 1 include 3 manos, 2 metate fragments, 7 abraders, 5 pieces of "other ground stone," 45 sherds, 2 pieces of chipped stone, and 5 pieces of eggshell. Part of a copper bell was found on top of this concentration along the south wall (Figure 4.7); it constitutes one of a very few copper specimens found in small house sites.

Rock Concentration 2. Located adjacent to the midsection of the north wall (Figure 4.7), this rock concentration also contained rocks that were cemented together with adobe. Some rocks from this concentration rested directly on Floor 1, but most of the basal layer rested several centimeters above the floor. The top of the concentration was 25-30 cm above the floor, which is roughly the same distance as Rock Concentration 1, but it extended up into fill Layer 5, which was present only in this section of the room. Rock Concentration 2 contained more artifacts than did Rock Concentration 1; Figure 4.7 indicates those recovered from the upper level. Ground stone pieces (either partial or damaged specimens) included 1 mano, 3 metate fragments, 8 abraders, 1 pot lid, 1 polishing stone, 1 anvil, and 1 piece of "other ground stone" (Akins 1980:Table 8.12). In and around Rock Concentration 2 were 11 sherds, 1 corrugated jar fragment, pieces of chipped stone, 302 bones, 1 corncob, and 3 pieces of eggshell.

Floor 1 Occupational Evidence. The upper surface in this room (an estimated 12.11 m^2) was located 80-92 cm below Site Datum A. Although these depths overlap those of the lower floor, which was located between 84 and 92 cm below the datum, there is a layer of intervening fill between them in most areas (Figures 4.4 and 4.5). Floor 1 slopes from its shallowest depth below the datum along the west wall toward the east where it reached a maximum depth in the center of the room just east of where the lower floor had been removed prehistorically (Figure 4.4). It then rises again toward the east wall. About a 10-cm difference was noted from west to east. Little slope was noted from north to south (Figure 4.5).

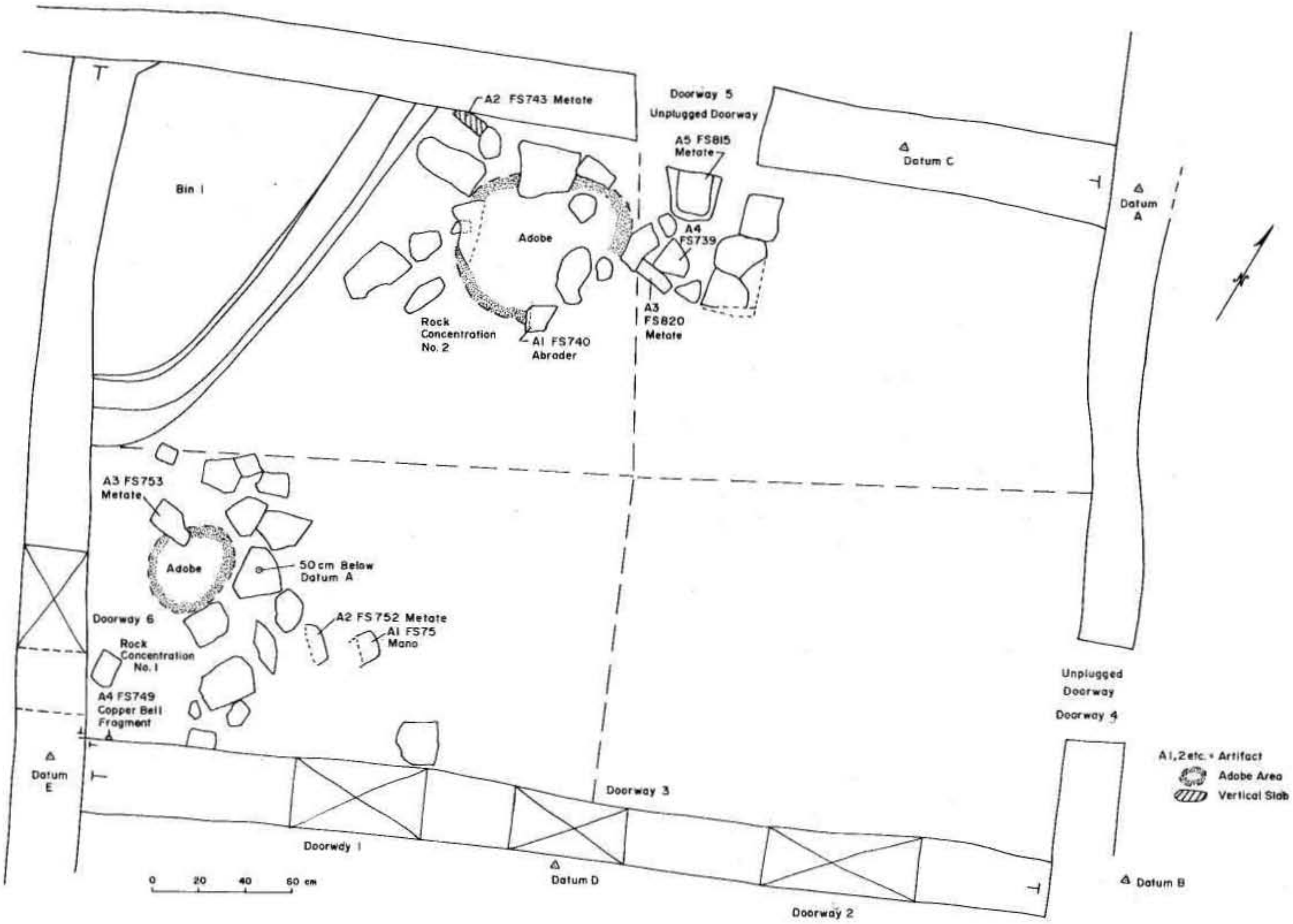


Figure 4.7. Room 7, Layers 5 and 6, rock concentrations

The surface of Floor 1 was in poor condition; it was broken up, particularly in the southeastern quarter of the room where much animal disturbance was noted. Most of the surface consisted of lumpy gray clay with thin layers of yellow-tan sand in and around these lumps. Where the plaster was well preserved, it was up to 1 cm thick, and no replastering was apparent. The best preserved plaster was around Firepit 1; it extended west around Posthole 1 (Figure 4.8).

Because there was considerable postoccupational animal disturbance in the fill down to Floor 1, it was difficult to determine the floor-associated artifacts versus dense trash material that directly overlaid the broken floor surface. The only definite floor associations were two burials with their grave goods and the floor features (see discussions below regarding Burial 3, Pit 6, and Chapter 12).

Floor 1 Features. Figure 4.8 provides locational data for the features associated with Floor 1. Table 5.4 in Chapter 5 lists their dimensions and characteristics. Included are several burns, two postholes, a possible storage cist, two pits of unknown function, and a burial pit. Two animal burrows were originally assigned feature numbers but do not appear to have been used prehistorically. In general, these features are centrally clustered. Contrary to what was expected before excavation, pits of this supposed living room were few in number. In addition, no well-burned, permanent-appearing firepit was found. One sad-appearing, slightly dished, burned area was designated as a firepit. A large storage bin is described with the Floor 2 features.

Firepit 1. This feature actually is a circular burn and not a firepit. A 34 by 30 cm slightly concave depression (3-4 cm deep) in the floor had been scooped out and plastered before use. It did not have evidence of repeated cooking or heating, but an archeomagnetic date of A.D. 1170 ± 28 years (ESO 1672) was obtained. The fill removed from the feature was not screened.

Floor Burn 1. In the west-central area of the floor was a small area (48 by 40 cm) where burned material consisting of charred bones, twigs, some blackened rocks, and red adobe rested on the floor. All fill was screened through 1/16-in. mesh. Because of its placement, it may have resulted from a postoccupational event. Again, there was no indication of repeated use, and there was no burn on the floor beneath it.

Floor Burn 2. This is a small concentration (33 by 30 cm) of burned wood that was found south-southeast of Posthole 2. It may represent a single log fire that occurred on this floor.

Pit 1. This large (67 by 59 cm), irregularly shaped feature (Figure 4.9) located in the southwestern quadrant of the room may have been used for storage. The dirt walls and base were gray and had evidence of a few calcium carbonate deposits. The indentation on the south wall is part of the original construction. Although the pit belled out at the bottom (26-28 cm depth), animal disturbance has destroyed portions of the walls; this disturbance extended down through Pit 1 into Firepit 1 of

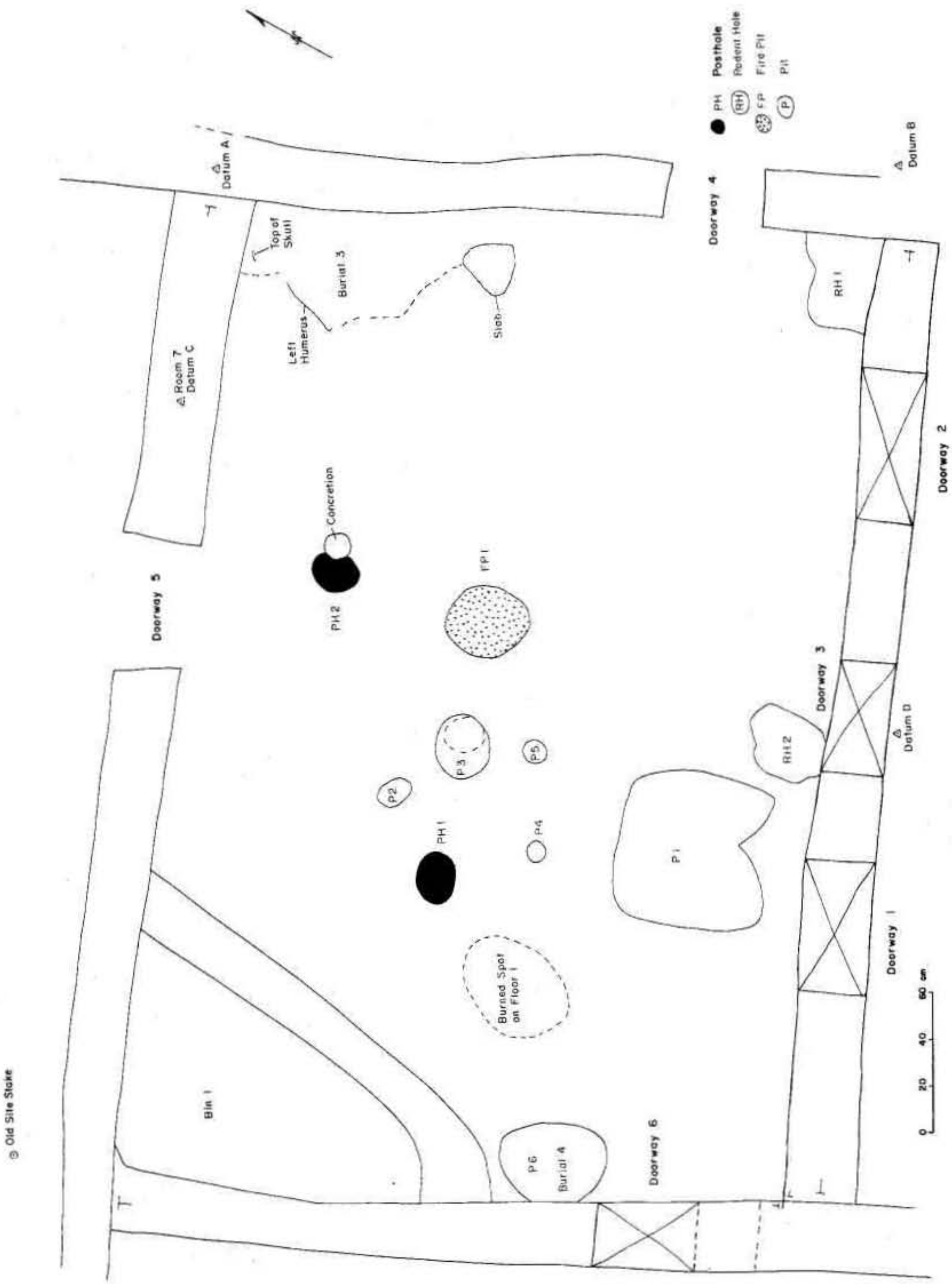


Figure 4.8. Room 7, Floor 1, plan view

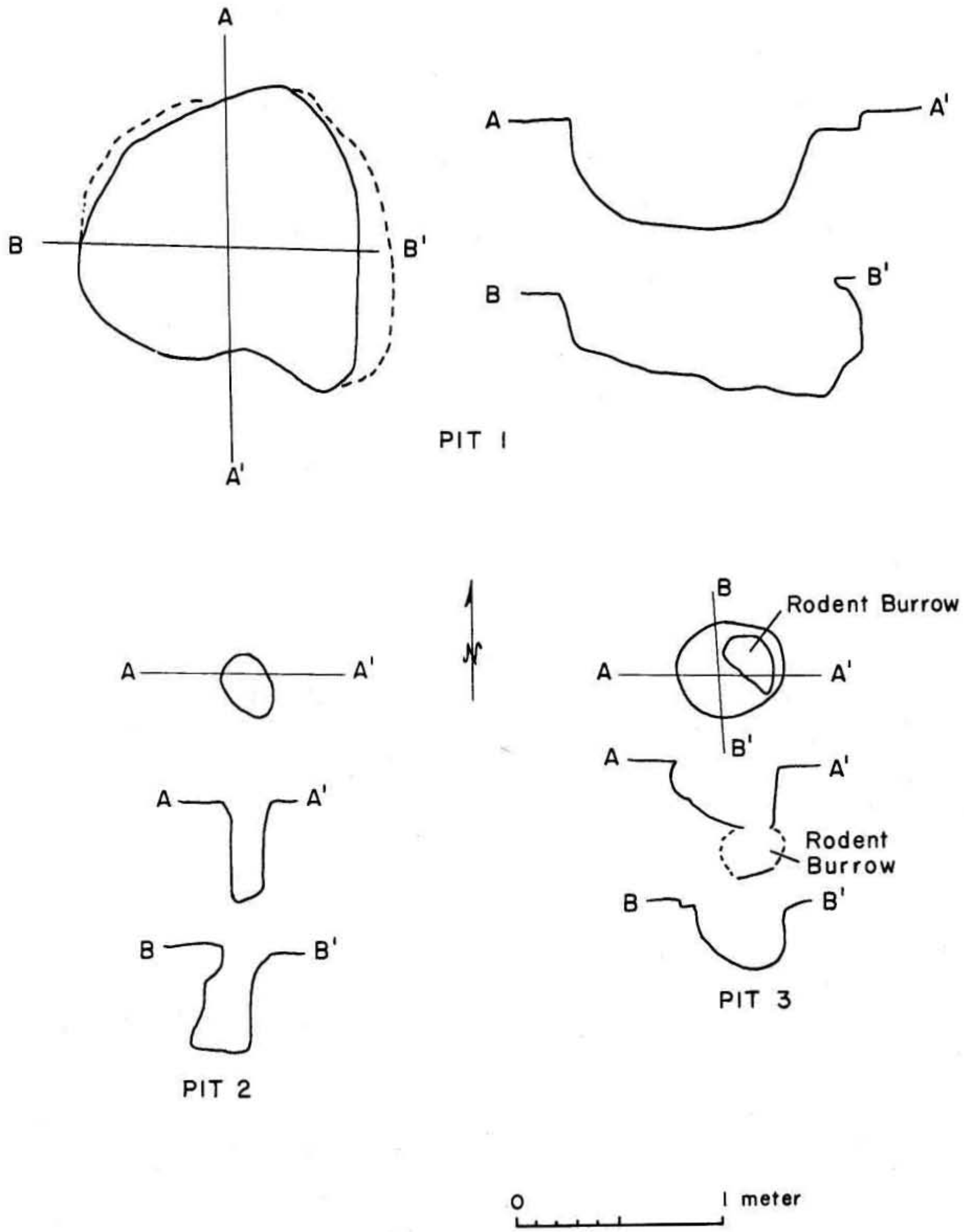


Figure 4.9. Room 7, Floor 1, Pits 1, 2, and 3

Floor 2 from which quantities of burned material were introduced into the clean, sandy fill of the storage pit.

Pit 2. This unlined, roughly dug, 12 by 10 cm oval pit that is 25 cm deep (Figure 4.9) may have been a post support, but it lacked shims, a basal slab, or shale packing--features common to postholes in other excavated rooms. It contained a single layer of clean, tan sand, which was screened through 1/16-in. mesh.

Pit 3. A circular pit of unknown function (Figure 4.9) was located in the approximate center of the room. It was 24 by 21 cm in size and 17 cm deep. Animal disturbance had obliterated the base of this feature. The walls were not plastered, and the ones that remained had evidence of calcium carbonate deposits. Two layers of fill had been disturbed. Layer 1 was made up of 9.5 cm of fine, tan, unburned sand; although it contained many burned twigs, these probably represent animal disturbance. Layer 2, 7.5 cm of moist, fine-grained, yellow, sandy soil, has charcoal only in areas where animal burrows were present. All fill was screened through 1/16-in. mesh.

Pit 4. This was an animal burrow, not used prehistorically.

Pit 5. This was another animal burrow, not used prehistorically.

Pit 6. This oval pit (Figure 4.10), located next to the west wall (Figure 4.8), was constructed as a burial pit for an infant (Burial 4, Chapter 12). Measuring 36 by 55 cm at the surface, it belled out as much as 5-7 cm near the base (28 cm deep), which cut through the lower floor but did not extend below the west wall foundations. The unlined walls were difficult to outline. They had been cut into soft, gold-tan sand. The irregular floor beneath the body was a clayey, brown sand and was irregular, just like the pit walls. The pit was probably dug at the end of the occupation of this room. Although the pit was covered with a series of small sandstone slabs less than 20 cm long that were set in plaster to seal the pit, an animal burrow containing unburned amaranth seeds was found overlying the skeleton, but the seeds were not associated with the burial. The pit fill was predominantly clean sand scattered with sparse charcoal, a few nonhuman bones, and sherds. A thin layer of lensed sand was found about halfway down; it may represent wash that came down between the rocks that plugged the pit. The burial was placed in the pit in a partially extended position with its legs bent up against the south wall. The only offering was one large, corrugated sherd, which was placed so that it partially covered the skull. See Chapter 12 for details regarding this burial. However, on Floor 1, next to the west wall just south of Bin 1 and immediately north of Pit 6, was a portion of a Crumbled House Black-on-white bowl that may or may not have been an associated grave offering. All fill was screened through 1/8-in. mesh.

Posthole 1. Posthole 1 was nearly circular (19 cm east to west and 18 cm north to south) and 37-38 cm deep (Figure 4.11). There were 2-3 cm of clay coping on the south and west sides, and the interior of the pit

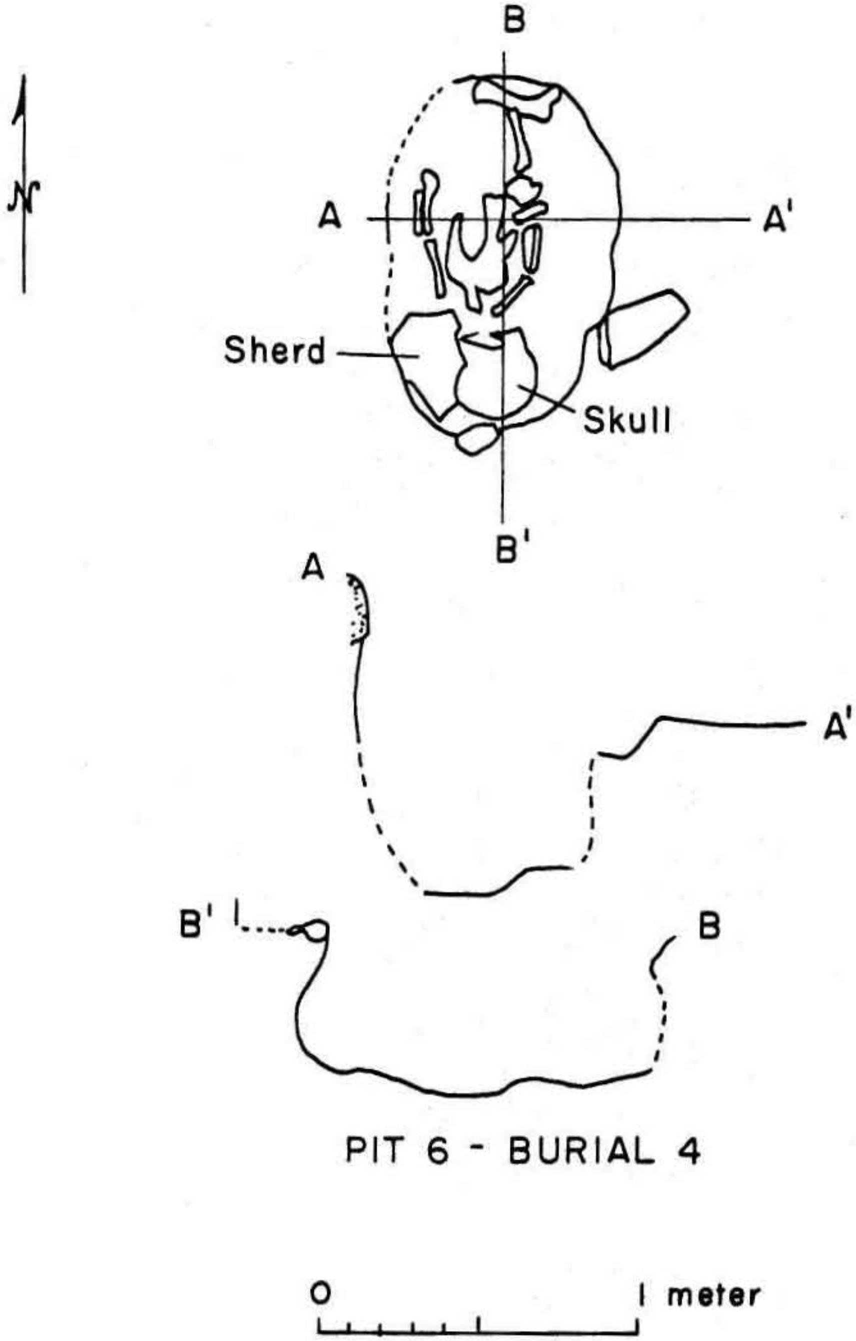


Figure 4.10. Room 7, Floor 1, Pit 6

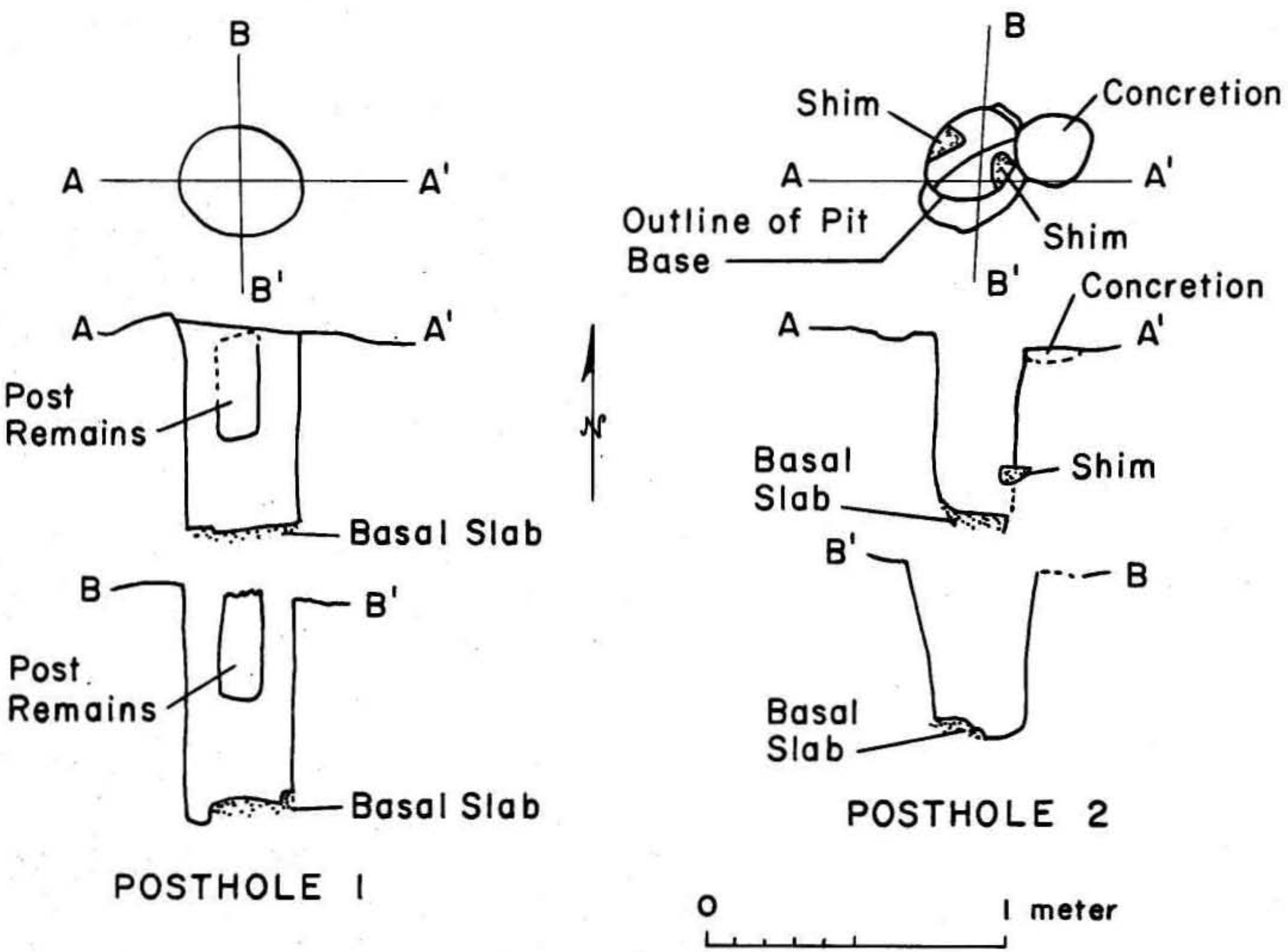


Figure 4.11. Room 7, Floor 1, Postholes 1 and 2

was plastered. The hole retained part of an unburned wooden post fragment, which was found 26-27 cm below the rim; however, it crumbled to pieces during removal. This post was 7 cm in diameter and was surrounded by basal slabs. Clean sand containing no artifacts completed the fill of this posthole. No pollen or flotation samples were collected, and no artifacts were recovered.

Posthole 2. Around Posthole 2, Floor 1 coped upward slightly on the west side, and the floor was burned slightly along the west side of this pit but not in its interior. A roughly circular hole 24 by 16 and 26 cm deep, with the base circumference smaller than the rim (Figure 4.11), was considered a posthole because of its size and the presence of shims at a depth of 19-20 cm below the floor. A thin coat of plaster was mostly washed off the sides. The shims were offset west of center, with one basal slab on the south and two lateral shims on the east and west that ran back into the pit walls. No post or post impression remained. A single layer of tan, sandy soil with scattered, sparse, charcoal flecks throughout filled the rest of the posthole, but there was no evidence of burning. All material was screened through 1/16-in. mesh. On the east side of this feature, an unmodified concretion had been set into the floor surface (Figure 4.8).

Rodent Holes. In addition to Pits 3, 4, and 5, which were attributed to animal burrowing, two rodent holes (RH 1 and RH 2, Figure 4.8) were identified. This considerable amount of disturbance made it difficult to determine whether artifacts were originally part of the floor material or associated with the dense trash deposits of fill just above Floor 1. Rodent Hole 1, 31 cm in diameter, was not completely excavated. It contained trash mixed with burned sand and charcoal.

Floor 1 Artifacts. As noted above, there was considerable animal disturbance in this room. Pottery overlying the first floor included a mix of types: Mesa Verde Black-on-white, McElmo Black-on-white, Chaco-McElmo Black-on-white, and wares with trachybasalt tempers (Crumbled House Black-on-white and Nava Black-on-white) that are equivalent to the first two. The decorated wares were present in sufficient numbers to indicate that site occupation continued into the A.D. 1200s (Toll et al. 1980:100, 114) although the percentages of St. Johns Polychrome in the floor fill of this room might indicate persistent site use into the later period (Carlson 1970:31?, McKenna and Toll, Chapter 7). St. Johns Polychrome is not well dated in Chaco Canyon, and site survey indicates a very limited distribution of this ceramic type (Windes, personal communication, 1979).

Burial 3. Located on the surface of Floor 1 in the northeastern corner of the room (Figure 4.8) was an adult male who was lying face down with his head turned slightly to the east and his knees pulled up. A large, ground sandstone slab covered his crushed skull, and several offerings were associated with the body (see Chapter 12). It was felt that animals had disturbed this partially exposed burial because his bones were somewhat scattered and a few were missing.

Fill Between Floor 1 and Floor 2

Layer 7 (intentional fill, sand, and clay). Between the first and second floors of Room 7 was a 2-7-cm, thin layer of very compact, light tan, sandy soil, which contained scattered small chunks of partially melted adobe. No laminae were noted, and very little cultural material, apart from sparsely scattered charcoal flecks, was found. This layer and Floor 2 (lower floor) were apparently removed in the eastern half of the room when the overlying surface (Floor 1) was constructed.

Floor 2 and Associated Features

Floor 2. This surface located from 84-92 cm below Datum A was 12.11 m^2. It was constructed early in the use of this area and was only partially complete; the eastern half had been removed prehistorically (Figure 4.12). In the western half of the room where portions of the floor remain, the floor surface is a thick gray clay with evidence of two plasterings. Although there is little or no fill between these coats, the upper layer broke cleanly away from the lower one during excavation. The combined thickness of these two surfaces was between 0.75 and 1.0 cm. Although the upper surface of Floor 2 is a smooth, nicely polished surface, it is not flat, and in certain areas it dips below the lower plaster level. Unlike Floor 1, which was very discontinuous, only one section of the upper plaster was in poor condition. This area was near the center of the room. Extensive rodent disturbance was noted in pits and along the floor surface. The presence of a hearth/firepit is indicative of its use as a living room during the initial occupation. Two storage areas were also present.

Floor 2 Features. Because of the removal of part of this floor during later remodeling of this room, there is limited information on floor features. Included are half of a firepit, a large storage bin, and a small storage cist. One additional feature, Pit 1, had evidence of extensive animal disturbance and is of uncertain prehistoric origin. Table 5.3 in Chapter 5 lists these features and their characteristics.

Firepit 1. This substantial hearth, which unfortunately was partially removed prehistorically (Figure 4.12), indicates that this room may have functioned originally as a living room. The firepit was 52 cm across and 21 cm deep in its remaining extent. Four layers of fill were discerned. Layer 1 consisted of 2-11 cm of light gray ash and scattered charcoal. Layer 2 was 4-18 cm of fine, purple sand with scattered charcoal; there was evidence of animal disturbance at its base. Layer 3 consisted of light tan sand with scattered ash and charcoal; again, animal disturbance was noted. Layer 4 was light gray ash. The hearth was plaster-lined and red at the base. One archeomagnetic sample provided a date of A.D. 1120 ± 26 (ESO 1676). This feature had been truncated when Pit 1 of Floor 1 was dug, and no plan or profile of the feature was drawn.

Pit 1. The function of this irregularly shaped, unplugged 75 by 24-28-cm pit that was 12 cm deep has not been defined (Figure 4.13). It

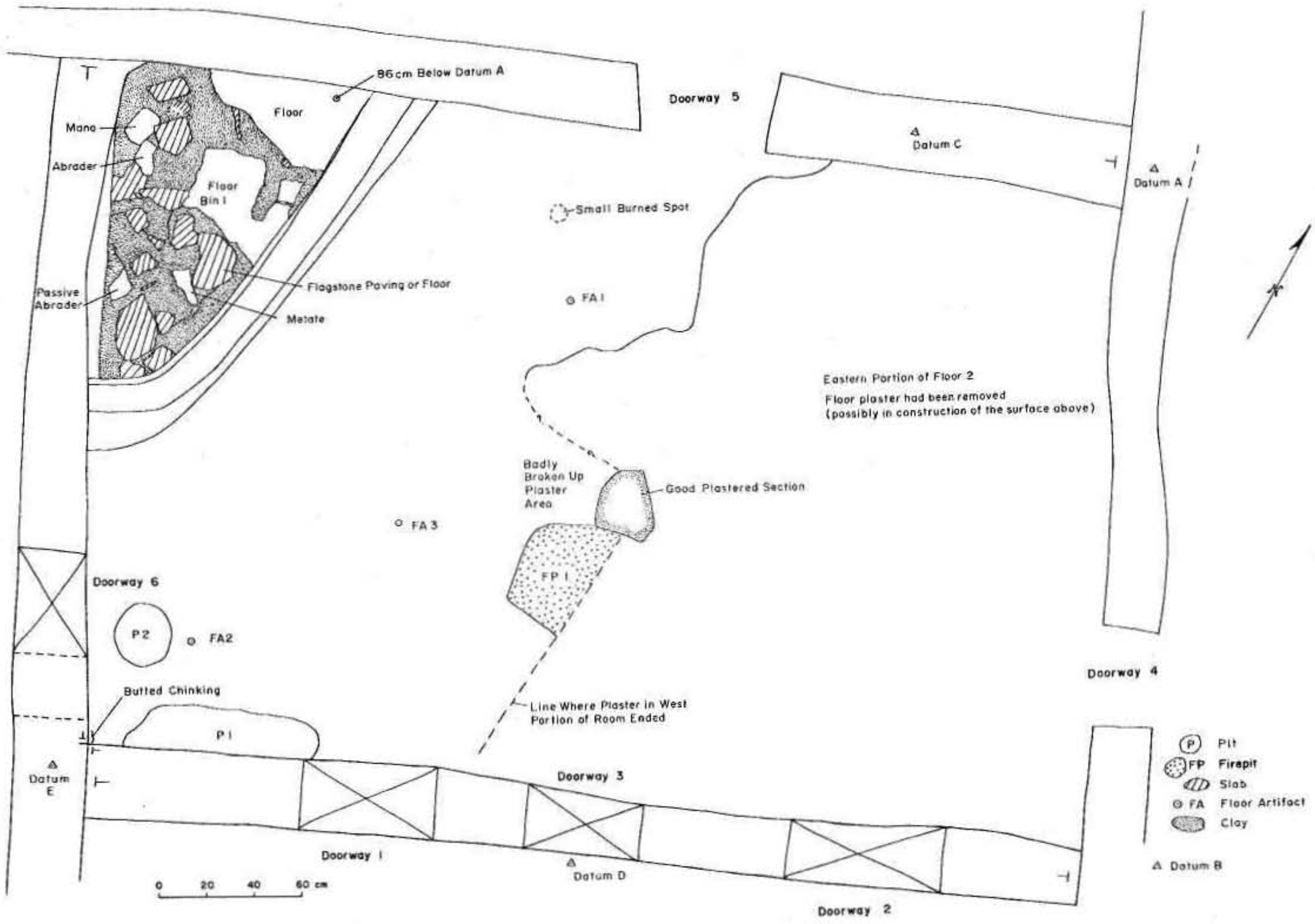


Figure 4.12. Room 7, Floor 2, plan view

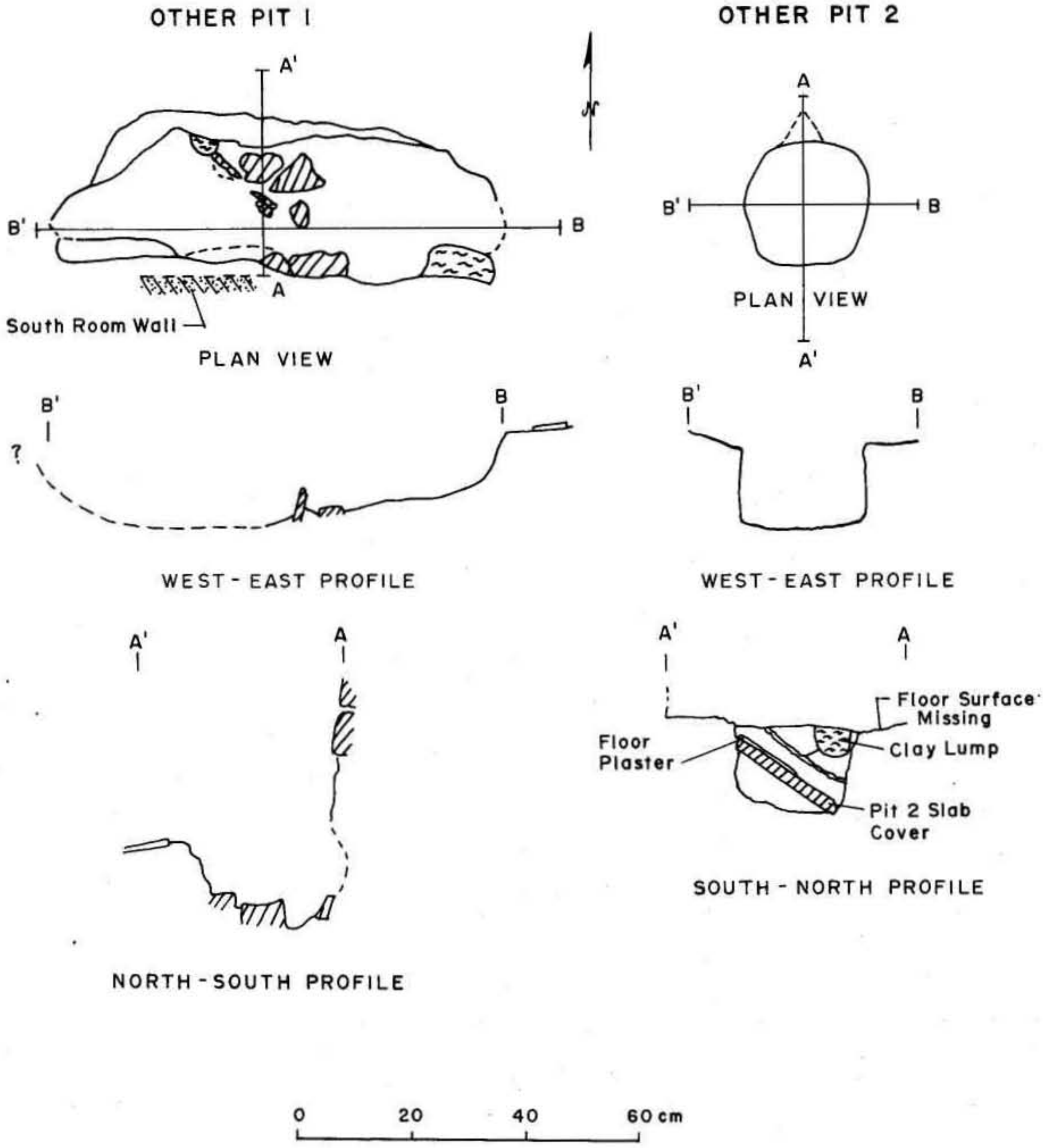


Figure 4.13. Room 7, Floor 2, Pits 1 and 2

may have been the result of animal burrowing. The fill consisted of clean, tan-gold sand with scattered pieces of sandstone near its base. Two animal burrows were evident in this fill.

Pit 2. This is a small-volume storage cist with an estimated 5,300 cc capacity. A ground, circular, sandstone cover had collapsed into the fill. This lid was covered with gray plaster, which indicated that it had once been cemented into the Floor 2 surface; some red pigment also adhered to its surface.

This pit was 22 cm in diameter and 15 cm deep and had patches of clay on its sides and bottom, but the plaster was not continuous. Three layers of fill were identified. Layer 1 consisted of about 5 cm of lumpy, brown-gray clayey sand. Layers 2 (3 cm) and 3 (7 cm) were distinguished because a sandstone slab separated the fairly clean, tan-gold sand that was characteristic of both of them. Animal disturbance was minimal and was recorded only in Layer 1. All fill was screened through 1/8-in. mesh.

Storage Bin 1. The northwestern corner of the room was walled off at the time the first plastering on Floor 2 occurred. There is no doubt that the bin wall was constructed in conjunction with Floor 1. The block of clean sand that underlaid the bin wall and went below Floor 2 was left purposely in the northwestern corner of the room. It also underlaid the entire west wall.

A triangular enclosure was created by a flat-laid masonry wall that abutted the midsection of the west wall and the western end of the north wall. This enclosure measured 1.04 m on the north, 1.35 m on the west, and 1.76 m on the bin wall (Figure 4.12). It extended 45-68 cm above the floor when excavated; its original height is not known. The small amount of rock found on the floor adjacent to this feature would have constituted only another two courses, or about 15 cm, for a total wall height of 83 cm. Although more height may have been added to the original structure during its continued use throughout the room occupation, no breaks in masonry were apparent. This wall had no foundation and was seated on clean sand. The soft, friable, light tan sandstone masonry extended 2-5 cm below Floor 1 and contained numerous spalls. A single coat of bin wall plaster, 0.2 cm thick, covered both sides of the room-facing bin wall. The adjacent north wall had almost 2 cm of plaster that passed behind the bin wall, which indicated that the room walls were not replastered after the bin construction during the first use of the room. Although most of the remaining bin plaster was left intact, remodeling was not noted even in the area where the bin wall curves to meet the west wall. The curving portion of the bin wall was the only segment with no plaster remaining on either face (Figure 4.14). There was no indication of a doorway connecting the bin with the room, and no access to adjacent rooms was apparent in the room walls that were part of this storage bin.

Figure 4.15 is a profile of the east-west section of bin fill. Only Layer 1 resembled the fill in the rest of the room. At a maximum of 13 cm thick, it contained tan, laminated, sandy soil with gray clay lenses; it extended 17 cm below the top of the bin wall and was continuous with the

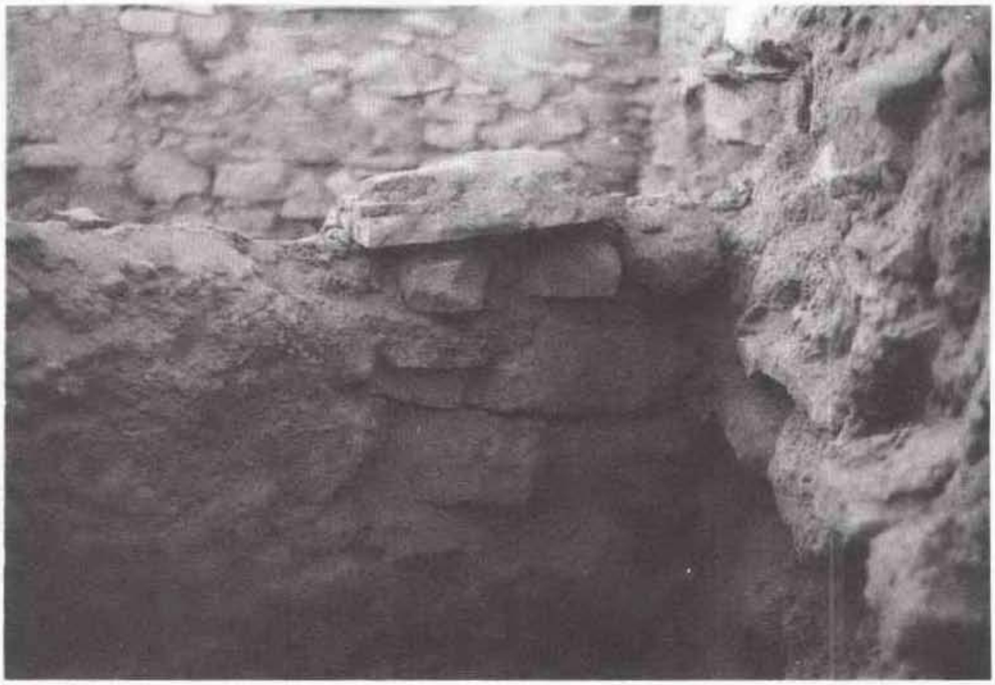


Figure 4.14. Room 7, Floor 2, Storage Bin 1, detail of curving wall (Chaco Project Neg. 19105)

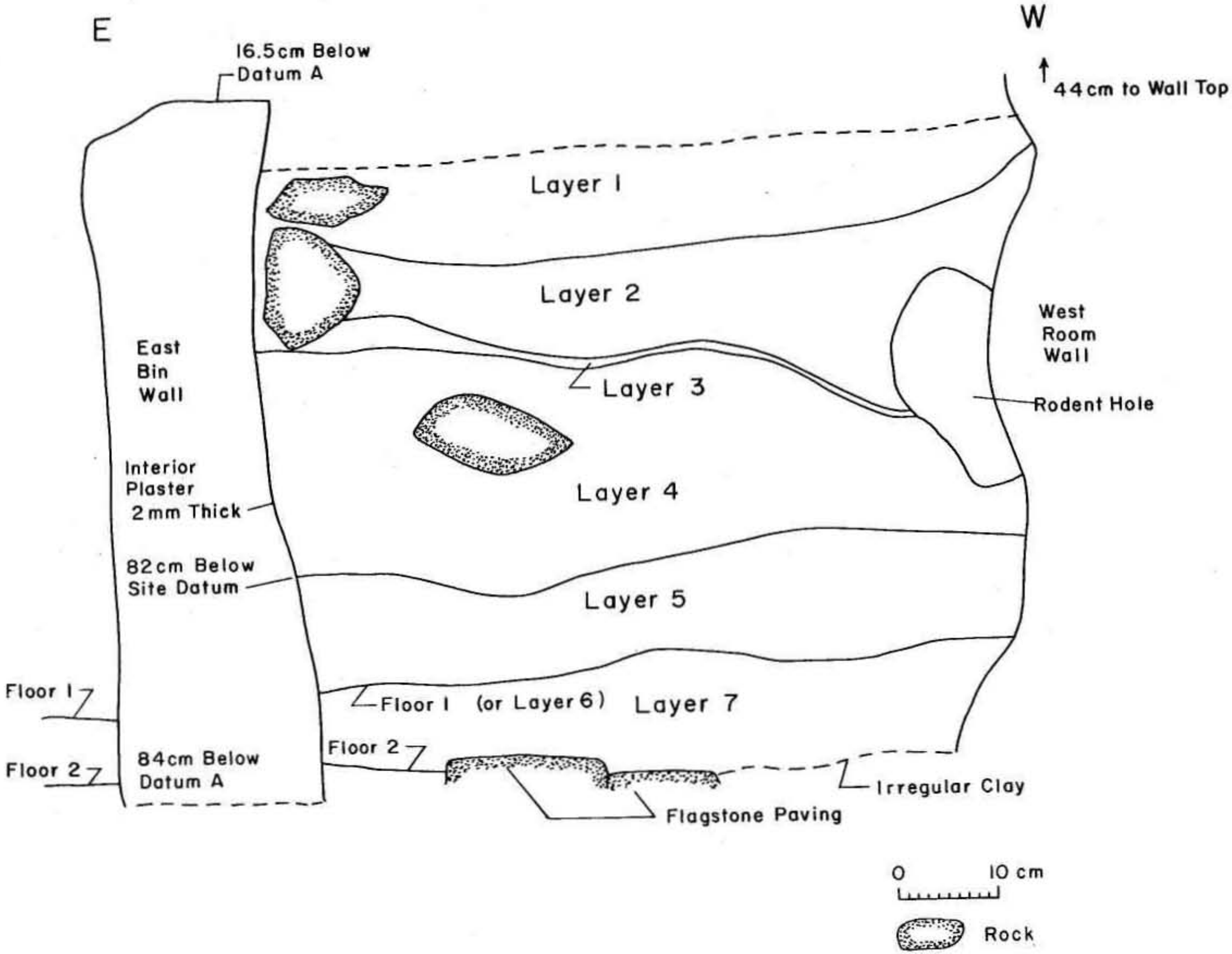


Figure 4.15. Room 7, Floor 2, Storage Bin 1, east-west stratigraphic profile

trash-rich Layers 2 and 3 in the rest of the room. Most of Layer 2 and the overlying Layer 1 in the rest of the room had been removed before the top of this feature was found.

Layer 2 in Storage Bin 1 consisted of 6-19 cm of sandy soil that was slightly darker in color than Layer 1. It contained dense concentrations of adobe chunks in a lensed sand, alluvial matrix. This layer sloped upward at the west wall, and the alluvial portion appears to have accumulated from this upslope direction.

Layer 3 consisted of only 3-5 cm of red-brown, compact sand and adobe. The sand was not burned but it had a high iron content. This layer was continuous across the bin.

Layer 4 was 11-23 cm of loosely compacted, sandy soil that contained scattered adobe chunks. It differed from Layer 2 in that it had smaller quantities of adobe; it also lacked alluvial lensing. A bone awl and a piece of turquoise were found next to the wall.

Layer 5 was separated from Layer 4 by a thin, discontinuous lens (12-16 cm) of gray clay. Although Layers 4 and 5 were similar in appearance, Layer 5, a soft, sandy soil with very little charcoal, contained a dense concentration of bones that included a number of turkey bones, none of which represented an articulated skeleton. Quantities of eggshell were also recovered, but dung, which might indicate that these birds were actually kept in this enclosure, was not found.

Floor 1 is synonymous with Layer 6; it was 0.5 cm thick, irregular, and discontinuous. Although dirt peeled off the surface, this possibly is only a contact between Layers 4 and 5. There was a concentration of brown spots, often typical of a floor, but a few turkey bones protruded through the surface. It is 73-75 cm below Site Datum A.

Layer 7 separated the first and second bin floors. It was 7-12 cm thick and consisted of small rocks in a tan-gold, unlaminated sand matrix. Rocks were more numerous at the top of the layer in the southern portion of the bin fill. Numerous discolorations attributed to animal disturbance were noted in this layer. Some late, carbon-painted, ceramics were recovered from this floor.

Floor 2 was a surface comprising sandstone slabs set in thick, gray clay (Figure 4.12). The plastered portion was a single coat thick. Flagstones included pieces of ground stone similar to those in the south wall of the room; they are a soft, sandstone anvil that probably was ground after it was set in the floor, an indurated sandstone abrader, a mano with evidence of only light use, and a metate fragment that had been reused for crushing and chopping before it was set in the floor surface. The presence of the flagstone flooring indicates that Floor 2 was used for food storage and limited food processing. Similar surfaces have been used both historically and prehistorically as work surfaces; they also prevent animal burrowing into stored food areas.

Floor 2, although plastered only once, appears to have accompanied the use of Floor 2 in Room 7. No late, carbon-painted sherds were found.

One shallow heating pit, Construction Heating Pit 1, was found below Storage Bin 1 (see below).

Floor 2 Artifacts. Despite the small volume of fill between the first and second room floors and the presence of animal disturbance in this floor, no late carbons or St. Johns polychrome sherds were found in association with Floor 2 or its floor features. No exotic materials and no worked pieces of stone were found in the small collection of chipped stone. One small turquoise bead and two shell beads were recovered in the fill.

Actual Floor 2 contact materials included one Gallup Black-on-white sherd and a piece of a slab cover. In addition, Pit 2 contained a ground, circular slab with floor plaster and red pigment adhering to one of its surfaces (see above).

Construction Levels

Layer 8 (construction debris and alluvial material). In the eastern half of Room 7 where Floor 1 was missing, a nonhomogeneous mixture of brown to gray adobe and sand with scattered charcoal and sandstone spalls was found (Figures 4.4 and 4.5). It contained some laminated sands and appears to be a mixture of alluvial material and construction debris. Several pockets of material of the same consistency, perhaps erroneously designated Layer 8, were found beneath Floor 2 in the western half of the room as well. The irregular nature of this layer obscured horizontal stratigraphic distinctions that would indicate what had been deposited with the upper and lower floors. Most pockets, however, appeared to be associated with the lower floor construction.

Construction Features. Near the base of Layer 8 and the room wall foundation were two firepits that were associated with the initial construction of Room 7. This location may indicate that they provided heat during construction of the foundations and/or walls. A burned feature that was found directly below Floor 2 also may have been associated with construction. None were slab-lined or finished with plaster, and no associated surfaces were noted.

Construction Firepit 1 (heating pit). Figures 4.4 and 4.5 indicate the location of this possibly oval area that was scooped out of the sandy soil in the western half of Room 7. About 5 cm of the pit's south edge was truncated when the plan view was drawn (Figure 4.16); its profile can be seen in Figure 4.5. The remaining area is about 68 by 48 cm and about 10-15 cm deep. It contained over 25,000 cc of ash and burned sand; such a large quantity, not usually found in small site firepits, indicates that it represents more than a single, small, hand-warming fire. It was deeper than Construction Firepit 2 and extended down as far as the base of the east wall foundations (which are lower than those of the west wall).

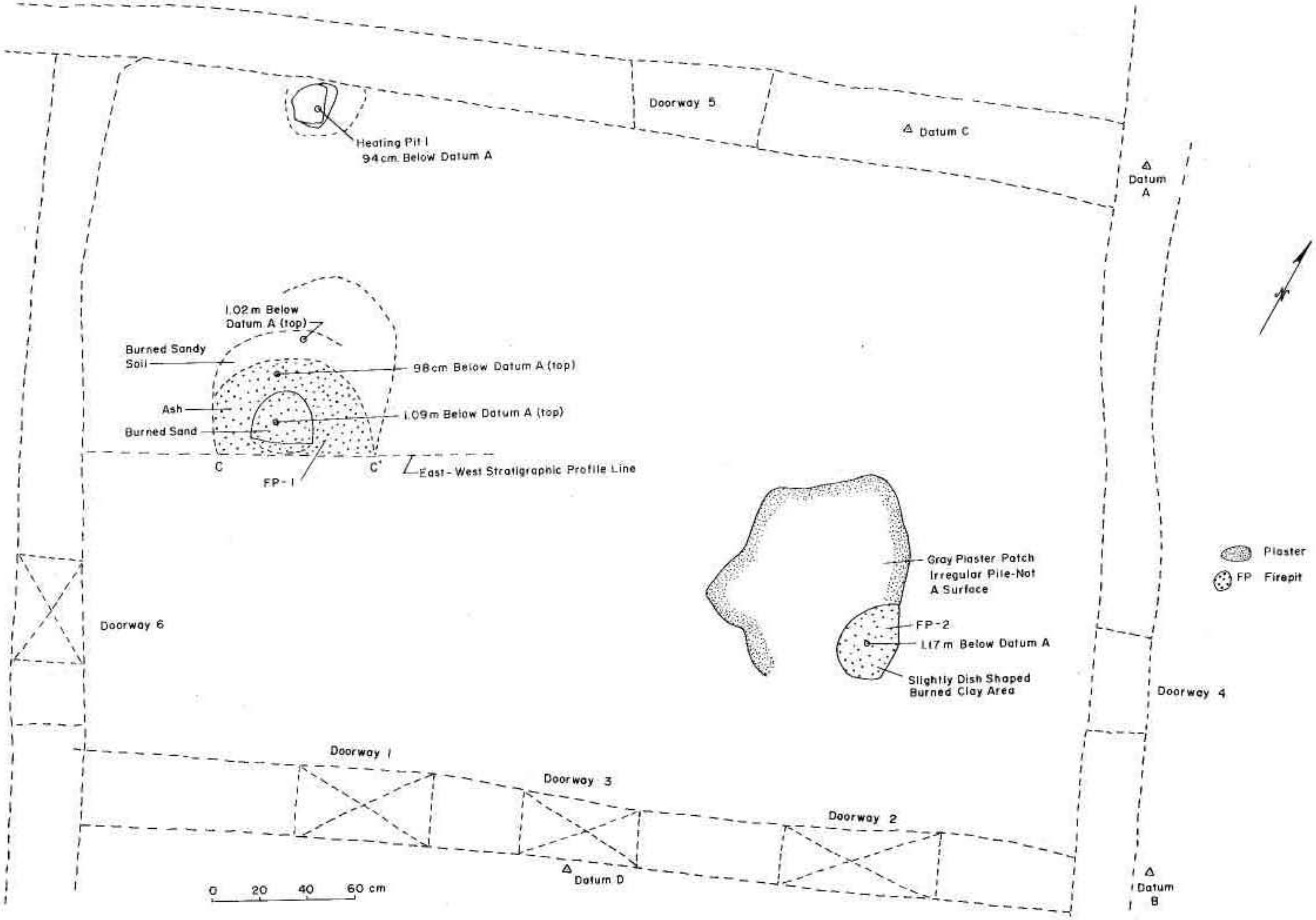


Figure 4.16. Room 7, plan view of Layer 8, below Floor 2, that indicates location of construction heating pits

Beneath this pit, Layer 8 was composed of clean sand intruded by several animal burrows (Figure 4.4).

Construction Firepit 2. Located in the southeastern portion of the room (Figure 4.16), this firepit was an irregular feature, 26-30 cm in diameter and about 3-6 cm deep, that had been scooped out of the sandy soil. A discontinuous expanse of gray clay, located north and west of this feature, probably represents an irregular pile of adobe melt rather than an associated surface. Only a small amount of charcoal-flecked trash remained, which was insufficient for collection.

Construction Heating Pit 1. Beneath Floor 2 and beneath the northeastern corner of Storage Bin 1 was a burned area originally thought to have been associated with the overlying feature (Figure 4.16). It was 8-10 cm below the floor, and it ran beneath the storage bin and the north room wall up to the north wall foundation (this wall was offset from its foundation). The pit was roughly circular, 20 by 20 cm, about 5 cm deep, and filled almost entirely with a sandstone slab that had been plastered into place with gray clay (Figure 4.17) that resembled the clay used on Floor 2 and the wall foundations. The remaining pit fill consisted of about 2 tablespoonsful of brown sand with ash and charcoal and a few pieces of scorched wood. The adjacent north wall footing was not fire-reddened, and the heating pit probably was not used extensively.

None of these features was sampled for archeomagnetic dating. Despite its large size, Construction Firepit 1 had virtually no areas of burned clay, whereas Construction Firepit 2 was too small to provide a sufficient collection of cubes.

Layer 9. In the eastern portion of Room 7 was a layer of clean sand mixed with a small amount of charcoal and a few sherds (Figure 4.4). There was no evidence of animal disturbance. This layer sloped downhill toward the east. The sherds did not indicate an earlier occupation of the ridge in this area.

Layers 10 and 11. Test areas in the northeastern corner of Room 7 contained the same fine, lensed sand as Layer 9 but without cultural material. These were the deepest natural layers exposed; they extended 83 cm below Floor 2, but bedrock was not reached (Figure 4.4). Additional testing below cultural strata made along the middle section of the south wall and in the southwestern corner of the room revealed only meandering, animal burrows. In contrast, Test Trench 2, which uncovered the north wall of Room 8 (see below), reached bedrock at 60 cm below ground surface. This trench was downslope, but the depth of the sand layers in Room 7 was lower and may indicate an aeolian pocket on this ridge where the house was located. Its extent and the true meaning of the differences in bedrock depth are not known.

Walls

Wall Foundations. All four walls of Room 7 had gray clay foundations that ranged from 6-26 cm deep (Table 4.1). Because they followed the

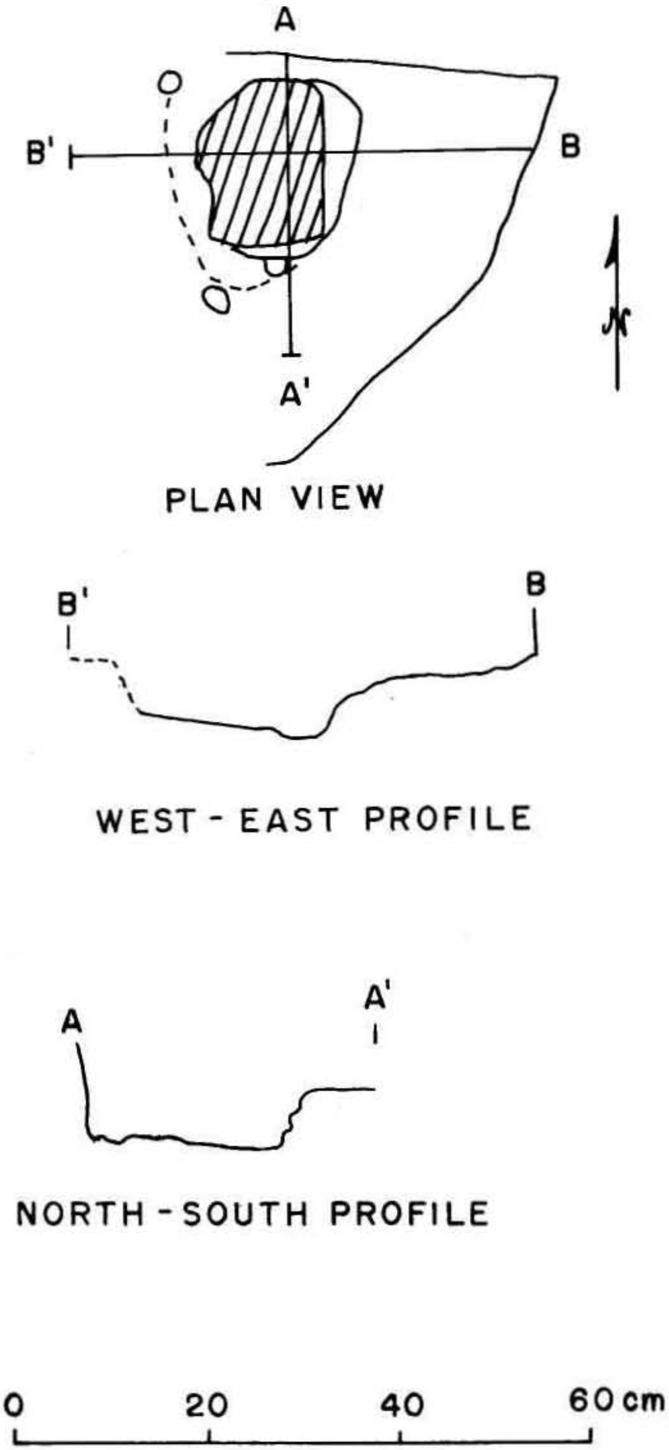


Figure 4.17. Room 7, Floor 2, Heating Pit 1

natural ridge topography, the shallowest footings were located on the upslope side of the room beneath the west wall and the west end of the north wall (Figures 4.18 and 4.19). The deepest foundation was located beneath the midsection of the north wall where the ridge runs downslope to the north beneath Room 8.

Table 4.1. Room 7, wall foundations and wall heights

Wall	Foundation (cm)	Wall Height (m)
South	14-16	0.81-1.13
East	14-24	0.94-1.18
North	6-26	0.86-0.96
West	9-10	1.02-1.07

The wall foundations were not set in trenches but were laid directly on the ridge sand. The footings were set as a unit, much like those in some large town sites (Lekson 1984:15). The overlying walls, built at a slightly later date even though no fill overlaid the footings beneath the structural walls, were offset from 6-10 cm in some cases (Figures 4.20 and 4.21).

Although the source of gray clay used in the construction of wall foundations is not known, it is similar to that found at other large and small sites in Chaco Canyon (Akins and Gillespie 1979; Windes 1987:144; Lekson, personal communication, 1979). A clay mixing pit at nearby Site 29SJ 628 (dating to A.D. 700s or 800s) contained material that Charles T. Johnson (University of New Mexico Geology Department, 1979) thought was derived from the decomposing Menefee shale that erodes beneath the Cliff House sandstone formation that composes the canyon walls in this rincon.

Wall Masonry. Because the wall samples were too small and inconsistent (Figures 4.18 and 4.19; Table 4.1), no design-style analysis was undertaken. Most of the stone incorporated into the walls of Room 7 was a light-colored, friable sandstone that is available at the base of the talus slopes around the rincon. Some dark, indurated sandstone similar to that used in the larger towns was also present in the Room 7 walls; some of these may have been reused ground stone. Although ground stone was noted in surprising quantities in the wall fall, the only similar stones found in the standing walls were near the wall tops and along the south wall where the plaster was largely missing. In the excavations at nearby Site 29SJ 627, few metates and little wall fall were recovered (Truell 1986:149; 1987:168). It is possible that inhabitants of 29SJ 627 moved uphill and used materials collected from their earlier home to build 29SJ 633.

The expediency apparent in the wall constructions at 29SJ 633 resulted in an irregular product. No clear lines of contrasting masonry were discerned that would indicate that the ground stone was incorporated as a remodeling episode or was only associated with the later occupation. Although some remodeling was noted, the masonry was not of a consistent

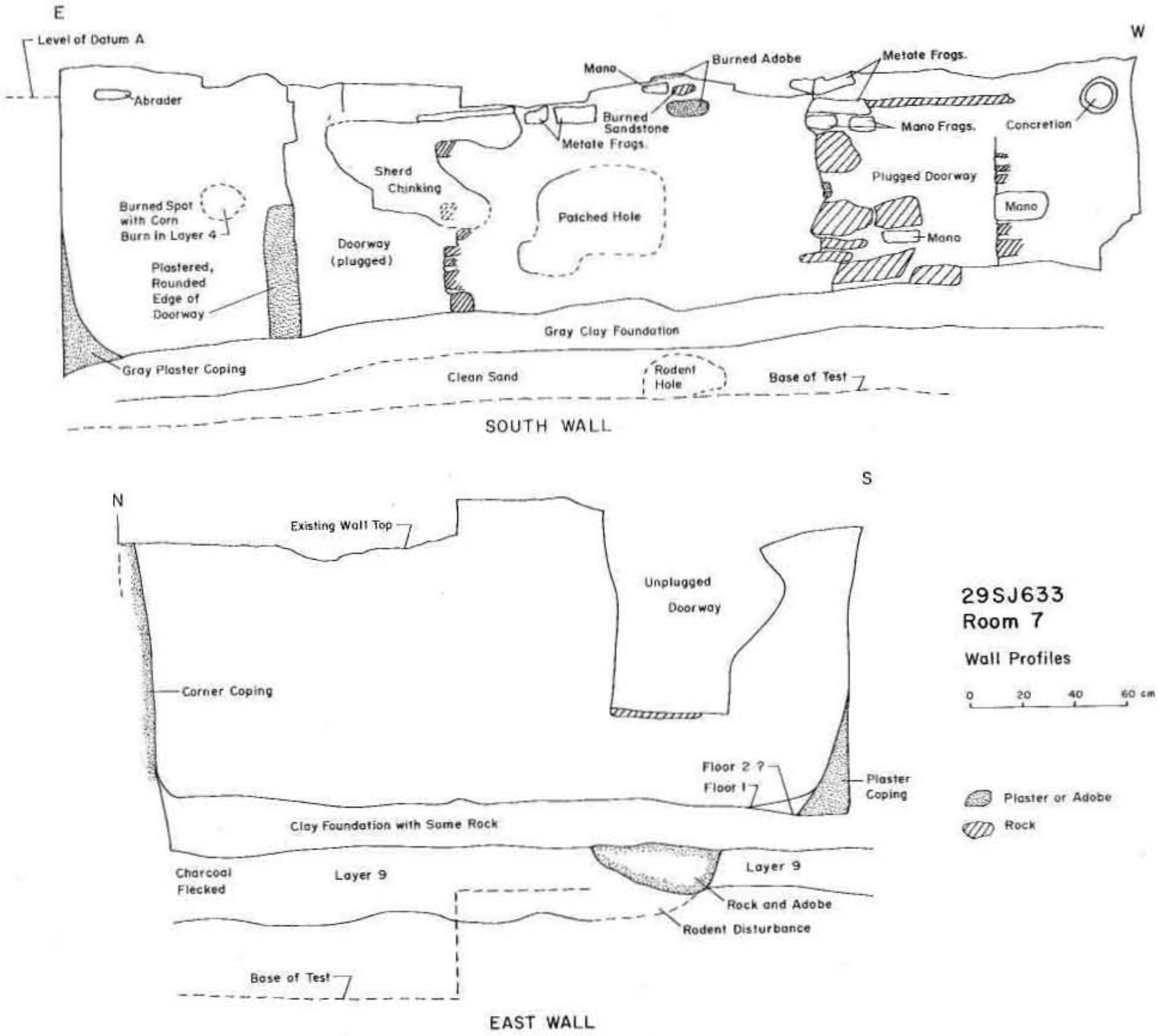


Figure 4.18. A. Room 7, south wall elevation
B. Room 7, east wall elevation

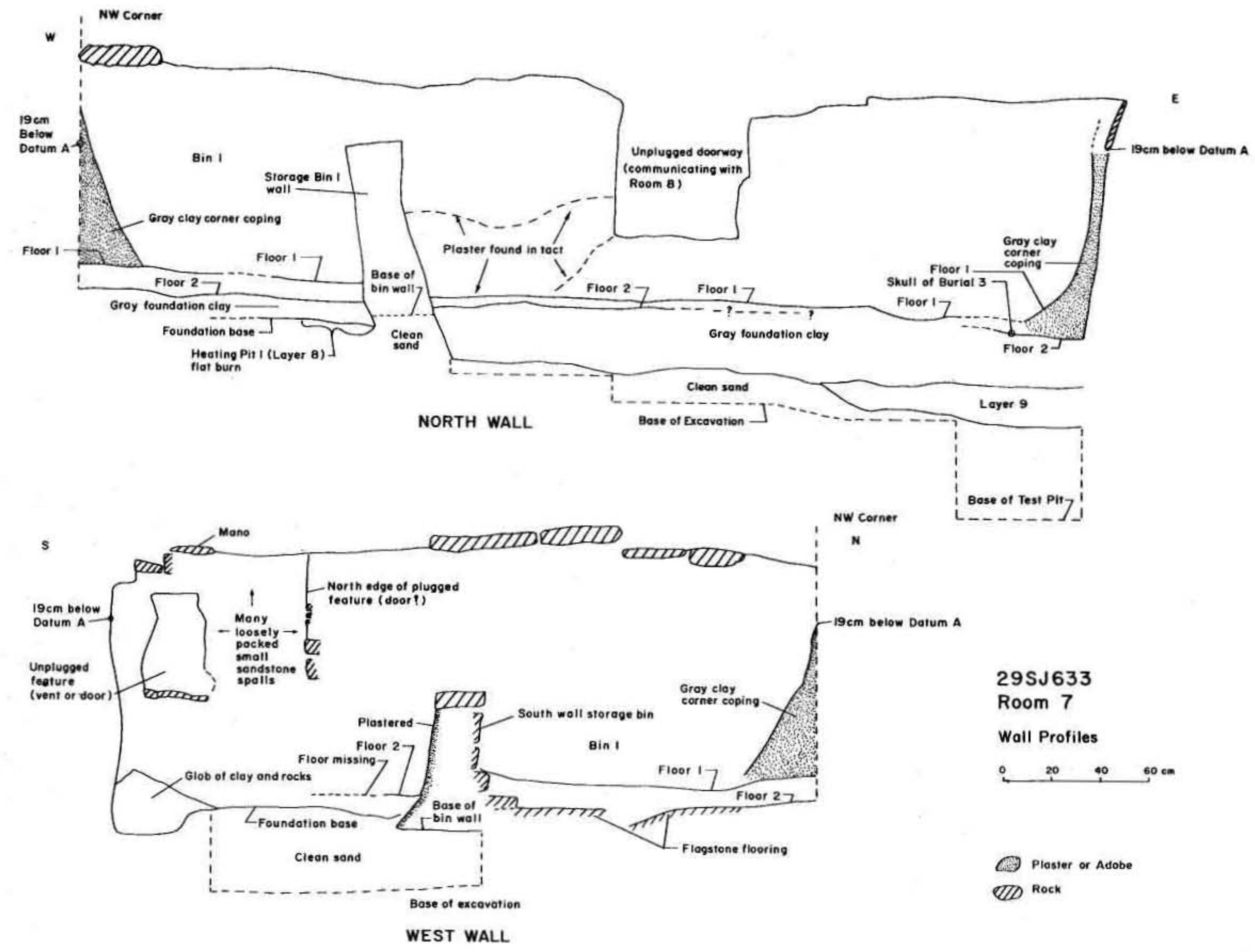


Figure 4.19. A. Room 7, north wall elevation
B. Room 7, west wall elevation

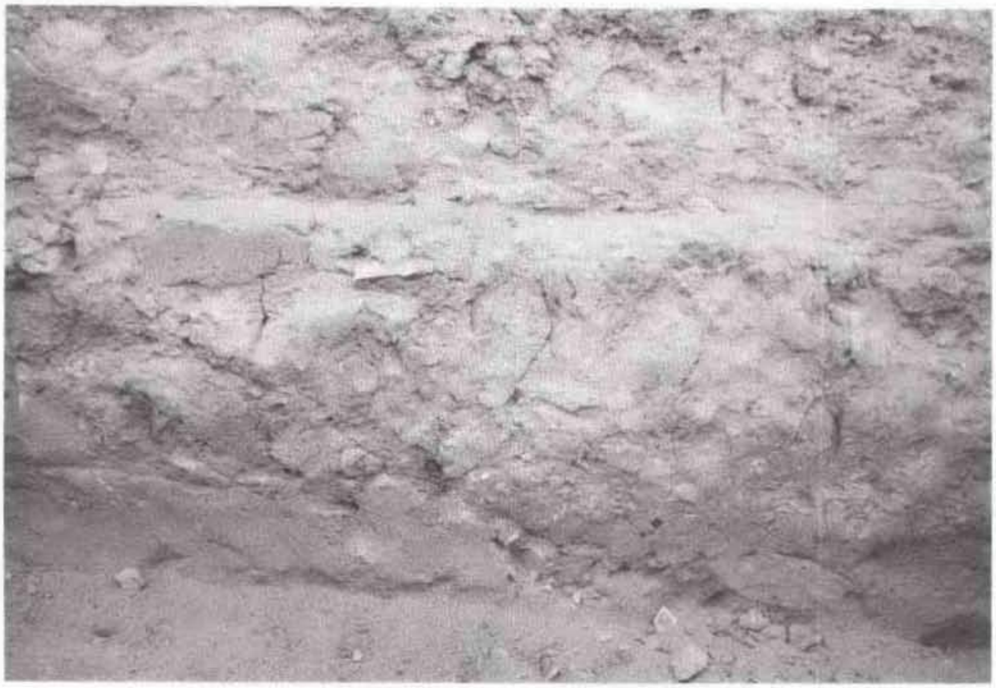


Figure 4.20. Room 7, clay foundation under north wall (Chaco Project Neg. 19108)

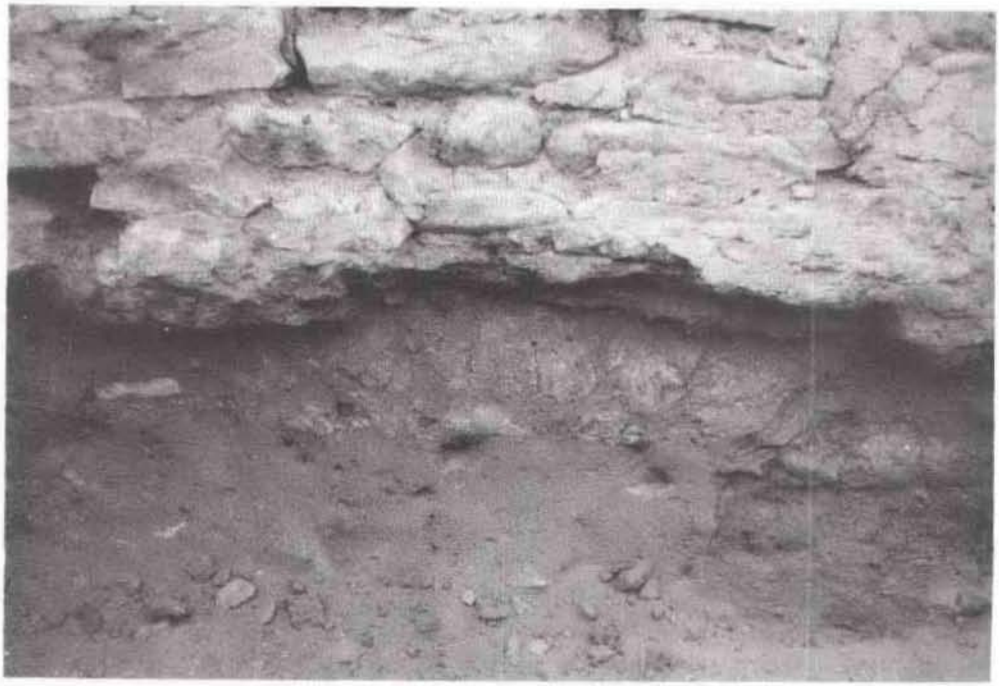


Figure 4.21. Room 7, clay foundation under south wall (Chaco Project Neg. 19106)

style across any surface in which additions were clearly evident. Chinking was used predominantly in areas that were remodeled or around plugged or added wall features. The chinking material was either soft sandstone or potsherds, with the former being more common than the latter.

The wall junctions of Room 7 are shown in Figure 4.3. Although the foundations were laid out as a unit, the upper walls give no hint that an orderly pattern was followed during their construction.

South Wall. This wall was seated on 14-26 cm of gray clay foundation and was 0.81-1.13 m high. The wall base in the western corner was about 23 cm higher than it was in the eastern end to conform to the ridge configuration (Figure 4.18a).

The wall masonry was varied and ranged from small spalls (2-5 cm long) to large slabs (25-35 cm long). This range is greater than that present in the west wall. Little grinding and no pecking were found in the south wall stones except on the surface of reused ground stones, which included a number of metates and a few mano fragments.

An unusual round concretion, 13 cm in diameter, was set into the masonry about 7 cm from the south room corner. Its concave side faced the room's interior (Figure 4.22), and it was filled with gray clay. A slight amount of grinding was noted only around the opening of the concavity. Several small sandstone slabs and 17 corrugated sherds that were not removed surrounded it. It seems unlikely that the sherds would have matched those found in the plugging material of Doorway 3, which were probably of later construction.

One section of wall plaster east of Doorway 2 was burned where it was in contact with the burned vegetal material described in Layer 4 (room fill).

The south wall has three plugged doors, which were originally framed by small, carefully shaped spalls and later filled with reused ground stone, small sherd and spall chunks, and blocks of varying sizes. This gives the wall the appearance of structural chaos. Door jamb construction also varied and added to the pattern confusion. The two larger doors were located to the east and west of the center of the wall (Figure 4.18a). A third, less evident break was located in the center of the wall. The bases of these features apparently extended all the way to the bottom of the walls and were at a height equal to the top of the wall foundation. None of the tops of the doors in this room could be identified. This wall had the largest number of doors for any single wall in this room.

Doorway 1. Located at the western end of the south wall, this doorway extended from the bottom of the wall (the foundation top) to the remaining course of masonry at 1.13 m. The width was 64 cm, and there is lateral bowing in the upper portion of the doorway. A mano was set into the door jamb so that its grinding surface faced the room interior (Figure 4.23).

Figure 4.22. Room 7, concretion set into south wall (Chaco Project Neg. 19089)

Figure 4.23. Room 7, Doorway 1, plugged doorway at the western end of the south wall (Chaco Project Neg. 19085)

Included in the plugging material were 3 manos, 3 metate fragments, and a large flat slab (54-56 cm long by 4 cm thick) that at first resembled a lintel; however, the doorjamb extended above it to the top of the remaining course of masonry.

Doorway 2. Located along the eastern end of the south wall, this doorway also extended upward from the base of the walls (foundation top) to above the remaining wall masonry (Figure 4.24). The doorway was 54-55 cm wide. It was plugged with moderate-sized building stones overlaid by very closely spaced, corrugated jar sherds set in gray clay. The area of sherds was roughly 60 cm and extended from the western edge of the door opening (Figure 4.25). A rounded coping of the same gray clay covered the eastern edge of the original jamb construction, which was still visible despite the later plug. A large slab had collapsed in the fill of the door opening, but as in Doorway 1, the jamb extended above this level (Figure 4.18a).

Doorway 3. Located in the center of the south wall, this break was indistinct and its dimensions are unknown (Figure 4.26). It was plugged from inside the room, but the plaza-facing side, found during excavation of Test Trench 1, was filled with dirt, which could indicate that only a thin veneer from the room's interior composed the fill (See Test Trench 1 below).

East Wall. The east wall had only 0.94-1.18 cm of masonry remaining. It was seated on 14-24 cm of gray foundation clay (Figure 4.18b). The masonry consisted of large sandstone blocks, and this wall may have been built in a manner similar to the west wall. At the base of the northern section of the wall, there were large areas that retained a coat of stiff, gray plaster that contained numerous sandstone spalls. Both the northeastern and southeastern corners had clay copings that extended a short distance above the lower floor (Figure 4.18b). The only wall feature was Doorway 4.

Doorway 4. This feature was located at the southern end of the east wall and contained loosely consolidated fill with some flat slabs near the bottom (Figure 4.27). If intentionally plugged, it represents a sloppy job. The base of the door was located 31-35 cm above the top of the clay foundation or Floor 2 surface. The opening was about 43 cm wide. It was about 9 cm wider than the long axis of the sill. The door jamb was lined with small sandstone slabs. A flat, ground slab, 34 cm by 2-4 cm thick, formed the sill.

North Wall. The north wall was between 0.86 and 0.96 m high and was offset slightly to the north of its 6-26-cm-thick foundations. Foundations ranged from 9 cm along the western end to between 22-32 cm on the eastern end, which presumably conforms to its ridge location and rock formation in that area. The western end of the wall also formed one wall of Storage Bin 1. The shallow foundation in the area of Storage Bin 1 was 9 cm deep. The north wall was 28 cm thick on the west side of Doorway 5 and 34 cm thick on the east side. Masonry consisted of a mixture of blocks of various sizes (Figure 4.28). Although it was plastered, it did not con-

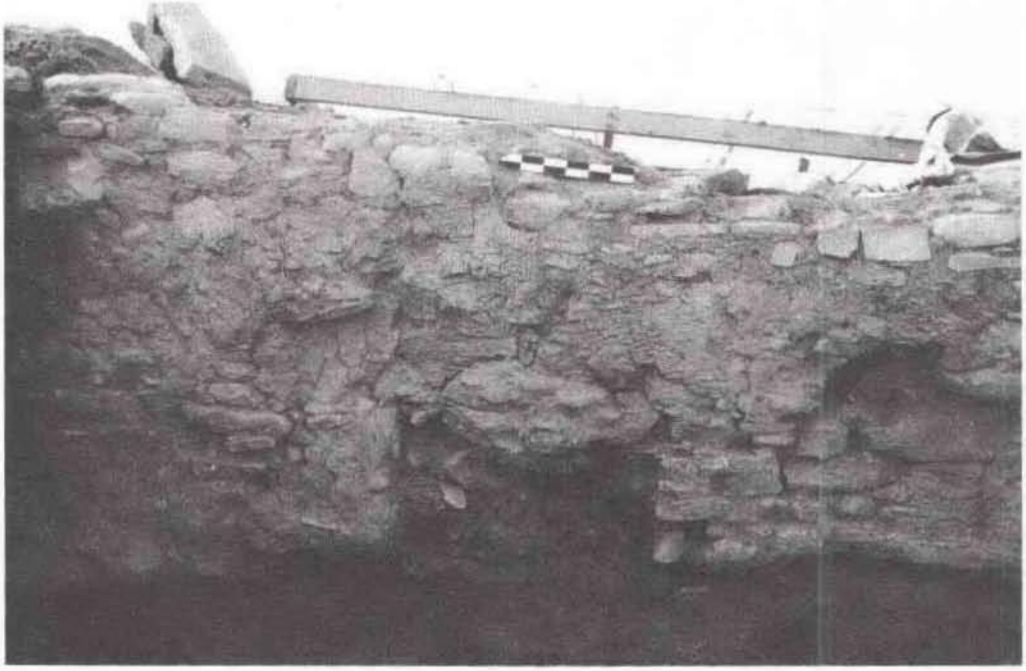


Figure 4.24. Room 7, Doorway 2, plugged doorway at the eastern end of the south wall (Chaco Project Neg. 19082)

Figure 4.25. Room 7, close view of chinking in plugged Doorway 2 at the eastern end of the south wall (Chaco Project Neg. 19087)

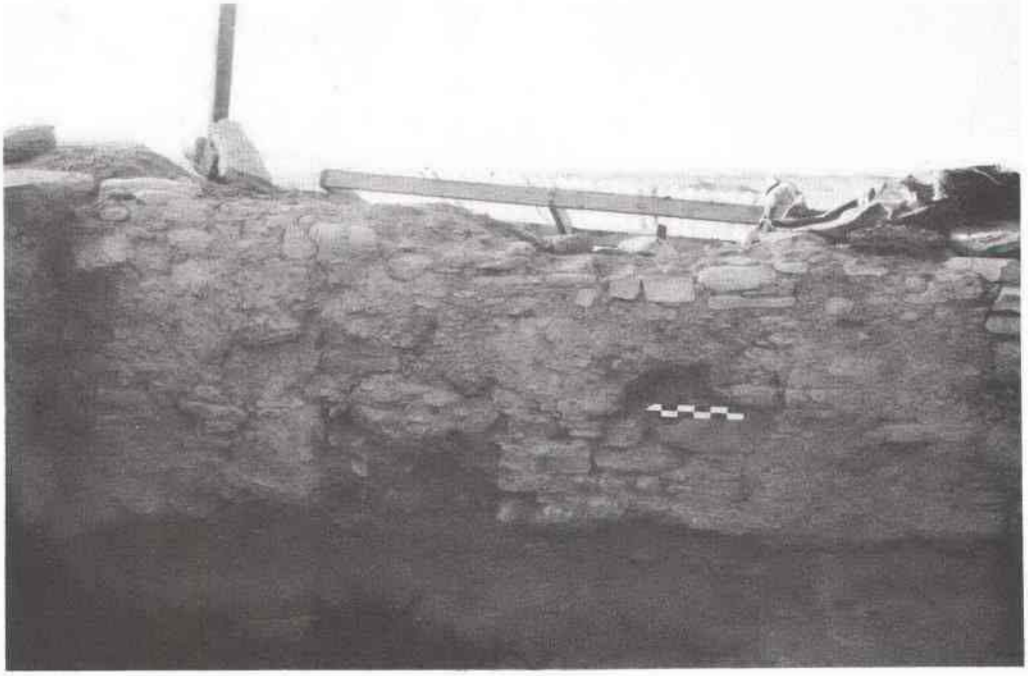


Figure 4.26. Room 7, Doorway 3, middle door in the south wall (Chaco Project Neg. 19077)

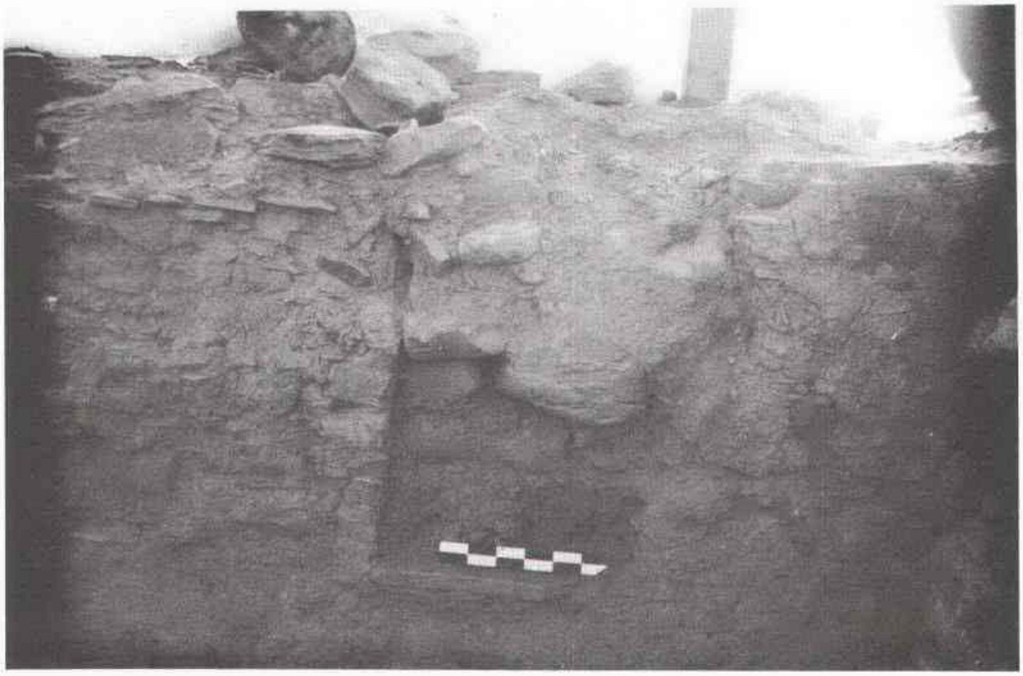


Figure 4.27. Room 7, Doorway 4, in east wall (Chaco Project Neg. 19079)

tain the numerous spalls present in the south wall. The eastern and western ends of this wall were better preserved than was the central portion, which had collapsed around Doorway 5.

Doorway 5. Located slightly east of center in the north wall, this unplugged doorway (Figure 4.28) provided access to Room 8, the storage room. It was lined up roughly with Doorway 3 in the south wall. The base of the doorway was 52 cm below the top of the wall (0.86-0.96 cm high). The sill slab was 37 cm long by 2-4 cm thick. The east jamb, which was made of sandstone chinks set between blocks, may have slightly narrowed the original opening. The west jamb edge contained all large blocks. Thickness of the north wall was 28 cm on the west side of the door and 34 cm on the east side. This feature was not excavated, even though both Room 7 and Room 8 were.

West Wall. Seated on 9-10 cm of gray foundation clay, the masonry in the west wall stood from 1.02-1.07 m high and was built almost entirely of large slabs of soft, friable, light tan sandstone that averaged 31 by 18-26 by 5-6 cm in size (Figures 4.19b and 4.29). The upper portion of this wall was leaning pronouncedly inward. The wall rocks were decomposing in place and, as a result, appeared more widely spaced than they actually were originally. The only variation from the larger soft slab construction in this wall was found around a plugged doorway located at the southern end (Doorway 6), which also contained a later-built wall niche or vent. Although no plaster was found on this wall, some plaster was found on the walls of Storage Bin 1, which was constructed of similar masonry. Thus, it is possible the west wall may have been plastered in a similar manner.

Doorway 6. Located on the southern end of the west wall, this feature measured about 20-25 cm. This doorway had been plugged with small, loosely packed, sandstone spalls set in brown, clayey sand and was subsequently reduced to a smaller wall feature (Niche 1 or Vent 1), which was offset slightly to the south of the earlier opening (Figures 4.19b and 4.30). These features were not excavated because the room on the west side of the wall was not dug and the wall was leaning inward. The base of Doorway 1 was about 45 cm above the surface of Floor 1 and had been partially obliterated on the south side of the jamb when Wall Niche 1 was built. A large slab and an additional small rock form the base of this Room 7 feature. The top of the door extended above the remaining upper masonry courses.

Wall Niche 1 or Vent 1. Located in the plugged Doorway 6 in the west wall, this feature measured 22-24 cm wide and 44 cm high. These dimensions are too small to be considered a doorway, but it was not possible to determine whether this was a wall niche or an interior (or window) vent. Both of these features are very unusual in the excavated sample of small house aboveground rooms. As far as can be determined, a vent occurred in only one other case, Room 40 at Bc 51, and it was recorded by Ray Rixey during Gordon Vivian's 1949 stabilization of the site (Vivian Archives 228).

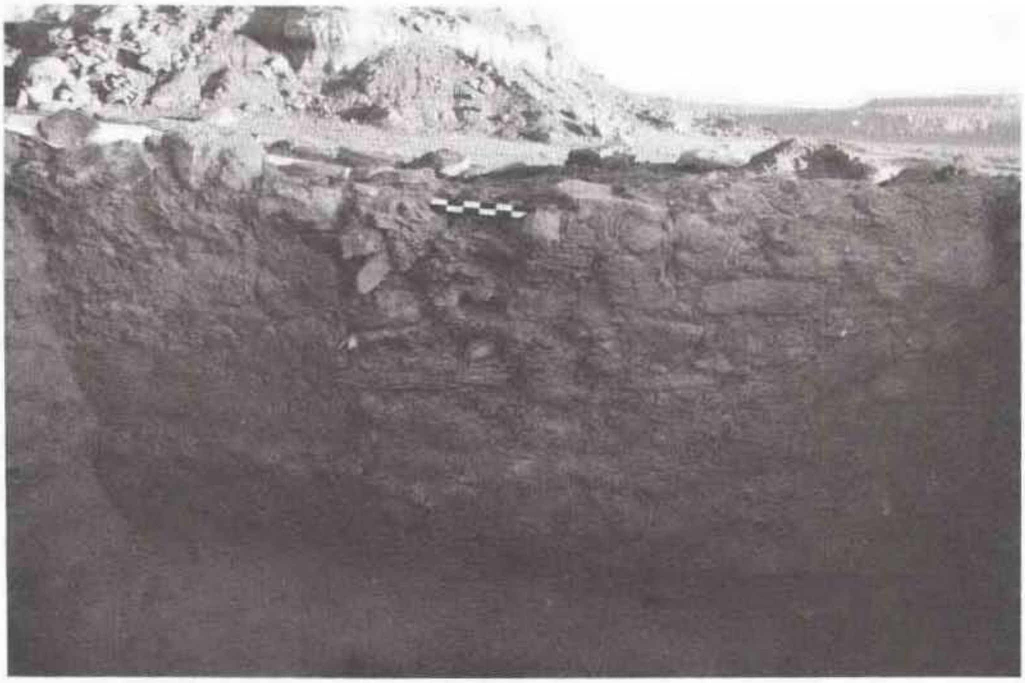


Figure 4.28. Room 7, Doorway 5, unplugged doorway in the north wall (Chaco Project Neg. 19075)

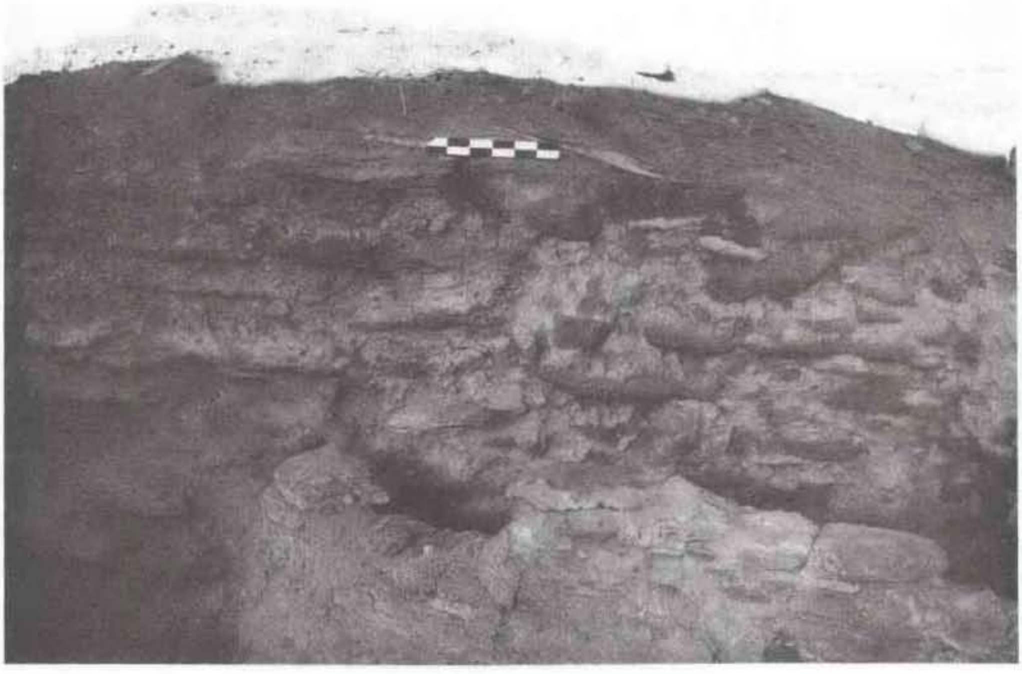


Figure 4.29. Room 7, large slab construction in the west wall (Chaco Project Neg. 19090)

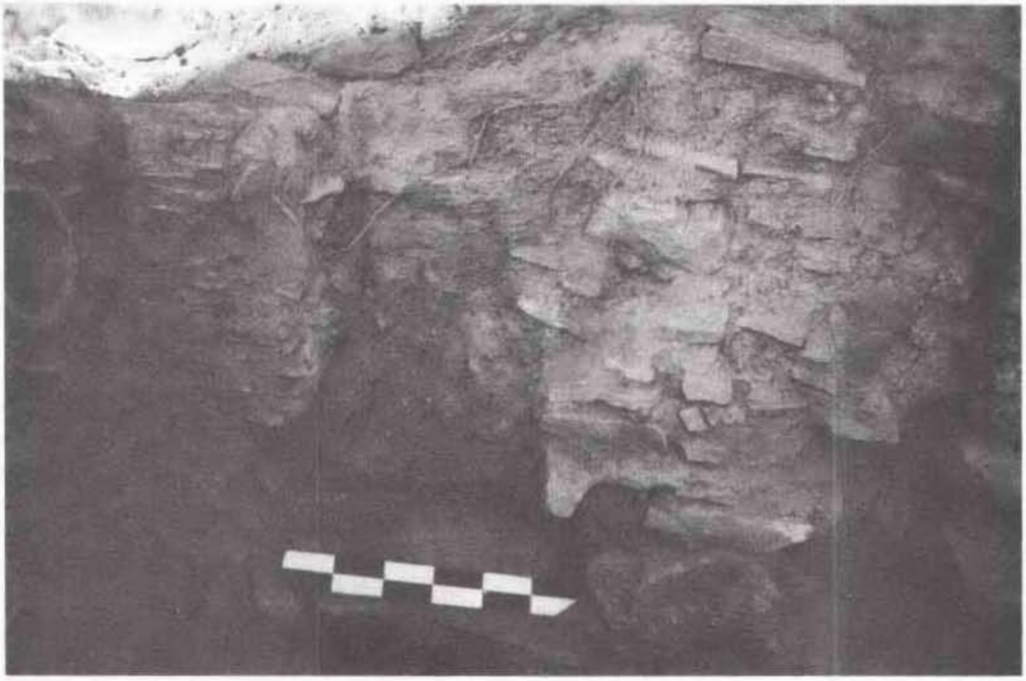


Figure 4.30. Room 7, Doorway 6, Wall Niche 1, or Vent 1 in the west wall (Chaco Project Neg. 19071)

Summary for Room 7

The possibility exists that the same cultural group did not occupy the two floor surfaces in Room 7. Evidence from the types of pottery present, the different types of features on the two floors, and the presence of burials associated with Floor 1 enchance this interpretation. During the Bonito Phase, burials were rare, but they were not an unknown occurrence in the earlier small houses.

Although the large storage bin in the northwestern corner of the room was built with the first occupation of Room 7, it was not torn down when Floor 2 was constructed. Although it may have had two floors also, the upper one is tentative, and the ceramics in the upper fill of this feature are somewhat earlier than those in the rest of the room.

The upper floor in Room 7 had little evidence of use as a living or working area. The lack of later ceramics in the storage bin remains unexplained, however.

Room 8

Room 8, located directly north of Room 7 (Figure 4.1), was rectangular in shape and was measured to be 4.5 m east-west by 1.85 and 1.65 m north-south. Floor area was estimated to be 7.4 m^2; thus, size alone suggests it functioned as a storage room. Doorway 6 connected with Room 7, and another door in the east wall (Doorway 7) connected to Room 10 (unexcavated).

Excavation Strategy

Only the eastern half of Room 8 was excavated. During wall clearing, a large amount of soil was removed from the northern portion of the room during the search for an intact wall. (After excavation it was apparent that this wall had collapsed outward; only two courses remained in place on the footing.)

Room 8 was excavated in 15-cm levels until burned material was found; this material was 10-15 cm above Floor 1. At that point, an east-west trench sectioned the remainder of the fill, which was then removed as two distinct quadrants. These quadrants were maintained for the remainder of the excavations down to sterile soil, or approximately 50 cm below Floor 1 in the northeastern quadrant. In the southeastern quadrant, an additional test extended to 0.95-1.00 m below Floor 1. Here cultural material, mainly transported through animal burrowing, extended to 0.70 m below Floor 1. The base of the deposits that can be associated with prehistoric construction, however, extended only to 28-30 cm below Floor 1, or just below the room foundation.

Figure 4.31 is a plan view of the excavated eastern half of the room; Figure 4.32 indicates the natural stratigraphy encountered along the western edge of the excavated area. This profile is used to describe the nine arbitrary levels and eight natural layers, the two floors, and other sur-

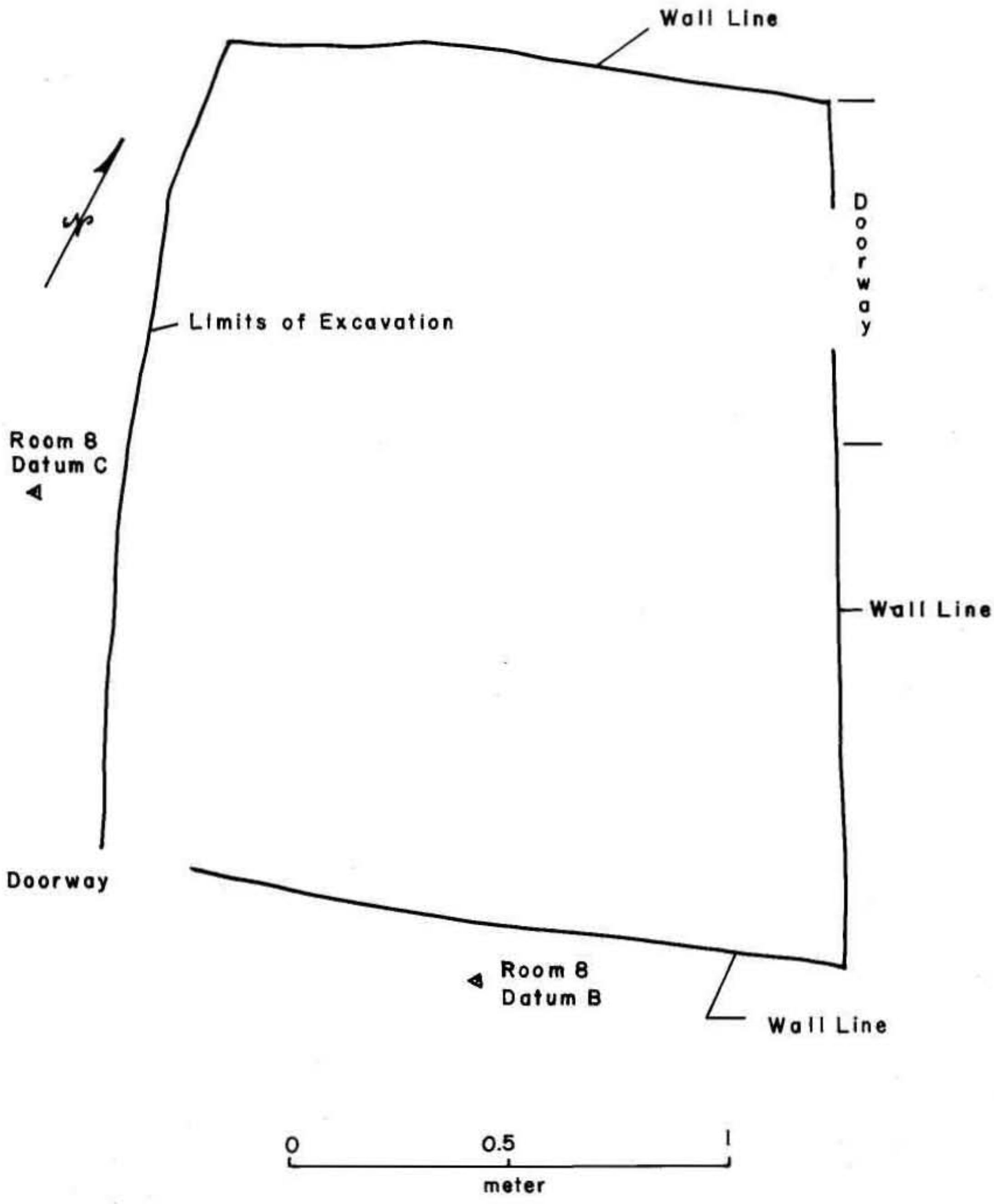


Figure 4.31. Plan view of Room 8 with locations of datums and plugged and unplugged doorways

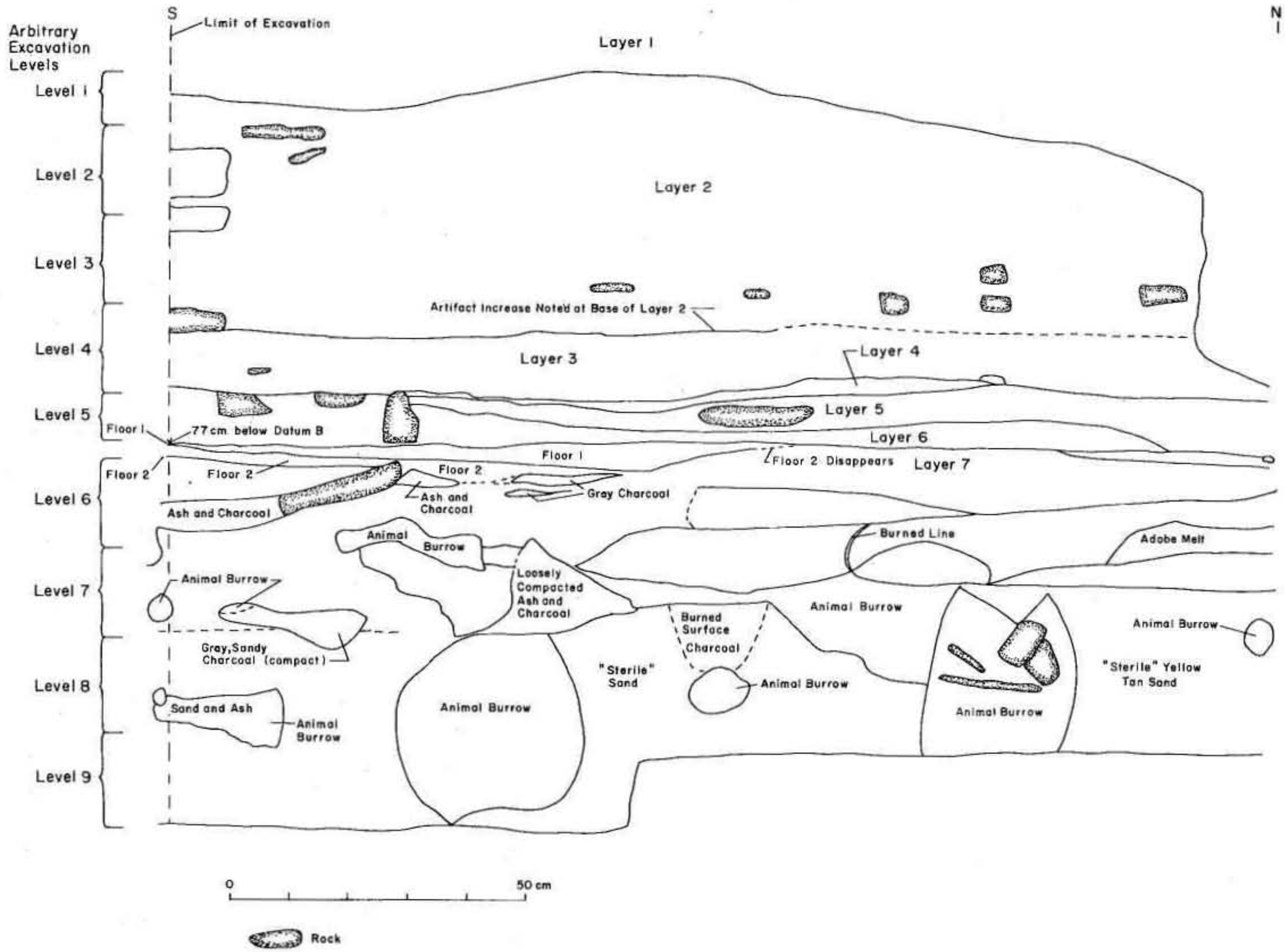


Figure 4.32. Room 8, stratigraphic profile taken across the center of the room in a north-south direction

faces. An additional profile (Figure 4.33) gives greater detail for the burned layers that were encountered above Floor 1.

Fill

Layer 1 (topsoil). The upper soil layer, which supported surface vegetation, was removed during wall clearing and does not appear in Figure 4.32.

Layer 2 (alluvial and aeolian sand and wall fall). The uppermost layer shown in the profile corresponds closely with Levels 1-3 and a small upper part of Level 4. It consists of 20-43 cm of compact, fine-grained, yellowish-brown, alluvial and aeolian sand and wall fall, which was composed primarily of sandstone building blocks, adobe lumps, and adobe melt. Wall rubble was particularly dense next to the south wall, which had collapsed northward. Near the bottom of Layer 2, the number of sandstone blocks decreased but the number and kinds of artifacts and the soil compaction increased. With greater soil consolidation, the adobe and moisture content also increased.

Because levels and layers did not correspond precisely, artifact densities were estimated to be 130 sherds, 26 pieces of chipped stone, and 42 pieces of bone per cubic meter of soil.

Layers 3 and 4 (burned material). Layer 3 corresponds to Level 4 and consisted of 9-11 cm of fire-reddened, fine-grained sand. Figure 4.32 illustrates the lack of clear contact between Layers 2 and 3 in the north. Combined with Layer 4, Layer 3 represents the western extent (as seen in the profile) of an intensely burned layer, which consisted largely of organic material. Figure 4.33 provides an east-west profile of this burn, which was a maximum of 19 cm thick in its most intensively burned area 30 cm west of the east wall. The color of the burned area ranged from orange to black to red depending on the contents of the fill. Two lenses of soft, unburned, tan sand were present in the eastern portion of this fill layer. A thin (2-4 cm) layer (Layer 4) of orange, burned sand lay beneath this in the approximate center of the profile (Figure 4.32); despite this differentiation, the entire burned area appeared to be a single depositional episode. A series of fire-reddened, sandstone blocks that formed a crescent contained the majority of the well-burned material in the eastern half of the room; these rocks were intentionally located so as to restrict the extent of the burning material. Although these unmapped rocks confined this material only along the northwestern and western sides of the burn, the burn did not touch the wall and reddened only the rocks corresponding to the upper portion of the fill layer along the east wall (Figure 4.34). The burned material was located directly above two burial pits associated with Floor 1.

Layer 5 (unburned floor fill). Combined with Layer 6, also a layer of unburned floor fill, this layer correlates with Level 5. In some places it underlaid the burned fill layers, which touched Floor 1 only in the southeastern portion of the room. Layer 5, which was concentrated along the north wall, pinched out toward the room interior. It was a

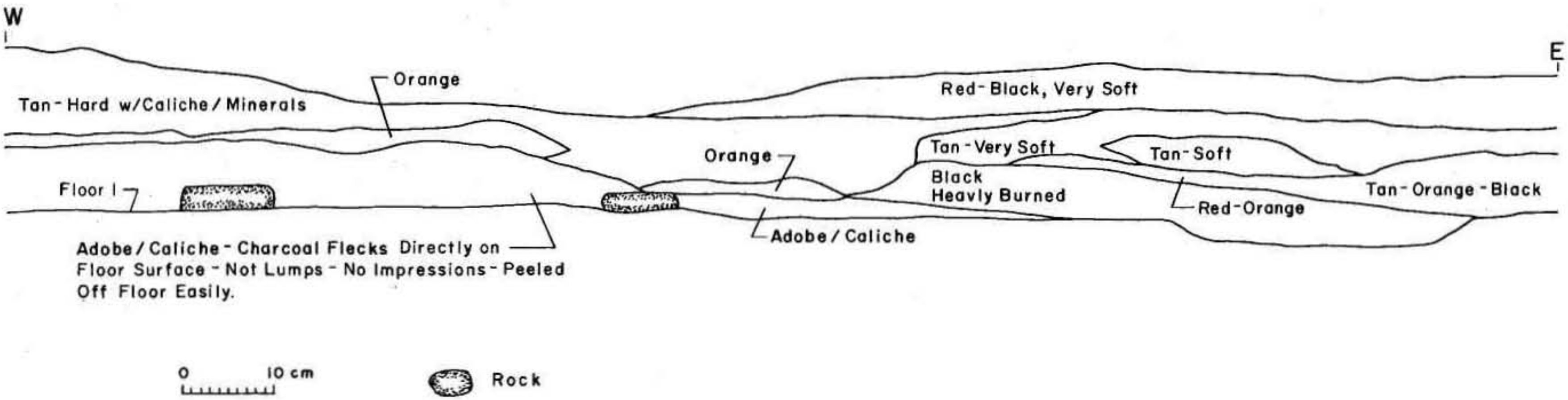


Figure 4.33. Room 8, east-west profile of the burned floor fill

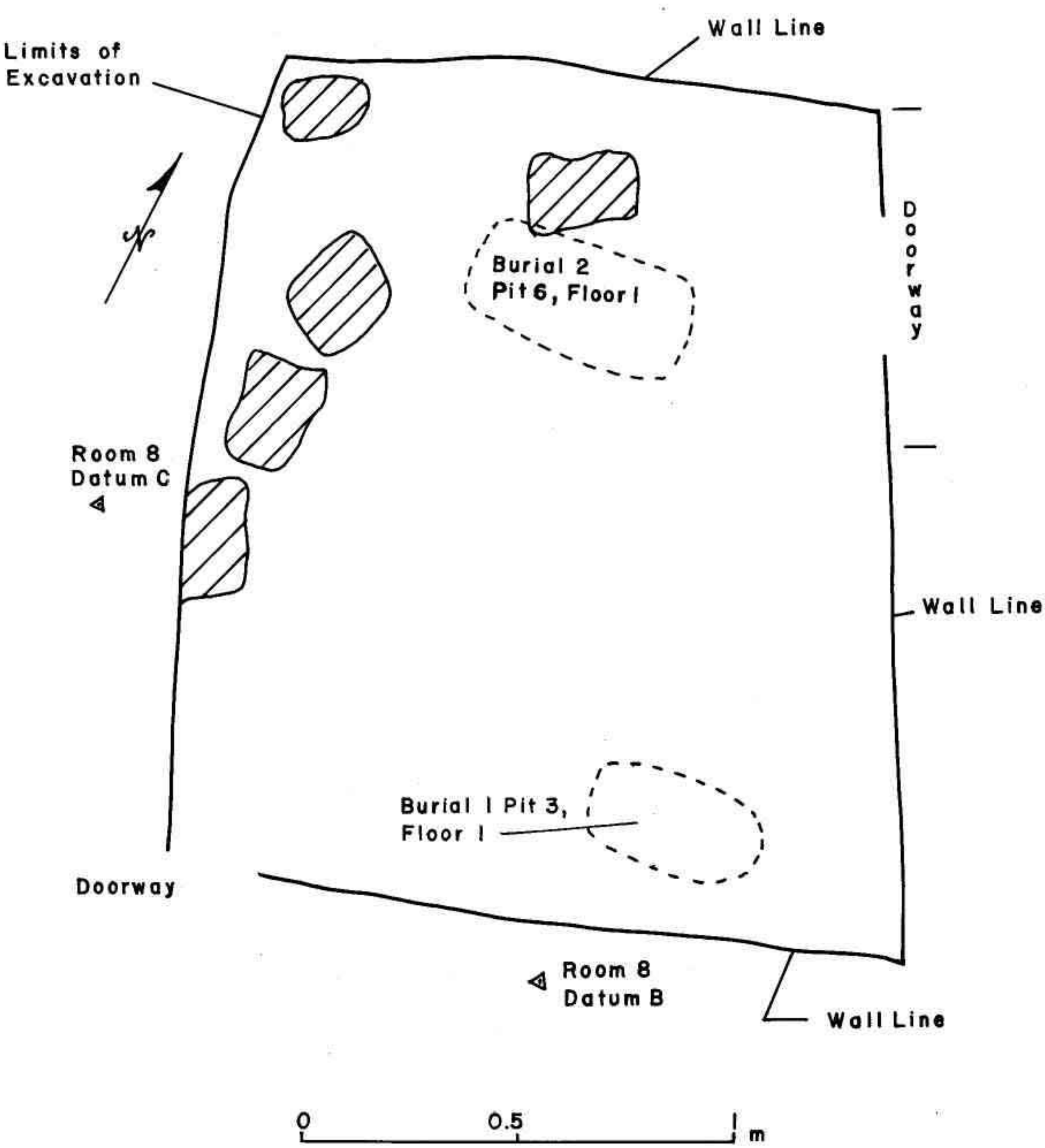


Figure 4.34. Room 8, Layers 3 and 4, indicating the location of rocks that partially surrounded burned sand in fill above Floor 1

maximum of 10 cm thick and consisted of loosely compacted sand, which covered the floor for a distance of about 7-17 cm south of the north wall in the northwestern portion of the excavation. No laminae were observed in Layer 5, but it is not certain whether this material represented a natural accumulation. Layer 5 overlapped areas of Layer 6 in the southwestern part of the excavation.

Layer 6 (unburned floor fill). Layer 6 covered the floor to the west and south of the burned concentration and ranged from 2-9 cm thick; it consisted of adobe melt and clods. It is likely that the adobe was wall mortar or roofing material discarded in the room after the roof was removed.

Floor 1 and Associated Features

Floor 1. The upper floor was a continuous, gray, clay-plastered surface that was 2 cm thick, and it was the nicest floor surface uncovered in either of the two excavated rooms. Despite its continuous nature, the surface was not smooth. At the walls, the floor coped up 2-5 cm; this was particularly evident in the corners. The coping and the surface material appear to have been laid down as a unit.

There were seven floor features associated with Floor 1; one, Pit 5, is a combination of Pits 6, 7, and 8 (Figure 4.35). In an area north of the eastern extension of Pit 3 (Burial 1) was a burn, and burned floor fill was still in contact with the floor surface. An archeomagnetic sample was taken. Initially it did not date, but on re-examination in 1989, a date of A.D. 1190 ± 28 years (ESO 1649) was obtained (see Chapter 3).

Floor Features. Figure 4.35 provides a plan view of the location of eight pits; Pits 1, 2, and 4 are probably the result of rodent activity.

Pit 1 (animal burrow?). This 13-cm-diameter pit was 16 cm deep and filled with very loosely compacted, fine, sandy soil, which contained yellow-brown charcoal flecks and gray ash at the base. Its circular shape, unfinished walls, and slightly rounded base may represent an animal burrow (Figure 4.36).

Pit 2 (animal burrow). Another small pit, 20 cm in diameter and 11 cm deep, may represent an animal burrow (Figure 4.36). As in Pit 1, charcoal and ash were associated with yellow-brown, sandy soil but, in this instance, they were at the top.

Pit 3 (Burial 1). This subrectangular pit measured 77 cm east-west and 67 cm north-south and was 43 cm deep (Figure 4.36). A top layer (5 cm thick) was composed of burned sand that contained charcoal and small, burned twigs. This burned material was part of the burned floor fill, which extended 2 cm below the sandstone slabs found in the pit. At the base of this layer, which formed a plug, the burned material may have sifted down through the pockets around these slabs.

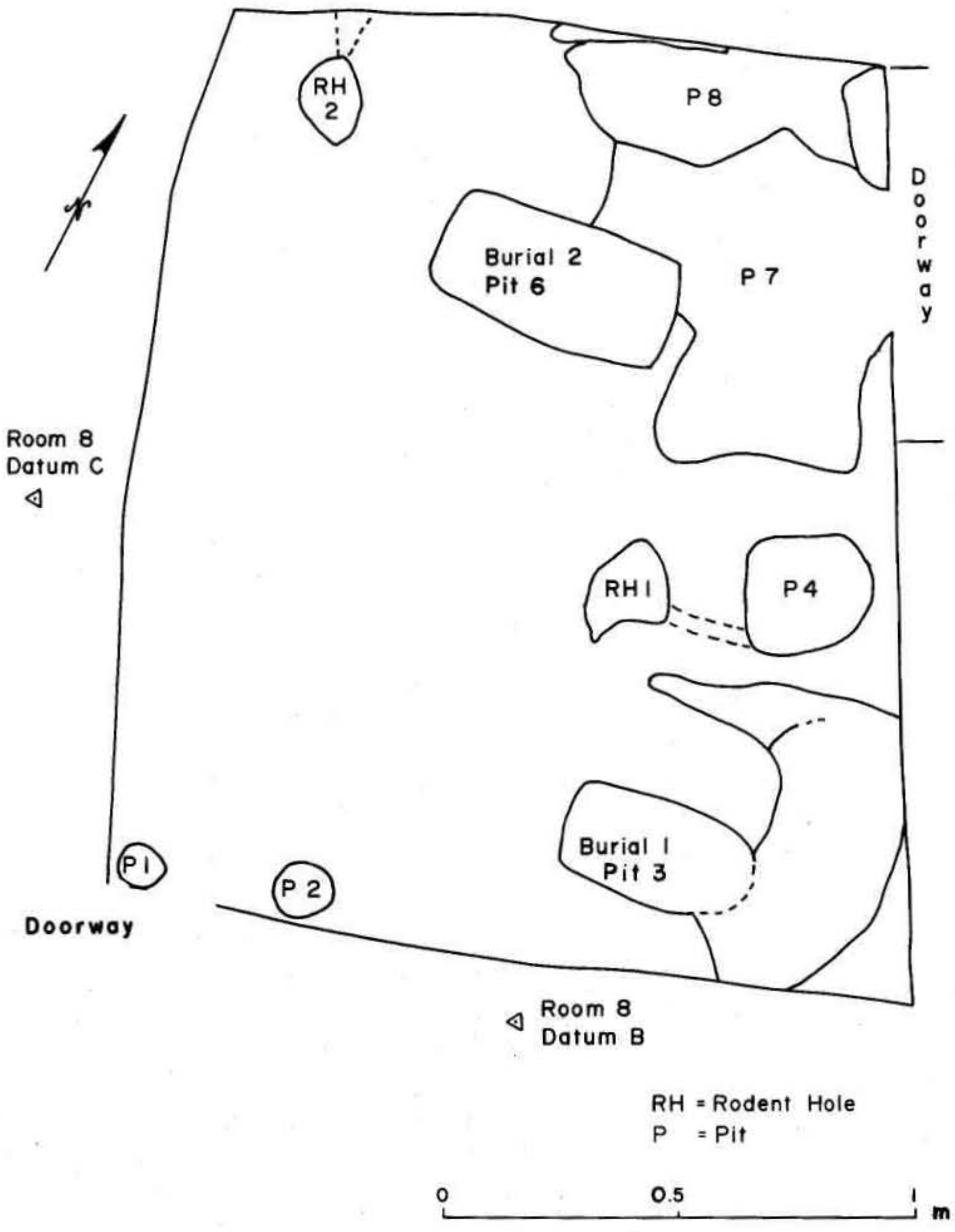


Figure 4.35. Room 8, Floor 1, plan view

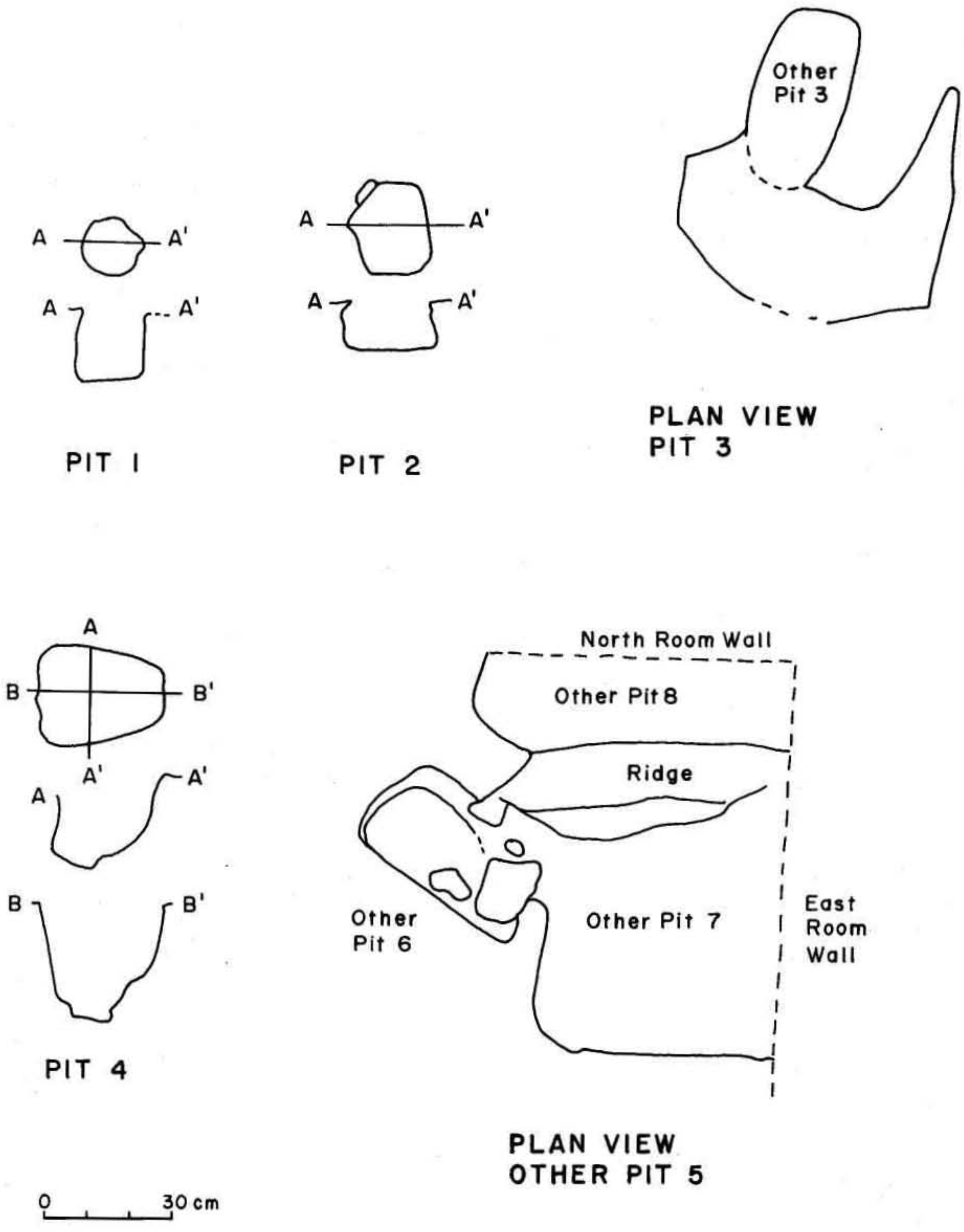


Figure 4.36. Room 8, Floor 1, plan view and profiles of floor features

Layer 2 had two components. The upper 2 cm was a burned sandy soil; the remaining 28 cm was a loosely compacted, yellow-brown, sandy soil that contained some charcoal.

Beneath a corrugated sherd and overlying the skull of the burial was Layer 3, a yellowish-brown sandy soil that contained charcoal, some small sherds, and burned bone. The body of a 12±-month infant was placed in the pit in a semiflexed position. It rested on its left side with the face down and averted to the east, the knees bent, and the feet in the air to about 4 cm below the top of this layer. The fill in some of the areas near the bones was much darker (brown/red/tan), especially in the pelvic region where there was evidence of burning on some of the bones. A pocket of ash overlaid the abdomen, the lower ribs, the upper legs, and burned patterns of the bones. This burned material had no stratigraphic contact with the burned floor fill in the upper layer of this pit; the body was separated from it by the intentional fill described above. It seems unlikely that mice were dragging around hot coals, and because a similar ash pocket was found in association with Burial 2, it appears that this was an intentional part of the burial practice.

Details pertaining to the body and its accompanying grave goods are presented in Chapter 11. The sherds (a large Pueblo II rim sherd, a Crumbled House Black-on-white ladle, a San Juan redware, an unidentified whiteware, and two pieces of unidentified corrugated ware) suggest a Mesa Verde Phase deposition.

A portion of the floor east of Pit 3 had also been removed, possibly in conjunction with the construction of this burial pit. The archeomagnetic sample was taken in this area. The pit was subsequently covered with clean sand but never plastered over.

Pit 4 (animal burrow). This pit was 30 by 22 cm and ran at an angle below the floor for 26 cm (Figure 4.36). Its upper rim was reddened from burned floor fill. Adobe clods over very soft, sandy soil containing charcoal flecks composed its fill. Like Pits 1 and 2, it is probably the result of animal disturbance.

Pit 5. This pit was 90 by 100 cm and was a composite of Pits 6, 7, and 8, which are described separately below (Figure 4.36). Pit 6 was a burial pit (Burial 2). Pit 7 may have been made during the construction of Pit 6. Pit 8, although possibly associated with the construction of Pit 6, seems too far from Pit 6 to be a useful part of it.

Pit 6 (Burial 2). Like Pit 3, this was a subrectangular burial pit that measured 54 by 30 cm across and 48 cm deep. Several stones lined the south side of the pit; one was an indurated sandstone mano that had been reused as an anvil and was partially burned before being incorporated into the pit wall. The area east of this pit had been dug out prehistorically in a manner similar to that noted for Pit 3 (Burial 1), presumably to assist in the construction of the burial pit. In this case where the grave was slightly larger than the pit opening, such additional excavation would have been necessary to accommodate the placement of the two basal slabs (Layer 4 below) (see also Pit 7).

Layer 1 was 13 cm of heavily burned, reddish-brown sand and charcoal. At the base of this material were two sandstone slabs and a few small rocks. One of these rocks projected slightly above the Floor 1 surface into the burned floor fill.

Layer 2 was only 1 cm thick. Dark, yellowish-brown, sandy soil covered 0.5 cm of ash, which was on top of a grave slab that is considered the base of this layer. The grave slab was originally a slab metate set with its grinding surface down. It measured 41 by 32 cm and was slightly wider than the pit opening; thus, it ran beneath the floor plaster on the south side of the pit interior.

Layer 3, which held the remains of Burial 2, consisted of 26 cm of soft, yellow-brown, sandy soil that contained large charcoal flecks. The soil was browner at a point beginning about 4 cm above the body. The child (24 months ± 8) had been placed in the pit in a semiflexed position, with knees bent, with the torso ventral side down and rolled slightly to the right. Both arms and legs were bent; the head was to the west. A pocket of ash was found over the knees and pelvis, and burned corn was recovered near the head and over the shoulders and ribs. Some bones were burned. Again, the burned material is not part of the floor fill and must have been placed with the body at the time of burial. Details pertaining to the body and accompanying grave goods are presented in Chapter 12. The Mesa Verde and McElmo ceramics suggest a date around late A.D. 1100s-early 1200s for this burial.

Layer 4 was 8 cm deep. The skeleton rested on two basal sandstone slabs that lined the pit bottom. There were 2 cm of soft, yellow-brown, sandy soil beneath these slabs and the sterile sand with residual gravels that represented the bottom of the pit.

Pit 7. Located to the east of Pit 6, Pit 7 was not covered with plaster. It was irregularly shaped and was measured at 53 by 47 cm across and 15 cm deep. Layer 1, which was floor fill, consisted of burned sand and charcoal. Beneath this, Layer 2 consisted of adobe clods and adobe beam impressions. As noted above, it was probably excavated prehistorically during the preparations for Burial 2.

Pit 8. This subrectangular pit was 66 by 22 cm across and 38 cm deep; its sides were not well defined. The thin upper layer, Layer 1, consisted of burned sand and charcoal, or floor fill. Layer 2 was a yellow-brown sandy soil, some of which was very compact while some was very loosely compacted. Sterile soil and adobe clods were found in the eastern half of the pit.

Pit 8 was formally very similar to the two other burial pits in this room (Pit 3 and Pit 6); it was even covered by a stone slab as if it were intended to hold another small body. An interment, however, was never placed in it.

Fill between Floor 1 and Floor 2

Where both Floors 1 and 2 were present, the fill between them consisted of a very thin, sandy layer in which no structure was apparent. Figure 4.32 shows a concentration of charcoal and ash along the profile line in the southern portion of the room. Only two sherds, one early Pueblo II neck corrugated and one unidentified whiteware, were recovered from the floor fill. These and the ceramics and other materials, such as chipped stone and bone found on the second floor surface, are suspect in terms of chronological association because of animal disturbances. (See the discussion of rodent holes in Floor 2 below.)

Floor 2 and Associated Features

Floor 2. The second floor was located 17-19 cm above the base of the masonry in the south wall (78-80 cm below Datum B). Much of this floor, which lay only 1-3 cm below Floor 1 (78-82 cm below Datum B), was missing as a result of numerous animal burrows that extended downward from the upper floor. Floor 2 was also broken up by the prehistoric excavation of the three large pits that were associated with Floor 1. In the southwestern portion of the excavated half of this room where the only intact remains of Floor 2 were located, the floor was a crumbly, irregular, clay surface. Although animal burrowing may have been partially responsible for this condition, evidence from other excavated small houses in Chaco Canyon indicates that the "back row" or "storage" rooms had less carefully finished surfaces, possibly because they received less foot traffic.

Floor 2 may have had two episodes of plastering; this was apparent in the northwestern portion of the excavation. The initial plastering, however, may represent ponding of construction material before the room was roofed.

Floor Features. No floor features were associated with Floor 2 and no plan view was drawn. Three animal burrows were present. One, in the southwestern portion of the excavation, contained a large quantity of ash that extended below the floor surface. The origin of this ash is not clear; there may have been a burned feature in the unexcavated half of the room. The second animal burrow was located near the middle of the east wall, and the third was in the northwestern section. One sherd of narrow neckbanded pottery was recovered from these burrows.

Layers below Floor 2

Layer 7. Layer 7 was a natural layer concentrated in the eastern portion of Level 6. It consisted of adobe clods and melt. It also changed as it was traced westward toward the profile (Figure 4.32) where a yellowish-tan, sandy soil was far less consolidated than was the adobe in the eastern half. This sand was 8-10 cm thick, and its base corresponded to that of the adobe in the eastern half of the excavation. Both of these segments were removed as part of Level 6.

"Unprepared Surface?" and Associated Burn. There was a break in stratigraphy at the base of Layer 7. No clay surface was present, but the break may represent an unprepared surface or leveling associated with construction similar to those described by Windes (1987:155) for Pueblo Alto. A similar surface in Room 7 had several heating pits associated with it; this surface in Room 8 had a semicircular burned area at the base of Layer 7 (Figure 4.32). Although the burn was at approximately the same depth as the construction firepits in Room 7, it was very much smaller and not identifiable as a feature. The burned area was 9 cm across. There were no signs of a basket or other form of container, and the surrounding soil was burned red, which indicates that whatever was there burned in place.

Layer 8. Two additional arbitrary levels, Level 7 and Level 8, were removed to reach a depth of 1.26 m below Datum B, which corresponds with 64 cm below Floor 1 and 2 cm below the bottom of the south wall foundations (Figure 4.32). A poorly defined, gravel lens separated portions of Layers 7 and 8. Layer 8 consisted of fine, sandy soil that contained numerous animal burrows and cultural material that was carried in as a result of those disturbances. One test in the southwestern quadrant of this excavation extended an additional 65 cm in depth to ensure that sterile soil had been reached.

Walls

Only the east wall and half of the north and south walls were uncovered. No stratigraphic interruptions were found between the wall bases and the overlying masonry. Measurements of wall foundations and heights are presented in Table 4.2. The east wall of Room 8 abutted the north wall in the northeastern corner, and the south wall abutted the east wall in the southeastern corner.

Table 4.2. Room 8, wall foundations and wall heights

Wall	Foundation (cm)	Wall Height (m)
South	30	0.94-1.04
East	14	1.06
North	14-21	0.60

Wall Foundations. Exposed portions of all three walls had gray clay footings similar to the ones described for Room 7.

Although the north wall of Room 8, for the most part, had collapsed, the foundation was still visible. There was a small break at the junction of the north and east walls. This square hole was 13 cm across and filled with soft, brown sand. It may represent an area where a rock had been knocked loose. The remaining portion in the northeastern corner of the room consisted of 14 cm of large pieces of sandstone set in stiff, gray clay very similar to that of the east wall. This foundation deepened to the west to a maximum of 21 cm near the north-south profile line.

The east wall footing consisted of large pieces of sandstone mixed with stiff, gray clay; it was only 14 cm thick vertically. Several sherds, including two plain gray, one Sanostee Red-on-orange, and one unidentifiable whiteware, were observed at its base. Sanostee Red-on-orange is a trachybasalt-tempered redware that dated to the ninth century or earlier (Windes 1977:346). Its presence here may correlate with use of other areas of the ridge not directly associated with this roomblock but part of the earlier occupation at 29SJ 633.

The foundation for the south wall, which separated Room 7 from Room 8, was offset from the overlying masonry. The foundation projected 6 cm into Room 7 and was recessed about 15 cm beneath the wall in Room 8. Only 15 cm of the 30-cm masonry wall rested on this footing. In Room 8, the foundation was 30 cm deep. No wall trench was located on either side of this wall, but presumably the entire linear excavation was filled with gray clay.

Wall Masonry. The building stones were primarily soft, poorly consolidated sandstone with some indurated sandstone present. Without tearing the walls apart, it is difficult to determine how much of the indurated sandstone was reused ground stone.

The south wall fell northward into Room 8, as did the north wall, which was found in a small test located to the north of Room 8. No attempt was made to quantify the remains of either of these walls.

Wall Features. Room 8 had two unplugged doorways; one (Doorway 6) provided passage to Room 7, and the other (Doorway 7), located in the east wall, provided passage to Room 10.

Doorway 6. This doorway was described in the section on Room 7, but there are several observations with regard to Room 8 that should be noted. The sill of the door was 16-17 cm above Floor 1, or 18-19 cm above Floor 2 (62 cm below Datum B). Whereas there was some evidence of remodeling on the Room 7 side (chinking along the edges), there was no evidence of remodeling on the Room 8 side. The wall was 34 cm wide on the eastern edge of the door opening.

Doorway 7. Located in the northern portion of the east wall, Doorway 7 was 39 cm above Floor 1 (36 cm below Datum B). The northern jamb edge had originally been formed by the north wall, which fell away during excavation. The 90-cm opening is estimated, based on the presence of the door sill, but the thickness of the east wall at the south side of the doorway is not known. No upper door jamb sections remained intact, and the original height of the door could not be determined. Although this doorway was not plugged, there was a bulge in the wall beneath it.

Summary for Room 8

As in Room 7, there is evidence for two floors in Room 8, and only the upper floor had two burials. The lack of features, other than the burial pits, suggests that it functioned as a storage room.

Because of the doorways in the eastern wall of this room and Room 7, it is probable that they were part of a suite of rooms that included Rooms 9 and 10 that are located in the central part of the roomblock.

Test Trenches

Three test trenches at 29SJ 633 provide additional information regarding the use of this site. Figure 1.8 indicates their locations.

Test Trench 1

Test Trench 1 extended north-south from the base of the site slope on the south side of the ridge to the plaza-facing side of Room 7. This 16.50-m-long and 60-70-cm-wide trench varied in depth from 10-82 cm. The variation in depth is the result of hand excavation, which was initiated once it was determined to be impossible to use the backhoe without destroying much of the site. Thus, the initial objective of exposing a complete section of this Pueblo III area down to sterile soil was not achieved.

Overall, Test Trench 1 consisted of a thin layer of loosely compacted topsoil, an alluvial/aeolian layer of variable thickness, and a layer of wall fall materials that had eroded downslope (Figure 4.37). A dense concentration of wall fall, possibly associated with Kiva 1 located to the south of Room 7, was noted 2.50 m south of the roomblock. This wall fall continued to be quite dense up to 7 m south of the Room 7 wall. It is possible that there was a rectangular wall enclosing Kiva 1 in this vicinity and that the rocks represent the collapsed portion of it.

Between 9.5-12.5 m south of Room 7, an extremely dense series of caliche lenses were noted. Also at 9.5 m south of Room 7 were residual gravels, lignite, and shale, which were part of the ridge rock 82 cm below the site surface. These are the base of the trench at this point, but they were only 18 cm below the surface at the southernmost extent of the trench.

The northern section of Test Trench 1 terminated at the plaza-facing side of the south wall of Room 7. The eastern edge of Doorway 3, located in the center of the south wall, was discovered in the western edge of this trench but only the upper 38 cm were exposed. In this small uncovered portion, it was obvious that the doorway was not plugged; brownish-tan sand filled the opening. During the excavation of Room 7, however, a sandstone block veneer (?) plugged the door. This veneer made it virtually indistinguishable from the rest of the interior south wall (Figure 4.26). If small chinks had been used to block up the exterior of this door, none remained.

Artifacts from the fill of Test Trench 1 included 494 sherds, 213 pieces of chipped stone, 14 fragments of bone, 5 abraders, 5 manos, and 16 metate fragments. Although no particularly dense trash concentrations were noted, sherd and chipped stone frequencies increased near the southern end of the test trench where the wall fall thinned out. Little

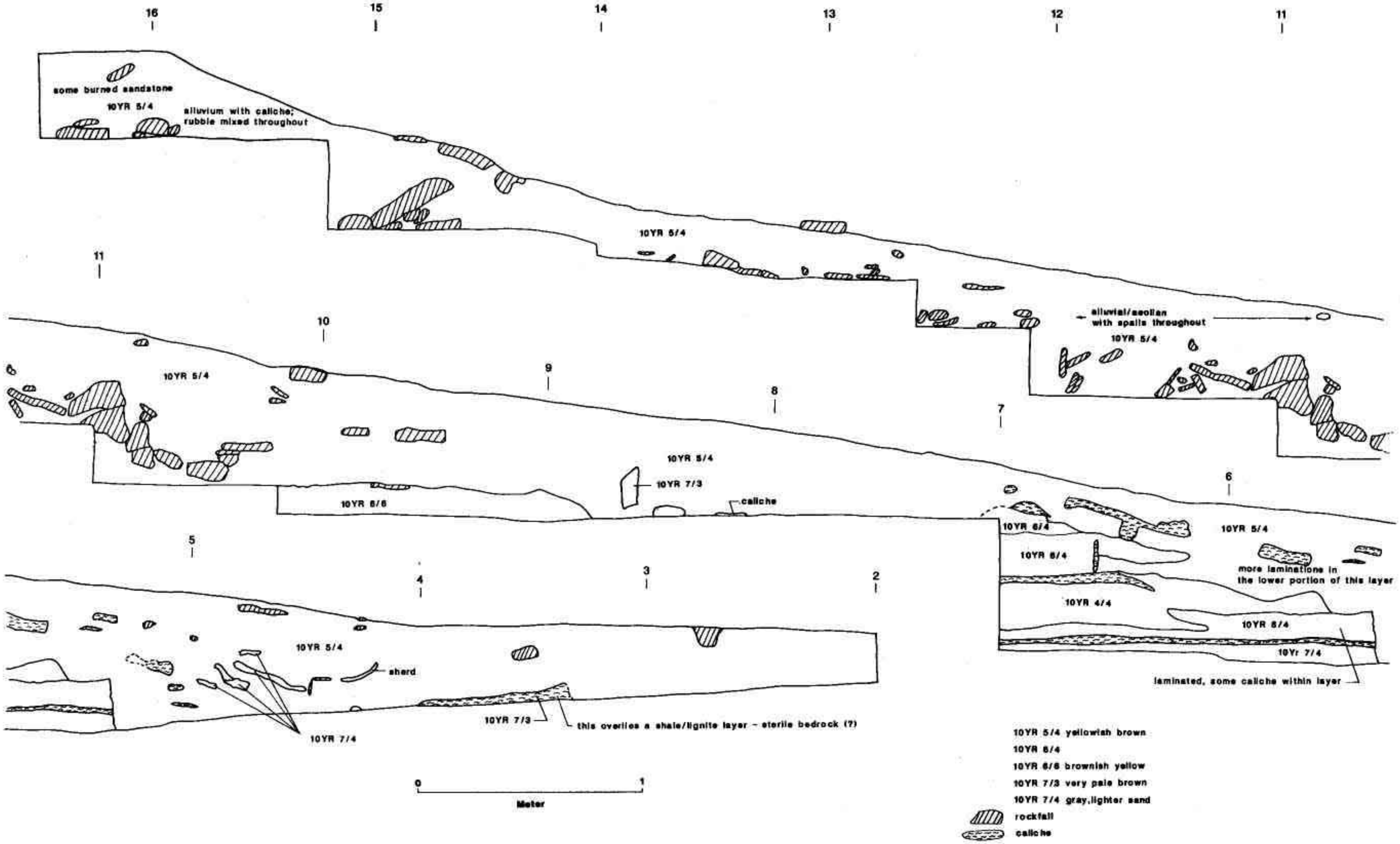


Figure 4.37. Test Trench 1, stratigraphic profile of east face

charcoal, bone, or other cultural material was mixed with the sherds or chipped stone from this area, possibly resulting, in part, from poor preservation in an exposed location. A swale at the base of the slope appeared to contain refuse from the trash mound that lies to the southeast; the refuse may have washed into the swale or rolled down when it was dumped on the mound, which is not visibly included in Test Trench 1. As a whole, the ceramics in this test trench indicated considerable mixing of the two periods of occupation inferred for the roomblock (McKenna and Toll, Chapter 7).

Test Trench 2

Test Trench 2 was irregular in plan (Figure 4.38) because the main portion, which is 3.40 m long by 0.60 m wide in a north-south direction, had two shallow side spurs that ran off to the west. Extending north from the exterior wall of Room 8, this trench was to be excavated to sterile soil. It would have been linked to Test Trench 1 by the intermediate Rooms 7 and 8 and would have provided a continuous north-south profile of the site. Time restrictions thwarted this attempt, however. The base of Test Trench 2 extended only to the top of the north wall foundations and not to sterile soil.

The north wall of Room 8 had collapsed northward into the area intersected by Test Trench 2. Dense wall fall, consisting of jumbled building blocks and mortar, extended about 1.90 m north of the roomblock wall; but building blocks were found in the entire length of the downslope trench.

At a distance of 70 cm north of Room 8 and beneath the layer of wall fall, residual gravels were discovered 60 cm below the site surface. At the northern extent of the trench, these gravels were 25 cm below the surface. Because excavations did not continue below the wall foundations of Room 8, the depth of these gravels at the southern end of this trench is not known. Within Room 8, only a poorly defined, gravel lens separated Layers 7 and 8, which were subfloor layers that had been disturbed by rodent activity. Deeper trenching in one area of the room did not reveal the gravels described in Test Trench 2.

Very little cultural material was recovered from the fill of Test Trench 2. Artifacts included 26 sherds, 5 pieces of chipped stone, and 5 bones. These limited numbers are not unusual; in the excavated sample of small house sites in Chaco Canyon, only rarely do trash deposits occur on the north sides of the roomblock.

Test Trench 3

This east-west trench was located 5.90-6.30 m south of Room 7 and intersected with the western edge of Test Trench 1 (Figures 1.8 and 4.39). It was 3.83 m long and 0.50 m wide. It was excavated in 25-cm increments. No deep tests were conducted. The purpose was to ascertain whether the depression southwest of Room 7 represented a pitstructure.

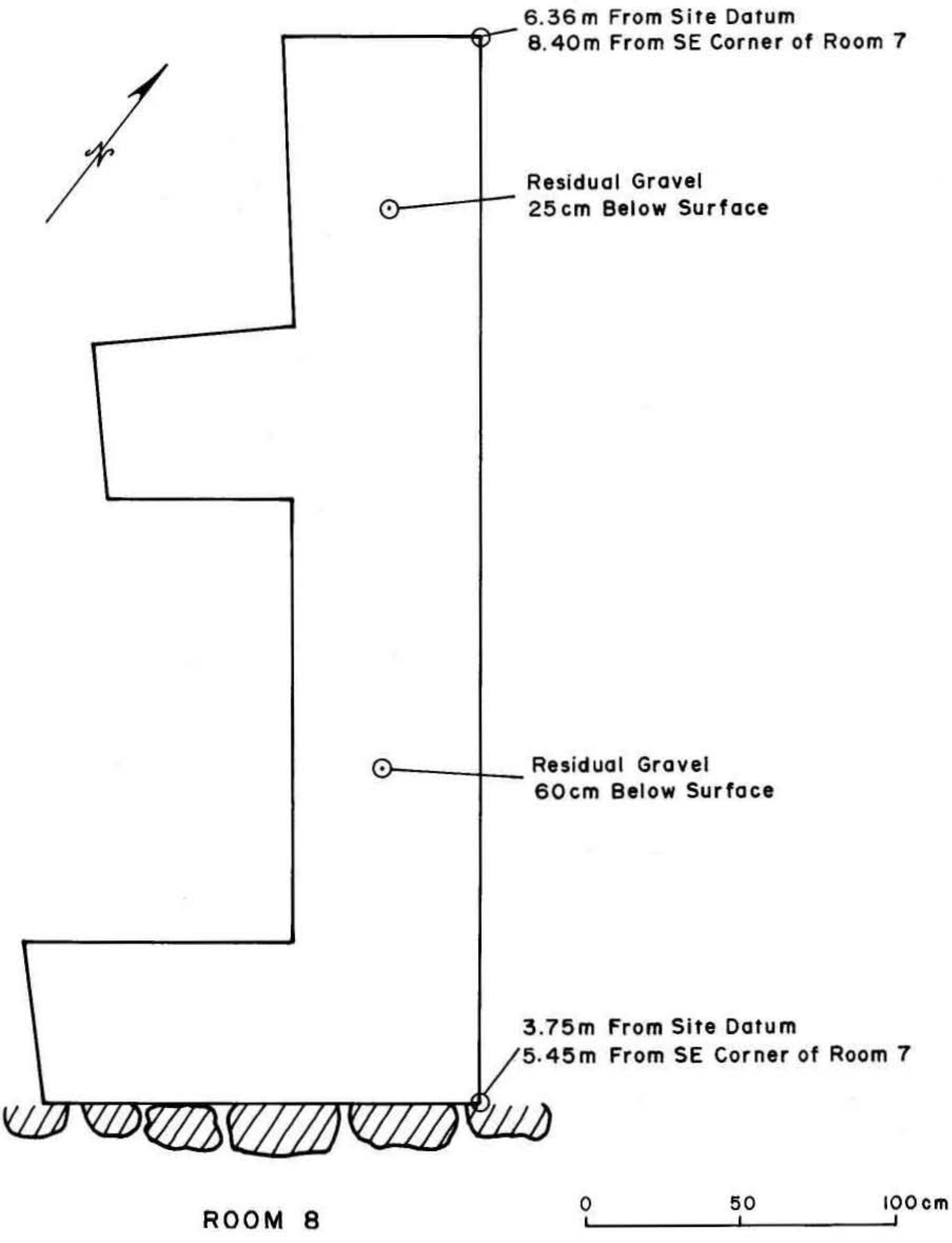


Figure 4.38. Test Trench 2, plan view

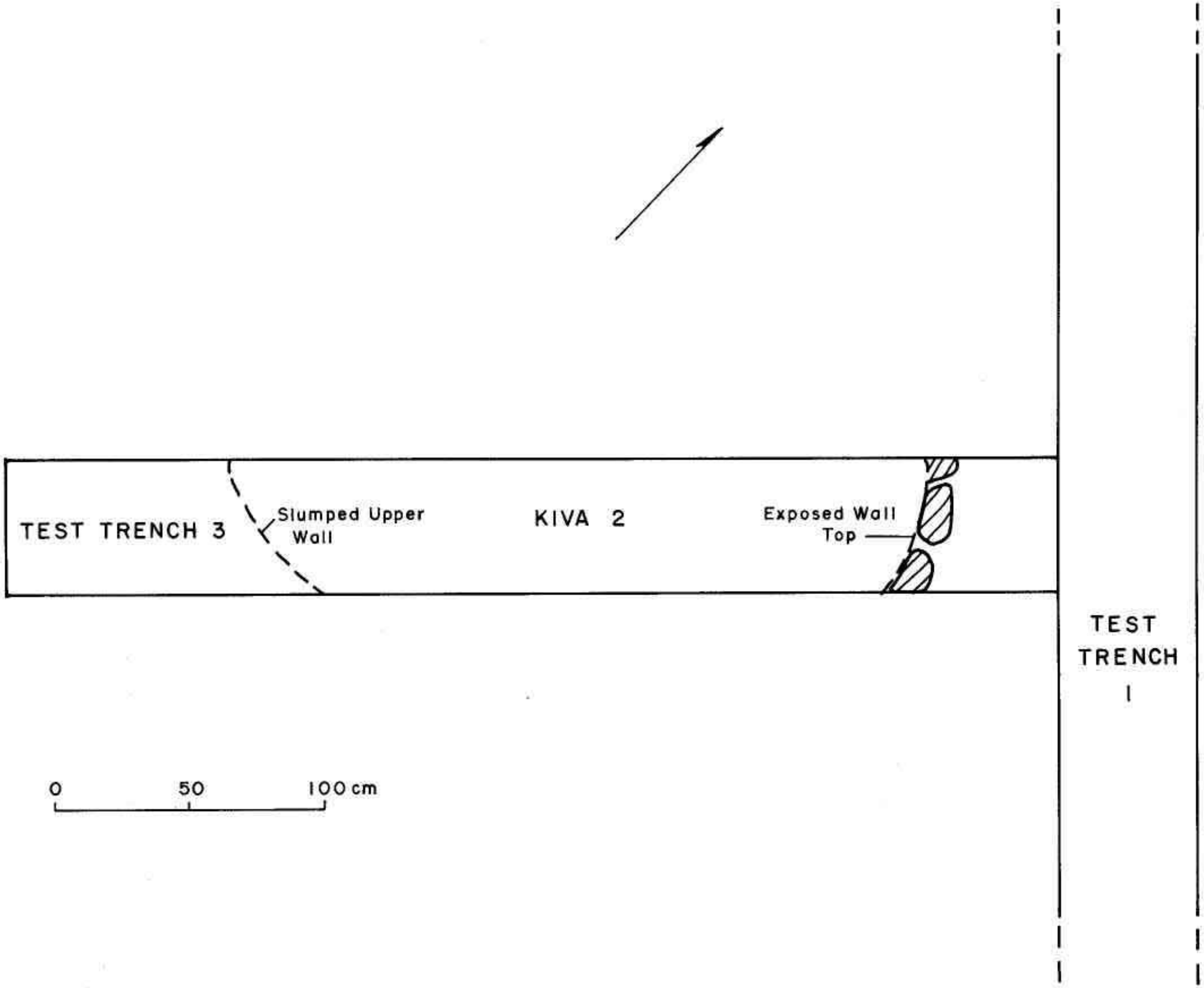


Figure 4.39. Test Trench 3, plan view

As indicated in Figure 4.39, evidence for the Kiva 2 wall was found. At the eastern end of Test Trench 3 and about 50 cm west of its intersection with Test Trench 1, the first flat-lying stones were located 33-34 cm below the ground surface. The curving interior face was cleared to about 21 cm below the top of the wall; this clearing exposed three courses of masonry. At 2-2.5 m farther west (or 3 m west of the intersection of Test Trenches 1 and 3) the top of the western portion of the pitstructure wall was uncovered at a depth of 21-22 cm below ground surface. Excavations along the interior of this wall were carried 15-16 cm deep and exposed two courses of masonry. These small portions of excavated wall indicate that this test trench cut across the pitstructure/Kiva 2 south of its center.

Scattered cultural material and wall fall were recovered from both excavation levels. A total of 89 sherds, 11 pieces of chipped stone, 3 bones, 1 metate fragment, 1 mano, and 2 abraders was recovered.

Anomaly Tests

Based on the results of the proton magnetometer test (Appendix B), ten test pits were placed in the 29SJ 633 roomblock. The locations of these tests are indicated on Figure 4.1. All excavations were 50-cm squares, and they were dug in 15-cm levels. Data pertaining to these tests are included in Table 4.3.

Anomaly Test 1

Located in the northern end of the unfinished east roomblock, this test pit was near the interior north wall and west of center. The five levels revealed two natural layers of fill (Figure 4.40). Datum 1 on the northeastern corner of Room 10 was used for all measurements. The surface was 30 cm below the test datum.

Layer 1

Levels 1, 2, and the top of Level 3 consisted of wall fall and alluvial/aeolian sand. Sandstone and adobe mortar appeared throughout this 38-44-cm layer. The upper material was drier and sandier; moisture and charcoal increased with depth.

Layer 2

An additional 16-19 cm of fill that consisted of the lower part of Level 3 and all of Level 4 was alluvial/aeolian, fine-grained, unburned sand, which contained quantities of burned corn kernels, cobs, and amaranth seeds overlying the burned floor (Level 5).

Floor 1

At 90-96 cm below the test datum that was located in the northeastern corner of Room 10, Floor 1 was exposed. It was dark red and well burned along the southeastern side. Excavation was stopped when the floor was reached.

Table 4.3. Anomaly test fill descriptions

Test Number	Dimensions (cm)	Depth (cm)	Fill Characteristics	Comments
1	50 by 50	60	Layer 1 (Levels 1, 2, and top of 3): 38-44 cm thick or 74-78 cm below test datum; wall fall and alluvial/aeolian sand; upper part drier and sandier, moisture and charcoal increased with depth; sandstone and adobe mortar throughout.	Test datum = northeast corner of Room 10.
			Layer 2 (bottom of Level 3, Level 4): 16-19 cm thick; alluvial/aeolian fine-grained unburned sand with quantities of burned corn kernels, cobs, and amaranth seeds overlying burned floor (Level 5).	
			Floor 1: 90-96 cm below test datum; well burned along southeast side of test.	
2	50-70 by 50	64-67	Layer 1 (Levels 1 and 2): 15-20 cm (5-35 cm below test datum); wall fall with a lot of rubble and mortar mixed with some laminated, tan sand.	Test datum = northwest corner of Room 11; north wall masonry juts out 10 cm about 34 cm above Floor 1.
			Layer 2 (Levels 3, 4, 5): 37 cm (35-72 cm below test datum); alluvial/aeolian, fine, yellow sand with adobe chunks.	
			Floor 1: 72-73 cm below test datum; unburned, excellent plastered surface.	

Table 4.3 (continued)

Test Number	Dimensions (cm)	Depth (cm)	Fill Characteristics	Comments
3	50 by 50 (test expanded, see text)	65	Layer 1 (Levels 1 and 2): 30-33 cm (25-51 cm below test datum); slightly compacted sand and sandstone (wall fall); some animal disturbance in test center; burn at base of layer on top of clay lens (51-55 cm below test datum); clay lens is melted mortar 5 cm thick along southern part of test. Layer 2 (Level 3): 7-18 cm (55-73 cm below test datum); very loosely compacted sand (animal disturbance); 1 piece of burned sandstone in profile. Layer 3 (Level 3N): lens of semi-compact sand along northern side of test, maximum 14 cm thick, like Layer 1. Layer 4 (Level 4): 15-18 cm thick (73-91 cm below test datum); fine-grained, tan, laminated, sandy soil; no cultural material; caliche concentration sloped down to east; residual gravel increased in this layer to solid at 85 cm.	Test datum = northwest corner of Room 11.
4	50 by 50	15	Layer 1 (Level 1): 10-25 cm below test datum; fine-grained sand; no charcoal or other cultural material.	Test datum = corner of test; test abandoned; not profiled.

Table 4.3 (continued)

Test Number	Dimensions (cm)	Depth (cm)	Fill Characteristics	Comments
5	50 by 50	45	Layer 1 (Levels 1, 2, 3): 32-35 cm (7-52 cm below test datum); fine-grained, sandy soil; some rubble and clay mortar; some animal disturbance in upper part of layer.	Test datum = corner of test; no burn found.
6	50 by 50	30	Layer 1 (upper Level 1): 16-23 cm thick; sloped off to north; fine, sandy soil with scattered charcoal flecks and adobe melt; no rubble; laminae evident in sand.	Test datum = corner of test; no burn found.
			Layer 2 (rest of Level 1, Level 2): maximum 16 cm (to 46 cm below test datum); very compact, fine sand; yellower near base where caliche began to appear.	
7	50 by 50	62	Layer 1 (Levels 1, 2, part of 3): 27-37 cm thick (2-35 cm below test datum); soft, loosely compacted, fine sand with charcoal flecks and rubble; rubble decreased with depth; animal burrowing.	Test datum in curved pit side; no burn found.
			Layer 2 (most of Level 3): 28-41 cm below test datum; more loosely compacted than Layer 1; extensive animal burrowings.	
			Layer 3 (Level 4): 40-63 cm below test datum; compact, sandy soil with laminations; more charcoal flecks; adobe lump near base of test.	

Table 4.3 (concluded)

Test Number	Dimensions (cm)	Depth (cm)	Fill Characteristics	Comments
8	50 by 50	73	Layer 1 (Levels 1, 2, part of 3): wall fall with a lot of mortar; very compact at layer base. Layer 2 (part of Level 3): 26-36 cm below test datum; mixed sand and mortar; clay overlying hearth (plug?). Hearth: 35-63 cm below test datum; slab-lined, heavily burned; fill is ash and charcoal (northwest quarter only removed); base is burned sand; basal adobe very burned.	Test datum = east wall of Room 13; datum is 10 cm above top of test; hearth not sampled for archeomagnetic dating; no floor exposed, just hearth.
9	50 by 50	60	Layer 1 (Levels 1, 2, 3, 4): 28-80 cm below test datum; fine-grained, yellow-tan, sandy soil, many small, sandstone spalls; spalls decreased with depth and sand became more compact; four burned rocks at top of this layer.	Test datum = pit corner (?); no burn found.
10	50 by 50	32	Layer 1 (Level 1): 7-22 cm below test datum; very loosely compacted, sandy soil with small rocks and spalls. Layer 2 (Levels 2, part of 3): 22-45 cm below test datum; similar to Layer 1 but much more compact and fewer spalls; some caliche. Layer 3 (Level 3—only part was dug): 33-39 cm below test datum; caliche; very hard; sterile.	Test datum = test pit corner (?); no burn found.

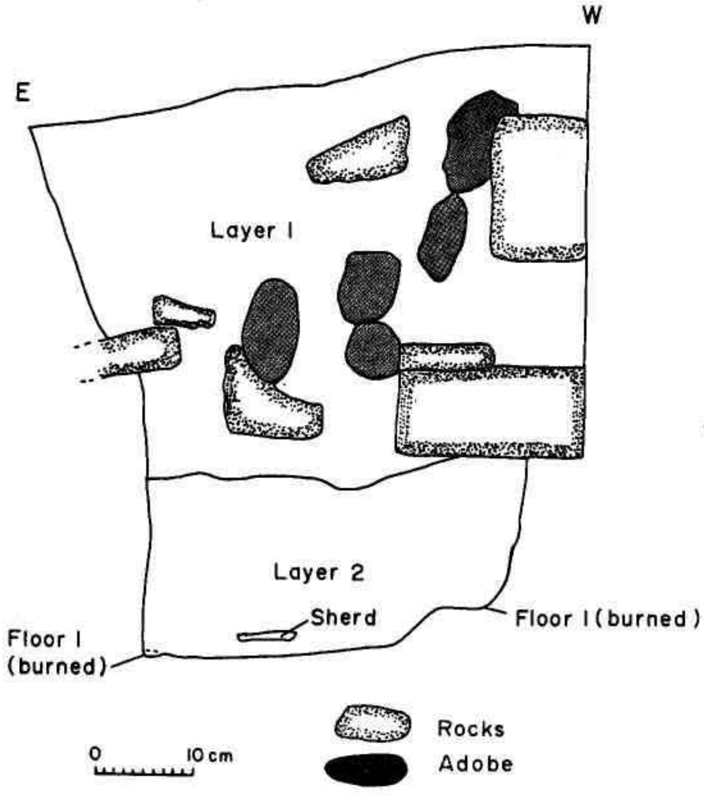


Figure 4.40. Anomaly Test 1, south face

Anomaly Test 2

This test was placed in the northwestern corner of Room 11. Again, the five excavated levels comprised two natural layers above Floor 1 (Figure 4.41). Datum 2 in the northwestern corner of Room 11 was used for all measurements. Surface depth was 5-8 cm below the test datum.

Layer 1

Levels 1 and 2 consisted of wall fall characterized by much rubble, mortar, and laminated tan sand. Six small, burned pieces of sandstone were found 15-30 cm below the surface.

Layer 2

Levels 3, 4, and 5 were 37 cm of alluvial/aeolian, fine sand containing adobe chunks.

Floor 1

At 72-73 cm below the test datum, an unburned, excellently plastered floor was discovered. The floor coped up to the plastered walls.

North Wall

About 34 cm above Floor 1, the north wall juts out about 10 cm. This wall was burned all the way from Floor 1 to the site surface; but because the floor showed no evidence of burning, it must be assumed that the source of the fire was either beneath the first floor or occurred before the plastering of Floor 1.

Anomaly Test 3

Along the southern wall in Room 3, an original 50 by 50 cm test square was eventually expanded an additional 50 by 50 cm. Four levels were combined into four natural layers (Figure 4.42). Datum 2 in the northwestern corner of Room 11 was used for all measurements; the surface depth was 25 cm below the test datum.

Layer 1

Levels 1 and 2 (30-33 cm or 25-51 cm below the test datum in the northwestern corner of Room 11) consisted mainly of wall fall and evidence of animal disturbance in the center of the test. Slightly compacted sand and sandstone indicated the presence of wall fall. A 5-cm clay lens consisting of melted mortar appeared in the southern area of this test. There was a burn at the top of this clay lens (51-55 cm below the test datum). Figure 4.42 indicates that Layer 1 coincides with the presence of wall masonry. The room was small, possibly a storage room, and the floor may have been located at this level.

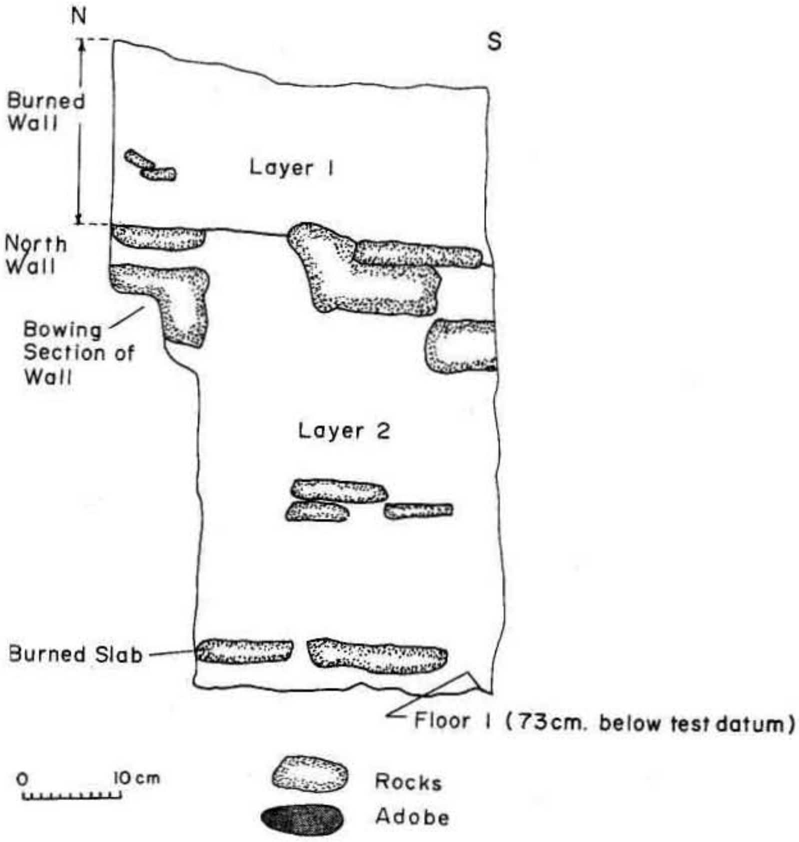


Figure 4.41. Anomaly Test 2, east face

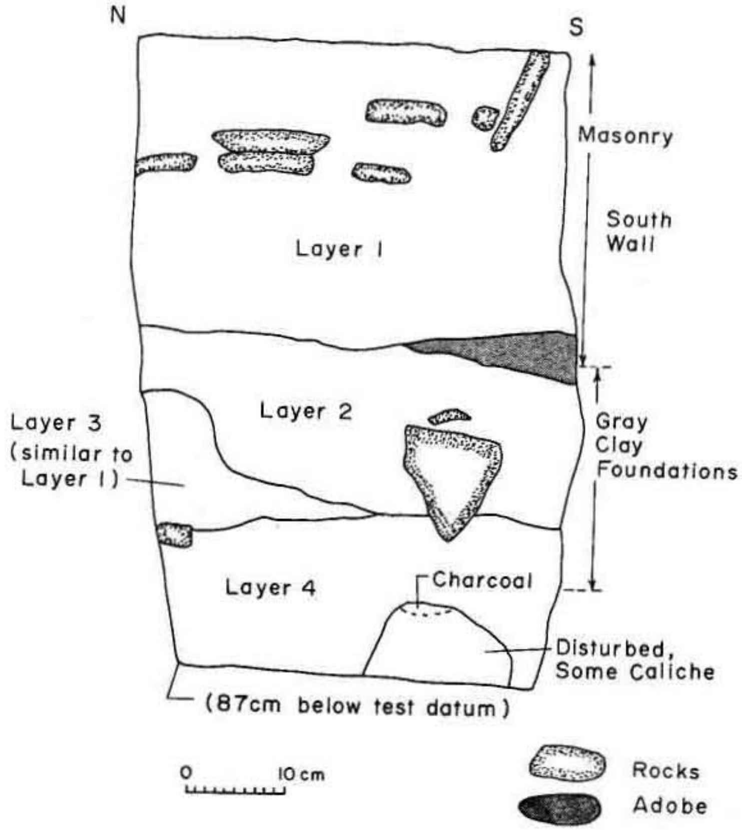


Figure 4.42. Anomaly Test 3, east face

Layer 2

This corresponded closely to Level 3 and consisted of 7-18 cm of very loosely compacted sand. Some animal disturbance was noted, and one piece of burned sandstone is recorded in the profile (Figure 4.42).

Layer 3

The northern part of Level 3 was a lens of semicompact sand that was a maximum of 14 cm thick. It was very similar to Layer 1.

Layer 4

Corresponding overall to Level 4, this layer was 15-18 cm thick (73-91 cm below the test datum). It consisted of fine-grained, tan, laminated, sandy soil. A caliche concentration sloped downward toward the east. Residual gravels increased in this layer until they were solid at a depth of 85 cm. No cultural material was found. Gray clay wall foundations for the south wall of Room 3 are seen in Figure 4.42. They correspond to Layer 2 and the upper half of Layer 4.

Anomaly Test 4

Located in the northwestern part of Room 1, Anomaly Test 4 was abandoned after only 10-25 cm below the test datum (located in the corner of this test at the far western end of the central wall) had been excavated; no charcoal or cultural material was noted. No profile was drawn. The surface was 10 cm below the test datum.

Anomaly Test 5

Located in the west plaza and abutting the south wall of Room 1, Anomaly Test 5 consisted of one layer (three levels, 32-35 cm) of fine-grained, sandy soil, some rubble, and clay mortar, with animal disturbance evident in the upper part of the layer. The test datum was located in the corner of this pit. No burn was discovered. Figure 4.43 is a profile of the south face of the pit.

Anomaly Test 6

Located in the northwestern quadrant of Room 4, this test revealed two layers of natural fill (Figure 4.44). The test datum was in the fill to the east of this test. It could not be placed in the wall because the wall was lower than the fill.

Layer 1

This 16-23-cm-thick layer (part of Level 1) sloped off toward the north and contained fine, sandy soil with scattered charcoal flecks and adobe melt. No rubble was uncovered. Laminae were evident in the sand.

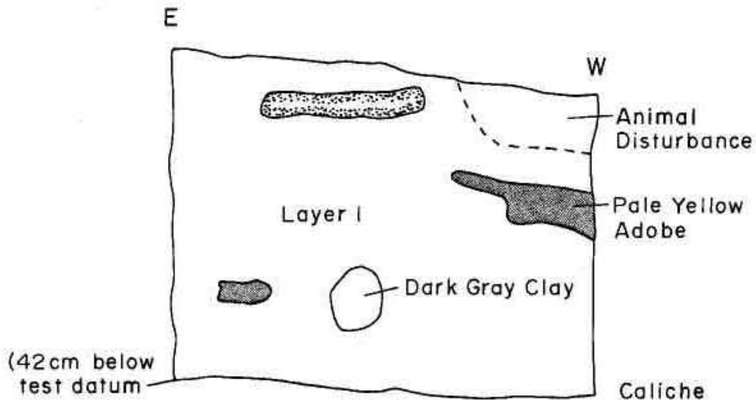


Figure 4.43. Anomaly Test 5, south face

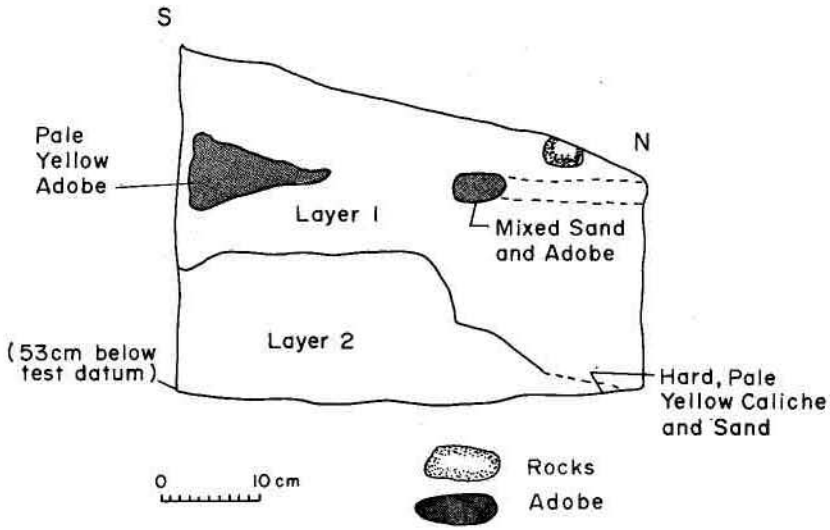


Figure 4.44. Anomaly Test 6, west face

Layer 2

The remainder of Level 1 and all of Level 2 made up Layer 2. It was a maximum of 16 cm deep. Basically, it was a very compact, fine sand, which was yellower near the base where caliche began to appear.

Anomaly Test 7

This test pit was located in the south plaza just south of a curved wall that was south of the west wall of Room 13. Excavated to a depth of 62 cm, it consisted of four levels that were assigned to three stratigraphic layers (Figure 4.45). The test datum was located in the south wall of the curved wall in the west wing of the rooms. The surface was 2 cm below the test datum.

Layer 1

Levels 1 and 2 and part of Level 3 ranged from 27-37 cm (2-39 cm below the test datum) of soft, loosely compacted, fine sand containing charcoal flecks and rubble. The amount of rubble decreased as the pit went deeper. There was some evidence of animal burrowing.

Layer 2

Most of Level 3 (28-41 cm below the test datum) was a more loosely compacted layer with extensive animal burrowing. A small, round, concentration of charcoal, 8 cm in diameter, was found at a depth of 36 cm; it continued to 43 cm below the surface.

Layer 3

Level 4 (40-63 cm below the test datum) consisted of a compact, sandy soil that was laminated. Charcoal flecks were present, and an adobe lump was discovered near the base of the test. Excavation was stopped at the plaza surface.

Anomaly Test 8

Located along the east wall of Room 13, this test uncovered a slab-lined hearth before excavation ceased. Three arbitrary levels above the hearth were assigned to two stratigraphic layers (Figure 4.46). The test datum was in the east wall 10 cm above the top of the test.

Layer 1

Levels 1 and 2 and part of Level 3 consisted of wall fall that included much mortar. It was very compact at the base of Layer 1 compared with Layer 1A where it was more loosely compacted (Figure 4.46).

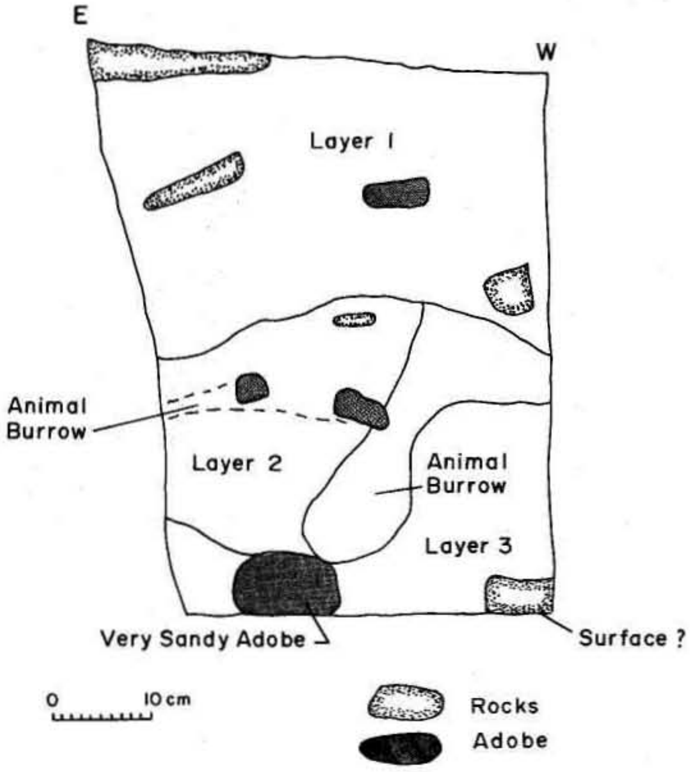


Figure 4.45. Anomaly Test 7, south face

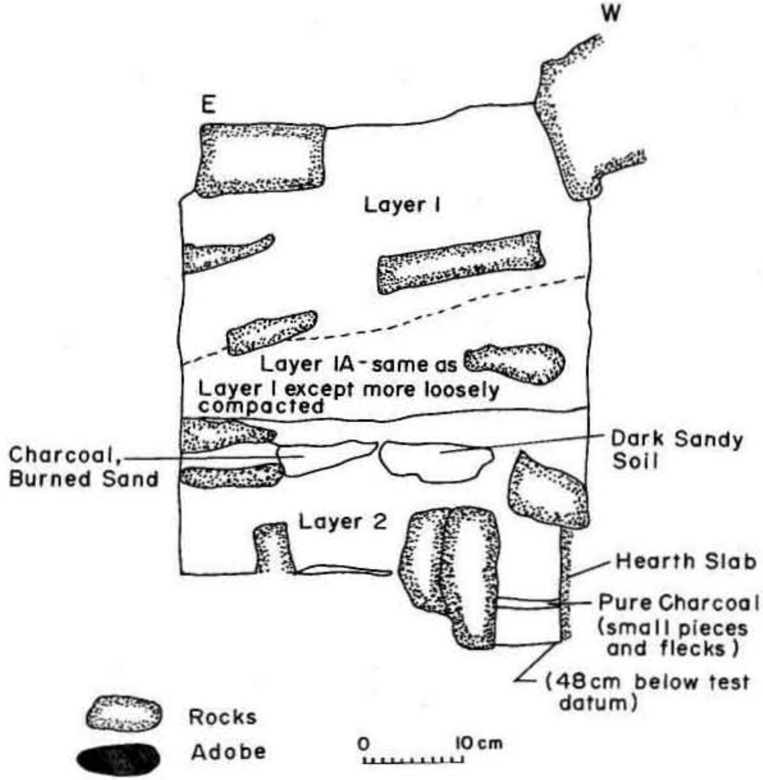


Figure 4.46. Anomaly Test 8, south face

Layer 2

Part of Level 3 (26-36 cm below the test datum) consisted of mixed sand and mortar and some clay that overlaid the hearth.

A layer of adobe overlaid the firepit, but its association with the feature or surrounding fill was impossible to determine because of the limited size of the pit.

Hearth

Between 35 and 63 cm below the test datum, a slab-lined, heavily burned hearth was discovered. Only the northwestern part of the hearth was removed. It contained ash and charcoal. The base consisted of burned sand, and the sandstone slabs and the basal adobe (possibly around the slabs) were very burned. The hearth was not sampled for archeomagnetic dating. No floor was exposed during this excavation.

Anomaly Test 9

Located in the west plaza, Anomaly Test 9 extended to a depth of 60 cm. All four levels were similar and were assigned to Layer 1 (Figure 4.47). The test datum was located in the pit corner(?) where the datum for Test 5 was located. The surface was 29 cm below this datum.

Layer 1

This layer (29-89 cm below the test datum) consisted of fine-grained, yellow-tan, sandy soil and numerous sandstone spalls. The spalls decreased with depth whereas the sand became more compact. Four burned rocks were uncovered at the top of this layer, but no burn was found.

Anomaly Test 10

This pit was located to the southeast of the mapped rooms in the main roomblock. A total of 32 cm was excavated. This was divided into three levels and layers (Figure 4.48). The test datum was in fill just north of the test pit corner; the surface was 7 cm below the test datum.

Layer 1

Level 1 (7-22 cm below the test datum) consisted of very loosely compacted, sandy soil that contained small rocks and spalls.

Layer 2

Level 2 and part of Level 3 (22-45 cm below the test datum) were similar to Layer 1, but were much more compact and contained fewer spalls. Some caliche was noted.

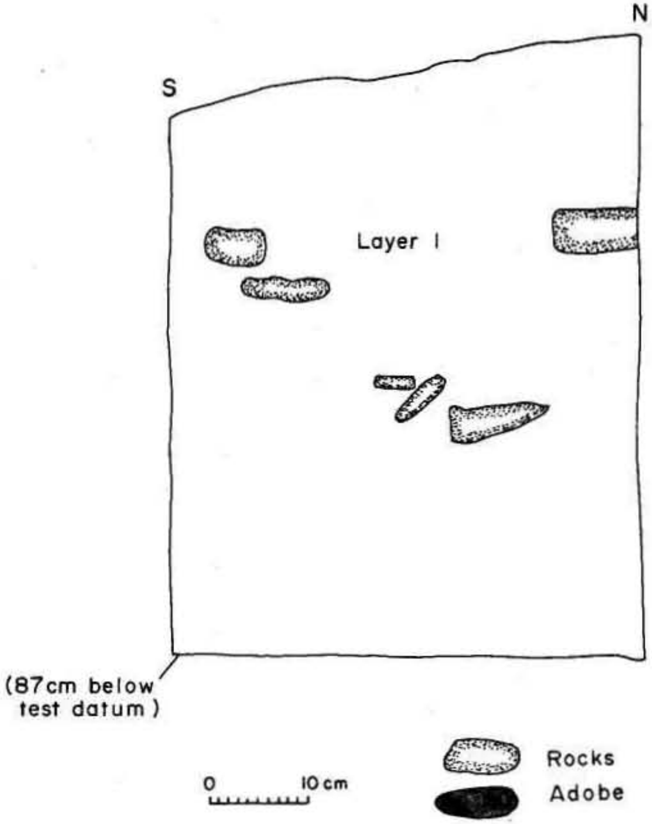


Figure 4.47. Anomaly Test 9, west face

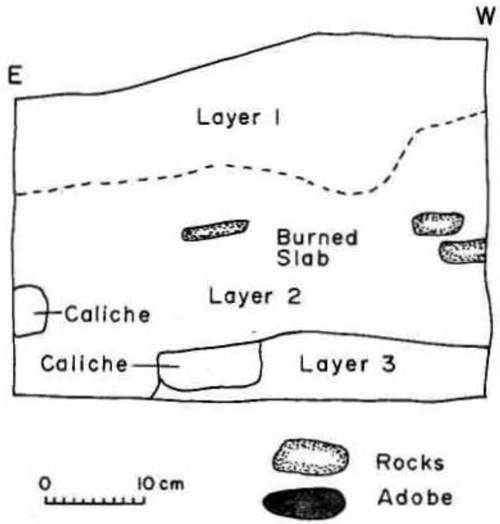


Figure 4.48. Anomaly Test 10, south face

Layer 3

Only a small amount of Level 3 (33-39 cm below the test datum) was excavated. It was similar to the above layers but was very hard, contained caliche, and was considered to be sterile soil.

Anomaly Test Summary

Although one of the purposes of excavating the ten pits (that is, to locate burns that would provide samples for archeomagnetic dating) was not achieved, the tests did provide some information about various rooms or areas of 29SJ 633.

Of the 10 anomalies tested, at least 6 (Anomaly Tests 1, 2, 3, 7, 8, and 9) and possibly 7 (Anomaly Test 6) had burned rocks, burned walls, or burned sand, charcoal, and ash. [The seventh (Anomaly Test 6) did not have any burned material in the fill, but there were fire-reddened rocks near the tested area.] These may account for the anomaly shown on the map. Only one test, Anomaly Test 8, revealed a formal hearth. This firepit was slab-lined and filled with charcoal and ash. The slabs and clay were heavily burned, but, unfortunately, there was not enough burned clay to take an archeomagnetic sample. The only other burn that had any potential was found in Anomaly Test 1, but not enough of the burned floor was exposed to excise the minimum number of cubes for a valid archeomagnetic sample.

A floor was reached in the east roomblock (Anomaly Test 1); another floor was discovered in Room 11 (Anomaly Test 2); the surface of the plaza was reached (Anomaly Test 7); but no floor was noted to be associated with the hearth in Room 13 (Anomaly Test 8). In these four tests, the fill above these surfaces was similar to that found in the two excavated rooms (Room 7 and Room 8); it consisted mainly of wall fall (rocks and adobe melt), alluvial/aeolian sand, and in one instance (Anomaly Test 1, east roomblock), burned vegetal material. This suggests a similar deposition pattern for the roomblock, with no later reuse of the site once the Mesa Verdean occupation had ended.

5

OCCUPATIONAL HISTORY OF 29SJ 633

This chapter summarizes the occupational history, as it is currently inferred, of this site on the basis of the limited amount of data gathered during the surveys and excavation. Because so little of the site was excavated, however, what is presented herein will need to be carefully evaluated and refined by future research.

Although four time components were discerned on the ridge and assigned the designation 29SJ 633, only two will be the major focus of discussion. The earliest (Pueblo I-Pueblo II) and the latest (Navajo) site use were not included in the excavations. The component dating to the A.D. 900s was recorded in 1947 when Pierson described the early roomblock that is located along the ridge on the western edge of 29SJ 633. These rooms, plus the trash deposit and cist located to the south of the ridge, have been dated based on Pierson's survey, a survey in 1972 by the Chaco Project, and the sherd transect analyses at this site (McKenna and Toll, Chapter 7 of this volume). The available evidence suggests a three-four room rectangular house with a depression to the south (an associated pitstructure).

Before the 1978 excavation, it was anticipated that additional evidence for an A.D. 900s occupation would be found beneath the rooms in the main roomblock. This, however, proved wrong. The A.D. 900s use of this site, therefore, was probably limited to one or two families who lived along the western part of this ridge.

Excavation of the main roomblock, located on the eastern part of this ridge, provided evidence of two major occupations. Details of the architecture and stratigraphy that provide the data base for much of the following discussion are presented in Chapter 4. Although animal burrowing did cause some mixing of cultural material, this complication has been considered in the presentation.

Two components were evident in both of the excavated rooms. The initial use of the main roomblock has been lumped into the late A.D. 1000s-early A.D. 1100s component and includes the construction and occupation of at least the core or central portion of the roomblock. The next component, the late A.D. 1100s-early A.D. 1200s, embodied at least some structural modification of the house, including floor resurfacing in the two rooms examined. The latter included the dense trash deposition found in Rooms 7 and 8 and was associated with a change in burial customs over those noted in earlier sites located elsewhere in this area. In considering these distinctions, it must be recognized that undoubtedly these components, as defined, include much more complexity than was intelligible from the restricted site explorations and that the hiatus suggested between these periods of site occupancy is conjecture.

Late A.D. 1000s-Early A.D. 1100s

In the late A.D. 1000s-early 1100s, the main roomblock at 29SJ 633 was constructed. An archeomagnetic sample from Firepit 1, Room 7, Floor 2, yielded a date of A.D. 1120 ± 26 yrs. Although the numbers of sherds recovered and analyzed from the lower floors of the excavated room and one-half were few, there is no reason to assume this date is not within the use period of the roomblock; surface materials in the associated trash mound indicate that portions of the roomblock may have been constructed in the middle to late 1000s. This dating remains tentative, however, because much of the cultural material was removed from the rooms during later site use.

The main roomblock that is inferred to have been constructed during this time period has 12-15 rooms, 2-3 kivas, and associated trash to the south (Figure 1.5). The two excavated rooms (7 and 8) are probably part of a central roomblock consisting of Rooms 7, 8, 9, and 10. This inference is based on the numbers and locations of doorways, both plugged and unplugged, that connected several of these rooms (Table 5.1). Doors connected Room 7, the proposed living room, to the plaza, to the storage room directly to the north (Room 8), and to unexcavated Room 9 to the east, as well as to another unexcavated room on the west. Room 8 also had a doorway between it and its eastern neighbor, Room 10.

The earliest use of Rooms 7 and 8 is evident below the floors. Several burns that are probably related to construction were found. Beneath Floor 1 of Room 7, three heating pits associated with the construction of substantial wall foundations were recorded (Table 5.2). There was no accompanying surface on which these heating pits were located. The levels of two of the three (Construction Firepit 1 and Construction Firepit 2), sterile sand, are associated with the room foundations. Their location near the base of construction debris may indicate that they provided heat during the construction of the foundation or room walls. Windes (1987: 155) notes the presence of similar heating pits at Pueblo Alto; these pits may have been associated with the Stage I construction at that Chaco Canyon greathouse. In Room 8 at 29SJ 633, a burn below Floor 2 was similar to the third burn (Construction Heating Pit 1) recorded for Room 7. (See Chapter 4 for more details.)

Although only two rooms were examined, it is suggested that the foundations for the original roomblock were constructed as a unit before the construction of any overlying walls (Tables 4.1 and 4.2). The substantial clay wall foundations were slightly offset from the walls in several places, which is indicative of their layout before upper wall construction. The level of preplanning inferred if the foundations were put in place as a unit indicates preplanning that has not been noted in earlier small sites excavated during the Chaco Project. Construction of foundations beneath the entire roomblock would have required considerable amounts of water. The foundations may have been laid out during seasons of greater available moisture such as early spring or late fall (Lekson 1984:13). If this were the case, the need for temporary heating facilities seems apparent (Chapter 4).

Table 5.1. Plugged and unplugged doorways in Room 7 and Room 8

Doorway No.	Location	Condition	Height Above Floor	Width (cm)
Room 7:				
1 to plaza	South wall, western end	Plugged	Base of wall	64
2 to plaza	South wall, eastern end	Plugged	Base of wall	54-55
3 to plaza	South wall, center	Plugged	-	-
4 to Room 9	East wall, southern end	Possibly plugged	31-35 cm above clay foundation or Floor 2 surface	43
5 To Room 8	North wall, slightly east of center	Unplugged	52 cm	
6 to Room 5	West wall, southern end	Plugged	Base of door 45 cm above Floor 1	20-25
Room 8:				
5 to Room 7				
7 to Room 10	East wall		39 cm above Floor 1	90

Table 5.2. Room 7, features below Floors 1 and 2

Feature Name	Function	Dimensions (cm)	Depth (cm)	Shape	Lined?	Plastered?	Fill	Comments
Construction Firepit 1	Heating pit	ca. 65 by 46	10-15	Oval?	No	Yes	> 25,000 cc of ash and burned sand.	Area was scooped out of sandy soil.
Construction Firepit 2	Heating pit	26-30 (diam.)	3-6	Irregular	No	Yes	Charcoal-flecked trash.	Area was scooped out of sandy soil.
Construction Heating Pit 1	Heating pit	20 by 20	<5	Circular	No	?	Sandstone slab, plaster, brown sand with ash, charcoal, and scorched wood.	

The masonry in the two excavated rooms was heterogeneous. Some dark, indurated material that is frequently described for walls in Chaco Canyon greathouses does occur in the walls of Room 7. Some of this material may be reused ground stone artifacts brought in from other small sites in the rincon. With few exceptions (Truell 1980:v-48), concentrations of ground stone were infrequent in small site wall construction in this rincon and elsewhere in Chaco Canyon. During excavation of 29SJ 627 (located 200 m away), few metates and very little wall fall were discovered (Truell 1986: 149; 1987:168). At 29SJ 633, however, 70 metate fragments were found during the clearing of room wall tops; and, in one case, a metate fragment and its companion mano (set lengthwise into the trough) were found cemented together. The apparent paucity of metates at 29SJ 627 may, in fact, be explained by this discovery at 29SJ 633. One possibility is that the inhabitants of 29SJ 627 moved up the hill in the late A.D. 1000s and built this roomblock at 29SJ 633, while using their former home as a source for some of the building material. Other building material consisted of soft, friable sandstone, which is abundant in this rincon. The irregularities in wall masonry (see Chapter 4) suggest expedient construction.

Tables 5.1, 4.1, and 4.2 summarize data on wall foundations, wall heights, and the doorways found in these two rooms. The presence of three plugged doorways (Doorways 1, 2, and 3) in the south wall of Room 7 suggests easy and open access to the plaza during the use of Room 7.

The floors of Rooms 7 and 8 were not constructed at the same level. In Room 8, Floor 2 was located 5-16 cm above Floor 2 of Room 7. (It was also 1-7 cm above the later surface, Floor 1, of Room 7.) This discrepancy in floor level is the opposite of what was expected. Most frequently, northern (storage) rooms in small sites in Chaco Canyon have floors that are located slightly deeper than the southern (living) rooms. That the two lower surfaces in Rooms 7 and 8 were still associated with one another is not in question because the footings or wall foundations of Room 8 are tied to those of Room 7.

The presence of a substantial hearth (Firepit 1, unfortunately partially removed prehistorically), a large, walled-off storage pit (Pit 2), and a heating pit (Heating Pit 1) associated with Floor 2 of Room 7 indicates that this room probably originally functioned as the living room (Table 5.3).

In Room 7, despite the small volume of fill between floors and the presence of extensive animal disturbance, no late carbon-painted sherds or St. Johns Polychrome sherds were found associated with the Floor 2 surface. No exotic materials and no worked pieces were found in the collection of chipped stone. One small turquoise bead and two shell beads were recovered from the floor fill. The actual floor contact materials included one sherd of Gallup Black-on-white and one piece of a slab cover.

Floor 2 of Room 8 had no floor features, again as predicted for an empty storage room. Only one early Pueblo III, neck-corrugated sherd was

Table 5.3. Room 7, Floor 2, features

Feature Name	Function	Dimensions (cm)	Depth (cm)	Shape	Lined?	Plastered?	Fill	Comments
Firepit 1	Hearth	52 by ?	21	?	No	Yes	Layer 1: 2-11 cm of light gray ash and scattered charcoal. Layer 2: 4-18 cm of purple, fine sand with scattered charcoal; animal disturbance at base of Layer 2. Layer 3: light tan, fine sand with scattered ash and charcoal; animal disturbance was noted. Layer 4: Light gray ash.	Partially removed prehistorically. Pit was plaster lined, and the base of the pit was red. Revised archeomagnetic date of A.D. 1120 ± 26 years was obtained.
Heating Pit 1	Heating pit	20 (diam.)	<5	?	No	No	?	Upper edges consisted of hard clay.
Pit 1	Unknown; possible animal burrow	75 by 24-28	12	Irregular	No	No	Clean, tan-gold sand with scattered pieces of sandstone near base.	Two animal burrows intrude fill.
Pit 2	Storage cist	22 (diam.)	15	Circular	No	Yes	Layer 1: ca. 5 cm of lumpy, brown-gray, clayey sand. Layer 2: ca. 3 cm of fairly clean, gold-tan sand with some sparse evidence of charcoal. Layer 3: 7 cm maximum of fairly clean, gold-tan sand with sparse charcoal but separated from Layer 2 by a sandstone slab.	Lid still had plaster adhering to it, which indicates it was once sealed into Floor 2; patches of clay also on bottom and sides of pit; animal disturbance noted in Layer 1.

Table 5.3 (concluded)

Feature Name	Function	Dimensions (cm)	Depth (cm)	Shape	Lined?	Plastered?	Fill	Comments
Storage Bin	Storage	104 (north) by 135 (west) by 176	45-68 at end of excavation; 83 estimated	Triangular	Walls	Yes	Layer 1: tan, laminated sandy soil with gray, clay lenses. Layer 2: 6-19 cm of slightly darker, sandy soil with dense concentrations of adobe chunks in an alluvial, lensed sand matrix. Layer 3: 3-5 cm of red-brown, unburned, compact sand and adobe. Layer 4: 11-23 cm of very loosely compacted, sandy soil containing scattered adobe chunks. Layer 5: 12-16 cm of loosely compacted, sandy soil with dense concentration of bone and some eggshell. Floor 1: 0.5 cm, irregular, discontinuous material. Layer 7: 7-12 cm of small rocks in a tan-gold, unlaminated sand matrix Floor 2: sandstone slabs and gray clay.	Wall to form triangle had no foundation; it was seated on clean sand and built at time lower plastering of Floor 2 was done; no remodeling was noted.

recovered from the floor (or fill), but the extensive animal disturbance makes the true association suspect.

In summary, the late A.D. 1000s-early 1100s structure provided architectural evidence that was indicative of the complexity of small site architecture during this time period. Both Rooms 7 and 8 were unusually large for small house sites in Chaco Canyon (Truell 1986:Table 2.37). Room 7 had an estimated floor area of 12.11 m^2. For Room 8 a floor area of 7.4 m^2 was estimated. The foundations of gray clay, walls offset from their foundations, which would indicate prelaid foundations, and the use of ground stone in wall masonry also were not characteristic of small sites. The large room size and prelaid wall foundations uncovered in the test excavation are indicative of the architectural continuum noted between large and small sites in Chaco Canyon in the early A.D. 1100s.

Late A.D. 1100s-Early A.D. 1200s

It was only during the excavations in Rooms 7 and 8 that the extent of the refuse from the late A.D. 1100s-early 1200s occupation was found. Although these data were not anticipated before excavation, the evidence is important. The later trash that filled these rooms suggests use of the site by people whose ceramic style was similar to the "Mesa Verdeans." McKenna (Chapter 6) discusses the interrelationships of these two archeologically defined groups and suggests a probable continuity of people in Chaco Canyon through time. The few centimeters between Floors 1 and 2 of Rooms 7 and 8, and in some places their overlap, indicate that not much fill had accumulated between the two occupations. Using the archeomagnetic dates as a guideline, there was probably a maximum 50-70-year hiatus--a possible one- to two-generation gap between their use. The gap could have been much shorter; this makes it impossible to determine whether or not the later inhabitants had any relationship to the earlier ones. Whether or not they did, their use of the rooms and their cultural remains indicate several differences between the two groups.

Because it is not clear how much of the fill below Floor 1 of these rooms was deposited or disturbed when the remodeling took place, comparisons are restricted. Room 8 may have retained its functions, but the use of Room 7, the living room, is not identical.

The possibility that the same group did not occupy the two floors in Room 7 is suggested by the pottery present, by the different types of features on the two floors, and by the presence of burials on the upper floor surface. The latter is a rare but not unknown occurrence in earlier small sites.

In Room 7 most of the Floor 1 features were clustered in the central part of the room (Figure 4.8 and Table 5.4). No well-built, permanent-appearing firepit was found. One sad-appearing, slightly dished burn area, designated Firepit 1, is more accurately described as a floor burn. It was a small, slightly concave depression that had been scooped out and plastered. It did, however, provide an archeomagnetic date of 1170 $\pm$ 28 (ESO 1672). One additional burned area was present in the western part of

Table 5.4. Room 7, Floor 1, features

Feature Name	Function	Dimensions (cm)	Depth (cm)	Shape	Lined?	Plastered?	Fill	Comments
Firepit 1	Burn	34 by 30	4	Circular	No	No	One layer of burned sandy soil with a small amount of ash.	Revised archeomagnetic date of A.D. 1170 + 28 years (ESO 1672).
Floor Burn 1	Burn	48 by 40	-	Oval	No	No	Thin concentration of burned material included charred bone and twigs with small blackened rocks and red adobe chunks; no ash; only reddened floor beneath.	Single burn on floor surface, possibly a postoccupational event.
Floor Burn 2 (SSE of Posthole 2)	Burn	33 by 30	-	?	No	No	Small concentration of burned wood.	Single log fire.
Pit 1	Storage	67 by 59	26-28	Irregular	No	No	One layer of compact, tan, fine-grained sand; animal disturbance introduced material from the firepit on Floor 2 which is located beneath Pit 1.	Indentation on south side is part of original construction.
Pit 2	Posthole?	12 by 10	25	Oval	No	No	One layer of clean, tan sand.	Pit lacked shims, basal slab, and shale packing, all features usually associated with postholes.
Pit 3	Unknown possible animal burrow?	24 by 21	17	Circular	No	No	Layer 1: 9.5 cm of fine, tan, unburned sand that contained many burned twigs.	Two layers, both with evidence of animal disturbance; only part of the caliche-covered original.

Table 5.4 (concluded)

Feature Name	Function	Dimensions (cm)	Depth (cm)	Shape	Lined?	Plastered?	Fill	Comments
							Layer 2: 7.5 cm of moist, fine-grained, yellow, sandy soil with charcoal only in areas where animal burrows were present.	Walls remain; the burned twigs in Layer 1 probably represent animal disturbance.
Pit 4	Animal burrow	-	-	-	-	-	-	-
Pit 5	Animal burrow	-	-	-	-	-	-	-
Pit 6	Burial Pit	55 by 36	28	Oval	No	No	Sandstone slabs in plaster-sealed pit; fill was composed of clean sand scattered with sparse charcoal, a few nonhuman bones, and sherds; a thin layer of lensed sand about halfway down may only represent wash from between the rocks above.	Burial 4, an infant 12 ± 4 months old covered by sandstone slabs set in plaster; had been penetrated by animals whose burrow contained unburned amaranth seeds; one corrugated sherd found with burial.
Posthole 1	Posthole	19 by 18	37-38	Circular	No	Yes	Clean sand.	There was clay coping on south and west sides, plus interior of pit was plastered; unburned post surrounded by basal slabs fell to pieces when removed.
Posthole 2	Posthole	22 by 16	26	Circular	One slab at base	Yes	One layer of tan, sandy soil contained sparse, charcoal flecks throughout.	Thin coat of plaster had mostly washed off the pit walls; shims indicate that the post had been offset to the west of center.

this floor (Figure 4.8); it appears as a small area of burned material resting on the floor and it may represent a postoccupational event. Neither of these two features accommodated repeated cooking or heating such as is indicated by the position and characteristics of Firepit 1 found on Floor 2. The absence of such a feature on Floor 1 indicates that the later use of this room was not typical of a living room; or if it were used as a living room, it was only for a short time. If "living room" activities had been planned for this area, a firepit probably would have been constructed, even though a short occupancy would have left evidence of only slight burning.

Other floor features include two postholes, which were probably the best preserved features in Floor 1 except for the burial pit (Pit 6, Burial 4). The postholes may have provided additional roof support, or they may have been part of a piece of furniture such as a rack. No evidence of their use as loom rests was apparent, and their central location in the room does not support an argument for their use as a loom support (Figure 4.8).

Also present in Floor 1 of Room 7 were a possible storage cist (Pit 1), two pits of unknown function (Pits 2 and 3), and one burial pit (Pit 6). Two animal burrows (Pits 4 and 5) were originally assigned feature numbers, but they do not appear to have had prehistoric use.

Although the large storage bin found in the northwestern corner of Room 7 was originally built during the earlier construction of this room and was not torn down during construction of Floor 1, it is not certain that it was used during the later occupation of this room. This storage bin may have had two interior floor surfaces, with the upper one being somewhat tentatively assigned; but the ceramics found in the upper fill of this feature are somewhat earlier in time than those found in the rest of upper Room 7.

The only unplugged doors in Room 7 included the north door into Room 8 (Doorway 6) and possibly the east door into unexcavated Room 9 (Doorway 5). Although nothing is known about Room 9, possibly it was part of this room suite and was abandoned simultaneously.

In Room 8, the only floor features were the two burial pits (Table 5.5). Both Rooms 7 and 8 contained burials associated with the upper floors; they were probably placed in these rooms at about the same time. All three children were interred in pits, but the adult male was placed on the floor and only lightly covered. All have evidence of animal disturbance to some extent. (See Chapters 4 and 12 for details.) In Room 8, a portion of the floor east of Pit 3 was also removed during the construction of the burial chamber. No such removal of the floor surface was noted for Pit 6 in Room 7 (Burial 4). The latter, however, had no basal slabs and clearly was not as carefully constructed as the two in Room 8. Despite the high concentration of artifacts in the floor fill directly above Floor 1 of Room 7 and the subsequent animal disturbance, most primary burial associations were evident. A quantity of unburned amaranth seeds associated with Burial 4 and adjacent to the west wall, however, may

Table 5.5. Room 8, Floor 1, features

Feature Name	Function	Dimensions (cm)	Depth (cm)	Shape	Lined?	Plastered?	Fill	Comments
Pit 1	Animal burrow	13 (diam.)	16	Circular	No	No	Loosely compacted, fine, sandy soil with yellow-brown charcoal flecks and gray ash at base.	
Pit 2	Animal burrow	20 (diam.)	11	Circular	No	No	Charcoal and ash at top of yellow-brown, sandy soil.	
Pit 3	Burial pit	77 by 67	43	Subrectangular	?	?	Layer 1: 5 cm of burned sand with charcoal and burned twigs. Layer 2: upper—2 cm of burned, sandy soil; lower--28 cm of loosely compacted, yellow-brown, sandy soil with some charcoal. Layer 3: yellowish-brown, sandy soil that contained charcoal, sherds, burned bone, and Burial 1.	Burial 1: 12 ± 4 month infant.
Pit 4	Animal burrow	30 by 22	26	Semi-circular	No	No	Soft, sandy soil containing charcoal flecks.	
Pit 5	-	100 by 90	-	-	-	-	-	Composite of Pits 6, 7, and 8.

Table 5.5 (concluded)

Feature Name	Function	Dimensions (cm)	Depth (cm)	Shape	Lined?	Plastered?	Fill	Comments
Pit 6	Burial pit	54 by 30	48	Subrectangular	Yes	No	Layer 1: 13 cm of heavily burned, reddish-brown sand and charcoal. Layer 2: 1 cm of yellowish-brown, sandy soil over ash, and both on top of grave slab. Layer 3: 26 cm of soft, yellow-brown, sandy soil that contained large charcoal flecks; soil browner around body; pockets of ash associated with body. Layer 4: 8 cm included basal sandstone slabs and 2 cm of soft, yellow-brown, sandy soil.	Burial 2: 24 ± 4 month infant; two sandstone slabs between Layers 1 and 2; grave slab at bottom of Layer 2.
Pit 7	?	53 by 47	15	Irregular	No	No	Layer 1: floor fill consisting of burned sand and charcoal. Layer 2: adobe clods and adobe beam impressions.	Probably excavated during preparations for Burial 2.
Pit 8	Possible unused burial pit	66 by 22	38	Subrectangular	No	No	Layer 1: floor fill consisting of burned sand and charcoal. Layer 2: yellow-brown sandy soil; few adobe clods.	No burial in possible grave.

represent postinterment disturbance. Once the three children and the adult male were interred in these two rooms, the rooms were probably no longer used.

Immediately after the roof of Room 7 was removed, the room began to fill. Three rock concentrations just above Floor 1 in Room 7 probably resulted from wall collapse after the removal of the roof (Chapter 4). Rock Concentration 1 directly overlaid Burial 4 in Pit 6 of the upper floor. Perhaps after the roof was removed, part of the wall above this interment was pushed in purposely. Yet, no rock was found above Burial 3 (the adult male), which also was associated with this floor surface.

In Room 7 Layer 4 consisted of burned vegetal material that did not directly overlay the floor surface but may have been related to the two burials. On the other hand, this material may have burned accidentally (Chapter 4). A considerable amount of apparently still usable food was found in the lenses; this contrasts with the overlying refuse. A similar, but much less extensive, burned layer was found in Room 8; it rested on the upper floor surface directly above the two interments in that room.

Anomaly Test 1 (Room 10) yielded perhaps an even more dense concentration of burned corn kernels and amaranth seeds in the northeastern corner of the room. Excavation ceased when this concentration, which was lying on the floor, was reached, and nothing is known about its contextual association (Chapter 4).

Other areas of 29SJ 633 must have remained in use. There are additional fill layers, Layers 2 and 3 in both Room 7 and Room 8, which indicate either (1) that the other site areas continued to be used and the inhabitants dumped their refuse in these rooms or (2) that refuse materials that were discards at 29SJ 633 were produced by inhabitants living at other sites in the area. The latter is less likely, however.

The artifact density in these upper layers was unusual. Gillespie (Chapter 10) notes the large number of bones recovered from the upper fill of Room 7: "...far greater than in most excavated Pueblo sites in Chaco or elsewhere in the Southwest." There was a lack of artiodactyl and domestic dog remains. The implications of the abundance and predominance of cottontail rabbits and turkeys that Gillespie describes in this collection are discussed in the consideration of the length and type of occupation at this site.

In addition, despite mixing with earlier material, the A.D. 1200s ceramics recovered in the upper deposits of Room 7 represent an unusual sample. Late ceramic types, such as Mesa Verde Black-on-white, have been noted in excavated small sites in Chaco Canyon; but, in general, documentation is poor. The type definitions are not clear nor are the associated assemblage compositions. Toll et al. (1980:106) note a slightly greater diversity in temper types represented in the later ceramics; this is mainly a result of the addition of San Juan andesite/diorite examples that were not present in earlier Chaco Canyon ceramics assemblages.

Cameron (Chapter 8) notes that most of the chipped stone collected at this site also came from the refuse layers above the first floor of Room 7. The frequencies were not considerably higher when compared to some other trash deposits in other small sites excavated by the Chaco Project staff. She notes higher percentages of local chalcedonies and local, chalcedonic petrified wood than was recovered at Pueblo Alto but lower percentages than those recovered from earlier small houses. In addition, there are higher percentages of Washington Pass chert, the most frequent lithic import (Cameron 1982:17), and obsidian than at other earlier small sites, but thes percentages are lower than the percentages recovered at Pueblo Alto (Cameron 1980:1-2).

Data from the anomaly tests indicate that other areas of this site probably were used in a manner similar to that of Rooms 7 and 8 during this last occupation by the Anasazi. Table 5.6 summarizes and compares the upper layers excavated in the rooms and tests. Not all rooms contained a burned vegetal concentration, but the one found in Room 10 (Anomaly Test 1) may be another clue to its function as part of the same suite in this part of the roomblock.

Discussion

Trash Mound and Temporal Placement of the Roomblock

One trash mound located on the 29SJ 633 ridge is southwest of the roomblock tested in 1978 (Figure 1.5). This midden is believed to have been associated with an A.D. 900s roomblock located, for the most part, west of the roomblock described in this report. A small portion of the 900s house may extend beneath the west end of the 1100s one.

A second extensive midden is located southeast of and associated with the A.D. 1100s roomblock. McKenna and Toll (Chapter 7) think this latter trash mound was most heavily used in the middle to late A.D. 1000s. This is particularly interesting because architecturally it appears as if the portion of the site excavated should date somewhat later than that—to the middle A.D. 1100s. The revised archeomagnetic date from the lower floor of Room 7 is in the early A.D. 1100s. However, there are some definite questions with respect to the reliability of the latter date. McKenna and Toll believe that this midden shows mixing and was in use for the entire length of site use. This point is probably quibbling. Based on this restricted test, it is impossible to tell the length of site occupation. However, Truell would be greatly surprised if the excavated portion dated to the middle 1000s.

On the basis of limited excavations, it is possible to infer some change in small site use that began during the late A.D. 1000s-early 1100s. Residents at 29SJ 633 followed many of the patterns (house layout, arrangement and use of space within suites) as did their ancestors. Yet, the larger rooms and wall foundations indicate an early A.D. 1100s trend of adapting some large site characteristics to small site construction. Although the common origin and organization of large and small site structures have been recognized, structural distinctions other than size were

Table 5.6. Comparison of layers among all tested rooms

Room 7		Room 8	
Layer 1	Topsoil	Layer 1	Topsoil
Layer 2	Wall fall, trash, and some natural deposits	Layer 2	Alluvial/aeolian sand and wall fall
Layer 3	Dense trash and some construction debris		
Layer 4	Burned vegetal concentration	Layer 3 Layer 4	Burned organic material with some rocks Burned organic material with some rocks
Layer 5	Intentionally deposited sand	Layer 5	Loosely compacted sand
Layer 6	Adobe and trash	Layer 6	Adobe melt
Rock concentrations			
Floor 1	3 floor burns 1 storage pit 1 post support? 2 post supports 1 burial pit (No. 4) 1 burial pit (No. 5)	Floor 1	Burn? 2 burial pits (No. 1 and No. 2) empty burial pit? (No. 8)
Layer 7	Intentional fill, sand, and clay		Thin sand layer where found
Floor 2	1 firepit 1 storage cist 1 storage bin	Floor 2	
Layer 8	Construction debris and alluvial material 2 heating pits 1 firepit	Layer 7	Adobe clods and melt Sand Unprepared surface and semicircular burn area
Layer 9	Sand with little cultural material	Layer 8	Gravel lens, sandy soil
Layers 10 & 11	Sterile		Sterile soil

Table 5.6 (concluded)

Room 10—Anomaly Test 1	
Layer 1	Wall fall and alluvial/aeolian sand
Layer 2	Alluvial/aeolian, fine-grained, unburned sand contained quantity of burned corn kernels, cobs, amaranth seeds
Floor	Burned

Room 11—Anomaly Test 2	
Layer 1	Wall fall 6 burned sandstone pieces
Layer 2	Alluvial/aeolian sand with adobe chunks
Floor 1	Unburned except plaster

Room 3—Anomaly Test 3	
Layer 1	Wall fall Possible floor at bottom
Layer 2	Loosely compacted sand
Layer 3	Semicompact sand
Layer 4	Fine-grained, tan, laminated, sandy soil Caliche Residual gravel Sterile

Room 4—Anomaly Test 6	
Layer 1	Fine, sandy soil Scattered charcoal flecks and adobe melt No rubble
Layer 2	Compacted fine sand

Outside Room 13—Anomaly Test 7	
Layer 1	Loosely compacted fine sand with charcoal flecks, rubble
Layer 2	More loosely compacted layer with charcoal
Layer 3	Compact, sandy soil with charcoal

Inside Room 13—Anomaly Test 8	
Layer 1	Wall fall with mortar
Layer 2	Mixed sand and mortar, clay
Adobe layer Hearth	

maintained until the early 1100s when more small sites incorporated some large-structure building techniques. This accompanied an increased inter-site structural diversity in small site organization.

The data from the last Anasazi occupation in the late A.D. 1100s-early 1200s provide much needed information about continued change in the area. The greater reliance on turkey, switches in areas from which imported ceramics and lithics came, the burials, and the difference in use of Room 7 suggest that these changes were profound and affected the entire lifestyle of the Anasazi. Whether the last occupation was part of a continuum or represents a hiatus and reoccupation of this site requires more research, but the ceramic data (Chapter 7) and McKenna's discussion of the Mesa Verdean phase (Chapter 6) should provoke further discussion and additional research on the topic.

6

CHACO CANYON'S MESA VERDE PHASE

Peter J. McKenna

> ". . . it became clear that this ware was not a Mesa Verde signature at all. It was the product of late stylistic changes in which the entire central San Juan drainage had shared. . . . It also became very clear that Anasazi farmers in general were nomads, at least in terms of decades and centuries." [Davis 1964: 300-301]

Early in the research on the San Juan Basin, Emma Lou Davis (1964) figured out that pots did not necessarily equal people, a point lost on many of her contemporaries, including those involved with Chacoan studies. One premise concerning the Mesa Verde Phase in Chaco Canyon is that it is part of a regional phenomenon no less than the preceding Bonito Phase and does not represent a "northern" intrusion that abruptly appears in the central basin. Anasazi occupation manifesting Mesa Verde-like pottery, or simply Mesa Verde Black-on-white and its local variants, is abundant in the central San Juan Basin and around the basin's periphery (Figure 1.1) (Davis 1964; Franklin 1980; Morris 1928). Areas peripheral to the basin evidencing Mesa Verde or Mesa Verde-like ceramics include the Mesa Verde "heartland" of southwestern Colorado, southeastern Utah, the Chinle drainage of northeastern Arizona, the San Juan drainages of northwestern New Mexico, and, as distinct site-unit intrusions, in localities to the south and east of the San Juan Basin itself (Breternitz et al. 1974; Collins 1975; Davis 1964; Franklin 1980; Lekson 1986, 1987; Morris 1928; Pippin 1987). Therefore, the range, relative distribution, and variation in the type argue for continuous development and use of regionally distinctive bichrome paint horizon styles.

The Mesa Verde Phase in Chaco Canyon, however, has been a controversial and inconsistently recognized period of occupation. The turmoil surrounding the period, which can be generally assigned to the thirteenth century, stems from the lack of period-specific research in Chaco Canyon, poor definition leading to problems of recognition, and, in no small part, the name "Mesa Verde" applied to phenomena in Chaco Canyon. As in most phase definitions, ceramics played a large role in defining not only the event but the cultural and historical implications for the phase. This chapter reviews the Mesa Verde Phase as manifested specifically in Chaco Canyon and presents data from other sites in the San Juan Basin, so that the interpretation of 29SJ 633 may be understood in the context of a central basin uplands adaptation within the regional development. This reevaluation, on a regional scale, of material and structural diversity that has been attributed to the Mesa Verde Phase attempts to clarify the available evidence from the central basin uplands and its meaning in the Chacoan sequence.

From the beginning of Chacoan studies, students have recognized a late development in the Chaco Canyon sequence that had Mesa Verde-like qualities (Dutton 1938; Kluckhohn and Reiter 1939; Roberts 1927). Vivian and Mathews (1965) first summarized Mesa Verde period concepts in Chaco Canyon. They mentioned a "Montezuma Phase" but generally regarded the post-Bonito Phase occupation in Chaco Canyon as the result of immigration from the northern San Juan, i.e., an earlier "McElmo Phase," augmented by new arrivals from Mesa Verde and/or the northern San Juan (Bannister 1965: 201; Vivian and Mathews, 1965:113). Chaco Canyon's Mesa Verde Phase was first formally mentioned by Judge in the late 1970s (1977:5). Toll et al. (1980:99) alluded to, without naming, a Mesa Verde period that followed the Bonito Phase and was substantively different enough from Chacoan developments to merit separate status. Other subsequent publications of the Chaco Project have indicated a similar placement with some minor dating and sequencing disagreements, all of which offered no specifics as to the phase's origin, content, or meaning in Chaco Canyon. Temporal placement of the Mesa Verde Phase can be summarized as follows.

Author	Preceding Phase (A.D.)	Mesa Verde Phase Dates
Vivian and Mathews 1965	Bonito Phase/McElmo Phase	McElmo Phase through A.D. 1200s
Lister and Lister 1981	Bonito Phase	McElmo Phase
Hayes 1981	Early PIII 1150-1175	Late P-III post A.D. 1200
Judge 1977	Late Bonito to 1175	A.D. 1175-1275
Toll et al. 1980	Late Bonito to 1220	post A.D. 1220
Judge et al. 1981	Late Bonito to 1220	A.D. 1220-1275
Windes 1987	McElmo 1150-1200	A.D. 1200-1300

"Mesa Verdean" occupations and components were recognized almost exclusively by the presence of the diagnostic pottery, Mesa Verde Black-on-white (Hayes 1981). More recently Truell (1986) recognized the presence of Mesa Verde pottery in many structures but could not associate construction events with these ceramics except for those at the Gallo Cliff Dwelling, which had late archeomagnetic dates. The Gallo Cliff Dwelling's ceramic assemblage is primarily a late Cibola Whiteware and McElmo Black-on-white mix similar to that found in the final occupation of Pueblo Alto, a fact that belies the Gallo site's status as a Mesa Verde period building (Abel 1974; Windes 1984:111-114).

Vivian and Mathews (1965) and Gwinn Vivian (1960:78-9, 1974a) set the tone for much of the recent interpretative work on a Mesa Verde Phase in Chaco Canyon. Their written work describes an uneven reconnaissance survey on Chacra Mesa (R. G. Vivian 1974a) and salvage excavations and other limited testing in Chaco Canyon (G. Vivian 1950). Vivian's interpretations of post-Bonito occupation were based on impressionistic data [as acknowledged (R. G. Vivian 1974a, 1990)], but the caution normally extended to this level of information has not been practiced in recent years. A number of important changes have taken place in our understanding of dating and material culture sequences since Gordon Vivian last wrote about Chaco's late occupation.

Because they had no absolute dates to work with, Vivian and Mathews' (1965) reconstruction was largely predicated on the belief that two pottery types, Houck and Querino Polychrome, were later variants of St. Johns Polychrome. The work of Carlson (1970) subsequently demonstrated that these types preceded St. Johns Polychrome. Houck and Querino now are known to be earlier and have been subsumed under Wingate Polychrome, the earliest polychrome in the White Mountain Redware series, and date to the late A.D. 1100s. With this information alone, Vivian and Mathews' model of the post-Bonito occupation can be considerably restructured and compressed. Sites with Wingate Polychrome that previously were dated at A.D. 1250-1275 can now be considered to have been occupied from about A.D. 1175 to A.D. 1210, whereas sites with relatively more St. Johns Polychrome can be assumed to have been occupied perhaps into the mid A.D. 1200s. Such a perspective puts the Mesa Verde period within a continuum of land use in Chaco Canyon through the Late Bonito Phase (to A.D. 1150) and the McElmo Phase (A.D. 1150-1200) and diminishes (if not negates) the theory of a mid-1200s "cultural infusion" from a rush of "Mesa Verde" migrants. The butte-top ("fortified") sites of Chacra Mesa may well have been occupied late in the A.D. 1200s, but as absolute dates are lacking, this, too, remains a tenet of sequence faith. Glaze paint Heshotuthla-like ceramics, a ceramic marker for the late A.D. 1200s, have been found on Chacra Mesa, but this pottery's occurrence has not been shown to be consistent with any one class of site, notably butte-top occupations, or area of the central basin.

Archeomagnetic dating has only recently provided what few absolute dates there are from this period in the central San Juan Basin. Tree-ring dates are not available because major construction events requiring spans of new, datable wood apparently were not undertaken. Pinyon dates well from the Chaco Canyon area but juniper (J. monosperma) does not (J. Dean personal communication 1986), and juniper is most commonly found as construction timbers of suspected Mesa Verde vintage. Available dates from the basin floor and central uplands are as follows.

Site	Provenience	Date (A.D.)	Lab No.[a]
29SJ 633	Room 7, upper floor	1170 ± 28[b]	ESO 1672
	Room 7, lower floor	1120 ± 26	ESO 1676
	Room 8, upper floor	1190 ± 28	ESO 1649
CM 100	Roomblock 4, rm vent	1300 ± 28	ESO 1465
Mesa Pueblo	Kiva 10, firepit	1200 ± 31	ESO 1503
Mesa Pueblo	Kiva 10, firepit	ca. 1200 ± 31	ESO 1504
Guadalupe Ruin	Room 31W, feature 8	1275 ± 55[c]	ESO 1148
Guadalupe Ruin	Room 31W, feature ?	1170 ± 21	ESO 1149
Gallo Cliff Dwelling	Kiva, firepit 2	1330 ± 25	ESO 1446
Gallo Cliff Dwelling	Kiva, firepit 3	ca. 1200 ± 56	ESO 1475

[a] Earth Sciences Laboratory, University of Oklahoma. Dates with errors less than ± 30 are based on the 1989 revised curve.

[b] Was A.D. 1250 ± 28.

[c] See Pippin (1987:Table 48) for terminal tree-ring dates 1264r to 1279+vv.

This is neither a strong array of dates nor one without controversy and simply indicates that occupation took place during the thirteenth century. The most recent date, that from Gallo Cliff Dwelling, is certainly at odds with the associated ceramics, which are a late A.D. 1100s assemblage in which McElmo Black-on-white is the predominant painted type (13%, Abel 1974). At this point, the discrepancy between the archeology and the archeomagnetic dating cannot be explained, but a conservative interpretation of the evidence favors the earlier ceramic date for Gallo Cliff Dwelling. The dates from 29SJ 633 suggest that deposition of Mesa Verde material occurred early in the thirteenth century, not the mid A.D. 1200s as previously thought (McKenna 1986:94; Toll et al. 1980). Because dating curves are still being developed, these readings are not gospel, and considerable concern exists regarding a now-dated sample that was previously judged unacceptable (ESO 1649). An occupational continuum in the central basin through the A.D. 1200s simply cannot be supported or rejected with these dates. Rapid replacement of ceramic temporal markers are indicated, however, as the 29SJ 633 dates suggest a quick transition from Wingate Polychrome to St. Johns Polychrome in the early A.D. 1200s in Chaco Canyon; Wingate Polychrome is present in the 29SJ 633 surface collections but not in the room refuse. Confident dating of the Mesa Verde Phase does not extend past the mid A.D. 1200s in Chaco Canyon.

There is a problem with recognition of Mesa Verde Phase occupation in Chaco Canyon for physical and methodological reasons. A few sites in the bottomlands of Chaco Canyon, such as Bc 180, Bc 176, Bc 236, and Headquarters Site B (Bradley 1971; Vivian and Mathews 1965:81) are notable in having strong Mesa Verde Black-on-white deposits. Recent surveys of sites located in talus or at cliff margins, however, often reveals the presence of a ceramic assemblage from the Mesa Verde period. This increased visibility during a period when cliff-oriented structures were most common (but not the predominant site type) leads to the "horseback impression" (Hayes 1981:33) that Mesa Verde Phase sites in Chaco Canyon reflect Mesa Verde, Colorado, roots by favoring cliff-edge locations. Whereas this may lead to a lack of vigilance in locating bottomland deposits, late component visibility itself is extremely low. Repeated use of favorable localities, which often results in abundant earlier pottery, is the main reason for this lowered visibility (Windes 1982, 1987:404-405). Even though Mesa Verde Black-on-white and St. Johns Polychrome are the main decorated types after A.D. 1200, they remain minor contributors to deposits with deep typological time. The locality of disposal, another factor in visibility, seems to have changed during the Mesa Verde Phase. The earlier Chaco Canyon pattern of placing trash in extramural middens gave way shortly after A.D. 1100 to disposal within rooms and kivas so that surface dispersal of late carbon-painted wares was reduced.

We do not know if middens are partially the result of episodic room cleaning rather than the extramural dump areas routinely used by earlier Chaco Canyon Anasazi. Midden formation, as a process, is not known to have occurred in strictly temporal or culturally distinct manners. That is, the final deposition of trash as accumulations of refuse in open areas early in the Chaco sequence could also represent episodic disposal of building fill during renovations. During the last occupation, Mesa Verde material in buildings never was removed to middens. A within-room disposal pattern constrains postoccupational dispersal of refuse, limits its surface expression, and reduces taphonomic and attritional effects relevant to many classes of material. Consequently, Mesa Verde deposits would be expected to be underrepresented in unstratified surface samples, especially in bottomland localities where additional factors of rapid alluviation and considerable cultural time depth came into play (see Windes 1987: 404-405). Early surveys did not stratify site components, which made it difficult to recognize and anticipate the significant presence of late (or any) occupational-based deposits. For example, 29SJ 633's representation as a PII-III site (ca. A.D. 850-1150) in Chaco Canyon's site inventory is true, but it does not anticipate the late body of material actually recovered (Hayes 1981; Pierson 1949). Because of considerable alluviation, high trash density in areas between structures, and historic conservational blading of Chaco Canyon's bottomland, recognition of nonstructural deposits has been a problematical and largely unattempted task in Chaco Canyon proper. This has the most impact on late occupation sites as this was the period of highest site-type diversity in the central basin (Sebastian and Altschul 1986).

Arguments on the beginnings and sequencing aside, the Mesa Verde Phase occupation is a consistent part of the archeological record in the central basin (Hayes 1981; Marshall et al. 1979; Powers et al. 1983). Its consistent "background" presence and variability belie the ephemeral, transient status or the minor presence often assigned to the period. Hayes (1981:20, 32-34) recognized 195 structural sites in Chaco Canyon alone that were occupied in the Mesa Verde period--largely because of the presence of "McElmo Style" masonry (see Lekson 1984:17-18) and Mesa Verde Black-on-white. These pueblos tend to have U-shaped ground plans with substantial rubble outlines featuring an enclosed plaza kiva and/or blocked-in kiva, which is a building module common to small structures in Chaco Canyon after A.D. 1050 (Truell 1986). Reoccupation of earlier small sites and sections of greathouses without substantial renovation was the common form of settlement despite the trend for increased use of talus and cliff-edge locations (Hayes 1981). The Vivians' reconnaissance of Chacra Mesa (R. G. Vivian 1974a) also noted U-shaped buildings or "crescent sites," a greathouse (CM 100), and smaller butte-top developments, some of which were sites with numerous rooms (Vivian and Mathews 1965:113). The continued use of Chaco's earlier public architecture through the Mesa Verde period is evident at Pueblo Bonito, Pueblo Pintado, and Una Vida (Judd 1954:79, 232; Kidder 1924; Windes 1982; Windham 1976). Consequently, similar public architecture on Chacra Mesa can be seen as part of this larger regional pattern of late occupation (Jacobson and Roney 1985; Lester et al. 1978:10; Sebastian and Altschul 1986:45).

Although structural sites are most commonly recognized in early surveys, recent work has indicated a marked increase in the diversity of site types in the Mesa Verde Phase, which is considered the most significant evidence suggesting "fundamental changes in resource utilization" (Sebastian and Altschul 1986:89). A steady decline in structural sites from 70-80% from the pithouse periods to 19% in the Mesa Verde Phase was evident in data from surveys of areas added to Chaco Culture National

Historical Park (NHP) (Sebastian and Altschul 1986:199). The variety of site types does not seem to have declined, however, and there are many, if not more, construction designs and site location choices than in the prior period. Included in this structural variety are expedient constructions featuring small talus-boulder shelters and granaries (Sebastian and Altschul 1986), open adobe rooms (Wiseman 1982:29-30), masonry pueblitos on butte tops (Marshall and Sofaer 1988; Sebastian and Altschul 1986), jacal buildings and augmentations to masonry rooms (Roney 1991; personal communication 1990; Fritz 1973), small boulder-backed pueblos (G. Vivian 1950; Lister and Lister 1981:252-253), and the development of new road segments on Chacra Mesa (Jacobson and Roney 1985). Finally, to reiterate, the reuse of buildings with little or no modification apparently is extensive and includes fixed and semifixed feature modifications and additions at such sites as 29SJ 633, Bc 236 (Bradley 1971), Casa Sombreada (Bc 52, Mulloy 1941), Łeyit Kin (Dutton 1938), and Bc 51 (Kluckhohn and Reiter 1939). Building reuse without significant alteration of design suggests that the structural design and allocated space met many of the requirements of their Mesa Verde Phase occupants.

New units of construction, however, are evident in Chaco Canyon. Among those excavated are the Headquarters Site B (Lister and Lister 1981: 252-253; Vivian and Mathews 1965), Unit III at Łeyit Kin (Dutton 1938: 93-94), and probably the northwestern unit around Kiva 6 at Bc 51 (Kluckhohn and Reiter 1939; Truell 1986:470), although the ceramic associations and archeological reporting at Bc 51 (as well as other early excavated sites) are so profoundly inadequate as to confound the issue. The Listers (1981:113-114) point out that the Mesa Verde occupation is evident in the final stages of occupation at Bc 51 but do not specify in which units. These early excavations provide the basis for the common perspective on Chaco Canyon's Mesa Verde architectural design featuring small, single-story, accretionally built rooms with blocked-in keyhole style, pilastered kivas. The main features within rooms are small firepits adjacent to walls, paired slab metates in bins, and subfloor burials (Bradley 1971; Dutton 1938:93-94; Hayes 1981:32). This is a strong constellation of features in the early Mesa Verde Phase, some of which (such as the kiva style) actually begin in the A.D. 1100s (Truell 1986). At best these "traits" are a limited inventory that would be considerably expanded and reordered given the structural variability indicated above.

Post-Bonito Phase occupations are perceived to be concentrated on the Chaco and Chacra Mesa uplands east of the park. Recently, reconnaisance surveys east of Chaco Culture NHP from Shabik'eshchee Village to at least Pueblo Pintado and the Pintado Gap region of Chacra Mesa (Windes 1990) have shown a consistent and continous pattern of earlier (Red Mesa period, A.D. 900s) houses overlaid by a Mesa Verde Phase occupation. Pueblo Pintado itself was probably established during the Early Bonito Phase (A.D. 920-1020) but was used through the Mesa Verde period (Marshall et al. 1979:82-85; Windes 1982). Occupation of Chacra Mesa east of Pintado Gap is generally considered inconsequential prior to the Late Bonito Phase [after A.D. 1100 (Klein and Wait 1983; Phibbs 1974; Vivian 1974a; Vivian and Mathews 1965)]. Common to all reconnaissances and a few spatially limited inventory surveys of Chacra Mesa is the finding that the McElmo-

Mesa Verde period occupations span the uplands from the central canyon to the eastern basin margins--around Las Ventanas and the Rio Puerco drainage--but earlier Anasazi horizons are either not present or are overshadowed by post A.D. 1100 occupations (e.g., Roney 1991). These demographics are variously explained by population movement out of Chaco Canyon and/or from Mesa Verde during periods of "abandonment" or population restructuring, ca. A.D. 1130-1150 and 1200s (Klein and Wait 1983; R. G. Vivian 1974a, 1984; Vivian and Mathews 1965).

Aside from the fact of regional abandonment after A.D. 1275, this reduction in Mesa Verde Phase occupation may be more apparent than real. It is appropriate to recall the difficulties noted in recognizing Mesa Verdean occupation in the Chaco Canyon bottomlands where it was most common. In a recent study Windes (1987:404-405) found Mesa Verde Phase evidence more common than previously thought though reduced from that of the A.D. 1100-1150 period, and site distribution is more even than during the Bonito Phase. On Chacra Mesa, if we plot Jacobson and Roney's (1985) limited inventory of previously identified sites (n = 40), several things are revealed: (1) relatively complex "small" sites of the Late Bonito Phase [with a "late mix" of carbon and mineral painted types (see Franklin 1982, Windes 1984)] mark the incursion onto Chacra Mesa; (2) McElmo Phase sites (with predominantly McElmo Black-on-white) are the most common and widely dispersed; and (3) Mesa Verde Phase sites are fewer and tend to cluster in more distinct communities. If we turn from site and room counts, however, and compare kiva counts on a site level as a more conservative measure of population (Lekson 1988:288-290), there is no real difference in the number of kivas identified during the McElmo Phase (n = 25) versus the Mesa Verde Phase (n = 23 plus one great kiva) in this small Chacra Mesa sample. The Mesa Verde communities--one centered around CM 100, another partially identified group to the north (Donaldson 1983, Jacobson and Roney 1985), and others at Pueblo Pintado and possibly Raton Springs (Marshall et al. 1979; Wait 1983:181-184)--appear to be highly integrated settlements featuring a variety of buildings, kivas, and interconnecting roads. Admittedly, the ceramic and structural data are crude, generally no better than lists of presence, absence, and relative abundance, but, though ambiguous, they are the same informational base used to infer a marked decline in Mesa Verde Phase populations. All surveys in the area have found that Mesa Verde Phase sites decreased absolutely from earlier periods of purportedly higher occupation (Hayes 1981; Sebastian and Altschul 1986; Windes 1987:397-405), but this "decline" may well be the result of fewer houses due to the short period of occupation rather than a decreased use of the central basin.

Evidence of stylistic and functionally sensitive change in ceramics of the period has been growing. Subregional varieties of Mesa Verde Black-on-white, the "index type" for the period, have never been fully developed or accepted but are sufficiently distinctive in subareas of the region to acknowledge that local production spheres were both viable and enduring. As Breternitz and others (1974:viii) point out, Mesa Verde Black-on-white can be perceived as the last (and to many, the finest) pottery in a broad regional continuum of ceramic development. Breternitz et al. (1974:46) also indicate that the type is not invariable, but specifics on varieties generally do not exist. For example, the western variety of Mesa Verde, in southeastern Utah, uses more mineral paint (Breternitz et al. 1974:46; Brew 1946; in part, Madsen 1973). Illustrated examples of Mesa Verde Black-on-white from southeastern Utah suggest stylistic differences that include band designs that are most often separated from the rim by a single, wide, framing line rather than a wide framer and multiple, thin, parallel lines (Brew 1946:286; Forsyth 1977:146-153; Madsen 1973: Figures 42m, 43; Sargent 1981). Simplification or subtle differences of design compared with classic Mesa Verde Black-on-white (as illustrated in Morris 1939; Rohn 1971) have often been cited as one aspect of variation, and frequently the distinction involves the lack of exterior designs on bowls, subtle differences with the band design framers, a lower incidence of "all over" style design, and a greater variety of motifs (e.g., Davis 1964; Lekson 1986, 1987; Stubbs and Stallings 1953:Plate 10; Toll et al. 1980:113). Yet, varieties remain sufficiently similar in style and finish to be recognized as "Mesa Verde" or at least to reinforce that argument. Other differences also have been noted, but these typically involve technological responses to locally available materials. The absence of slip on vessels has been noted in western Mesa Verde ceramics (Breternitz et al. 1974:46), but such surface treatment seems more likely to occur with the use of buff-firing clays, for example, along the La Plata Valley (Morris 1939:213; Shepard 1939:277). Differences in temper and paste are surely local (Wheat in Breternitz et al. 1974:viii; Knight and Gomolak 1987), but the dominance of sherd temper in areas of sandstone sources appears to consistently correlate with the fact that sand and sandstone are unsatisfactory as temper (Rohn 1971; Schaefer 1986:420; Shepard 1939: 276; Toll et al. 1980) because sherd particles are not a major inclusion in vessels using igneous sources (Franklin 1980:267, 1983:293; Shepard 1939:276; Windes 1977). Given that local subtraditions exist and existed long enough to become archeologically recognizable, Chaco Canyon's Mesa Verde Black-on-white might be a variation or an amalgam of researchers' descriptions of all Mesa Verde varieties for which various scenarios and interpretations have been posited (Toll et al. 1980:107).

Within these contexts, the recognition and variety of vessel forms in use-assemblages are important for an understanding of the late occupation in Chaco Canyon. Regional surveys and some excavations that have studied assemblage composition for this time period suggest that an increase in painted bowls and differential amounts of grayware according to site size are key parts of the assemblage make-up (Franklin 1980; Mills 1986, 1991).

Other noteworthy aspects of Chaco Canyon's Mesa Verde Phase include a change in subsistence strategies as indicated by the intramural placement of burials (Akins 1986:105-107), faunal remains, ethnobotanical remains, and related milling equipment. Subsistence changes include a faunal assemblage emphasizing small mammals and turkey at the relative expense of artiodactyls (Akins 1982b, 1985; Gillespie in this report); similar findings appear in other Chaco Basin sites not included in Akins' summary figures (Bradley 1971:Appendix A; Phibbs 1974:5). Small mammals, particularly cottontails and jackrabbits, seem to be the most consistent component of central basin assemblages, though the record for the northern periphery is less clear. Small mammals and turkeys tend to predominate and show the classic reversal from artiodactyls usually attributed to the Mesa Verde period, although at Salmon artiodactyls are considered the most important meat source (Harris 1980). At Aztec Ruins, the species found as faunal remains in Mesa Verde deposits vary throughout the complex (probably at Salmon Ruin, too) with artiodactyl remains occasionally occurring as the most abundant faunal remains in a deposit, which suggests a number of possiblities including seasonality or cultural selection (Bertram 1988; Nordby 1979). Increased and seasonal or task-sensitive association of domestic and field-related fauna with many deposits (for example, rabbits, rodents, and turkeys) is evident in the central basin during the twelfth-century Late Bonito Phase (Bertram and Draper 1982). The faunal patterns in the Bis sa'ani Community make a good case for prey strategies that focus on game availability but are integrated with scheduling and expected residence units in an essentially agricultural economy and society in the central basin (Bertram and Draper 1982). Chaco Canyon's Mesa Verde-period faunal assemblage conforms to the Bis sa'ani model and shows continuity with patterns expected for field-related prey in less complex subsistence economies than have been attributed to previous periods in Chaco Canyon. The continuity of the faunal data during this time period indicates that Chaco Canyon's occupation is part of, rather than distinct from, the pattern(s) of regional variation; patterns of large-bodied animals previously associated with central basin greathouses are now evident at public complexes in the northern San Juan drainages.

The change in regional-scale subsistence patterns suggested by faunal remains seems to be reflected in corn as well. Corn from Chaco Canyon's Mesa Verde Phase appears to be distinct from the general trend in Anasazi corn development into the thirteenth century, most notably in the northern San Juan drainages. Corn at Salmon Ruin changed from a flint or pop type to a flour corn during the Mesa Verde occupation (Doebley and Bohrer 1980) while contemporary corn in Chaco Canyon continued to be of the Chapalote-like, or pop or flint type (M. Toll 1985;260-263). Chaco Canyon corncobs consistently tend to be small, 10-12 rowed ears of the pop or flint type, with a brief increase in the appearance of the larger-kerneled, higher-rowed cobs in select sites and deposits during the Late Bonito Phase, which led M. Toll (1985:261-263) to suggest their importation from green belts such as the San Juan Valley and Chuska slopes. The limited occurrence and distinct appearance of this larger corn represent a distinct departure in the trend for Chaco's corn and represent a new corn population in Chaco Canyon (M. Toll, personal communication, 1990). Flint corn or popcorn seems to have advantages over flour corn for the central basin because it is more drought resistant (via tiller success?), has wider temperature tolerances, and perhaps flowers earlier for advantageous use of critical spring moisture and faster maturation (Galinat 1985; Minnis 1985:332). In addition, flint or popcorns better resist disease, pests, and storage stress (Christenson 1972:37-38). Experiments with growing Hopi flour corn (H. Toll et al. 1985) show that such corn can be successfully grown in Chaco Canyon given intensive husbandry, opportunistic planting during years of high spring (April-May) moisture, and knowledgeable use of dune-related environments that best retain and make available water for plant use. It takes no great leap of faith to extend these results for even better cropping success to hardier corn varieties, such as a flint corn, in dispersed favorable locations along Chaco Canyon's south side or on Chacra Mesa where higher precipitation and frequent but scattered dune/sage localities offer even more opportunities for planting.

Direct and indirect evidence suggest that a variety of popcorn or flint corn was grown during the Mesa Verde Phase in Chaco Canyon. By no means is the possible dichotomy of a dry highland pop or flint corn belt and a riverine, flour corn belt cleanly separated, although planting and cropping success may have followed this pattern. Both varieties were used at Salmon, with one late deposit having almost completely a pop or flint corn (Room 90W, Doebley and Bohrer 1980:216; 1984:34). In Chaco Canyon, small quantities of possible flour-type corn were found in association with McElmo and Mesa Verde ceramics give evidence for mixed use (Bradley 1971; McKenna 1984:309; Bc288, T. Windes, personal communication 1989).

The use of bin-housed slab metates during the Mesa Verde Phase also suggests that flour-type corn was processed in the canyon; Shelley (1980a: 106-113) and Doebley and Bohrer (1980:210-216; 1984) make a good case that flour corn processing is associated with slab metates whereas flint corn processing is most feasible on trough metates. The use of slab metates during the Chaco Canyon Mesa Verde Phase suggests either that flour corn was processed in Chaco Canyon or that the process of lime-soaking was common for nonflour varieties (Galinat 1979:10). Flour corn may have been raised as a short-cycle consumption crop (immature green ears) or brought into Chaco Canyon as a shelled, preferred food by seasonal occupants. Flint corn, on the other hand, may have been largely stored or processed in ways (for example, soaked or boiled) that made slab metate grist work easier or not even required. Suggesting the possible structuring of maize varieties (intentional or not) in an Anasazi system is not unique (Winter 1973; 1983:430) and seems hardly controversial given the attributed scope and (on occasion) complexity of the Chaco system. The data are few, however, and the question of maize varieties, their relative ecological strengths, success, and distributions needs to be more rigorously studied for the San Juan Basin [for a start see Winter (1983)].

A regional view of the Mesa Verde period in the central basin uplands, which includes Chaco Canyon proper, suggests that the prehistoric inhabitants of the area may have altered their subsistence strategies somewhat but that the population was not necessarily diminished; it maintained economic success and social stability on a regional level. Habitation of Chaco Canyon, even if periodic in intensity and mostly in the peak precipitation and cropping years between A.D. 1230 and 1250 (using the PDSI index of Rose et al. 1982), would have provided planting and settlement alternatives to the densely populated river valleys of the north (for example, the San Juan River and its tributaries). It would also have provided fallow time for heavily worked fields on the basin's periphery and alternative planting opportunities for fields located at the foot of surrounding mountains that were made unusable by a too wet or late spring thaw. As a result, long-established land use patterns were maintained. With the ascendency of the northern San Juan communities as regional centers during the Mesa Verde Phase, occupation of Chaco Canyon was unquestionably reduced and fundamentally altered. The arrangement of earlier community structure seems to have been maintained but not on the earlier scale as implied by the abandonment of the earlier Chaco-system public buildings, such as Pueblo Alto. The expanded and more even distribution of Mesa Verde Phase communities suggests an areally intensified, uniform fit for man-land relationships that are associated with farming practices other than diversion systems (Vivian 1974a,b, 1990). The information available is insufficient to determine if this represents residential reorganization of Chaco Canyon inhabitants or increased use of the Chaco Basin by additional groups. Some combination of the two is probable (see Vivian 1984), but the intentional reshaping of the demographic landscape seems as likely to have been a response to intensified developments on the basin's periphery and to successful cropping requirements as to have been any ex post facto "budding" resulting from hypothetical local headwater cutting in Chaco Canyon (see Klein and Wait 1983). Whatever the case, significant readjustments including changes in subsistence strategies, overall community structure, and related architecture and artifact patterns, seem to have taken place in the central basin. With a shift in the economic and subsistence focus from and in Chaco Canyon, it seems likely that changes occurred in the structure of artifact assemblages. The demonstration of changes in the nature of assemblages and tool classes is a necessary prerequisite to the discussion of change in cultural adaptation and ultimately to the related but separate issue of system abandonment.

7

CERAMICS FROM 29SJ 633, THE ELEVENTH HOUR SITE

Peter J. McKenna and H. Wolcott Toll

The ceramics from 29SJ 633 were the focus of a comparative study examining late ceramic patterns in Chaco Canyon (Toll et al. 1980). We still hold as valid the views expressed in the "Late Ceramic Patterns..." article, but we recognize that the 1980 paper, because of its scope, does not represent a ceramic study for 29SJ 633 comparable with those developed for other sites. Although we stand by our earlier findings, they represent but a part (albeit a large part) of the ceramic interpretation of the Eleventh Hour Site. The 1980 study contained many of the methods and much of the interpretation for the Mesa Verde period in Chaco from a ceramic viewpoint and should be considered a companion reference to the present report. In the published study we attempted to place the ceramics of 29SJ 633 on a continuum of regionally based ceramic attributes and to derive statements about the condition of the Chaco Anasazi exchange system at the end of Chaco Canyon's occupation. In comparative analyses of temper, clay color, typological assignment, and limited surface attributes, carbon-painted ceramics from 29SJ 633 were determined to be more diverse than equivalent ceramics from other sites in the canyon (Pueblo Alto, 29SJ 627) and the Aztec Ruins. Ceramics from 29SJ 633 were found to be intermediate to both the Aztec and Chaco comparative samples, so that temporal variation could not be held accountable for all the differences. Ceramics at the site apparently represent a fusion of Chacoan and San Juan traditions, which implied broader areal ceramic contributions than would the dominance of any one source or ceramic tradition in the 29SJ 633 assemblage. The increased amount of San Juan igneous tempers, in conjunction with other cultural evidence, suggested that the San Juan River area had gained ascendancy in the exchange system. Later, comparisons with Pueblo Alto and the ceramic data from other small sites suggested, despite the rise in San Juan igneous tempers, that the overall level of importation had declined during the final occupation (Toll and McKenna 1987; Toll 1985:129-140).

This chapter has two main objectives, the presentation of basic ceramic data for the Eleventh Hour Site and the interpretation of those data. The interpretation largely falls within traditional domains of inquiry: site chronology and ceramic sources and their bearing on the state of the local and regional economy of the time. Temporal and functional implications of intrasite ceramic distributions are also of interest when ceramics from this site are compared with other assemblages. The approach follows that used in other Chaco Project ceramic reports wherein discrete attributes such as design, paint type, temper, and grain size within traditional type groups are examined in order to describe those type or technical groups and to delineate attribute clusters that may have meaning in the definition of source. Demonstration of source-related diversity has both ecological and social implications, the mutual consideration and interpretation of which lie at the heart of Chaco Project research (Judge

1979). Because the excavation collection is limited, and many of the results of a comparative provenience study are presented in Models and Methods in Prehistoric Ceramic Exchange (Fry 1980), we have not found it useful in analyzing 29SJ 633 ceramics to develop and test refined, subtype-level, ceramic attribute groups as has been done in the examination of large, ceramic collections at other sites.

At this point, it is appropriate to pause and reflect on the nature of the ceramic collection, the sample thereof, and to what ends analysis was undertaken. From 29SJ 633 we have about 4,000 pottery items including sherds and whole pots collected during the excavation of one and one-half rooms, a test trench crossing a kiva and some intramural workspace in the plaza, and a smattering of anomaly test pits across the roomblock that were excavated to investigate the subsurface character of positive magnetometer readings (Figure 7.1). A lengthy, multicomponent occupation is certainly evident; it contributed to some ceramic mixing, but the deposits of interest have been established as primarily Mesa Verde Phase refuse from the early to mid 1200s with an average ceramic date estimated to be between A.D. 1200 and 1220. We focused on Mesa Verde Phase refuse primarily because of its absence in other excavations of the Chaco Project and because there was not enough time to cover other (earlier) pottery that met the normal project standards for analytical inclusion. We have used about 7% of this collection, based on a vessel-oriented selection of rims and distinctive body sherds, to develop and explore the pattern(s) of ceramic distribution and change in a provenience-oriented study. Readers may form their own opinions about the strength and general application of a study of this sample, which was extremely limited in size and scope, to questions regarding Chaco Canyon or the Chaco system. Compositional and assemblage level distributions have been descriptively (and quantitatively) presented in the following text and tables; this summary re-emphasizes and interprets the main ceramic information with regard to site function, demography, cultural history, and interaction models insofar as the data permit.

An overview of the Mesa Verde Phase (Chapter 6) provides a background for the discussion of thirteenth-century developments and the continuum in ceramic styles found within the broader region. The present chapter proceeds as follows. The full ceramic collection and its sample is discussed, typological time for the various deposits and site proveniences is established, and sample assemblage variation is examined. The most abundant ceramic types are analytically described; this description is followed by a technical and functional discussion and testing of covarying technological attributes with regard to vessel form, temper, and soot deposits on culinary ware for the entire sample. The limited refiring tests are summarized to include the evidence of wares other than carbon-painted. Description and discussion of whole and restorable vessels and the implications of their projected size ranges completes the analysis section. Finally, the main points concerning the sample and adaptive interactions suggested by the analysis are summarized, and a synthetic view concerning the level of import during the Mesa Verde period at 29SJ 633 is presented.

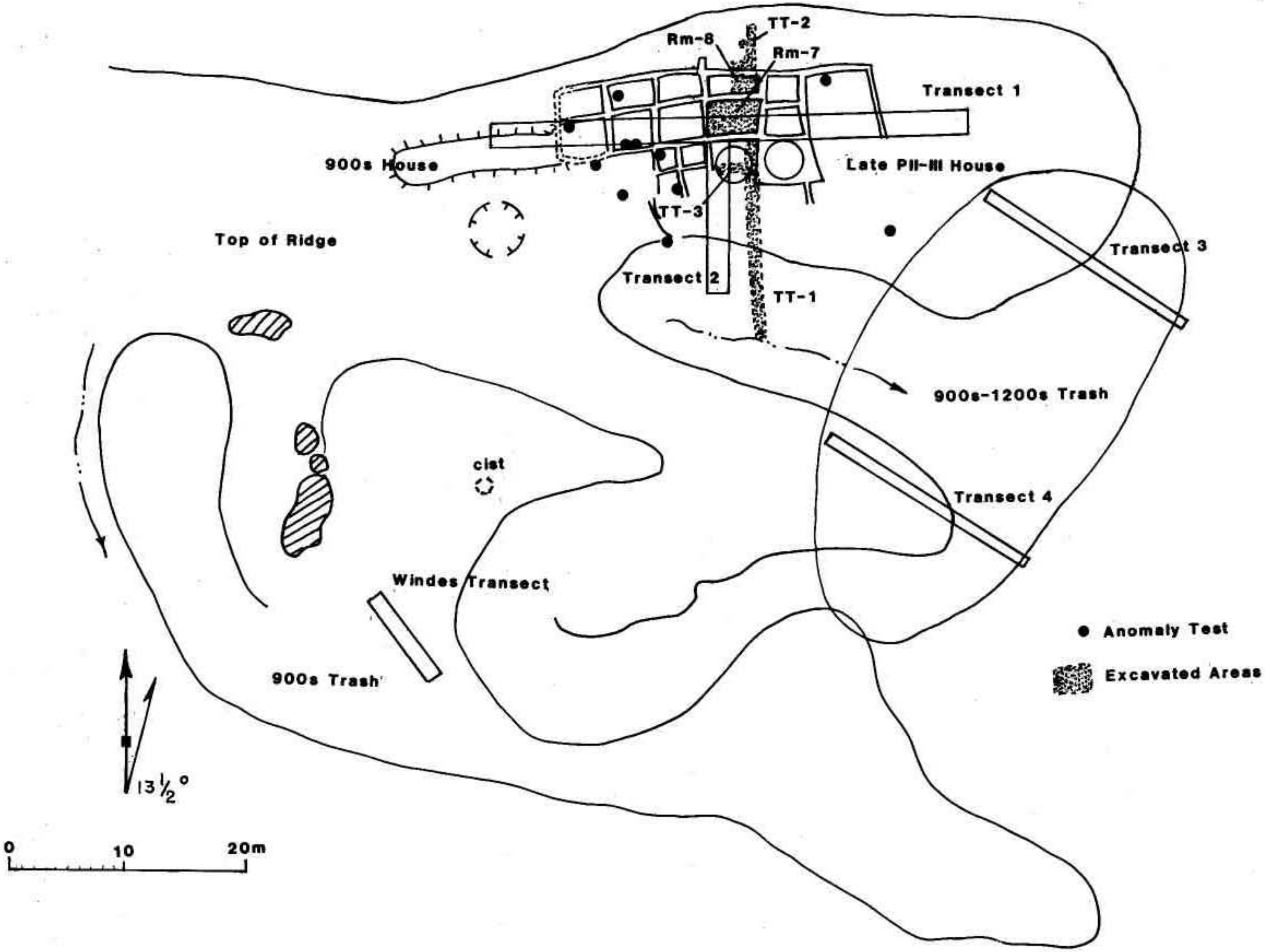


Figure 7.1. Map of 29SJ 633 showing ceramic sampling locations

The Sample

Many sherds have passed through archeological hands at the Eleventh Hour Site over the years (Table 7.1). These various ceramic tabulations are the result of the intensive and extensive surface sampling as well as the remote sensing test excavations (Figure 7.1). Survey tabulations and midden samplings attest to the long (if not continuous) occupation at 29SJ 633. Though these typological "analyses" represent large collections, they are not included in the data base of the present analysis of ceramic material from the excavations.

The various surface collections, tabulated in the rough-sort format on Table 7.1, were identified using a number of schemes reflected in the Appendix C inventories where traditional southwestern ceramic nomenclature is featured. Ceramic collections and in-field tabulations were made largely to place the site within a traditional ceramic chronology (for example, Breternitz 1966). Early survey collections by Pierson and Hayes were simple, unstratified, grab samples from across the site, which emphasized datable decorated wares; these were re-examined, in part (McKenna 1981). Beginning in the mid 1970s, limited controlled inventories were undertaken to produce reliably comparable, assemblage-level data; the increase in culinary, unidentified decorated counts and the more even frequency distributions reflect this change in sampling method. The Chaco Project staff collected six 1 by 1 m grids across the site in 1975 in conjunction with intensive sampling of small houses in Marcia's Rincon preparatory to a planned, but subsequently curtailed, excavation program for the rincon community (Judge 1975). Controlled transect inventories across discrete major features were undertaken by the Remote Sensing Division in 1978 in an attempt to refine the data for different periods of deposition and relative amounts of discard. Despite consistent traces of Mesa Verde ware in these samples, its significance in the occupation(s) of 29SJ 633 was usually discounted. Windes' 1988 (Windes 1990) sampling of the trash deposit southwest of the Pueblo II and Pueblo III house mounds completed the controlled sampling of individual features and demonstrated that this midden best represents the earliest occupation (ca. A.D. 900 to mid 1000s) at the site. This early component is evident in all other samples but is overlain by more abundant trash from the eleventh through early thirteenth centuries.

The ceramic differences evident in the various surficial deposits present a common occupational pattern in Chaco Canyon where choice site locations were consistently used or reused through the centuries, which produced mixed assemblages that may be interpreted as continuous occupations of incredible length. Nevertheless, Windes (1982) has shown that, by sampling discrete areas, not only can distinct episodes of deposition be identified but the "tails" of ceramic distributions become more meaningful, depending on the type of deposit. At 29SJ 633, surface sampling has revealed three major episodes of occupation: an A.D. 900s occupation represented by the southwestern midden; a large southeastern midden most heavily used during the mid to late A.D. 1000s but with evidence of ceramics that span the site occupation(s); and a roomblock (that must have seen

Table 7.1. Ceramic sample sources, 29SJ 633

Rough Sort	Pierson 1960		Hayes 1972		Judge 1975		Remote Sensing 1978				Windes 1988		Excavations 1978					Totals	
							Rooms		SE Midden		SW Midden		Test	Rm 7	Rm 8				
Type	n	%	n	%	n	%	n	%	n	%	n	%	n	n	n	n	%	N	%
Plain Gray	2	2.0	3	3.0	56	11.2	38	12.6	372	15.3	119	34.7	108	202	62	372	8.8	962	12.0
Lino Gray			1	1.0					3	0.1				1		1	0.0	5	0.1
Lino Fugitive									1	0.0				5	2	7	0.2	8	0.1
Wide Neckbanded			1	1.0	1	0.2	4	1.3	15	0.6	21	6.1	4	8	2	14	0.3	56	0.7
Narrow Neckbanded			6	6.1	20	4.0	7	2.3	83	3.4	22	6.4	39	37	15	91	2.2	229	2.9
Neck Corrugated					6	1.2			7	0.3	5	1.5	5	3	1	9	0.2	27	0.3
PII Corrugated	1	1.0	6	6.1			1	0.3	10	0.4	3	0.9	1	18		19	0.5	40	0.5
PII-III Corrugated	1	1.0	1	1.0	2	0.4			2	0.1				3		3	0.1	9	0.1
PIII Corrugated			2	2.0					3	0.1			1	8	2	11	0.3	16	0.2
Indented Corrugated	4	4.0	13	13.1	207	41.3	105	34.9	1,049	43.3	24	7.0	404	1,616	199	2,219	52.8	3,621	45.1
Brownwares									1	0.0			5	5		10	0.2	11	0.1
TOTAL GRAYWARES	8	7.9	33	33.3	292	58.3	155	51.5	1,546	63.8	194	56.6	567	1,906	283	2,756	65.5	4,984	62.1
BMIII-PI M/w							1	0.3	10	0.4	2	0.6	3	5	3	11	0.3	24	0.3
E. Red Mesa B/w			1	1.0	1	0.2			10	0.4				4	1	5	0.1	17	0.2
Red Mesa B/w	9	8.9	7	7.1	28	5.6	15	5.0	54	2.2	43	12.5	16	20	8	44	1.0	200	2.5
Escavada B/w	1	1.0	3	3.0			1	0.3	12	0.5			4	4	2	10	0.2	27	0.3
Puerco B/w	4	4.0	1	1.0	5	1.0	2	0.7	12	0.5			2	13	2	17	0.4	41	0.5
Gallup B/w	20	19.8	9	9.1	19	3.8	8	2.7	84	3.5	5	1.5	18	61	23	102	2.4	247	3.1
Chaco B/w			3	3.0	2	0.4	1	0.3	5	0.2	1	0.3	6	3	1	10	0.2	22	0.3
Exotic M/w			3	3.0	1	0.2	1	0.3	8	0.3			6	17	2	25	0.6	38	0.5
PII-III M/w	24	23.8	9	9.1	61	12.2	38	12.6	333	13.7	32	9.3	135	177	84	396	9.4	893	11.1
Total M/w	58	57.4	36	36.4	117	23.4	67	22.3	528	21.8	83	24.2	190	304	126	620	14.7	1,509	18.8
BMIII-PI C/w					1	0.2	1	0.3	4	0.2				2		2	0.0	8	0.1
Chuskan RM design													1	1		2	0.0	2	0.0
Chuska B/w									2	0.1			1			1	0.0	3	0.0
Chuskan C/w							8	2.7	7	0.3	3	0.9	1	6	2	9	0.2	27	0.3
Tusayan C/w			1	1.0			1	0.3	3	0.1			1		1	2	0.0	7	0.1
Chaco-McElmo B/w			1	1.0					4	0.2			2	2		4	0.1	9	0.1
McElmo B/w	11	10.9					4	1.3	19	0.8			16	62	5	83	1.9	117	1.5
PII-III C/w			9	9.1	24	4.8	6	2.0	8	0.3			29	49	7	85	2.0	132	1.6
Mesa Verde B/w	1	1.0	3	3.0			1	0.3	7	0.3			37	72	23	132	3.1	144	1.8
Total C/w	12	11.9	14	14.1	25	5.0	21	7.0	54	2.2	3	0.9	88	194	38	320	7.6	449	5.6
Whiteware	11	10.9	1	1.0	61	12.2	44	14.5	256	10.6	62	18.1	156	227	68	451	10.7	886	11.0
TOTAL WHITEWARE	81	80.2	51	51.5	203	40.5	132	43.9	838	34.6	148	43.1	434	725	232	1,391	33.1	2,844	35.4
Decorated red	10	9.9	15	15.2	6	1.2	12	4.0	33	1.4	1	0.3	25	54	9	88	2.1	165	2.1
Polychromes	2	2.0					1	0.3	2	0.1			2	8	3	13	0.3	18	0.2
TOTAL REDWARE	12	11.9	15	15.2	6	1.2	13	4.3	35	1.4	1	0.3	27	62	12	101	2.4	183	2.3
Polished Smudged							1	0.3	5	0.2			2	9	1	12	0.3	18	0.2
GRAND TOTAL	101	100.0	99	100.0	501	100.0	301	100.0	2,424	100.0	343	100.0	1,030	2,702	528	4,260	100.0	8,029	
% of total	1.3		1.2		6.2		3.7		30.2		4.3					53.1			100.0

considerable alteration) that was the focus of trash associated with the final occupation of 29SJ 633 during the early to possibly mid A.D. 1200s.

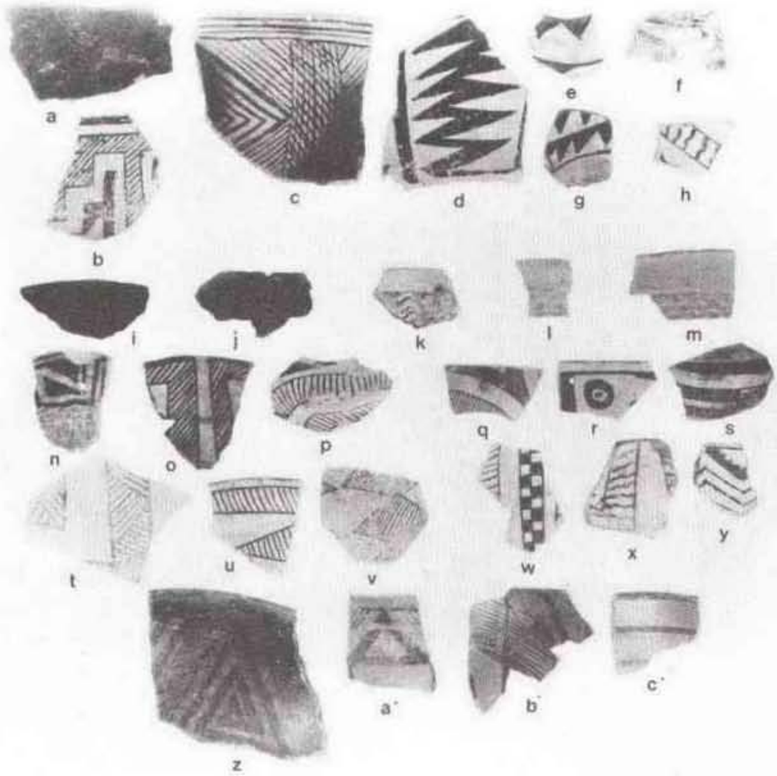
The excavated rooms (7 and 8) (Figure 7.1) were filled with rich Mesa Verde Phase trash (as described elsewhere in this report) including faunal deposits, carbonized vegetal remains, lithic debris, and ceramic material that includes several whole or largely restorable vessels. Aside from the Mesa Verde Whiteware, other associated fill sherds included a mix of earlier ceramics such as Red Mesa, Burnham, and Kana'a Black-on-white as well as ceramic materials more commonly associated with late assemblages in Chaco Canyon such as Reserve, Mancos, Socorro, and Gallup Black-on-white and St. Johns and Wingate Polychromes (Figure 7.2). Room 7, the larger southern room (Figure 7.1), contained loose, mixed trash with several restorable and broken but large bowl fragments that probably served as utensils or trays before discard (Figure 7.3). In Room 8, whole vessels including ladles, small bowls, and a large "covering" sherd of indented corrugated were associated with infant burials in floor pits (Figure 7.4). These room deposits contributed most heavily to our Mesa Verde assemblage because tests immediately outside the rooms provided significantly lower numbers of McElmo and Mesa Verde Black-on-white and White Mountain Polychromes (see Excavations 1978 columns on Table 7.1).

Typological time, that is, the more or less serial trends of ordinal types and their default time spans, and relative contributions of selected decorated ceramics in the different deposits are shown on Figure 7.5. Figure 7.5 shows that the percentage of Mesa Verde Black-on-white was greatest in the plaza trenches immediately south of Rooms 7 and 8. This area, where trenches cut into the upper fill of a kiva, apparently contained the latest deposits at the site even though more late sherds were actually collected from the rooms. This temporal separation between room deposits and "plaza" fill appeared to be minimal with considerable sequence overlap. Ceramics from the test trench were also compositionally distinct (Table 7.2), as they showed relatively more trachyte and less sandstone temper than did sherds in room deposits. This decline in Chuskan material is also a characteristic of other central basin Mesa Verde period occupations (Mills 1986; Toll 1985:129-140), a fact often overshadowed by the abundance of ceramics from earlier deposits.

The excavated sample, then, represents the universe for the present analysis--n = 4,260 sherds (Table 7.3). Table 7.3 includes four aspects for structuring the sample: the bulk collection from which the sample was drawn, the analytical sample itself, the sample portion analyzed for temper and on which interpretations involving paste are based, and the proportion of rims that represents proxy "vessels" in the detailed sample. Southwestern ceramic typology (Colton and Hargrave 1937) provides the foundation for the taxonomic structure separating the various wares and a second-order breakdown within whiteware by paint type. Within these groups, those items represented by a rim or those distinctive enough to be determined nonredundant were subjected to attribute recording of selected surface and paste characteristics and measurement. Fifty-four specimens (17% of the detailed analysis) were sherds without rims, with the majority of this group (82%) selected from whiteware, and 28 sherds from Cibola

Figure 7.2. Associated ceramics of the Late McElmo and Mesa Verde Phase, 29SJ 633: a-h from Room 7, remainder from Room 8. Upper plate is a view of the primary field: (a) P-III Indented Corrugated; (b) Reserve Black-on-white; (c) McElmo Black-on-white; (d, e, g, n-p) Mancos Black-on-white; (f, t-v) Gallup Black-on-white; (h) Red Mesa Black-on-white; (w) Late Red Mesa/early Gallup Black-on-white; (x) Burnham Black-on-white; (y) Kana'a Black-on-white; (z, a') St. Johns Polychrome; (b') Wingate Polychrome; and (c') Puerco Black-on-red

Lower plate is a view of the secondary field: (c') Oblique parallels on McElmo Black-on-white; (d) Exterior corrugations on Mancos Black-on-white; (n) Painted design on Mancos Black-on-white; (z-a') White-on-red slip design; and (b') Red-on-white slipped design. Note v as a possible cylinder jar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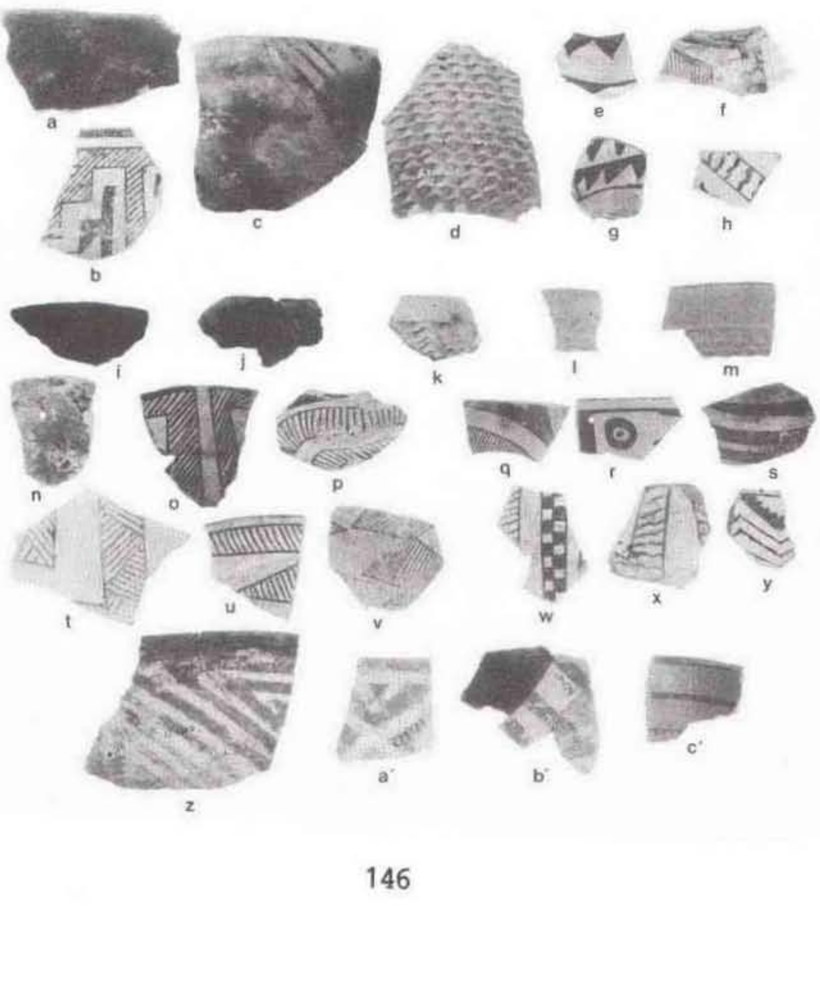
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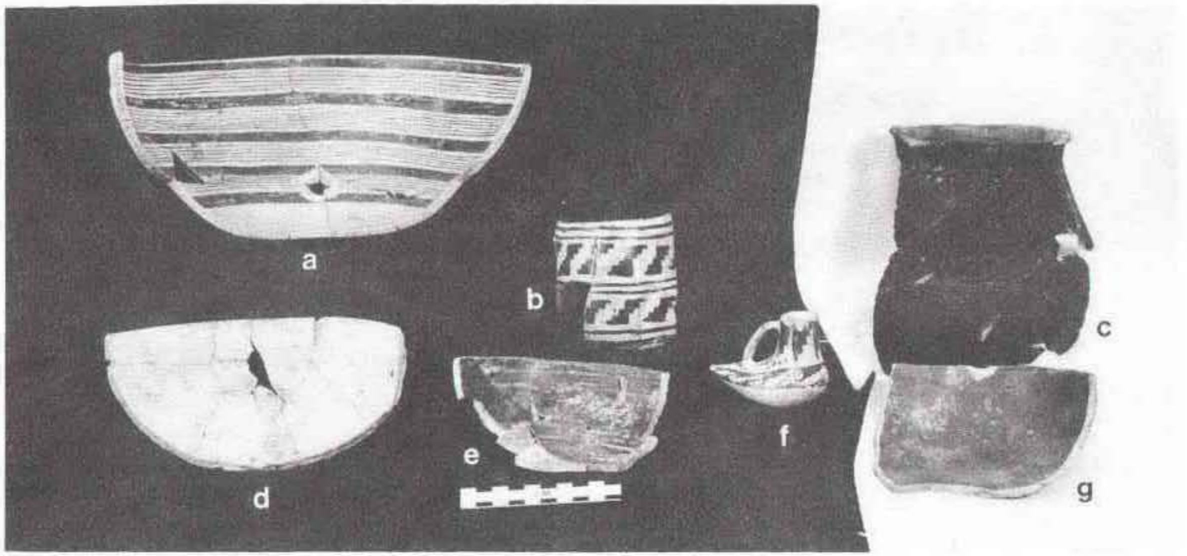
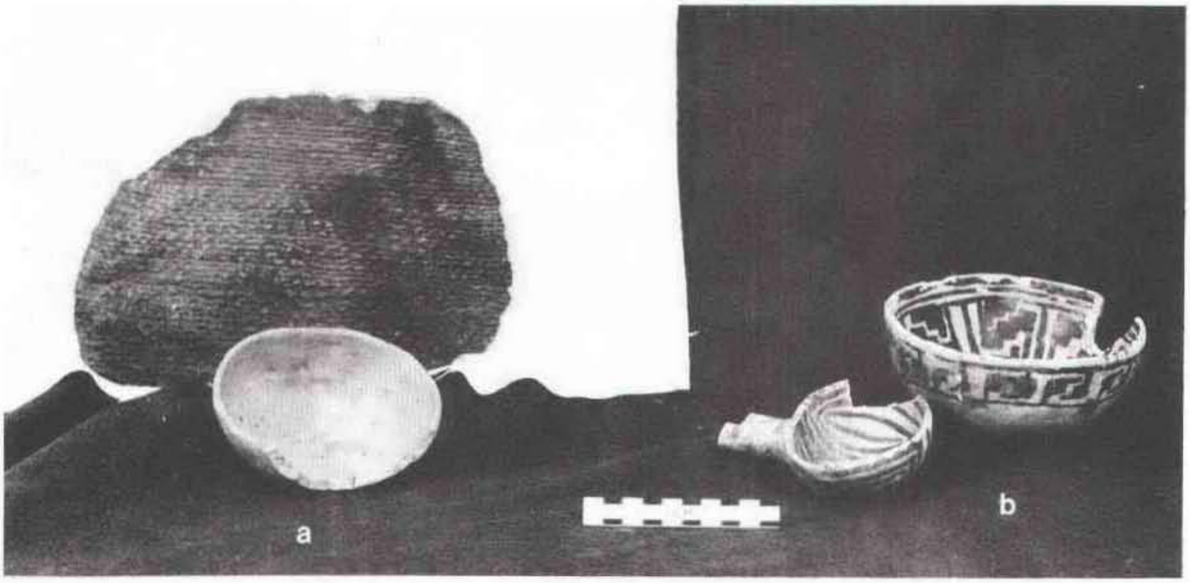


Figure 7.3. Partial and complete vessels from 29SJ 633: (a) Mesa Verde Black-on-white bowl; (b) Crumbled House Black-on-white mug; (c) P-II-III neck corrugated jar; (d) Whiteware bowl reused as scoop; (e) Mesa Verde Black-on-white bowl; (f) Puerco Black-on-white duck pot; and (g) White ware bowl. Duckpot recovered from anomaly test; all other vessels from Room 7 and Room 8.



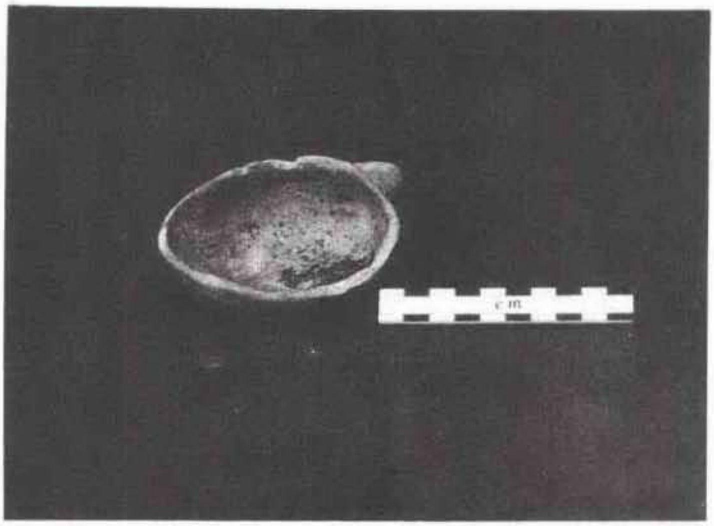


Figure 7.4. Vessels associated with Burials in Room 7 and Room 8: (a) with Room 7, Burial 1, a large, indented corrugated jar "cover" and Mesa Verde whiteware ladle; (b) with Room 7, Burial 2, Mesa Verde Black-on-white bowl and ladle; and (c) with Room 8, Burial 3, Mesa Verde whiteware ladle

	A.D.	Reference
Red Mesa B/w	900–1050	cf. Windes 1984:99
Gallup B/w	1040–1200	cf. Windes 1984:99
Chaco B/w	1100–1150	cf. Windes 1984:99
Chaco-McElmo B/w	1100–1150	cf. Windes 1984:99
McElmo B/w	1075–1200	Breternitz et al. 1974:42
Mesa Verde B/w	1200–1300	Breternitz et al. 1974:46
Puerco B/w	1000–1200	Carlson 1970:11
Wingate B/w	1050–1200	Carlson 1970:17
Wingate Polychrome	1125–1200	Carlson 1970:25
St. Johns Polychrome	1175–1300	Carlson 1970:41

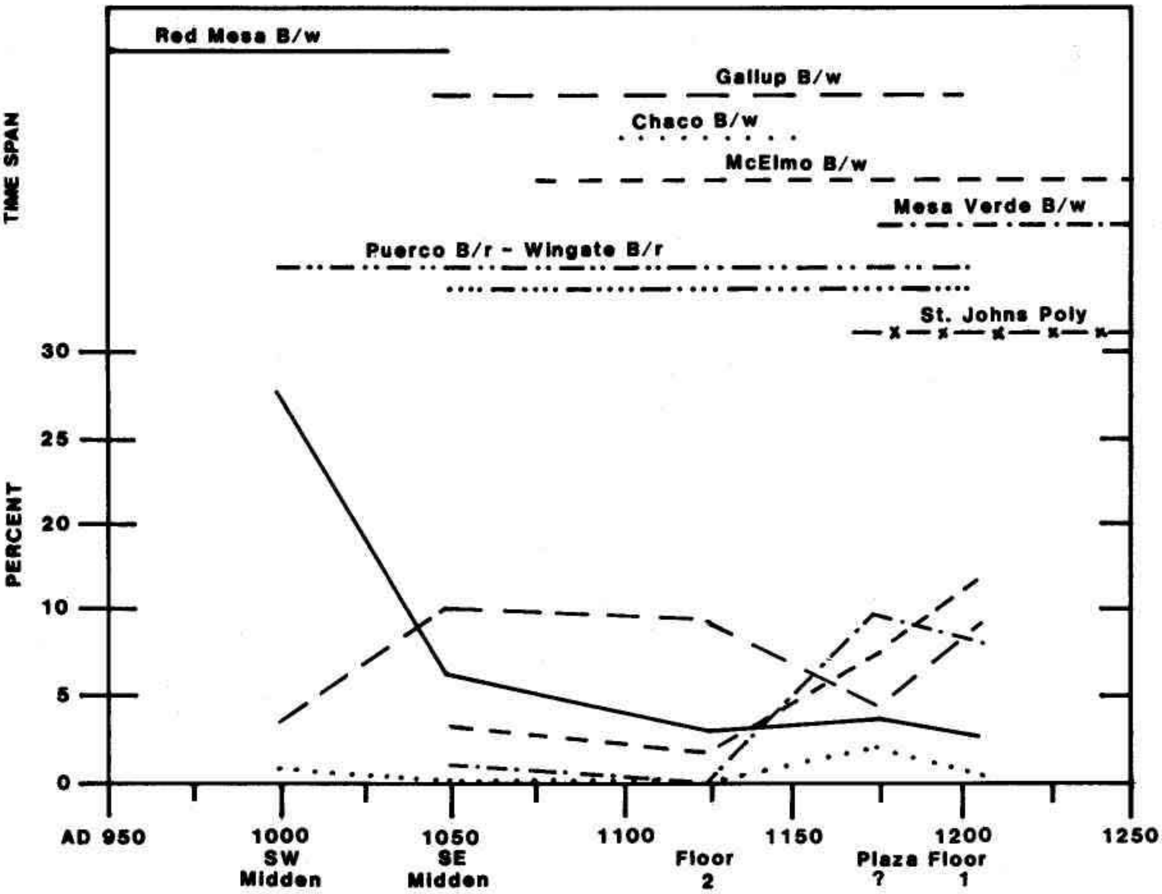


Figure 7.5. Ceramic dates and provenience composition, 29SJ 633

Table 7.2. 29SJ 633 temper types tabulated by general provenience

	Frequency of Temper Types							
Provenience	Sand-stone	Chalcedonic SS[a]	Magnetitic SS	San Juan	Trachyte	Unidentified Igneous	Total N	Total %
Room 4	1						1	
Room 7	128	3	1	24	31	13	200	
row %	64.0	1.5	0.5	12.0	15.5	6.5		100
Room 8	37	4	1	3	10	1	56	
row %	66.1	7.1	1.8	5.3	17.9	1.8		100
Test Trench 1	24		1	7	16	5	53	
row %	45.3		1.9	13.2	30.2	9.4		100
TOTAL	190	7	3	34	57	19	310	
%	61.3	2.2	1.0	11.0	18.4	6.1		100

[a]SS = sandstone-tempered sherd.

Table 7.3. Ceramic sample comparison, 29SJ 633

Rough Sort Type	Rough Sort n	Rough Sort %	Detailed n	Detailed %	Temper n	Temper %	Rim n	Rim %
Plain Gray	372	8.8	8	2.5	8	2.6	6	2.4
Lino Gray	1	0.0	1	0.3	1	0.3	1	0.4
Lino Fugitive	7	0.2	1	0.3	1	0.3	1	0.4
Wide Neckbanded	14	0.3	1	0.3	1	0.3	1	0.4
Narrow Neckbanded	91	2.2	8	2.5	8	2.6	8	3.3
Neck Corrugated	9	0.2	3	0.9	3	1.0	3	1.2
PII Corrugated	19	0.5	10	3.1	10	3.2	10	4.1
PII-III Corrugated	3	0.1	9	2.8	8	2.6	9	3.7
PIII Corrugated	11	0.3	7	2.2	7	2.3	7	2.8
Indented Corrugated	2,219	52.8	39	12.3	39	12.6	26	10.6
Brownwares	10	0.2	0	0.0	0	0.0	0	0.0
TOTAL GRAYWARES	2,756	65.5	87	27.4	86	27.7	63	25.6
BMIII-PI M/w (all)	11	0.3	0	0.0	0	0.0	0	0.0
E. Red Mesa B/w	5	0.1	0	0.0	0	0.0	0	0.0
Red Mesa B/w	44	1.0	16	5.0	14	4.5	15	6.1
Escavada B/w	10	0.2	5	1.6	5	1.6	4	1.6
Puerco B/w	17	0.4	3	0.9	3	1.0	1	0.4
Gallup B/w	102	2.4	14	4.4	13	4.2	9	3.7
Chaco B/w	10	0.2	3	0.9	3	1.0	2	0.8
Exotic M/w[a]	25	0.6	18	5.7	18	5.8	10	4.1
PII-III M/w	396	9.4	50	15.7	49	15.8	40	16.3
Total M/w	620	14.7	109	34.2	105	33.9	81	32.9
BMIII-PI C/w (all)[b]	2	0.0	2	0.6	2	0.6	2	0.8
Chuskan RM design	2	0.0	0	0.0	0	0.0	0	0.0
Chuska B/w	1	0.0	1	0.3	1	0.3	1	0.4
Chuskan C/w[c]	9	0.2	2	0.6	2	0.6	1	0.4
Tusayan C/w[d]	2	0.0	0	0.0	0	0.0	0	0.0
Chaco-McElmo B/w	4	0.1	2	0.6	2	0.6	2	0.8
PII-III C/w[e]	168	4.0	42	13.2	41	13.2	36	14.6
Mesa Verde B/w[f]	132	3.1	32	10.1	31	10.0	28	11.4
Total C/w	320	7.6	81	25.5	79	25.8	70	28.5
Whiteware	451	10.7	23	7.2	23	7.4	18	7.3
TOTAL WHITEWARE	1391	33.1	213	67.0	207	66.4	169	68.7
Plain red	0	0.0	1	0.3	1	0.3	0	0.0
Decorated red	88	2.1	12	3.8	11	3.6	11	4.5
Polychromes	13	0.3	4	1.3	4	1.3	2	0.8
TOTAL REDWARE	101	2.4	17	5.3	16	5.2	13	5.3
Polished Smudged	12	0.3	1	0.3	1	0.3	1	0.4
GRAND TOTAL	4,260	100.0%	318	100.0%	310	100.0%	246	100.0%
% of total				7.6%		7.3%		5.8%
% of detailed analysis						97.7%		77.4%

[a]Exotic M/w: Reserve B/w n = 4, Socorro B/w n = 4, Mancos B/w n = 17.
[b]BMIII C/w: Kana'a B/w n = 2.
[c]Chuskan C/w: Toadlena B/w n = 3, Nava B/w n = 1, Chuskan C/w n = 5.
[d]Tusayan C/w: Tusayan C/w n = 1, Black Mesa B/w n = 1.
[e]PII-III C/w: McElmo B/w n = 76, Wetherill B/w n = 7, San Juan C/w n = 85.
[f]Mesa Verde B/w: Mesa Verde B/w n = 124, Crumbled House B/w n = 8.

Whiteware, specifically. The criterion of distinctiveness coupled with selection of rims tends to favor whiteware so that ware representation between the bulk sherd counts and the detailed analysis sample is reversed. We (Toll and McKenna 1987:38-39) have offered explanations as to why this trend should be expected in this sampling strategy--and those reasonings are still viable--but at 29SJ 633 indented corrugated sherds would seem to be underrepresented in the detailed analysis. Similar sampling strategies, however, have produced similar samples in proportion to bulk counts (McGarry 1968:21-24). Thus, discussions here concern an assemblage of vessels rather than a collection of sherds in which the number of times any given vessel is represented is subject to a large number of uncontrolled variables.

Ceramic types representing at least 2.5% of the rough sort are individually described, but the entire sample contributes to various compositional groups used in the analytical comparisons. Table 7.3 combines samples specified as "McElmo Black-on-white" (see Table 7.1 and Appendix C) into the "rough sort" analytical category, PII-III carbon-on-white, with the understanding that this category is largely San Juan Whiteware, other wares having been at least partially taxonomically segregated. Nonetheless, this category does contain some unidentifiable sherds as well as some McElmo Black-on-white sherds that were too small, eroded, or minimally painted for confident type assignment. Where specifically identified and where possible, "McElmo Black-on-white" is occasionally used in this report, but the PII-III carbon category is the main level of discussion. Although three types were abundant enough to describe, including indented corrugated (n = 55), PII-III carbon-on-white (n = 168), and Mesa Verde Black-on-white (n = 132), it must be noted that the Cibola Whitewares (admitting Mancos Black-on-white) are twice as abundant as the carbon-painted group. Cibola Whiteware seems to merit some further attention, and the amount present undoubtedly has implications on several levels; but as the current concern is the examination of the latest ceramics, our focus on the carbon-painted types and indented corrugated sherds is appropriate. Analysis, comparable discussion, and interpretation of contemporary Cibolan and carbon-painted types can be found in the Pueblo Alto report (Toll and McKenna 1987), although the latest ceramics at Pueblo Alto temporally precede those at 29SJ 633.

A brief word is in order on the statistics employed here. Our usage follows that in earlier reports, which offer fuller explanation (McKenna and Toll in McKenna 1984; Toll 1985, 1987; Toll and McKenna 1987). Most information is given in the tables as frequency data with simple percentages and chi-square tests as appropriate. The distribution of expected values generated from the chi-square test is used for discussing the structure of the attributes in question. The Coefficient of Contingency (C) is a relative measure of the strength of association in which higher values represent stronger association. The measure approaches 1.0 at its maximum, but that maximum depends on the degrees of freedom (df) so that it is strictly comparable only between tables of similar size. The Shannon-Weaver Diversity Index (H') is likewise used as a comparative measure that looks at sample category (s), diversity (high H'), and the relative contribution of items to the diversity score itself (J) (see Toll

1985; 1987). Because confidence in this index relies very much on frequency, which is acknowledged to be low in the present sample, the index is used in a very relative, ordinal manner for structuring discussion and not as a demonstration of ceramic truth. Other parametric and nonparametric procedures used herein [Student's t, means, standard deviation (s.d.), coefficient of variation (CV)] are basic statistics (Thomas 1976) and are presented in tables as part of a quantitative description for the primary types and selected attributes under consideration.

The ceramic sample at the Eleventh Hour Site showed strong similarity in temper type to other ceramic samples from Chaco Canyon. Vessels were primarily tempered with sandstone or quartz sand with the proportion of (nonlocal) igneous tempers greatest in the carbon-painted ceramics. The distribution of these tempers was, however, more even than that recorded for earlier site deposits (Table 7.4). Trachyte temper from the Chuska slopes west of Chaco Canyon was well represented in the culinary ware, whereas igneous temper from the San Juan River Valley and its northern tributaries was well represented in the carbon-painted group where it slightly surpassed the Chuskan material. Cibola Whiteware remained overwhelmingly tempered with sandstone (Table 7.5). Vessel forms were separated strongly by type of ware; grayware was composed almost exclusively of jars whereas bowls predominated in the decorated wares (Tables 7.6 and 7.7). Cibola Whiteware showed a greater variety of closed forms than did other painted wares. 29SJ 633 differed from other sites in the Chacoan sample in having the highest relative frequency of culinary ware, which undoubtedly has functional implications for the assemblage.

Mesa Verde Phase Ceramics

Primary Types

The main ceramic types recovered from the excavation of Rooms 7 and 8 at the Eleventh Hour Site are indented corrugated, PII-III carbon-on-white ("McElmo"), and Mesa Verde Black-on-white. These types, or related wares, are well described elsewhere and need not be fully treated here (see Breternitz et al. 1974; Cattanach 1980; Morris 1939; Rohn 1971; Windes 1977). Our interest is in recognizing the variability among these types from their classic descriptions and how that variation bears on the interpretation of 29SJ 633.

Indented Corrugated

For analytical purposes indented corrugated and PII-III and PIII indented corrugated were treated as a unit (Table 7.8) as these categories most likely represent subdivisions of late utility ware. One sample analysis, including scattergrams and histograms, indicates that this is a homogeneous group of sherds that deserves treatment as a unit. The distinction between the types is in the acuteness of the rim flare (increasing through typological time), which is subjectively judged during the rough sort. Apparently, such distinctions were not made with consistency in the present sample although moderate to extreme rim flares are a characteristic of this "late" group of culinary vessels. Cibolan, Chuskan,

Table 7.4. Intersite comparative diversity indices of temper, Chaco Canyon

Time/Site	n	s	Temper H'	Temper J	Sandstone[a]	Chalc. SS	Iron SS	Magn. SS	Trachyte	SJ ign.	Unk.[b] ign.
BMIII											
29SJ 1659 Pithouse Y	111	4	0.785	0.567	82		12	16			1
29SJ 628	726	7	0.813	0.418	555	3	72	11	1	77	7
PI											
29SJ 724	659	7	0.679	0.349	552	8	16	9	44	29	1
PI-II											
29SJ 629	1,653	7	0.904	0.465	1,251	140	15	20	150	56	21
29SJ 1360	1,660	7	1.179	0.605	1,039	258	9	15	183	103	53
PII-III											
29SJ 627	7,185	7	0.808	0.415	5,504	360	22	59	1,019	188	33
Pueblo Alto	3,837	6	0.985	0.550	2,348	134	2	-	1,153	97	83
PIII											
29SJ 633	310	6	1.156	0.645	190	7	-	3	57	34	19

[a]Includes SS + trachyte and "Tusayan."
[b]Includes "Socorro" igneous.

Table 7.5. 29SJ 633 temper types tablulated by rough sort types

Rough Sort Type	Sand-stone	Chalcedonic SS	Magnetitic SS	San Juan	Trachyte	Unidentified Igneous	Total
Plain gray	6	1			1		8
Lino Gray	1						1
Lino Fugitive Red	1						1
Wide Neckbanded	1						1
Narrow Neckbanded	5	2			1		8
Neck Corrugated	3						3
PII Corrugated	3	1			6		10
PII-III Corrugated	4				4		8
PIII Corrugated	6			1			7
Indented Corrugated	19	1		2	15	2	39
GRAYWARE TOTALS	49	5		3	27	2	86
GRAYWARE %	57.0	5.8		3.5	31.4	2.3	
Red Mesa B/w	11		1		1	1	14
Escavada B/w	5						5
Puerco B/w	3						3
Gallup B/w	9				4		13
Chaco B/w	1				1	1	3
Exotic M/w	7		1	2	1	7	18
PII-III M/w	42	2		1	4		49
MINERAL-ON-WHITE TOTALS	78	2	2	3	11	9	105
MINERAL-ON-WHITE %	74.3	1.9	1.9	2.8	10.5	8.6	
Polished BMIII-PI C/w	2						2
Chuska B/w					1		1
Chuskan PII-III C/w					2		2
Chaco-McElmo B/w	2						2
PII-III C/w	22			8	9	2	41
Mesa Verde B/w	7		1	13	4	6	31
CARBON-ON-WHITE TOTAL	33		1	21	16	8	79
CARBON-ON-WHITE %	41.8		1.3	26.6	20.2	10.1	
Whiteware	18			2	3		23
WHITEWARE TOTALS	129	2	3	26	30	17	207
WHITEWARE %	62.3	1.0	1.4	12.6	14.5	8.2	
Plain red				1			1
Decorated red	7			4			11
Polychromes	4						4
REDWARE TOTALS	11			5			16
REDWARE %	68.8			31.2			
Polished smudged	1						1
GRAND TOTAL[a]	190	7	3	34	57	19	310
%	61.3	2.2	1.0	11.0	18.4	6.1	100.0

[a]SS = 10 items sandstone and igneous for 3.2% of grand total.
SJ = 15 items igneous and sandstone for 4.8% of grand total.
Trach = 26 items trachyte and sandstone for 8.3% of grand total.
Chi-square test: less red and smudged; types regrouped into grayware, M/w, C/w, table = 3 x 3, n = 270, x^2 = 45.389, df = 4, p = 0.000, C = 0.379, cells <5 = 0; >E are grayware in trachyte, M/w in sandstone, and C/w in San Juan igneous.

Table 7.6. 29SJ 633, vessel forms by rough sort types

Rough Sort Type	Bowl	Ladle	Canteen	Pitcher/ Mug*	Seed Jar	Tecomate	Jar	Olla	Effigy/ Duckpot*	Unknown	Total
Plain gray							8				8
Lino Gray						1					1
Lino Fugitive Red							1				1
Wide Neckbanded							1				1
Narrow Neckbanded							8				8
Neck Corrugated							3				3
PII Corrugated							10				10
PII-III Corrugated							9				9
PIII Corrugated							7				7
Indented Corrugated							39				39
GRAYWARE TOTALS						1	86				87
% of ware						1.1	98.9				
Red Mesa B/w	12		1		1		1		1*		16
Escavada B/w	2	2		1							5
Puerco B/w	1			1			1				3
Gallup B/w	8					1	5				14
Chaco B/w	2			1							3
Exotic M/w	10			1		1	5		1*		18
PII-III M/w	35	2	1				9		2	1	50
MINERAL-ON-WHITE TOTALS	70	4	2	4	1	2	21		4	1	109
% of ware	64.2	3.7	1.8	3.7	0.9	1.8	19.3		3.7	0.9	
BMIII-PI C/w	2										2
Chuska B/w	1										1
Chuskan C/w	1	1									2
Chaco-McElmo B/w	2										2
PII-III C/w	38	1					2	1			42
Mesa Verde B/w	28	3		1*							32
CARBON-ON-WHITE TOTALS	72	5		1			2	1			81
% of ware	88.9	6.2		1.2			2.5	1.2			
Whiteware	14	3				1	3	1		1	23
WHITEWARE TOTALS	156	12	2	5	1	3	26	2	4	2	213
% of ware	73.2	5.6	0.9	2.4	0.5	1.4	12.2	0.9	1.9	0.9	
Plain red	1										1
Decorated red	12										12
Polychromes	4										4
REDWARE TOTALS	17										17
% of ware	100.0										
Polished Smudged	1										1
GRAND TOTALS	174	12	2	5	1	4	112	2	4	2	318
%	54.7	3.8	0.6	1.6	0.3	1.3	35.2	0.6	1.3	0.6	100.0%

Table 7.7. Comparative diversity indices of selected types, 29SJ 633

Type	Design			Design Distribution		Temper			Texture		Paste Color		Vessel Forms		
	n	s	H'/J	s	H'/J	n	s	H'/J	s	H'/J	s	H'/J	n	s	H'/J
PII-III C/w	56	23	2.787 0.889	3	0.715 0.651	42	9	1.547 0.704	6	1.412 0.788	7	1.477 0.759			
Mesa Verde B/w	61	18	2.498 0.864	3	0.986 0.898	32	9	2.041 0.929	7	1.815 0.933	6	1.114 0.621	74	5	0.474[a] 0.294
Corrugateds	56	7	1.446 0.743		na	54	9	1.353 0.616	6	1.649 0.920	7	1.538 0.791	46	1	na
Cibola Whiteware													108	9	1.183 0.538

[a]Combines Mesa Verde Black-on-white and PII-III carbon-on-white.

Table 7.8. Culinary description highlighting PIII corrugated[a]

A. SURFACE ATTRIBUTES

1. Decoration:

Designs	PIII Motif No. 1	PIII Motif No. 2	Corr. Group Motif No. 1	Corr. Group Motif No. 2	Group N	Group %
Undifferentiated neckbanding			2		2	3.6
Narrow corrugated 2-5 mm	6		27		27	48.2
Wide corrugated >5 mm			1		1	1.8
Flattened corrugations		1	1	1	2	3.6
Undifferentiated corrugated			10		10	17.9
Corrugated, unknown style	1		11		11	19.6
Mummy Lake style plain			3		3	5.3
Total	7	1	55	1	56	100.0

Type Design Diversity: H' = 1.446; J = 0.743; s = 7

2. Sooting:

	PIII n	Corr. Group n	Corr. Group %
Sooted	4	25	45.5
Unsooted	3	30	54.5
Total	7	55	100.0

3. Handles

	Corr. Group n	Corr. Group %
Tabular lug	1	100.0

4. Forms and Metrics (mm)

Jars	n	%		n	range (mm)	x̄	s.d.	cv
	55	100.0%	all culinary					
			orifice dia.	30	95-350	206.8	61.665	29.8
			rim fillet	34	6- 39	20.1	8.510	42.4
			rim flare	11	12- 44°	28.8°	9.466	32.6
			unidentified					
			orifice dia.	15	130-290	207.0	48.617	23.5
			rim fillet	20	7- 39	19.8	8.581	43.3
			PII-III					
			orifice dia.	7	95-350	225.0	84.902	37.7
			rim fillet	8	7- 37	20.9	9.311	44.6
			rim flare	5	12- 36°	25.2°	7.833	31.1
			PIII					
			orifice dia.	7	130-330	195.0	68.860	35.3
			rim fillet	6	6- 30	19.8	8.681	43.8
			rim flare	6	19- 44°	31.7°	8.863	28.0

[a]PIII corrugated figures are shown separately but are embedded in group and group total figures. Corrugated group figures include PIII corrugated (n = 7), PII-III corrugated (n = 8), and indented corrugated (n = 40).

Table 7.8 (concluded)

B. PASTE

1. Temper Composition:

Temper	PIII n	Corr. n	Group %
Unidfferentiated sandstone	5	28	51.8
All chalcedonic sandstone		1	1.9
Trachyte		16	29.6
Trachyte with sandstone		3	5.5
San Juan igneous without hornblende	1	1	1.9
San Juan igneous without hornblende + sandstone		2	3.7
Unidentified igneous		1	1.9
Sandstone with unidentified igneous	1	1	1.9
Sandstone + trachyte + San Juan igneous		1	1.9
Total	7	54	100.1

Temper Diversity H' = 1.353; J = 0.616; s = 9

2. Texture Attributes:

Grain Size	PIII n	Group n	Group %
Fine	0	0	0.0
Medium	2	17	31.5
Coarse	5	27	50.0
Very Coarse	0	10	18.5
Totals	7	54	100.0

Density	PIII n	Group n	Group %
1-2%	0	0	0.0
5%	0	8	14.8
10%	6	26	48.1
20%	1	19	35.2
30%	0	1	1.9
>40%	0	0	0.0
	7	54	100.0

Sherd Temper	PIII n	Group n	Group %
None	2	26	47.3
<half	0	4	7.3
>half	4	16	29.1
all	1	9	16.4
	7	55	100.0

Undifferentiated Sandstone

Grain Size	PIII n	Group n	Group %
Fine	0	0	0.0
Medium	2	8	28.6
Coarse	3	16	57.1
Very coarse	0	4	14.3
Totals	5	28	100.0

Texture Index	PIII n	Group n	Group %
Very fine (0-2)		0	0.0
Fine (2.1-4)	2	15	27.8
Fine-medium (4.1-7)	3	14	25.9
Medium (7.1-10)		2	3.7
M-Coarse (10.1-13)		6	11.1
Coarse (13.1-16)	2	7	13.0
Very Coarse (16.1+)		10	18.5
	7	54	100.0

3. Clay Attributes:

Clay-temper Types	PIII n	Group n	Group %
No type assigned	2	18	32.7
Black with white sherd		4	7.3
Gray w/ black & white sherd	1	1	1.8
Gray with white sherd	2	3	5.5
Chuska gray homogeneous		7	12.7
Tan to brown clay	2	20	36.4
Black clay		2	3.6
Totals	7	55	100.0

Vitrification	PIII n	Group n	Group %
None	1	4	7.3
Present	5	42	76.4
Marked	1	9	16.4
	7	55	100.0

Paste Diversity H' = 1.538; J = 0.791; s = 7

and Mesa Verdean indented corrugated wares would be expected in this late culinary group. The major, if not exclusive, method of surface treatment was fine, indented corrugations (Table 7.8A); unidentified indented styles were small specimens or rim fillets lacking sufficient corrugations to be confidently placed in a specific style. A late style of plain gray with a single, wide-rim fillet was also present in small amounts (see also Abel 1974:Ceramics 10). The vessels were uniformly simple jars that were almost evenly divided between those with soot that is direct evidence of use as a cooking pot and those that were unsooted. Analysis of measurements based on the type sort suggests that the PII-III group consisted of vessels with slightly larger orifices (and probably volume) and a less flared rim than the P-III corrugated (Table 7.8A). However, t tests of all measured attributes between the types showed no significant differences.

Just over half of the indented corrugated sherds have sandstone temper, another 35% have trachyte temper, and the remaining 11% are tempered with other igneous and mixed igneous material (Table 7.8B). Temper grain size is solidly "coarse" or larger (67%) with sandstone tempers contributing more (71%) to the coarser-tempered vessel group. The addition of considerable sherd temper to the paste mix (53% in some sherds) greatly alters the paste texture index so that two paste groups are evident, with the majority (54%) in the finer paste texture range and another group (32%) in the coarse range (Table 7.8B). These groups reflect the presence or absence of sherds in the paste body and largely represent a distinct technological departure in the preparation of culinary ware paste compared with the preceding period during which notable use of sherd-tempering was rare and coarse-tempered grayware was the rule (Toll and McKenna 1987). Most pastes were tan to brown, with a notable group not assignable to a defined color group. Most of the vessels (76%) showed some high firing of the paste, but well-vitrified examples were uncommon.

Pueblo II-III Carbon-on-white and Mesa Verde Black-on-white

The analytical category Pueblo II-III carbon-on-white is the equivalent of earlier uses of the type "McElmo Black-on-white" in Chaco (Vivian and Mathews 1965; Voll 1964), and as a rough sort classification, it is expected to be more variable than it would be for any single type, such as Nava or Mesa Verde Black-on-white (Tables 7.9 and 7.10). Although the inventory of painted designs on the PII-III carbon-on-white and Mesa Verde Black-on-white samples is not mutually exclusive (Tables 7.9A, 7.10A), design distribution and emphasis differ greatly. Not only is PII-III carbon-on-white represented by nine more motifs than is Mesa Verde Black-on-white, but the five most common motifs are not comparable. PII-III carbon-on-white emphasizes parallel lines, checkerboards, and wide Sosi-style designs, all geared to cover the decorative surface in a continuous, nonbanded design (Figure 7.6f through m). In contrast, Mesa Verde Black-on-white emphasizes banded framers, solid band design, and motifs associated with the classic Mesa Verde style of parallel-line-framed, banded decoration (see Cattanach 1980:184-185). All of the Mesa Verde Black-on-white at 29SJ 633 is done in banded style with parallel framers (Figure 7.6a through c) and no evidence of Tularosa style, which is a possibly later A.D. 1200s development.

Table 7.9. Pueblo II-III carbon-on-white description

A. SURFACE TREATMENT

1. Decoration:

Designs	Motif Number 1	2	3	N	%
Parallel lines	8	1		9	16.1
Banded framers	2			2	3.6
Pendant parallel lines		1		1	1.8
Irregular wide lines		1		1	1.8
Solid corner triangles		1		1	1.8
Scrolls	1	1	1	3	5.3
Dots, framed and unframed	1			1	1.8
Framing dots		1		1	1.8
Dotted lines	1			1	1.8
Checkerboard	4			4	7.1
Eyed solids			1	1	1.8
Sawteeth	1			1	1.8
Barbs	1			1	1.8
Wide Sosi style	6			6	10.7
Narrow Sosi style	1			1	1.8
Solid band design	2			2	3.6
General solids	7	1	1	9	16.1
Hachure B-1	1			1	1.8
Counterchange	1			1	1.8
Hatched pendants	2			2	3.6
Solid ticked triangles		2		2	3.6
Ext. bowl motif	1	2		3	5.3
Others, hachure	1	1		2	3.6
Totals	41	12	3	56	100.2
Number with 1, 2, 3 designs	29	9	3	41	
% with 1, 2, 3 designs	70.7	22.0	7.3		100.0

Type Design Diversity H' = 2.787; J = 0.889; s = 23

Design Distribution Diversity H' = 0.715; J = 0.651; s = 3

2. Paint:

Carbon	n	%
	42	100.0%

Rim Decoration	n	%
Unpainted	12	28.6
Solid line	4	9.5
Dotted	15	35.7
Eroded, solid line	2	4.8
Use-ground	1	2.4
Unknown	8	19.0
Totals	42	100.0

Table 7.9 (continued)

3. Polish:

	Open n	Open %	Closed n	Closed %	Total N	Total %
Unknown	3	7.7			3	7.1
One side						
moderate	1	2.6			1	2.4
total	4	10.3	3	100.0	7	16.7
Both sides						
Total	29	74.3			29	69.0
Differential	2	5.1			2	4.8
Totals	39	92.9	3	7.1	42	100.0

4. Slip:

	Open n	Open %	Closed n	Closed %	Total N	Total %
Absent	3	7.7	1	33.3	4	9.5
Interior	3	7.7			3	7.1
Exterior			2	66.7	2	4.8
Slip-slop						
both sides	29	74.3			29	69.0
unknown	4	10.3			4	9.5
Totals	39	92.9%	3	7.1%	42	100.0

5. Forms and Metrics:

			Orifice Diameter (mm)				
Form	n	%	n	range	$\bar{x}$	s.d.	cv
Bowl	37	88.1	29	70-325	185.5	60.183	32.4
Ladle	2	4.8	2	105-110	107.5		
Jar	2	4.8	1	70			
Olla	1	2.4	1	90			
Total	42	100.1					

Diversity of Forms H' = 0.414; J = 0.298; s = 4

6. Handles:

Type	n	%
Trough	1	100.0%

Table 7.9 (concluded)

B. PASTE

1. Temper Composition:

Temper	n	%
Undifferentiated sandstone	21	51.2
Trachyte with sandstone	9	22.0
sandstone with trachyte	1	2.4
San Juan igneous w/hornblende	1	2.4
sandstone w/SJ igneous w/hornblende	2	4.9
San Juan igneous w/o hornblende	4	9.8
sandstone w/SJ igneous w/o hornblende	1	2.4
Sandstone w/unidentified igneous	2	4.9
Total	41	100.0

Temper Diversity H' = 1.547; J = 0.704; s = 8

2. Texture Attributes:

Grain Size	n	%
Fine	4	9.8
Medium	21	51.2
Coarse	16	39.0
Very coarse	0	0.0
Totals	41	100.0

Density	n	%
1-2%	0	0.0
5%	0	0.0
10%	15	36.6
20%	23	56.1
30%	3	7.3
40%+	0	0.0
	41	100.0

Sherd Temper	n	%
None	6	14.6
0-50%	4	9.8
50-95%	25	51.0
100%	6	14.6
	41	100.0

Undifferentiated Sandstone

Grain Size	n	%
Fine	3	14.3
Medium	8	38.1
Coarse	10	39.0
V. coarse	0	0.0
Totals	21	100.0%

Texture index	n	%
Very Fine (0-2)	3	7.3
Fine (2.1-4)	15	36.6
F-Medium (4.1-7)	16	39.0
Medium (7.1-10)	3	7.3
M-Coarse (10.1-13)	2	4.9
Coarse (13.1-16)	0	0.0
Very Coarse (16.1+)	2	4.9
	41	100.0

3. Clay Attributes:

Clay-temper types	n	%
No type assigned	19	45.2
Black clay, white sherd	4	9.5
Gray clay, black & white shd	2	4.8
Gray clay, white sherd	5	11.9
Chuska gray, homogeneous	1	2.4
Tan to brown clay	5	11.9
White clay	1	2.4
Totals	42	100.0

Vitrification	n	%
Absent	2	4.8
Present	33	78.6
Marked	7	16.7
	42	100.1

Paste Diversity H' = 1.477; J = 0.759; s = 7

Table 7.10. Mesa Verde Black-on-white description

A. SURFACE TREATMENT

1. Decoration:

Designs	Motif No. 1	2	3	N	%
Parallel lines	3	1		4	6.6
Cribbed parallel lines	1			1	1.6
Banded framers	7	3	1	11	18.0
Scrolls	2	1		3	4.9
Framing dots		1		1	1.6
Dotted lines	2			2	3.3
Checkerboard	2			2	3.3
Barbs	1			1	1.6
Wide Sosi style	1			1	1.6
Narrow Sosi style		2		2	3.3
Heavy dotted lines		1		1	1.6
Heavy curvilinear lines	1	1		2	3.3
Solid band design	6			6	9.8
General solids	2	4		6	9.8
Hachure B-1	1			1	1.6
Counterchange	1	1		2	3.3
Interlocked frets		2		2	3.3
Ext. bowl motif	2	3	8	13	21.3
Totals	32	20	9	61	99.8
Number with 1, 2, 3 designs	12	11	9	32	
% with 1, 3, 3 designs	37.5	34.4	28.1		100.0

Type Design Diversity H' = 2.498; J = 0.864; s = 18

Design Distribution Diversity H' = 0.986; J = 0.898; s = 3

2. Paint:

Carbon	n	%
	32	100.0%
Totals		

Rim Decoration	n	%
Unpainted	1	3.1
Dotted	24	75.0
Use-ground	1	3.1
Unknown	6	18.9
	32	100.0

Table 7.10 (continued)

3. Polish:

	Open		Mug		Total	
	n	%	n	%	N	%
Unknown	2	6.5			2	6.3
One side						
Total			1		1	3.1
Both sides						
Total	29	93.5			29	90.6
Totals	31	96.9	1	3.1	32	100.0

4. Slip:

	Open		Mug		Total	
	n	%	n	%	N	%
Both sides	31	96.9	1	3.1	32	100.0

5. Form and Metrics:

			Orifice Diameter (mm)				
Form	N	%	n	range	$\bar{x}$	s.d.	cv
Bowl	28	87.5	19	80-315	195.5	63.723	32.6
Ladle	3	9.4	3	70-95	75.0	7.071	9.4
Mug	1	3.1	1	80			
Total	32	100.0					

Diversity of Forms: H' = 0.447; J = 0.407; s = 3

6. Handles:

Type	n	%
Strap	1	25.0
Tubular	3	75.0
Total	4	100.0

Table 7.10 (concluded)

B. PASTE

1. Temper Composition:

Temper	n	%
Undifferentiated sandstone	7	22.6
Magnetitic sandstone	1	3.2
Trachyte	2	6.4
with sandstone	2	6.4
San Juan igneous w/hornblende	2	6.4
with sandstone	3	9.7
San Juan igneous w/o hornblende	5	16.1
with sandstone	3	9.7
Unidentified igneous w/sandstone	6	19.4
Total	31	99.9

Temper Diversity H' = 2.041; J = 0.929; s = 9

2. Texture Attributes:

Grain Size	n	%
Fine	6	19.4
Medium	18	58.1
Coarse	7	22.6
Very coarse	0	0.0
Totals	31	100.1

Density	n	%
1-2%	0	0.0
5%	0	0.0
10%	13	41.9
20%	17	54.8
30%	1	3.2
40%+	0	0.0
	31	99.9

Sherd Temper	n	%
None	14	45.2
0-50%	5	16.1
50-95%	10	32.3
100%	2	6.5
	31	100.2

Undifferentiated Sandstone Grain Size	n	%
Fine	1	14.3
Medium	6	85.7
Coarse	0	0.0
Very coarse	0	0.0
Totals	7	100.0

Texture Index	n	%
Very Fine (0-2)	5	16.1
Fine (2.1-4)	9	29.0
F-Medium (4.1-7)	4	12.9
Medium (7.1-10)	2	6.5
M-Coarse (10.1-13)	3	9.7
Coarse (13.1-16)	2	6.5
Very Coarse (16.1+)	6	19.4
	31	100.1

3. Clay Attributes:

Clay-temper types	n	%
No type assigned	21	67.7
Gray clay, black sherd	1	3.2
Gray clay, black & white	1	3.2
Gray clay, white sherd	2	6.5
Chuska gray, homogeneous	3	9.7
Tan to brown clay	3	9.7
Totals	31	100.0%

Vitrification	n	%
Absent	3	9.7
Present	24	17.4
Marked	4	12.9
	31	100.0

Paste Diversity H' = 1.114; J = 0.621; s = 6

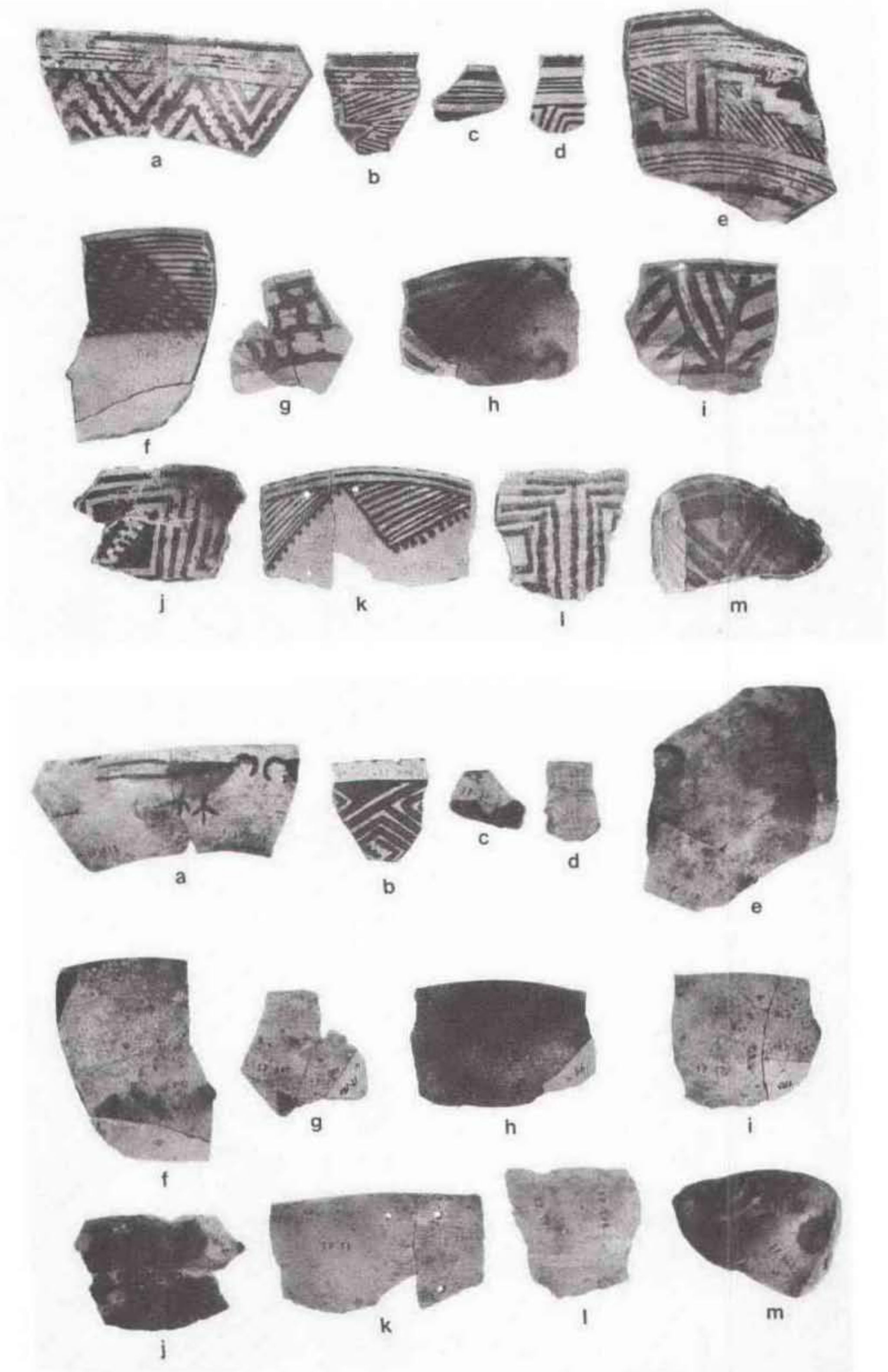


Figure 7.6. Mesa Verde phase carbon-on-white bowls. Upper plate is a view of the interior field. Lower plate is a view of the exterior field. (a-e) Mesa Verde Black-on-white, and (f-m) McElmo Black-on-white

This difference in decorative emphasis is reflected in the diversity and evenness indices where PII-III carbon-on-white sherds include a more diverse motif inventory. The repetition of design alternatives, however, is much less than in Mesa Verde Black-on-white where designs are repeated, as measured by the more even distribution of motif occurrence for vessels with one, two, and three designs and the higher evenness values for Mesa Verde Black-on-white. The five most common motifs on PII-III carbon-on-white represent only 45% of the inventory whereas Mesa Verde's five most common designs account for 61%. The extensive use of exterior bowl motifs is also distinct in the Mesa Verde Black-on-white sample. The greater variety in PII-III carbon-on-white decoration extends to other aspects of surface treatment as well. Rim treatments are almost exclusively dotted on Mesa Verde Black-on-white pottery whereas PII-III carbon-on-white is represented by unpainted and solid-line painted rims also. Mesa Verde Black-on-white is completely slipped and polished in the "open" forms recovered; and although PII-III carbon-on-white shows a strong similar mode, there is more variability in the way slip and polish are handled on all vessel forms. Vessel forms are limited in both types, but the big difference is the lack of jars in Mesa Verde Black-on-white. Mesa Verde Black-on-white, in this sample, is restricted to bowls and individual items of service ware whereas the PII-III carbon-on-white group contains general jars and jars specified as ollas or water vessels. When we compared bowls between the two groups, Mesa Verde bowls were judged to be slightly but not significantly larger (20-cm versus 18-cm orifice diameter) than the PII-III carbon-on-white group ($n = 50$, $t = 0.566$, $df = 48$, $p > |t| = .635$ two tails).

Temper and other aspects of paste composition are also markedly different between PII-III carbon-on-white and Mesa Verde Black-on-white (Tables 7.9B and 7.10B). Temper in the PII-III carbon-on-white group is half sandstone whereas temper in Mesa Verde is only about 26% sandstone, so igneous material (trachyte and San Juan) has much higher representation. Although the amount of trachyte temper has decreased in Mesa Verde Black-on-white, the distribution of the various tempering materials is much more even than for previous types; thus, through time, whiteware from nonlocal sources does not decline. Paste preparation likewise apparently changed and reflects an increased variety of paste types in the higher texture index (Table 7.7). Mesa Verde Black-on-white tempers tend to be finer grained, but the majority (61%) have little or no sherd temper included. Because the relative amount of rock temper (density on Tables 7.9B and 7.10B) is very similar between the two types, it is the lack of sherd temper in a number of Mesa Verde vessels that creates a distinct group with coarser-textured paste. Mesa Verde Black-on-white and PII-III carbon-on-white paste textures both tend to occur (58% and 83%, respectively) in the finer range of texture, but Mesa Verde Black-on-white is also represented by a significant group with coarser pastes (26%). Relatively more (23%) of the PII-III carbon-on-white samples can be assigned to a specific clay color-temper combination than can Mesa Verde Black-on-white samples, which follows from the analytical type's polyglot nature.

The pattern of vitrification is similar between grayware and whiteware with the majority of both wares showing high firing of vessels without severe thermal alterations of the paste.

Technological and Functional Attributes

Of the attributes that have been found to segregate pottery along functional lines, the presence of painted decoration, type and coarseness of temper, and vessel form stand out as useful (Braun 1974 cited in Plog 1980:85; Plog 1980:88).

In this section the covariation of form and temper is examined with respect to other functional and technological attributes for the entire temper sample without regard to type, so that assemblage-level trends indicating source and functional inferences may be offered. Basic information on source and technology is found in temper types, grain sizes, and density whereas functional differences inherent between culinary (plain ware) and decorated (painted) ware should account for a fundamental dichotomy in the way technological attributes covary.

Vessel Forms

The percentage profile of vessel forms at 29SJ 633 is distinct in the Chaco Canyon sequence in that it shows higher proportions of grayware and a reversal of the painted jar:bowl ratios that earlier favored jars (Mills 1986:36). Grayware jar sherds were relatively more abundant than in earlier deposits, particularly in Room 7, where culinary jars accounted for 70% of the bulk assemblage. In sites of the Chaco area system, relatively high amounts of grayware are associated with greathouses (Mills 1986, 1991; Toll and McKenna 1987); this fact has been interpreted as having socioeconomic, if not functional, correlations (Toll 1985). Mills (1991) has noted that for a contemporary small site along the San Juan River, plainware occurred as expected (<60%) but painted bowls increased markedly relative to painted jars through typological time. A similar pattern in painted ware was evident at 29SJ 633 where late painted jars were notable by their absence.

Forms from 29SJ 633 also tend to be compositionally discrete. Ware-temper distributions on Tables 7.5 and 7.6 show the predominance of certain tempers within paint/ware groups and within specific vessel forms: jars in grayware, mixed closed and bowl forms in Cibola Whiteware, and the near exclusiveness of bowls for carbon-painted and redware pottery. Significant differences in tempering material can be found between vessel forms at the ware level, but this does not extend to form differences within whiteware (Table 7.11). Sandstone-tempered whiteware bowls and closed forms of all tempers occur in expected frequencies, so the greatest variety of forms are derived from sources more likely than not to be local. Some specific vessel forms can be associated with specific temper sources. Fully 79% of the San Juan igneous temper occurs in bowls whereas almost half (48%) of the trachyte occurs as jars. These two tempers are, of course, compositionally different but are similar in having an angular grain. In addition to type density and size, grain angularity is consid-

Table 7.11. 29SJ 633 temper distributions by vessel form[a]

Vessel Form	Sand-stone	Chalcedonic SS	Magnetitic Sandstone	San Juan	Trachyte	Unidentified Igneous	Total	%
Bowl	92	1	3	23	21	13	153	49.4
Ladle	7				3	1	11	3.6
Canteen	1			1			2	0.3
Duck pot	1						1	0.3
Effigy	2						2	0.6
Mug					1		1	0.3
Pitcher	3				1		4	1.3
Seed jar	1						1	0.3
Tecomate	2				1	1	4	1.3
Olla	2						2	0.6
Gray jar	47	5		3	27	2	84	27.1
White jar	20			2	3	2	27	8.7
Red bowl[a]	11			5			16	5.2
Unknown	1	1					2	0.6
Totals	190	7	3	34	57	19	310	
%	61.3	2.2	1.0	11.0	18.4	6.1		100.0

Chi-square test:

Omitting unknown forms and redware bowls, regrouping tempers into sandstone, San Juan igneous and unknown igneous, and trachyte in a 3 by 3 table; n = 292; x^2 = 19.829; df = 4; p = 0.001; C = 0.252; cells < 5 = 0.

Contributors (E = Expected):

> E are San Juan igneous bowls and trachyte jars; sandstone bowls and whiteware closed forms occur as expected.

[a]Includes one smudged red.

ered an important quality for culinary tempers (Rice 1987:74, 229-231; Rye 1976; Shepard 1956:26-27). The occurrence of (angular) San Juan igneous temper primarily in bowls and the occurrence of trachyte in gray jars suggest either that there was an areal preference for specific forms or that select economic and social filters were operative in these types' appearance at 29SJ 633. The relative abundance of angular sandstone (chalcedonic) and trachyte in grayware suggests that specific types of tempering material were not selected on the basis of their ability to impart superior thermal or chemical qualities to vessel walls. Fully 44% of the grayware temper is clearly nonlocal, which indicates that a significant proportion of bulky, gray jars was being brought to 29SJ 633 from peripheral areas of the San Juan Basin. The variety of forms with undifferentiated sandstone and trachyte suggests that a special relationship continued to exist between inhabitants of Chaco Canyon and the Chuska Mountain slopes.

Grain size differences in various forms are also conditioned by ware (Table 7.12). Decorated ware, particularly whiteware, is tempered with finer material than is culinary ware. The addition of sherd temper is also more common in whiteware and redware than in grayware, although the complete tempering of vessels with sherd fragments is relatively similar among the wares (Table 7.13). Typologically late, grayware ceramics (Table 7.8) make up the bulk (87%) of sherd-tempered items in the grayware assemblage, including all of those that are completely sherd-tempered. Within whiteware, mineral-painted bowls tend to use relatively more sherd temper (67% sherd-dominant temper) and greater consistency in the amount of sherd temper. In contrast, carbon-painted vessels with sherd-predominant temper are less common (53%) and show a less even distribution in the relative amount of sherd tempering; that is, vessels either lack sherd temper or completely sherd-tempered vessels occur more often than expected (Table 7.13). As should be expected, the 32 carbon-painted vessels with sandstone temper account for the majority of the sherd-dominant subgroup (29 of 41 samples), all but two of which are bowls. Redware bowls show the strongest tendency to be tempered completely with sherd inclusions (67%). This tendency clearly correlates with the area of production as igneous-tempered redware (San Juan) lacks sherd inclusions whereas specimens with sherd inclusions are almost exclusively White Mountain Redware.

The analysis sample identifies 10 vessel forms at 29SJ 633 (Table 7.6), but re-examination of the collection during rim form tabulation showed that considerable variability exists in some of the form classes, and at least one additional form may be present: a cylinder jar. The possible cylinder jar of Gallup Black-on-white, omitted from the detailed analysis, appears to be a lower body fragment with a thicker vessel wall than would normally occur on pitcher necks, with which it might be confused (Figures 7.2v and 7.7j through l). Several other attributes of this sherd also fit the pattern for cylinder jars, including the stacked, hachured, diamond motif in parallel rows; abundant sherd temper with a sand-trachyte mix; and the estimated diameter of about 9 cm, which falls very close to the mean for mineral-painted cylinder jars (Toll 1990:284; Washburn 1980). This particular specimen came from the fill of the small back room (Room 8).

Table 7.12. Grain size distribution by vessel form, 29SJ 633

Form	Grain Size				N	%
	Fine	Medium	Coarse	V. Coarse		
Bowl	38	80	34		152	49.0
Ladle	1	6	3	1	11	3.6
Canteen		2			2	0.7
Duck pot	1				1	0.3
Effigy		1	1		2	0.6
Mug			1		1	0.3
Pitcher	2	1	1		4	1.3
Seed jar	1				1	0.3
Tecomate	2	1	1[a]		4	1.3
Olla		1	1		2	0.6
Gray jar	1	25	44	15	85	27.4
White jar	6	13	7		26	8.4
Red bowl[b]	4	10	3		17	5.5
Unknown		2			2	0.6
Totals	56	142	96	16	310	
%	18.1	45.8	31.0	5.1		100.0

Chi-square tests:

Combining c-vc, whiteware jar varieties and all open forms, omitting unknown forms; n = 308; table size = 4 x 3; x^2 = 63.939; df = 6; p = 0.000 C = 0.415; cells < 5 = 1.

Contributors (E = Expected):

> E whiteware bowls and jars high in fine-medium, low in coarse; gray jars high in medium-coarse, low fine. [expanded table (df = 6, cells < 5 = 2)] shows general whiteware jars high in medium with special closed high fine. Omitting redware (n = 291) gives the same result but no cells are < 5.

[a]Grayware, included with gray jars for testing.
[b]Includes one smudged red bowl.

Table 7.13. Vessel forms and sherd temper, 29SJ 633

	Sherd Temper					
Form	none	<half	>half	all	N	%
Bowl	33	27	79	13	152	49.0
Mineral-on white	8	14	42	3		
Carbon-on-white	23	11	30	8		
Ladle	1	1	9		11	3.6
Canteen			1		2	0.7
Duck pot			1		1	0.3
Effigy			2		2	0.6
Mug	1				1	0.3
Pitcher			4		4	1.3
Seed jar			1		1	0.3
Tecomate	2[a]	1	1		4	1.3
Olla		1	1		2	0.6
Gray jar	48	8	20	9	85	27.4
White jar		5	20	1	26	8.4
Mineral-on-white		8	23	1		
Carbon-on-white	1		3			
Red bowl	4		7	6	17	5.5
Unknown			2		2	0.6
Totals	89	44	148	29	310	99.9
%	28.7	14.2	47.7	9.4		100.0

Chi-square tests:	Contributors (E = Expected):
n = 308 (less unknown); table size 4 x 3; X^2 = 54.056; df = 6; p = 0.000; C = 0.386; cells < 5 = 2.	Combines "all" with > half sherd. Expanded table shows same pattern but has 4 cells < 5 E. > E in > half sherd are white and red bowls and white jars, and white bowls in < half, and gray jars in none.
n = 147 (Mineral-on-white vs. carbon-on-white open); table size = 2 x 4; n = 139; X^2 = 11.726; df = 3; p = 0.008; C = 0.279; cells < 5 = 0.	Mineral-on-white > E in > half, carbon-on-white > E in none.

*Includes one polished smudged.
[a]One grayware, included with gray jars for testing.

Variety in vessel forms was recognized from various curvatures, ridges, and key sections of vessel walls that are indicative of form as shown on Figure 7.7. Gray jars are represented by elliptical and globular bodies and the latter are associated with more everted rims; the temporal trend for increased rim eversion and globular bodies has been well documented (Breternitz et al. 1974; Morris 1939). However, the presence of a sooted, almost complete neck corrugated jar in the Mesa Verde assemblage (Figure 7.3c) suggests that earlier vessel forms and styles were still in production. Seed jars tend to be short-shouldered with a more open orifice relative to body size. Pitchers occur in both the round and classic angular-shouldered forms. Bowls tend to be symmetrically hemispherical with only one, large, asymmetrical, Mesa Verde Black-on-white bowl (Figure 7.3c) present. This large bowl shows wall flattening and circumferential distortion typical of bowls dried while tilted on their edges; asymmetry may facilitate ease of pouring, especially from large bowls. One steep-sided deep bowl of Reserve Indented Smudged (not in the analysis) was also present. Ladles occur as both trough-handled and solid or hollow tubular-handled vessels, the latter associated with the Mesa Verde Whiteware. Cibola Whiteware jars occur as globular and elongated bodied forms, the latter referred to as ollas and usually associated with mineral-painted pottery; no in-wall, cup-like, olla handles were observed at 29SJ 633, but these are common in earlier assemblages (Figure 7.7p). Canteens were recognized by small orifices of various height and/or by small, perforated, nubbin-lugs on the vessel shoulder. Duck pots occurred in the handled-pitcher form (Figure 7.3f) or as modified seed jars with stubby "wings" (and probably a small appended head, see Figures 7.2n and 7.7o). Effigies at 29SJ 633 include a small, unslipped, lower body of a possible human figurine decorated with black subglaze lines and a possible frog effigy, probably a pitcher handle (Figure 7.7v and w). The possible human effigy fragment is a solid, miniature, "pinch" piece not a container such as those full-figured forms associated with Pueblo Bonito (Pepper 1906).

Rim form in the decorated wares of the Mesa Verde assemblage shows a marked change for the first time in Chaco Canyon's ceramic sequence. Rims in earlier assemblages after A.D. 850 are almost all painted with a solid line along a directly tapered or slightly rounded lip in the mineral-painted ceramics. Carbon-painted types showed more variety in rim treatments with unpainted rims the most common (Toll and McKenna 1987). Rim form was not an attribute recorded during the analysis (because of its uniformity), but a scan of the collection indicated definite typologically associated trends in rim form (Table 7.14). A progression in the pattern of rim shapes through typological time runs from tapered to flat rims through the Red Mesa-Gallup-McElmo-Mesa Verde sequence. A new rim form, beveled rims with a flared lip, occurs in the Mesa Verde assemblage (see also Cattanach 1980:190-191). This rim form may be one of many stylistic introductions associated with the White Mountain Redware trade complex (see Carlson 1970: 101-105; Franklin 1990; Snow 1982:251), which begins to be a widespread regional occurrence in this and subsequent horizons in the Rio Grande Valley. There may be some functional value because such rims on large bowls are easier to lift and grasp during serving or mixing, and flattened rims facilitate cover fastenings for expedient storage (Rice 1987:241).

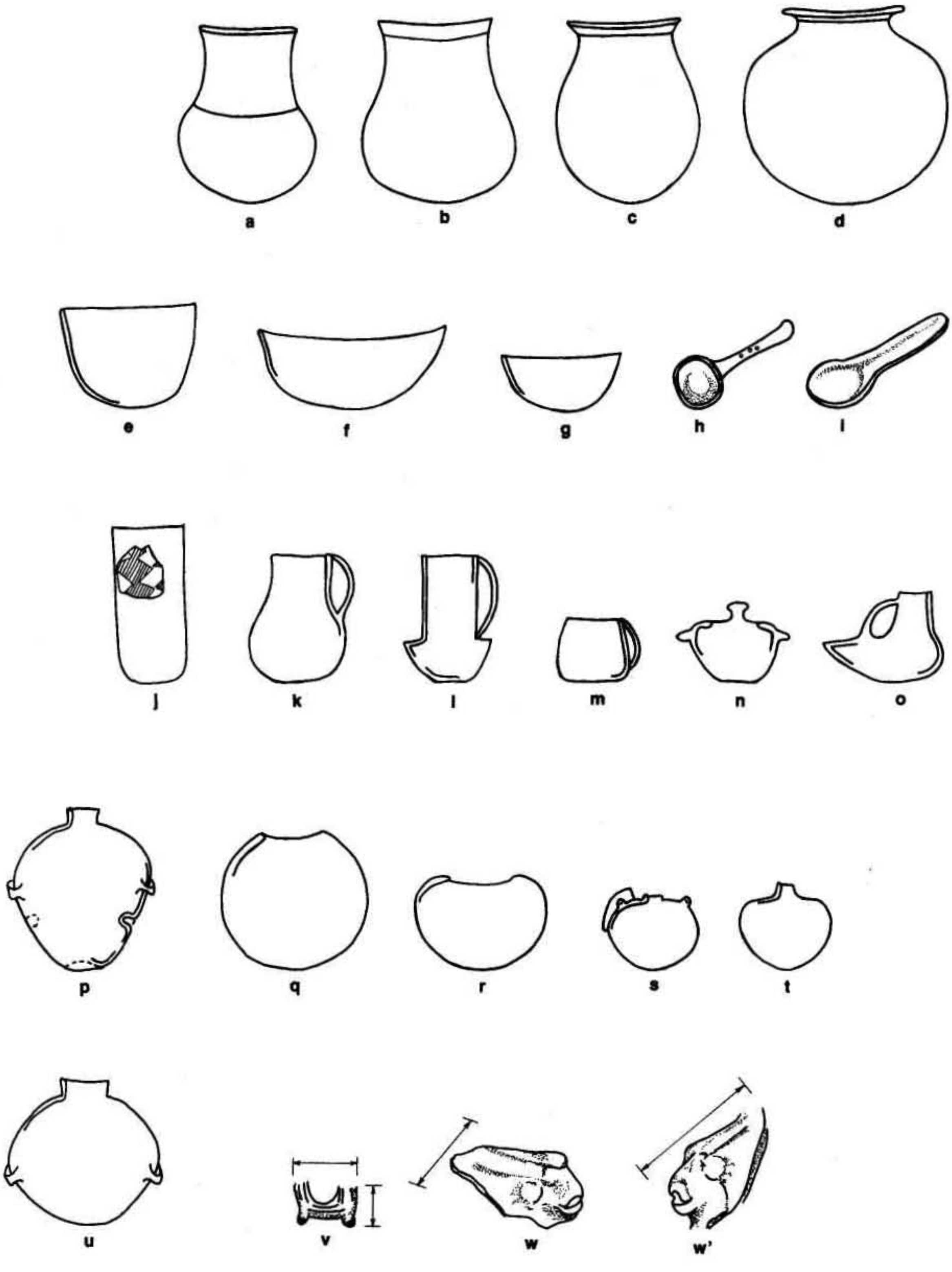


Figure 7.7. Vessel forms at 29SJ 633

Table 7.14. Bowl rim forms, 29SJ 633[a]

	Rim Form					
	Tapered	Rounded	Beveled	Flattened		
Ware	1	2	3	4	N	%
Whiteware		4	2		6	5.8
Red Mesa B/w	6	2			8	7.8
Gallup et al. B/w[b]	7	10		1	18	17.5
PII-III M/w	4	6		1	11	10.7
McElmo B/w	1	10	2	15	28	27.2
Mesa Verde B/w	1[c]	2		19	22	21.3
Puerco/Wingate B/r		3		5	8	7.8
St. Johns Polychrome			2		2	1.9
Totals	19	37	6	41	103	
%	18.5	35.9	5.8	39.8		100.0

a

McElmo Black-on-white bowl
Room 7

Crumbled House Black-on-white mug
Room 8

[b]Includes Chaco, Puerco, Escavada, Mancos, Reserve, and Socorro Black-on-white.
[c]Crumbled House Black-on-white mug.

Particularly notable is an apparent reduction in the diversity of vessel forms through typological time. Cibola Whitewares have the greatest variety of forms whereas those of Mesa Verde Black-on-white are entirely bowls and items of personal service; a strict Mesa Verde assemblage consists of bowls, ladles, the occasional mug, and primarily small corrugated jars for cooking pots. If interpretation of ceramic wares is held to typological time lines, the Mesa Verde Phase shows a marked reduction in storage jars--notably storage vessels for dry goods that feature restricted access (ollas, short-necked jars, seed jars, canteens, kiva jars) or "high security"--where seed corn or other shelled grains might be stored for extended periods (Blinman 1988:123-143; Braun 1974 cited in Plog 1980; Ericson et al. 1972; Rice 1987). This interpretation would be weakened if Cibola Whiteware had remained in production. If earlier trends in central basin pottery production continued, certain sources accounted for certain forms (Chuska Grayware jars, San Juan carbon-on-white bowls, Cibola Whiteware closed forms, Table 7.5), and most interregional imports were bowls [redwares, smudged wares, Tusayan carbon-on-white (see Whittlesey 1974)]; therefore there would be good reason to suspect a strict "Mesa Verde assemblage" as an artifact of conventional typology and the vagaries of dating sites in Chaco Canyon.

The impression that pots were acquired as part of assemblages is furthered by the consistent but low-level presence of a "southern" subassemblage in the late A.D. 1100s to early A.D. 1200s collections from Chaco Canyon. This southern assemblage, present at 29SJ 633, is usually composed of two-to-three vessels of Socorro Black-on-white in bowl, pitcher, and jar forms with a trace of brownware indented corrugated culinary jars and smudged interior bowls. Assignment of this southern assemblage to the movement of White Mountain Redware and its smudged red affiliate (Showlow Smudged) is possible, but unlikely, as production centers for these wares are traditionally considered to have been hundreds of kilometers apart; Socorro Black-on-white was abundant on the Lower Puerco River near Albuquerque and White Mountain Redware was abundant along the central highlands of the Arizona-New Mexico border (Carlson 1970; Eidenbach 1982:9-13, 138-167; Ford et al. 1972). The point is that probably none of these "assemblages," whether they had a Socorro Black-on-white or Mesa Verde Black-on-white "core," were exclusively used or disposed of as sets (Bedaux and van der Waals 1987; David 1972; Foster 1960) despite their apparent cohesiveness and visibility in mixed assemblages.

The staggered life expectancy of different forms, combined with the likelihood of periodicity in the acquisition of different wares, suggests that a variety of vessel forms was used at 29SJ 633 during the Mesa Verde period. Certainly the greatest variety of whiteware forms can be attributed to "local" Cibola Whiteware, but form variability, particularly rare forms, would seem to be enhanced through interregional importation. Ceramics from the Eleventh Hour Site do not appear to break the continuum of diversity in types, sources, and forms established for Chaco Canyon, no matter what the assemblage period.

In summary, a functional difference in pastes is evident for certain wares and forms, and variety in vessel form may have declined through typological time. If true, the decline has significance for occupational duration, seasonality, and function; and it represents a distinct change from earlier form/assemblage patterns in the Chaco Canyon sequence. Increased seasonality with limited ceramic functions might be implied (after Plog 1980:96). On another level, different technologies for paste preparation crosscut the decorated wares (some have more sherd, some abundant rock tempers), but distinctions are clear between culinary jars and decorated wares of all forms in that there is both larger grain size and lack of grog (sherd temper) in the culinary vessels. The poor binding and thermal qualities of sandstone (Rice 1987) probably account for its inordinate coincidence with sherd temper in whiteware and, for the first time in any appreciable amounts, in grayware.

Temper Patterns

Although differences can be found in the covariation of tempers with surface and paste attributes, the pattern of slipping and polishing tends to be more uniform across production areas as indicated by temper. As suggested on typological grounds, paint types associate strongly with specific tempers: carbon paints with trachyte, San Juan igneous, and mineral paint with sandstone (Table 7.15). Decorated ware is almost uniformly finished with a slip (>90%) that, in turn, is usually completely polished on those surfaces possible to polish (Table 7.16). Significant differences are found between the surface treatments of sandstone- and igneous-tempered bowls. San Juan igneous- and unknown-igneous-tempered bowls are fully slipped and polished more often than is any other temper group (Table 7.16) whereas sandstone-tempered bowls show the least amount of investment in complete slip (67%) or polish (77%). Although no significant difference was found in the amount of polish across temper types, the pattern of polishing followed that of slip, that is, trachyte (and San Juan igneous) vessels most often were completely polished (>90%). Those specimens with igneous and sandstone mixes occur as "differentially polished" (complete on interior, incomplete on exterior), lending further support to the probability of greater variety in surface finishes when the temper is sandstone. Tests of slip and polish on samples having a base composition of sandstone temper show that although there is no difference in slipping practices between those that are sandstone tempered and those that are predominantly sherd tempered, the smaller set of sandstone-dominant tempered vessels evidences more complete polishing than does the sherd-tempered group. Closed forms, for which sample size is an acute problem, likewise show more variation in surface treatment in sandstone-tempered vessels. Products represented by the largest possible group, those pots tempered with sandstone and sherd mixes, are the most variable in surface finish whereas pots of primarily rock temper are more consistently (completely) finished.

Just as there are strong differences between some technological attributes and temper, so are there strong associations of temper with certain technological attributes. Unlike in earlier site assemblages, there is no significant difference in the distribution of grain size of tempering material. All temper types run between 35-40% coarse or larger,

Table 7.15. 29SJ633 temper types tabulated by paint types

Paint Type	Temper Type: Sand-stone	Chalcedonic SS	Magnetitic SS	San Juan	Trachyte	Unidentified Igneous	Total	%
No paint	69	5		6	30	2	112	36.1
Mineral								
red	1				1		2	0.7
brown	23	1		1	1	5	31	10.0
black	50	1	2	2	7	4	66	21.3
green	1						1	0.3
glaze	3						3	1.0
Carbon	33		1	21	17	8	80	25.8
Mineral/Carbon	10			4			14	4.5
Unknown					1		1	0.3
Totals	190	7	3	34	57	19	310	
%	61.3	2.2	1.0	11.0	18.4	6.1		100.0

<u>Chi-square test:</u>
Less no paint, unknown and mineral/carbon; combining sandstone varieties and San Juan igneous with unknown igneous; table size = 2 x 3, n = 183; x^2 = 26.907; df = 2; p = 0.000; C = 0.350; cells < 5 = 0.

<u>Contributors (E = Expected):</u>
> E are mineral in sandstone and carbon in trachyte and San Juan igneous.

Table 7.16. Temper by attributes of surface treatment, 29SJ633

A. SLIP

	Surface Treatment										
	None		Interior	Exterior	Slip-Slop		Both	Unknown			
	open	closed	open	closed	open	closed	open	open	closed	N	%
WHITEWARE											
Sandstone	8	6	16	19	1	2	56	15	1	124	56.1
+ SJ igneous				1						1	0.5
+ trachyte	1		1				2			4	1.8
+ unknown igneous			2				1			3	1.4
[> half sherd	(6)	(6)	(13)	(17)		(2)	(45)	(9)		(98)	(74.2)]
San Juan igneous	1						12	1		14	6.3
+ sandstone	1		1	2			8			12	5.4
[> half sherd	(1)			(1)						(2)	(7.7)]
Trachyte					1		6	2		7	3.2
+ sandstone	1		2	4		1	13			23	10.4
[> half sherd	(1)		(2)	(2)		(1)	(8)	(2)		(16)	(53.3)]
Unknown igneous							1			1	0.5
+ sandstone	1			4			11			16	7.2
[> half sherd				(1)			(9)			(10)	(58.8)]
subtotal	13	6	22	30	2	3	110	18	1	205	92.8
REDWARE											
Sandstone							11			11	5.0
[> half sherd							(11)			(11)	]
San Juan igneous	2		1				2			5	2.3
[> half sherd	(1)									(1)	]
subtotal	2	—	1	—	—	—	13	—	—	16	7.2
Totals	21		23	30	5		123	19		221	
%	9.5		10.4	13.6	2.3		55.6	8.6			100.0%

Chi-square tests of slipped bowls: less unknown forms (2) and slips, combining San Juan and unknown igneous in a 3 x 3 table; $n = 147$; $X^2 = 7.348$; $df = 2$; $p = 0.025$; $C = 0.218$; cells < 5 = 0 so that > E are sandstone in "other" and San Juan and unknown igneous in both with trachyte as expected. Test comparing sandstone and sandstone/sherd dominant bowls; $n = 86$; $X^2 = 0.467$; $df = 2$; $p = 0.792$; $C = 0.073$; cells < 5 = 2, not significant.

Table 7.16 (concluded)

B. POLISH

	One Surface							Two Surfaces						
	None		Streaky	Moderate		Complete		Mod.	Complete	Differential	Unknown			
	open	closed	open	open	closed	open	closed	open	open	open	open	closed	N	%
WHITEWARE														
Sandstone	11	3	2	4	2	22	22	1	37	8	11	1	124	56.1
+ SJ igneous							1						1	0.5
+ trachyte						1			3				4	1.8
+ unknown igneous	1					1			1				3	1.4
[> half sherd	(9)	(2)	(2)	(4)	(2)	(12)	(20)	(1)	(31)	(7)	(7)	(1)	(98)	(74.2)]
San Juan igneous						1			9		4		14	6.3
+ sandstone	1					1	2		8				12	5.4
[> half sherd	(1)					(1)							(2)	(7.7)]
Trachyte						1			6				7	3.2
+ sandstone			1	1		1	4		11	3	1	1	23	10.4
[> half sherd				(1)		(1)	(3)		(9)	(1)	(1)		(16)	(53.3)]
Unknown igneous										1			1	0.5
+ sandstone						1	4	2	7	1	1		16	7.2
[> half sherd							(1)	(1)	(5)	(2)	(1)		(10)	(58.8)]
subtotal	13	3	3	5	2	29	33	3	82	13	17	2	205	92.8
REDWARE														
Sandstone									10		1		11	5.0
[> half sherd									(10)		(1)		(11)	
San Juan igneous						3			2				5	2.3
[> half sherd						(1)							(1)	
subtotal	—	—	—	—	—	3	—	3	12	—	—	—	16	7.2
Totals	16		3	7		65		3	94	13	20		221	
%	7.2		1.4	3.2		29.4		1.4	42.5	5.9	9.0			100.0

Chi-square tests of polished bowls: less unknown and differential polish with 'none' included as < complete in a < complete and complete comparison. San Juan and unknown igneous combined for a 3 x 2 table; n = 135; X^2 = 4.567; df = 2; p = 0.168; C = 0.160; cells < 5 = 1, not significant.
Comparing sandstone and sandstone/sherd dominant bowls: n = 143; X^2 = 5.464; df = 1; p = 0.019; C = 0.336; cells < 5 = 0; > E is sandstone in complete and sherd dominant in less than complete polish.

so the usual association of coarse-grained material with trachyte is not evident in this assemblage (Table 7.17); this may be one effect of the underrepresentation of culinary wares in which trachyte is the only other major temper (Table 7.5). The association of sandstone with sherds as a temper combination is clear with sherd-dominant tempered whitewares (65%) and graywares (35%)(Table 7.18) more common than in earlier assemblages such as those at Pueblo Alto and 29SJ 627, where sherd-dominant tempers do not exceed 60% and 10% of the respective wares. Distinctions between sandstone-tempered pastes and igneous-tempered pastes (and between some igneous pastes) are maintained in the remainder of the comparisons. Clay color is distinguished among the three different groups of temper (Table 7.19), and temper density shows differences by material as the lower density for sandstone-tempered vessels undoubtedly is affected by the high coincidence of sherd temper (Table 7.18). As paste colors differ significantly by temper type, so too does clay color differ with temper size and the presence of sherd temper: culinary and decorated ware differences likely account for the distributions (Tables 7.20 and 7.21). Firing regimes are well developed and uniform with three-quarters of all vessels showing evidence of high firing (Table 7.22). Mineral-painted vessels are more often fired higher--that is, there is evidence of marked alterations of the paste--than are graywares or carbon-painted vessels, but no significant difference is found by temper type (Table 7.22).

The strongest technological associations with temper are paint type and the relative amounts of sherd and refired clay colors (discussed below). The patterns of other attributes also support the probability that real differences in sources and potters are represented in the 29SJ 633 assemblage. That is, other attributes of technology are sufficiently different between the kinds of temper that potter or source differences would seem to be real rather than a result of mobility by a limited number of potters. These strong areal and technological associations make assessments of change through typological time less clear. The customary mineral-carbon paint sequencing assumptions become less secure in mixed assemblages of suspected short deposition. To show this, Table 7.23 compares technological attributes for the 29SJ 633 bichromes; the results are mixed.

Among the whiteware bichromes, technical differences other than those related to formation are quite noticeable (Table 7.23). How these differences relate to time is not particularly clear even though a linear sequence is often assumed. Strong similar atemporal modes are evident in grain size and density, but the nature of producing whiteware and the requirements of vessel formation pretty much dictate similarity in these attributes. The ware that is consistently argued as being a Basin-wide product, Cibola Whiteware (mineral-on-white, Table 7.23), is a poor third in the representativeness of potential sources as reflected by temper percentages (thanks to "sandstone"), and its pattern of technological attributes contrasts strongly with those of Mesa Verde Black-on-white at 29SJ 633. Cibolan temper distribution at 29SJ 633 is very similar to that at Pueblo Alto (Toll and McKenna 1987:Table 1.1), which is, perhaps, one argument for an earlier temporal position. The interplay of technological continua and rapid change is, however, apparent as the PII-III carbon-on-

Table 7.17. 29SJ 633 temper distributions by grain size

Grain Size	Temper: Sand-stone	Chalcedonic Sandstone	Magnetitic Sandstone	San Juan	Trachyte	Unidentified Igneous	Total	%
Fine	32		2	1	9	12	60	18.1
Medium	87	2	1	21	26	5	142	45.8
Coarse	63	4		12	16	1	96	31.0
Very coarse	8	1			7		16	5.2
Totals	190	7	3	34	58	18	310	
%	61.3	2.2	1.0	11.0	18.4	6.1		100.0

Chi-square test:
Combined categories of all sandstone varieties, San Juan and igneous varieties, and trachyte: table size 4 x 3; n = 310; x^2 = 11.400; df = 6; p = 0.077; C = 0.188; cells < 5 = 2.

Contributors:
Not significant.

Table 7.18. Proportion of sherd temper by geologic temper, 29SJ 633

	Geologic Temper						
Sherd Temper	SS	San Juan Igneous	Trachyte	Unknown Igneous	N	% of n	% of N
Grayware							
None-< sherd	30	2	24	1	57	66.3	18.4
> half sherd	24	1	3	1	29	33.7	9.4
ware total	54	3	27	2	86		
% > sherd/ware	44.4	33.3	11.1	50.0			
Whiteware							
none-< sherd	27	24	14	7	72	34.8	23.2
> half sherd	107	2	16	10	135	65.2	43.5
ware total	134	26	30	17	207		
% > sherd/ware	79.9	8.3	53.3	58.8			
Redware							
none-< sherd		4			4	25.0	1.3
> half sherd	11	1			12	75.0	3.9
ware total	11	5			16		
% > sherd/ware	100.0	20.0					
Smudged							
none-< sherd							
> half sherd	1				1	100.0	0.3
ware total	1				1		
% > sherd/ware	100.0						
Total < sherd	57	30	38	8	140		45.2
> half sherd	143	4	19	11	170		54.8
GRAND TOTAL	200	34	57	19	310		100.0%
Cum. % > sherd/ware	71.5	11.8	33.3	57.9			

Chi-square tests:
Comparing < sherd and > sherd: table size 2 x 4; N = 310; X^2 = 58.605; df = 3; p = 0.000; C = 0.399; cells < 5 = 0.

Contributors (E = expected):
> E are sandstone in > sherd, trachyte and San Juan igneous in < sherd.

Whiteware < sherd and > sherd: n = 207; X^2 = 52.751; df = 3; p = 0.000; C = 0.451; cells < 5 = 0.

> E values as in full test.

Table 7.19. 29SJ 633 density distributions for temper types

	Temper Types							
Density	Sand-stone	Chalcedonic Sandstone	Magnetitic Sandstone	San Juan	Trachyte	Unidentified Igneous	Total	%
5-10%	19				1		20	6.5
10-20%	85	5		8	15	12	125	40.3
20-30%	76	2	2	25	35	6	146	47.1
30-40%	9			1	6	1	17	5.5
40%+	1		1				2	0.6
Total No.	190	7	3	34	57	19	310	
%	61.3	2.2	1.0	11.0	18.4	6.1		100.0

Chi-square test:
Combining igneous varieties against sandstone varieties: table size 4 x 2; n = 310; X^2 = 17.568; df = 3; p = 0.001; C = 0.232; cells < 5 = 0.

Contributors (E = Expected):
> E is sandstone in low-moderate (5-10% and 10-20%), and igneous is high in dense (20-30%) [expanded table separating igneous from trachyte (df = 6, cells < 5 = 4) indicates both igneous types contribute to the > E value].

Table 7.20. 29SJ 633 temper distributions by clay color

Clay Color	Temper Type: Sand-stone	Chalcedonic Sandstone	Magnetitic Sandstone	San Juan	Trachyte	Unidentified Igneous	Total	%
No type	66	3	2	23	15	10	119	38.4
Black w/white sherd	18	1			3		22	7.1
Gray w/black sherd	11			2		1	14	4.5
Gray w/bl. & wh. sherd	22			1	3		26	8.4
Chuska gray					17		17	5.5
Gray, w/white sherd	29				6	3	38	12.2
Tan to brown	21			6	12	1	40	12.9
Black	10	1			1		12	3.9
White	13	2	1	2	1	3	22	7.1
Totals	190	7	3	34	58	18	310	
%	61.3	2.2	1.0	11.0	18.7	5.8		100.0

Chi-square test:
Omitting Chuska gray, and combining San Juan igneous and unidentified igneous: n = 293; table size = 6 x 3; X^2 = 19.747; df = 5; p = 0.001; C = 0.251; cells < 5 = 1.

Contributors (E = Expected):
> E in San Juan igneous for no type, expanded table: (df = 10) indicates San Juan igneous is main source of > 5.
> E in sandstone for black pastes with and without sherds.
> E in trachyte for tan-brown pastes, this is probably a color phase of Chuska gray that is exclusive to trachyte.

Table 7.21. Grain size distribution by clay color, 29SJ 633

Clay Color	Grain Size: Fine	Medium	Coarse	V. Coarse	N	%
No type	25	48	42	4	119	38.4
Black w/white sherd	5	13	4	0	22	7.1
Gray w/black sherd	1	8	5	0	14	4.5
Gray w/blk. and wh. sherd	4	15	6	1	26	8.4
Chuska Gray	1	9	5	2	17	5.5
Gray, w/white sherd	10	24	4	0	38	12.2
Tan to brown	4	13	15	8	40	12.9
Black	1	3	7	1	12	3.9
White	5	10	7	0	22	7.1
Totals	56	143	95	16	310	
%	18.1	46.1	30.6	5.2		100.0

Chi-square test:
Combining all gray with sherd pastes and coarse with very coarse grains: N = 310; table size = 7 x 3; X^2 = 28.569; df - 12; p = 0.005; C = 0.290; cells < 5 = 5.

Contributors (E = Expected):
> E are gray with sherd in medium, low in coarse; tan-brown high in coarse, low in medium; black with sherd high in fine-medium, low in coarse.

Table 7.22. Temper type and vitrification by ware, 29SJ 633

	Temper Type											
Vitrification	Sand-stone	Chal. SS	Magn. SS	SJ ign.	SJ+ SS	Trach.	Trach. +SS	Unkn. ign.	?ign. +SS	N	% of n	% of N
Grayware												
absent	3									3	3.5	1.0
present	39	4		1	1	19	1	2		67	77.9	21.6
marked	7	1	—	—	1	7	—	—	—	16	18.6	5.2
TOTAL GRAYWARE	49	5	—	1	2	26	1	2	—	86	100.0	27.7
Whiteware												
absent										0	0.0	0.0
present	15				1	2	1			19	9.2	6.1
marked	3			1						4	1.9	1.3
subtotal	18	—	—	1	1	2	1	—	—	23	11.1	7.4
Mineral paint												
absent	1	1								2	1.0	0.6
present	57		1	1	2		4	1	5	70	33.8	22.7
marked	20	1	1			1	6		3	33	15.9	10.6
subtotal	78	2	2	1	2	1	10	1	8	105	50.7	33.9
Carbon Paint												
absent	2								1	3	1.4	1.0
present	28		1	8	9	2	11		5	64	30.9	20.6
marked	3			4		2	1		2	12	5.8	3.9
subtotal	33	—	1	12	9	4	12	—	8	79	38.2	25.8
TOTAL WHITEWARE	129	2	3	14	12	7	23	1	16	207	100.0	66.8
Redware												
absent										0	0.0	0.0
present	12[a]			2						14	82.4	4.5
marked				3						3	17.6	1.0
TOTAL REDWARE	12	—	—	5	—	—	—	—	—	17	100.0	5.5
TOTAL	190	7	3	20	14	33	24	3	16	310		
%	61.3	2.3	1.0	6.4	4.5	10.6	7.7	1.0	5.2		100.0	

VITRIFICATION SUMMARY

	n	%	% Gray	% White	% M/w	% C/w	% Red	Cumulative %
Absent	8	2.6	37.5	0.0	25.0	37.5	0.0	100.0
Present	234	75.5	28.6	8.1	29.9	27.4	6.0	100.0
Marked	68	21.9	23.5	5.9	48.5	17.7	4.4	100.0
Totals	310	100.0						

Chi-square test: tabling present and marked vitrification by ware less whiteware; table size 4 x 2; n = 279; $X^2 = 7.922$; df = 3; p = 0.048; C = 0.166; cells < 5 = 1; > E is M/w in marked with C/w and grayware in present.
Chi-square test: tabling present and marked by combined tempers, table size 4 x 2; n = 302; $X^2 = 4.010$; df = 3; p = 0.260; C = 0.115; cells < 5 = 1; not significant.

[a] Includes one polished smudged.

Table 7.23. Comparison of whiteware bichrome technological attributes, 29SJ 633

	Percent by Attribute		
	M/w[a]	PII-III C/w	Mesa Verde B/w
Temper:			
Sandstone	16.5	12.2	12.9
> sherd	60.4	51.2	22.6
Trachyte	3.3	4.9	9.7
> sherd	6.6	17.1	3.2
SJ and unk. igneous	9.9	4.9	35.5
> sherd	3.3	7.3	16.1
[geologic temper	29.7	22.0	58.1
> sherd temper	70.3	78.0	41.9]
Grain size:			
Fine	34.1	9.7	19.3
Medium	46.1	51.2	58.1
Coarse	19.8	39.0	22.6
Density:			
< 10%	11.0	0.0	0.0
10-20%	78.0	92.7	96.8
> 20%	11.0	7.3	3.2
Clay color:			
No type	29.7	43.9	67.7
Black w/sherd	6.6	9.8	0.0
Gray w/sherd	40.7	17.1	12.9
Chuska gray	1.1	2.4	9.7
Tan-brown	2.2	12.2	9.7
White	14.3	2.4	0.0
Black	5.5	0.0	0.0
Texture:			
Fine (< 4.1)	74.7	43.9	45.2
Medium (4.1-10)	20.9	46.3	19.4
Coarse (10.1-16)	3.3	4.9	16.1
Very coarse (> 16)	1.1	4.9	19.4
Frequency	91	41	31

[a]Less Red Mesa Black-on-white.

white group is both a technologically intermediate ware and contemporary of Mesa Verde and Cibolan groups. Cibola Whiteware and PII-III carbon-on-white groups are similar in the use of sherd temper, clay color, and texture distribution. Mesa Verde Black-on-white attributes contrast with these "earlier" patterns; yet Mesa Verde's predecessor and contemporary, McElmo Black-on-white, contributes substantially to the PII-III carbon-on-white group attributes. Again, where greater similarities might be expected between PII-III carbon-on-white and Mesa Verde Black-on-white, differences are the rule.

It would appear that marked technological changes occurred periodically along the typological time continuum, the last being at the Red Mesa/Gallup transition (ca. A.D. 1040) with the phenomenal increase in Chuskan ware in Chaco Canyon. At this point in the Bonito Phase, technically distinct wares and types are found that are unquestionably contemporaneous. A similar period of change appears to have occurred about A.D. 1200. Here, too, a period of mixed assemblages is evident in which wares are technologically distinct, yet standard interpretation holds the cause to be largely if not wholly temporal; types that make up PII-III carbon-on-white provide a stylistic and technical link between Mesa Verde and Cibolan types, yet differences between the groups are marked. Although typological time undoubtedly does play a factor in the 29SJ 633 Mesa Verde Phase assemblage, it is equally likely that significant numbers of the mineral-painted ceramics are contemporary and not redeposited intrusives.

Grayware Sooting

Soot deposits on culinary vessels are usually considered a result of a vessel's use over a fire, probably for cooking. Soot was identified as a vessel characteristic when carbonaceous material was smudged by fingers when a sherd was rubbed. Not all blackened sherds are considered sooted, therefore, but some do exist and may represent other uses around the hearth that are not considered here. Intuitively, it seems that temper and paste varieties may have implications for a culinary pot's functional role if we assume that different pastes perform diffently under stress, thermal or otherwise. Although ceramic engineering tests are appropriate for identifying superior expectations in culinary ware performance (Bronitsky 1986), such tests are not available to us at present, and it is still best to compare the ware against physical evidence, such as, soot that reflects an actual practice.

Studies at other sites in Marcia's Rincon, 29SJ 629 and 29SJ 627 (Toll and McKenna 1981, 1986), have shown that the occurrence of soot is not significantly distributed by temper type but that differences in the occurrence of soot can be found between site proveniences. Provenience differences depend primarily on the suspected and real nature of postdepositional environments; sherds exposed for some time show less soot. The occurrence of soot also has been found to increase through typological time, but here again the effects of postdepositional weathering probably contribute more to the pattern than not using pots over fires. Sooting patterns at 29SJ 633 are similar to these previous findings in that sooting does increase through typological time and no significant difference can be found in the co-occurrence of soot with technological attributes of grayware (Table 7.24). On Table 7.24 the far right column summarizes the data for the indented corrugated sample where sooting is consistent and well represented (47%). Sooting is found predominantly on Chuskan (trachyte) culinary ware with which "Chuska gray" and "tan" pastes are are associated, on vessels with very coarse temper, and on vessels that show marked thermal alterations to the paste. More small jars than large ones (using orifice diameter as an indication of volume) are sooted, but between the type breakdowns, sooting is unevenly apportioned. PII corrugated has most of the large, sooted jars whereas the combined PII-III and PIII group contains more small, sooted jars. As discussed earlier, when the figures for unidentified corrugated vessels are added to the late indented corrugated group, this pattern does not change.

Again, these differences were not found to be statistically significant; and, in the light of similar findings, it would seem that a source preference for culinary vessels was not a consideration in the selection of a cooking pot. Although the numbers are too small to permit testing, and the relationship of potential fuel problems exists, the possible shift to smaller cooking vessels in the Mesa Verde period suggests group size and possibly structure had been altered or reduced during the final period of occupation.

Refiring Analysis

A selected sample of ceramics from 29SJ 633 was refired primarily to examine the variability (or lack thereof) in the clay colors of carbon-painted ceramics. Accordingly, most of the data (55 of 67 sherds) were used to address distributional questions in "Late Ceramic Patterns in Chaco Canyon" (Toll et al. 1980). Briefly, the assumptions and utility behind refiring analyses are that (1) clay beds differ throughout the region; (2) pottery is produced near favored sources; and (3) by oxidizing a sherd (to 950°C), the relative iron content of the clay will be revealed so that source differences become apparent (Shepard 1939, 1956; Toll et al. 1980:103-104; Windes 1977). Variability in local clay sources makes the correlation of color to source less than ideal, so that other information, such as temper and type, is required to determine the possible source. As a general rule, low-iron (buff) clays characterize the central basin and higher-iron clays (red) are found on the western and northern periphery. Complete data for refired sherds are provided in Appendix C and are summarized in Table 7.25.

In addition to the carbon-painted samples, a few culinary (n = 6), whiteware (n = 4), and mineral paint (n = 2) samples were also refired (Table 7.25A). As previously noted (Toll et al. 1980), refired colors are fairly evenly distributed for the carbon types, but buff colors are generally absent for the other types where buff-firing clays are normally expected (Toll and McKenna 1987). Inspection of the data in Appendix C shows that sandstone-tempered clay sherds (n = 7) in this noncarbon-painted group are exclusively pink or buff whereas igneous-tempered sherds (2 of 5 are San Juan igneous) make up the red group. This difference is maintained during testing of the entire group were pink-clay, sandstone-

Table 7.24. Soot deposits compared to grayware technological attributes, 29SJ 633[a]

	Plain & Lino		Neck-bandeds		Neck corrug.		PII		PII-III		PIII		Unident.		Total sample				Indented corrugated sample	
	s	ø	s	ø	s	ø	s	ø	s	ø	s	ø	s	ø	N	s	ø	%s	s/n	%s
Temper:																				
Sandstone		9	1	7		3	1	2	3	1	3	2	7	13	56	15	37	28.8	14/32	43.8
San Juan ign. +?							1				1	1		3	6	2	4	33.3	2/6	33.3
Trachyte		1		1			4	2	2	2			8	8	28	14	14	50.0	14/26	53.9
Totals															86	31	55	36.1	30/64	46.9
Grain size:																				
Fine		1													1		1	0.0	-	-
Medium		2	1	2			2	1		1	2		6	8	25	11	14	44.0	10/20	50.0
Coarse		6		5		1	3	3	2	2	2	3	6	12	44	13	31	29.5	13/32	40.6
Very coarse		1		1		2	1		3				3	4	15	7	8	46.7	7/11	63.4
Totals															85	31	53	36.5	30/63	47.7
Paste color:																				
No type		4	1	6					1		1	1	4	11	29	7	22	24.1	6/18	33.3
Black w/sherd		1											1	2	4	1	3	25.0	1/3	33.3
Gray w/sherd				1			2				1	1	1	1	7	4	3	57.1	4/6	66.7
Chuska gray		1					2	1		2			3	2	11	5	6	45.5	5/10	50.0
Tan		1				1	2	2	4	1	2	1	5	7	26	13	13	50.0	13/24	54.2
Black		3				2							1	1	7	2	5	28.6	1/2	50.0
White				1				1							2		2	0.0	0/1	-
Totals															86	32	54	37.2	30/64	46.9
Vitrification:																				
Absent								1	1			1	1		4	2	2	50.0	2/4	50.0
Present		8	1	5		2	5	3	4	3	4	1	9	22	67	24	43	35.8	22/51	43.1
Marked		2		3		1	1					1	5	2	15	6	9	40.0	6/9	66.7
Totals		10	1	8		3	6	4	5	3	4	3	15	24	86	32	54	37.2	30/64	46.9
% soot by type	0.0		11.1		0.0		60.0		62.5		57.1		38.5							
s:ø	0:10		1:8		0:3		1.5:1		1.6:1		1.3:1		1:1.6							
Orifice diameters:																				
Small (< 19 cm)		5	1	5		3	1	1	2	1	3	1	2	2	27	9	18	33.3	8/13	61.5
Large (> 22 cm)				1			3	1	1	3	1	1	3	5	19	8	11	42.1	8/18	44.4
1 s.d. dia.		1					1		2			1	2	2	9	5	4	55.5	5/8	62.5
Totals															55	22	33	42.0	21/39	53.8

[a]s = soot, ø = no soot.

Table 7.25. Summary of refiring tests, 29SJ 633

	Color Group								
	White		Buff		Pink	Y-red	Red		
	0	1	2	3	4	5	6	N	%
A. Colors by types:									
PII-III M/w					1			1	1.5
Exotic M/w					1			1	1.5
PII-III corrugated			1		3		2	6	8.9
Toadlena B/w							1	1	1.5
Chuska B/w							1	1	1.5
Chaco-McElmo B/w		1	1		1			3	4.5
Whiteware					1	3		4	6.0
McElmo B/w		3	7		10	4		24	35.8
Mesa Verde B/w		2	7		8	4	5	26	38.8
Totals		6	16		25	11	9	67	
%		9.0	23.9		37.3	16.4	13.4		100.0
B. Colors by temper:									
Sandstone (ss)		6	7		16	1		30	44.8
(fine-medium)		(6)	(6)		(8)			(20)	
(coarse+)			(1)		(8)	(1)		(10)	
SS + SJ igneous					1			1	1.5
San Juan igneous			1		2	2	4	9	13.4
San Juan igneous + ss			3		3	2		8	11.9
Unknown igneous			1		2			3	4.5
Unknown igneous + ss						1	1	2	3.0
Trachyte						2	3	5	7.5
Trachyte + ss			4		1	3	1	9	13.4
Totals		6	16		25	11	9	67	
%		9.0	23.9		37.3	16.4	13.4		100.0

Chi-square test:
Grouping tempers into sandstone: San Juan igneous, unknown igneous, and trachyte: table size = 3 x 3; X^2 = 24.335; df = 4; p = 0.000; C = 0.516; cells < 5 = 1.

Contributors:
Sandstone high in pink.
Trachyte high in yellow-red, red.
San Juan igneous and unknown igneous occur as expected.

tempered sherds and yellow-red of red clay, trachyte-tempered sherds are the main contributors (Table 7.25B). Within the sandstone-tempered sherds some source differentiation is implied by grain size. Half of the the fine-grained material is buff whereas 80% of the coarse-grained sherds are pink; seven of these coarse-grained items are McElmo Black-on-white.

Although the data are certainly not representative of the entire Mesa Verde Phase assemblage, the color trend of the few noncarbon-painted ceramics is similar to the carbon-painted group. If this is, in fact, the pattern for refired colors at 29SJ 633, it is markedly different from the pattern for antecedent assemblages of which almost 80% fall in the buff groups 1-3 (Toll and McKenna 1986, 1987). The more even distribution of clay colors in the 29SJ 633 assemblage suggests either much more representation of nonlocal pottery than found previously in Chaco Canyon or that there were fundamental changes in the technological preparation and/or requirements of ceramics. Although verification of this would require substantially more chemical and compositional tests, such color changes could be accounted for by a switch of clay sources to more expediently used, ponded, clay deposits or by the intentional mixing of clays to satisfy binding requirements of carbon-painted vessels (see Shepard 1956: 34-35).

Whole Vessels and Vessel Size

Seven whole or largely complete vessels and ten other substantial vessel portions were recovered during the excavations. One miniature duck pot was recovered during magnetic anomaly testing (Figure 7.3f), but the remainder came from Rooms 7 and 8 with five vessels or ceramic pieces accompanying four burials (Figures 7.3 and 7.4).

In Room 7, Burials 3 and 4 were accompanied by a whiteware ladle (Figure 7.4c) and a large Chaco Corrugated jar fragment, respectively. In Room 8, two infant burials were accompanied by a whiteware ladle, a large Chaco Corrugated cover (Burial 1), and a Mesa Verde Black-on-white ladle and bowl (Figure 7.4b). These vessels all appear to be older, heavily used, or broken pieces. All the ladles had broken handles, and one (Figure 7.4c) exhibits extensive abrasion along the rim and erosion of the vessel body. Abraded edges are also evident on the large Chaco Corrugated sherd covering Burial 1, which suggest it was used as a large tray before the interment. The whiteware ladle from Burial 1 and the Mesa Verde Black-on-white vessels from Burial 2 show little evidence of marginal wear or erosion, but they have sections broken from the rim, perhaps intentionally, as these missing fragments were not recovered from the burial pits and the broken sections are not worn. As can be seen in Figure 7.4, the Mesa Verde Black-on-white vessels are small, and surface finish and design are not executed with the classic clarity normally attributed to the type. The vessels assigned to the graves are not in prime condition and probably represent ceramics at least once removed from their primary function as containers; the condition of one ladle suggest salvage from exposed refuse (Figure 7.4c). Apparently, prime pottery was not sacrificed for interment.

Except for a Crumbled House Black-on-white mug from Room 8, the remaining vessels came from the fill of Room 7 (Figure 7.3b). Three of the four half-bowls shown in Figure 7.3 exhibit shaping and abrasion along their broken edge, which indicates reforming and secondary use of these vessels. Several vessels show multiple, paired, mending holes, which indicates that extensive repairs were routinely performed to extend vessel life as a container; one whiteware bowl shows three, evenly spaced mendholes spanning the body before its final reuse as a scoop (Figure 7.3d). Reused bowls, such as those in Figure 7.3, would serve admirably as portable mealing catchments, trays, incidental holders, wedges for vessel support in a hearth, or scoops for the cleaning of hearths or ladling of stored grain.

Vessel size (volume) can be measured directly from whole pots or can be calculated where sufficient portions remain to determine height and orifice diameter (Rice 1987:219-224). Enough complete bowls were available from 29SJ 633 to show that the earlier close relationship between orifice diameter and vessel volume continued in the Mesa Verde Phase. We assume (for this analysis) that jar orifice:volume relationships for noneccentric forms also continued as previously shown (Toll and McKenna 1987). Because of the constriction of the orifice and belling of the body through time, however, height and body diameters are crucial to accurate volume measures. Measurements from these sections of grayware are lacking in this analysis, and we must be satisfied with what is available. We acknowledge that the data structure may shift, but it should do so equally across the range of orifice sizes. Bell-bodied cooking jars with smaller mouths may well have been advantageous for minimizing fuel requirements (Mills 1991), an advantage in Chaco Canyon where ecological models imply acute deterioration of fuel-wood supplies by the A.D. 1200s (Judge 1979; Samuels and Betancourt 1982; Toll 1981). A partial counter to the argument that bell-bodied jars were used in the Mesa Verde Phase is that our latest grayware specimens (most approximating <u>de facto</u> refuse) <u>do not</u> show marked belling (Figures 7.2 and 7.3); therefore, orifice:volume ratio comparisons remain valid. Plots of orifice diameter for decorated and culinary types suggest that the function of certain ware classes may have changed, perhaps becoming more specific through time (Figure 7.8). In the decorated wares, McElmo and Mesa Verde Black-on-white are generally slightly smaller than are mineral-painted bowls--about 1,000-2,000 cc versus 2,000-3,000 cc--although exceptionally large Mesa Verde bowls are present (Figure 7.8b). Redware, however, occurs almost exclusively as the largest class, which suggests this ware, particularly White Mountain Redware (all vessels <2,000 cc are San Juan Redware), was especially imported for communal purposes. Likewise, Pueblo II corrugated and the unidentified indented corrugated are strongly represented in one size range (2,000-2,500 cc) whereas the combined Pueblo II-III and Pueblo III culinary wares show a bimodal distribution bracketing the Pueblo II jars (Figure 7.8c). Keeping in mind the small sample size, we believe it is still worth pointing out that typologically later culinary jars are represented in all size ranges, which may indicate first-order discards. Vessel size through typological time does decrease, but late culinary jars are also represented by a relatively larger group of bigger pots than is the earlier grayware. This late group of large culinary jars is small, but it complements the larger serving bowls of White Mountain Redware.

Ceromancy

Analysis of the latest ceramic types has shown that there are fundamental differences in wares and types, though they can be placed on a related continuum of technology and/or style. Between PII-III carbon-on-white and Mesa Verde Black-on-white, the decorative systems appear to have changed with PII-III carbon-on-white displaying a greater variety of motifs oriented to a system of all-over and continuous band designs. Mesa Verde Black-on-white, in contrast, has a different set of motifs oriented toward paneled band designs within multiparallel line framers; continuity between the two types is shown in the use of a similar inventory of geometric design in which 56% of the motifs are mutually expressed. Both types show similar modes in other aspects of surface treatment, with PII-III carbon-on-white being the more variable. In contrast to its surface treatment, Mesa Verde Black-on-white is more diverse in attributes of paste and has the most even representation of temper types found in the Chaco Canyon sequence. Grayware shows the marked rim eversion, lack of handles or nubbin lugs, and fine indented corrugations anticipated in other analyses of near-contemporary grayware. A major difference through typological time, noted by comparing assemblages from 29SJ 627 and Pueblo Alto, is the decline in trachyte temper, principally in grayware.

Trachyte temper is thought to make a more durable vessel that withstands thermal shock better than do sand-tempered vessels (Rye 1976). It is noteworthy, however, that the decline in trachyte temper was countered by the increased use of sherd temper among potters using a sand or sandstone tempering base, presumably because superior technological performance can be attributed to the use of sherd temper (Rice 1987:229). If this is true, the functions for which Chuskan Grayware were preferred cannot have changed or been abandoned in Chaco Canyon because a technological subsitute was found.

Technologically oriented comparative analyses involving the entire sampled assemblage showed that strong covariation existed among temper and other attributes related to source: paint, clay color, temper density, and the presence of sherd temper. Vessel form also was associated with temper. Various attributes of production suggested the making of pottery was similar across the region (sources) in terms of temper preparation, firing and finishing, but very real differences were present at 29SJ 633 in terms o source-related contributions. The meaning of this diversity is the subject of the remaining discussion.

Reappraisal of the Assemblage

Problems of confidence with assemblage integrity are an important aspect for interpretation and are not easily, or cleanly, catalogued. The conventional wisdom holds that late (post A.D. 1150) assemblages in Chaco Canyon are dominated by carbon-painted types (Vivian and Mathews 1965;

Windes 1984), and this is repeatedly confirmed in analyses of Chaco Canyon's late refuse deposits. That the majority of the last use-assemblage at 29SJ 633 were primarily carbon-painted types, culinary jars, and White Mountain Redware is attested to by the number of whole vessels and relatively large sherd sizes for which refitted or matchable items satisfy expectations for pottery waste in final deposits (Schiffer 1976:129-130, 1989:41-51). Nevertheless, bulk and sample frequencies include considerable Cibola ceramic material, so the Cibola ware's presence in the assemblage needs some explanation. Assigning these typologically earlier materials to their traditional timespan is possible, but it sidesteps the issue, and the implications, of their actual production and use into the thirteenth century.

Archeological evidence indicates that Rooms 7 and 8 were cleaned out, somewhat remodeled, and used before conversion into a dumping ground. Therefore, room contents and contents of fill adjacent to the buildings can be considered as an "assemblage" on a stratigraphic level. Clearly, some temporal mixing is present given the coincidence of Basketmaker through Mesa Verde pottery in the same deposit. But how much of the mix is really "intrusive," and how does this affect assemblage composition and interpretation? Are the typologically "earlier" Cibola types completely accountable as incidental inclusions from site cleanup, discards from sherds selected for temper, or do they represent breakage from a portion of the use-assemblage? If they do, why does it matter? It matters because without the Cibolan contribution, the nature of the Mesa Verde Phase use-assemblage is radically altered, which affects our perception of the late occupation of the site in the grand as well as the trivial scheme.

Cibola vessels account for more than half of the bichromes and decorated forms in the analysis sample. Their omission reduces the probability of lengthy occupation and/or ceramically diverse functions at the site. Red Mesa Black-on-white and earlier Cibola types, as well as some of the later Pueblo II-III material, undoubtedly can be attributed to redeposition during late occupational activity, and some as incidental to temper collections and recyclable items. Sherd temper associates too well with sandstone to be credible for other than technological (hence source) reasons as it is equally likely to appear in Cibola Whiteware, late grayware, and central basin varieties of McElmo Black-on-white (Table 7.23) (Franklin and Ford 1982). Windes (1987:404) has ascribed the presence of Cibola Whiteware in survey collections of Mesa Verde Phase sites to temper collection. If this is the case, it suggests that broad-based local production of about one-third of both the gray and whiteware may have occurred in Chaco Canyon during the A.D. 1200s.

As an alternative to the presence of Cibolan wares as "grog" in the Mesa Verde assemblages, some findings in this analysis suggest the continued, simultaneous production of different wares. Comparison of technological and source-related attributes between the late carbon-painted and other types indicates that considerable variability is accounted for by source and not entirely by time. With source-related variability extending to vessel forms, a "normal" use assemblage is only possible at 29SJ 633 by admitting that all the wares were at least partially contemporaneous with the Mesa Verde assemblage.

The recent reassessment of the archeomagnetic dates from 29SJ 633 somewhat furthers the argument of assemblage variability. Although the accuracy of these dates is not above suspicion, they do suggest that the last burned, floor features are nearer to A.D. 1200 than A.D. 1250 than previously thought; the ceramic refuse postdates room use by some unknown span. The assemblage itself is more compatible with an early A.D. 1200s date when mineral-painted ceramics might be expected to have continued into the mid to late A.D. 1100s, given their predominance in some localities of the central basin (Franklin 1982). Stylistic variability and quality of decorative execution may be partly related to vessels produced during the early end of Mesa Verde Black-on-white's production span, but much of that variability is also related to the heterogeneity of sources represented in the types at 29SJ 633. The following examples suggest the difficulty in separating source from temporal variability: (1) the continuance of late Cibola Whiteware in other Mesa Verde assemblages in the canyon and elsewhere (Bradley 1971:40; Franklin 1980, 1982; Schaefer 1986:408; Vivian and Mathews 1965:81); (2) the presence of Crumbled House Black-on-white, the Chuskan variety of Mesa Verde Black-on-white, whose production is generally thought to have slightly preceded that of "San Juan" Mesa Verde (Windes 1977:319-327); (3) the lack of Tularosa-style "all-over" designs, which are believed to have occurred in "mature" if not late Mesa Verde Black-on-white assemblages (Cattanach 1980:181; cf. Franklin 1990; Rohn 1971:149); (4) the equal presence of beveled rims in both McElmo and Mesa Verde Black-on-white, which is also usually ascribed to "mature" Mesa Verde Black-on-white (Cattanach 1980:191; Rohn 1971:148); and (5) stylistic variations of Mesa Verde Black-on-white, which are known to have occurred throughout the Anasazi Southwest during the A.D. 1200s (Brew 1946; Davis 1964; Lekson 1986; Toll et al. 1980).

Having counted caveats and wrung our hands, we arrive at two possible scenarios for which the data are neither sufficiently clear nor sufficient to establish a favorite. Consideration of the full assemblage as more or less contemporary would suggest a normal occupation by a group of some size for some duration whereas the alternative, focusing on a very limited group of ceramics at the end of the typological time line, would indicate that a very small group was most likely at 29SJ 633 for a short time as has been suggested for the Mesa Verde Phase (Vivian and Mathews 1965:112-113). Mesa Verde Whiteware at 29SJ 633 lacks ollas, a form that declines through typological time, but ollas have a longer expected use-life than do other forms, so an absence of ollas might imply a short occupation (Blinman 1988:188-208, 223-226). The full assemblage, however, exhibits a variety of forms indicating diverse functions: short- and long-term storage; water transport and storage; food preparation for large, commensal parties; and possible ceremonial or status vessels.

If body size to orifice size is not greatly exaggerated, the proportionally higher counts of grayware for 29SJ 633 suggest greater investment in food processing (especially corn) than is evident in earlier site deposits (see Blinman 1988:93-94). Medium-sized grayware jars have been suggested (Blinman 1988:202-203) as the workhorses in the food processing assemblage of interhousehold or extended commensal units. It is, however, our typological Pueblo II and (particularly) unidentified indented corrugated samples that compose this culinary vessel size class at 29SJ 633. Typologically late grayware occurs as either small or large vessels (Figure 7.8). Again, a change is indicated if size classes of grayware represent nodes of food processing along strict typological time lines. These patterns are reinforced by the vessel size distributions in service ware, as previously noted.

Perhaps furthering the argument of limited occupation (one family?) or a limited number of household contributors to this trash deposit is the relative density of ceramic trash. When excavated, and as reinforced by later discussion, deposits were considered "rich." This may be true in terms of vegetal and faunal remains, but the relative quantity of ceramic trash shows a marked decline from previous periods of Pueblo-type occupation in Chaco Canyon (Table 7.26). The comparisons in Table 7.26 are based on enclosed trash deposits similar in context to those in the rooms of 29SJ 633 and not on dispersed, open middens (except the Pueblo Alto midden) where dispersion through time is likely to negatively affect artifact density. In this set of data, only the Basketmaker deposits are less dense than the material from 29SJ 633. Basketmaker populations are usually considered to be more mobile with caching and food preparation and serving less dependent on ceramics, so that production (and discard) of vessels is expected to be at lower levels than during the Pueblo periods in which ceramic usage was standard (see Glassow 1972; Wills and Windes 1989). What is impressive here is the truly remarkable decline in density of 29SJ 633's Mesa Verde period deposits compared to the late carbon-mix deposits from 29SJ 627's Kiva E and Pueblo Alto's Kiva 10 where a surprising number of sherds or pots were still being discarded after the "phenomenal" portion of the Bonito Phase deposition had ceased [at least at Pueblo Alto (Toll and McKenna 1987:207-212)] and ceramic refuse was returning to a more normal profile. With the understanding that the calculation of years of deposition are best-guess conservative estimates where scale is arguable, the raw amount of ceramic refuse suggests that either groups of small size or very limited occupation (or both) contributed to the Eleventh Hour Site trash.

The sealing of plaza-facing Room 7, perhaps after the interment of the adult (Burial 3), probably marks the end of dumping but possibly not of occupation, if the relatively higher numbers of Mesa Verde Black-on-white in the plaza trenches are significant. If these last deposits are more or less continuous with those in the rooms, the marked difference in the relative amounts of sandstone and trachyte temper suggest that ceramic supply was not particularly stable or systemic during the Mesa Verde Phase; the rise in trachyte-tempered ceramics in the plaza runs counter to trends for its reduction through typological time. A minor backdrop to this is the low-level presence of sets of ceramics with multifunction ware and form associated with more distant regions, which also suggests direct importation and use by different groups in a situation akin to a frontier or hinterland occupation. Intraregional import, by contrast, focuses on specific forms from specific areas. Fluctuations in the ceramic supply evident in late Kiva 10 deposits at Pueblo Alto are thought to indicate perturbations in the Bonito Phase supply system, and similar fluctuations are evident at 29SJ 633. The contrast in types and tempers between the

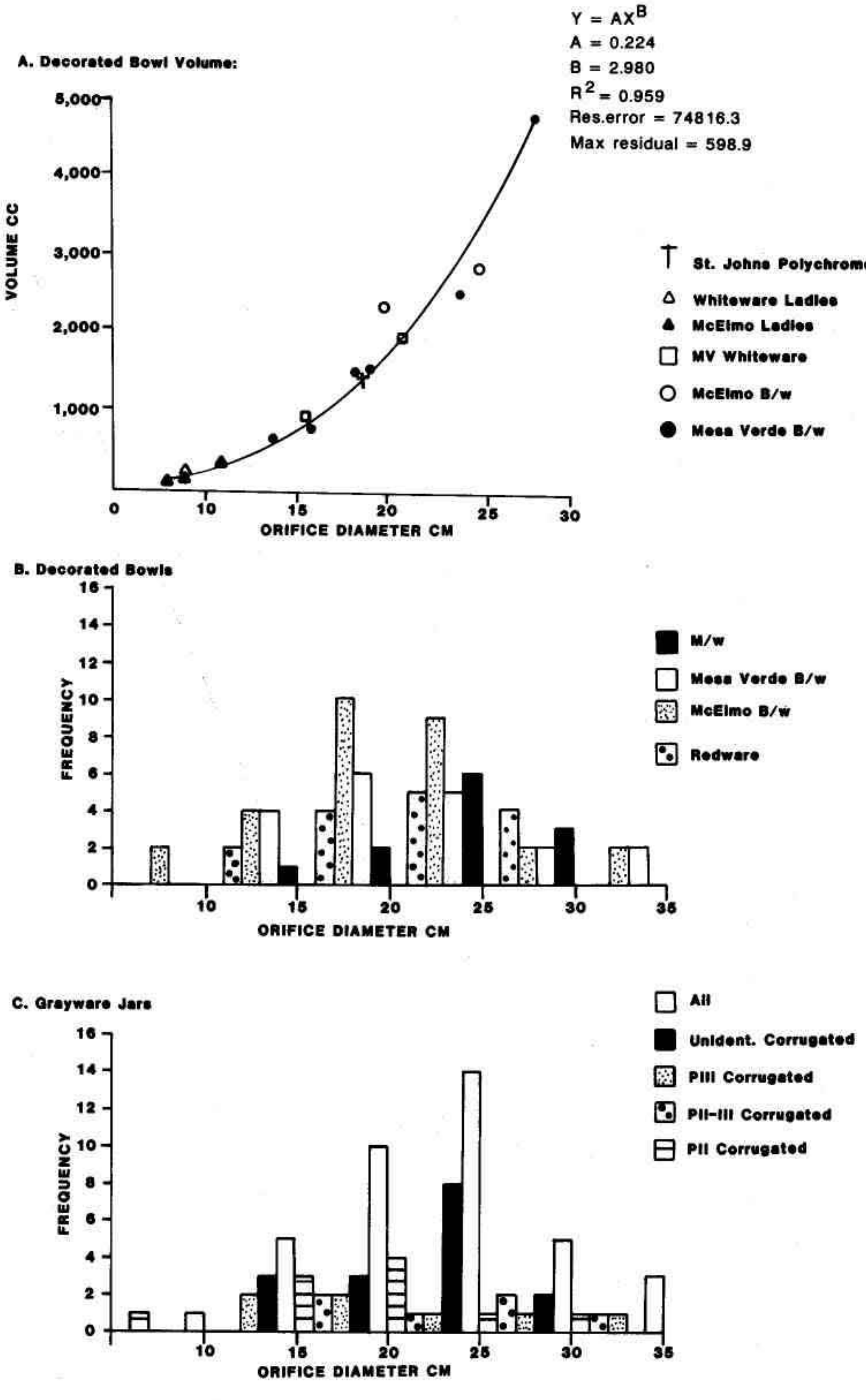


Figure 7.8. Volume relationships to orifice diameter and orifice variability in service and culinary ware. (A) decorated bowl volume:orifice diameter; (B) decorated bowls; and (C) grayware jars

Table 7.26. Comparative ceramic density for selected enclosed trash deposits, Chaco Canyon[a]

	Fill (m^3)	Bulk n	Years of Deposit	Sherds (m^3)	C%	D%
29SJ 1659 Pithouse Y (BMIII)	21.8	600	10	28	96	4
29SJ 299 Pithouse D (BMIII)	20.8	417	10	20	89	11
29SJ 627 Pithouse C (PI)	43.0	10,602	30	247	62	38
29SJ 629 Pithouse 3 (EPII-EBP)	14.3	3,509	25	245	60	40
29SJ 1360 Pithouse A (PII-EBP)	23.0	5,412	20	235	37	63
29SJ 627 Kiva E (ePIII-CBP)	22.0	16,426	20	747	54	46
Pueblo Alto Trash Mound (ePIII-CBP)	73.0	17,339	60	513-893[b]	53	47
Pueblo Alto Kiva 10 (PIII-LBP)	14.0	8,256	30	590[b]	49	51
29SJ 633 Room 7 (PIII-MV)	16.4	2,501	20	153	70	30
29SJ 633 Room 8 (PIII-MV)	3.0	528	20	176	53	47

Estimated deposit rates at 29SJ 633:

	n	Deposition interval: 10 years 1215-1225	Deposition interval: 20 years 1210-1230
Grayware vessels	87	8.7	4.4
Whiteware vessels	231	23.1	11.6
Total	318	31.8	15.9

[a]Key: EBP, CBP, LBP = Early, Classic, and Late Bonito Phase; MV = Mesa Verde Phase; others are Pecos Classification abbreviations; C%, D% = culinary and decorated percentages.
[b]Source: Windes (1987:Table 8.14) estimates range from 893 sherds per cubic meter from F. H. H. Roberts' test pits to 513 sherds per cubic meter for trench excavated by Chaco Project.

plaza and room deposits suggests some instability in the ceramic supply, but it is equally open to charges of more intensive mixing in the open deposits.

Ceramic Importation at 29SJ 633

Ceramics imported to 29SJ 633 represent the Chaco Project's latest assemblage from which to interpret the meaning of commodity movement to the central basin. The importation question looms large for many in studies of Chaco Canyon as a de facto index of complexity because of its putative focus as the system center, a correlation of dubious worth but one that persists. Vessels, rather than materials, seem to have been the form of ceramic commodity movement given the archeological lack of evidence for nonlocal tempers and stored clays, evidence for manufacture in Chaco Canyon, and evidence from Arnold (1981, 1985) that the movements of the bulk materials in question are beyond the ethnographic limits for Chaco Canyon's potters. Progressive ecological deterioration, particularly for fuel, likewise makes local ceramic production in Chaco Canyon less plausible through time (Arnold 1981, 1985; Toll 1981:92-94); on ecological grounds alone, therefore, nonlocal ceramics were likely to increase.

Table 7.27 considers three configurations for importation at 29SJ 633 during the Mesa Verde Phase. Although the sample is largely from deposits above the first floor, some reorganization and simplification was necessary to produce the table. First, all samples below the first floor and all Red Mesa Black-on-white or types of earlier vintage (n = 46) were omitted to restrict the assemblage as well as possible to a post-A.D. 1175 period. Vessels were considered imports if they were tempered with any of the igneous materials listed or with chalcedonic sandstone or if surface attributes showed that they were typologically exotic. Mixed rock tempers were placed under the dominant rock type so that such pastes with sandstone-trachyte mixes were not automatically considered imported items but required typological distinction for admittance. If an item was typologically exotic and tempered with nonlocal rock, it was tabulated under the temper.

As discussed in other reports, entries in the table were calculated to show the following:

% Import Columns--the percentage of the total number of a given ware in a particular time group that are identifiable imports.

Total Import Rows--again the percentage of the total ware in a time group that fits this definition of imported.

Ware % of Import Row--the number (n) of imported wares is divided by the total of imports.

Ware % of Total--the total of each ware is divided by the total number (n) of the time period. This is useful for comparing the ware percentage of imports as a sort of expected value.

Table 7.27. Summary of imported pottery for 29SJ 633, Mesa Verde Phase

	Grayware		Whiteware		Redware		Smudged		Overall	
	n	% import	n	% import	n	% import	n	% import	N	% import
A. Minimum import:[a]										
Trachyte	25	37.5	29	15.8					54	20.5
San Juan igneous	3	4.5	26	14.2	4	28.6			33	12.5
Unidentified igneous	2	3.0	16	8.7					18	6.8
Chalcedonic sandstone	2	3.0	2	1.1					4	1.5
Typological			36[b]	19.7	10	71.4	1		37	17.8
Totals	32	48.5	109	59.6	14	100.0	1	100.0	156	59.1
Total No.	66		183		14		1		264	
Ware % imports		20.5		69.9		9.0		0.6		
Ware % of total		25.0		69.3		5.3		0.4		
B. Maximum import:										
Coarse grained sandstone as nonlocal										
Fine	0		20						20	7.6
Medium	9		57						72	25.0
Coarse	20		27						50	17.8
Very coarse	4		1						5	1.9
Totals	33		105						152	
Total C + Vc	24	72.7	28	26.7					40	
Maximum import[c]	56	85.0	125	68.3	14		1		181	68.6

C. Conservative Mesa Verde (MV) Phase comparisons:

	Grayware	Whiteware	Redware	Smudged	N	G&W%	Max%
A.D. 1200+							
29SJ 633 MV types[d]	28.6	45.9	4.7		85	47.1	60.5
P. Alto report/29SJ 633	46.2	51.4	7.4		151	50.0	60.0
A.D. 1120-1200							
Pueblo Alto	60.4	40.6	6.7	3.9	820	46.2	61.9
29SJ 627	39.9	58.7			286	49.3	77.6
29SJ 633	50.0	41.9			49	42.9	69.4

[a]% import columns for Mesa Verde Phase assemblage omits Lino varieties, plain gray, neck corrugated grayware, Red Mesa B/w and BMIII-PI C/w, and all sherds associated with lower floors.
[b]31 C/w, 5 M/w.
[c]Maximum import is sum of temper, typological exotics, and coarse-very coarse sandstone less those coarse-tempered items counted as typologically exotic; here, whiteware coarse ss exotic items = 12, grayware = 0 [e.g., Total C + Vc = whiteware 28 - 12 = 16 + 109 (Minimum import) = 125 (Maximum import)].
[d]Uses PIII Corrugated n = 7, Mesa Verde B/w n = 31, PII-III C/w n = 41, Chaco McElmo n = 2, St. Johns Polychrome n = 4; figures for 29SJ 633 from Pueblo Alto report on Table 1.49, Toll and McKenna 1987, and admit an additional 29 grayware, 29 whiteware, and 8 redware items to the calculation.

The upper two sections of Table 7.27 (A and B) treat the sample as if the majority of the sherds compose a contemporary assemblage--consequently, most of the culinary and Cibola Whiteware are included. These minimum importation figures address the assemblage as a late deposit, largely omitting types and sherd associations earlier than A.D. 1175. The maximum importation figures (Table 7.27B) include coarse-grained sandstone as a nonlocal component on the basis of Warren's (1976, 1977) contention that coarse-grained sandstone or sand was not to be found in Chaco Canyon. However, because the nearest geologic occurrence of coarse-grained sandstone, the Ojo Alamo Formation (Dane and Bachman 1965), lies within ethnographically established catchments for securing temper (Arnold 1980:149, 1985), and because coarse-grained material is available in bottomland Quaternary deposits (see Layer 6 in Love 1983a,b), importation of coarse-sand-grained vessels is not a given. The likelihood that much of the coarse-grained, sand-tempered pottery was nonlocal is increased because fine-grained sandstone is predominant in Chaco Canyon and coarse-tempered pastes are related to clays that fire to redder colors (an uncommon combination in Chaco Canyon). Furthermore, coarse-grained sandstone as temper has been shown to occur independently by pottery type through time, which suggests that such grain size source-related distinctions do contribute to assemblage diversity (Toll and McKenna 1987:200). The lower section (Table 7.27C) takes a more conservative approach by including only carbon-painted ceramics, PIII corrugated, and St. Johns Polychrome (n = 85) with reference to Mesa Verde Phase ceramics. The final lines in Table 7.27C include comparative figures from the earlier time period and a compromise assemblage from 29SJ 633 (n = 151) as presented in the Pueblo Alto report (Toll and McKenna 1987:193-203). The combination of these sections serves to hedge against assessments of imported ceramics by strictly either typological time or (mixed) deposit.

Altogether, these figures suggest that importing pottery to Chaco Canyon was still a thriving concern in the early A.D. 1200s with the amounts, at worst (Table 7.27C), only slightly less than during the Late Bonito Phase (ca. A.D. 1100-1150). Other comparisons show that importation figures at 29SJ 633 and other sites or at earlier deposits are very similar; and although variable by site, they increase through time and culiminate in the highest overall levels for the assemblage at the Eleventh Hour Site (see Toll and McKenna 1987:Table 1.49). Comparison with previous importation trends also shows that the relative frequency of decorated ceramics increased significantly, especially if it is assumed that carbon-painted sherds signify importation. It has been previously noted in reports on Chaco Canyon's ceramics that movement of imported culinary and decorated pottery seems to have been independent given the disparity in relative frequency. This situation seems to have continued in the Mesa Verde Phase, but traditional carbon-painted/nonlocal source correlates allowed, for the first time, the favoring of decorated imports during this period.

It is unlikely that all carbon-painted vessels were produced outside Chaco Canyon and the central San Juan Basin; Chaco-McElmo Black-on-white (Windes 1984) and Cibola carbon (Franklin and Ford 1982) are two homegrown examples that suggest that later pottery (e.g., Mesa Verde Black-on-white) was not entirely imported. Fully 51% (n = 21) of McElmo Black-on-white and 26% (n = 8) of Mesa Verde Black-on-white sherds are sandstone or sherd-sandstone tempered at 29SJ 633, and about half the sandstone in McElmo and all the Mesa Verde is medium- or finer-grained material which indicates that a central basin source (if not Chaco Canyon per se) is more likely (Toll et al. 1980). Deducting this finer sandstone component from the carbon paint typological contribution to "imports" reduces whiteware import levels to about 49%, whereas disallowing all sandstone tempers lowers imported whiteware to 44%. These figures are more in keeping with those from the Late Bonito Phase but still maintain the increased emphasis on decorated imports during the final occupation of Chaco Canyon.

Although Chuskan culinary ware is still the main obviously imported grayware in mixed assemblage counts, it occurs about 16% less frequently than during the Late Bonito Phase (54% versus 38%). It composes only 23% (3 of 13) of late indented corrugated wares and was noted only in the PII-III corrugated sample, so its decline late in Chaco Canyon's occupation, as noted by others, appears to have been real (Mills 1986; Vivian and Mathews 1965:81). The sandstone-grain-size assumption that nonlocal material is coarse considerably increases the number for projected amount of grayware imports, but that increase is also relatively lower than for preceding periods (85% here versus >90%). This fact reflects the associations of greater amounts of finer-grained material with central basin formations. Again, much of the coarse-grained material is likely to be nonlocal, and its relatively lower occurrence in grayware is another indicator of the greater evenness of ceramic source contributions in the 29SJ 633 assemblage.

Enter the Fat Lady

Having climbed beyond the limits of wisdom, we have proceeded at several points to venture further out than the sampling limb should reasonably support. At the least, we have shown that considerable amounts of pottery were still being moved into Chaco Canyon although it is not clear if this was the result of the nature of Chaco Canyon or the nature of pottery as a commodity per se (see Renfrew 1977 on the convergence of economic alternatives). The complementary nature of decorated and utility wares in series that make up the late assemblage suggests that ceramics were not acquired as random additions but were selected for specific functions. The level of imports, the continuity in sources with past assemblages, and the technological compensations undertaken with the decline in Chuskan Grayware all suggest a regional system adjusting to changing conditions but enduring. Our view regarding some fusion of Chacoan and San Juan traditions for this assemblage still holds. The assemblage is sufficiently similar to earlier and contemporary complexes to suggest that human occupation encompassed a variety of ceramically related activities that continued for an indeterminate time.

8

CHIPPED STONE FROM SITE 29SJ 633

Catherine M. Cameron

During the 1978 excavations at site 29SJ 633, 632 chipped stone artifacts were recovered. The chipped stone material was analyzed in 1979, and a report on these artifacts was prepared in 1980. What follows is a revised version of that report, prepared in 1990. It presents raw data, data organized for easy comparison to other sites in Chaco Canyon, and a discussion of patterns of chipped stone use at 29SJ 633. Access to computer files was not available for the updated version, and this limited both the analysis and the verification of some data tables.

Site 29SJ 633 was a small habitation site of approximately 15 rooms. Room 7 was completely excavated; Room 8 was partially excavated; test excavations were conducted in the plaza; and anomaly tests were made in other areas of the site. All deposits at the site were screened to maximize chipped stone recovery. These investigations revealed two temporal components: one dating to the mid A.D. 1100s and a later Mesa Verdean occupation (mid A.D. 1200s). The bulk of the chipped stone was recovered from a trash deposit in Room 7 and dated to the later period. Chipped stone from the earlier period was not well represented in either room. Extensive rodent disturbance caused mixing of deposits and destroyed most primary context material. Some chipped stone was recovered from these mixed deposits.

Site 29SJ 633 is one of the few sites excavated by the Chaco Center that was occupied during the mid twelfth and thirteenth centuries. The mid twelfth century saw the collapse of the Chacoan system, and a "Mesa Verde" reoccupation has been suggested for the following thirteenth century. Site 29SJ 633 provided information on chipped stone material use, especially access to nonlocal material sources, during the period when the Chacoan system collapsed. Unfortunately, very little chipped stone material from 29SJ 633 dates to the early period (A.D. 1120-1220). Because site 29SJ 633 was the only site excavated by the Chaco Center that dated to the thirteenth century, the data examined here provide a small glimpse of chipped stone material use during this largely unknown period of Chaco Canyon prehistory.

Methods

Analysis of chipped stone material from sites in Chaco Canyon emphasized regional resource exploitation through the identification of sources of raw material (see Cameron 1982 for analytic procedures). Functional variation in the use of chipped stone materials was also examined. The material type categories used were those developed by Warren (n.d.). In this report, Warren's types are combined into the 11 major groups (5 nonlocal and 6 local) used in other Chaco Canyon chipped stone analyses (Cameron 1982, 1984, 1987, 1989). More detailed morphological and technological analyses were made of all formal tools (Lekson 1979, 1985) and cores (Cameron 1982). In this report, Lekson's tool type designations are used, but specific core type designations are not used, and wear pattern analysis for 29SJ 633 chipped stone is not discussed (see Cameron 1982). The source of obsidian recovered from 29SJ 633 was identified using trace element analysis (Cameron and Sappington 1984).

Sources of local materials used in chipped stone manufacture at 29SJ 633 are within 10 km of the canyon and contain primarily silicified woods and pebble cherts (Table 8.1 and Figure 8.1). Silicified wood is found in the Kirtland formation, the Fruitland formation, and the Ojo Alamo sandstone. The Ojo Alamo and Quaternary gravel terraces produce pebble cherts and some reworked silicified wood. Most of the locally available material occurs to the north of the canyon.

The sources of nonlocal materials are more than 50 km from Chaco Canyon (Table 8.1). Four types of nonlocal materials have been identified in the chipped stone collections from 29SJ 633, but some of these may have come from more than one source (Figure 8.2). Usable outcrops of Morrison formation material have been reported only in the Four Corners area (Shelley 1980a:126-127), but the Morrison formation does outcrop at many other locations around the San Juan Basin. Occurrences of yellow-brown spotted chert have been reported only in the Zuni Mountains, but other outcrops may exist. The source of Washington Pass chert is known to be restricted to a small area in the Chuska Mountains. Obsidian recovered at 29SJ 633 was from two different sources, both located in New Mexico.

A 10X stereoscopic microscope was used to identify artifact types. Artifact type categories included formal tools, retouched flakes, utilized flakes, unutilized whole flakes, angular debris, cores, and unmodified raw material. Definitions of each of these types can be found in Cameron (1982). In much of the discussion that follows, unutilized whole flakes, angular debris, and unmodified raw material are combined as "debitage."

Data Tables

Two tables present the raw data used in the analysis of the 29SJ 633 chipped stone. Table 8.2 is a data list containing attributes recorded for each piece of chipped stone from site 29SJ 633. It is ordered by provenience, by material type, and tool type. Table 8.3 lists material type by artifact type for each piece of chipped stone.

Material Selection and Temporal Variation in Materials

Local materials were the most common at site 29SJ 633; only 12% of the total assemblage was nonlocal material (Table 8.4). The most common local material was chalcedonic silicified wood, composing 35% of the assemblage. This material was also very common at nearby site 29SJ 629 where it may have been associated with turquoise-working activities (Cameron 1989). No such association was noted at 29SJ 633. At site 29SJ 633, miscellaneous materials included in the "other" category represented almost one-fourth of the assemblage, and many of these materials

Table 8.1. Material type groups

Material Type	Warren's Type Numbers Included
Morrison Formation[a]	1020, 1022, 1040, 2201, 2205
Yellow-brown Spotted Chert[a]	1072
Washington Pass Chert[a]	1080, 1081
Zuni Silicified Wood[a]	1160, 1161
Obsidian[a]	3500-3640
High Surface Chert	1050-1054
Cherty Silicified Wood	1112, 1113
Splintery Silicified Wood	1109, 1110
Chalcedonic Silicified Wood	1140-1145
Quartzite	4000, 4005
Others	All other material types[b]
Totals	

[a]Exotic material types.
[b]Other material types: 1010, 1011, 1042, 1060, 1070, 1111, 1120, 1130, 1150, 1153, 1210, 1230, 1231, 1232, 1400, 2000, 2010, 2200, 2202, 4525, 5010.

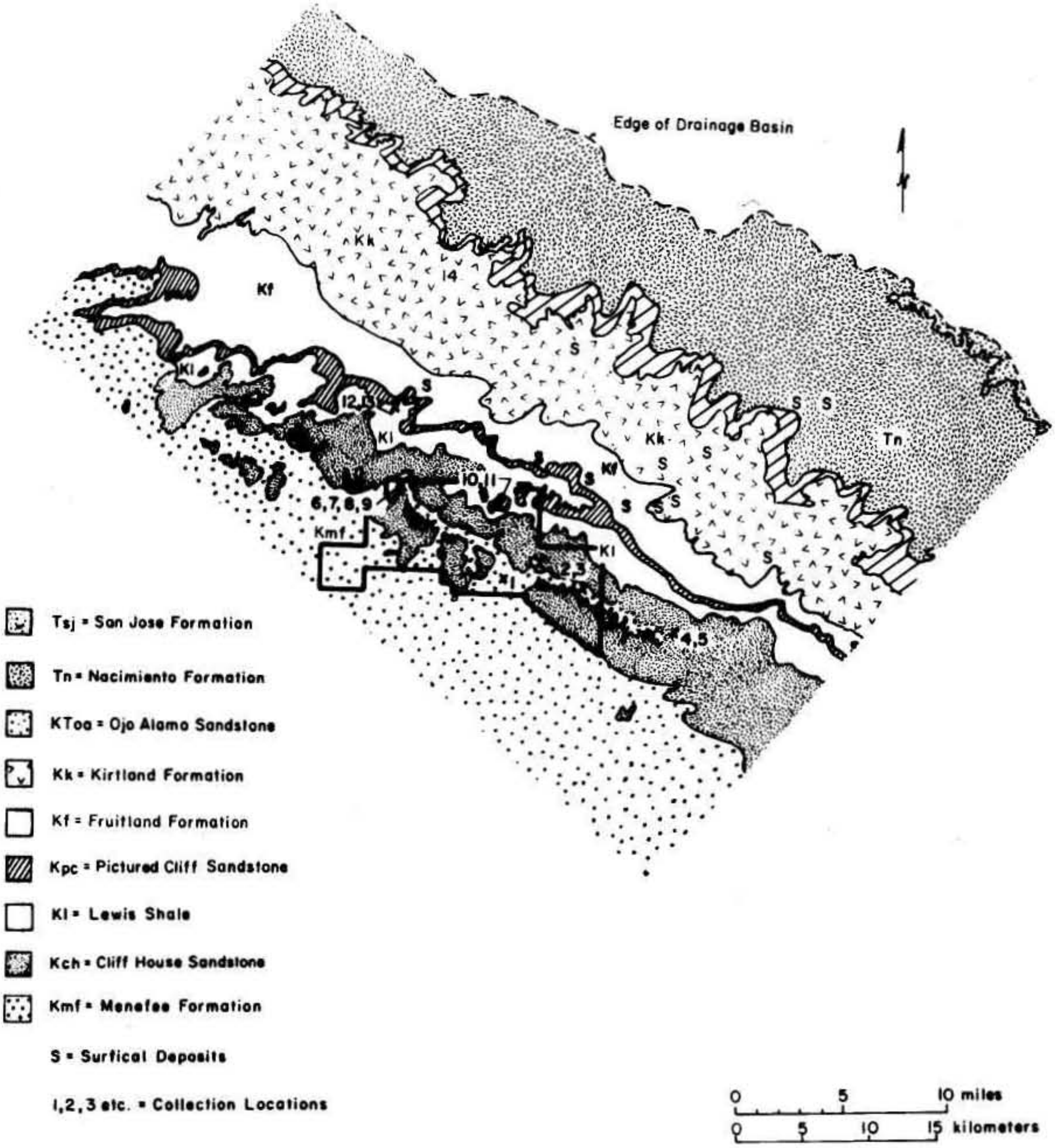


Figure 8.1. Local sources of chipped stone material

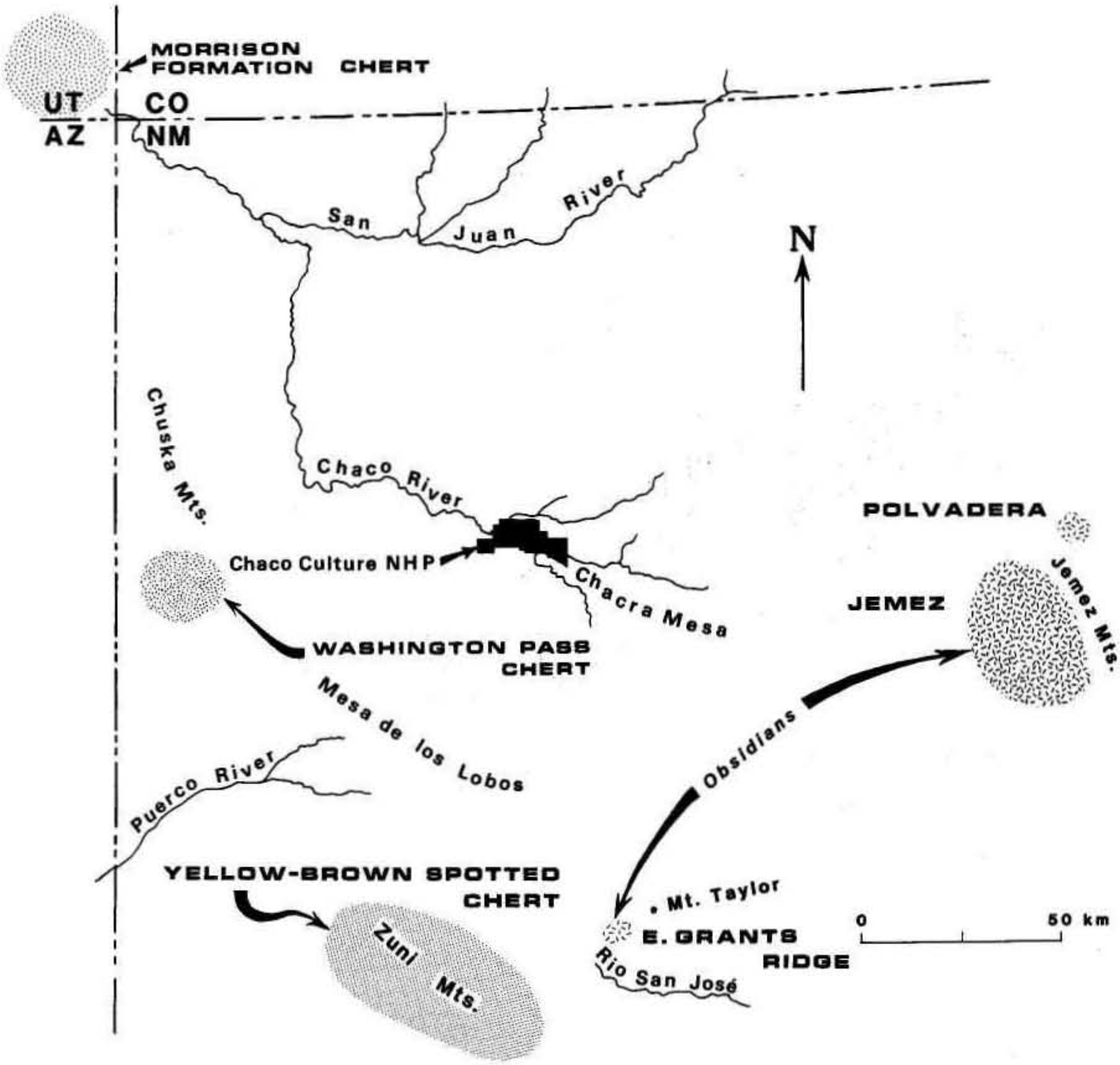


Figure 8.2. Sources of exotic chipped stone

Table 8.2. Attributes recorded for each piece of chipped stone

Attribute/ Type No.	Description
202	Stemmed projectile point with a narrow distal end for hafting without notches.
203	Corner-notched projectile point. Bifacially flaked piece with a point at the proximal end. Distal end consists of haft with notches emanating from the base.
204	Side-notched projectile point. Same as No. 203 except notches emanate from the side.
205	Triangular point. Bifacially flaked with triangular shape and no visible hafting element.
209	Small non-hafted blade. Bifacially flaked piece without visible hafting elements.
210	Large non-hafted blade. Large bifacially flaked piece without visible hafting elements.
211	Side scraper. Steep unifacial retouch along the long axis of the piece. Retouch may extend over one face.
213	Small non-hafted blade. Small bifacially flaked piece without visible hafting elements.
214	Asymmetrical bifacially flaked piece. Asymmetrical distal end consists of side notches for hafting. Point or drill.
221	Knife. Bifacially flaked piece with bifacial retouch or bifacial edge damage along one or more edges.
231	Formal drill. Manufactured projection exhibiting retouch on tip or sides of projection.
234	Informal or fortuitous perforator. Natural projection exhibiting retouch on tip or sides of projection.
241	Utilized flake. Any piece that exhibits evidence of edge damage due to use: step flakes, feathered flakes, nibbling, polish, rounding. Distinguished from fortuitous damage related to processing or bag wear by regularity and extent of damage.
242	Retouched flake. A piece that exhibits intentional retouch on one or more edges or faces but cannot fit easily into one of the tool categories. Distinguished from edge damage by large regularly-spaced feathered flakes emanating from the edge.
243	Whole flake. A piece exhibiting a platform, bulb of percussion, and full distal end.
249	Angular debris. A piece exhibiting no positive or negative bulb of percussion but with the remains of flake production evidence. These include parts of flake scars, ripple marks, etc.
251	Core. A piece exhibiting no bulb of percussion but from which two or more flakes 2 cm or more in length have been removed.
299	Other chipped stone. Any retouched piece not fitting the above two categories.
770	Raw material. Pieces of siliceous stone material that do not exhibit any signs of use or manufacture. This category is not included in the chapter discussion or tabulations.
Material	Material types follow the system established by Warren (1979).
Cortex	Recorded for pieces exhibiting any cortical material.
Frequency	The number of pieces of the same material and artifact subtype were recorded by provenience.
Weight	Each piece was weighed to the nearest tenth of a gram using a Sartorius 1103 read-out scale.

Table 8.3. Chipped stone artifact types by material type at 29SJ 633

Material	Artifact Types											
	Fluted Points	Corner-notched Points	Side-notched Points	Little Side-notched Points	Utilized Flake	Retouched Flake	Whole Flake	Angular Debris	Core	Raw Material	TOTAL	%
Cherts												
1010 fossiliferous					2		6	2			10	1.6
1011 San Juan fossiliferous					1		2	1			4	0.6
1040 Brushy Basin					2	1	1	1			5	0.8
1042 purple/gray argillaceous							1	1			2	0.3
1050 white, miscellaneous					1	2	1	3	1		8	1.3
1052 chalcedony, clear, misc.		1			9	1	11	13	1		36	5.7
1053 chalcedony, clear with black mossy inclusions					1		11	16	3		31	4.9
1054 chalcedony, includes 1051-1053, high surface gravel				1			10	6			17	2.7
1060 red (jasper)					3						3	0.5
1070 yellow/brown (jasper)		1			4		3	2			10	1.6
1072 yellow/brown; black mossy inclusions					4	1	7	5			17	2.7
1080 Washington Pass					12		9	16	3		40	6.3
1081 like Washington Pass		1					1	1			3	0.5
Petrified Wood												
1109 dull, splintery, noncon-coidal fracture					1			11		3	15	2.4
1110 dull, splintery, noncon-coidal fracture					1		1	7		1	10	1.6
1111 gray/brown; rod-like inclusions (Nacimiento fm.)					1	1	2	2			6	0.9
1112 dark colors, waxy luster, concoidal fracture					4		4	8			16	2.5
1113 light colors, waxy luster, cherty					16	4	4	13	1	1	39	6.2
1120 red shades					3		4	16			23	3.6
1130 palm wood					3		2	4	1		10	1.6
1140 light colors, white, chalcedonic					9	2	15	29	3		58	9.2
1142 light colors, chalcedonic	1				14	1	26	34	4		80	12.6
1145 chalcedonic					13	1	25	38	5		82	13.0
1150 yellow/brown (jasper)					8		9	20	2		39	6.2
1153 yellow/brown (jasper)									1		1	0.2
Chalcedonies												
1210 mossy inclusions							1				1	0.2
1230 clear; sparse red inclusions					1			1			2	0.3
1231 clear; abundant red inclusions								1			1	0.2
1232 clear; scattered yellow and red inclusions								1			1	0.2
1400 chert (undifferentiated)							1				1	0.2
Sedimentaries												
2000 sandstone (undifferentiated)					8		1				9	1.4
2010 sandstone, fine-grained, indurated, massive							1				1	0.2
2200 quartzitic sandstone							3				3	0.5
2202 quartzitic sandstone (Nacimiento fm.)							9	6			15	2.4
Obsidians												
3520 Jemez Mountains; brownish, translucent			1		2	1	2	2			8	1.2
3550 Red Hill, NM, area; smokey, waxy, gray streaks						1	1				2	0.3
Quartzites (Miscellaneous)												
4000 with cobble cortex					2		5	2			9	1.4
4005 cobbles, varicolored					3		3	4			10	1.6
4525 greenstone, massive					1						1	0.2
5010 rock, colorless								3			3	0.5
Total	1	3	1	1	129	16	182	269	25	5	632	100
%	T	1	T	T	20	3	29	43	4	1		100

Table 8.4. Grouped material type by artifact type at 29SJ 633

Material Type	Formal Tools	Utilized Flakes (241)	Retouched Flakes (242)	Debitage (243/249)	Cores (251)	Total	%
Morrison Formation		2	1	2		5	1.0
Yellow-brown Spotted Chert		4	1	12		17	2.7
Washington Pass Chert		12		27	3	42	6.6
Obsidian	1	2	2	5		10	1.6
High Surface Chert	3	11	3	71	5	93	14.9
Cherty Silicified Wood		20	4	30	1	55	8.7
Splintery Silicified Wood		2		23		25	4.0
Chalcedonic Silicified Wood	1	36	4	167	12	220	34.8
Quartzite		5		14		19	3.0
Other	1	35	1	105	4	146	23.1
Total	6	129	16	456	25	632	
%	1.0	20.4	2.5	72.2	4.0		

Nonlocal tools = 25
Nonlocal debitage = 49
Debitage/tools = 1.96

Local tools = 126
Nonlocal debitage = 432
Debitage/tools = 3.4

were also varieties of silicified wood (Table 8.3). The most common nonlocal material was Washington Pass chert (6.6%).

Two-thirds of the chipped stone material at 29SJ 633 was from proveniences dating from A.D. 1220 to A.D. 1320. The earlier period, A.D. 1120-1220, was represented by only 70 pieces of chipped stone. Although sample sizes for these two periods are unequal, materials selected for chipped stone use were remarkably similar between periods (Table 8.5). A third group of chipped stone of mixed time period (A.D. 1120-1320) was also very similar in relative frequency of material types.

Site 29SJ 633 was virtually the latest of any of the small sites excavated by the Chaco Center (McKenna 1986:14), so temporal comparisons with other small sites are not possible. However, the earliest time period at site 29SJ 633 does overlap with the latest time periods at two of the excavated town sites: Pueblo Alto and Kin Kletso. The "Late Mix" phase at Pueblo Alto dates to A.D. 1100-1150 (Windes 1987), whereas Kin Kletso was constructed and occupied during the early to mid 1100s (Vivian and Mathews 1965).

During the Late Mix phase at Pueblo Alto, nonlocal materials composed almost 30% of the chipped stone (Cameron 1987:268). Washington Pass chert and obsidian were the most common types. At Kin Kletso, one-third of all chipped stone tools and another third of all "scrap" (debitage) were obsidian (Vivian and Mathews 1965:91). Access to nonlocal material sources, especially obsidian, was apparently extensive for town sites during the first part of the twelfth century. Local material at Pueblo Alto consisted of almost equal quantities of the three major types of silicified wood (totaling 40% of the assemblage) whereas comparable local material type categories were difficult to determine at Kin Kletso.

Table 8.5 shows that material selection during the early period at 29SJ 633 was very different from that at twelfth century town sites. At 29SJ 633, nonlocal materials were only 11% of the early assemblage, and more than 30% of the assemblage was chalcedonic silicified wood. Obsidian was absent. Splintery silicified wood composed less than 2% of the assemblage, whereas it was more than 13% of the Pueblo Alto assemblage. Splintery silicified wood has been associated at Pueblo Alto with the use of hammerstones in manufacture of architectural stone and maintenance of ground stone (Cameron 1987:269). Masonry at 29SJ 633 is soft and irregular and suggests scavenging and expedient use of available material (McKenna 1986:95) possibly from nearby sites. The lack of stone shaping at 29SJ 633 may explain the low frequency of flakes or artifacts of splintery silicified wood at this site.

Although access to nonlocal materials during the twelfth century at 29SJ 633 appears to have been different from that at the two town sites, this is not the case when 29SJ 633 is compared with other village sites of earlier periods. At nearby site 29SJ 629, occupied during the tenth and eleventh centuries, nonlocal material was never more than 2% of the assemblage. At another nearby site, 29SJ 627, also occupied primarily in the tenth and eleventh centuries, nonlocal material was only 8% of the assem-

Table 8.5. Grouped material by time period at 29SJ 633

Material Type	1120-1220 (A.D.)	1220-1320 (A.D.)	1120-1320 (mixed) (A.D.)	Total	%
Morrison Formation		4	1	5	0.8
(percentage)		0.9	0.7		
Yellow-brown spotted chert	3	10	4	17	2.7
(percentage)	4.3	2.3	3.0		
Washington Pass chert	5	31	7	42	6.6
(percentage)	7.1	7.2	5.2		
Obsidian		8	2	10	1.6
(percentage)		1.9	1.5		
High surface chert	11	61	20	92	14.6
(percentage)	15.7	14.3	14.9		
Cherty silicified wood	5	36	14	55	8.7
(percentage)	7.1	8.4	10.4		
Splintery silicified wood	3	12	10	25	4.0
(percentage)	4.3	2.8	7.5		
Chalcedonic silicified wood	23	149	48	220	34.8
(percentage)	32.9	34.8	35.8		
Quartzite	3	13	3	19	3.0
(percentage)	4.3	3.0	2.2		
Other	17	104	25	146	23.1
Total	70	428	134	632	100.0

blage in the early eleventh century. The small sample of chipped stone material at site 29SJ 633 suggests that during both the twelfth and thirteenth centuries the inhabitants of the site had less access to nonlocal material than did nearby town sites that were part of the eleventh- and twelfth-century Chacoan system. However, access to nonlocal material at 29SJ 633 may have been similar to that at other village sites. Alternatively, it is possible that much of the nonlocal material recovered at 29SJ 633 during both time periods was collected by 29SJ 633 residents from trash deposits at nearby sites dating to earlier time periods.

Sources of Obsidian

Only 10 pieces of obsidian were recovered from 29SJ 633 and they composed less than 2% of the chipped stone assemblage. Trace element analysis indicated that the obsidian had been obtained from the Jemez Ridge source in northern New Mexico (eight pieces) and from the Red Hill source (two pieces) in west-central New Mexico [Table 8.3 (Cameron and Sappington 1984)]. Jemez obsidian is the most common type of obsidian found at sites in Chaco Canyon after A.D. 920, whereas Red Hill obsidian is the most common before A.D. 700 (Cameron 1987:267; Cameron and Sappington 1984). Only one piece of obsidian recovered at 29SJ 633 was in the form of a finished tool: a side-notched projectile point.

Interestingly, obsidian was found only in proveniences dating to the later period at 29SJ 633 (A.D. 1220-1320) and in mixed proveniences (A.D. 1120-1320). No obsidian was recovered from proveniences dating to A.D. 1120-1220 (Table 8.5). This period overlaps slightly the occupation of Kin Kletso and the Late Mix phase at Pueblo Alto, both of which produced relatively high frequencies of obsidian. Much of the obsidian at Pueblo Alto (Late Mix phase) was from Jemez (85%) (Cameron 1987:267) whereas the source of the Kin Kletso obsidian is largely undetermined [of five pieces sampled, three were from Jemez and two were from the Mineral Mountains, Utah (Cameron and Sappington 1984:157)].

Artifact Types

As noted above, five basic artifact categories were recognized in the 29SJ 633 chipped stone assemblage: formal tools; utilized flakes; retouched flakes; debitage (including whole flakes, angular debris, and unmodified raw materials); and cores (Table 8.4). As at other sites in Chaco Canyon, tool production at 29SJ 633 was primarily expedient. Formal tools were rare (only 1% of the assemblage) and informal tools (utilized and retouched flakes) were far more common (26%). Cores composed 4% of the assemblage, a slightly higher relative frequency than at other Chaco Canyon sites.

Local and nonlocal materials differed in the frequency with which they were used for formal and informal tools at 29SJ 633 (Table 8.4). A ratio of debitage to tools (including formal and informal tools) was lower for nonlocal materials (1:1.96) indicating fewer pieces of debitage per tool, and higher for local materials (3.4:1). The lower proportion of debitage for nonlocal materials may indicate both that formal tools of nonlocal materials were manufactured away from the site and that flakes of nonlocal material were preferentially selected for use as informal tools.

Cores were predominantly local material, especially chalcedonic silicified wood, the most common material at the site. Three of the cores were Washington Pass chert, the only cores of nonlocal material recovered. This nonlocal material was apparently reduced at the site. As few formal tools were found at 29SJ 633, core reduction seems to have aimed at the production of flakes for use as informal tools. However, the small chipped stone sample and the types of proveniences excavated may not adequately represent the use of formal chipped stone tools at the site. The lack of cores for some material types could indicate that chipped stone reduction processes occurred away from the site, but it is more likely that the informal nature of the chipped stone technology seldom resulted in recognizable cores.

Formal Tools

Formal tools included all items identified as facially flaked points, knives, or drills; all pieces retouched over more than one-third of the face; and all drill facets (Cameron 1982; Lekson 1979, 1985). A total of six formal tools was identified at 29SJ 633 (Table 8.3). All were projectile points. Three were corner-notched points, one a fluted point, one a side-notched point, and one a small side-notched point.

The side-notched point was of Jemez obsidian whereas the remainder of the points were all local material, primarily high surface chert. Only the fluted point was of chalcedonic silicified wood, the most common local material at the site. High surface chert was frequently selected for formal tool manufacture at other sites in Chaco Canyon (Cameron 1982).

Projectile points recovered from sites in Chaco Canyon show a temporal trend from the use of stemmed projectile points in the early periods to corner-notched points to side-notched points in the later periods (Cameron 1982; Lekson 1985), a trend typical of the Anasazi area (Cameron 1982; Hayes and Lancaster 1975:144-145; Morris 1939:127; Woodbury 1954). Although 29SJ 633 is much later in time than most of the small sites excavated in Chaco Canyon, corner-notched projectile points are the most common style. One corner-notched point was recovered from the early period (A.D. 1120-1220) whereas the remainder of the projectile points were recovered from the later period. No projectile points were found in mixed deposits. Again, some of these projectile points may have been collected by inhabitants from nearby, abandoned sites.

Summary

Excavations at 29SJ 633 produced a small sample of chipped stone material that is interesting primarily because it is the only collection representing occupation during the end of the operation of the Chacoan system and during the subsequent "Mesa Verdean" period. Local material sources, especially for chalcedonic silicified wood, were most commonly selected for chipped stone use at 29SJ 633. There does not appear to have been extensive access to nonlocal chipped stone materials for residents of 29SJ 633 during either occupation, unlike the situation in town sites during the operation of the Chacoan system. Although Jemez obsidian was common at the early twelfth-century town sites of Kin Kletso and Pueblo Alto, no obsidian was attributed to the twelfth-century occupation at 29SJ 633. Some of the nonlocal material present at 29SJ 633 may have been collected from nearby, abandoned sites.

Chipped stone technology at 29SJ 633 was primarily expedient, as at other Chaco Canyon sites. Cores were primarily of local materials, although three cores of Washington Pass chert indicate reduction of this nonlocal material at the site. Formal tools recovered from 29SJ 633 consisted of six projectile points including three corner-notched points. Corner-notched points are more common in earlier periods in Chaco Canyon, and it is possible that some points were collected by inhabitants of 29SJ 633 from earlier sites. One of the six projectile points was made of Jemez obsidian; the others were of local materials.

9

ORNAMENTS AND MINERALS FROM 29SJ 633

Frances Joan Mathien

Ornaments and minerals from site 29SJ 633 were analyzed using a standard format in order to answer a set of questions applied to this artifact type for all sites excavated during the Chaco Project (Mathien 1985). The materials recovered from one and one-half rooms, the plaza test, and several anomaly tests are dated to the latter part of the Anasazi occupation of Chaco Canyon: late A.D. 1000s-early 1100s (construction) and late A.D. 1100s-early 1200s (remodeling) at this estimated 12-15-room site. Because this site was excavated in a manner similar to that of 29SJ 627 and 29SJ 629 in Marcia's Rincon and to Pueblo Alto (29SJ 389), there should be no major differences that would affect the recovery of cultural material from this site. The small number of artifacts from the late A.D. 1000s-early 1100s probably reflects the removal of such material at the time of first abandonment of the rooms; or it may be due to differences in behavior between the earlier and later inhabitants of the site. Table 9.1 lists all of the ornaments and minerals recovered by provenience.

Material Types

A total of 17 different material types was recorded during this analysis; shell was subdivided into five categories. These are listed in Table 9.2 by time period and artifact class. All shells were identified as to species by Helen DuShane of the Division of Malacology, Los Angeles County Museum of Natural History, with reference to Keen (1971). Minerals were compared to those in type collections supplied by David Love (now with the New Mexico Bureau of Mines and Mineral Resources) and A. Helene Warren, both geologists formerly associated with the Chaco Project, who also assisted the author in the identification of puzzling specimens. Source locations for minerals were provided by Love (personal communication, 1979), Warren (personal communication, 1979), and by reference to Northrop (1959). These are as follows.

Argillite: Found in gravels at Chaco Canyon.

Azurite: Found in mountains around the San Juan Basin (Zuni, San Juan, and Nacimiento mountain ranges).

Claystone: Locally available in Chaco Canyon.

Copper: Although this mineral is found in New Mexico, no deposits are found in the San Juan Basin.

Gypsite: Found in Chaco Canyon.

Gypsum: Found locally in Chaco Canyon.

Table 9.1. Ornaments and minerals by provenience, 29SJ 633

Provenience	FS No.	No.	Material	No.	Type	Dating (A.D.)
Test 1, E. Rm. Bl. Lev. 5	1023	1	Glycymeris	1	Bead	Mixed
Test 1, E. Rm. Bl. Lev. 5	1024	1	Unid. shell	1	Unid.	Mixed
Test 1, Lev. 2	1043	1	Malachite	1	Unm.	Mixed
Test 3, Rm. 3, Lev. 2	1045	1	Glycymeris	1	Br.fr.	1100-1200s
Test 3, Rm. 3, Lev. 3	1047	1	Shark's tooth			1100-1200s
Test 3, Rm. 3, Lev. 3	1048	1	Lymnae sp.	1	Unm.	1100-1200s
Test 7, Fill	1065	1	Shale	1	Pend.	1100-1200s
Rm. 7, Lay. 1, Lev. 1	103	1	Lignite	1	Pend.Eff.	1100-1200s
Rm. 7, Lay. 2, Lev. 3	115	2	Selenite	2	Unm.	1100-1200s
Rm. 7, Lay. 2, Lev. 3	73a	4	Selenite	4	-	1100-1200s
Rm. 7, Lay. 2, Lev. 3	149	1	Argillite	1	Pend.	1100-1200s
Rm. 7, Lay. 2, Lev. 4	78	4	Selenite	4	Unm.	1100-1200s
Rm. 7, Lay. 2, Lev. 4	84	7	Gypsite	7	Unm.	1100-1200s
Rm. 7, Lay. 2, Lev. 4	85a	8	Gypsite	8	-	1100-1200s
Rm. 7, Lay. 3, Lev. 5	90	4	Selenite	4	Unm.	1100-1200s
Rm. 7, Lay. 3, Lev. 5	92	1	Selenite	1	Unm.	1100-1200s
Rm. 7, Lay. 3	245	1	Selenite	1	Unm.	1100-1200s
Rm. 7, Lay. 3	254	1	Turquoise	1	Mod.	1100-1200s
Rm. 7, Lay. 3, Lev. 5	609	1	Claystone	1	Bead	1100-1200s
Rm. 7, Lay. 3, Lev. 5	774	2	Selenite	2	Unm.	1100-1200s
Rm. 7, Lay. 3, Lev. 5	775	1	Hematite	1	Unm.	1100-1200s
Rm. 7, Lay. 3, Lev. 5	781	1	Turquoise	1	Pend.bl.	1100-1200s
Rm. 7, Lay. 4, burn conc.	185	1	Turquoise	1	Mod.	1100-1200s
Rm. 7, Lay. 4, burn conc.	186	1	Selenite	1	Pend.	1100-1200s
Rm. 7, Lay. 5, burned sand	802	1	Selenite	1	Unm.	1100-1200s
Rm. 7, Lay. 6, Lev. 7	221	1	Selenite	1	Unm.	1100-1200s
Rm. 7, Lay. 6, Lev. 7	647	1	Lignite	1	Disk fr.	1100-1200s
Rm. 7, Lay. 6, Lev. 7	654	1	Gypsite	1	Unm.	1100-1200s
Rm. 7, Lay. 6, Lev. 8	661	1	Argillite	1	Bead	1100-1200s
Rm. 7, Lay. 6, Lev. 8	232	1	Barite/quartz crystal	1	Mod.	1100-1200s
Rm. 7, Lay. 6, Lev. 8	236	1	Sandstone	1	Disk	1100-1200s
Rm. 7, Lay. 6, Lev. 8	629	1	Selenite	1	Unm.	1100-1200s
Rm. 7, Lay. 6, Lev. 8	842	1	Limonite	1	Mod.	1100-1200s
Rm. 7, Lay. 6, Lev. 8	830	1	Turquoise	1	Deb.	1100-1200s
Rm. 7, Rock concent.	749	1	Copper	1	Bell	1100-1200s
Rm. 7, Rock concent.	754	1	Turquoise	1	Inlay	1100-1200s
Rm. 7, Fl. 1, burn 1	921	15	Lignite	15	Unm.	1100-1200s
Rm. 7, Fl. 1, Burial 3	284	1	Gypsum	1	Mod.	1100-1200s

[a] Listed on catalog sheets but not found during analysis.

Table 9.1 (continued)

Provenience	FS No.	No.	Material	No.	Type	Dating (A.D.)
Rm. 7, Fl. 1, E. portion	1188a	1	Selenite	1	-	1100-1200s
Rm. 7, Fl. 1, contact	636	1	Selenite	1	Pend.	1100-1200s
Rm. 7, Fl. 1, rodent hole	909	16	Lignite	16	Unm.	1100-1200s
Rm. 7, Bin 1, Lay. 1	675	1	Unid. shell	1	Unm.	1100-1200s
Rm. 7, Bin 1, Lay. 3	682	1	Turquoise	1	Deb.	1100-1200s
Rm. 7, Bin 1, fill to Fl. 1	705	1	Turquoise	1	Deb.	1100-1200s
Rm. 7, cleanup, mixed	1149	1	Malachite	1	Unm.	1100-1200s
Rm. 7, fill Fl. 2, Lay. 7	813	1	Olivella dama	1	Bead	1000-1100s
Rm. 7, fill Fl. 2, Lay. 7	825	1	Turquoise	1	Bead	1000-1100s
Rm. 7, fill Fl. 2	965	2	Argillite	2	Unm.	1000-1100s
Rm. 7, Bin 1, Fl. 2, Lay. 7	998	1	Olivella dama	1	Bead	1000-1100s
Rm. 7, Fl. 2, Firepit 1	980a	1	Pigment	1	-	1000-1100s
Rm. 7, Lay. 8, bel. Fl. 2	887	1	Azurite	1	Unm.	1000-1100s
Rm. 7, Lay. 8, bel. Fl. 2	893	1	Turquoise	1	Deb.	1000-1100s
Rm. 7, Lay. 9, bel. Fl. 2	1170	1	Turquoise	1	Pend.	1000-1100s
Rm. 8, Lev. 2	352	1	Hematite	1	Paintst.	1100-1200s
Rm. 8, Lev. 3	361	2	Selenite	2	Unm.	1100-1200s
Rm. 8, Lay. 1, Lev. 4	370	1	Turquoise	1	Mod.	1100-1200s
Rm. 8, Lay. 1, Lev. 4	574	1	Glycymeris	1	Br.fr.	1100-1200s
Rm. 8, Lev. 5, fl. fill	386	6	Gypsite	6	Unm.	1100-1200s
Rm. 8, Lev. 5, fl. fill	411a	1	Malachite	1	-	1100-1200s
Rm. 8, Lay. 3, Fl. 1, Burial 2	477	1	Turquoise	1	Mod.	1100-1200s
Rm. 8, Pit 2	419	1	Argillite	1	Mod.	1100-1200s
Rm. 8, Fl. 1, OP3, Bur. 1	428	3	Gypsite	3	Unm.	1100-1200s
Rm. 8, Lev. 6	540	8	Selenite	8	Unm.	1000-1100s
		2	Gypsum	2	Unm.	1000-1100s
Rm. 8, Fl. 2, contact	524	1	Turquoise	1	Unm.	1000-1100s
Rm. 8, Fl. 2	535	1	Haliotus	1	Mod.	1000-1100s
Rm. 8, Lev. 6, bel. Fl. 2	543	1	Haliotus	1	Mod.	1000-1100s
Rm. 8, Lev. 7	550	2	Hematite	2	Unm.	1000-1100s
Rm. 8, Lev. 7	551	1	Azurite	1	Unm.	1000-1100s
Rm. 8, Lev. 7	552	6	Limonite	6	Unm.	1000-1100s
Rm. 8, Lev. 7	553	5	Selenite	5	Unm.	1000-1100s
		4	Gypsite	4	Unm.	1000-1100s
Rm. 8, Lev. 7	554	1	Limonite	1	Mod.	1000-1100s

[a] Listed on catalog sheets but not found during analysis.

Table 9.1 (concluded)

Provenience	FS No.	No.	Material	No.	Type	Dating (A.D.)
Rm. 8, Lev. 8	512	1	Limonite	1	Unm.	1000-1100s
Rm. 8, Lev. 8	561	1	Hematite	1	Unm.	1000-1100s
Rm. 8, Lev. 8	562	11	Hematite	10	Unm.	1000-1100s
				1	Mod.	1000-1100s
		2	Limonite	2	Unm.	1000-1100s
Rm. 8, Lev. 8	563	1	Selenite	1	Unm.	1000-1100s
		6	Gypsite	6	Unm.	1000-1100s
Plaza 1, Test Trench 1	332	1	Turquoise	1	Unm.	mixed
Trash Mound, Surface	1196	1	Unid. shell	1	Pend.	mixed
Trash Mound, Grid 5, Surf.	5a	1	Turquoise	1	Piece	mixed
Site Surface	1184	1	Turquoise	1	Inlay	mixed
Total		182				

[a] Listed on catalog sheets but not found during analysis.

Table 9.2. Ornaments and minerals by material types, 29SJ 633

Material Type	Total No.	1000s-1100s (A.D.)	1100s-1200s (A.D.)	Mixed
Argillite	5	2 Unmodified	1 Bead 1 Modified 1 Pendant	
Azurite	2	2 Unmodified		
Claystone, green	1		1 Bead	
Copper	1		1 Bell	
Crystal	1		1 Mod.	
Gypsite	35	10 Unmodified	17 Unmodified 8[a]	
Gypsum	3	2 Unmodified	1 Modified	
Hematite	16	13 Unmodified 1 Modified	1 Paintstone 1 Unmodified	
Lignite	33		31 Unmodified 1 Pendant/Effigy 1 Pendant blank (?)	
Limonite	11	9 Unmodified 1 Modified	1 Modified	
Malachite	3		1 Unmodified 1[a]	1 Unmodified
Pigment	1	1[a]		
Sandstone	1		1 Unmodified	
Selenite	40	14 Unmodified	19 Unmodified 2 Pendant 5[a]	
Shale	1		1 Pendant	
Shark's tooth	1		1	

[a] Listed on catalog sheets but not found during analysis.

Table 9.2 (concluded)

Material Type	Total No.	1000s-1100s (A.D.)	1100s-1200s (A.D.)	Mixed
Shell				
<u>Glycymeris</u>	3		2 Bracelet fragments	1 Bead
<u>Haliotus</u>	2	2 Modified		
<u>Lymnaea</u> sp.	1		1 Unmodified	
<u>Olivella</u>	2	2 Beads		
Unidentified	3		1 Unidentified	1 Pendant 1 Unident.
Turquoise	16	1 Bead 1 Debris 1 Pendant 1 Unidentified	4 Modified 1 Pendant blank 3 Debris 1 Inlay	1 Unmodified 1 Unident. 1 Inlay
Totals	182	63	113	16

Hematite: Available in Cliff House formation in Chaco Canyon.

Lignite: Found in strata in cliffs of Chaco Canyon.

Limonite: In Cliff House formation in Chaco Canyon.

Malachite: Found in small quantities in the Haystack area, Grants District of McKinley County.

Pigment: Specimen missing.

Quartz crystal: Found around Gallup, McKinley County. This specimen was later identified as barite by Warren. Barite is found in both McKinley and San Juan counties.

Sandstone: Abundant in local formations in Chaco Canyon.

Selenite: Abundant in Chaco Canyon where especially good crystals have been found.

Shale: Locally available in the Menefee formation. Mancos shales are found around the peripheries of the San Juan Basin.

Sharks' teeth: Fossilized local material.

Shells (taken from Keen, 1971):

Glycymeris gigantea (Reeve, 1843)--Pelecypoda (bivalves or clams) found from Bahia Magdalena, Baja California Sur to Acapulco and in the Gulf of California north to approximately Mulege, Baja California Sur. On the west coast of Mexico, only beach valves are found north of Mazatlan, Sinaloa.

Haliotus cracherodii Leach, 1817--Gastropoda (snails) found from Coos Bay, Oregon, to Cabo San Lucas, Baja California Sur, Mexico. Common on rocks at low tide. Does not occur in the Gulf of California.

Lymnaea sp.--Freshwater gastropod that survives in slow-moving water.

Olivella dama (Wood, 1828, ex Mawe MS)--Gastropoda found from the head of the Gulf of California, Mexico, to Panama.

Unidentified.

Turquoise: Although this mineral is found in six counties in New Mexico, no deposits have been located within the San Juan Basin. The nearest source to Chaco Canyon is over 100 airline miles away.

The most common material at this site was gypsite with 35 pieces or 19.2%. Only copper, shell, and turquoise would have been imported from outside the San Juan Basin; these three materials totaled 27 artifacts or 14.8% of those analyzed in this study. Only seven others (crystal, azurite, and malachite) or 3.8% were not locally available within the canyon; all of these are found nearby within the San Juan Basin.

When long-distance imports are broken down by time period, 15.9% (10 of 63) were imported during the late A.D. 1000s-early 1100s. For the late 1100s-early 1200s, this figure was 11.5% (13 of 113). Fifteen artifacts could not be classified into these time periods.

Ornament Classes

Twenty-six (14.3%) of the 182 artifacts included in this study were placed into nine ornamental classes; Table 9.3 lists these by time period and material type. These are as follows.

Beads: A total of six beads made from five different material types was found. Table 9.4 presents numerical and verbal descriptions of individual artifacts. Because the sample is limited, it is difficult to make comparisons between time periods or among material types.

Bell: One copper bell fragment (FS 749) was recovered from above the rock concentration in the floor fill of Room 7 (Figure 9.1). Although the piece is badly deformed and presently more of a concave rectangular plate than a sphere, it is possible to see what may have been part of the slit. The fragment is 1.73 by 1.25 by 0.90 cm in length, width, and thickness and was found in the late 1100s-early 1200s fill.

Bracelet fragments: Two fragments of Glycymeris gigantes shell bracelets were recovered; both are dated to the late A.D. 1100s-early 1200s. The first piece (FS 1045) was found during excavation of Test 3, Room 3, Level 2, and represents less than one-quarter of a complete bracelet. It is 3.46 cm long and ranges in diameter from 0.34 to 0.39 cm. It had been ground around the peripheries, and one edge has a beveled appearance.

The second piece (FS 574) was from Layer 1, Level 4, Room 8. It, too, represents approximately one-quarter of a bracelet and measures 2.86 cm in length with a diameter ranging from 0.31 to 0.49 cm.

Disks: FS 647 from Room 7, Layer 6, Level 7, dates to the late A.D. 1100s-early 1200s occupation and is a possible disk fragment made from lignite. Because it is broken and the remaining contours appear to be part of a circular plate, this shape is inferred. This piece is 2.43 cm on the long axis, 0.87 cm on the short axis, and 0.34 cm thick. It had been worked on all exterior surfaces and has three incomplete perforations, which may have held inlay at one time (Figure 9.2). Numerous striations are visible.

FS 236 is a disk-shaped piece of sandstone. Probably a natural occurrence, it is described below under "other."

Table 9.3. Ornament classes, 29SJ 633

Ornament Class	Total No.	Late 1000s-early 1100s (A.D.)	Late 1100s-early 1200s (A.D.)	Mixed
Beads	6	2 _Olivella_ 1 Turquoise	1 Argillite 1 Claystone	1 _Glycymeris_
Bell	1		1 Copper	
Bracelet fragments	2		2 _Glycymeris_	
Disk fragment	1		1 Lignite	
Inlay	2		1 Turquoise	1 Turquoise
Paintstone	1		1 Hematite	
Pendants	7	1 Turquoise	1 Argillite 1 Lignite 1 Shale 2 Selenite	1 Unid. shell
Pendant blank	1		1 Turquoise	
Other	5		1 Sandstone 1 Crystal/barite 1 _Lymnaea_ sp. 1 Unid. shell	1 Unid. shell
Totals	26	4	18	4

Table 9.4. Beads from 29SJ 633

Period (A.D.)	FS No.	Provenience	Material	Dimensions (cm) Length	Width	Thick.	Perf.	Comments
Late 1000s-1100s	813	Rm. 7, Fl. 2 fill	*Olivella dama*	0.84	0.79	0.09	0.20	Ground 1 end.
	825	Rm. 7, Fl. 2 fill	Turquoise	0.23	0.23	0.06	0.05	Ground all sides, edges. Biconical perforation.
	998	Rm. 7, Bin 1	*Olivella dama*	0.87	0.80	0.08	0.29	Ground 2 ends.
Late 1100s-1200s	609	Rm. 7, trash	Claystone, green	0.73	0.73	0.28	0.21	Ground all sides, edges. Biconical perforation.
	661	Rm. 7, Lay, 6, Lev. 8	Argillite	0.29	0.29	0.15	0.12	Ground all sides, edges. Biconical perforation.
Mixed	1023	Test 1	*Glycymeris*	0.32	0.32	0.08	0.09	Ground all sides, edges. Drilled 1 side, complete.

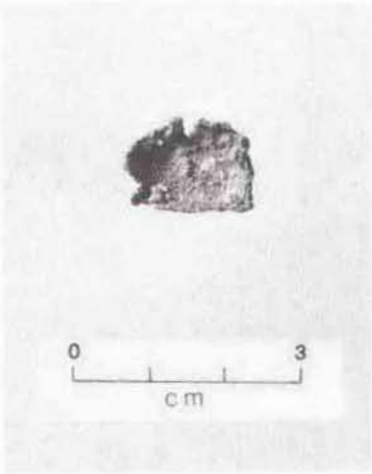


Figure 9.1. Copper bell fragment from 29SJ 633: FS 749, Room 7 (Chaco Project Neg. 24501)

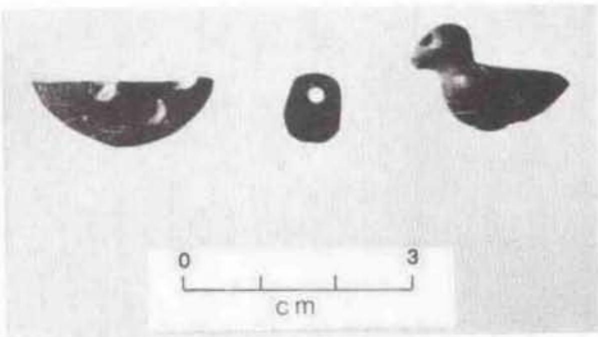


Figure 9.2. Lignite artifacts from 29SJ 633: FS 647, part of a disk; FS 1065, black shale pendant; and FS 103, lignite effigy pendant (Chaco Project Neg. 24502)

Inlay: Two pieces of turquoise were classified as inlay. FS 754 from the rock concentration, structural rubble, in Room 7 dated to the late A.D. 1100s-early 1200s and was definitely ground on two sides and three edges. The fourth edge appears to have been broken off, possibly after manufacture. There was evidence of polish on the upper surface and beveling on one edge (Figure 9.3). Measurements are 0.46 by 0.36 by 0.12 cm in length, width, and thickness.

FS 1184 was recovered from the site surface and may date any time from late A.D. 1000s through the 1200s. Considerably smaller in size (0.32 by 0.21 by 0.12 cm in length, width and thickness), this piece is very worn (similar to gizzard stones) on three edges, but the fourth edge appears to have been broken off. Polish appears on all but the fourth edge.

Paintstone: One unusual piece of hematite (FS 352) had been classified as a paintstone. It was somewhat harder than most of the hematite pieces recovered during recent excavations, was cylindrical in shape (formed by grinding on both ends and around the exterior surface), and was highly polished (Figure 9.4). It is 2.51 cm long and 0.51 cm in diameter.

Pendants: Table 9.5 presents numerical and verbal descriptions on the seven pendants recovered from this site (Figures 9.2, 9.3, and 9.5). These were made from five different materials: argillite, lignite, selenite, shale, and turquoise. Two were zoomorphic in shape: FS 149 (argillite) and FS 103 (lignite). The two selenite pieces, which are irregular in shape, represent an unusually high relative proportion of pendants made from this material at one site. However, because of the limited sample size, little comparative analysis of pendants at this site is warranted.

Pendant blank: FS 781 was classified as a pendant blank even though it may be a broken pendant. However, the edges of this turquoise piece, although ground, have not been fashioned into the usual, smooth, rectangular or trapezoidal shape noted for Chacoan pendants. These edges were much more angular. The fragment measured 0.59 cm on the long axis, 0.50 on the short axis, and was 0.21 cm thick. Color was recorded as 2.5 BG 7/6. It was found in Room 6, Layer 3, and dates to the late A.D. 1100s-early 1200s.

Other: Several pieces were classified as other and deserve a few comments.

FS 1048 is a shell (Lymnaea sp.) recovered from Test 3, Room 3, Level 3, late A.D. 1100s-early 1200s. This is a complete freshwater clam shell that measured 0.88 cm long and from 0.46 to 0.57 cm in diameter.

FS 675 from Bin 1, Room 7, was a piece of unidentified shell. During analysis of bone, several other pieces, probably of the same shell, were found as follows (Figure 9.6):

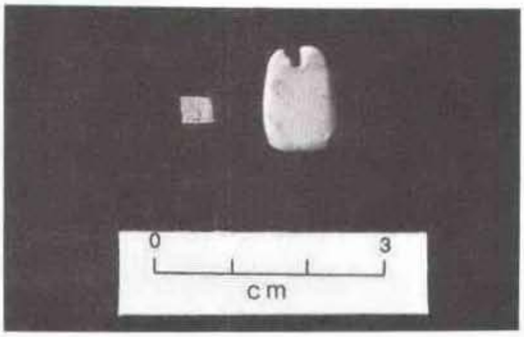


Figure 9.3. Turquoise artifacts from 29SJ 633: FS 764, inlay; and FS 1170, pendant (Chaco Project Neg. 24503)

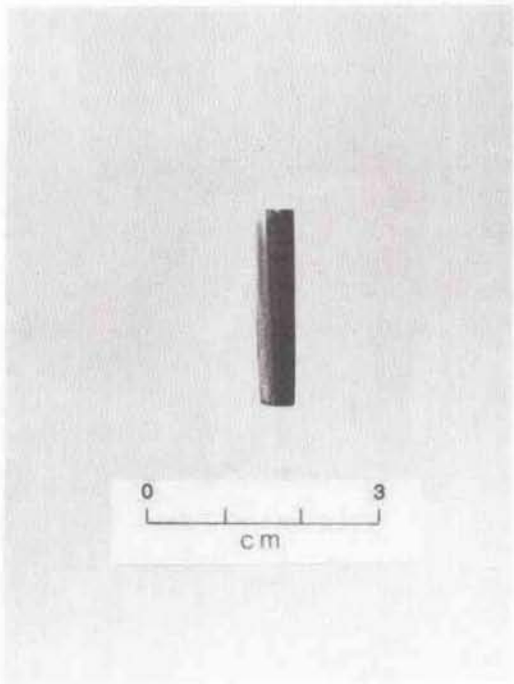


Figure 9.4. Paintstone/cylinder from 29SJ 633: FS 352 (Chaco Project Neg. 24504)

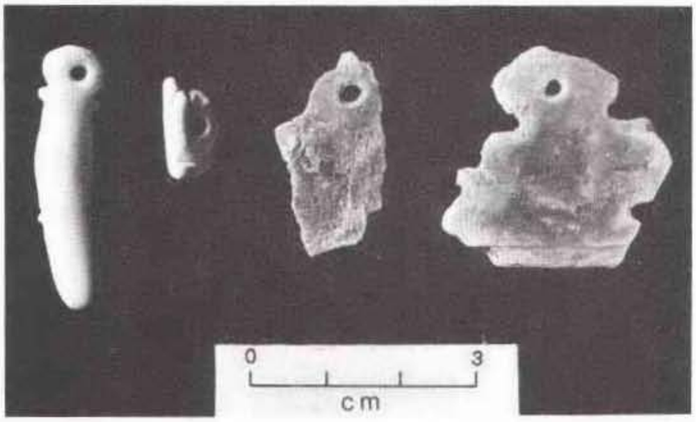


Figure 9.5. Pendants from 29SJ 633: FS 1196, shell; FS 149, argillite; FS 186 and FS 636, selenite (Chaco Project Neg. 24506)

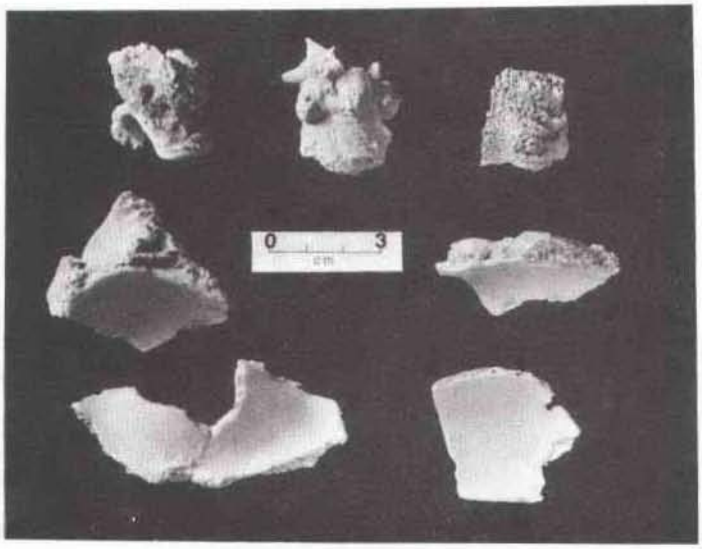


Figure 9.6. Unidentified shell pieces from 29SJ 633: FS 675 (Chaco Project Neg. 24500)

Table 9.5. Pendants from 29SJ 633

Period (A.D.)	FS No.	Provenience	Material	Dimensions (cm) Length	Width	Thick.	Perf.	Comments
Late 1100s-early 1200s	1065	Test 7, fill	Shale	0.91	0.76	0.12	0.23	Ground all sides, edges. Drilled bi-conically. Striations.
	149	Rm. 7, Lay. 2, Lev. 3	Argillite	1.35	0.75	0.75	0.23	Zoomorphic. Ground all sides, edges. Drilled biconically.
	186	Rm. 7, Lay. 4	Selenite	2.74	1.62	0.27	0.27	Irregular. Drilled biconically.
	636	Rm. 7, Floor 1	Selenite	2.95	2.73	0.28	0.21	Irregular. Ground 1 side, notched 1 side. Drilled biconically.
	103	Rm. 7, Lay. 1, Lev. 3	Lignite	2.05	1.10	0.99	0.22	Zoomorphic-duck(?) Ground all sides, edges. Drilled biconically. Other perforations.
Late 1000s-early 1100s	1170	Rm. 7, Lay. 9, above Floor 2	Turquoise	1.38	0.98	0.33	0.16	Ground all sides, edges. Polished 2 sides. Beveled 4 edges. Drilled biconically.
Mixed	1196	Trash Mound, surface	Unid. shell	3.47	0.85	0.39	0.20	Irregular shape. Nicely ground and polished, possibly reused bracelet fragment.

FS 102	Layer 1, NW quarter	one piece
FS 57	Layer 2, Level 2, SW quarter	two pieces
FS 107	Layer 2, Level 2, NW quarter	two pieces
FS 68	Layer 2, Level 3, SW quarter	two pieces
FS 603	Layer 2, Level 4, NW quarter	one piece

Several of these pieces could be put together, and it is suggested that all are part of a large snail. These were dated to the late A.D. 1100s-early 1200s.

FS 1024, another unidentifed shell from Test 2 in the East roomblock, Level 5, is from mixed materials. It is a small snail.

FS 232 is a barite crystal that had been shaped into a disk (Figure 9.7). It was found in Room 7, floor fill, and dates to the late A.D. 1100s-early 1200s. It measures 0.87 to 0.91 cm in diameter and is 0.57 cm thick.

FS 236 is a natural sandstone disk with considerable amounts of hematitic pigment. It was also recovered from Room 7, Layer 6, and dates to the late A.D. 1100s-early 1200s. It is approximately 3.51 cm in diameter and 1.00 cm thick.

Other Minerals

Table 9.6 presents data on the number of soft minerals found at 29SJ 633 by period. During the late A.D. 1000s-early 1100s, selenite and hematite were the most common minerals. If, however, one assumes that the most important colors were those obtained when all the minerals listed in the table were ground into pigments, then white is the most common color (from gypsite, gypsum, and selenite). This is followed by hematite and limonite (red and yellow) and then azurite (blue). This is the typical pattern found at other sites in Chaco Canyon excavated by the NPS.

The late A.D. 1100s-early 1200s again had more minerals that would produce white pigments, but lignite (black) is the most predominant mineral type. Lignite, however, may have served several purposes, e.g., it is used for fill in postholes and may therefore be disproportionately represented.

Minerals from the entire span are too few to evaluate.

Unusual or Notable Groupings

No unusual groups of ornaments were found at this site. Because only one and one-half rooms were excavated, this information does not preclude such incidences in other areas of the site.

Color of Turquoise Pieces

Fifteen turquoise artifacts were color-coded using a Munsell color chart containing the blue-green hues, supplemented by a Rock-Color Chart. The distribution of hues was as follows:

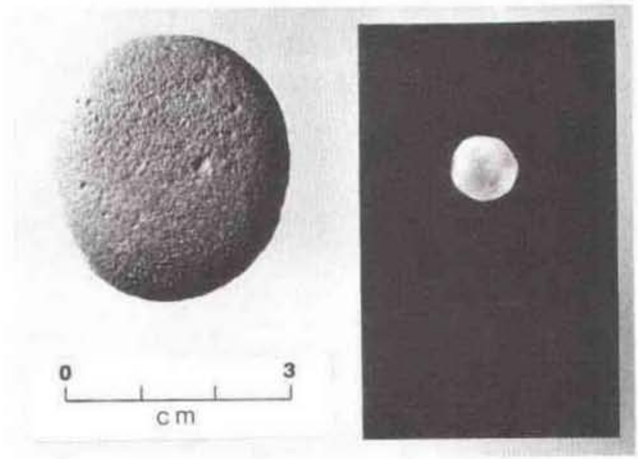


Figure 9.7. Discoidal-shaped pieces from 29SJ 633: FS 236, sandstone; and FS 232, crystal/barite (Chaco Project Neg. 24505)

Table 9.6. Soft minerals from 29SJ 633

Material Type	Color	Late 1000s-Early 1100s (A.D.)	Late 1100s-Early 1200s (A.D.)	Mixed
Azurite	Blue	2	-	-
Gypsite	White	10	25	-
Gypsum	White	2	1	-
Hematite	Red	14	1	-
Lignite	Black	-	31	-
Limonite	Yellow	10	1	-
Malachite	Green	-	2	1
Selenite	White	14	24	-
Totals		52	85	1

Hue	No. of Artifacts	%
5 G	1	6.7
2.5 BG	5	33.3
5 BG	4	26.7
7.5 BG	3	20.0
10 BG	2	13.3
	15	99.7

Figure 9.8 graphically displays these. Hues tend to cluster at the greener end of the blue-green spectrum.

Color values recorded were 6, 7, and 9, whereas chroma fell into 4, 6, and 8. This suggests that the colors of the turquoise artifacts were more intense and clear; they did not tend toward either the black or white depths that are sometimes found. This evaluation is consistent with what this author has observed for some of the better quality and/or harder turquoises.

No one combination of hue, value, or chroma predominated. There were two artifacts each in the following categories: 2.5 BG 7/6, 2.5 BG 6/8, and 5 BG 7/6. In summary, colors of turquoise artifacts at this site were generally in the greener end of the spectrum. This contrasts with findings at Pueblo Alto where the colors clustered at the bluer end but is not abnormal in small sites in Chaco Canyon. Pueblo Alto, a town site, may represent some different type of social organization.

Summary and Conclusions

Of the recently investigated sites, 29SJ 633 provides data on the latest Chacoan occupation in the canyon. Because only one and one-half rooms were excavated and most of the material was redeposited trash, it is difficult to discuss procurement, processing, and reuse. There are sufficient number of ornaments from the late A.D. 1100s-early 1200s occupation to suggest that the occupants were participants in a cultural continuum. Ornaments were made from argillite, claystone, copper, lignite, selenite, shale, Glycymeris gigantea shell, and turquoise. Only the copper, Glycymeris, and turquoise (plus the Haliotus and Olivella) were imported to the canyon from outside the San Juan Basin. Truell, the site excavator, felt the copper may actually belong to the earlier occupation, or it may have been collected from another site, curated, and then lost. None of the exotic shells seen at Pueblo Alto (29SJ 389), 29SJ 627, and 29SJ 629 that dated to the Bonito Phase occupation were found at this site. Although the sample size is limited, this fact may indicate that there was a shift in trade networks and/or objects utilized during the late A.D. 1000s-early 1100s. According to data obtained during the analysis of materials from other sites, the Glycymeris, Haliotus, and Olivella shells (as well as the turquoise) were part of a trade network that existed during the Basketmaker III-Pueblo I periods. Exotic shells of other species were not found until the Early Bonito Phase around A.D. 920. Late sites could have reverted to earlier trade patterns during the Late Bonito

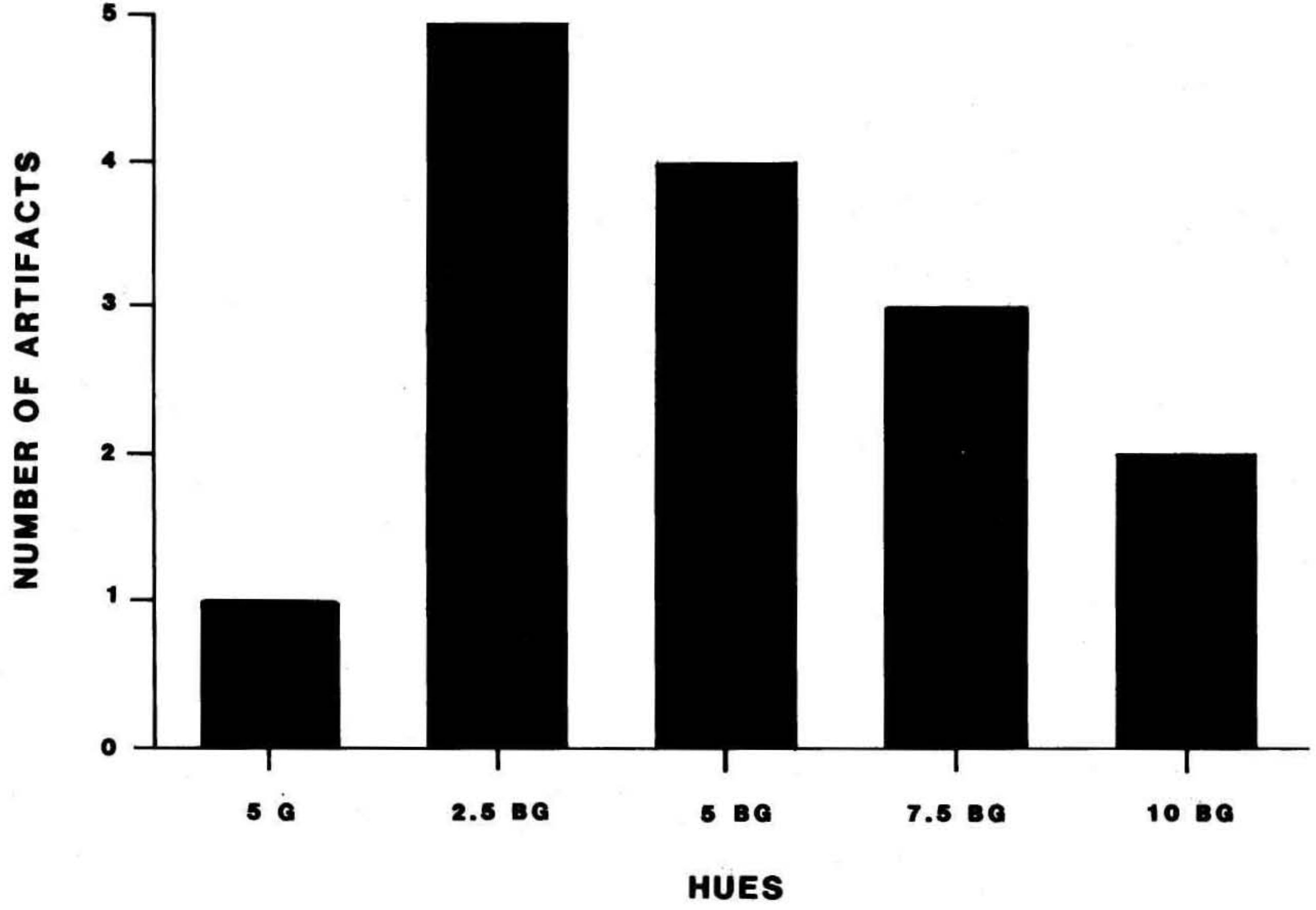


Figure 9.8. Turquoise colors at 29SJ 633

Phase. The larger number of ornaments made from local materials suggests a change in the materials that were available and/or used during this later time period.

10

FAUNAL REMAINS FROM 29SJ 633

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The limited excavations at site 29SJ 633 produced a surprisingly large number of animal bones. The two excavated rooms and miscellaneous tests yielded a total of 3,912 individual bones of which some 2,585 or 66 percent are identifiable to the genus or species level. The bulk of the bones (3,400, 87 percent) was recovered from Room 7, the larger of the two excavated rooms. The 358 bones from Room 8 make up 9 percent of the total, and the remaining 154 specimens were found in three test trenches and eight anomaly tests.

Perhaps the most striking attribute of the collection is its size, given the small volume of excavated material. The density of the faunal remains is far greater than in most excavated pueblo sites in Chaco Canyon or elsewhere in the Southwest. The total of 3,400 from a single room exceeds the amount commonly found in entire small habitation sites. The fundamental reason for this large total is relative abundance of high-density trash, but it should also be noted that recovery techniques were more thorough than at previously excavated pueblo sites in Chaco Canyon (or elsewhere). The abundance of rabbit-sized and smaller faunal forms testifies to the small modal size of bone fragments, a size that would almost certainly be underrepresented in a collection gained from less careful excavation and without complete screening.

Table 10.1 lists the taxonomic groups identified in the collection. A minimum of 28 individual species are represented. Included among the mammals are the two ubiquitous rabbits (Sylvilagus and Lepus), at least ten species of rodents, three carnivores, and the three common artiodactyl species. Birds include turkeys (M. gallopavo) and eight wild taxa. The only identified herpetological taxon is the Gopher Snake (Pituophus melanoleucus).

This chapter presents most of the basic frequency data in Tables 10.2-10.5 and then discusses, in order, (1) the relative abundances of the taxa and different methods of measuring frequency; (2) meat weight estimates and different techniques of estimation; (3) the occurrence of each of the taxa; and (4) miscellaneous information such as charring, butchering, distributions in features, etc.

Frequencies

Table 10.2 presents site totals for each identified taxon (identified to species or genus level) and for categories of unidentified remains. Two measures are given: the number of specimens (or elements) and an estimate of minimum number of individuals (MNI). In tables throughout the report, these two values are separated by a slash (Elem./MNI). Tables 10.3, 10.4, and 10.5 are detailed breakdowns of bone frequencies for most

Table 10.1. Vertebrate taxa present at site 29SJ 633

MAMMALS

Scientific Name	Common Name
Lagomorpha	
Leporidae	
Sylvilagus cf. audubonii	Desert cottontail
Lepus californicus	Black-tailed jackrabbit
Rodents	
Sciuridae	
small sciurid, cf. Spermophilus spilosoma	Ground squirrel, cf. spotted ground squirrel
Cynomys gunnisoni	Gunnison's prairie dog
Geomyidae	
Thomomys bottae	Botta's pocket gopher
Heteromyidae	
Perognathus cf. flavenscens	Pocket mouse, cf. plains pocket mouse
Dipodomys ordii	Ord's kangaroo rat
D. spectabilis	Banner-tailed kangaroo rat
Cricetidae	
Reithrodontomys megalotis	Western harvest mouse
Peromyscus cf. maniculatus	White-footed mouse, cf. deer mouse
cf. Onychomys leucogaster	cf. northern grasshopper mouse
Neotoma	Woodrat
Carnivores	
Canidae	
Canis sp. and cf. Canis	Unidentified canid, either dog or coyote
Canis cf. latrans	cf. coyote
Mustelidae	
Taxidea taxus	Badger
Felidae	
Felis (Lynx) rufus	Bobcat
Artiodactyls	
Cervidae	
Odocoileus hemionus	Mule deer
Antilocapridae	
Antilocapra americana	Pronghorn
Bovidae	
Ovis canadensis	Mountain sheep

Table 10.1 (concluded)

BIRDS

Scientific Name	Common Name
Anseriformes	
Anatidae	
Anatidae sp.	Unidentified duck or goose
Falconiformes	
Accipitridae	
Aquila chrysaetos	Golden eagle
Buteo sp.	Unidentified broad-winged hawk
Galliformes	
Phasianidae	
Callipepla squamata and cf. *C. squamata*	Scaled quail
Phasianidae sp.	Unidentified quail, probably scaled quail
Meleagridae	
Meleagris gallopavo	Turkey
Strigiformes	
Strigidae	
Bubo virginianus	Great horned owl
Passeriformes	
Alaudidae	
Eremophila alpestris	Horned lark
Corvidae	
Corvus corax	Common raven
Fringillidae	
Pipilo chlorura	Green-tailed towhee

REPTILES

Scientific Name	Common Name
Squamata	
Colubridae	
Pituophis melanoleucus	Gopher snake

Table 10.2. Site totals of vertebrate remains at site 29SJ 633; number of specimens and estimated minimum numbers of individuals (MNI)

Taxon	Elem.	% of Iden. Mammals	% of All Bone	MNI: Site MNI	MNI: % of Iden. Mammals	% of Site MNI/Elem.	minMNI: MNI	minMNI: % of Mammals	midMNI: MNI	midMNI: % of Mammals	maxMNI: MNI	maxMNI: % of MNI
LAGOMORPHS												
Sylvilagus cf. *audubonii*	1,101	61.9	28.2	37	42.0	0.03	52	41.9	60	35.7	83	36.1
Lepus californicus	351	19.7	9.0	11	12.5	0.03	14	11.3	25	14.9	37	16.1
RODENTS												
cf. *Spermophilus spilosoma*	1	0.1	t	1	1.1	1.00	1	0.8	1	0.6	1	0.4
Cynomys gunnisoni	160	9.0	4.1	11	12.5	0.07	15	12.1	26	15.5	38	16.5
Thomomys bottae	9	0.5	0.2	2	2.3	0.22	3	2.4	5	3.0	6	2.6
Perognathus sp.	7	0.4	0.2	1	1.1	0.14	3	2.4	4	2.4	4	1.7
Dipodomys ordii	19	1.1	0.5	3	3.4	0.16	5	4.0	9	5.4	12	5.2
D. spectabilis	6	0.3	0.2	1	1.1	0.17	3	2.4	3	1.7	3	1.3
Reithrodontomys megalotis	1	0.1	t	1	1.1	1.00	1	0.8	1	0.6	1	0.4
Peromyscus sp.	73	4.1	1.9	5	5.7	0.07	7	5.6	12	7.1	17	7.4
Onychomys leucogaster	2	0.1	0.1	1	1.1	0.50	2	1.6	2	1.2	2	0.9
Neotoma sp.	36	2.0	0.9	7	8.0	0.19	9	7.3	9	5.4	15	6.5
CARNIVORES												
Canis sp. and *C.* cf. *latrans*	4	0.2	0.1	1	1.1	0.25	3	2.4	3	1.8	3	1.3
Taxidea taxus	2	0.1	0.1	1	1.1	0.50	1	0.8	1	0.6	1	0.4
Felis (*Lynx*) *rufus*	2	0.1	0.1	1	1.1	0.50	1	0.8	2	1.2	2	0.9
ARTIODACTYLS												
Odocoileus hemionus	1	0.1	t	1	1.1	1.00	1	0.8	1	0.6	1	0.4
Antilocapra americana	4	0.2	0.1	2	2.3	0.50	2	1.6	3	1.8	3	1.3
Ovis canadensis	1	0.1	t	1	1.1	1.00	1	0.8	1	0.6	1	0.4
Total Identified Mammals	1,780	100.1	45.7	88	99.7	(0.05)	124	99.8	168	100.1	230	99.8

t = trace.

Table 10.2 (concluded)

Taxon	No. of specimens: Elem.	No. of specimens: % of All Bone	Abs. min. MNI	MNI/Elem.	MinMNI	MidMNI	MaxMNI
BIRDS							
Anatidae sp.	1	t	1	1.00	1	1	1
Aquila chrysaetos	1	t	1	1.00	1	1	1
Buteo sp.	5	0.1	2	0.20	2	3	3
Callipepla squamata and cf. *Callipepla*	12	0.3	2	0.17	2	2	2
Meleagris gallopavo	766	19.6	12	0.02	19	28	47
Bubo virginianus	2	0.1	1	0.50	1	1	2
Eremophila alpestris	1	t	1	1.00	1	1	1
Pipilo chlorura and cf. *Pipilo*	2	0.1	1	0.50	1	2	2
Corus corax	1	t	1	1.00	1	1	1
REPTILES							
Pituophis melanoleucus	1	t	1	1.00	1	1	1
				% of Unidentified Species			
UNIDENTIFIED REMAINS							
Unidentified snake	4	0.1		0.3			
Unidentified small rodent	36	0.9		2.7			
Unidentified small mammal	1,139	29.2		85.5			
Unidentified medium mammal	11	0.3		0.8			
Unidentified med.-lg. mammal	34	0.9		2.6			
Unidentified artiodactyl	2	0.1		0.2			
Unidentified bird	3	0.1		0.2			
Unidentified vertebrate	103	2.6		7.7			
Total Unidentified Specimens	1,332	34.1		100.0			
Total (All Specimens)	2,124	100.2	111.0		154	209	291

t = trace.

Table 10.3. Vertebrate remains present in Room 7, 29SJ 633

Taxon	Fill							
	Layer 1	Layer 2	Layer 3	Layer 4	Rock Concentration	Layer 5	Layers 5-6 Mixed	Total Fill Elem./ midMNI/maxMNI
MAMMALS								
Lagomorphs								
Sylvilagus cf. audubonii	5/1	49/4	62/5	36/-	74/6	27/3	145/9	398/18/28
Lepus californicus		17/1	14/2	4/-	75/4	10/1	58/4	178/6/12
Rodents								
cf. Spermophilus spilosoma							1/1	1/1/1
Cynomys gunnisoni		7/2	18/3	12/-	8/2	6/1	9/3	60/5/11
Thomomys bottae		1/1			2/1		2/1	5/2/3
Perognathus sp.			2/1					2/1/1
Dipodomys ordii		1/1	3/2				2/1	6/2/4
D. spectabilis								
Reithrodontomys megalotis								
Peromyscus sp.			5/1				1/1	6/1/2
Onychomys leucogaster								
Neotoma sp.		1/1		2/-	8/3	2/2	2/1	15/3/7
Carnivores								
Canis sp. and C. cf. latrans								
Taxidea taxus		2/1[a]						2/1/1
Felis (Lynx) rufus			1/1					1/1/1
Artiodactyls								
Odocoileus hemionus								
Antilocapra americana			2/1					2/1/1
Ovis canadensis								
Total Identified Mammals	5/1	78/11	107/16	54/-	167/16	45/7	220/21	676/42/72

[a]Articulated foot.

Table 10.3 (continued)

Taxon	Fill: Layer 1	Layer 2	Layer 3	Layer 4	Rock Concentration	Layer 5	Layers 5-6 Mixed	Total Fill Elem./ midMNI/maxMNI
BIRDS								
Anatidae sp.								
Aquila chrysaetos				1/1				1/1/1
Buteo sp.					1/1			1/1/1
Callipepla squamata and cf. Callipepla		1/1					1/1	2/1/1
Meleagris gallopavo	4/1	19/1	75/2	18/-	105/5	56/3	125/4	402/6/16
Bubo virginianus								
Eremophila alpestris		1/1						1/1/1
Pipilo chlorura and cf. Pipilo								
Corus corax								
REPTILES								
Pituophis melanoleucus								
UNIDENTIFIED REMAINS								
Unidentified snake							1	1
Unidentified small rodent			2		3			5
Unidentified small mammal	2	35	281	121	32	19	204	694
Unidentified medium mammal			1	1	4		5	11
Unidentified med.-lg. mammal		6	4			1	1	12
Unidentified artiodactyl								
Unidentified bird			2					2
Unidentified vertebrate			20	11	5		23	59
Total Unidentified Specimens	2	41	310	133	44	20	234	784
Total (All Specimens)	11/2	140/14	492/18	206/(1)	317/22	121/10	580/26	1,867/51/91

Table 10.3 (continued)

Taxon	Floor Fill: Layer 6	Floor 1 Association: Floor 1 Contact ("burned spots")	Bin 1 (all of Layers 1 and 2)	Floor 1 Features	Burial 3	Rodent Disturbances	Total Floor 1 Assoc. Elem./midMNI/maxMNI
MAMMALS							
Lagomorphs							
Sylvilagus cf. *audubonii*	436/15	2/1	62/4	3/2	13/2	17/3	97/6/12
Lepus californicus	112/7		16/2		5/1	2/1	23/2/4
Rodents							
cf. *Spermophilus spilosoma*							
Cynomys gunnisoni	43/3	1/1	11/2	2/1	4/3	2/1	20/4/8
Thomomys bottae					1/1		1/1/1
Perognathus sp.					1/1		1/1/1
Dipodomys ordii	4/2					2/1	2/1/1
D. spectabilis							
Reithrodontomys megalotis							
Peromyscus sp.	14/2		2/1	5/1			7/2/2
Onychomys leucogaster							
Neotoma sp.	9/2		1/1				2/1/2
Carnivores							
Canis sp. and *C.* cf. *latrans*							
Taxidea taxus							
Felis (*Lynx*) *rufus*							
Artiodactyls							
Odocoileus hemionus			1/1				1/1/1
Antilocapra americana	1/1						
Ovis canadensis							
Total Identified Mammals	619/32	3/2	93/11	10/4	24/8	24/7	154/19/32

Table 10.3 (continued)

Taxon	Floor Fill: Layer 6	Floor 1 Association: Floor 1 Contact ("burned spots")	Bin 1 (all of Layers 1 and 2)	Floor 1 Features	Burial 3	Rodent Disturbances	Total Floor 1 Assoc. Elem./midMNI/maxMNI
BIRDS							
Anatidae sp.							
Aquila chrysaetos							
Buteo sp.	2/1				2/1		2/1/1
Callipepla squamata and cf. *Callipepla*							
Meleagris gallopavo	183/5	1/1	65/4	3/1	23/2	4/1	96/4/9
Bubo virginianus							
Eremophila alpestris							
Pipilo chlorura and cf. *Pipilo*							
Corus corax							
REPTILES							
Pituophis melanoleucus	1/1[a]						
UNIDENTIFIED REMAINS							
Unidentified snake	3						
Unidentified small rodent	5		5	1			6
Unidentified small mammal	184	7	29	7	6	9	58
Unidentified medium mammal							
Unidentified med.-lg. mammal	3		5			1	6
Unidentified artiodactyl	1		1				1
Unidentified bird							
Unidentified vertebrate			9		10		19
Total Unidentified Specimens	196	7	49	8	16	10	90
Total (All Specimens)	1,001/39	11/3	207/15	21/5	65/11	38/8	342/24/42

Table 10.3 (continued)

Taxon	Floor 2 Association: Layer 7	Floor 2 Association: Floor 2 Features	Floor 2 Association: Total Floor 2 Association Elem./midMNI/max/MNI	Subfloor: Layer 8	Subfloor: Layer 9, Level 10	Subfloor: Layer 10	Subfloor: Total Subfloor Elem./midMNI/maxMNI	Totals: Room 7 Total Elem./minMNI/midMNI/maxMNI
MAMMALS								
Lagomorphs								
Sylvilagus cf. *audubonii*	23/2	4/1	27/2/3	4/1	7/1		11/1/2	969/36/42/60
Lepus californicus	2/1		2/1/1	9/1	1/1		10/1/2	395/9/17/26
Rodents								
cf. *Spermophilus spilosoma*								1/1/1/1
Cynomys gunnisoni	2/2	1/1	3/2/3	2/1	3/1		5/2/2	131/8/16/27
Thomomys bottae					1/1		1/1/1	7/2/4/5
Perognathus sp.								3/1/2/2
Dipodomys ordii	1/1	1/1	2/1/2					14/3/6/9
D. spectabilis		4/1	4/1/1					4/1/1/1
Reithrodontomys megalotis								
Peromyscus sp.	10/3	28/2	38/3/5					65/5/8/11
Onychomys leucogaster		1/1	1/1/1					1/1/1/1
Neotoma sp.						7/1	7/1/1	33/7/7/12
Carnivores								
Canis sp. and *C.* cf. *latrans*				1/1			1/1/1	1/1/1/1
Taxidea taxus								2/1/1/1
Felis (Lynx) rufus				1/1			1/1/1	2/1/2/2
Artiodactyls								
Odocoileus hemionus								1/1/1/1
Antilocapra americana					1/1		1/1/1	4/2/3/3
Ovis canadensis		1/1	1/1/1					1/1/1/1
Total Identified Mammals	38/9	40/8	78/12/17	17/5	13/5	7/1	37/9/11	1,564/81/114/165

Table 10.3 (concluded)

Taxon	Floor 2 Association			Subfloor				Totals
	Layer 7	Floor 2 Features	Total Floor 2 Association Elem./midMNI/maxMNI	Layer 8	Layer 9, Level 10	Layer 10	Total Subfloor Elem./midMNI/maxMNI	Room 7 Total Elem./minMNI/midMNI/maxMNI
BIRDS								
Anatidae sp.								0
Aquila chrysaetos								1/1/1/1
Buteo sp.								5/2/3/3
Callipepla squamata and cf. *Callipepla*	11/1		11/1/1					12/2/2/2
Meleagris gallopavo		1/1	1/1/1	1/1	1/1		2/1/2	684/11/17/33
Bubo virginianus								0
Eremophila alpestris								1/1/1/1
Pipilo chlorura and cf. *Pipilo*								0
Corus corax								0
REPTILES								
Pituophis melanoleucus								1/1/1/1
UNIDENTIFIED REMAINS								
Unidentified snake								4
Unidentified small rodent	10	7	17					33
Unidentified small mammal	19	7	26	9	4		13	975
Unidentified medium mammal								11
Unidentified med.-lg. mammal		3	3	1			1	25
Unidentified artiodactyl								2
Unidentified bird								2
Unidentified vertebrate								78
Total Unidentified Specimens	29	17	46	10	4	0	14	1,130
Total (All Specimens)	78/10	58/9	136/14/19	28/6	18/6	7/1	53/10/13	3,398/99/139/206

Table 10.4. Vertebrate remains from Room 8, 29SJ 633

	Fill					Floor fill	Floors	
Taxon	Level 1	Level 2	Level 3	Level 4	Total Fill Elem./midMNI/ maxMNI	Level 5 Floor fill	Floor 1 Association	Floor 2 Association
MAMMALS								
Lagomorphs								
Sylvilagus cf. *audubonii*	2/1	3/1	1/1	7/1	13/1/4	7/2	12/2	
Lepus californicus	1/1		2/1	2/1	5/1/3	1/1		1/1
Rodents								
cf. *Spermophilus spilosoma*								
Cynomys gunnisoni		1/1	1/1	4/1	6/2/3	1/1	2/1	1/1
Thomomys bottae				2/1	2/1/1			
Perognathus sp.								
Dipodomys ordii							1/1	
D. spectabilis				1/1	1/1/1			
Reithrodontomys megalotis								
Peromyscus sp.		1/1		1/1	2/1/2		2/1	1/1
Onychomys leucogaster								
Neotoma sp.		1/1	1/1		2/1/2	1/1		
Carnivores								
Canis sp. and *C.* cf. *latrans*								
Taxidea taxus								
Felis (*Lynx*) *rufus*								
Artiodactyls								
Odocoileus hemionus								
Antilocapra americana								
Ovis canadensis								
Total Identified Mammals	3/1	6/4	5/4	17/6	31/8/16	10/5	17/5	3/3

Table 10.4 (continued)

Taxon	Fill: Level 1	Fill: Level 2	Fill: Level 3	Fill: Level 4	Fill: Total Fill Elem./midMNI/maxMNI	Floor fill: Level 5 Floor fill	Floors: Floor 1 Association	Floors: Floor 2 Association
BIRDS								
Anatidae sp.								
Aquila chrysaetos								
Buteo sp.								
Callipepla squamata and cf. Callipepla								
Meleagris gallopavo		5/1	3/1	6/1	14/1/3	49/3	3/1	
Bubo virginianus								
Eremophila alpestris								
Pipilo chlorura and cf. Pipilo							1/1	
Corus corax			1/1		1/1/1			
REPTILES								
Pituophis melanoleucus								
UNIDENTIFIED REMAINS								
Unidentified snake								1
Unidentified small rodent		2	10	12	24	3	30	6
Unidentified small mammal								
Unidentified medium mammal								
Unidentified med.-lg. mammal			6		6		2	
Unidentified artiodactyl								
Unidentified bird			1		1			
Unidentified vertebrate				5	5			3
Total Unidentified Specimens	0	2	17	17	36	3	32	10
Total (All Specimens)	3/1	13/5	26/6	40/7	82/10/20	62/8	53/7	13/3

Table 10.4 (continued)

Taxon	Subfloor				Totals
	Level 6	Level 7	Level 8	Total Subfloor Elem./midMNI/ maxMNI	Room 8 Total Elem./minMNI/ maxMNI
MAMMALS					
Lagomorphs					
Sylvilagus cf. *audubonii*	11/1	31/2	9/1	51/2/4	83/5/7/12
Lepus californicus	4/1	5/1	1/1	10/2/3	17/2/5/8
Rodents					
cf. *Spermophilus spilosoma*					0
Cynomys gunnisoni	5/1			5/1/1	15/3/6/7
Thomomys bottae					2/1/1/1
Perognathus sp.			3/1	3/1/1	3/1/1/1
Dipodomys ordii		3/1		3/1/1	4/1/2/2
D. spectabilis					1/1/1/1
Reithrodontomys megalotis					
Peromyscus sp.	1/1	1/1	1/1	3/1/2	8/2/4/6
Onychomys leucogaster					0
Neotoma sp.					3/2/2/3
Carnivores					
Canis sp. and *C.* cf. *latrans*		2/1		2/1/1	2/1/1/1
Taxidea taxus					0
Felis (Lynx) rufus					0
Artiodactyls					
Odocoileus hemionus					0
Antilocapra americana					0
Ovis canadensis					0
Total Identified Mammals	21/4	42/6	14/4	77/9/13	138/19/30/42

Taxon	Subfloor Level 6	Level 7	Level 8	Total Subfloor Elem./midMNI/ maxMNI	Totals Room 8 Total Elem./minMNI/ max/MNI
BIRDS					
Anatidae sp.					0
Aquila chrysaetos					0
Buteo sp.					0
Callipepla squamata and cf. *Callipepla*					0
Meleagris gallopavo		1/1	1/1	2/1/2	68/3/6/9
Bubo virginianus		1/1	1/1	2/1/2	2/1/1/2
Eremophila alpestris					0
Pipilo chlorura and cf. *Pipilo*		1/1		1/1/1	2/1/2/2
Corus corax					1/1/1/1
REPTILES					
Pituophis melanoleucus					0
UNIDENTIFIED REMAINS					
Unidentified snake					0
Unidentified small rodent					1
Unidentified small mammal	12	31	3	46	109
Unidentified medium mammal					0
Unidentified med.-lg. mammal			1	1	9
Unidentified artiodactyl					0
Unidentified bird					1
Unidentified vertebrate	5	4	6	15	23
Total Unidentified Specimens	17	35	10	62	143
Total (All Specimens)	38/4	80/9	26/6	144/12/18	354/25/40/56

Table 10.5. Vertebrate remains from miscellaneous tests and site totals for 29SJ 633

Taxon	Plaza 1, Test Trench 1 and 3	Test Trench 2	Anomaly Test 1 (unnumbered room)	Anomaly Test 2 (Room 11)	Anomaly Test 3 (Room 3)	Anomaly Test 6 (Room 4)	Anomaly Test 7 (Plaza ?)	Anomaly Test 8 (Room 14)	Anomaly Test 9 (Plaza)	Anomaly Test 10 (Trash)
MAMMALS										
Lagomorphs										
Sylvilagus cf. *audubonii*	3/1	1/1	7/1	1/1		2/1	29/3	3/1	1/1	2/1
Lepus californicus	2/1	1/1					6/1			
Rodents										
cf. *Spermophilus spilosoma*										
Cynomys gunnisoni	1/1						12/2		1/1	
Thomomys bottae										
Perognathus sp.			1/1							
Dipodomys ordii			1/1							
D. spectabilis							1/1			
Reithrodontomys megalotis			1/1							
Peromyscus sp.										
Onychomys leucogaster			1/1							
Neotoma sp.										
Carnivores										
Canis sp. and *C.* cf. *latrans*	1/1									
Taxidea taxus										
Felis (Lynx) rufus										
Artiodactyls										
Odocoileus hemionus										
Antilocapra americana										
Ovis canadensis										
Total Identified Mammals	7/4	2/2	11/5	1/1	0	2/1	48/7	3/1	2/2	2/1

Table 10.5 (continued)

Taxon	Plaza 1, Test Trench 1 and 3	Test Trench 2	Anomaly Test 1 (unnumbered room)	Anomaly Test 2 (Room 11)	Anomaly Test 3 (Room 3)	Anomaly Test 6 (Room 4)	Anomaly Test 7 (Plaza ?)	Anomaly Test 8 (Room 14)	Anomaly Test 9 (Plaza)	Anomaly Test 10 (Trash)
BIRDS										
Anatidae sp.			1/1							
Aquila chrysaetos										
Buteo sp.										
Callipepla squamata and cf. *Callipepla*										
Meleagris gallopavo		4/2			1/1		8/1	1/1		
Bubo virginianus										
Eremophila alpestris										
Pipilo chlorura and cf. *Pipilo*										
Corus corax										
REPTILES										
Pituophis melanoleucus										
UNIDENTIFIED REMAINS										
Unidentified snake										
Unidentified small rodent			1				1			
Unidentified small mammal	6	1	16			1	26	3	1	1
Unidentified medium mammal										
Unidentified med.-lg. mammal										
Unidentified artiodactyl										
Unidentified bird										
Unidentified vertebrate							1		1	
Total Unidentified Specimens	6	1	17	0	0	1	28	3	2	1
Total (All Specimens)	13/4	7/4	29/6	1/1	1/1	3/1	84/8	7/2	4/2	3/1

Table 10.5 (continued)

Taxon	Site Totals				
	Elements[a]	SiteMNI[b]	MinMNI[c]	MidMNI[d]	MaxMNI[e]
MAMMALS					
Lagomorphs					
Sylvilagus cf. *audubonii*	1,101/	37/	52/	60/	83
Lepus californicus	351/	11/	14/	25/	37
Rodents					
cf. *Spermophilus spilosoma*	1/	1/	1/	1/	1
Cynomys gunnisoni	160/	11/	15/	26/	38
Thomomys bottae	9/	2/	3/	5/	6
Perognathus sp.	7/	1/	3/	4/	4
Dipodomys ordii	19/	3/	5/	9/	12
D. spectabilis	6/	1/	3/	3/	3
Reithrodontomys megalotis	1/	1/	1/	1/	1
Peromyscus sp.	73/	5/	7/	12/	17
Onychomys leucogaster	2/	1/	2/	2/	2
Neotoma sp.	36/	7/	9/	9/	15
Carnivores					
Canis sp. and *C.* cf. *latrans*	4/	1/	3/	3/	3
Taxidea taxus	2/	1/	1/	1/	1
Felis (Lynx) rufus	2/	1/	1/	2/	2
Artiodactyls					
Odocoileus hemionus	1/	1/	1/	1/	1
Antilocapra americana	4/	2/	2/	3/	3
Ovis canadensis	1/	1/	1/	1/	1
Total Identified Mammals	1,780/	88/	124/	168/	230

[a]Number of specimens.
[b]Unit = site.
[c]Unit = room.
[d]Unit = major fill divisions.
[e]Unit = layer.

Table 10.5 (concluded)

Taxon	Site Totals: Elements[a]	SiteMNI[b]	MinMNI[c]	MidMNI[d]	MaxMNI[e]
BIRDS					
Anatidae sp.	1/	1/	1/	1/	1
Aquila chrysaetos	1/	1/	1/	1/	1
Buteo sp.	5/	2/	2/	3/	3
Callipepla squamata and cf. *Callipepla*	12/	2/	2/	2/	2
Meleagris gallopavo	766/	12/	19/	28/	47
Bubo virginianus	2/	1/	1/	1/	2
Eremophila alpestris	1/	1/	1/	1/	1
Pipilo chlorura and cf. *Pipilo*	2/	1/	1/	2/	2
Corus corax	1/	1/	1/	1/	1
REPTILES					
Pituophis melanoleucus	1/	1/	1/	1/	1
UNIDENTIFIED REMAINS					
Unidentified snake	4				
Unidentified small rodent	36				
Unidentified small mammal	1,139				
Unidentified medium mammal	11				
Unidentified med.-lg. mammal	34				
Unidentified artiodactyl	2				
Unidentified bird	3				
Unidentified vertebrate	103				
Total Unidentified Specimens	1,332				
Total (All Specimens)	3,904/	111/	154/	209/	291

[a]Number of specimens.
[b]Unit = site.
[c]Unit = room.
[d]Unit = major fill divisions.
[e]Unit = layer.

provenience units at the site. These tables are for Room 7, Room 8, and other test pits, respectively.

The number of specimens, or elements, is the number of individual bones of each taxonomic group. Skeletons and major articulated sections are counted as single specimens. Elements that could not be identified to the genus level are placed in one of eight categories of unidentified remains, depending on probable size and order of the animal represented. These categories are unidentified snake; unidentified bird; unidentified small rodent (mouse-rat sized); unidentified small mammal (rabbit-prairie dog sized); unidentified medium mammal (dog sized, probably a carnivore); unidentified artiodactyl (deer, pronghorn sheep, or bighorn sheep), unidentified medium-large mammal (carnivore, artiodactyl, or human); and unidentified vertebrate (unknown mammal, bird, or herptile of unspecified size). Thus, for specimens that cannot be identified, some information is still contained in the categories of unidentified remains.

In all of these tables, a plurality of MNI estimates is presented--not one or two but four different estimates are given. These differ in the methods of grouping proveniences for determining the criteria for totaling MNIs. In part, this is an exercise to see the effects of various provenience distinction methods on the absolute and relative frequencies of MNI values and on meat weight estimates, a quantification partially dependent on MNI frequencies. Archeologists have seldom explored the effects of provenience division on MNI frequencies, and only recently has work demonstrated that the effects can be great (e.g., Grayson 1978, 1979). As a result, there is growing evidence that interpretations based on relative abundance of MNIs should be approached with caution.

The four techniques given here are as follows.

(1) Site MNI--the absolute minimum MNI value given by considering the site assemblage as an undifferentiated unit. This is Grayson's (1979) minimum distinction method (or maximum agglomeration) and is also the same as the "Minimum MNI" used in other Chaco Project reports (Akins 1981a-f, 1982a-b; Gillespie 1979, 1981).

(2) Minimum MNI (minMNI)--considers each room or pitstructure separately but does not segregate proveniences within structures. Thus, the site MNI totals entail the sum of minimum numbers from each structure. This is essentially the approach advocated by Harris (1963). Note that "minimum MNI" was devised for this site only (as a handy label in distinguishing the different techniques) and differs from the definition of minimum MNI used at other Chaco Canyon sites.

(3) Mid-MNI (midMNI)--this is defined by separation of major fill categories within each structure (i.e., fill, floor fill, features, subfloor, and where appropriate, separate associated materials for separate floors).

(4) Maximum MNI (maxMNI)--has as its basis the separation of individual layers in stratigraphic depositions. This is the most divisive tech-

nique used here, although one could consider each excavation unit (FS number) individually. Grayson (1979) notes that the number of specimens for each taxon is theoretically the maximum MNI estimate.

The site MNI method is most applicable in small sites with small collections where mixing between provenience units is extreme or where the physical basis for defining provenience units is minimal (as in arbitrary levels in poorly stratified deposits). However, where sites are relatively more complex (as in most pueblo sites) and discrete units exist with minimal probability of sharing, this method will lead to an underestimation. The underestimation will not affect all taxa equally as high-frequency taxa will most probably be reduced more. Thus, the relative frequencies of taxa will change.

MinMNI would appear to be most appropriate where quantities of bone from rooms are small and deposits are not well stratified. This was the approach used with rooms at site 29SJ 629 (Gillespie 1981) where frequencies were much lower than at site 29SJ 633. The midMNI method is favored for the site 29SJ 633 rooms where remains are abundant and major fill units are evidently discretely separated. My impression is that maxMNI tends to sometimes yield more individuals than are actually represented. At site 29SJ 633, bones that undoubtedly came from a single individual and elements broken into more than one piece were occasionally found in adjacent layers. Nonetheless, this technique is commonly used in sites that have abundant remains and that lack architectural structure, not only where strata are well defined (e.g., Durrant 1970) but where levels are arbitrary (e.g., Guilday et al. 1978). In pueblo sites, examination for "matching sherds" should indicate whether a maxMNI estimation would be erroneous and, more generally, what MNI estimation technique would be most appropriate.

Table 10.2 shows the changes in relative frequencies of taxa for different MNI calculation techniques. In general, the percentages are reasonably constant with no more than 6 percent difference in any taxa. Moreover, the ordinal relationships remain similar although there are a few reversals. This accords with Grayson's (1979) findings that ordinal relationships are nearly constant whereas frequency values depend in part on the method of calculation. The small differences between the different methods suggest that comparison between sites may not be greatly hampered by slight differences in MNI calculation, although care must be taken to concentrate on general differences rather than low frequency variation. When turkeys are included, percentages are somewhat more variable.

All of the MNI estimates and the numbers of specimens show that cottontails are easily the most abundant taxon with turkeys second in frequency. Prairie dogs and jackrabbits are about equal in estimated MNI although the number of jackrabbit elements is more than twice that of prairie dogs. This same relationship was noted at site 29SJ 629 and seems to be a general characteristic of these species. This occurrence appears to result from a combination of factors including the larger size of Lepus, the tendency for rabbits to fragment into a greater number of pieces, and the easy recognizability of rabbit specimens, even with very tiny fragments. (There may be other factors as well.) Turkeys, when abundant, show an even stronger tendency for very low ratios of MNI to number of elements (siteMNI/Elem. in Table 10.2). As a result, not only do relative frequencies of number of specimens and MNI differ greatly for some taxa, but the ordinal ranking may change as well.

The next most abundant probable game animal is Neotoma. Other rodents are predominantly noncultural in derivation. Artiodactyls are quite sparse at the site with only six identified specimens and two unidentified artiodactyl elements. Nonetheless, deer, pronghorn, and bighorn are all present. Carnivores are slightly more abundant with a few specimens of badger, bobcat, and coyote present. More detailed discussions of the occurrence of all taxa are given below under "Taxonomic Composition."

Meat Weight Estimates

Lyman (1979) and Binford (1978) have recently presented convincing reasons for not continuing the common practice of calculating meat weight values on the simple basis of minimum number of individuals represented. This stems from the growing recognition that the MNI meat weight method (identified with White 1953) can lead to vast overestimation of the meat weight represented by the remains of larger taxa and marked distortion of the relative abundances of different taxa. Site 29SJ 633 is a case in point. Here artiodactyl species account for only 6 of more than 1,700 identified mammal bones (0.3 percent) and only a small percentage of the estimated MNI. Yet, even taking into account the very young Antilocapra individual, the artiodactyl specimens represent as much as 69 percent of the estimated meat weight total when White's method is applied (and this is while using smaller live weight estimates than those given by White). It is this type of situation that favors the application of an alternative method of estimation.

Between the two of them, Binford (1978) and Lyman (1979) indicate three techniques that might be profitably used to give more accurate and reliable estimates of consumed meat weight. These are (1) "skeletal portion" (Lyman), (2) "butchering portion" (Lyman), and (3) individual element (Binford). In each case, the method sums the usable meat weight represented by the anatomical portion represented. "Skeletal portion" or "major anatomical segments" as they are labeled by Binford, refer to the division of the body into five parts: the axial skeleton, two front limbs, and two hind limbs. Both Binford and Lyman give figures of the meat weight present in each portion for various species of artiodactyls.

It is also reasonable to modify the meat weight calculations for the next largest set of animals, the carnivores, in an effort to reduce overestimation of their dietary importance. If one attempts to gain more realistic meat weight estimates for artiodactyls by considering only the anatomical portions represented, but calculates carnivore meat weight on the basis of individuals represented, the result is a clear overestimation of the importance of the latter group. High estimates of meat value for carnivores are particularly suspect in view of indications that several carnivores (e.g., Taxidea taxus, Felis rufus) were often procured for reasons other than food value. Similarly, there is only limited evidence at most sites that domestic dogs were eaten.

In order to produce what are thought to be more realistic meat weight estimates, carnivore remains can be handled in a manner similar to that of the artiodactyls. However, detailed comparative data on the meat weights represented by specific skeletal parts are not as readily available as they are for the larger artiodactyls. In lieu of such data, carnivores are divided only into basic skeletal portions--axial skeleton, front legs, rear legs--and the relative meat weight contributions of each are based on Binford's (1978) sheep data. Using these values and following Binford rather than Lyman for definitions of the major skeletal portions (i.e., cranium, mandible, pelvis, and sacrum included with axial skeleton), the guidelines used for estimating consumed weight represented by carnivore remains found at site 29SJ 633 are given on Table 10.6.

"Butchering portion" is a more appealing categorization involving the division of the body into more refined anatomical sections that (presumably) have a more integral relationship to the way in which a large animal might have been cut up and distributed. Lyman gives meat weight values for the butchering portions that were standard for the early twentieth century (e.g., "hotel racks," "chucks," and "briskets"). Although these are appropriate to his study of historic use of domestic animals, two aspects make application of his butchering units to prehistoric remains tenuous. First, with its Euro-American bias, such an integral part of the body as the skull is omitted. Second, some of the butchering portions require a saw or minimally an axe/cleaver and thus do not correspond to anatomical portions that result from dismemberment by simpler tools (e.g., chuck).

Binford (1978) carries the reduction further by considering only the meat weight represented by each individual element. This technique is required for Binford's complicated manipulations designed to assess variability in the relative abundance of each element and is suited to his Nunamiut collections where faunal remains are quite abundant. However, in situations where large game elements are not so abundant, it appears that estimating consumed meat weight by simply figuring the amount of meat attached to each element present could lead to noticeable underestimation of the actual meat weight present.

The approach adopted here combines data presented by Binford with the basic methodology outlined by Lyman. Eight anatomical sections identified by Binford as basic butchering units (and a ninth category of "feet") are established, and the relative meat weight of each is calculated from Binford's data on sheep elements (Tables 10.7 and 10.8). The relative amounts of meat weight for each section are then used to estimate values for different average live weights of the different artiodactyl species (Table 10.9). This method involves the assumption that skeletal proportions of the species in question (<u>Ovis</u>, <u>Odocoileus</u>, and <u>Antilocapra</u>) are equivalent or nearly so. Figures given by Binford for sheep and caribou suggest that this assumption is not completely appropriate; i.e., that artiodactyl species do show differences in skeletal proportions and dis-

Table 10.6. Values used in calculating consumed meat weight of carnivore major skeletal portions[a]

	Estimated % of Available Meat Weight	Cf. *Canis*, *Canis latrans* (kg)	*Lynx*, *Taxidea* (kg)
Estimated live weight	-	11.0	10.0
Estimated available meat weight (assumed 50%)	-	5.5	5.0
Axial skeleton (cranium, vertebrae, ribs, sternum, pelvis, sacrum)	58.2	3.20	2.91
Front leg (two each) (scapula, humerus, radius-ulna, metacarpals, carpals, phalanges)	9.6	0.53	0.48
Rear leg (two each) (femur, tibia, fibula, metatarsals, tarsals, patella, phalanges)	11.2	0.62	0.58

[a]Relative amounts are based on Binford's data for sheep (1978).

Table 10.7. Meat weights of Binford's (1978) 90-month sheep

Skeletal Portion and Elements		Gross Weight (kg)	% of Gross Weight	Bone Weight (kg)	Meat Weight (kg)	% of Meat Weight	
Head							
Cranium (with brain)		0.94		0.29	0.65		
Mandible (with tongue)		1.19		0.17	1.02		
Total		2.13	10.6	0.46	1.67	9.9	
Cervical vertebrae							
Atlas-axis		0.41		0.09	0.32		
Cervicals 3-7		1.09		0.14	0.95		
Total		1.50	7.4	0.23	1.27	7.5	
Thoracic vertebrae		1.76	8.7	0.29	1.47	8.7	
Lumbar and pelvic area							
Lumbar vertebrae		0.87		0.21	0.66		
Pelvis and sacrum		1.62		0.32	1.30		
Total		2.49	12.4	0.53	1.96	11.6	
Sternum and ventral portions of ribs		1.86	9.2	0.05	1.81	10.7	
Ribs (Rib slabs) (dorsal portion)		2.00	9.9	0.37	1.63	9.7	
Front leg (feet)							
Scapula		0.84		0.08	0.76		
Humerus		0.58		0.10	0.48		
Radius-ulna		0.32		0.09	0.23		
Total	(two each)	1.74	8.6	0.27	1.47	8.7	(17.4)
Rear leg (feet)							
Femur		1.47		0.12	1.35		
Tibia		0.50		0.11	0.39		
Total	(two each)	1.97	9.8	0.23	1.74	10.2	(20.6)
Foot							
Metacarpal		0.14		0.05	0.09		
Metatarsal		0.15		0.06	0.09		
(any metapodial)		-		-	0.09		
Phalanges		0.105		0.04	0.065		
Total	(four each)	0.25 (avg)	1.2	0.095 (avg)	0.155	0.9	(3.6)
Totals		20.16		3.30	16.85		

[a]Live 45 kg (44,905.05 g = 99 lb) values were used in estimating meat weight for Chaco area artiodactyls.

Table 10.8. Meat weight estimate figures for artiodactyls by equating Binford's (1978) "gross weight" with the butchered "dressed weight" used by wildlife biologists

	% of Total Meat Weight	Meat Weight as % of Gross Weight	Ovis canadensis and Odocoileus hemionus (kg)	Antilocapra americana (kg)
Estimated average live weight	-	-	75.00	45.00
Estimated dressed weight (53% of live weight)	-	-	39.75	23.85
Head	9.9	8.3	3.30	1.98
Cervical vertebrae	7.4	6.3	2.50	1.50
Thoracic vertebrae	8.7	7.3	2.90	1.74
Lumbar vertebrae and pelvis	11.6	9.7	3.86	2.32
Sternum (ventral ribs)	10.7	9.0	3.57	2.14
Ribs (dorsal parts)	9.7	8.1	3.21	1.93
Front leg (each)	8.7	7.3	2.90	1.74
Rear leg (each)	10.3	8.6	3.43	2.06
Feet (each)	0.9	0.8	0.31	0.18
Total	(99.6)	83.7	33.24	19.93
			(44.3% of live wt.)	(44.3% of live wt.)

Table 10.9. Estimated consumed meat weight amounts for 29SJ 633 artiodactyls on the basis of anatomical portions

Taxon	Provenience	Element	Anatomical Portion	Estimated Meat Weight (kg)
Odocoileus	Room 7, Bin 1	1 left scapula	Front leg	2.90
Antilocapra	Room 7, Layer 3	1 right dentary 1 left molar (very young)	Head	0.22
	Room 7, Layer 6	1 radius fragment	Front leg	1.74
	Room 7, Layer 9	1 lower premolar	Head	1.98
Total				3.94
O. canadensis	Room 7, Floor 2, Other Pit 1	1 right metacarpal	Foot	0.31
Unid. artiodactyl	Room 7, Layer 6	1 thoracic vertebra	Thoracic region	2.90
		1 metapodial fragment	Foot	0.31
Total artiodactyls				10.36

tributions of usable meat. However, in lieu of comparable data for the three taxa, the proportions determined by Binford (1978:16) for a mature domestic sheep are used here with the recognition that the resultant estimates are not as precise as they would be with better comparative data. [One should also recognize the great amount of intraspecific variability in meat weight amounts according to such factors as age, sex, and season (see Smith 1975).] Still, it is thought that these estimates of consumed meat amounts (as opposed to available meat) are far more accurate and relevant than are the estimates derived from White's method.

Tables 10.10 and 10.11 show the average live weight of taxa and the estimated available meat weight values for site 29SJ 633 mammals and turkeys (for midMNI and maxMNI). Table 10.12 shows estimates based on each of the four MNI calculations for each taxonomic order. These values show that turkeys and artiodactyls have the greatest potential meat weight. Rabbits are next, then carnivores, with rodents (mainly Cynomys) contributing very little. Individually, using the midMNI values, turkeys rank first; jackrabbits, cottontails, and the three artiodactyl species are all very close to each other but have considerably lower meat weight values.

These figures also show that the method of MNI calculation has a much more noticeable effect on meat weight estimates than was noted for the relative MNI frequencies themselves. This results from (1) the rapid increase in MNI estimates for common taxa (such as Meleagris) when there is more divisive MNI calculation, combined with (2) stable MNI values for the low-frequency large mammals. Relative frequencies of artiodactyl MNIs decline with decreased agglomeration (Table 10.2), but the percentages are so small that the changes seem insignificant. However, when these are multiplied by a relatively large meat weight value per individual, the decline becomes far more apparent. Thus, when we use site MNI values, artiodactyls constitute more than half of the estimated available meat weight amount, but with maxMNI values they make up less than 30 percent of the total.

This same trend also pertains to consumed meat weight estimates as can be seen in Tables 10.13 and 10.14 and Figure 10.1. This occurrence would seem to have important implications for site-to-site comparisons of taxa by abundance. As noted above, different methods of MNI calculation do not have pronounced effects on the figures for relative abundances of MNIs. However, this is not the case when either available or consumed meat weight values are derived from these figures. This suggests that determining relative frequencies of taxa on the basis of meat weight estimates is a more suspect means of comparing faunal assemblages. Although the data here support Grayson's (1979) contention that ordinal ranking using different MNI calculation methods is usually consistent, his characteristic does not hold with meat weight estimates.

Consumed meat weight estimates (Tables 10.13 and 10.14) show turkeys as the biggest food resource at the site, followed closely by rabbits. Artiodactyls, carnivores, and large rodents contributed considerably less. With regard to individual taxa, the four highest meat weight estimates using midMNI values are turkey, jackrabbit, cottontail, and prairie dog,

Table 10.10. Estimated average live weights of Chaco Canyon area mammals and estimated available meat weights[a]

Taxon	Estimated Live Weight (g)	(lb)	Log_{10} (g)	Est. % Usable Meat	Est. Meat weight (g)
Perognathus flavus	8	0.02	0.9	-	-
P. flavenscens	10	0.02	1.0	-	-
Reithrodontomys megalotis	10	0.02	1.0	-	-
Peromyscus crinitus	17	0.04	1.2	-	-
P. maniculatus, boylii, truei	25	0.06	1.4	-	-
Microtus mexicanus	30	0.07	1.5	-	-
Onychomys leucogaster	32	0.07	1.5	-	-
Microtus longicaudus	50	0.11	1.7	-	-
M. pennsylvanicus	60	0.13	1.8	-	-
Dipodomys ordii	70	0.15	1.8	0.4	28
Ammospermophilus leucurus	100	0.22	2.0	0.4	40
Spermophilus spilosoma	110	0.24	2.0	0.4	44
Thomomys bottae	170	0.4	2.2	0.4	68
Dipodomys spectabilis	175	0.4	2.2	0.4	70
Small Neotoma (N. stephensi, albigula, mexicana)	175	0.4	2.2	0.4	70
(Unid. Neotoma)	225	0.5	2.4	0.4	90
Large Neotoma (N. cinerea)	275	0.6	2.4	0.4	110
Spermophilus variegatus	800	1.8	2.9	0.4	320
Cynomys gunnisoni	925	2.0	3.0	0.4	370
Sylvilagus audubonii	955	2.1	3.0	0.4	382
Lepus californicus	2,750	6.0	3.4	0.4	1,100
Erethizon dorsatum	6,000	13.0	3.8	0.4	2,400

[a]Taxa arranged by increasing size. Live weight values from Armstrong (1972), Lechietner (1969), Bailey (1931), and White (1953).

Table 10.10 (concluded)

Taxon	Estimated Live Weight (kg)	(lb)	Log_{10} (g)	Est. % usable Meat[a]	Est. Meat weight (kg)[a]
Taxidea taxus	10	22	4.0	(0.5)	(5.0)
Lynx rufus	10	22	4.0	(0.5)	(5.0)
Canis familiarus	7	15.5	3.8	(0.5)	(3.5)
Canis latrans	11	24	4.0	(0.5)	(5.5)
Canis lupus	27	60	4.4	(0.5)	(23.5)
Urocyon cineroargenteus	4.5	10	3.7	(0.5)	(2.25)
Ursus americanus	90	200	5.0	(0.5)	(45.0)
Antilocapra americana	45	100	4.7	(0.4)	(16.85)
Odocoileus hemionus	75	165	4.9	(0.4)	(28.1)
Ovis canadensis	75	165	4.9	(0.4)	(28.1)
Cervus canadensis	300	660	5.5	(0.4)	(120.0)
Bison bison	590	1,300	5.8		

[a]For these larger species, calculations of consumed meat weight on the basis of anatomical portions is favored, though figures for calculation of available biomass are given here. Using anatomical portions for *Ovis*, *Odocoileus*, and *Antilocapra*, available meat weight is estimated to be 44 percent of live weight.

Table 10.11. Available meat weights for site 29SJ 633 with the use of midMNI and maxMNI estimates

Taxon	Estimated Mean Live Wt. (kg)	Usable Meat %	Using midMNI for Site: MidMNI	Using midMNI for Site: Est. Meat Weight (kg)	Using midMNI for Site: %[a]	Using maxMNI: MaxMNI	Using maxMNI: Est. Meat Weight (kg)	Using maxMNI: %[a]
Lagomorphs								
Sylvilagus	0.955	40	60	22.92	9.0	83	31.71	9.7
Lepus	2.75	40	25	27.50	10.8	37	40.70	12.5
Rodents								
Cf. S. spilosoma	0.11	—						
Cynomys	0.925	40	26	9.62	3.8	38	14.06	4.8
Thomomys	0.17	40	5	0.34	0.1	6	0.41	0.1
Perognathus	0.11	—						
Dipodomys ordii	0.07	—						
D. spectabilis	0.175	40	3	0.21	0.1	3	0.21	0.1
Reithrodontomys	0.01	—						
Peromyscus	0.025	—						
Onychomys	0.03	—						
Neotoma	0.225	40	9	0.81	0.3	15	1.35	0.4
Carnivores								
Canis	11.0	50	3	16.50	6.5	3	16.50	5.1
Taxidea	10.0	50	1	5.00	2.0	1	5.00	1.5
Felis (Lynx)	10.0	50	2	10.00	3.9	2	10.00	3.1
Artiodactyls								
Odocoileus	75.0	37	1	28.10	11.9	1	28.10	8.6
Antilocapra	45.0	37	3[b]	38.70	15.3	3[b]	38.70	11.9
Ovis	75.0	37	1	28.10	11.9	1	28.10	8.6
Turkeys								
Meleagris	4.7	50	28	65.80	25.9	47	110.45	34.0
Totals				253.60	99.7		325.29	99.9

[a]Percentages based on mammals plus turkeys.
[b]5.0-kg weight assumed for very young pronghorn individual.

Table 10.12. Percentages of estimated available meat weight (kg) for taxonomic orders with the use of different techniques of MNI estimation

Order	SiteMNI Weight	%	MinMNI Weight	%	MidMNI Weight	%	MaxMNI Weight	%
Lagomorphs	26.23	17.2	35.26	18.4	50.42	19.9	72.41	22.3
Rodents	4.91	3.2	6.70	3.5	10.98	4.3	16.03	4.9
Carnivores	15.50	10.1	26.50	13.9	31.50	12.4	31.50	9.7
Artiodactyls	78.05	51.0	78.05	40.8	94.90	37.4	94.90	29.2
Galliformes	28.20	18.4	44.65	23.4	65.80	25.9	110.45	34.0
Totals	152.89	99.9	191.16	100.0	253.60	99.9	325.29	100.1

Table 10.13. Estimated amounts and relative frequencies of consumed meat weight for 29SJ 633, with the use of different methods of estimating minimum number of individuals

Taxon	SiteMNI kg	SiteMNI %	MinMNI kg	MinMNI %	MidMNI kg	MidMNI %	MaxMNI kg	MaxMNI %
Lagomorphs								
Sylvilagus	14.13	17.7	19.86	18.5	22.92	15.5	31.71	14.5
Lepus	12.10	15.2	15.40	14.4	27.50	18.6	40.70	18.6
Rodents								
Cynomys	4.07	5.1	5.50	5.1	9.62	6.5	14.06	6.4
Thomomys	0.14	0.2	0.20	0.2	0.34	0.2	0.41	0.2
D. spectabilis	0.07	0.1	0.21	0.2	0.21	0.1	0.21	0.1
Neotoma	0.63	0.8	0.81	0.8	0.81	0.5	1.35	0.6
Carnivores								
Canis	3.20	4.0	3.20	3.0	3.20	2.2	3.20	1.5
Taxidea	3.45	4.3	3.45	3.2	3.45	2.3	3.45	1.6
Felis (Lynx)	3.45	4.3	3.45	3.2	3.45	2.3	3.45	1.6
Artiodactyls								
Odocoileus	2.90	3.6	2.90	2.7	2.90	2.0	2.90	1.3
Antilocapra	3.94	4.9	3.94	3.7	3.94	2.7	3.94	1.8
Ovis canadensis	0.31	0.4	0.31	0.3	0.31	0.2	0.31	0.1
Unid. artiodactyls	3.21	4.0	3.21	3.0	3.21	2.2	3.21	1.5
Turkeys								
Meleagris gallopavo	28.20	35.3	44.65	41.7	65.80	44.6	110.45	50.4
Total	79.80	99.9	107.09	100.0	147.66	99.9	219.35	100.2

Table 10.14. Estimated consumed meat weight at 29SJ 633 by taxonomic order, based on different MNI estimates

Taxon	SiteMNI		MinMNI		MidMNI		MaxMNI	
	kg	%	kg	%	kg	%	kg	%
Lagomorphs	26.23	32.9	35.26	32.9	50.42	34.1	72.41	33.0
Rodents	4.91	6.2	6.72	6.3	10.98	7.4	16.03	7.3
Carnivores	10.10	12.7	10.10	9.4	10.10	6.8	10.10	4.6
Artiodactyls	10.36	13.0	10.36	9.7	10.36	7.0	10.36	4.7
Galliformes	28.20	35.3	44.65	41.7	65.80	44.5	110.45	50.4
Total	79.80	100.1	107.09	100.0	147.66	99.8	219.35	100.0

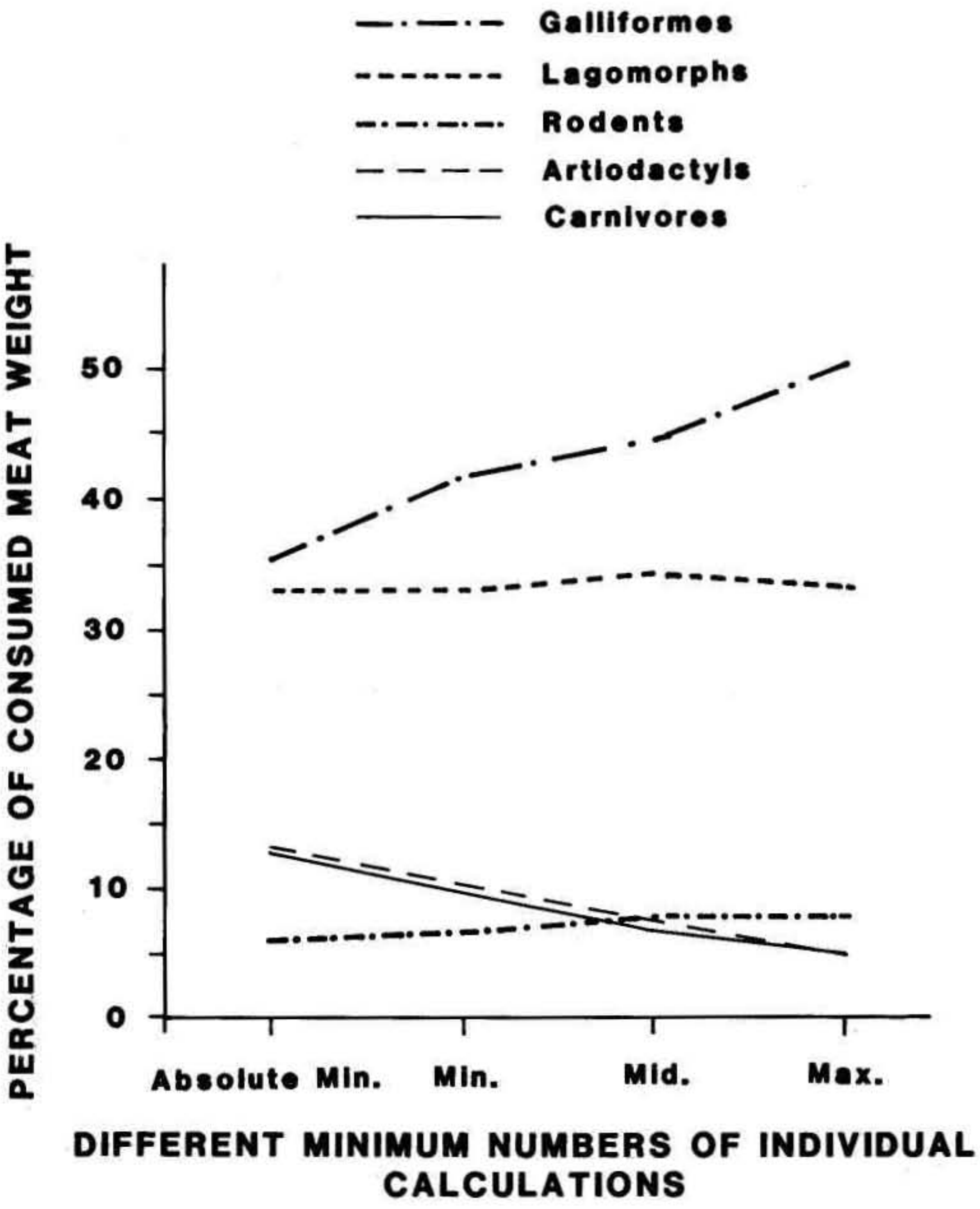

Figure 10.1. Relative amounts of estimated consumed meat weight for taxomonic orders with the use of different MNI estimates

respectively. Each of the other taxa makes up less than 3 percent of the estimated total.

Taxonomic Composition

Lagomorphs

Sylvilagus cf. audubonii (cottontail)

As at most Chaco Canyon sites, cottontails are the most abundant taxon found, both in terms of identified specimens and minimum number of individuals. A total of 110 specimens accounts for 26.8 percent of all bone and 62.0 percent of the identified mammals (see Tables 10.2 and 10.3). An absolute minimum of 37 individuals is represented, though using the maximum distinction method (maxMNI) there are an estimated 83 minimum number of individuals. Any way they are counted, cottontails make up 35-40 percent of the total number of identified mammal individuals. Because of its small body size, Sylvilagus ranks third behind Meleagris and Lepus in estimated consumed meat weight.

All individuals are thought to be desert cottontails (S. audubonii) rather than the more mesic Nuttall's cottontail (S. nuttalli). All intact dentaries were measured (tooth row length and dentary height) and, according to the criteria of Findley et al. (1975), the site 29SJ 633 assemblage is characteristic of S. audubonii.

Although it is possible that a portion of the Sylvilagus collection is from postoccupational intrusion, it seems clear that cottontails here were a basic food item and that the bulk of the number is cultural refuse. A relatively large proportion--15.9 percent--of the cottontail bones are charred, and several specimens show signs of deliberate fracturing. No articulated individuals were recovered, and articulated sections rarely involved more than a foot or limb.

Individuals at 29SJ 633 appear to be rather small compared to other S. audubonii. For example, published measurements for S. audubonii (Armstrong 1972; Findley et al. 1975; Hoffmeister and Lee 1963) and measured dentaries from other Chaco Canyon sites (Hunter 1978) show that maxillary tooth row lengths are characteristically greater than 12.0 mm. At 29SJ 633, less than 40 percent exceed this length with a mean of 11.72 mm (s.d. = 0.95; n = 33). This is significantly smaller than samples from nearby 29SJ 628 ($\bar{x}$ = 12.42; s.d. = 0.55; n = 48) and from Pueblo Alto ($\bar{x}$ = 12.45; s.d. = 0.61; n = 48). In both cases, t values in comparison with 29SJ 633 are significant at the 0.001 level of confidence.

The reason for this difference could come from three different sources: either (1) physically smaller adult forms composed the population exploited by people at 29SJ 633 or (2) more individuals in the 29SJ 633 collection were subadult and not full-sized or (3) smaller individuals were in part excluded from the 29SJ 628 and Pueblo Alto samples. Unfortunately, the last possibility cannot entirely be dismissed. Hunter did purposefully exclude recognizably smaller, immature specimens from his sample. However, even if the smallest individuals from 29SJ 633 are removed so that the range of sizes is comparable with Hunter's sample, the 29SJ 633 collection is still significantly smaller than either the 29SJ 628 or Pueblo Alto samples. In comparison to 29SJ 628, t = 2.53, signif. at 0.5, and in comparison with Pueblo Alto, t = 3.21, signif. at 0.01.

Assuming that there is a "real" tendency for these to be higher frequencies of smaller individuals, it remains to be seen whether the first or second possibilities above is contributing more to the difference. Rabbits are difficult to age since they grow and mature quickly. Epiphyseal union gives some clue, but dates of closure for most elements are unknown, and those that have been studied show great variability in fusion. For example, proximal humeri have been shown to close anywhere from 8 to 20 months (Pelton 1969). Closure of distal tibiae epiphyses was monitored and showed more unfused (10) than fused (8) examples. As this is an epiphyseal union that should close at a rather young age, this suggests a prevalence of young individuals in the sample. By comparison, all of the distal tibiae epiphyses from nearby 29SJ 629 were fused. This does not include obviously quite young and small individuals of which there are at least four at the site. These data combined with the fact that dentary sizes range up to sizes as large as at the other sites suggest that the main reason 29SJ 633 cottontails are smaller is that there are a greater number of immature individuals.

Lepus californicus (black-tailed jackrabbit)

Jackrabbit remains are abundant at 29SJ 633 with 351 elements ranking second only to Sylvilagus among mammals and MNI values about the same as Cynomys. In terms of estimated consumed meat weight, Lepus ranks first among mammals. Remains are thoroughly disarticulated and 8 percent are charred. Specimens are distributed fairly evenly through the excavated areas, although there appears to be a slight trend in frequencies in the strata of both rooms. In each case, Lepus is more abundant (vis-a-vis Sylvilagus and other common taxa) in the fill and subfloor deposits than it is in association with floors (see Tables 10.15 and 10.16 and Figures 10.2-10.5).

Rodents

Nine genera and a minimum of ten species of rodents are present in the 29SJ 633 collection. The most abundant taxon, also the largest and the one most often used for food, is the prairie dog, Cynomys gunnisoni. Medium-sized rodents such as woodrats (Neotoma sp.), ground squirrels (cf. Spermophilus), gophers (Thomomys bottae), and possibly large kangaroo rats (Dipodomys spectabilis) may have been used for food on occasion but also could be noncultural intrusives. Smaller rodents, most probably noncultural, are dominated here by white-footed mice (Peromyscus sp.) though several other taxa are present in low frequencies. Compared to nearby 29SJ 629, only the two largest taxa, Cynomys and Neotoma, are as common or more common at 29SJ 633. This is thought to be in part a result of the

Table 10.15. Relative frequencies of the four most common taxa at 29SJ 633 for primary proveniences. Number of identified specimens (elements)

	Whole site		Room 7											
			Fill		Floor Fill		Floor 1		Floor 2		Subfloor		Room Total	
Taxon	Elements	Rel. %	Elements	%	Elements	%	Elements	%	Elements	%	Elements	%	Elements	%
Sylvilagus	1,103	46.3	398	38.3	436	56.3	97	41.1	27	81.8	11	39.3	969	45.9
Lepus	351	14.7	178	17.1	112	14.5	23	9.7	2	6.1	10	35.7	325	15.4
Cynomys	160	6.7	60	5.8	43	5.6	20	8.5	3	9.1	5	17.9	131	6.2
Meleagris	766	32.2	402	38.7	183	23.6	96	40.7	1	3.0	2	7.1	684	32.5
Total	2,380	99.9	1,038	99.9	774	100	236	100	33	100	28	100	2,107	100

	Room 8									
	Fill		Floor Fill		Floors 1 and 2		Subfloor		Room Total	
Taxon	Elements	%	Elements	%	Elements	%	Elements	%	Elements	%
Sylvilagus	13	34.2	7	12.1	12	63.1	51	75.0	83	45.4
Lepus	5	13.2	1	1.7	1	5.3	10	14.7	17	9.3
Cynomys	6	15.8	1	1.7	3	15.8	5	7.4	15	8.2
Meleagris	14	36.8	49	84.5	3	15.8	2	2.9	68	37.2
Total	38	100	58	100	19	100	68	100	183	100

Table 10.16. Relative frequencies of the four most common taxa at 29SJ 633 for primary proveniences. Minimum numbers of individuals (maxMNI)

	Whole site		Room 7											
		Rel.	Fill		Floor Fill		Floor 1		Floor 2		Subfloor		Room Total	
Taxon	MNI	%	MNI	%	MNI	%	MNI	%	MNI	%	MNI	%	MNI	%
Sylvilagus	83	40.5	28	41.8	15	50.0	12	36.4	3	37.5	2	25.0	60	41.1
Lepus	37	18.0	12	17.9	7	23.3	4	12.1	1	12.5	2	25.0	26	17.8
Cynomys	38	18.5	11	16.4	3	10.0	8	24.2	3	37.5	2	25.0	27	18.5
Meleagris	47	22.9	16	23.9	5	16.7	9	27.3	1	12.5	2	25.0	33	22.6
Total	205	99.9	67	100.0	30	100.0	33	100.0	8	100.0	8	100.0	146	100.0

	Room 8									
	Fill		Floor Fill		Fl. 1 & 2		Subfloor		Room Total	
Taxon	MNI	%	MNI	%	MNI	%	MNI	%	MNI	%
Sylvilagus	4	30.8	2	28.6	2	28.6	4	40.0	12	33.3
Lepus	3	23.1	1	14.3	1	14.3	3	30.0	8	22.2
Cynomys	3	23.1	1	14.3	3	42.9	1	10.0	7	19.4
Meleagris	3	23.1	3	42.9	1	14.3	2	20.0	9	25.0
Total	13	100.1	7	100.1	7	100.1	10	100.0	36	99.9

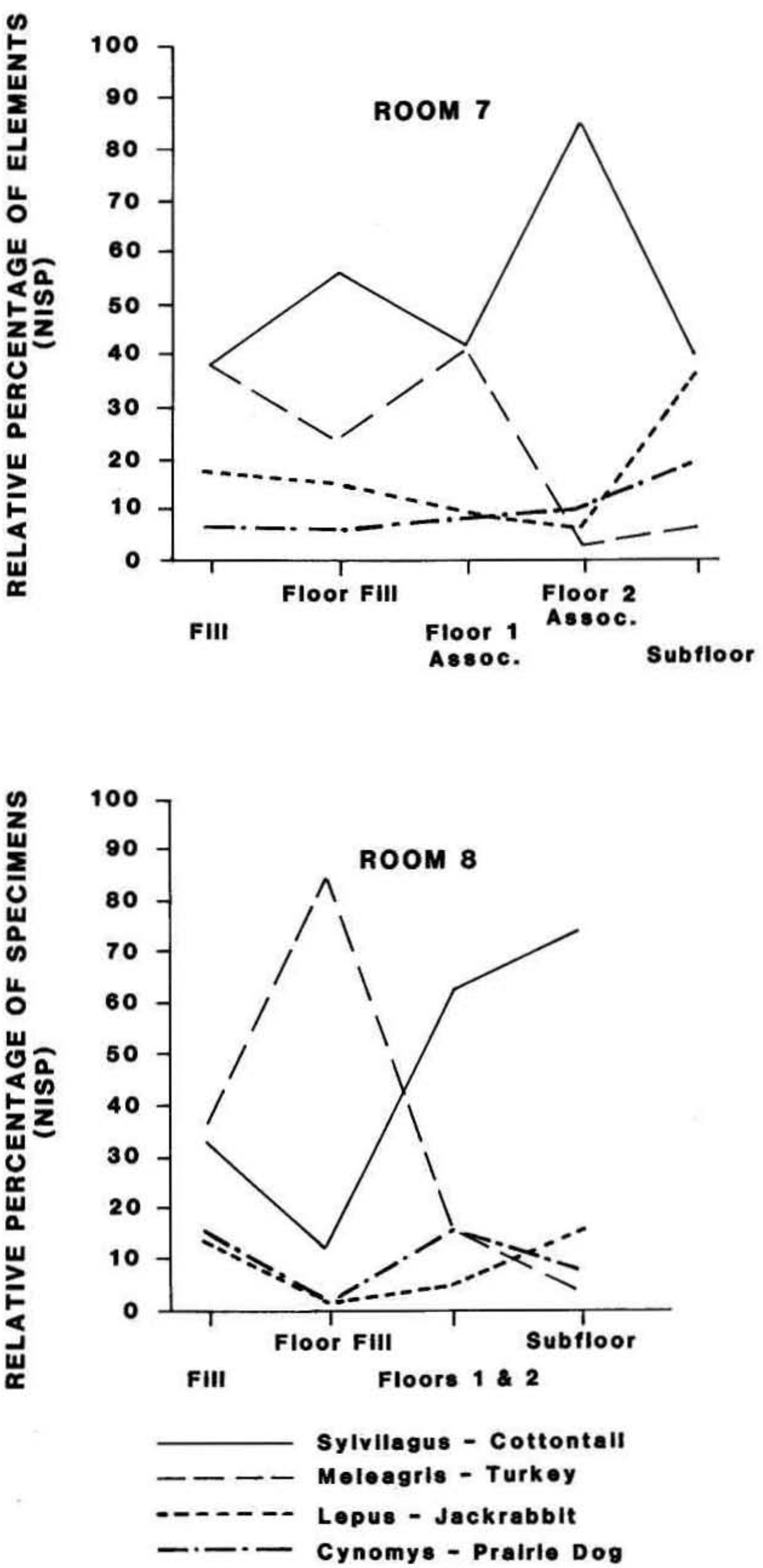

Figure 10.2. Relative frequencies of the four most abundant economic taxa in major fill units of Rooms 7 and 8, site 29SJ 633

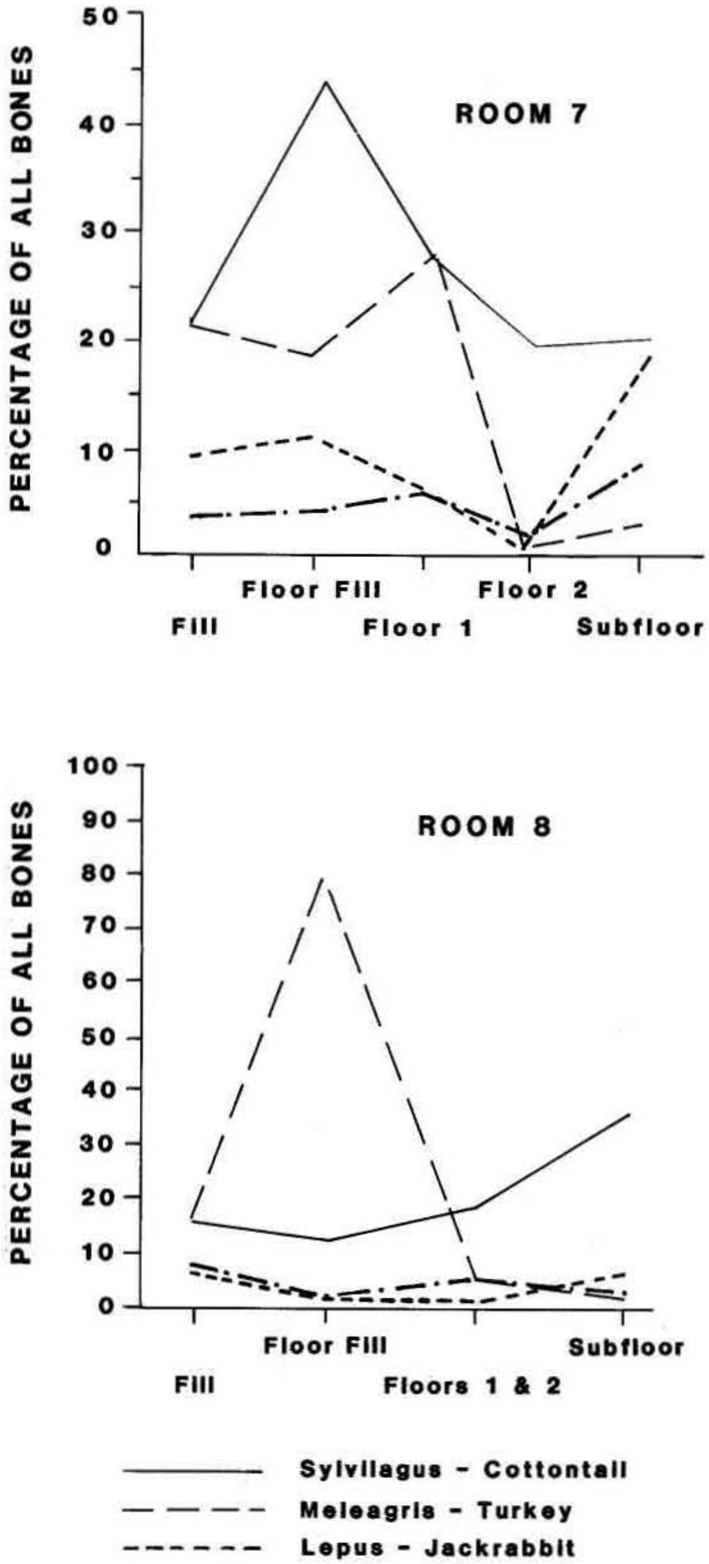

Figure 10.3. Frequencies of the four most abundant taxa at site 29SJ 633 in terms of total number of bones

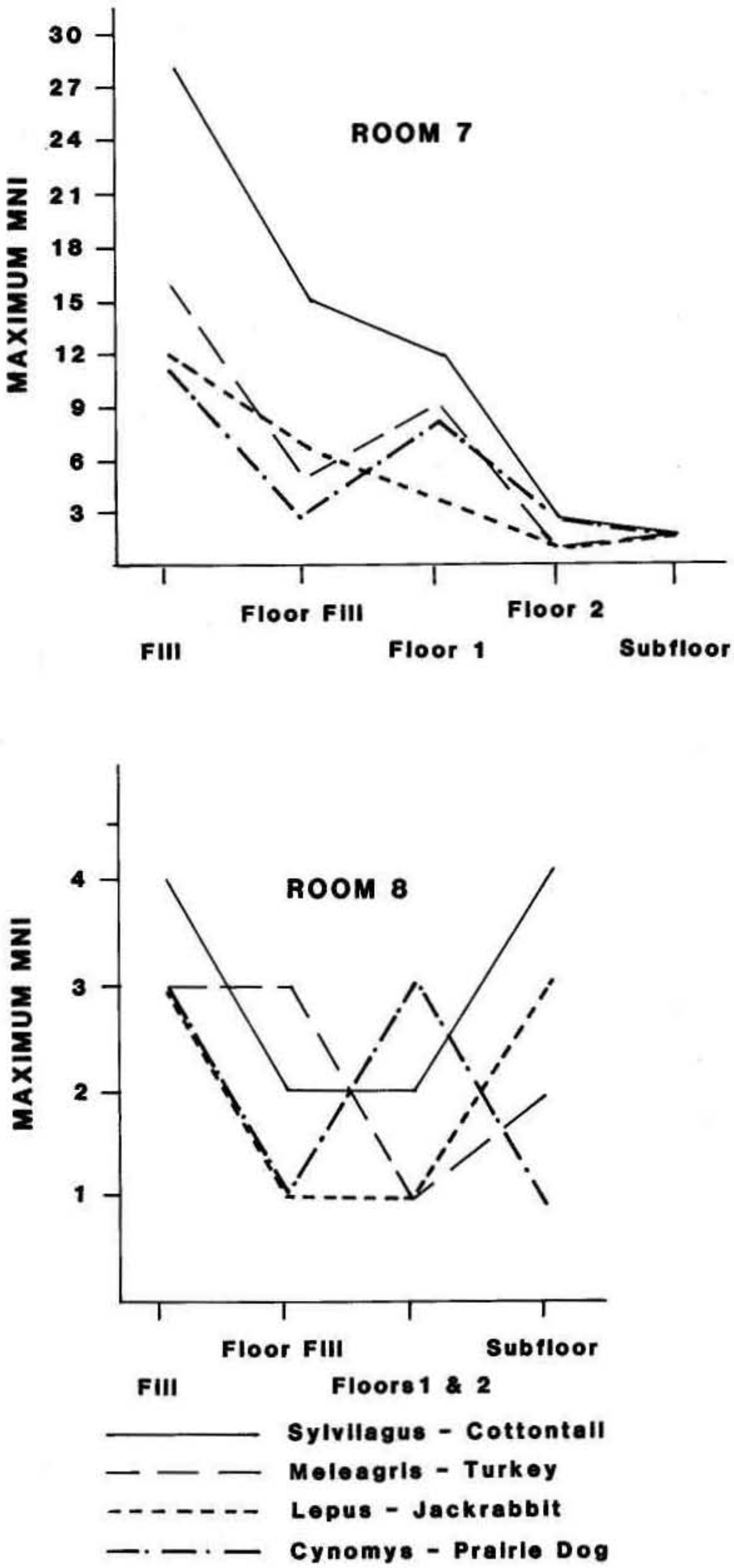

Figure 10.4. Minimum numbers of individuals (maxMNI) from the four most common taxa for major fill units of Rooms 7 and 8

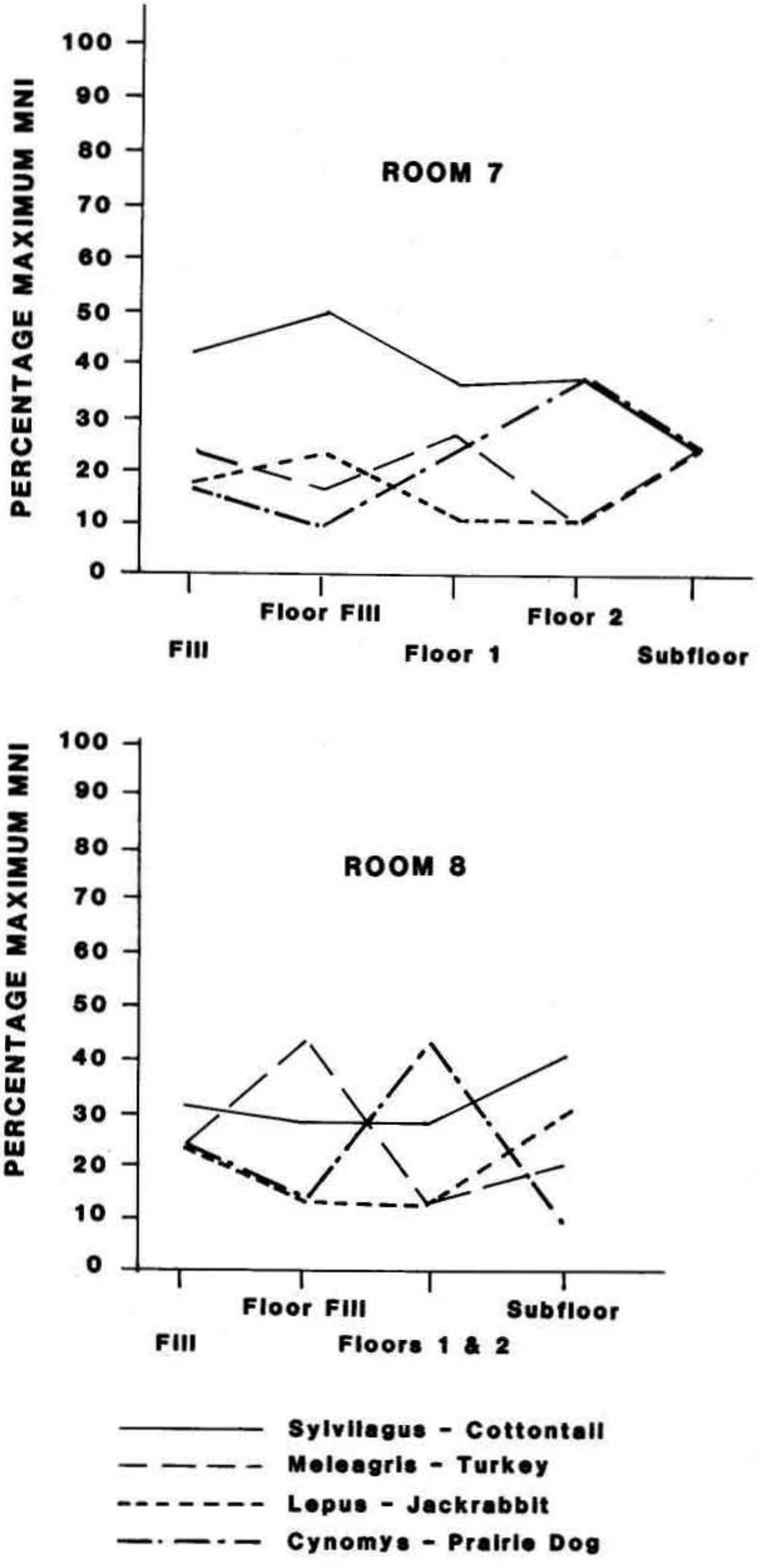

Figure 10.5. Relative MNI values of the four most common taxa for major fill units, Rooms 7 and 8

greater occurrence of noncultural intrusives at 29SJ 629 and the resulting lower relative numbers of small game animals.

cf. Spermophilus spilosoma (small ground squirrel, cf. spotted ground squirrel)

At least one element--a tibia--is clearly of a small ground squirrel and compares best with S. spilosoma (if not this species, it is probably an Antelope Ground Squirrel--A. leucurus). Other elements may be present but could not be identified and are listed as unidentified small mammals. Although small squirrels such as S. spilosoma could have been procured for food, their scarcity in the archeological remains suggests otherwise. Ground squirrels are presently common on rocky ridges such as the one on which 29SJ 633 is located. The single referred specimen is from Room 7, Layers 5-6 mixed.

Cynomys gunnisoni (Gunnison's prairie dog)

Prairie dogs rank with jackrabbits as the second most abundant mammalian taxon at 29SJ 633 (in terms of minimum number of individuals). Between 11 (site MNI) and 38 (maxMNI) individuals are represented by 160 specimens. This abundance, the lack of articulation, and the relatively high percentage of charring (over 8 percent) show that this was an important small game taxon with few if any specimens from postoccupational intrusion. Remains were found throughout the tested parts of the site with an even distribution showing little indication of localized abundances. There is a slight tendency for MNI totals to be relatively high (vis-a-vis Sylvilagus and Lepus) in Room 8 samples, but this may be largely a function of small sample size.

Thomomys bottae (Botta's pocket gopher)

Only nine elements from a minimum of two individuals were found at 29SJ 633. Seven of the specimens are from a variety of fill and subfloor layers in Room 7 whereas two are from Room 8, Layer 4. Distribution suggests that these may be cultural debris but not necessarily. Gophers were more common in 29SJ 629. This difference may reflect an edaphic difference resulting from 29SJ 629 being sited in side-slope alluvium whereas 29SJ 633 is on a rocky ridge; the former would appear to favor postoccupational use by gophers.

Perognathus sp. and P. cf. flavescens

Only seven elements of pocket mice were found at the site, and they represented from one (siteMNI) to four (maxMNI) individuals. Remains were spread throughout the site (e.g., Room 7, upper fill, Burial 3, Room 8, fill, Anomaly Test 1) which suggests that a plurality of individuals is represented. A single partial skull was identified as P. cf. flavescens, the larger of the two pocket mice species now present in Chaco Canyon. Pocket mice are far more plentiful in the 29SJ 629 collection, but, as in the case of several other small taxa, this may be a result of a microenvironment more favorable to postoccupational burrowers at 29SJ 629.

Dipodomys ordii (Ord's kangaroo rat)

Other than Peromyscus sp., these kangaroo rats are the most abundant small rodent taxon in the collection. At least 3 and probably several more individuals are represented by 19 elements. Most of the specimens are hind limb elements (16 of the 19). Although no articulated sections were noted, most remains are thought to be noncultural in derivation. Remains were spread throughout the excavated areas with no strong indications of unusual abundances or absences.

D. spectabilis (banner-tailed kangaroo rat)

Six elements from probably three individuals of this large kangaroo rat were found. Four elements from Room 7, Floor 2, Other Pit (OP) 1 are an articulated section of a hind limb (a calcaneum, an astragalus, and two metatarsals). Other hind limb elements were found in Room 8, Level 4, and Anomaly Test 7. Although the sample is small, the abundance of this species relative to the smaller and more common D. ordii is somewhat greater than at 29SJ 629 and than at Chaco Canyon today.

Reithrodontomys megalotis (western harvest mouse)

A single definite identification of this small mouse is a dentary from Anomaly Test 1, Level 3. Other than at Atlatl Cave, I know of no other recorded occurrences of harvest mice from Chaco Canyon archeological sites. This species is present in Chaco Canyon today but apparently only rarely makes its way into archeological remains. Other postcranial remains may be included in the cf. Peromyscus sample (Peromyscus is the most similar genus). It is interesting to note the two most unusual occurrences at 29SJ 633—the single duck and this harvest mouse—were found in Anomaly Test 1.

Peromyscus maniculatus and cf. Peromyscus sp. (deer mouse and cf. white-footed mouse)

The most abundant small rodent taxa is the genus Peromyscus of which 73 elements and an estimated 12 individuals (minimally 5) were recovered. All identifiable cranial and dental material is referable to P. maniculatus, the most common mouse in Chaco Canyon today and a common intrusive in archeological sites. Isolated postcranial specimens were classed as cf. Peromyscus in recognition of the possibility of the presence of other cricetid taxa. Most of these specimens are almost certainly Peromyscus, and more specifically, P. maniculatus. Peromyscus remains were scattered throughout the excavated areas but were most abundant in the Floor 2 association of Room 7. Most specimens are undoubtedly postoccupational intrusions, though the possibility exists that some were procured for food.

Onychomys leucogaster (northern grasshopper mouse)

This large mouse is represented by at least two specimens and one or two individuals. Although present in Chaco Canyon today, this species has not been found in archeological sites very often (a few are known from nearby 29SJ 629). The two occurrences at 29SJ 633 were in the Floor 2 association of Room 7 and in Anomaly Test 1 (again). These were most likely postoccupational intrusions.

Neotoma sp. (unidentified woodrat)

A total of 36 specimens of Neotoma sp., representing a minimum of 7 and an estimated 9 individuals (midMNI), were present. Species identifications were not attempted because of the scarcity of cranial material (only one fragmentary dentary and one maxilla). Remains are most likely of N. cinerea (Bushy-tailed Woodrat) and/or N. stephensi (Stephen's Woodrat), the two species presently found in Chaco Canyon.

Woodrats in archeological sites can be either cultural or intrusive, and it is often difficult to determine which. Two-thirds of the 29SJ 633 sample is from the fill and floor fill of the trash-filled Room 7, which suggests that the specimens are food debris. These remains are disarticulated, and two specimens, both from Layer 4, are charred. Seven of the remaining specimens are from the lowest subfloor deposits of Room 7, Level 10, and are almost certainly from a single individual. These are the only bones from the level, and it is most probable that they are noncultural in origin.

Carnivores

Remains of carnivores were not abundant, although they were somewhat more common than the larger artiodactyl game animals. This is a reversal from the situation at nearly all Anasazi sites and serves to emphasize the scarcity of artiodactyls at 29SJ 633. Eight identified bones represent three genera--Canis, Lynx, and Taxidea. An absolute minimum of three individuals (one for each genus) is represented, though other MNI estimates suggest as many as six individuals (see Table 10.2). Eleven bones, identified only as "unidentified medium mammal," are thought to be from carnivores. Other small fragments may be included in the category of "unidentified medium-large mammals."

Identified carnivore specimens were not distributed randomly throughout the site; rather, bobcat and badger bones appeared to be concentrated in the late upper fill (especially Room 7) whereas probable Canis fragments were found only in the early deposits (subfloor fill material). None of the Canis specimens is distinctive enough to definitely distinguish dogs (C. familiaris) and coyotes (C. latrans), though all are from one or the other. Still, there is no definite evidence that C. familiaris is present.

Canis sp.

Four bones were recovered and identified, with varying degrees of certainty, as one of the small canids, either coyote or domestic dog. One element, a portion of a rib, was identified as "cf. Canis," indicating that it is a carnivore and probably a small canid but not definitely.

This was recovered from Test Trench 1 in the plaza area at 6-10 m along the trench (FS 313). Another bone was clearly from either a dog or coyote, but no specific identification could be made. This is an isolated tooth, the left upper third incisor, and was found in the subfloor fill of Room 7, Layer 8, northeast quarter (FS 852). The two remaining specimens are a nearly complete cervical vertebrae and a small portion of another found in the subfloor fill of Room 8, Level 7 (FS 555). These two bones were tentatively identified as coyote (C. latrans).

It is interesting to note the paucity of domestic dog remains in contrast to some of the earlier nearby sites (especially 29SJ 629). Although their presence cannot be discounted at 29SJ 633, they appear to be uncommon at best. This compares well with other late sites, such as Pueblo Alto, and appears to lend support to the possibility that domestic dogs were nearly extirpated by the late occupation of Chaco Canyon. Note, too, that the Canis bones occur in the earliest excavated deposits at the site; none can be positively identified as coming from the late deposits even though the bulk of all bones are from the later deposits.

Taxidea taxus (badger)

At least one, and probably no more than one, badger was found at 29SJ 633. Elements include an undisturbed, well-preserved, articulated hind foot and the coronoid process portion of a right dentary. Both parts were found in Room 7, Layer 2, Level 4, in the southwest quarter. Although the foot included 23 individual bones (tarsals, metatarsals, and phalanges), it is listed as a single specimen in the tables because it was clearly articulated. Although the coronoid process fragment shows no cut marks, it appears to have been removed from the rest of the dentary by a fresh snap fracture such as would be produced by physically removing the lower jaw while the cranial musculature was still intact.

It is possible that these remains indicate a postoccupational intrusion or food residues. On the other hand, it may be more likely that the intact foot represents a prepared pelt with the foot left attached to the pelt during skinning. This is not an entirely satisfactory explanation as one might then expect four feet instead of one. Perhaps, for reasons we do not know, only an isolated foot was kept and later discarded. A similar, single, isolated, badger foot was found at nearby 29SJ 628 (Akins 1981f).

Association of the dentary portion with a pelt is more difficult to imagine. However, it is possible if one accepts (1) that the fragment was left attached to the cranium after removal of the mandible and (2) that the cranium was left with the skin, as suggested by Judd (1954:65) for a situation at Pueblo Bonito. The question then becomes, "Where is the cranium?"

Felis (Lynx) Rufus (bobcat)

Three elements were definitely identified as bobcat, though one is not tabulated because it had been modified into an artifact (a needle).

The remaining two, though not artifacts, also show signs of cultural modification. One element is a cranial fragment, specifically a piece of the left frontal, which was found in Room 7, Layer 3, Level 5, northeast quarter (FS 248). This is the only bone from the site that shows definite cut marks, two transverse cuts on the top of the cranium just behind the postorbital process. These marks are presumably a result of skinning. Also from Layer 3, Level 5, is a sharp-pointed needle made from a left fibula. This artifact was found in two pieces, one in the northwest quarter (FS 606), the other in the southwest quarter (FS 772), although the break looks suspiciously fresh. The third element is the proximal half of a right fourth metatarsal from the fill of a firepit in Layer 8, northwest quarter of the Room 7 subfloor fill (FS 1144). The bone is gray from a thorough burning.

All three bones are larger than comparative material, which suggests one or more large individuals. Other Lynx may be represented by a few vertebral and rib fragments, but these could not be positively identified.

Artiodactyls

Large game animals are remarkably sparse in the 29SJ 633 faunal assemblage. Only 6 of the more than 3,900 bones could be identified as one of the 3 common artiodactyl species--Odocoileus hemionus (mule deer), Antilocapra americana (pronghorn), and Ovis canadensis (bighorn sheep). Of these six identified, four are Antilocapra and there is one each of the other two species. Moreover, only two other fragments were listed as "unidentified artiodactyl." Other bones may be included in the "unidentified medium-large mammal" category, but they are no more than a handful of tiny, unidentifiable scraps. All six of the identified specimens as well as the two unidentified artiodactyl bones were found in Room 7.

Antilocapra americana (pronghorn sheep)

Four bones were identified as pronghorn. These represent an absolute minimum of two individuals but no more than three. All are from Room 7: two from Layer 3, northwest quarter, Level 5 (FS 607); one from the Layer 6 floor fill, southeast quarter, Level 7 (FS 219); and one from the subfloor Layer 9, southeast quarter (FS 1174).

The two Layer 3 specimens are the highly fragmented remains of a right dentary, including at least one deciduous molar, and a lower left cheek tooth of a very young pronghorn. Exact age has not been determined; it is unlikely that the fawn was more than a week or two old. This individual would have yielded minimal usable meat, and it could be that it was procured for other reasons, e.g., for a fawn-skin bag such as can still be seen at Zuni Pueblo today. It is interesting to note that badger and bobcat bones from the same or nearby proveniences are also suggested to represent nonfood items.

The other two pronghorn bones are both from adults: a proximal radius fragment from the Layer 6, floor fill, southeast quarter, Level 7

(FS 219), and a heavily worn, lower left, second premolar from subfloor Layer 9, southeast quarter (FS 1174). Although these are potentially from a single individual, the stratigraphic separation suggests otherwise.

Odocoileus hemionus (mule deer)

Only one mule deer bone, a badly weathered, left scapula head, could be positively identified. This was found in undifferentiated fill of Bin 1 in Room 7 (FS 703). Other deer bone fragments may be present among the unidentified scraps.

cf. Ovis canadensis (bighorn sheep)

One probable bighorn sheep bone is a badly eroded, distal right metacarpal from Room 7, Floor 2, Other Pit 1 (FS 969), a rodent-disturbed area apparently associated with Floor 2. Identification is tentative because of the poor condition and small size of the fragment.

Birds

Meleagris gallopavo (turkey)

Turkeys were quite abundant at 29SJ 633, far more so than at other earlier nearby sites. The total of 766 individual specimens recorded is second only to cottontails in overall frequency. The minimum number of individuals is also second to Sylvilagus with estimates varying from 12 (siteMNI) to 47 (maxMNI) depending upon the spatial criteria used. Rather surprisingly, turkeys rank first in estimates of consumed meat weight with as much as 50 percent of the total amount represented by the assemblage (using maxMNI; see Table 10.13). Even considering available meat weight with higher values for artiodactyls and carnivores, turkeys still rank first (see Table 10.11). If we use the midMNI figures as the best estimate at 29SJ 633, turkeys account for 14.4 percent of the individuals (mammals and turkeys), 23.4 percent of the estimated available meat weight, and 44.5 percent of the estimated consumed meat weight.

The meat weight figures, of course, rely on the assumption that the turkeys were food items. This may not be entirely correct, but there is good reason to believe that at least some of the birds were consumed. A small but widespread number of elements show signs of charring (3.3 percent), and several examples of intentional fracturing and knife cut marks (1 case) were noted. As uncommon as these examples are (some 35 cases altogether), they do lend support to the notion of turkey consumption in the late occupation of Chaco Canyon.

It is probable that turkeys were kept in captivity at the site. Most telling in this regard is the presence of at least two very young birds (ca. one week old), one in each of the two rooms (Room 7, Bin 1; Room 8, Level 5, floor fill). Adult birds show a wide range of sizes though the majority are rather small, presumably female, individuals. Of tibiometatarsi that are intact enough to determine sex (by presence or absence of a spur), two are males and seven are females. My intuitive impression on the basis of element sizes is that this ratio is generally representative of the entire assemblage.

Another attribute that may be taken as an indication of use is the characteristic disarticulation of turkey remains. Despite their abundance, no wholly or even partially articulated individuals were noted in the field. This is a different situation than at some other, somewhat earlier, Chaco Canyon sites (e.g., site 29SJ 299, Una Vida, Bc 50).

Two bones--a right ulna (Room 7, Layer 6, floor fill, northwest quarter, FS 615) and a left tibiotarsus (Room 7, Layer 4, southwest quarter, FS 784)--show premortem breaks that had healed. Such instances are clearly suggestive of birds kept in captivity rather than hunted wild birds.

Turkeys were not distributed randomly throughout the two excavated rooms. In both cases, the number of identified specimens (NISP) suggests a marked increase in the later deposits, specifically the upper floor and overlying fill. Only 5 (2 in Room 8, 3 in Room 7) of the total of 766 turkey bones occurred in the sub-Floor 1 deposits of the two rooms. Turkey elements made up only 2.5 percent of the identified mammals and turkeys in the early deposits as opposed to 32.5 percent of the late proveniences.

In Room 8, turkey bones were very abundant in the Level 5 floor fill unit where they made up 79.0 percent of all bones (elements = 49, MNI = 3). In the fill, turkeys were not as predominant but were still the most common identified taxon (31.1 percent of mammals and turkey NISP). In Room 7, turkey bones were the most common taxon (by elements) in Bin 1, the Burial 3 pit, Layer 5, Layer 4 rock concentrations, and Layer 3. In all of the layers above Floor 1, turkeys accounted for about 20 percent or more of identified mammals and turkey specimens.

Anatidae sp. (unidentified waterfowl)

A single, broken coracoid of a duck was found in Anomaly Test 1, Level 2. Waterfowl are rare in Chaco Canyon today with only an occasional migrant passing through. Similarly, waterfowl are not frequently found in Chaco Canyon archeological sites, although they have been found in low frequencies at several sites. The fractured ends of the specimen may indicate human use, presumably for food.

Aquila chrysaetos (golden eagle)

The only golden eagle bone at the site was an ungual phalanx (talon) from Room 7, Layer 4, southeast quarter. Golden eagle remains, especially ungual phalanges, are relatively common occurrences in Chaco Canyon sites.

Buteo sp. (unidentified broad-winged hawk)

Five hawk elements were found in Room 7, four claws (ungual phalanges) and another phalanx. Two of the claws were from Layer 6, northwest quarter, another from Rock Concentration 1 (southwest quarter), and the fourth with an associated phalanx from "near Burial 3." Hawks are common in Chaco Canyon sites, and several species of the genus Buteo are known to occur. The prevalence of talons (as with the only eagle bone) suggests that the remains may have been used for ornamentation as in a necklace. Probably two individuals were present.

Bubo virginianus (great horned owl)

Two bones of this large owl are almost certainly from a single individual. Both are from the subfloor deposits of Room 8, a left humerus from Level 7 and a left tarsometatarsus from Level 3. Both specimens are immature. Great horned owls are common in Chaco Canyon now and have frequently been found in archeological sites.

Callipepla squamata, cf. C. squamata, and unidentified quail (scaled quail, etc.)

At least two quails are represented in the collection, both probably scaled quail. The only positive identification is of a humerus from high in the fill of Room 7, Layer 2, southeast quarter. The cf. C. squamata specimen involves several bones (scapulae, coracoids, humerus, femur, tibiotarsus, and carpometacarpus) of a single individual from the floor fill of Room 7, Floor 2, southwest quarter. This is clearly a different individual from the Layer 2 specimen as both include left humeri. The specimen identified by Emslie as "unidentified quail" is probably from a third individual, though not definitely. This is part of a left tarsometatarsus from Room 7, Layers 5-6 (southeast quarter). This, too, is most likely a scaled quail, the only quail species recorded for Chaco Canyon. The other possibility is Gambel's quail (Lophortyx gambelii), which occurs in scattered parts of the Southwest.

Eremophila alpestris (horned lark)

A single humerus of E. alpestris is from the upper fill of Room 7, Layer 2, northwest quarter. Horned larks are very common in Chaco Canyon now and are among the abundant small birds found in archeological sites. It is possible (perhaps probable) that this is a postoccupational intrusion.

Corvus corax (common raven)

A tarsometatarsus of a raven was found in the fill of Room 8 (Level 3). Ravens are common in Chaco Canyon but only occasionally found in archeological sites.

Pipilo chlorura and cf. P. chlorura (green-tailed towhee)

This is the smallest bird found at 29SJ 633 and, perhaps because of its small size, has only occasionally been recovered from sites. Two elements were recovered, a carpometacarpus from Room 8, subfloor, Level 7, and a mandible (identification questioned) from Room 8, Other Pit 5. The occurrence of one specimen in a pit and the other from subfloor deposits may indicate two individuals, but the spatial proximity of the two suggests that because of mixing or confusion in defining pit walls, only one individual may be present.

Temporal Change and Room Comparisons

Change through time in the relative abundances of taxa in the 29SJ 633 sample can be examined in two ways: first, by the two major divisions of the site time-space framework established by the site excavator, M. Truell; and second, by the stratigraphic sequences in each room.

The time-space matrix places most proveniences into one of the two categories, ca. the late A.D. 1000s-early A.D. 1100s and ca. the late A.D. 1100s-early A.D. 1200s. In both excavated rooms, Floor 2 and subfloor deposits constitute the early material. The bulk of faunal remains are in the late category, including fill and Floor 1 associations of both rooms and Anomaly Tests 7-10. Table 10.17 shows the abundances and relative frequencies of taxa in the early and late periods. To emphasize economic species, small rodents have been lumped and turkeys included with mammals. Several differences show up between the early and late periods.

(1) Turkeys are far more abundant in the late period with only five elements occurring in the early deposits.

(2) Small rodents (mice, rats, etc.) are more abundant in the early period perhaps because of their association with floor level deposits. (In the late period, there are proportionally more small intrusive rodents in Floor 1 associations than in the fill.)

(3) Small game taxa are abundant throughout. In terms of MNI, *Sylvilagus* is relatively more abundant in the late period.

(4) Canid remains are more abundant at an early time. The only three specimens for which temporal category is assignable are all from early deposits. Three of the four other identified carnivores (badger and bobcat) are from late deposits, and all of these are from high in the fill of Room 7.

(5) Artiodactyls are relatively more common in the early period, although the frequencies are exceedingly low.

For finer chronological divisions, each of the rooms can be divided into major stratigraphic sections (i.e., fill, floor fill, Floor 1 associations, Floor 2 associations, and subfloor). Frequencies of the four most abundant economic taxa (*Sylvilagus*, *Lepus*, *Cynomys*, and *Meleagris*) for these divisions are given in Tables 10.15 and 10.16 and Figures 10.2-10.5. Because of low frequencies, Floors 1 and 2 are combined in Room 8. It is important to note that although the units are chronologically ordered, this does not mean that apparent variability is necessarily chronological. The units are also different types of deposits. This same difficulty of

Table 10.17. Relative frequencies of 29SJ 633 faunal remains with respect to primary periods and major proveniences[a]

	Early					Late					
Taxon	Room 7	Room 8	Total	% Elements[b]	% MidMNI[b]	Room 7	Room 8	Anomaly Test 7-10	Total	% Elements[b]	% MidMNI[b]
Sylvilagus	38/3	51/2	89/5	44.5	13.2	931/39	32/5	35/7	998/51	43.0	35.2
Lepus	12/2	11/3	23/5	11.5	13.2	313/15	8/2	6/1	327/18	14.1	12.4
Cynomys	8/4	6/2	14/6	7.0	15.8	123/12	9/4	13/3	145/19	6.2	13.1
Neotoma	7/1	0	7/1	3.5	2.6	26/6	3/2	0	29/8	1.2	5.5
Small rodents	46/9	10/4	56/13	28.0	34.2	49/15	11/6	1/1	61/22	2.6	15.2
Canis	1/1	2/1	3/2	1.5	5.3	0	0	0	0	-	-
Taxidea	0	0	0	-	-	2/1	0	0	2/1	0.1	0.7
Felis (*Lynx*)	1/1	0	1/1	0.5	2.6	1/1	0	0	1/1	t	0.7
Odocoileus	0	0	0	-	-	1/1	0	0	1/1	t	0.7
Antilocapra	1/1	0	1/1	0.5	2.6	3/2	0	0	3/2	0.1	1.4
Ovis	1/1	0	1/1	0.5	2.6	0	0	0	0	-	-
Total Mammals	115/23	80/12	195/35	97.5	92.1	1,449/92	63/19	55/12	1,567/123	67.5	84.8
Meleagris	3/2	2/1	5/3	2.5	7.9	681/15	66/5	9/2	756/22	32.5	15.2
Total	118/25	82/13	200/38	100.0	100.0	2,130/107	129/24	64/14	2,323/145	99.8	100.1

[a]Frequencies are number of elements and midMNI estimates (elem/midMNI).
[b]Percentages are of total mammals and turkeys.

distinguishing chronological from nonchronological variability pertains to the simple early/late division as well.

Interpretations of these relative frequency data should also be tempered by the realization that both quantifications employed here—number of specimens and MNI—are less accurate than the figures may imply. In other words, although the percentage figures are quite precise, the data upon which they are based intrinsically lack a comparable precision. Thus, it is important to look for large-scale trends and differences rather than rely on small percentage differences.

Within these limitations, indications of major temporal trends in the course of room depositions are ambiguous. Other than the tendencies noted above toward scarcity of turkeys in the floor fill of Room 8, the variability in general appears to be unpatterned. Otherwise, relationships among these taxa appear reasonably stable.

Other than the much greater abundance of remains in Room 7, the assemblages of the two rooms are generally similar. Considering room totals, the ordinal relationships of the most common taxa are the same for number of specimens, MNI, and consumed meat weight values (Tables 10.15, 10.16, 10.18, and 10.19). Specimen frequencies or meat weight estimates of major taxa show surprisingly similar percentages, but MNI values show less conformity. Tables 10.15, 10.17, and 10.19 and Figures 10.2-10.5 point out differences between the rooms at the level of major fill divisions, but many of these are strongly influenced by small sample sizes. As noted above, turkeys show the same pattern in both rooms of scarcity in subfloor and Floor 2 deposits and abundance in higher levels. More species, including all of the artiodactyl remains, were present in Room 7, but this may, in part, be a product of the much larger sample size. For a more detailed breakdown of individual layers, see Appendix D.

Charred Bones

One attribute generally considered indicative of human consumption is burning or charring of bones. Here, charring is used to include both scorching or blackening (occasionally dark brown) and bleached white calcined bone. Although charring is often taken to be a result of food preparation, bones can become charred by other means. For instance, many of the most thoroughly charred specimens probably got that way from having been tossed in a fire rather than charred during cooking. Still, they presumably would not have been disposed of in this manner were they not food items. On the other hand, many methods of cooking leave no signs of charring, and even over an open fire bone would not be visibly altered if insulated by muscle fiber.

Charred bone is relatively abundant in the excavated portions of 29SJ 633 with some 12.8 percent (499 of 3,912) of bones showing some degree of charring. This rather high frequency reflects the interpretation of much of the collection, particularly the Room 7 fill, as occupational refuse. Both Room 7 and Room 8 have overall charred frequencies of more than 10 percent as do the lumped miscellaneous plaza and anomaly tests.

Table 10.18. Relative amounts of estimated consumed meat weight for Room 7, Room 8, and other proveniences

Taxon	Room 7 (maxMNI) kg	Room 7 (maxMNI) %	Room 8 (maxMNI) kg	Room 8 (maxMNI) %	Other Test Pits (maxMNI) kg	Other Test Pits (maxMNI) %
Lagomorphs						
Sylvilagus	22.92	14.2	4.58	11.2	4.20	17.5
Lepus	28.60	17.8	8.80	21.6	3.30	13.8
Rodents						
Cynomys	9.99	6.2	2.59	6.4	1.48	6.2
Thomomys	0.34	0.2	0.07	0.2	-	-
D. spectabilis	0.07	t	0.07	0.2	0.07	0.3
Neotoma	1.08	0.7	0.27	0.7	-	-
Carnivores						
Canis	3.20	2.0	3.20	7.9	3.20	13.3
Taxidea	3.45	2.1	-	-	-	-
Felis (*Lynx*)	3.45	2.1	-	-	-	-
Artiodactyls						
Odocoileus	2.90	1.8	-	-	-	-
Antilocapra	3.94	2.4	-	-	-	-
Ovis canadensis	0.31	0.2	-	-	-	-
Unid. artiodactyls	3.21	2.0	-	-	-	-
Total mammals	83.46	51.8	19.58	48.1	12.25	51.0
Galliformes						
Meleagris	77.55	48.2	21.15	51.9	11.75	49.0
Total	161.01	99.9	40.73	100.1	24.00	100.1

t = trace.

Table 10.19. Relative frequencies of mammals and turkeys for Rooms 7 and 8, based on minMNI

Taxon	Mammals Only						Mammals and Turkeys		
	Site		Room 7		Room 8		Site	Rm. 7	Rm. 8
	Total MinMNI	%	MinMNI	%	MinMNI	%	%	%	%
Sylvilagus	52	41.9	36	44.4	5	26.3	36.4	39.1	22.7
Lepus	14	11.3	9	11.1	2	10.5	9.8	9.8	9.1
cf. S. spilosoma	1	0.8	1	1.2	0	-	0.7	1.1	-
Cynomys	15	12.1	8	9.9	3	15.8	10.5	8.7	13.6
Thomomys	3	2.4	2	2.5	1	5.3	2.1	2.2	4.5
Perognathus	3	2.4	1	1.2	1	5.3	2.1	1.1	4.5
Dipodomys ordii	5	4.0	3	3.7	1	5.3	3.5	3.3	4.5
D. spectabilis	3	2.4	1	1.2	1	5.3	2.1	1.1	4.5
Reithrodontomys	1	0.8	0	-	0	-	0.7	-	-
Peromyscus	7	5.6	5	6.2	2	10.5	4.9	5.4	9.1
Onychomys	2	1.6	1	1.2	0	-	1.4	1.1	-
Neotoma	9	7.3	7	8.6	2	10.5	6.3	7.6	9.1
Canis	3	2.4	1	1.2	1	5.3	2.1	1.1	4.5
Taxidea	1	0.8	1	1.2	0	-	0.7	1.1	-
Felis (Lynx)	1	0.8	1	1.2	0	-	0.7	1.1	-
Odocoileus	1	0.8	1	1.2	0	-	0.7	1.1	-
Antilocapra	2	1.6	2	2.5	0	-	1.4	2.2	-
Ovis	1	0.8	1	1.2	0	-	0.7	1.1	-
Total Identifiable Mammals	124	99.8	81	99.7	19	100.1			
Meleagris	19		11		3		13.3	12.0	13.6
Total Mammals and Turkeys	143		92		22		100.1	100.2	99.7

However, as noted below, there is considerable variability among different taxa and among various proveniences within the rooms.

Taxonomic Variability

Only a few of the identified genera and species are represented in the collection of charred bones. Specifically, only five taxa of mammals--Sylvilagus audubonii, Lepus californicus, Cynomys gunnisoni, Neotoma sp., and Lynx rufus--have identifiable burned specimens. Turkeys (Meleagris gallopavo) are the only nonmammals to be represented by charred specimens.

Of the mammals, the three most ubiquitous forms--Sylvilagus, Lepus, and Cynomys--account for the vast majority of the burned bones with Sylvilagus accounting for the bulk of the total (Table 10.20). Not only do these three taxa make up the majority of identified charred bones, but the category "unidentified small mammals", which is considered to be fragments of rabbit-sized forms, accounts for half of all charred bones (249 of 499). If it is assumed that this category of unidentified remains includes essentially small, unidentifiable fragments of the two rabbit species and prairie dogs, then it is apparent that these three taxa make up over 90 percent of the total number of burned bones.

Instances of charring are much more limited on other species. The only rodent taxon other than Cynomys to show any charring is Neotoma sp. (unidentified woodrat). Two elements, a dentary and an isolated tooth, of Neotoma were burned, and both are probably from a single individual (same layer--Room 7, Layer 4--though from different quadrants). One other charred rodent bone could not be identified. None of the sparse artiodactyl bones showed any charring though three small fragments, which could only be labeled as "unidentified medium-large mammal," were charred and could be artiodactyl bone fragments. The only burnt bone from a carnivore was the thoroughly heated, gray fragment of a Lynx rufus metatarsal. The significance of charring of this bobcat bone is uncertain, but the fact that it is a foot bone may indicate that it was part of a skin rather than a remnant of a cooked food item.

As indicated by Table 10.20, cottontails (Sylvilagus) are clearly the taxon with the greatest amount of charring. Moreover, this taxon also shows the greatest relative frequency of charring: 15.9 percent of all Sylvilagus bones exhibit some degree of burning. The two other common taxa--Lepus and Cynomys--reveal less charring, 8.5 and 8.1 percent, respectively. Figure 10.6 shows that the frequency of charring diminishes noticeably with both larger and smaller body sizes. Two burned Neotoma bones account for 5.6 percent of that genus, but only one other charred bone of a mouse- or rat-sized rodent (unidentified small rodent) was recorded. Of the medium and large mammals (carnivores and artiodactyls), the one charred Lynx bone and three unidentified fragments account for 6.3 percent of the total identified and unidentified bones.

The presence of a number of charred turkey (Meleagris gallopavo) bones is also noteworthy in that it is frequently assumed that turkeys

Table 10.20. Relative frequencies of charred bones among different taxa

Taxon	Total No. Specimens	Number of Charred Specimens	% of Specimens Charred	% of All Charred Specimens	% of Charred Identified Mammals
Mammals					
Sylvilagus	1,103	175	15.9	35.1	79.2
Lepus	351	30	8.5	6.0	13.6
Cynomys	160	13	8.1	2.6	5.9
Neotoma	36	2	5.6	0.4	0.9
Lynx	2	1	50.0	0.2	0.5
Birds					
Meleagris	766	25	3.3	5.0	-
Unidentifiable					
Unid. small rodent	36	1	2.8	0.2	-
Unid. small mammal	1,139	249	21.9	49.9	-
Unid. med.-lg. mammal	36	3	8.3	0.6	-
Total	3,912	499	12.8	-	-

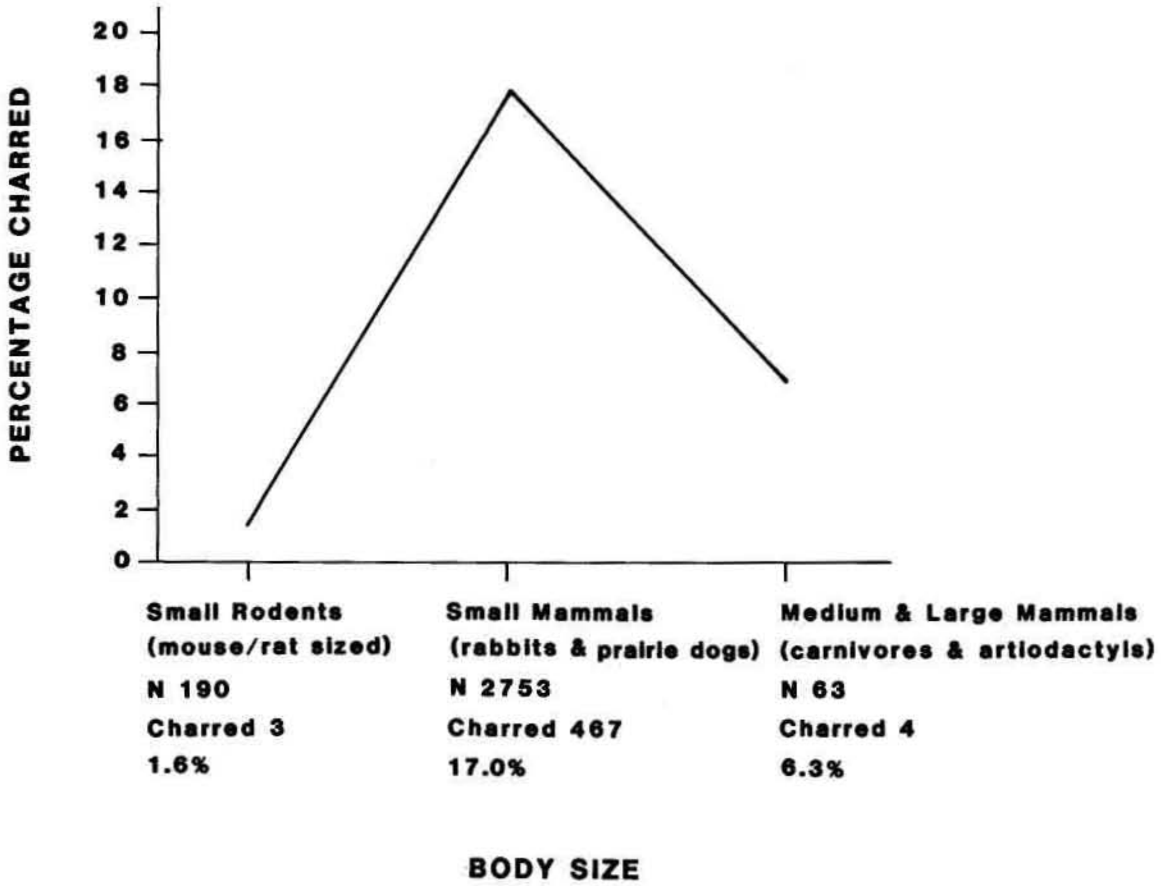

Figure 10.6. Percentage of charred bones for three general size classes of body size

were rarely eaten by the Anasazi. Although the relative number that show any charring is low (25 of 766 specimens, 3.3 percent), the number is high enough to suggest that some turkeys at 29SJ 633 were eaten. Charred specimens were noted in a variety of proveniences, which indicates that the abundance of burned bones was not the result of a single episode.

It is interesting to note that in both Room 7 and Room 8 the relative frequency of charring is higher in the category "unidentified small mammal" than in any of the identified taxa (except for the one of two Lynx). This means that compared to uncharred fragments, a greater proportion of charred bones are unidentifiable, which may result from weakening of bones from burning and subsequent fracturing into smaller, less recognizable pieces. Not only are the smaller pieces less likely to be recognized, but the probability of duplication from counting a single element more than once is much greater.

Spatial Variability in Charring

Although both Room 7 and Room 8 have comparable frequencies of charring with each slightly over 10 percent, both show marked variability within their deposits. In Room 7, the most abundant burning was in the dense trash of the Layer 6 floor fill where nearly 20 percent of the bones were charred and in Layer 4 of the fill where nearly 40 percent charring occurred. Together, these two layers account for 63 percent of all the burned bones from Room 7 and 56 percent of the total number recovered in excavations at the site. Other general proveniences in Room 7 that contained high percentages of burned bone included parts of Layer 3, the "burned spot" on Floor 1, and one of the rodent-disturbed areas in Floor 1 (Rodent Hole 2). Tables 10.21-10.24 list individual proveniences that contained conspicuous amounts of burned bone, either relatively (more than 20 percent) or in absolute numbers ($n \geq 15$). It may be of interest to note that of the eight excavation units in the fill or floor fill with abundant charring, five were from the southeast quadrant of the room, and two others were from the southwest quadrant. Only one was from the northern half of the room. This may give some indication of the locus of burned debris dumping in the room.

In Room 8, more charred bones were found in association with the two floors than in either the fill above or the subfloor fill. Bone associated with each floor level shows over 30 percent charring and together the two floors account for 67 percent of the burned bone recovered from the room though only 18 percent of the total bone from the room. Specifically, burned bone was found to be most abundant in the pits containing Burials 1 and 2. Reasons for this concentration are not known.

Indications of Butchering

Two types of evidence of butchering were noted: (1) cut marks, either from skinning or meat removal, and (2) intentional fractures, sharp breaks of bone thought to have been made by man while the bone was still fresh. Such fractures include both snapping of smaller, more fragile

Table 10.21. Site 29SJ 633, charred bone frequencies--individual proveniences with high frequencies of charred bone (> 20%)[a]

	Room 7									
Taxa	FS 244 Layer 3 SE 1/4	FS 176 Layer 4 SE 1/4 "burned conc."	FS 261 Layer 4 NE 1/4 "burned"	FS 198 Layer 5 SE 1/4	FS 645 Layer 6 FF SW 1/4	FS 659 Layer 6 Fl. Fill Level 7 SW 1/4	FS 219 Layer 6 Fl. Fill Level 7 SE 1/4	FS 228 Layer 6 Fl. Fill Level 8 SE 1/4	FS 923 Floor 1 contact "burned spot"	FS 914 Floor 1 Rodent Hole 2
Mammals										
Sylvilagus	0	15 (45.5)	1 (50.0)	-	25 (56.8)	4 (22.2)	6 (25.0)	42 (17.9)	2 (100.0)	4 (80.0)
Lepus	-	0	0	-	4 (57.1)	0	1 (25.0)	6 (12.5)	-	1 (100.0)
Cynomys	1 (33.3)	7 (77.8)	0	-	1 (33.3)	0	1 (11.1)	0	0	-
Neotoma	-	1 (100.0)	1 (100.0)	-	-	0	-	0	-	-
Lynx	-	-	-	-	-	-	-	-	-	-
Birds										
Meleagris	-	0	3 (60.0)	-	1 (100.0)	2 (8.3)	2 (6.2)	0	0	-
Unidentified species										
Unid. small rodent	-	-	-	-	-	-	-	0	-	-
Unid. small mammal	10 (35.7)	57 (50.9)	0	-	17 (70.8)	7 (58.3)	5 (20.8)	37 (40.2)	2 (28.6)	4 (100.0)
Unid. med.-lg. mammal	-	-	-	1 (100.0)	-	-	-	1 (33.3)	-	-
Number of specimens	33	171	20	1	79	61	94	463	11	10
Number of burned specimens	11	80	5	1	48	13	15	86	4	9
% of specimens charred	(33.3)	(46.8)	(25.0)	(100.0)	(60.8)	(21.3)	(16.0)	(18.6)	(36.4)	(90.0)

[a]n = number of charred specimens, (n) = percentage of specimens charred, 0 = taxon present but no specimens charred, - = taxon not present.

Table 10.21 (concluded)[a]

Taxa	Room 8					Anomaly Tests		
	FS 410 Level 5 FF NE 1/4	FS 427 Floor 1 Other Pit 3 Layer 2 Burial 1	FS 446 Floor 1 Other Pit 3 Layer 3 Burial 1	FS 467 Floor 1 Burial 2 Layer 2	FS 474 Floor 1 Burial 2 Layer 3	FS 1021 Anomaly Test 1 Level 5	FS 1067 Anomaly Test 7 Level 2	FS 1088 Anomaly Test 8 Level 2
Mammals								
Sylvilagus	0	-	2 (100.0)	2 (100.0)	1 (50.0)	0	1 (16.7)	1 (50.0)
Lepus	1 (100.0)	-	-	-	-	-	1 (50.0)	-
Cynomys	-	-	1 (100.0)	-	-	-	-	-
Neotoma	-	-	-	-	-	-	-	-
Lynx	-	-	-	-	-	-	-	-
Birds								
Meleagris	0	-	-	1 (100.0)	2 (100.0)	-	-	-
Unidentified species								
Unid. small rodent	-	-	-	-	-	-	-	-
Unid. small mammal	2 (100.0)	1 (50.0)	2 (50.0)	-	8 (80.0)	4 (66.7)	1 (33.3)	0
Unid. med.-lg. mammal	-	-	-	0	-	-	-	-
Number of specimens	7	4	7	4	14	9	12	2
Number of burned specimens	3	1	5	3	11	4	3	1
% of specimens charred	(42.9)	(25.0)	(71.4)	(75.0)	(78.6)	(44.4)	(25.0)	(50.0)

[a]n = number of charred specimens, (n) = percentage of specimens charred, 0 = taxon present but no specimens charred, - = taxon not present.

Table 10.22. Site 29SJ 633, summary of charred bone frequencies[a]

Taxa	Room 7: Fill	Room 7: Floor Fill	Room 7: Floor 1 Assoc.	Room 7: Floor 2 Assoc.	Room 7: Subfloor	Room 7: Total	Room 8: Fill	Room 8: Floor Fill	Room 8: Floor 1 Assoc.	Room 8: Floor 2 Assoc.	Room 8: Subfloor	Room 8: Total	Misc. Tests	Site Totals
Mammals														
Sylvilagus	58 (14.6)	91 (20.9)	14 (14.4)	0	1 (9.1)	164 (16.9)	0	0	5 (41.7)	-	3 (5.9)	8 (9.6)	3 (6.7)	175 (15.9)
Lepus	12 (6.7)	13 (11.6)	1 (4.3)	0	1 (10.0)	27 (8.3)	0	1 (100.0)	-	0	0	1 (5.9)	2 (33.3)	30 (8.5)
Cynomys	9 (15.0)	2 (4.7)	0	0	0	11 (8.4)	1 (16.7)	0	1 (50.0)	0	0	2 (13.3)	0	13 (8.1)
Neotoma	2 13.3)	0	0	-	0	2 (6.1)	0	0	-	-	0	0	0	2 (5.6)
Lynx	0	-	-	-	1 (100.0)	1 (50.0)	-	-	-	-	-	-	-	1 (50.0)
Birds														
Meleagris	6 (1.5)	14 (7.7)	2 (2.1)	0	0	22 (3.2)	0	0	3 (100.0)	-	0	3 (4.4)	0	25 (3.3)
Unidentified species														
Unid. small rodent	0	0	0	0	-	0	-	-	-	1 (100.0)	0	1 (100.0)	0	1 (2.8)
Unid. small mammal	127 (18.3)	76 (41.3)	8 (13.8)	3 (11.5)	1 (7.7)	215 (22.1)	0	2 (66.7)	11 (36.7)	3 (50.0)	5 (10.9)	21 (19.3)	13 (27.1)	249 (21.9)
Unid. med.-lg. mammal	2 (16.7)	1 (33.3)	0	0	0	3 (12.0)	0	-	0	-	0	0	-	3 (8.3)
Number of specimens	1,867	1,002	342	136	53	3,400	83	62	53	13	147	358	132	3,912
Number of burned specimens	216	197	25	3	4	445	1	3	20	4	8	36	18	499
% of specimens charred	(11.6)	(19.7)	(7.3)	(2.2)	(7.5)	(13.1)	(1.2)	(4.8)	(37.7)	(30.8)	(5.4)	(10.1)	(13.6)	(12.8)

[a]n = number of charred specimens, (n) = percentage of specimens charred, 0 = taxon present but no specimens charred, - = taxon not present.

Table 10.23. Site 29SJ 633, frequencies of charred bone, Room 7[a]

Taxa	Layer 1	Layer 2	Layer 3	Layer 4	Layer 4 Rock Conc.	Layer 5	Layer 5-6 Mixed	Total Fill
Mammals								
Sylvilagus	0	1 (2.0)	1 (1.6)	15 (41.7)	0	3 (11.1)	38 (26.2)	58 (20.9)
Lepus	-	0	1 (7.1)	0	0	0	11 (19.0)	12 (6.7)
Cynomys	-	0	1 (5.6)	7 (58.3)	0	0	1 (11.1)	9 (15.0)
Neotoma	-	0	-	2 (100.0)	0	0	0	2 (13.3)
Lynx	-	-	0	-	-	-	-	0
Birds								
Meleagris	0	1 (5.2)	1 (1.3)	1 (5.6)	3 (2.9)	0	0	6 (1.5)
Unidentified species								
Unid. small rodent	-	-	0	-	0	-	-	0
Unid. small mammal	0	0	31 (11.0)	57 (47.1)	0	4 (21.1)	35 (17.2)	127 (18.3)
Unid. med.-lg. mammal	-	0	1 (25.0)	0	0	1 (100.0)	0	2 (16.7)
Number of specimens	11	140	492	206	317	121	580	1,867
Number of burned specimens	0	2	36	82	3	8	85	216
% of specimens charred	(0.0)	(1.4)	(7.3)	(39.8)	(0.9)	(6.6)	(14.7)	(11.6)

[a] n = number of charred specimens, (n) = percentage of specimens charred, 0 = taxon present but no specimens charred, - = taxon not present.

Table 10.23 (continued)[a]

Taxa	Layer 6 Fl. fill	Floor 1 Contact	Bin 1	Floor 1 Features	Burial 3	Rodent Disturb.	Floor 1 Assoc. Total
Mammals							
Sylvilagus	91 (20.0)	2 (100.0)	3 (4.8)	0	3 (23.1)	6 (35.3)	14 (14.4)
Lepus	13 (11.6)	-	0	-	0	1 (50.0)	1 (4.3)
Cynomys	2 (4.7)	0	0	0	0	0	0
Neotoma	0	-	0	-	-	0	0
Lynx	-	-	-	-	-	-	-
Birds							
Meleagris	14 (7.7)	0	2 (3.1)	0	0	0	2 (2.1)
Unidentified species							
Unid. small rodent	0	-	0	0	-	-	0
Unid. small mammal	76 (41.3)	2 (28.6)	2 (6.9)	0	0	4 (44.4)	8 (13.8)
Unid. med.-lg. mammal	1	-	0	-	-	0	0
Number of specimens	1,002	11	207	21	65	38	342
Number of burned specimens	197	4	7	0	3	11	25
% of specimens charred	(19.7)	(36.4)	(3.4)	(0.0)	(4.6)	(28.9)	(7.3)

[a]n = number of charred specimens, (n) = percentage of specimens charred, 0 = taxon present but no specimens charred, - = taxon not present.

Table 10.23 (concluded)[a]

Taxa	Layer 7	Floor 2 Features	Total Floor 2 Assoc.	Layer 8	Layer 9	Layer 10	Total Subfloor	Room 7 Total
Mammals								
Sylvilagus	0	0	0	0	1 (14.3)	-	1 (9.1)	164 (16.9)
Lepus	0	-	0	0	1 (100.0)	-	1 (10.0)	27 (8.3)
Cynomys	0	0	0	0	0	-	0	11 (8.4)
Neotoma	-	-	-	-	-	0	0	2 (6.1)
Lynx	-	-	-	1 (100.0)	-	-	1 (100.0)	1 (50.0)
Birds								
Meleagris	-	0	0	0	0	-	0	22 (3.2)
Unidentified species								
Unid. small rodent	0	0	0	-	-	-	-	0
Unid. small mammal	2 (10.5)	1 (14.3)	3 (11.5)	1 (11.1)	0	-	1 (7.7)	215 (22.1)
Unid. med.-lg. mammal	-	0	0	0	-	-	0	3 (12.0)
Number of specimens	78	58	136	28	18	7	53	3,400
Number of burned specimens	2	1	3	2	2	0	4	445
% of specimens charred	(2.6)	(1.7)	(2.2)	(7.1)	(11.1)	(0.0)	(7.5)	(13.1)

[a]n = number of charred specimens, (n) = percentage of specimens charred, 0 = taxon present but no specimens charred, - = taxon not present.

Table 10.24. Site 29SJ 633, charred bone frequencies, Room 8, and anomaly tests[a]

Taxa	Level 4 Fill[b]	Level 5 Fl. fill	Floor 1 Assoc.	Floor 2 Assoc.	Level 6	Level 7	Level 8	Subfloor Total	Room 8 Total	Anomaly Test 1	Anomaly Test 7	Anomaly Test 8
Mammals												
Sylvilagus	0	0	5 (41.7)	-	2 (18.2)	0	1 (11.1)	3 (5.9)	8 (9.6)	0	2 (6.9)	1 (33.3)
Lepus	0	1 (100.0)	-	0	0	0	0	0	1 (5.9)	-	2 (33.3)	-
Cynomys	1 (25.0)	0	1 (50.0)	0	0	-	-	0	2 (13.3)	-	0	-
Neotoma	-	0	-	-	-	-	-	-	0	-	-	-
Lynx	-	-	-	-	-	-	-	-	-	-	-	-
Birds												
Meleagris	0	0	3 (100.0)	-	-	0	0	0	3 (4.4)	-	0	0
Unidentified species												
Unid. small rodent	-	-	-	1 (100.0)	-	-	-	-	1 (100.0)	0	0	-
Unid. small mammal	0	2 (66.7)	11 (36.7)	3 (50.0)	2 (16.7)	2 (6.5)	1 (33.3)	5 (10.9)	21 (19.3)	5 (31.2)	7 (26.9)	0
Unid. med.-lg. mammal	-	-	0	-	-	-	0	0	0	-	-	-
Number of specimens	40	62	53	13	39	80	28	147	358	29	84	7
Number of burned specimens	1	3	20	4	4	2	2	8	36	5	11	1
% of specimens charred	(2.5)	(4.8)	(37.7)	(30.8)	(10.3)	(2.5)	(7.1)	(5.4)	(10.1)	(17.2)	(13.1)	(14.3)

[a]n = number of charred specimens, (n) = percentage of specimens charred, 0 = taxon present but no specimens charred, - = taxon not present.
[b]No charred bone in Levels 1-3.

bones and fracturing by tools of stouter elements (e.g., artiodactyl long bones).

Signs of butchering on bones from 29SJ 633 are rather uncommon. This is largely because of the remarkable prevalence of small mammals that can be cooked and eaten with minimal butchering and because of the small, fragmented nature of the few large mammal bones.

Cut marks were noted on only two bones from the entire collection. A pair of deep cut marks was found on a fragment of the left frontal of a Felis (Lynx) rufus skull from Room 7, Layer 3 (FS 248), and a series of light diagonal cuts appear on the shaft of a Meleagris left tibiotarsus from Room 7, Layer 4 (FS 784). This turkey bone is also interesting in that the shaft also shows a badly mended premortem break.

Intentional fractures are more abundant with some 28 individual bones from 6 species interpreted as having been intentionally broken (Table 10.25). There are undoubtedly many more instances of intentionally broken bones among the small mammals, but these were not recorded because they cannot be easily distinguished from naturally broken cases. The ones listed here are only those that I am reasonably certain were intentionally fractured. Most of these are simple snap fractures with only a single Antilocapra radius showing a probable twist break (terminology is that of Sadek-Kooros 1972). Just as they are the most ubiquitous taxa, cottontails and turkeys make up the bulk of the snap-fractured examples. Both cottontails and jackrabbits show snapped hind legs with the joints left intact.

One of the more intriguing cases of fractured bones involves parts of a medium-sized bird from the Floor 2 floor fill, Layer 7, southwest quarter (FS 961) of Room 7. This bird, tentatively identified as a scaled quail (Callipepla squamata), apparently had both wings ripped off. Only the proximal portions of both scapulae and coracoids are left along with a few other bones of the upper torso. Also present are the distal end of a femur and the proximal end of a tibiotarsus, i.e., another articulated "knee" joint. Whether this assemblage of bones represents a bird disarticulated for food consumption or for nonfood reasons (e.g., to have intact wings) is unknown.

Taxonomic Composition of Bone Artifacts

Some 14 bone artifacts were recovered from the testing at 29SJ 633. Only five of these could be identified taxonomically, as listed below.

Taxon	No. of Artifacts
Lepus californicus	1
Felis (Lynx) rufus	1
cf. Odocoileus hemionus	1
Meleagris gallopavo	2
Unidentified medium mammal	1
Unidentified artiodactyl	5

Table 10.25. Faunal specimens from 29SJ 633 that show indications of intentional fracturing

Taxon	Provenience	FS	Element and Portion	Comments
Sylvilagus cf. _auduboni_:	Room 7, Layer 3, SE 1/4	44	Right innominate fragment	Fracture not definite
	Room 7, Layer 3, NE 1/4	162	Right innominate fragment	Fracture not definite
	Room 7, Layer 4, Rock Concentration 1	755	Right proximal tibia	Articulated joint
	Room 7, Layer 6, SW 1/4	645	3rd, 4th, 5th left metatarsal proximal halves	Articulated foot, also burned
	Room 7, Layer 10, NE 1/4	862	Left proximal tibia (head only)	
Lepus californicus:	Room 7, Bin 1, Layer 5	694	Left proximal tibia Left distal femur	Articulated joint
Taxidea taxus:	Room 7, Layer 2, SW 1/4	77	Coronoid process of right dentary	
Antilocapra americana:	Room 7, Layer 6, floor fill, SE 1/4	219	Right proximal radius	Probably a twist break after cracking
Unidentified artiodactyl:	Room 7, Layer 6, floor fill, NE 1/4	808	Fragment of thoracic vertebra	
Meleagris gallopavo:	Room 7, Layer 3, NE 1/4	248	Proximal 1/2 of coracoid	
	Room 7, Layer 6, SE 1/4	219	Distal left tibiotarsus	
	Room 7, Bin 1, Layer 5	694	Distal right humerus Proximal 1/2 of right radius Proximal left femur	Humerus and radius probably articulated
	Room 7, Floor 1, OP 1	936	Distal left tibiotarsus	
	Room 7, Floor 1, Burial 3	282	Proximal right humerus Distal 1/4 right tibiotarsus	2 individuals
	Room 8, Layer 4, E 1/2	371	Proximal right coracoid	
Medium bird cf. _Callipepla squamata_: (scaled quail)	Room 7, Layer 7, SW 1/4	961	Proximal left and right scapulae	"shoulder" bones articulated
			Proximal left and right coracoids	femur and tibia articulated
			Proximal tibiotarsus	
			Distal femur	

Unidentified large mammal	2
Unidentified vertebrate	1
Total	14

Note that the number of artiodactyl bones here matches the total from the unmodified bone collection. (See Chapter 11 for more details on bone artifacts.)

Skeletal Part Representation

For taxa with few specimens--and this includes all artiodactyls, carnivores, and wild birds--the elements recovered from the site are given above under "Taxonomic Composition." Table 10.26 and Figure 10.7 display the frequencies of cranial and long bone elements for each of the six most common taxa--Sylvilagus, Lepus, Cynomys, Peromyscus, Neotoma, and Meleagris.

Age Composition and Seasonality

Age distribution of taxa for which season of birth is restricted can give some indication of season of death, and by extension, seasonality of human occupation if the specimens are cultural in derivation. With each of the three, main, small game animals found at 29SJ 633, a small number of young (less than ca. one month) individuals were recovered--two Sylvilagus, two Lepus, and one Cynomys. Although few in number, these individuals indicate accumulation during the summer months of the year. Three large bird taxa are also represented by young individuals--Meleagris (turkey), cf. Corvus corox (raven) and Bubo virginianus (great horned owl). These, too, suggest summer occupancy. Another definite summer specimen is the very young pronghorn individual.

Also of note is the abundance of immature cottontails. Compared to nearby 29SJ 629, the Sylvilagus sample from 29SJ 633 involves proportionally far fewer mature adults (see Gillespie 1981 for further discussion). This is indicated both by epiphyseal fusion of the tibia and the sample of dentaries. The abundance of juveniles suggests procurement in the summer or fall when juveniles are most abundant. Also suggestive of summer procurement is the abundance of prairie dogs, a hibernator that during the winter can be obtained only by digging.

These characteristics strongly point to occupation during the summer months. However, the information is inconclusive with regard to winter occupation--i.e., people were there in the summer, but it is unknown whether or not occupation was year round.

The artiodactyl remains, or more specifically their paucity, might suggest a lack of winter use, inasmuch as the traditional season of big game hunting is fall or winter. Note, too, that one of the few artiodactyl individuals is definitely a summer occurrence (i.e., young pronghorn).

Table 10.26. Relative frequencies of major skeletal elements (long bone and cranial) among the most abundant taxa at 29SJ 633

Element	Sylvilagus		Lepus		Cynomys		Peromyscus		Neotoma		Meleagris	
	MNI	%	MNI	%	MNI	%	MNI	%	MNI	%	MNI	%
Cranium (maxillary portion)	17.5	63.6	3	35.3	4.5	52.9	2	44.4	0.5	11.1	1	11.1
Mandible	27.5	100	4.5	52.9	8.5	100	4.5	100	0.5	11.1	2	22.2
Scapula	25	90.9	5	58.8	1.5	17.6	0.5	11.1	1	22.2	8.5	94.4
Humerus	24.5	89.1	6	70.0	2.5	29.4	2.5	55.6	1.5	33.3	5	55.6
Radius	24	87.3	4.5	52.9	6.5	76.5	1	22.2	0	0	6.5	72.2
Ulna	25	90.9	5	58.8	1.5	17.6	2	44.4	0	0	5.5	61.1
Innominate	22	80.0	8.5	100	2	23.5	3	66.7	3	66.7	2.5	27.8
Femur	22.5	81.8	4	47.1	2.5	29.4	4.5	100	3	66.7	7	77.8
Tibia	27.5	100	8	94.1	5.5	64.7	4	88.9	4.5	100	-	-
Calcaneum	18.5	67.3	6	70.6	1.5	17.6	0	0	0.5	11.1	-	-
Tibiotarsus											8.5	94.4
Tarsometatarsus											9.0	100
Coracoid											6.0	66.7
Carpometacarpus											2.0	22.2

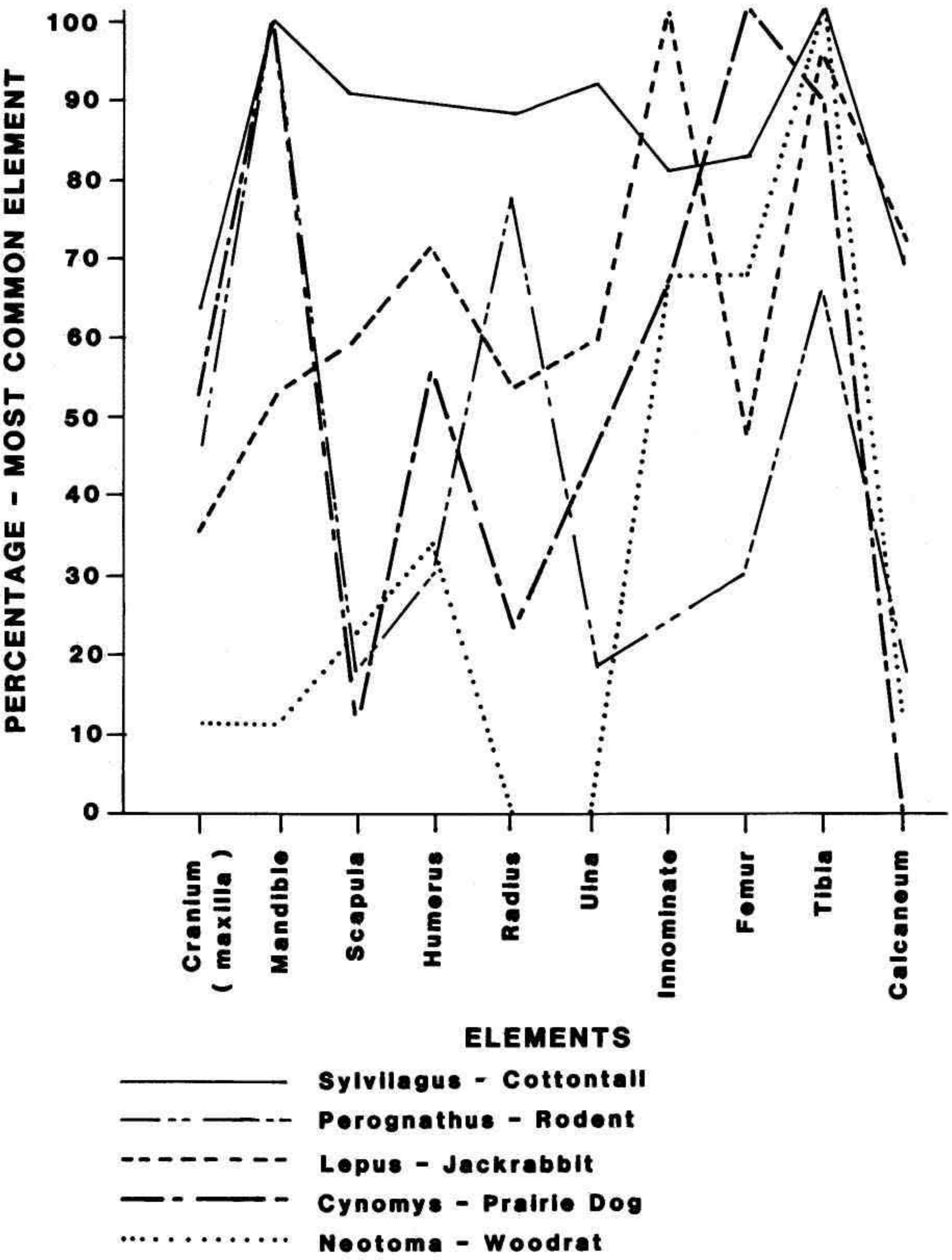

Figure 10.7. Relative frequencies of cranial and major appendicular skeletal elements of the most abundant mammal taxa. Values are standardized by setting most common element to 100

Summary

The site 29SJ 633 faunal assemblage is noteworthy on several accounts. Briefly, these include

(1) the abundance of remains given the limited amount of excavation (more specimens were recovered than at most of the more extensively cleared small sites);
(2) the predominance of cottontails and turkeys;
(3) the indications that turkeys were kept at the site and were consumed, making them an important food source;
(4) a lack of domestic dogs;
(5) the acute scarcity of artiodactyl specimens;
(6) evidence of summertime occupation but uncertainty about winter use; and
(7) the abundance of small, immature cottontails.

Several of these attributes suggest that faunal resources may have been under stress during this late occupation of the canyon. A potential scenario would suggest a scarcity of preferred big game animals and, as a result, use of (a) abundant but not full-sized cottontails, (b) immature big game (though the single case is not much to go on); and (c) a domestic food source, turkeys, which show fewer indications of use in earlier sites. Perhaps in keeping with this interpretation of stress is the lack of dogs, a species that may have been locally extirpated by this time.

With regard to some methodological aspects, calculation of a variety of different MNI estimates suggested that relative abundances of common taxa are not greatly affected by the method of estimation. On the other hand, meat weight estimates for different taxa varied markedly with the method of MNI calculation. Two methods of meat weight estimation were employed, the standard "available" meat weight amounts and a more refined "consumed" meat weight approach. The latter is thought to more accurately represent the relative importance of economic taxa, although it still varies considerably with the method of MNI calculation.

11

BONE TOOLS FROM 29SJ 633

Judith Miles

Introduction

Although the density of faunal remains at 29SJ 633 is one of the highest for sites excavated by the Chaco Project (see Chapter 10), there were few bone tools in the sample. Bone artifacts are not a high-density item, even in extensively built-up trash deposits, and, if nearby sites such as 29SJ 627 (Miles 1982), 29SJ 1360 (McKenna 1980, 1984), and 29SJ 629 (Miles 1983b) are comparable to 29SJ 633, the majority of bone artifacts will be found in the kivas rather than in the rooms. Because the limited testing of the site (less than 10%) was restricted to two specific rooms, we feel that we did not obtain a sufficiently large sample of bone artifacts on which to make definitive statements. What follows is a summary of the recorded attributes and general comments on the artifacts' relationship to the site.

Faunal Remains

William Gillespie provided the faunal attribute determination utilized in this report and coded that information and the provenience data. The most notable attribute of the faunal remains collected from 29SJ 633 excavations is its size: 3,912 bones from the partial excavations (see Chapter 10). The reason offered by Gillespie is the relative abundance of higher-density trash and thorough recovery techniques. Even though the total number for faunal remains is extraordinarily high, the total for worked bone, including fragments, was not excessive (n = 18). Bone tools are not high-density items, and this disproportion between unworked and worked bone may demonstrate the independence of bone utilization from the available fauna. The specific faunal taxonomy determination and skeletal element for bone tools are provided in Table 11.1.

Lagomorphs (cottontails and jackrabbits) are represented by the largest number of elements (1,101 and 351, respectively) in the overall group of faunal remains (Chapter 10). There is only one worked lagomorph element: a tinkler fashioned from a jackrabbit tibia, a not-so-surprising combination; however, it is not known why tinklers are almost always modified jackrabbit tibias. Equally perplexing is the avoidance of using cottontail bones despite their seemingly plentiful availability.

Turkey remains, the second most numerous of the fauna (766 items), seemed also to be proportionally underutilized as depicted by their worked bone counts. These trends may indicate a conscious selection of sturdier skeletal elements by bone craftsmen.

Table 11.1. Faunal determination of bone tools from 29SJ 633

Field Specimen Number	Artifact Type	Scientific Name	Common Name	Skeletal Element
217-1	awl		artiodactyl	long bone
623-1	awl		midsized animal	long bone
809-1	awl	Meleagris gallopavo	turkey	tarsometatarsus
821-1	awl		artiodactyl	long bone
1159-1	awl		small-to-medium mammal	long bone
606-1	pin	Felis rufus	bobcat	fibula
219-1	tubular bead	Meleagris gallopavo	turkey	ulna
272-1	tinkler	Lepus californicus	jackrabbit	tibia
162-1	fragment		unknown bird or mammal	long bone
19-1	fragment		artiodactyl	long bone
282-1	fragment		artiodactyl	long bone
502-1	fragment		medium-to-large mammal	long bone
772-1	fragment[a]	Felis rufus	bobcat	fibula
615-1	fragment		artiodactyl	long bone
644-1	fragment[b]		artiodactyl	long bone
683	fragment	Odocoileus hemionus	mule deer	tibia
1146-1	fragment		artiodactyl	long bone
1146-2	fragment		medium-to-large mammal	long bone

[a]Fragment fit on to FS No. 606-1.
[b]Fragment fit on to FS No. 821-1.

Bone Tool Inventory

The inventory consisted of eight identifiable artifact types—5 awls, 1 pin, 1 tubular bead, 1 tinkler, and 10 fragments, for a grand total of 18. The recognizable bone tools are included in Table 11.2.

Measuring Techniques

Measurements were taken only from complete specimens. The specification of complete is in regard to length, width, and thickness as defined below. The unit measurement for length, width, and thickness is centimeters. Lengths are measurements of the longest line parallel to the long axis of the element. Widths are between the right and left sides of the artifact, at the midpoint and at right angles to the length. Thicknesses are distances from front to back of the artifact and perpendicular to length and width.

Tip diameters were also measured and recorded in millimeters. The tip diameters of awls and the pin were measured 1 mm back from the tip end in order to be consistent with previous analyses (McKenna 1980, 1984; Miles 1983a, 1983b, 1983c; Olsen 1979). The tinkler's distal end was measured across the item as was the width, 1 mm back from the tip.

Descriptive Statistics

Table 11.2 presents the dimensions of the measured bone tools. Awl lengths range from 4.7-10.9 cm and average 8.0 cm. Their tip ends range from 0.5-1.3 mm in diameter. These values are not unusual.

Manufacturing Techniques

What seems to be a standard practice in awl manufacturing (McKenna 1980, 1984; Miles 1982, 1983a, 1983b, 1983c) was also adopted by the designers of the 29SJ 633 bone tools. Longitudinally split or splintered long bones were ground sufficiently to smooth the jagged edges and butt ends and develop rounded, pointed tip ends. Other than the tubular bead that exhibits a high polish and perhaps the pin that showed finer sanding over its entire surface, bone artifacts were made by the easiest and quickest methods, abandoning details. The attributes of manufacturing technique are listed in Table 11.3.

Based on the available data (Table 11.4), 78% (14 of 18) of the bone tools are marked by some erosion, as evidenced by the onset of decay on the periosteum or surface of the articular plate. One item, a fragment, has been severely eroded beyond the surficial bone tissues. Two other fragments displayed burned tissues; they were completely charred.

Spatial and Temporal Contexts

No artifacts were found in direct association with features. The closest to such finds were two awls in the postoccupational fill of two separate pits that served an unknown use and a worked artiodactyl fragment

Table 11.2. Bone tool types and their measurements

Field Specimen Number	Artifact type	Length (cm)	Width (cm)	Thickness (cm)	Tip Diameter (mm)
217-1	awl	10.9	1.3	0.5	0.8
623-1	awl	4.7	0.7	0.2	0.5
809-1	awl	8.6	0.8	0.6	1.3
821-1	awl	7.5	0.9	0.5	0.7
1159-1	awl	8.2	0.8	0.5	1.2
606-1	pin	13.8	0.4	0.3	0.4
219-1	tubular bead	3.5	1.2	0.9	12.8[a]
272-1	tinkler	10.7	0.8	0.7	6.9

[a]Opposite end broken, not measured.

Table 11.3. Manufacturing techniques employed listed by individual bone tool

Field Specimen Number	Artifact Type	Primary Modification	Secondary Modification	Tip Shape	Butt Description
217-1	awl	splintered	transverse striae on tip and interior cut	beveled exterior	ground smooth, symmetrical
623-1	awl	splintered	miscellaneous grinding	round in cross section	unmodified splinter
809-1	awl	spiral fracture	miscellaneous grinding	round in cross section	not modified
821-1	awl	longitudinally split	miscellaneous grinding	round in cross section	unmodified splinter
1159-1	awl	longitudinally split	transverse striae on tip and interior cut	round in cross section	unmodified splinter
606-1	pin	whole element	miscellaneous grinding	round in cross section	slightly rounded[a]
219-1	tubular bead	circumference grooved, then snapped	highly polished	beveled exterior[b]	na
272-1	tinkler	whole element	miscellaneous grinding	bluntly ground	bluntly ground
162-1	fragment	splintered	miscellaneous grinding	na	ground smooth, symmetrical
19-1	fragment	splintered	miscellaneous grinding	na	ground smooth, symmetrical
282-1	fragment	longitudinally split	miscellaneous grinding	na	unknown
502-1	fragment	longitudinally split	miscellaneous grinding	na	ground smooth, symmetrical
722-1	fragment	indeterminable split	miscellaneous grinding	na	unknown
615-1	fragment	split longi-tudinally, bilaterally	miscellaneous grinding	na	ground smooth, symmetrical
644-1	fragment	indeterminable split	miscellaneous grinding	na	ground smooth, symmetrical
683-1	fragment	longitudinally split	miscellaneous grinding	unknown, broken	unknown, broken
1146-1-2	fragments (2)	longitudinally split	miscellaneous grinding	na	unknown, broken

[a]Cause indeterminable—manufacture or use?
[b]Opposite end broken, fine shaping indeterminable.

Table 11.4. Specific provenience of individual bone artifacts

Field Specimen Number	Artifact Type	Provenience and Type of Deposition	Condition of Bone
217-1	awl	Room 7, Floor 1, Layer 6, Level 7 (adobe and trash fill)	Complete tool, but slightly eroded
623-1	awl	Room 7, Floor 1, Layer 3, Level 5 (trash fill)	Slightly eroded with minor damage to tool
809-1	awl	Room 7, Floor 1, Pit 6 (postoccupational fill)	Complete tool, but slightly eroded
821-1	awl	Room 7, Floor 1, Layer 6, Level 7 (alluvial/aeolian-trash fill)	Slightly eroded with minor damage to tool
1159-1	awl	Room 7, Floor 2, Pit 2 (Layer 1 and 2 fill)	Slightly eroded with minor damage to tool
606-1	pin	Room 7, Floor 1, Layer 3, Level 5 (trash fill)	Complete tool, but slightly eroded
219-1	tubular bead	Room 7, Floor 1, Layer 6, Level 7 (adobe and trash fill)	Consolidated bone but minor damage to tool
272-1	tinkler	Room 7, Floor 1, Layers 5 and 6, Level 6 (alluvial/aeolian-trash fill)	Slightly eroded with minor damage
162-1	fragment	Room 7, Floor 1, Layer 3, Level 5 (trash fill)	Slightly eroded
19-1	fragment	Room 7, Floor 1, Layer 2, Level 2 (alluvial fill)	Slightly eroded
282-1	fragment	Room 7, Floor 1, Burial 3	Badly eroded
502-1	fragment	Room 8, Test Trench 2 (alluvial/aeolian fill)	Slightly eroded
772-1	fragment	Room 7, Floor 1, Layer 3 (trash fill)	Slightly eroded
615-1	fragment	Room 7, Floor 1, Layer 6, Level 7 (alluvial/aeolian-trash fill)	Slightly eroded
644-1	fragment	Room 7, Floor 1, Layer 6, Level 7 (alluvial/aeolian-trash fill)	Slightly eroded
683-1	fragment	Room 7, Floor 1, Layer 3 top (alluvial/aeolian fill)	Slightly eroded with extensive damage
1146-1-2	fragments (2)	Room 7, Floor 1, SE and NE quadrants (alluvial/aeolian fill from cleanup[a])	Burned black

[a]Fill dirt adhering to walls, which was removed in order to map architecture (Truell, personal communication).

from Burial 3. The artiodactyl piece is assumed not to have been a conscious inclusion with Burial 3 because of its singular fragmentary condition, the surrounding high-density trash, and evidence of a great deal of depositional disturbance by animal burrowing. Refer to Table 11.4 for provenience data.

Early and late occupational time periods (Chapter 5), as indicated by floor level, reveal that only one bone tool remained from the early A.D. 1100s (of the portions of the site that were excavated); however, Floors 1 and 2 were close (about 2-3.5 cm vertically apart) and broken up in areas (see Chapter 4, Figures 4.4 and 4.5), allowing mixing of their respective fill.

The proveniences provided in Table 11.4 show that 59% (10 of 17) of the bone tool assemblage was recovered from Layers 3 and 6. The importance of the distinction is tempered somewhat by the cultural nature of the fill and its large volume.

Summary

The artifact types, their morphologies and faunal characteristics are common to the prehistoric puebloan culture of the Southwest. Their ubiquitous distribution within the fill offers no enchancement to the interpretation of bone tools or the site.

The bone tool collection from 29SJ 633 is understandably small because excavations were limited to a very small portion of the site which, as a single type of structure, is a poor candidate for providing a representative worked bone sample. However, the data gathered are valuable for a more complete understanding of intrasite articulation should future excavation of 29SJ 633 be undertaken.

HUMAN REMAINS FROM SITE 29SJ 633

Excavation and testing procedures at 29SJ 633 uncovered four complete burials plus a number of isolated human elements. The complete burials (two each from pits and upper floors in Room 7 and Room 8) are assigned to the Mesa Verde Phase, but the isolated specimens possibly reflect other occupational periods of the site as well. They were found in various fill levels of both rooms and Plaza Test Trench 1. After the presentation of the inventory of human remains, this chapter will include a description of the burials, a discussion of the physical remains and grave goods, and a comparison with other data from the Mesa Verde period. Although the sample is small, several suggestions for future investigations are made.

Inventory of Human Remains

In addition to 4 complete burials (3 infants and 1 adult male), 34 human bones were recovered from Room 7, Room 8, and Plaza Test Trench 1. All were examined by Nancy Akins; Dr. R. Ted Steinboch also examined the skeletal material for pathologies. Table 12.1 lists the proveniences of all specimens and provides a determination of age and sex of individuals where possible.

Human remains from Room 7 included two burials associated with Floor 1, plus bones from different individuals that had been scattered in the fill of the room, between the floors, and in the lowest levels. There were 18 bones in the fill above Floor 1; whether these represent one or several individuals is uncertain because of the various elements represented and their locations. Although all are parts of adult skeletal remains, six were not part of an adult male, Burial 3, which was found on the upper floor. Eight other elements, one of which probably belonged to an adult female and two of which were not part of Burial 3, were recovered from the intentional fill between Floor 1 and Floor 2. One cervical vertebra found in Bin 1 of Floor 2 also was not part of Burial 3. The lower left rib found in the fill below Floor 2 possibly represents the remains of an adult who died before the initial use of Room 7. There was much disturbance in these rooms, however; and assignment to a specific time period is not warranted.

In Room 8, four adult bones were recovered in addition to the two complete infant burials. The adult remains from Level 6 and Level 8 are probably part of the (possibly redeposited) fill beneath the floor(s) of this room.

The remaining two elements were bones from adult(s) recovered in trash deposits examined in Plaza Test Trench 1. This trash was difficult to date because it included a ceramic mix representing two periods of occupation at this site. Some of it may have accumulated through a dumping process, but part of it could represent material that had washed downhill. The trench included wall fall as well as cultural material. The material

Table 12.1. Human bone from 29SJ 633[a]

Burials	Field Specimen No.	Provenience	Age
Burial 1	FS 425	Room 8, Floor 1, Other Pit 3	8-16 months
Burial 2	FS 480	Room 8, Floor 1, Other Pit 6	1 1/2-2 1/2 years
Burial 3	FS 282	Room 7, Floor 1	16-20 years, male
Burial 4	FS 948	Room 7, Floor 1, Other Pit 6	8-16 months

Isolated Elements

Field Specimen No.	Provenience	Element	Age
	Room 7, fill above Floor 1:		
FS 33	Room 7, Layer 2, Level 2, SE	left metacarpal 1	adult (not part of FS 282)
		hand phalanx 3	adult
FS 68	Room 7, Layer 2, Level 2, SE	upper left canine tooth	adult, large, probably male
		hand phalanx 3	adult
FS 137	Room 7, Layer 2, Level 2, NE	cervical vertebra fragment	adult
		thoracic vertebra fragment	adult
FS 144	Room 7, Layer 2, Level 3, NE	left metacarpal 3	adult (not part of FS 282)
FS 603	Room 7, Layer 2, Level 4, NW	hand phalanx 1	adult (not part of FS 282)
		rib fragment	adult
FS 828	Room 7, Layer 5, SW	upper right first incisor	adult (not part of FS 282)
FS 272	Room 7, Layers 5 and 6, NE	skull case fragment	adult
		left metacarpal 5	adult (not part of FS 282)
		hand phalanx 2	adult
		hand phalanx 3	adult
		left hamate	adult
		fused foot phalanx 2 and 3	adult
FS 228	Room 7, Layer 6, Level 8, SE	right metacarpal 3	adult (not part of FS 282)
		skull case fragment	adult
	Room 7, intentional fill between Floors 1 and 2:		
FS 961	Room 7, Layer 7, SW	left rib fragment	adult
		lumbar vertebra fragment	adult
FS 963	Room 7, Layer 7, SW	upper right first incisor	adult, probably female
		left metacarpal 2	adult (not part of FS 282)
		hand phalanx 1	adult (not part of FS 282)
FS 964	Room 7, Layer 7, SW	left rib fragment	adult
FS 969	Room 7, Layer 7, SW	right rib fragment	adult
		left rib fragment	adult
	Room 7, Floor 2:		
FS 997	Room 7, Floor 2, Bin 1	cervical vertebrae	adult (not part of FS 282)
	Room 7, below Floor 2:		
FS 834	Room 7, Level 9, SW	left lower rib	adult
	Room 8:		
FS 541	Room 8, Level 6	left humerus fragment	adult (not part of FS 282)
		metacarpal shaft fragment	adult (not part of FS 282)
		rib fragment	adult
FS 564	Room 8, Level 8	hand phalanx 2	adult (not part of FS 282)
	Plaza Test Trench 1:		
FS 309	Plaza Test Trench 1	skull fragment	adult
		left metatarsal 1	adult

[a]Human bones were identified, aged, and sexed by Nancy J. Akins.

probably postdates room use, which the ceramic analysis places in the early A.D. 1200s (see Chapter 7 by McKenna and Toll).

Although a detailed analysis and discussion is possible only for the four complete burials, the presence of other human elements in the fill of the rooms and plaza trash indicates that several adults probably died during the span of occupation of this site. They represent two time periods, the McElmo and Mesa Verde ceramic associations.

Burials

The four burials from 29SJ 633 were included in Akins' (1986) analysis of human remains from Chaco Canyon. This presentation relies heavily on information from her report that pertains to the physical characteristics of the individuals; these and other data are summarized below to provide a more comprehensive description of the interments. Detailed descriptions of the burial pits are included in the discussion of room features (Chapters 4 and 5).

Burial 1

Akins (1986:Table 1) estimated the age of Burial 1 to be 12 $\pm$ 4 months on the basis of dental evidence. The year-old infant was found in an unlined pit excavated into Floor 1 in the southeastern corner of Room 8. Other Pit 3 was dug as a burial crypt; and after the body had been interred, two sandstone slabs plugged the pit, which eventually was covered by fill that, in this area, was burned. The infant had been placed into the pit in a semiflexed position with the head at the west. It rested on its left side with the face down and everted slightly to the north. The right arm was straight along the side; the left one lay under the rib cage with the elbow slightly bent and the hand under the abdomen. The knees were bent and the feet extended upward (Figure 12.1). Red pigment was noted on the parietals. A pocket of ash overlay the abdomen, lower ribs, upper legs, and burned portions of the bones. Because the body, which was covered with ash, was separated from the area of burned fill (which penetrated the slab covering) by a yellowish brown fill covering some charcoal flecks, it is assumed that the ash pocket that covered the bones was an intentional part of the burial ritual.

In addition to the red pigment on the parietals and the ash deposit, grave goods included a large Pueblo II corrugated rim sherd (FS 432) (concave side up), which was located a few centimeters above the skull, and a (Mesa Verde or Crumbled House) Black-on-white ladle (FS 436) (handle missing) located on the right side of the body next to the face (Figures 7.3, 12.1). A flake of cream-colored fossiliferous chert (FS 434) was lying over the abdomen. Included in the intentional fill that surrounded the body were sherds of a San Juan redware bowl, an unidentified whiteware jar, two pieces of unidentified corrugated pottery, a corn cob, and nine pieces of bone.

Generally, the skeletal material was in excellent condition, and Jacobson found some material that she thought may have been cartilage, but

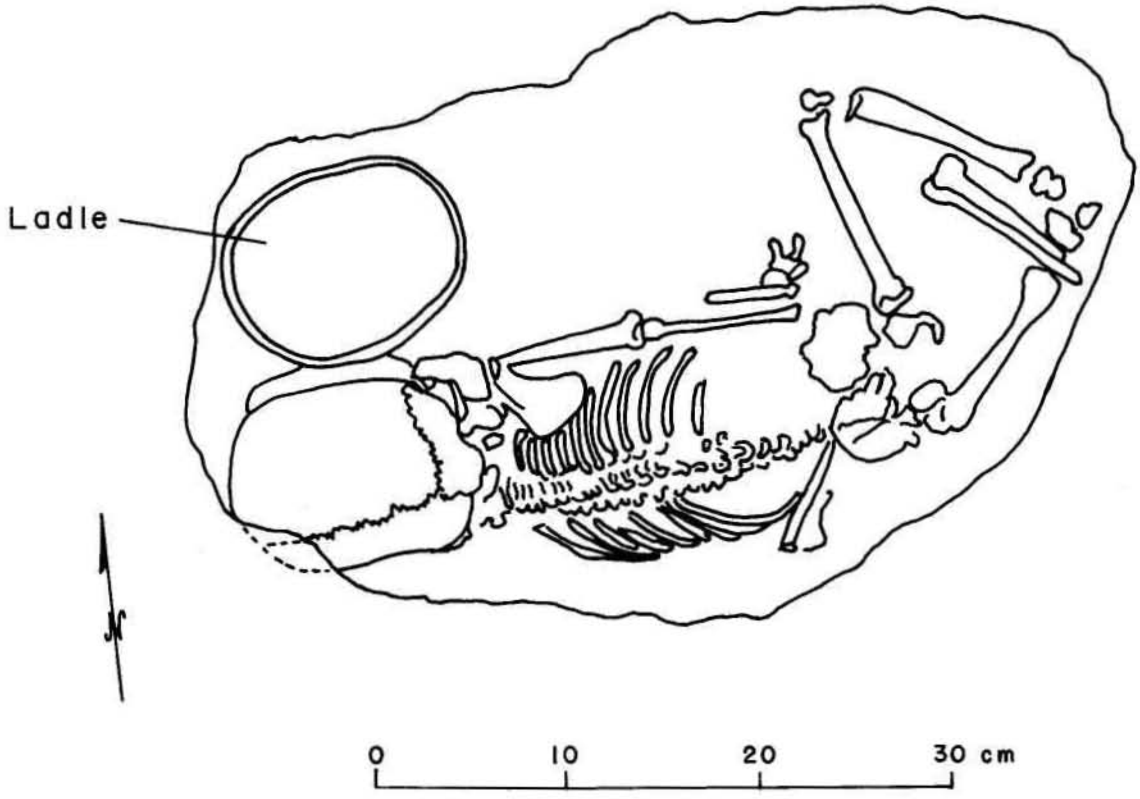

Figure 12.1. Sketch of Burial 1 found in Room 8, Floor 1, Pit 3

this was not confirmed. Only the facial portion of the skeleton was fragmentary.

Akins' (1986:Tables A.2, A.5) detailed analysis of the skeleton included two age estimates: 12 ± 4 months, based on tooth eruption, and 6-12 months based on measurements of bones. Sex was not determined. Congenital and developmental disorders included cranial deformation of the right occipital and parietal and a mandibular suture that had not fused. Iron deficiency anemia was inferred by the presence of cribra orbitalia and porotic hyperostosis. The lesions on the superior portion of the orbits were slight with some remodeling; those on the cranial vault were moderate, and the bone had been remodeled.

Burial 2

A second infant burial was recovered from Other Pit 6 in Room 8. The prepared pit sides and base were well defined, and a stone lining in the lower half of the pit was made from shaped and unshaped stones. One of these slabs, located on the south side, was an indurated sandstone mano (FS 479) that had been reused as an anvil and burned before being incorporated into the pit lining. The semiflexed body rested on two shaped stones that lay at the bottom of the pit. The medial axis of the body ran east-west with the torso ventral side down and rolled slightly to the right. The head was at the western end with the face down and to the right or south. Both elbows were bent; the arms rested under the body and the hands were beneath the lower abdomen. The legs were at a 90° angle from the body; the knees were bent and pulled up tightly to the femurs with the left one lying over the right leg (Figure 12.2). A pocket of ash near the eastern end of the pit covered the knees and pelvic region. The bone beneath the ash was burned, similar to that found with Burial 1 in this room. The pit was filled with a soft, yellowish brown, sandy soil and covered with a 41 by 32 cm slab metate (FS 470) set with its grinding surface down. Two additional stone slabs covered the metate; one projected slightly above Floor 1 into the burned floor fill.

Burned corn was recovered near the head of this infant, over its shoulders, and on the upper ribs. A Mesa Verde Black-on-white bowl (FS 472) was inverted immediately south of the skull, and a Mesa Verde Black-on-white ladle (FS 488) rested directly beneath it (Figure 7.3). A piece of utilized, noncortical palm wood (FS 473) had been placed directly over the legs. Only one other object, a small piece of turquoise (FS 477), was found in the pit fill, Layer 3.

The bones of this skeleton were well preserved. Akins (1986:Tables A.2, A.5) estimates the infant was 24 + 8 months old, based on tooth eruption, and 10-18 months old, based on bone measurements. Like Burial 1, this skeleton had evidence of right occipital and parietal cranial deformation.

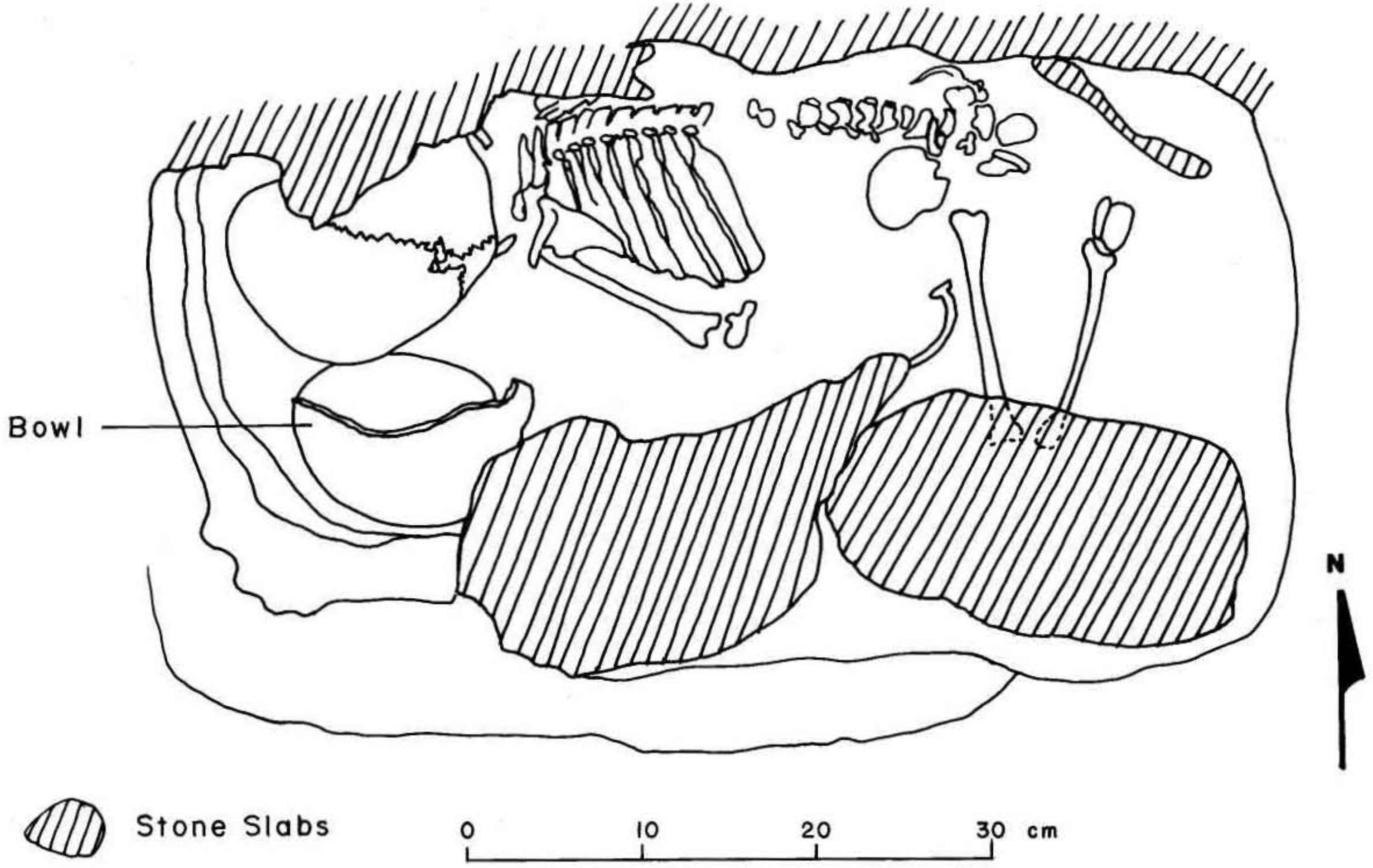

Figure 12.2. Sketch of Burial 2 found in Room 8, Floor 1, Pit 6

Burial 3

Unlike the infant burials at 29SJ 633, this 18-20-year-old male was not placed in an intentionally prepared pit. Instead, he was laid on the surface of Floor 1 in the northeastern corner of Room 7. The body was flexed with the head down and to the north (Figure 12.3) and the face looking east. The arms were bent with the left arm under the spinal column. The knees were pulled up tightly toward the body. A large, ground, sandstone slab (34 cm long by 27-28 cm wide), tilted against the north wall, covered and crushed his skull. The right hand was missing and foot bones were scattered on the room floor; this can be attributed to animal disturbance. The pelvis and legs also bore evidence of some disturbance. These finds support the conclusion that the body remained partially exposed until room fill accumulated; this fill included gray adobe chunks mixed with dense trash that is labeled Layer 6 (see Chapter 4).

Several grave offerings were recovered. A Mesa Verde Black-on-white ladle (FS 291) (Figure 7.3) was found near the head; it was missing the distal portion of its handle, and the rim of the bowl had been ground as if it had been used as a scoop. Multiple plaited strands of twine (FS 286) (as yet unidentified as to material source) were found lying immediately south of the ladle bowl. A portion of a mushroom cap (FS 286), identified by Dr. William Martin of the University of New Mexico Biology Department as a member of the genus Coprinus, possible species comatus (common inky mushroom) (Figure 12.4), lay directly beneath the twine. This mushroom species has not been identified as growing in Chaco Canyon in recent times nor could other occurrences for it be found in the archeological record. It commonly grows in dead tree trunks or in "loose or sandy soil, rich in calcareous substances" (Rinaldi and Tyndalo 1974:50). Despite the fact that this species is found in areas that are moister than Chaco Canyon, it is not clear whether a spore adhering to the twine could have grown in a moist burial context. Martin thinks that it is unlikely, although not impossible, that this could have occurred. Other artifacts possibly associated with this burial are a piece of worked artiodactyl bone (FS 282), some worked selenite (FS 284) (Figure 12.5) that was located near the upper left scapula, and a faceted barite crystal (FS 232) that was found immediately southwest of the right femur next to a slab at the foot of the burial and at the opposite end of the body from the other grave offerings.

The age of the male (18-20 years) was estimated on the basis of dental evidence, and his stature (166.1 cm or 5'4"-5'5") was based on femur length (Akins 1986:Tables A.1, D.1). He was slightly taller than other analyzed male skeletons from Chaco Canyon small sites (see below). The bones were brittle and poorly preserved. Although he had evidence for moderate to extensive squatting facets and a large conoid tubercle, there was no evidence for congenital or developmental disorders. He had moderate calculus formations on his teeth, but no caries, abscesses, antemortem loss or resorption of teeth. Hypoplasia was evident on the canines. Trauma was noted on the thoracic vertebrae. The first foot phalanx was rotated and had a bony pad. The proximal femur had indications of osteomyelitis (lesions indicating an inflammatory reaction), with a lytic lesion just off the femoral cap (Akins 1986:Tables A.2-A.6).

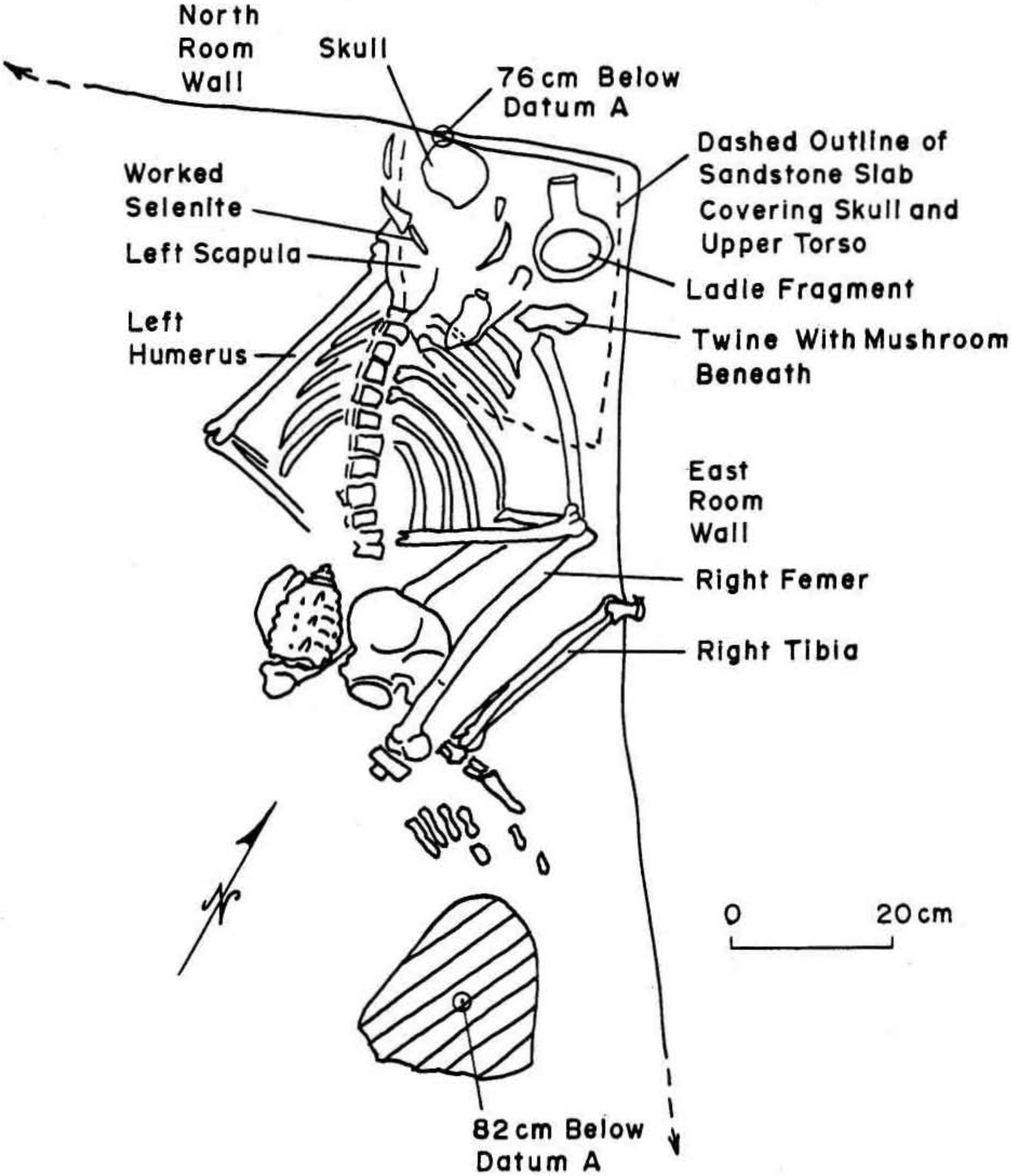

Figure 12.3. Sketch of Burial 3 found in Room 7 on Floor 1

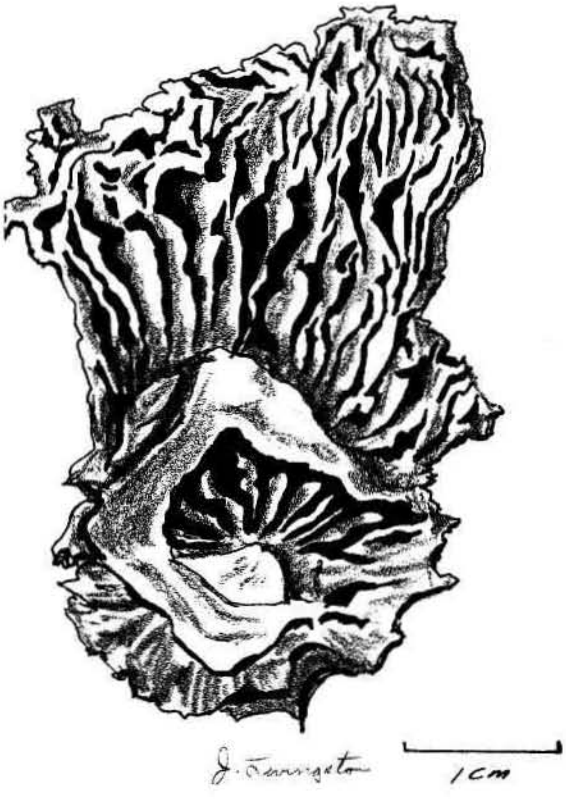

Figure 12.4. Sketch of mushroom cap found with Burial 3

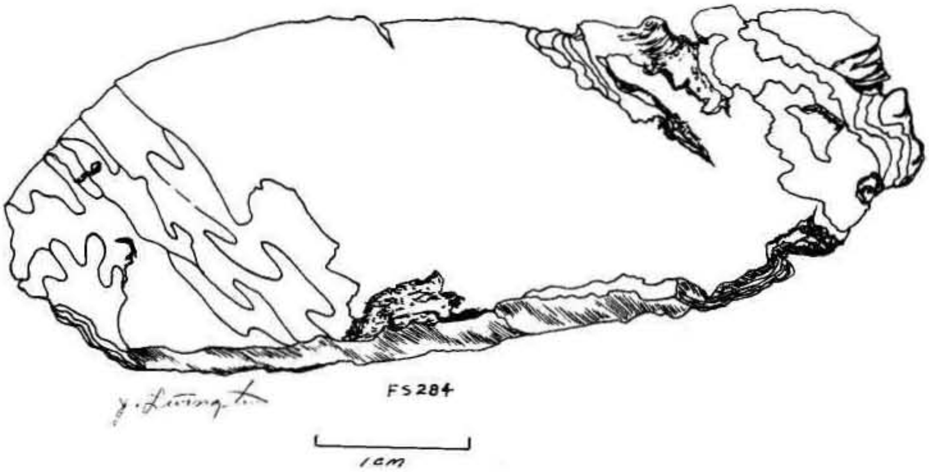

Figure 12.5. Sketch of selenite piece found with Burial 3

Burial 4

Other Pit 6 in the southwestern corner of Room 7 had been excavated through the first floor and contained the remains of a year-old infant. The walls of the pit were rough and unfinished. The semiflexed body was placed face down with the medial axis of the body running north-south (Figure 12.6). The head faced south and was slightly everted to the west. The arms lay by the sides, and the left knee was down with the foot resting against the northern pit wall. The right femur was missing. Pit fill surrounding the interment was predominantly clean, brown sand. Although the burial had been sealed with a series of small sandstone slabs less than 20 cm long and set in plaster, there was some evidence of rodent disturbance. A tunnel entered the pit at the north, went above the vertebral column, and exited the south end of the pit. In it was a concentration of unburned amaranth seeds that are not part of the grave goods. Sometime after the burial had been interred, Rock Concentration 1 (wall fall) fell or was pushed into the area above this burial pit. No similar rock concentration was found over the other burial in this room.

The only offering accompanying this child was a large corrugated sherd, which partially covered the skull (Figure 12.6). It is unknown whether a portion of a Crumbled House Black-on-white bowl found on Floor 1 next to the west wall and just south of Bin 1 and immediately north of Other Pit 6 was a grave offering.

The brittle and poorly preserved skeletal remains revealed no evidence of congenital or developmental disorders. The infant, age 12 $\pm$ 4 months, did have some cribra orbitalia based on bone remodeling. Also present were indications of extensive parietal porotic hyperostosis and a thin cortical bone (Akins 1986:Tables A.1, A.5). Akins feels that severe anemia probably caused the death of this individual.

Discussion

Although these four burials are a limited sample on which to base definitive conclusions, several similarities and differences can be noted regarding their health, the burial preparations, and the grave goods recovered.

With regard to physical well-being, two of the three infants (Burials 1 and 4, each around a year old) had evidence of iron deficiency anemia. Akins (1986:42) indicates that infants between the ages of 6 and 24 months are more likely to develop anemia resulting from rapid growth and an increased need for iron during this period. It is assumed that prolonged milk feeding and diets of maize gruel (which is low in iron content and which contains two chelating agents that inhibit its absorption) contributed to this problem. Infant Burials 1 and 2 exhibited right occipital and parietal deformation. Akins (1986:25) noted cranial deformation on a number of skeletons from Chaco Canyon, but the data were too limited to determine whether there was any patterning among these cases.

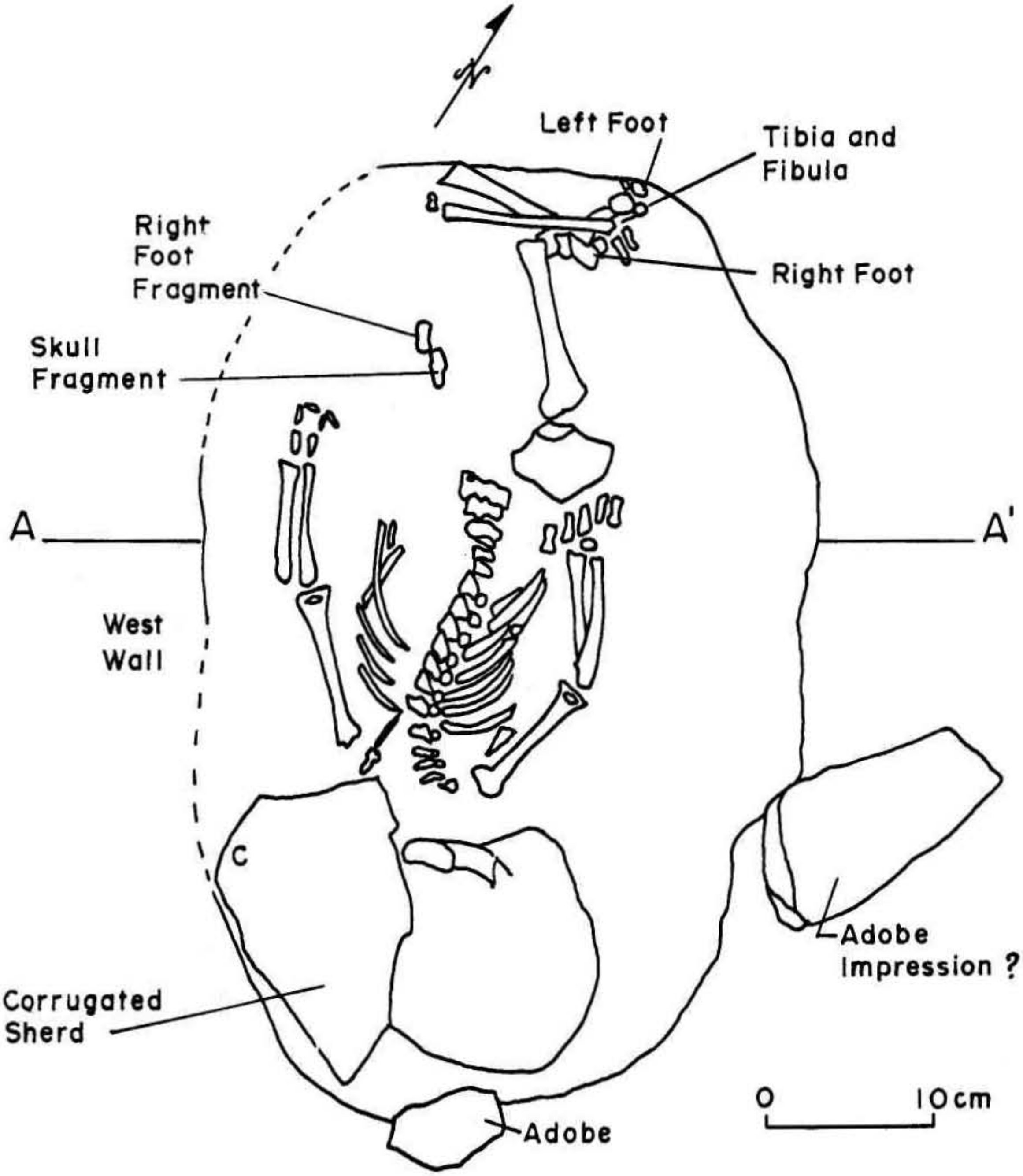

Figure 12.6. Sketch of Burial 4 found in Room 7, Floor 1, Pit 6

During excavation, Truell noted that Burial 3, the 18-20-year-old male, seemed to be taller than most Chaco Canyon burials. Akins (1986 Table 6.2) indicates that the average femur length for males recovered from small sites is 42.8 cm with a minimum of 39.3 cm and a maximum of 44.6. Although Burial 3 (femur length 43.5 cm) is not the largest male found in a small site, he was taller than average and would fit within the range recorded for males from Pueblo Bonito, Room 33 (minimum length 43.1 cm, maximum 46.9 cm). However, he did have some evidence of trauma.

Although the adult male, Burial 3, was not interred in a prepared grave, all three infants were placed in excavated pits that were dug into the upper floors of the rooms and covered with stones or slabs after the bodies had been placed in the graves and the graves filled with sandy soil. Burials 1 and 2 also had evidence of burned ash above the bones. The only other reference to ashes or coals placed on bodies was recorded by Judd (1954:336); a child in Room 290 at Pueblo Bonito was buried in a firepit full of wood ash. Among modern pueblos, Parsons (1939) notes that the Zuni and Laguna Indians rub ashes on infants to preserve health, to ward off witchcraft, and to prevent the spread of disease. At Zia Pueblo, a mother rubs ashes on herself before she presents her newborn child to the sun (Parsons 1939:463), but no mention is made of ashes being incorporated into burial practices.

All burials were accompanied by at least one sherd. The adult, Burial 3, had the greatest number of grave goods with the widest range of materials. Burial 2, who was interred in the best prepared pit, was the only infant accompanied by an ornament, the single turquoise chip found in the fill. The crystal (barite) that was near the feet of the adult could be classified as an ornament. One example of a crystal accompanying a burial is from Bc 59; it bears some resemblance to Burial 3 in Room 7 at 29SJ 633. Two other quartz crystals found with this Bc 59 burial had pointed facets, which put them into a category sometimes referred to as engineering tools (DiPeso 1974, Vol. 2; Jernigan 1978:201). In addition to these Bc 59 crystals, the Chaco Center catalogs indicate that similar crystals were recovered from Bc 57 and Kin Kletso. Judd (1954:289) and Pepper (1920:63) both describe crystals, mostly identified as quartz, from Room 6 and Room 12 at Pueblo Bonito. Pepper (1920:63) noted a "mass of between 50 and 75 pieces" in Room 12, all of which lacked evidence of grinding or use. Judd (1954:289) indicated that the artifacts he and Pepper excavated from Room 6 and the surrounding rooms were recovered from an area of the pueblo that was used as a storage place for altar goods by the early Bonitan religious societies.

Comparisons with Other Mesa Verdean Burials from Chaco Canyon

Because there is such a small sample of burials from the Mesa Verde Phase, Akins (1986:105-107) was cautious about her comparisons between material from site 29SJ 633 (four burials), Bc 236 (one burial), Ƚeyit Kin (one burial), and a small site 16 km east of Pueblo Bonito that was excavated by Frank H. H. Roberts, Jr. (five burials). In general, the adult burials were oriented north-south, which contrasts to an east-west direction for earlier burials associated with McElmo ceramics. Infants tended to be oriented west.

Grave goods were generally limited to ceramics. The only ornaments noted were those recovered from site 29SJ 633 where one infant, Burial 2, had a turquoise chip, and the adult, Burial 3, had the selenite and quartz crystal.

Conclusions

Although the burials are few and the sample precludes drawing any conclusions, several inferences can be made and tested when additional excavations bring more data to bear on the discussion. First, the diet and/or feeding practices of the children living during the Mesa Verde Phase probably were not much different than they were in the earlier Bonito Phase. Two of three children probably suffered from iron deficiency anemia, a problem not uncommon in areas where the diet consists of corn, beans, and squash (Akins 1986:42-44). Second, of the skeletal remains analyzed from Chaco Canyon from the Mesa Verde ceramic-associated period, the child with turquoise (Burial 2) and the male with the quartz crystal and the selenite (Burial 3) represent the only cases in which possible ornaments were recovered as grave goods.

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SUMMARY DISCUSSION AND CONCLUSIONS

The limited excavation and testing at 29SJ 633 have led to much thought and many new questions about the continuity of Anasazi occupation, movement of people from one area to another, and the meaning of changes in material culture remains. The main purpose for examining 29SJ 633--to gain more information on the A.D. 1100s occupation, particularly in the area known as Marcia's Rincon with its long continuum of occupation and some differences from the Casa Rinconada area (Truell 1981) was rewarding. The diversity in small site architecture that had been noted to increase through time was confirmed, and attributes of greathouse architecture were recorded.

Although the Mesa Verde-like occupation of Chaco Canyon in the A.D. 1200s has long been recognized on the basis of a few sherds typical of that period, this occupation had been described mainly only for Chacra Mesa (Vivian 1974a). The wealth of data from 29SJ 633 was not anticipated.

In addition, the remote sensing experiments carried out in conjunction with the test excavations provided useful lessons. This chapter will summarize what was learned, attempt to place 29SJ 633 into a broader cultural picture, and suggest areas for future research.

Remote Sensing Experiments

As noted in Chapter 1, the selection of the sample for excavation at 29SJ 633 required particular efficiency and careful forethought because of extreme time and labor restrictions and the specific requirements of the sample itself. This is the way all samples should be selected; but, in this case, there was little leeway for sample expansion or additional testing. Despite a number of drawbacks, the results obtained from the sample selected were somewhat successful, and a number of potential time-saving recording techniques were evaluated.

Several mapping experiments pointed to the need to carefully evaluate techniques and needs. Costs in time and dollars must be weighed against the size of an area to be mapped, its topography, and types of features. Pre-excavation maps made from aerial photography did not provide the type of information desired when drawn to a scale equal to that used for larger sites. Postexcavation maps made using a plane table and alidade versus those made photogrammetrically had a 5-6-cm discrepancy in room size. Does that difference justify the expense? Problems encountered (rectification of slope and scale) using bipod photography made it impossible to map large areas quickly; but for individual rooms, actual field time decreased considerably. Without immediate development to ensure good photographs, however, progress was somewhat delayed. As a result, although all mapping techniques have advantages and disadvantages, it is up to the excavator to determine what method is most applicable for a given circumstance.

Ground-penetrating tests were not as successful as hoped. The slow return of results of the refractive seismology, and the problems encountered at 29SJ 633, led to the conclusion that wall clearing was a more efficient way to obtain the site plan. In contrast, use of the proton magnetometer was more rewarding.

Rooms 7 and 8 had good indications of anomalies on the proton magnetometer maps. Both contained layers of burned vegetal material in burned sand and clay, and Room 7 had burned floor plaster and hearths associated with its occupational use. In addition, a portion of the upper floor of Room 8 was burned. On the anomaly map, Figure A.2, the location of the Room 8 anomaly was offset considerably to the north of the burned fill and floor; it may, in fact, have been generated by the wall fall concentration associated with the north wall collapse rather than burned features. The Room 7 anomaly location corresponded exactly with the densest concentration of burned vegetal material. The dense concentration of ash below Floor 2, however, was not indicated on the map. This latter ash may have been below the optimum depths at which anomalies were registered.

The ten anomaly tests which were designed to locate good datable burns, determine factors and conditions responsible for the generation of anomalies, and determine the possible effects of these variables on intensities registered did provide some information on burned material or areas. Only three of the ten anomalies tested, however, contained "good" burns generated from cultural agents. Several factors, including a dense concentration of wall fall containing iron-bearing material or composed of burned sandstone are of interest in the evaluation of use of proton magnetometers. In some cases, test grids may have been too restricted to be certain that burns were not present nearby and that something "drew" off the location slightly, or that the map of cultural features was not properly overlaid on the anomaly map.

None of the burns in these three 50 by 50 cm tests were sampled for archeomagnetic dating. Not only were the burned areas inaccessible without enlargement of the test squares, but little or nothing was known about the contexts they represented. These features were buried immediately to avoid further damage. From an archeological standpoint, it is important to note that this method of testing anomalies, from which we gained no knowledge about their proveniences or their relation to any fully excavated site tests, is not recommended. More complete excavation of areas would have improved the results and would have been no more destructive to the site.

Excavation Results

Increased diversity in small site house form in Chaco Canyon is apparent in the late A.D. 1000s and early A.D. 1100s (McKenna and Truell 1986; Truell 1981, 1986:282-301). Because the Chaco Project's carefully excavated site sample is somewhat localized within the canyon (three areas), it is not clear whether this variability appeared suddenly or whether it developed gradually through time. Tests at 29SJ 633 indicate that house form (the house layout, arrangement, and use of space), which was traced through the three areas from the A.D. 600s or 700s, was relatively consistent in the changes noted through time, with minor variations, into the late A.D. 1000s or early A.D. 1100s. Site 29SJ 633, like 29SJ 627 and 29SJ 629 in Marcia's Rincon, consisted of an arc or line of suites with plaza-facing rooms backed by storage rooms (Truell 1981; 1986: 305-315; 1987:I.6, VII.3-8). This layout and room suite organization is not consistent with a number of sites that were excavated in the 1930s and 1940s in the Casa Rinconada area or with previously excavated sites located elsewhere in Chaco Canyon, e.g., Łeyit Kin (Dutton 1938), Lizard House (Maxon 1963), and Bc 54 (Bullen 1941).

The late A.D. 1000s-early 1100s structure, however, provided architectural evidence that was, in itself, indicative of the complexity of small site structure during this time period and that provided evidence for a number of large site building techniques previously only attributed to large "Bonito towns" or greathouses. Foundations of thick gray clay, much like those found in greathouses, underlay all the walls that were uncovered. These footings were continuous in the one common corner that was excavated for Room 7 and Room 8. Members of the Chaco Project staff who were familiar with greathouse construction (Stephen H. Lekson and Thomas C. Windes) agreed that the wall foundations at 29SJ 633 were not the same as those found in earlier small site excavations that were made for occasional shoring up of old walls. This is significant because this level of "preplanning" was not discovered at other small sites excavated by the Chaco Project. The overlying masonry walls in all cases did not sit directly on top of the foundations; an offset of several centimeters on one side or the other resembled findings at Pueblo Alto (Windes 1987). The extent of these foundations at 29SJ 633 is unknown, but the excavated sample suggests that they may extend beneath the entire roomblock. The inference is that this site had prelaid foundations as did the larger sites.

Another surprise was the sizes of rooms. Room 7, the plaza-facing "living room" had an estimated floor area of 12.11 m^2 which is comparable to sizes noted by Lekson (1984:40) at greathouse sites. Regardless of the variability of large site room sizes, which skews the large site mean size noted by Lekson, this room definitely contrasts with the 6 or 7 m^2 average size at small sites noted in the previous period (mid A.D. 900s-mid 1000s; Truell 1986:Table 2.36). Although chronological control is not tight, evidence suggests that this room size is large compared with most small houses thought to have been built in the late A.D. 1000s and early 1100s. There are a few other examples, such as Lizard House and Bc 57, which also have similar dates and large-sized rooms. Lizard House also has evidence of core and veneer masonry, another architectural trait usually found only at greathouses.

Some other A.D. 1100s small sites have no features such as foundations or large rooms, but they have 50 or more sprawling rooms that were apparently in use contemporaneously. This difference in the number of rooms found in small sites is one more example of the diversity found at this time. Certainly in previous periods, from what we know of them, the small sites had a more consistent formal expression. Thus, while there is a consistent notion held by Stephen Lekson and many other members of the Chaco Project staff that small and large sites represent part of the same continuum of architectural development, there may be more factors influencing this period of expansion than are covered by our explanation.

The Chaco Project staff anticipated that the ceramics from the 29SJ 633 test excavations could be compared with those from other excavated sites dating to the A.D. 1000s-early 1100s, which had similar and different formal architectural characteristics, to determine whether consistencies or inconsistencies in the pottery might be correlated with architectural form. They hoped that the correlation might indicate the origin of the builders and occupiers of these houses. No one expected this to be clear because of the mixing of both ceramic and house styles. Because no trash mound excavations were planned, they expected that room fill would provide an adequate sample. The latter, however, presented a surprise. Despite the lack of surface indications, these rooms, particularly Room 7, contained the best A.D. 1200s trash recovered to date from a small site excavation for which information is available. The deposited ceramics were mixed with some earlier material, but they remain a good sample from the later period. The late A.D. 1000s-early 1100s deposits were restricted to a thin layer contained between floor surfaces and offered too little material for good relative temporal placement, let alone intersite comparison. The A.D. 1200s occupants had remodeled and filled these rooms with dense trash. Before they abandoned these quarters, they had also buried three children and one adult. The late A.D. 1100s-1200s use of this site and the associated trash provided information about small house occupation during a period that is less well known archeologically, a period in which it was assumed that habitation of Chaco Canyon had declined sharply.

Although little material separated the two floors in the excavated rooms at 29SJ 633, the later upper surfaces seem to have been used for different purposes. The family that originally occupied the rooms was not the family that remodeled the house. Based on the archeomagnetic dates (50-70 years apart for the two floor levels), there may have been a two-generation gap between house use if the later occupants were even descendents of the earlier inhabitants of this general area. The upper floor of Room 7 lacked a substantial, burned firepit. Areas of the floor surface were burned, and one shallow feature had evidence of slight reddening. Frequently the resurfaced floors noted at other excavated sites in this rincon had evidence for placement of features found on the lower floors in the same locations as those on the later floors. The resurfacing was analagous to a new coat of paint because the room function and feature location remained consistent through time. This was not the case in Room 7. It is difficult to say whether there was any change in Room 8 because the lower floor was almost completely destroyed by the later burial pits.

The late upper-floor burials at 29SJ 633 were also unusual for Chaco Canyon small sites. At these other, earlier sites, with few exceptions, burials were not placed within rooms; they occurred even more rarely in pits (Akins 1986). Except in cases of accident or violence, bodies generally were placed in less "expensive" accommodations such as the trash mound. Based on the early excavated sample, the chances of finding four bodies in one and one-half rooms would have been exceedingly slim.

The ceramics associated with the burials at 29SJ 633 included McElmo Black-on-white, Mesa Verde Black-on-white, and Crumbled House Black-on-white, all of which, along with an archeomagnetic date of A.D. 1170 $\pm$ 28 years, dated this occupation. McKenna and Toll (Chapter 7) note mixing in the ceramics in the upper fill overlying Floor 1 of Room 7, but they indicate that this accumulation probably dates to the early A.D. 1200s, ca. A.D. 1220s. Very little comparative information is available from other houses of this period, which prevents refinement of these estimated dates. This site, however, does provide a base for comparison during future excavations.

Despite quantities of bone and concentrations of vegetal material recovered from the fill of Room 7, McKenna and Toll (Chapter 7) note that the relative number of ceramics in the trash fill of the rooms is smaller than that commonly associated with limited households during previous Pueblo occupations in Chaco Canyon. In addition, McKenna and Toll note that there was a continuity in ceramic traditions through time but that more identifiable, discrete sets of pottery were brought into the canyon from different regions during the early A.D. 1200s.

The density of animal bones during the A.D. 1200s, which Gillespie (1981:49 and Chapter 10) describes as being composed mainly of small rabbits and turkeys, may have been better preserved because these deposits were protected within the room walls. He notes a conspicuous lack of artiodactyl and domestic dog remains. He states that the bone assemblage indicates that faunal resources were under stress. Inhabitants of the area exploited immature small game because preferred larger species were lacking. He also suggests that the lack of domestic dogs may indicate periods of food scarcity.

Gillespie indicated that the ages of the fauna from the late occupation at this site definitely suggest summer occupation, but he could not rule out winter use. Taken in conjunction with the lack of good burns on the upper floors of the excavated rooms, there is a possibility of seasonal use during the last occupation at 29SJ 633. If this were true, it may be a partial explanation for the lower frequency of exotic lithic materials, fewer types of shell, and fewer bone tools found during excavation when compared with earlier small sites in Marcia's Rincon. The question of where the population would have lived during the winter season needs to be addressed.

Problems Raised

In addition to the questions about reasons for the increased diversity in small site architecture that was noted for the late A.D. 1000s, the relationship between small house and greathouse inhabitants, and the continuity of Anasazi use of the canyon through time (whether it was seasonal or intermittent), a number of questions about the Mesa Verde Phase need to be examined.

Because the break in occupation between the late A.D. 1000s-early 1100s and late A.D. 1100s-early 1200s components indicates a difference in room use between the two major occupations at 29SJ 633, it is tempting to jump to the conclusion that a small influx of San Juan River area population, previously said to form the basis for the A.D. 1200s occupation in Chaco Canyon (Vivian and Mathews 1965), were the later occupants of 29SJ 633. Their living patterns did not resemble those of the former site inhabitants. The Mesa Verdean occupation on Chacra Mesa might provide some answers, but until we know more about the last use of Chaco Canyon by the Anasazi, these ideas remain in the realm of speculation as McKenna (Chapter 6) indicates.

Gwinn Vivian, who read Chapters 6 and 7 of this report, expressed his thoughts about the Mesa Verde occupation in an August 17, 1989, letter to Peter McKenna. He suggests that the Mesa Verde occupation is represented by two phases: the first he called a late McElmo and early Mesa Verde phase, A.D. 1170-1220; the second, A.D. 1220-1350, is a very late Mesa Verde occupation especially on Chacra Mesa, which had a very different settlement pattern, and may represent an influx of new arrivals. Vivian also suggests that there are differences in the areas east and west of Pueblo Pintado, the area on the east having been settled only after A.D. 1075-1100. These ideas are further elaborated in his recent publication (Vivian 1990:383-389). Basically, he sees a slow decline of Chaco Anasazi predominance in the central basin beginning about A.D. 1080 when changes in rainfall patterns began. The respite between A.D. 1100-1120 allowed the population time to readjust and realign their cultural trajectory before the longer periods of lesser rainfall occurred. The gradual shift, which is evidenced by the Mesa Verde style, thus began earlier and was a less abrupt transition than many have believed to date (Vivian 1990). Vivian also sees a difference between the evidence from the earlier Mesa Verde period and some of the Chacra Mesa sites discussed by McKenna (Chapter 6), particularly the butte-top sites.

Windes (1987:393-405) resurveyed a sample of small houses located in the bottomlands of Chaco Canyon from Pueblo Pintado to Peñasco Blanco. Although there are difficulties discerning a "Mesa Verde" reoccupation in many sites (e.g., 29SJ 633), he proposes an earlier socioeconomic change as evidenced by the shift in use of greathouse middens during the Red Mesa- and Gallup-dominated ceramic periods (A.D. 950-1100) to the A.D. 1100-1150 Chaco-McElmo-dominated sites in which trash was found in rooms within the sites. For the small sites, however, he proposes that differences in locations of small sites in the eastern and western halves of Chaco Canyon may have affected the visibility of some of the trash middens. His resurvey also indicated a change in location from the eastern cluster of sites near Fajada Butte to the western cluster around Pueblo Bonito. This does not mean lack of earlier use of the western end of the canyon but a decreasing use of the eastern half. He also concludes that this early 1100s occupation was the most widespread one in the canyon.

Between A.D. 1150 and 1200, Windes proposes an abandonment or near abandonment of the canyon. By A.D. 1200, however, there was a reoccupation of many sites that had been occupied in the early A.D. 1100s as well as construction of houses on talus areas or next to vertical cliffs. The estimated populations, however, were not as large but were evenly distributed throughout the canyon.

Based on environmental data and the recent re-examination of the ceramics from the Mesa Verde Phase (McKenna, Chapter 7), the explanation of immigrants from the San Juan River area is too simplistic. Although northern influences may have appeared in Chaco Canyon during the A.D. 1200s, other pre-existing patterns appear to have been maintained. It is certain that with the information obtained from only one and a half rooms, the existing sample from 29SJ 633 does not answer the questions raised. The data, however, are important and informative and can be used by future investigators pursuing the explanation of the Mesa Verde Anasazi and the Chaco Canyon relationships.

At this point the differences among investigators should be pointed out:

1. Windes (1987:404) discounts the presence of early ceramics on the talus sites in the main canyon area as evidence of their earlier use whereas Truell (1986:302) and McKenna consider them indicative of earlier occupation. For example, site Bc 52 has evidence for a late A.D. 1000-early A.D. 1100 occupation as well as a late A.D. 1100-early A.D. 1200 component (Truell 1986:Tables 2.8 and 2.9).

2. Windes leans toward an abandonment or near abandonment of the canyon between ca. A.D. 1150 and 1200. McKenna (Chapter 6) proposes a possible continuum. Truell sees a distinct break in continuity at 29SJ 633, but she feels people were always going in and out of Chaco Canyon, either periodically or seasonally. Thus, the fact that the various occupants of this site exhibited different use patterns is no surprise; they may have been families from a northern area or they may reflect different adaptations to changes in environmental and/or social factors.

3. Vivian sees two distinct Mesa Verdean occupations, both part of a continuum that began earlier, but he does not state a preference for abandonment of the canyon. For him, there could have been some continuity of population with additional influx during periods more suitable for dry farming.

Data from tree-ring analyses have allowed Rose et al. (1982) to reconstruct climatic conditions of the area since ca. A.D. 900. Windes (1987:32-37) used the July Palmer Drought Severity Index (P.D.S.I.) to correlate proposed environmental conditions and changes in Anasazi development. He considered the early A.D. 1100s to be one of the best periods for agriculture, especially from A.D. 1100-1129, and it is then that he sees the largest population in Chaco Canyon. The 50-year period between A.D. 1130-1180, however, was one of the most difficult ones when moderate drought prevailed (Windes 1987:Figures 2.2 and 2.3). From ca. A.D.1175 to 1250, P.S.D.I. values tended to be over the mean before they fell well below it for another ca. 25-year period. For agriculturalists, the difficulties of farming during a drought period could easily lead to abandonment of an area or to adaptation of other strategies, e.g., greater dependence on hunting and gathering and perhaps more mobility, which would allow them to survive the more difficult agricultural conditions. Vivian's (1990) reconstruction of changes in rainfall and water tables are not greatly different, but like Windes, he does not go past the mid A.D. 1300s in his discussion of the Anasazi. Why the Anasazi never returned after their A.D. 1200s abandonment, then, is not well explained by this variable—other factors must be evaluated. Certainly there would have been some periods during the next few centuries when some type of agriculture would have been possible in the Chaco Basin.

In conclusion, investigations at the Eleventh Hour Site provided tantalizing tidbits that leave us with more questions to answer and research problems to pursue, especially with regard to our understanding of the diversity in small site architecture that occurs in the late A.D. 1000s-early A.D. 1100s and of the "Mesa Verde" occupation of the San Juan Basin. Closer examination of the transition between Chaco-dominant traits and Mesa Verde-dominant traits is warranted as is closer examination of correlations between climate and settlement patterns. With regard to environmental and social correlates, however, we need to be careful when we try to tie cultural responses to climatic conditions. Time lags between events and cultural changes need to be considered as do other options regarding resources that can be used or strategies to be put into effect to allow people to survive climatically difficult times.

Appendix A

REMOTE SENSING TECHNIQUES USED IN THE 1978 TESTS AT 29SJ 633

During the 1970s the Remote Sensing Division had been evaluating several techniques with regard to their applicability to archeological research (Lyons 1976; Lyons and Avery 1977; Lyons and Hitchcock 1977). Some needed further field testing. In 1978, when the need for timesaving methods for mapping and discovery arose, it was appropriate to combine efforts to test several of those techniques, especially the subsurface tests, to determine both their utility and accuracy. An evaluation of aerial photography and several ground-penetrating survey techniques was planned. In some instances, the tests were not carried out (resistivity survey), were not successful (seismic survey), or have been tested, evaluated, and the results of similar evaluations published elsewhere (aerial photographic analyses, bipod photography, and resulting maps). Although these techniques are presented below because they are an integral part of the research design, their results are not fully presented in this report; the reader is referred to Jacobson (1979) for details that, while interesting, do not increase our knowledge or understanding of this site. Jacobson also includes recommendations about improved methods, etc. Those results that are pertinent to the growth, development, and place of this site in Chaco Canyon prehistory are incorporated in the appropriate chapters of this volume.

Each technique will be discussed in a similar manner. An explanation of how it works, how it was used, and the success of its employment will be presented. References to other published or unpublished reports will be included.

Bipod Photography and Mapping

An adjustable bipod that extends from 5-30 ft in length and covers a maximum area that is 16.8 by 27.4 ft (5.73 by 8.35 m) when a 35-mm lens on a 35-mm camera is used was developed by Julian Whittlesey of the Whittlesey Foundation in Wilton, Connecticut (Whittlesey 1966, 1976). A camera with an automatic shutter release is attached to a movable plate and is raised and lowered using a rope attached to a pulley. Once the camera is locked into a second plate at the top of the bipod, a long string is used to activate the shutter release. By positioning the bipod and camera at a 90° angle to the ground so that it is level horizontally, and by moving the equipment across predetermined transects, stereo pairs of photographs are obtained. Depending on the size of the area and the purposes for which this technique is employed, maps of various scales and detail are made once the photographs are rectified and joined in a mosaic (Boyer 1980, Klausner 1980).

Several problems will affect the creation of a usable mosaic at an accurate scale. A level scale and photoboard identification must be included in each photograph to aid in proper alignment of finished pictures and rectification of scale for the completed map. Extreme slope of a site will lead to scale differences and problems in matching of photographs. Depending on the scale of the photographs, surface rubble could obscure walls or surface artifacts (a problem encountered at 29SJ 633) (Jacobson 1979).

Bipod mapping had proven useful for mapping and recording features (Klausner 1980:321), but its use for mapping an entire site was still under investigation. In this instance, usefulness would be dependent largely on the amount of time required to photograph the site. At 29SJ 633, the bipod was used twice to map the site as well as to map rooms after excavation. Before other work at the site, the first set of bipod photographs was taken with the bipod extended to 17 ft. Although the detail in the photographs was excellent, difficulties were encountered in rectifying the photos needed to create the mosaic because of improperly set ground control. A second set of photographs, taken with the 30-ft leg extension, were rectified for slope and tilt, but then the scales were not compatible among all photographs. As a result, resolution of some photographs was not good, and details on the photographs taken at the 30-ft height were not as clear as they were on the 17-ft ones. Some of the problems were also due to the fact that the second set of bipod photographs was taken later in the season when the vegetation had reached full growth and had obscured more of the ground. Jacobson (1979) compared the time, effort, and costs to create a plane table map, using an alidade with bipod mapping and concluded that the utility of bipod mapping would depend on the size of the area encompassed and the amount of detail desired on the final product.

Application of this technique for mapping in rooms, where size was smaller and floors less tilted, provided excellent plan view details of wall configurations, burials, floor and fill features, and floors themselves. When maps were made of the partially and fully excavated rooms, they were very similar to those made by triangulation. Although the bipod mapping was much faster in this instance, there was a delay of several days for confirmation of results because photographs were sent to Albuquerque for developing and printing. This could either have delayed additional excavation or resulted in the lack of a map of the room if the photographs had not come out well. If a darkroom were to be established near the site, this problem would be eliminated. The reader is referred to Jacobson (1979) for details regarding comparisons of the two map-making procedures. The photographs are on file at the Branch of Cultural Research, National Park Service regional office in Santa Fe.

Aerial Photography

Depending on the scale and type, aerial photographs can be used as an aid to discovery or a base from which to map various features. Several sets of aerial photographs that included 29SJ 633 were available; these are listed in Table A.1. During the spring of 1978, the photographs were evaluated on stereoscopic equipment available in the Division of Remote Sensing. Mylar overlay maps of each of the aerial photographs examined by Jacobson included all features she was able to detect. The overlays were

Table A.1. Aerial photographs that include 29SJ 633

Source	Date	Scale	Type
Soil Conservation Service	1930s	1:62,500	Black and white
Soil Conservation Service	1930s	1:32,000	Black and white
U. S. Geological Survey	1950s	1:32,000	Black and white
U. S. Geological Survey	1971	1:3,000	Black and white
Koogle and Pouls	1973	1:3,000	Black and white
Koogle and Pouls	1975	1:3,000	Black and white
Koogle and Pouls	1975	1:1,200	Black and white
Koogle and Pouls	1973	1:6,000	Color transparency
Remote Sensing Division[a]	1974	35-mm oblique	Color infrared

[a]Office then located in Albuquerque, NM.

compared, and they were used to generate a pre-excavation site map and a vegetation map of Marcia's Rincon (Jacobson 1979).

At a scale of 1:1,200, the greatest detail is discerned. Small bush-sized items are seen with the naked eye, and field anomalies that indicate sites are clear. At a scale of 1:3,000, it is still possible to locate sites but not with as much accuracy. Slight changes in soil and vegetation are more difficult to see, and the vegetation cover types are less distinct. Topographic detail, however, is excellent. Similarly, photographs taken at a scale of 1:6,000 are good for general overviews of topography, drainage, and roads. Gross patterns for vegetation and soils are apparent, but there is little value for use in site location. With regard to type of photography, the color transparencies are easier to use than the black-and-white prints because the human eye distinguishes differences in color better than it does differences in shades of gray. As a result, archeological sites show up best on colored film.

After the initial analysis of the available photography was completed, a photogrammetric map of the site was desired. Preparation of such maps, made from stereo pairs of photographs, allows for an evaluation of height, which is demarcated by contour lines. Depending on the scales chosen, slight changes in elevation can be discerned and often suggest feature outlines. Because identical scales had been used when maps of other sites in Marcia's Rincon were prepared, a photogrammetric map of 29SJ 633 at a scale of 1 cm = 2.5 m with a contour interval of 25 cm was prepared by Koogle and Pouls Engineering using the 1:1,200 black-and-white photographs. Although we hoped that the resulting photogrammetric map would indicate the location of walls and kiva depressions that could not be seen on the ground, there was not enough detail in the contour lines. A second map made from the same imagery but at a scale of 1 cm = 1 m with a contour interval of 10 cm did indicate some anomalies based on changes in vegetation and the presence of rock cairns. The site mound was clearer and the area of the walls was more distinctive. The contours, however, still did not provide hints as to the location of kivas or the number of rooms. It was concluded that while maps at a similar scale were more useful when sites were larger and walls more obvious, at small eroded sites such as 29SJ 633 the lack of surface detail did not make the investment in time and money worthwhile (Jacobson 1979). Unfortunately, no photointerpretative maps were made to compare with the photogrammetric map.

Preparation of a vegetation map of Marcia's Rincon utilized three photographs taken at three scales (1:1,200; 1:3,000; and 1:6,000). Photographs that included the rincon area were overlaid with clear acetate, and vegetation boundaries were subjectively outlined. This was done three times at different intervals to obtain independent observations by the same analyst. These maps were then compared and analyzed for discrepancies before being rectified to the same scale. In addition, a densitometer analysis was performed on transparencies made from one set of photographic negatives. The densities that resulted were clustered and a map was prepared. This map was compared with those described above, and both types of maps were taken to Mollie Streuver Toll and Anne C. Cully for examination. They checked the maps and provided names for the delineated vegetation zones; the final map is included as Figure 2.1.

Refractive Seismological Survey

Seismographic studies measure the time it takes shock waves to travel between two points. Two types, working on similar principles but with two different return wave paths, were available in 1978 (Aitken 1974). Both employ the use of geophones located at points in the site as start and stop devices, the former being activated by a shock device (either dynamite or a striking of the earth's surface with a heavy instrument).

A reflective seismograph measures shock waves that travel in straight lines sending initial shock waves downward into the substrate. As different layers are reached, some of the waves return via the same path to the surface where the instrument records the travel time; other waves continue downward to deeper levels. The depth of statigraphic variations is calculated and maps are prepared. Because there is no variation in the shock wave path, the route is predicted and controlled. Theoretically, this machine functions under all geological conditions. At that time, unfortunately, the machine had been developed only recently, was not as reliable as later models, and was expensive to use.

With a refraction seismograph, shock waves initiated at the earth's surface travel downward to a point of impact but then are reflected in an unpredictable manner along the path of least travel time to a second point along the earth's surface. The second or stop geophone located on the surface is not in the same place as the start geophone. The path of the shock waves cannot always be predicted or controlled. Because this type of machine functions best when the bedrock is buried deep beneath the surface and the stratigraphy is uncomplicated, it is advisable that the operator know the geology of the area under study in order to determine the value of using this type of machine in a specific location (Aitken 1974).

Assuming that archeological site stratification was similar to geological stratification (but on a smaller scale), we decided to test the refractive seismograph's value as a remote sensing tool. The reason for using this technique at 29SJ 633 was to discover wall locations at the site. The work was done under contract by Phillip Bandy of Texas Technological College; he was assisted by Jacobson. At 29SJ 633, two transects were established (Figure A.1). Both areas were expected to contain walls or other features. One ran east-west across the roomblock; the second, at a 90° angle, crossed the plaza and kiva. In the first transect, test points were set at 50-cm intervals while in the second there was a 1-m interval between points. The stop geophone was placed on the edge of the site while the start geophone was moved from place to place along the transects where it was hit with a sledgehammer. Several readings were taken at each point, the extreme values were eliminated, and the remainder averaged for each stop.

Results of these tests were disappointing (Bandy 1980). The data produced no patterns that could be interpreted as site features. The

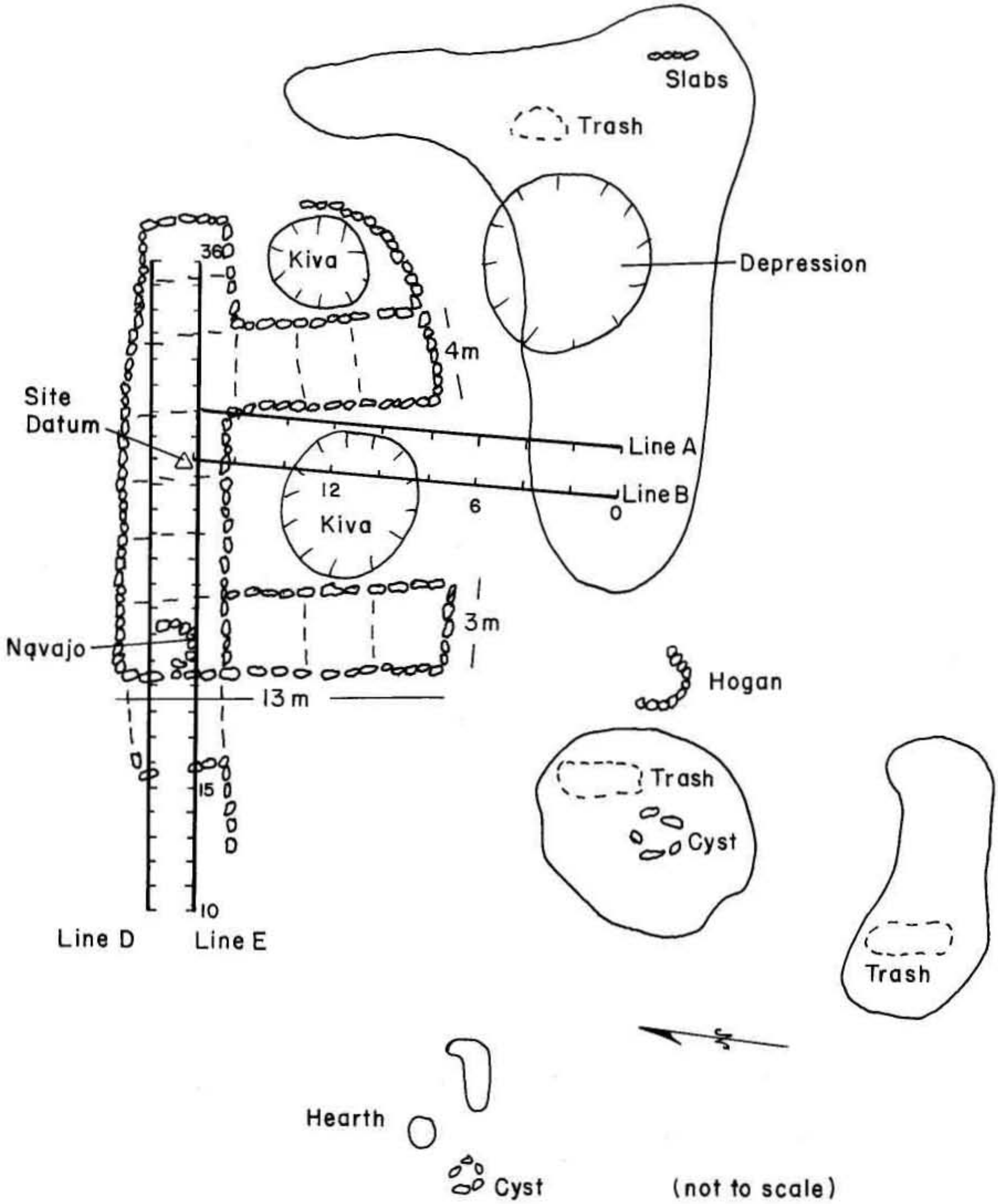

Figure A.1. Location of refractive seismograph transects; the map is taken from Bandy (1980) and was drawn from the site survey map before wall clearing variations in time versus distance were extreme because the shock waves followed a number of paths. Causes listed for these poor results include the slope of the site, which may have been too great; use of equipment that was not engineered for local conditions (e.g., little depth to bedrock); interference because of wind and airplanes overhead; and the possibility of equipment malfunction. No matter which cause(s) was primary, the desired results were not achieved as no new walls or subsurface features were identified.

Proton Magnetometer Survey

A proton magnetometer is a machine that measures the intensity of the earth's gravitational field that is located directly below the instrument. In magnetometry, the protons act as miniature bar magnets and gyroscopes. In the presence of a magnetic field, the protons align with the magnetic field, which attracts them in the same way that a magnet does; and the gyroscopic action slows the protons. As they incline toward the alignment, the protons gyrate at a rate directly proportional to the magnetic intensity, which then is reflected in the gyration rate. The magnetometer is highly sensitive to extraneous iron; but it can be affected by igneous formations and changes in the atmosphere.

Magnetometer readings are taken at specific intervals. When numerical readings are plotted graphically, the result indicates peaks and valleys. The shape of a feature will help determine its magnetic intensities, which are indicated by variations in the strength of the magnetic field (Hole and Heizer 1973:169). An overview of an area indicates where intensities of readings cluster; anomalous readings relating to specific locales indicate possible subsurface features.

Although this technique for discovery had been used successfully in some areas of the United States of America, in 1978 it had not been tested in the American Southwest. It was expected that datable hearths would be located. Robert Nickel of the Midwest Archeological Center, who was evaluating this technique as an archeological tool, contracted with the Nebraska Center for Archaeophysical Research to carry out a proton magnetometer survey at two sites in Chaco Canyon. Information pertaining to the methods and results of the survey at 29SJ 633 has been abstracted from a report prepared by Bennett and Weymouth (1981) and is presented in Appendix B of this volume. Jacobson superimposed a plane table map of the site, which was made after the walls of the site had been cleared, over the anomaly map of the main area of the site (Figure A.2). Areas of high-intensity readings were noted. Based on the location of these areas, decisions were made to excavate two rooms and 10 anomaly test pits with the hope of locating burns that could be dated archeomagnetically. Details on excavation methods and results are presented in Chapter 4. Although many of the burns were not datable, the technique was useful as a remote sensing technique. Unfortunately, the deep tests into several areas of the site were destructive and did not greatly add to our knowledge of site formation or use.

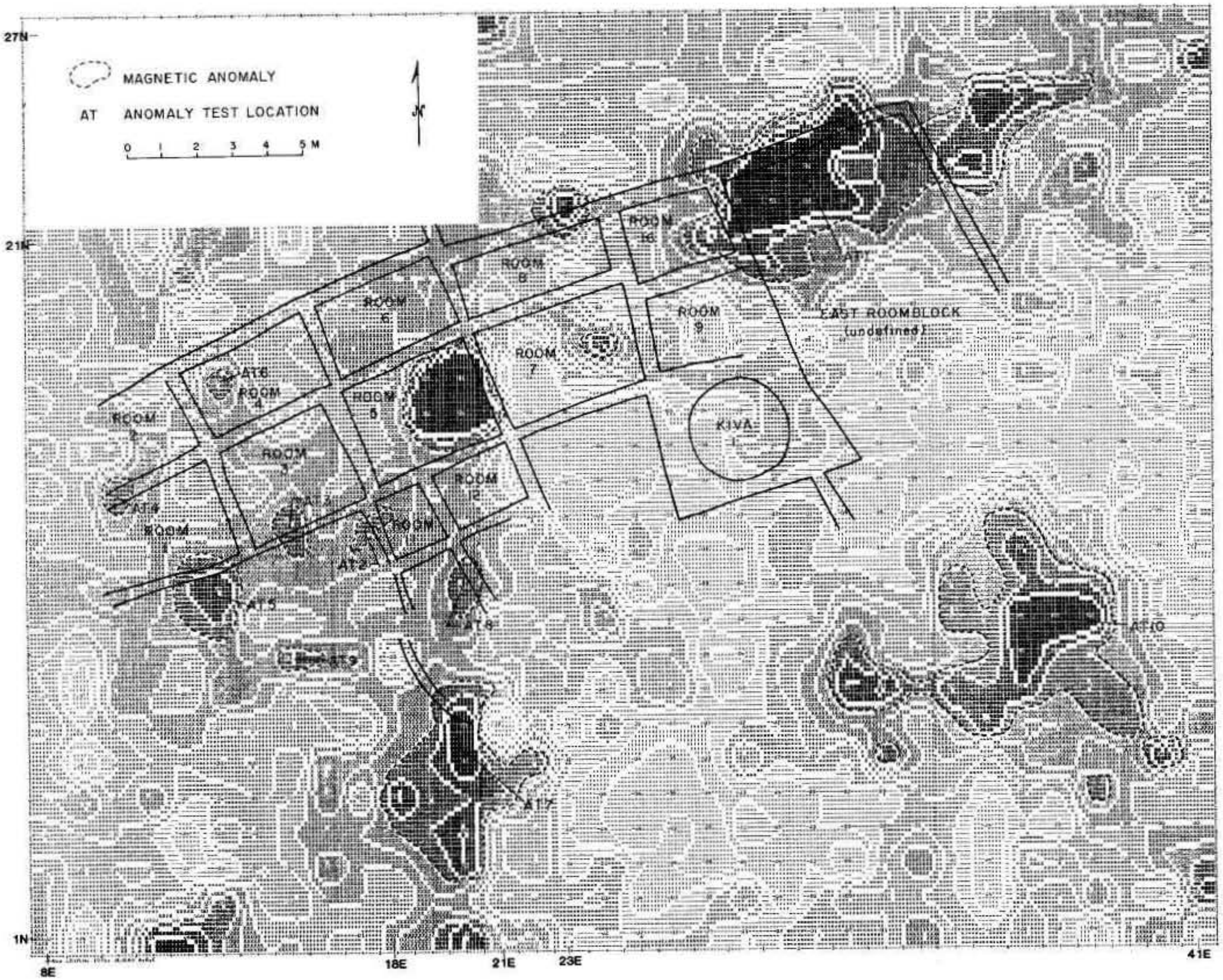

Figure A.2. Map of main roomblock at 29SJ 633 superimposed over proton magnetometer survey results; anomalous areas are outlined

Resistivity Survey

Because earth materials are good conductors of electrical current in proportion to their water content and dissolved salts, electrical current forced into the ground through two electrodes can be measured across two other electrodes, and voltage drops affected by different subsurface conditions can be calculated. For shallow investigations, electrodes are placed relatively close together, but broader spacing is needed to probe greater depths. Sequences of layers appear in sequences of readings. Interpretation, however, consists of deducing subsurface conditions from the readings (Bison Instruments 1975).

Application of this technique in archeological research had been noted by Aitken (1974:267-275), but this technique had not been tested in the American Southwest. In 1978 this equipment was available, and it was hoped that the Midwest Archeological Center would be able to provide experienced personnel to run it, but that proved impossible so the planned tests were not carried out.

Appendix B

ANALYSIS OF THE MAGNETIC SURVEY AT SITE 29SJ 633

Connie Bennett and John Weymouth

Introduction

The ability of a magnetic survey to locate subsurface prehistoric features depends upon the features themselves and the environment in which they are found. Before 1977, the American Southwest was a cultural and environmental region where the technique of magnetic survey had not been vigorously tested. Thus, as part of ongoing archeological investigations at Chaco Canyon National Monument (now Chaco Culture National Historical Park) in New Mexico, a series of small magnetic surveys were conducted as feasibility studies to determine the practicality of magnetic surveying there.

In 1978 the survey concentrated on one region of site 29SJ 633 and applied two different surveying procedures with the sensor at different heights. This report presents the results of these surveys.

Survey Procedures

The surveys were conducted using two proton magnetometers of 1 gamma sensitivity, one of which measured the intensity of the earth's magnetic field at grid point locations and the other at a reference station. The data were recorded with the logger system developed by the Midwest Archeological Center, which also provided the survey personnel under the direction of Robert Nickel. Because this investigation was part of a feasibility study, the areas surveyed consisted of traverses as well as large two-dimensional areas. Regions of varying dimensions were labeled "blocks," which permitted convenient data collection and subsequent manipulation and analysis.

The usual method of survey was to measure the earth's magnetic field from 60 cm above the surface with readings spaced 1 m apart. When necessary, additional information about the subsurface features was obtained by changing the sensor height and decreasing the grid spacing or by simply repeating the measurements several times to get a more accurate reading for a particular region. The investigatory nature of this study provided the opportunity to test all of these alternative methods; the specific method used in each region along with the rationale for its use and the results are presented in the results section.

Data Analysis

Once the data were entered into the computer, the first step in the analysis was to subtract the reference values from the data values. The results were then placed in a matrix and used as the basis for the mapping program developed by NEBCAR (Nebraska Center for Archaeophysical

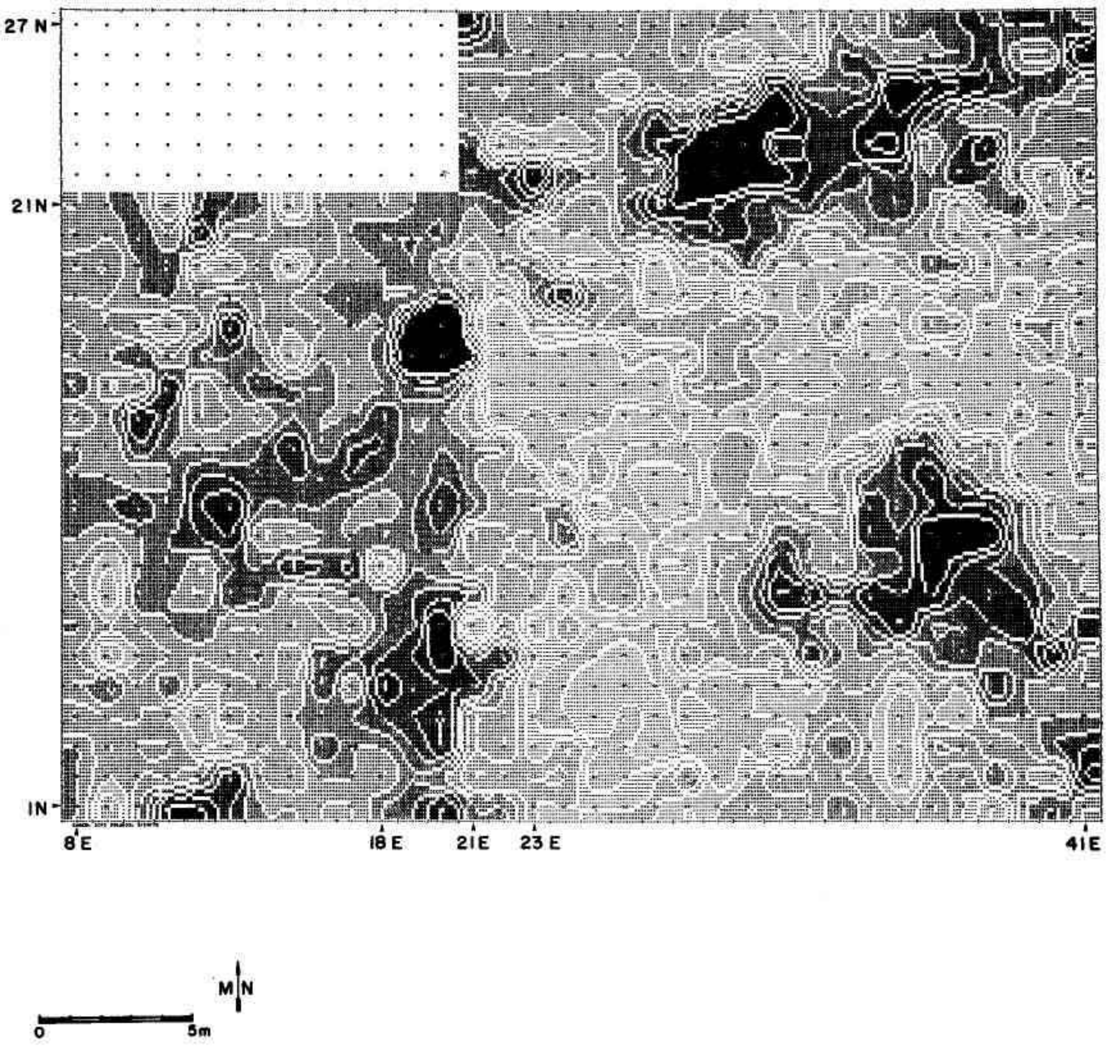

Figure B.1. Variable-density contour of area surveyed by proton magnetometer at 29SJ 633

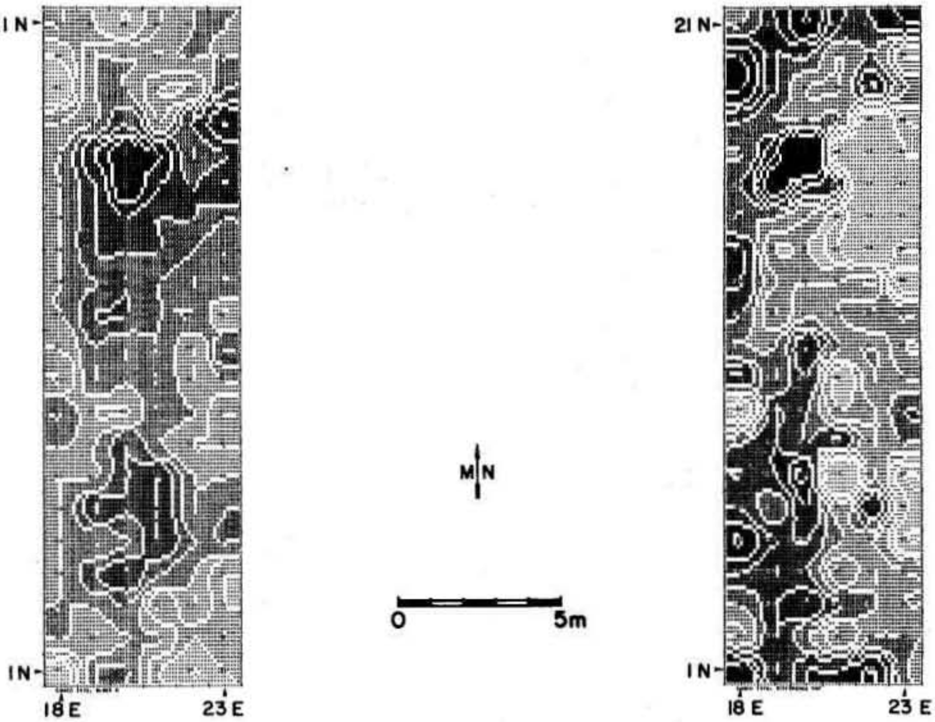

Figure B.2. Variable-density contour, taken at higher height, of region 18-23-E, 1-21 N, at 29SJ 633

Research). When the measurements of the magnetic field were taken more than once at any location, the difference values were averaged and the average value placed in the matrix. The contour maps presented in this report were produced by SYMAP (Harvard Laboratory of Computer Graphics) and usually divided the data into one or two gamma contour intervals.

Results

The magnetic survey of site 29SJ 633 covered 780 m^2 with 100 m^2 of that area resurveyed at a higher sensor height. Figure B.1 is a variable-density contour map of the whole region. The anomaly centered at 17 N 20 E is probably caused by a burned region. The anomaly is not extensive enough to indicate a pitstructure. Subsequent excavation apparently revealed a series of roomblocks in the northern half of the magnetic survey grid. One room encompasses this anomaly, while another room surrounds the anomaly at 22 N 29 E. This second anomaly is much smaller in intensity and has a sharper gradient, which indicates a smaller, less burned feature or one that is more deeply buried. The unexcavated anomaly pattern in the vicinity of 10 N 36 E is much larger in extent and more diffuse. It could be due to a midden area or possibly a partially burned subterranean structure.

To obtain information to calculate the depth of the anomaly at 17 N 20 E, the region from 18-23 E and 1-21 N was resurveyed with the sensor at a higher height. A variable density map of the values recorded at a higher sensor height and a map of the difference values when the higher height values were subtracted from the lower height values are shown in Figure B.2. The anomaly at 17 N 20 E still has a sharp gradient but is not of the same intensity as when it was recorded at a lower level. It is probably a sharp-edged feature, fairly near the surface. If it were deeply buried, the higher survey would produce a similar anomaly.

Summary

The magnetic surveys at site 29SJ 633 located indications of burned features and possibly a kiva and surface structures. These features would have been better defined had larger areas been surveyed to establish the magnetic background and to allow anomaly patterns to emerge. However, with the exploratory nature of the survey, the data collected gave positive evidence that proton magnetometers can be used beneficially at sites in Chaco Canyon NHP. The subtle magnetic anomalies observed in these data would be more informative if they had been measured by 1/4 gamma instruments that are now available. This study shows that the magnetic survey technique is capable of locating prehistoric features in the American Southwest cultural and environmental region. Since these data were collected, other research in southwest Colorado that used 1/4 gamma instruments has proven that magnetic surveying not only can locate the features but can also provide information about size, depth, degree of burning, orientation, and internal feature configuration (Huggins and Weymouth 1978, 1981).

Appendix C

CERAMIC TABLES

Peter J. McKenna and H. Wolcott Toll

Table C.1. 29SJ 633 surface surveys: ceramic forms and type by provenience and survey

The Surveys	Mesa Verde Whiteware: Mesa Verde B/w				Chuska Whiteware: Nava B/w	Chuska B/w	Toadlena B/w	Tunicha B/w
	Mesa Verde B/w	McElmo B/w			Nava B/w	Chuska B/w	Toadlena B/w	Tunicha B/w
	Bowl	Bowl	Jar	Other	Bowl	Bowl	Jar	Bowl
Pierson's 1930								
General surface	1	9	2					
Total	1	11						
% in collection	1.0	10.9						
Hayes 1972								
Trash Mound 1 (north)	2							
Trash Mound 2 (south)	1							
Total	3							
% in collection	3.0							
Judge 1975[a]								
General surface								
Total								
% in collection								
Remote Sensing 1978								
Roomblock Transect 1								
E-W Grid 1								
E-W Grid 2								
E-W Grid 3	1							
E-W Grid 4								
E-W Grid 5								
E-W Grid 6								
E-W Grid 7		2						
E-W Grid 8		1						
Roomblock Transect 2								
N-S Grid 1								
N-S Grid 2		1						
N-S Grid 3								
Roomblock vessel totals	1	4						
Subtotals	1	4						
% in roomblock transects	0.3	1.3						
North Trash Mound								
Transect 1 Grid 1								
Transect 1 Grid 2		3						
Transect 1 Grid 3	5	8	1		1			1
Transect 1 Grid 4								
N. Trash Mound vessels	5	11	1		1			1
Subtotals	5	12			1			1
% in N. Trash Mound	0.3	2.0			0.2			0.2
South Trash Mound								
Transect 1 Grid 1								
Transect 1 Grid 2								
Transect 1 Grid 3							2	
Transect 1 Grid 4	2	6		1		2		
S. Trash Mound vesseels	2	6		1		2	2	
Subtotals	2	7				2	2	
% in S. Trash Mound	0.1	0.4				0.1	0.1	
Remote Sensing Transects								
Cumulative totals	8	23			1	2	2	1
Cumulative %	0.3	0.8			-	0.1	0.1	-
Cumulative Surface Surveys	----	----			----	----	----	----
Frequency totals	12	34			1	2	2	1
% in surface collections	0.4	1.0			-	0.1	0.1	-

[a]Judge survey not divided into vessel forms.

Table C.1 (continued)

The Surveys	Tusayan Whiteware: Kana-a B/w Bowl	Tusayan Whiteware: Lino B/g Bowl	Unidentified Whiteware: San Juan Uniden. Bowl	Unidentified Whiteware: San Juan Uniden. Jar	Unidentified Whiteware: Tusayan Uniden. Bowl	Unidentified Whiteware: Chuskan Uniden. Bowl	Unidentified Whiteware: Chuskan Uniden. Jar
Pierson's 1930							
General surface							
Total							
% in collection							
Hayes 1972							
Trash Mound 1 (north)			5	2	1		
Trash Mound 2 (south)			1	1			
Total			9		1		
% in collection			9.1		1.0		
Judge 1975[a]							
General surface	1		21				
Total	1		21				
% in collection	2.2		4.2				
Remote Sensing 1978							
Roomblock Transect 1							
E-W Grid 1							
E-W Grid 2						1	
E-W Grid 3						1	
E-W Grid 4			4				
E-W Grid 5							
E-W Grid 6							
E-W Grid 7		1					1
E-W Grid 8			1	1	1	2	3
Roomblock Transect 2							
N-S Grid 1							
N-S Grid 2							
N-S Grid 3							
Roomblock vessel totals		1	5	1	1	4	4
Subtotals		1	6		1	8	
% in roomblock transects		0.1	2.0		0.3	2.7	
North Trash Mound							
Transect 1 Grid 1			1	1			
Transect 1 Grid 2	1						
Transect 1 Grid 3							
Transect 1 Grid 4			3			1	
N. Trash Mound vessels	1		4	1		1	
Subtotals	1		5			1	
% in N. Trash Mound	0.2		0.8			0.2	
South Trash Mound							
Transect 1 Grid 1		1	1				
Transect 1 Grid 2	1		1		1	1	
Transect 1 Grid 3			1				
Transect 1 Grid 4					2		2
S. Trash Mound vesseals	1	1	3		3	1	2
Subtotals	1	1	3		3	3	
% in S. Trash Mound	0.1	0.1	0.2		0.2	0.2	
Remote Sensing Transects							
Cumulative totals	2	2	14		4	12	
Cumulative %	0.1	0.1	0.4		0.1	0.4	
Cumulative Surface Surveys	---	---	---		---	---	
Frequency totals	3	2	44		5	12	
% in surface collections	0.1	0.1	1.3		0.1	0.4	

[a]Judge survey not divided into vessel forms.

Table C.1 (continued)

The Surveys	Chaco-Cibola Whiteware: Chaco-McElmo B/w Bowl	Chaco-McElmo B/w Jar	Chaco B/w Bowl	Chaco B/w Jar	Chaco B/w Other	Gallup B/w Bowl	Gallup B/w Jar	Escavada B/w Bowl	Escavada B/w Jar	Puerco B/w Bowl	Puerco B/w Jar	Red Mesa B/w Bowl	Red Mesa B/w Jar	Red Mesa B/w Other	Early Red Mesa B/w Bowl	Early Red Mesa B/w Jar	Early Red Mesa B/w Other	BMIII-PI Minerals Bowl	BMIII-PI Minerals Jar
Pierson's 1930																			
General surface						6	14		1		4	4	5						
Total						20		1		4			9						
% in collection						19.8		1.0		4.0			8.9						
Hayes 1972																			
Trash Mound 1 (north)				2	1	5	3	3			1	4			1				
Trash Mound 2 (south)	1					1						1	2						
Total	1			3		9		3		1			7			1			
% in collection	1.0			3.0		9.1		3.0		1.0			7.1			1.0			
Judge 1975[a]																			
General surface				2		19				5		28				1			
Total				2		19				5			28			1			
% in collection				0.4		3.8				1.0			5.5			0.2			
Remote Sensing 1978																			
Roomblock Transect 1																			
E-W Grid 1												1							
E-W Grid 2												3							
E-W Grid 3							1	1				2	2						
E-W Grid 4							1					1							
E-W Grid 5						1	2												
E-W Grid 6																			
E-W Grid 7						1							1						
E-W Grid 8			1				2			1	1	3					1		
Roomblock Transect 2																			
N-S Grid 1																			
N-S Grid 2												1	1						
N-S Grid 3																			
Roomblock vessel totals			1			2	6	1		1	1	11	4				1		
Subtotals				1		8		1		2			15			1			
% in roomblock transects				0.3		2.7		0.3		0.7			5.0			0.3			
North Trash Mound		1																	
Transect 1 Grid 1													2						
Transect 1 Grid 2						5	7		1			4	3						
Transect 1 Grid 3						2	3		1		2	1	2	1				2	
Transect 1 Grid 4			1	1		1	3				3		1						
N. Trash Mound vessels		1	1	1		8	13		2		5	5	8	1				2	
Subtotals	1			2		21		2		5			14						2
% in N. Trash Mound	0.2			0.3		3.4		0.3		0.8			2.3						0.3
South Trash Mound																			
Transect 1 Grid 1							4					2				1			
Transect 1 Grid 2						8	9	1			1	3	8		2			3	2
Transect 1 Grid 3	1	1		1		5	10	2	4	2	2	4	5	2	4				2
Transect 1 Grid 4		1	1	1		3	24	1	2	1	1	9	7			3			1
S. Trash Mound veseeals	1	2	1	2		16	47	4	6	3	4	18	20	2	6	4		3	5
Subtotals	3		3			63		10		7			40		10			8	
% in S. Trash Mound	0.2		0.2			3.5		0.6		0.4			2.2		0.6			0.4	
Remote Sensing Transects																			
Cumulative totals	4		6			92		13		14			69		11			10	
Cumulative %	0.1		0.2			3.4		0.5		0.5			2.5		0.4			0.4	
Cumulative Surface Surveys	---		---			---		---		---			---		---			---	
Frequency totals	5		11			140		17		24			113		13			10	
% in surface collections	0.1		0.3			4.1		0.5		0.7			3.3		0.4			0.3	

[a]Judge survey not divided into vessel forms.

Table C.1 (continued)

The Surveys	Cibola Mineral-on-white: Mancos B/w	Cortez B/w		Socorro B/w		Brimhall B/w	Pueblo II-III Mineral Unid.			Whiteware		
	Bowl	Bowl	Jar	Bowl	Jar	Bowl	Bowl	Jar	Other	Bowl	Jar	Other
Pierson's 1930												
General surface							8	15	1	2	9	
Total								24			11	
% in collection								23.8			10.9	
Hayes 1972												
Trash Mound 1 (north)	1	1	1				1	1	1			
Trash Mound 2 (south)							2	3	1		1	
Total	1	2						9			1	
% in collection	1.0	2.0						9.1			1.0	
Judge 1975[a]												
General surface	1							61			61	
Total	1							61			61	
% in collection	0.2							12.2			12.2	
Remote Sensing 1978												
Roomblock Transect 1												
E-W Grid 1										1	1	
E-W Grid 2								3			2	
E-W Grid 3							3	4		2	2	
E-W Grid 4							1	1		1	4	
E-W Grid 5							1	3		1	4	
E-W Grid 6								1			2	
E-W Grid 7							3	2		1	3	
E-W Grid 8							5	9		9	4	
Roomblock Transect 2												
N-S Grid 1											1	
N-S Grid 2								2		2	2	
N-S Grid 3				1						1	1	
Roomblock vessel totals				1			13	25		18	26	
Subtotals				1				38			44	
% in roomblock transects				0.3				12.6			14.6	
North Trash Mound												
Transect 1 Grid 1							1	1				
Transect 1 Grid 2	1				1		8	16		9	16	1
Transect 1 Grid 3	2						16	18	1	9	15	3
Transect 1 Grid 4							2	8		4	12	1
N. Trash Mound vessels	3				1		27	43	1	22	43	5
Subtotals	3			1				71			70	
% in N. Trash Mound	0.5			0.2				11.6			11.4	
South Trash Mound												
Transect 1 Grid 1							2	9		3	5	
Transect 1 Grid 2		1				1	27	27	3	12	35	
Transect 1 Grid 3							20	27	1	22	30	
Transect 1 Grid 4			1	1			49	96	1	24	55	
S. Trash Mound vessesls		1	1	1		1	98	159	5	61	125	
Subtotals		2		1		1		262			186	
% in S. Trash Mound		0.1		0.1		0.1		14.5			10.3	
Remote Sensing Transects												
Cumulative totals	3	2		3		1		371			300	
Cumulative %	0.1	0.1		0.1		-		13.6			11.0	
Cumulative Surface Surveys	—	—		—		—		—			—	
Frequency totals	5	4		3		1		465			373	
% in surface collections	0.1	0.1		0.1		-		13.6			10.8	

[a]Judge survey not divided into vessel forms.

Table C.1 (continued)

The Surveys	Redware: Puerco B/r Bowl	Wingate B/r Bowl	Wingate B/r Jar	Wingate Polychrome Bowl	St. Johns Polychrome Bowl	White Mountain Redware Bowl	White Mountain Redware Jar	Bluff B/r Bowl	Bluff B/r Jar	Deadmans B/r Jar	Sanostee R/o Jar	San Juan Redware Bowl
Pierson's 1930												
General surface	3			2		6						1
Totals	3			2		6						1
% in collection	3.0			2.0		5.9						1.0
Hayes 1972												
Trash Mound 1 (north)												
Trash Mound 2 (south)												
Total												
% in collection												
Judge 1975[a]												
General surface												
Total												
% in collection												
Remote Sensing 1978												
Roomblock Transect 1												
E-W Grid 1												
E-W Grid 2						1						
E-W Grid 3			1	1		2	1			1		
E-W Grid 4	1					2						
E-W Grid 5												
E-W Grid 6						1						
E-W Grid 7												
E-W Grid 8		2										
Roomblock Transect 2												
N-S Grid 1												
N-S Grid 2												
N-S Grid 3												
Roomblock vessel totals	1	2	1	1		6	1			1		
Subtotals	1	3		1		7				1		
% in roomblock transects	0.3	1.0		0.3		2.3				0.3		
North Trash Mound												
Transect 1 Grid 1												
Transect 1 Grid 2				1		4						
Transect 1 Grid 3	1	1			1	2	3					
Transect 1 Grid 4											1	1
N. Trash Mound vessels	1	1		1	1	6	3				1	1
Subtotals	1	1		1	1	9					1	1
% in N. Trash Mound	0.2	0.2		0.2	0.2	1.5					0.2	0.2
South Trash Mound												
Transect 1 Grid 1												
Transect 1 Grid 2												
Transect 1 Grid 3						3		1				
Transect 1 Grid 4						10	1		2			1
S. Trash Mound vesseels						13	1	1	2			1
Subtotals						14		3				1
% in S. Trash Mound						0.8		0.2				-
Remote Sensing Transects												
Cumulative totals	2	4		2	1	30		3		1	1	2
Cumulative %	0.1	0.1		0.1	-	1.1		0.1		-	-	0.1
Cumulative Surface Surveys												
Frequency totals	5	4		4	1	36		3		1	1	3
% in surface collections	0.1	0.1		0.1	-	1.1		0.1		-	-	0.1

[a]Judge survey not divided into vessel forms.

Table C.1 (continued)

The Surveys	Utility Ware: Showlow Smudged Bowl	Forestdale Smudged Bowl	Unidentified Redware Bowl	Unidentified Redware Jar	Plain Gray Jar	Lino Gray Jar	Wide Neck-banded Jar	Narrow Neck-banded Jar
Pierson's 1930								
General surface					2			
Total					2			
% in collection					2.0			
Hayes 1972								
Trash Mound 1 (north)			13	2	1			2
Trash Mound 2 (south)					2	1	1	4
Total			15		3	1	1	6
% in collection			15.2		3.0	1.0	1.0	6.1
Judge 1975[a]								
General surface			6		56		1	20
Total			6		56		1	20
% in collection			1.2		11.2		0.2	4.0
Remote Sensing 1978								
Roomblock Transect 1								
E-W Grid 1					2			1
E-W Grid 2					4		2	
E-W Grid 3					3			1
E-W Grid 4	1				9		1	1
E-W Grid 5					1			
E-W Grid 6					1			
E-W Grid 7					4			
E-W Grid 8					12			3
Roomblock Transect 2								
N-S Grid 1					1			
N-S Grid 2					1		1	
N-S Grid 3								1
Roomblock vessel totals	1				38		4	7
Subtotals	1				38		4	7
% in roomblock transects	0.3				12.6		1.3	2.3
North Trash Mound								
Transect 1 Grid 1					3			
Transect 1 Grid 2					27		1	4
Transect 1 Grid 3					36		3	5
Transect 1 Grid 4					12			
N. Trash Mound vessels					78		4	9
Subtotals					78		4	9
% in N. Trash Mound					12.7		0.7	1.5
South Trash Mound								
Transect 1 Grid 1					28	1	3	2
Transect 1 Grid 2		3			90	1	1	37
Transect 1 Grid 3	1		2		59			22
Transect 1 Grid 4		1			117	1	7	13
S. Trash Mound vessesls	1	4	2		294	3	11	74
Subtotals	1	4	2		294	3	11	74
% in S. Trash Mound	-	0.2	0.1		16.2	0.2	0.6	4.1
Remote Sensing Transects								
Cumulative totals	2	4	2		410	3	19	90
Cumulative %	0.1	0.1	0.1		15.0	0.1	0.7	3.3
Cumulative Surface Surveys								
Frequency totals	2	4	23		471	4	21	116
% in surface collections	0.1	0.1	0.7		13.7	0.1	0.6	3.4

[a]Judge survey not divided into vessel forms.

Table C.1 (concluded)

The Surveys	Utility Ware: Early Pueblo II Neck-corrugated Jar	Unidentified Corrugated Jar	Pueblo II Rims Jar	Pueblo II-III Rims Jar	Pueblo III Rims Jar	Brownware Jar	Fugitive Reds Jar	Subtotals	% and Totals
Pierson's 1930									
General surface		4	1	1					101
Total		4	1	1					
% in collection		4.0	1.0	1.0					100.2
Hayes 1972									
Trash Mound 1 (north)		5	4	1	2			66	
Trash Mound 2 (south)		8	2					33	
Total		13	6	1	2				99
% in collection		13.1	6.1	1.0	2.0				99.9
Judge 1975[a]									
General surface	6	207		2					498
Total	6	207		2					
% in collection	1.2	41.3		0.4					100.1
Remote Sensing 1978									
Roomblock Transect 1									
E-W Grid 1		2						8	
E-W Grid 2		3						19	
E-W Grid 3		17	1					47	
E-W Grid 4		22						47	
E-W Grid 5								13	
E-W Grid 6		2						7	
E-W Grid 7		6						25	
E-W Grid 8		36						101	(267)
Roomblock Transect 2									
N-S Grid 1		9						11	
N-S Grid 2		4						15	
N-S Grid 3		4						8	(34)
Roomblock vessel totals		105	1						
Subtotals		105	1						301
% in roomblock transects		34.9	0.3						99.6
North Trash Mound									
Transect 1 Grid 1		12						20	
Transect 1 Grid 2	1	70				1		157	
Transect 1 Grid 3	1	143	1		2			293	
Transect 1 Grid 4		58			1			114	
N. Trash Mound vessels	2	283	1		3	1			
Subtotals	2	283	1		3	1			614
% in N. Trash Mound	0.3	46.1	0.2		0.5	0.2			100.6
South Trash Mound									
Transect 1 Grid 1	2	12						77	
Transect 1 Grid 2		233	4					516	
Transect 1 Grid 3	2	231	3	1				473	
Transect 1 Grid 4	1	290	2	1			1	744	
S. Trash Mound vessels	5	766	9	2			1		
Totals	5	766	9	2			1		1,810
% in S. Trash Mound	0.3	42.3	0.5	0.1			-		99.9
Remote Sensing Transects									
Cumulative totals	7	1,154	11	2	3	1	1		2,725
Cumulative %	0.3	42.3	0.4	0.1	0.1	-	-		99.6
Cumulative Surface Surveys									
Frequency totals	13	1,378	18	6	5	1	1		3,423
% in surface collections	0.4	40.2	0.5	0.2	0.1	-	-		99.7

[a]Judge survey not divided into vessel forms.

Table C.2. 29SJ 633 test ceramics: vessel and type by provenience

Tests 29SJ 633	Mesa Verde B/w Bowl	McElmo B/w Bowl	McElmo B/w Jar	Chuska B/w Bowl	Newcomb B/w Other	San Juan Unidentified Bowl	San Juan Unidentified Jar	Tusayan Unidentified Bowl	Chuskan Unidentified Jar
Plaza 1:									
TT 1 alluv. layer 1	21	2		1	1	6	5		1
Mixed trash layer 2	10					2	2		
TT 3 surface						4			
TT 3 layer 1	3	1				3	1		
Vessel totals	34	3		1	1	15	8		1
Grand totals	34	3		1	1	23			1
% in Plaza 1	4.7	0.4		0.1	0.1	3.2			0.1
To North Wall:									
TT 2		2						1	
% in TT 2		7.7						3.8	
Anomaly Tests:									
Anomaly 1									
Anomaly 2									
Anomaly 3									
Anomaly 5									
Anomaly 6									
Anomaly 7		6	2			2	1		
Anomaly 8		3				1			
Anomaly 9	1					2			
Anomaly 10	2								
Vessel totals	3	9	2			5	1		
Grand totals	3	11				6			
% in Anomaly Tests	1.0	3.8				2.1			
	====	====		===	===	====		===	===
Cumulative totals	37	16		1	1	29		1	1
Cumulative %	3.6	1.6		0.1	0.1	2.8		0.1	0.1

Table C.2 (continued)

Tests 29SJ 633	Chaco-McElmo B/w Bowl	Chaco-McElmo B/w Jar	Chaco B/w Bowl	Chaco B/w Jar	Gallup B/w Bowl	Gallup B/w Jar	Escavada B/w Bowl	Escavada B/w Jar	Puerco B/w Jar	Red Mesa B/w Bowl	Red Mesa B/w Jar	Red Mesa B/w Other
Plaza 1:												
TT 1 alluv. layer 1	1		2		5	3		1		3	4	1
Mixed trash layer 2		1	1	2	2	3					3	
TT 3 surface						1				1	1	
TT 3 surface layer 1						1						
Vessel totals	1	1	3	2	7	8		1		4	8	1
Grand totals	2		5		15		1			13		
% in Plaza 1	0.3		0.7		2.1		0.1			1.8		
To North Wall:												
TT 2			1								1	
% in TT 2			3.8								3.8	
Anomaly Tests:												
Anomaly 1												
Anomaly 2												
Anomaly 3								1				
Anomaly 5									1			
Anomaly 6												
Anomaly 7					1		1	1	1	1		
Anomaly 8												
Anomaly 9											1	
Anomaly 10					1	1						
Vessel totals					2	1	1	2	2	1	1	
Grand totals					3		3		2	2		
% in anomaly tests					1.0		1.0		0.7	0.7		
Cumulative totals	2		6		18		4		2	16		
Cumulative %	0.2		0.6		1.7		0.4		0.2	1.6		

Table C.2 (continued)

Tests 29SJ 633	Basketmaker III-Pueblo I Minerals Bowl	Basketmaker III-Pueblo I Minerals Jar	Mancos B/w Bowl	Reserve B/w Jar	Pueblo II-III Mineral Unidentified Bowl	Pueblo II-III Mineral Unidentified Jar	Whiteware Bowl	Whiteware Jar	Whiteware Other
Plaza 1:									
TT 1 alluv. layer 1			3		23	38	27	53	1
Mixed trash layer 2	1	2			6	20	6	4	
TT 3 surface							4	9	
TT 3 surface layer 1					4	10	3	8	
Vessel totals	1	2	3		33	68	40	74	1
Grand totals	3		3		101		115		
% in Plaza 1	0.4		0.4		14.1		16.1		
To North Wall:									
TT 2					1		2	3	
% in TT 2					3.8		19.2		
Anomaly Tests:									
Anomaly 1					2	1	1	3	
Anomaly 2					1	3	2		
Anomaly 3					3				
Anomaly 5					1	2	2		
Anomaly 6						1			
Anomaly 7			1	1	3	7	9	3	
Anomaly 8					1				
Anomaly 9				1	3		1	2	
Anomaly 10					1	4	6	7	
Vessel totals			1	2	15	18	21	15	
Grand totals			1	2	33		36		
% in Anomaly Tests			0.3	0.7	11.4		12.5		
	===		===	===	=====		=====		
Cumulative totals	3		4	2	135		156		
Cumulative %	0.3		0.4	0.2	13.1		15.1		

Table C.2 (continued)

Tests 29SJ 633	Puerco B/w Bowl	Wingate B/r Bowl	St. Johns B/r Bowl	St. Johns Polychrome Bowl	White Mountain Redware Bowl	San Juan Redware Bowl	Tusayan Redware Bowl
Plaza 1:							
TT 1 alluv. layer 1	1	3		2	3		2
Mixed trash layer 2							
TT 3 surface	1					1	
TT 3 surface layer 1			2				
Vessel totals	2	3	2	2	3	1	2
Grand totals	2	3	2	2	3	1	2
% in Plaza 1	0.3	0.4	0.3	0.3	0.4	0.1	0.3
To North Wall:							
TT 2	2						
% in TT 2	7.7						
Anomaly Tests:							
Anomaly 1					1	1	
Anomaly 2							
Anomaly 3		1					
Anomaly 5							
Anomaly 6							
Anomaly 7					1		
Anomaly 8							
Anomaly 9			1				
Anomaly 10					1		
Vessel totals		1	1		3	1	
Grand totals		1	1		3	1	
% in Anomaly Tests		0.3	0.3		1.0	0.3	
	===	===	===	===	===	===	===
Cumulative totals	4	4	3	2	6	2	2
Cumulative %	0.4	0.4	0.3	0.2	0.6	0.2	0.2

Table C.2 (continued)

Tests 29SJ 633	Forestdale Smudged Bowl	Unidentified Redware Bowl	Unidentified Redware Jar	Plain Gray Jar	Wide Neck-banded Jar	Narrow Neck-banded Jar	Early Pueblo II Neck-corrugated Jar	Unidentified Corrugated Jar
Plaza 1:								
TT 1 alluv. layer 1	2	1		61		25	4	183
Mixed trash layer 2		2	1	12			1	51
TT 3 surface				7		2		
TT 3 surface layer 1			1		1			19
Vessel totals	2	3	2	80	1	27	5	253
Grand totals	2	5		80	1	27	5	253
% in Plaza 1	0.3	0.7		11.2	0.1	3.8	0.7	35.3
To North Wall:								
TT 2				10		2		1
% in TT 2				38.5		7.7		3.8
Anomaly Tests:								
Anomaly 1				1		1		5
Anomaly 2								
Anomaly 3				1				14
Anomaly 5				4		3		4
Anomaly 6						1		1
Anomaly 7				3		2		64
Anomaly 8				2		1		21
Anomaly 9				6	3	1		11
Anomaly 10				1		1		30
Vessel totals				18	3	10		150
Grand totals				18	3	10		150
% in Anomaly Tests				6.2	1.0	3.5		51.9
Cumulative totals	2	5		108	4	39	5	404
Cumulative %	0.2	0.5		10.5	0.4	3.8	0.5	39.2

Table C.2 (concluded)

Tests 29SJ 633	Pueblo II Corrugated-rims Jar	Pueblo III Corrugated-rims Jar	Brownware Jar	Provenience Totals	Provenience %
Plaza 1:					
TT 1 alluv. layer 1			5	494	69.0
Mixed trash layer 2		1		133	18.6
TT 3 surface				31	4.3
TT 3 surface layer 1	1			58	8.1
Vessel totals	1	1	5	716	
Grand totals	1	1	5	716	100.0
% in Plaza 1	0.1	0.1	0.7		99.7
To North Wall:					
TT 2				26	100.0
% in TT 2					99.8
Anomaly Tests:					
Anomaly 1				16	5.5
Anomaly 2				6	2.1
Anomaly 3				20	6.9
Anomaly 5				17	5.9
Anomaly 6				3	1.0
Anomaly 7				110	38.1
Anomaly 8				29	10.0
Anomaly 9				33	11.4
Anomaly 10				55	19.0
Vessel totals				289	99.9
Grand totals				289	
% in Anomaly Tests					99.4
	===	===	===	=======	
Cumulative totals	1	1	5	1,031	
Cumulative %	0.1	0.1	0.5		99.3

Table C.3. Room 7 ceramics: vessel and type by provenience

Room 7	Mesa Verde B/w	McElmo B/w			Wetherill B/w	Crumbled House B/w	Nava B/w	Toadlena B/w	Burnham B/w	Kana'a B/w
	Bowl	Bowl	Jar	Other	Bowl	Bowl	Bowl	Bowl	Bowl	Bowl
Floor 1 general fill:										
East 1/2		2							1	1
Layer 1	2	2	2	2	3					
Layer 2	31	11	4		3			1		
Layer 3	14	3	1			1	1			
Layer 4	2	4								
Layer 5	3	1						1		
Layers 5/6	6	10	1		1					
Floor 1 fill, Layer 6	7	4	3	1						
Floor 1 contact	1	1								
Floor 1 features:										
Storage Bin 1 fill										
Layer 1										
Layer 4										
Floor fill, Layer 5										
Rock Feature 1	5	1								
Rock Feature 2		1	1							
Posthole 2										
Firepit 1										
Other Pit 1										
Other Pit 6										
Burial 3										
Burial 4										
Wall Trench 3										1
Floor 2, general fill										
Floor 2 fill, Layer 7										
Floor 2 concentration(?)										
Layer 8										
Layer 9										
Layer 10										
Floor 2 contact										
Floor 2 features										
Firepit 1										
______Firepit 1										
Total by vessel	71	40	12	3	7	1	1	2	1	2
Grand total	71	55			7	1	1	2	1	2
% in room	2.6	2.0			0.3	-	-	0.1	-	0.1

Table C.3 (continued)

Room 7	San Juan Unidentified Bowl	Jar	Chuskan Unidentified Bowl	Jar	Chaco-McElmo B/w Bowl	Chaco B/w Jar	Gallup B/w Bowl	Jar	Other	Escavada B/w Bowl	Jar	Other
Floor 1 general fill												
East 1/2												
Layer 1	3					1		5				
Layer 2	6	7	1	1		1	12	19	1			
Layer 3	5	1			1	1	2	8			1	
Layer 4	1										1	
Layer 5	1	2	1					2				
Layers 5/6							1	2		1		
Floor 1 fill, Layer 6	14	4			1			1				
Floor 1 contact	1											
Floor 1 features												
Storage Bin 1 fill	1						1					
Layer 1												
Layer 4												
Floor fill, Layer 5	1											
Rock Feature 1												
Rock Feature 2	1							1				1
Posthole 2												
Firepit 1												
Other Pit 1												
Other Pit 6												
Burial 3												
Burial 4												
Wall Trench 3												
Floor 2, general fill												
Floor 2 fill, Layer 7												
Floor 2 concentration(?)												
Layer 8								2				
Layer 9	1											
Layer 10							1					
Floor 2 contact							1					
Floor 2 features												
Firepit 1							1					
______Firepit 1							1					
Total by vessel	35	14	2	1	2	3	20	40	1	1	2	1
Grand total	49		3		2	3	61			4		
% in room	1.0		0.1		0.1	0.1	2.3			0.1		

Table C.3 (continued)

Room 7	Puerco B/w		Red Mesa B/w		Early Red Mesa B/w		Basketmaker III-Pueblo I Minerals		Mancos B/w			Socorro B/w	
	Bowl	Jar	Bowl	Jar	Bowl	Jar	Bowl	Jar	Bowl	Jar	Other	Bowl	Jar
Floor 1 general fill													
East 1/2													1
Layer 1		1		1									
Layer 2		1	6	1	2		2		3	8	1		1
Layer 3	1		4	3									
Layer 4													
Layer 5			1						1				
Layers 5/6		1				2						1	
Floor 1 fill, Layer 6		2	2										
Floor 1 contact													
Floor 1 features													
Storage Bin 1 fill		1											
Layer 1													
Layer 4		1											
Floor fill, Layer 5													
Rock Feature 1													
Rock Feature 2													1
Posthole 2													
Firepit 1													
Other Pit 1													
Other Pit 6													
Burial 3													
Burial 4													
Wall Trench 3													
Floor 2, general fill													
Floor 2 fill, Layer 7		2											
Floor 2 concentration(?)													
Layer 8	2		1					1					
Layer 9							2						
Layer 10													
Floor 2 contact													
Floor 2 features													
Firepit 1		1	1										
_______Firepit 1													
Total by vessel	3	10	15	5	2	2	4	1	4	8	1	1	3
Grand total	13		20		4		5		13			4	
% in room	0.5		0.7		0.1		0.2		0.5			0.1	

Table C.3 (continued)

Room 7	Pueblo II-III Minerals Bowl	Pueblo II-III Minerals Jar	Pueblo II-III Minerals Other	Whiteware Bowl	Whiteware Jar	Puerco B/r Bowl	Wingate B/r Bowl	St. Johns B/r Bowl	St. Johns Polychrome Bowl
Floor 1 general fill									
East 1/2					1				1
Layer 1	3	6		8	11				
Layer 2	34	47	1	64	46	3			2
Layer 3	8	14		14	11			1	2
Layer 4	2	2		1	1				2
Layer 5	1	5		1	3				
Layers 5/6	3	8	1	10	5				1
Floor 1 fill, Layer 6	2	9		11	9	1	2		
Floor 1 contact	1				1				
Floor 1 features									
Storage Bin 1 fill									
Layer 1				1					
Layer 4									
Floor fill, Layer 5		1							
Rock Feature 1				2	2	1			
Rock Feature 2	1	1		3	3				
Posthole 2									
Firepit 1		1							
Other Pit 1	1				1				
Other Pit 6									
Burial 3									
Burial 4									
Wall Trench 3	2			1	1				
Floor 2, general fill	1								
Floor 2 fill, Layer 7	3	2		1	3				
Floor 2 concentration(?)									
Layer 8	7	8		3	5				
Layer 9		2			4	1	1		
Layer 10									
Floor 2 contact									
Floor 2 features									
Firepit 1					1				
______Firepit 1									
Total by vessel	69	106	2	120	108	6	3	1	8
Grand total		177			227	6	3	1	8
% in room		6.6			8.4	0.2	0.1	-	0.3

Table C.3 (continued)

Room 7	White Mountain Redware Bowl	White Mountain Redware Jar	San Juan Redware Bowl	San Juan Redware Jar	Showlow Smudged Bowl	Forestdale Smudged Bowl	Smudged Reds Bowl	Unidentified Redware Bowl
Floor 1 general fill								
East 1/2	1							
Layer 1	2							
Layer 2	15	2	1			4		
Layer 3	2							3
Layer 4	1		1					
Layer 5	1						1	
Layers 5/6	2		3	2				
Floor 1 fill, Layer 6			1				2	
Floor 1 contact	1							
Floor 1 features								
Storage Bin 1 fill								
Layer 1								
Layer 4								
Floor fill, Layer 5								
Rock Feature 1	1							
Rock Feature 2	1							
Posthole 2								
Firepit 1								1
Other Pit 1								
Other Pit 6								
Burial 3								
Burial 4								
Wall Trench 3								
Floor 2, general fill								
Floor 2 fill, Layer 7					1			
Floor 2 concentration(?)								
Layer 8	1		1					1
Layer 9							1	
Layer 10								
Floor 2 contact								
Floor 2 features								
Firepit 1								
______Firepit 1								
Total by vessel	28	2	7	2	1	4	4	5
Grand total	30		9		1	4	4	5
% in room	1.1		0.3		-	0.1	0.1	0.2

Table C.3 (continued)

Room 7	Plain Gray Jar	Lino Gray Jar	Wide Neck-banded Jar	Narrow Neck-banded Jar	Early P-II Neck-corrugated Jar	Unidentified Corrugated Jar
Floor 1 general fill						
East 1/2						10
Layer 1	8			1	1	83
Layer 2	77		2	13	1	355
Layer 3	14		1	1		328
Layer 4	6		1	2		192
Layer 5	1			1	1	30
Layers 5/6	3			2		189
Floor 1 fill, Layer 6	13			6		262
Floor 1 contact	4					4
Floor 1 features						
Storage Bin 1 fill						14
Layer 1						5
Layer 4						1
Floor fill, Layer 5	1			1		2
Rock Feature 1	2					31
Rock Feature 2	5					27
Posthole 2	1					1
Firepit 1						1
Other Pit 1						2
Other Pit 6						2
Burial 3						16
Burial 4						1
Wall Trench 3						6
Floor 2, general fil			2			1
Floor 2 fill, Layer 7	9		2	1		9
Floor 2 concentration(?)						
Layer 8	20	1		6		22
Layer 9	26					17
Layer 10						
Floor 2 contact						
Floor 2 features						
Firepit 1	1			2		3
______Firepit 1	2			1		2
Total by vessel	202	1	8	17	3	1,616
Grand total	202	1	8	17	3	1,616
% in room	7.5	-	0.3	1.4	0.1	59.8

Table C.3 (concluded)

Room 7	Corrugated Pueblo II Rims Jar	Corrugated Pueblo II-III Rims Jar	Corrugated Pueblo III Rims Jar	Brownwares Jar	Fugitive Reds Jar	Subtotals	%
Floor 1 general fill							
East 1/2						18	0.7
Layer 1	3					141	5.2
Layer 2	4		1	4		799	29.6
Layer 3	6	2	1	1		462	17.1
Layer 4		1				221	8.2
Layer 5						58	2.1
Layers 5/6			2			256	9.5
Floor 1 fill, Layer 6	4		4			365	13.5
Floor 1 contact						14	0.5
Floor 1 features							
Storage Bin 1 fill						17	0.6
Layer 1						6	0.2
Layer 4						2	0.1
Floor fill, Layer 5						6	0.2
Rock Feature 1	1					46	1.7
Rock Feature 2						47	1.7
Posthole 2						2	0.1
Firepit 1						3	0.1
Other Pit 1						4	0.1
Other Pit 6						2	0.1
Burial 3						16	0.6
Burial 4						1	-
Wall Trench 3						11	0.4
Floor 2, general fill						4	0.1
Floor 2 fill, Layer 7						33	1.2
Floor 2 concentration(?)							
Layer 8					1	93	3.4
Layer 9					2	57	2.1
Layer 10						1	-
Floor 2 contact						1	-
Floor 2 features							
Firepit 1						10	0.4
_______Firepit 1						6	0.2
Total by vessel	18	3	8	5	5		
Grand total	18	3	8	5	5	2,702[a]	
% in room	0.7	0.1	0.3	0.2	0.2		99.6

[a]Breakdown:

Bowls	470	(17.4%)
Jars	2,224	(82.3%)
Others	8	(0.3%)
	2,702	(100.0%)

Table C.4. Room 8 ceramics: vessel and type by provenience

Room 8 East 1/2	Mesa Verde B/w Bowl	Mesa Verde B/w Other	McElmo B/w Bowl	Black Mesa B/w Bowl	Crumbled House B/w Other	Toadlena B/w Jar	San Juan Unidentified Bowl	San Juan Unidentified Jar	Chuskan Unidentified Other
Floor 1 general fill:									
Surface level 1	1						1		
Surface level 2									
Surface level 3			1					1	
Surface level 4	10		1		7		2	2	
Floor 1 floor fill	1		3			1			1
Floor 1:									
Burial 1 layer 3		1							
Burial 2 layer 2									
Burial 2 layer 3	2	1							
Other Pit 1							1		
Other Pit 3									
Other Pit 7									
Other Pit 8									
Floor 2 rodent hole									
Floor fill									
Construction 6									
Construction 7									
Construction 8				1					
SE foundations									
NE foundations									
Total by vessel	14	2	5	1	7	1	4	3	1
Grand total	16		5	1	7	1	7		1
% in room	3.0		0.9	0.2	1.3	0.2	1.3		0.2

Table C.4 (continued)

Room 8 East 1/2	Chaco B/w	Gallup B/w		Escavada B/w	Puerco B/w	Red Mesa B/w		"Early" Red Mesa B/w	Basketmaker III-Pueblo I Minerals	
	Jar	Bowl	Jar	Jar	Bowl	Bowl	Jar	Jar	Bowl	Jar
Floor 1 general fill:										
Surface level 1		1	2			1	1			
Surface level 2		1				1	1			
Surface level 3		2					1			
Surface level 4		4	1						2	
Floor 1 floor fill		5	2			2		1		1
Floor 1:										
Burial 1 layer 3										
Burial 2 layer 2										
Burial 2 layer 3										
Other Pit 1						1				
Other Pit 3	1									
Other Pit 7										
Other Pit 8										
Floor 2 rodent hole										
Floor fill										
Construction 6		1	1							
Construction 7				2	2					
Construction 8		2	1							
SE foundations										
NE foundations										
Total by vessel	1	16	7	2	2	5	3	1	2	1
Grand total	1	23		2	2	8		1	3	
% in room	0.2	4.4		0.4	0.4	1.5		0.2	0.6	

Table C.4 (continued)

Room 8 East 1/2	Reserve B/w		Pueblo II-III Mineral Unidentifed			Whiteware			Wingate B/r	St. Johns Polychrome	White Mountain Redware	Sanostee R/o
	Bowl	Jar	Bowl	Jar	Other	Bowl	Jar	Other	Bowl	Bowl	Bowl	Bowl
Floor 1 general fill:												
Surface level 1				4		1						
Surface level 2			6	12			1					
Surface level 3			2	5	1	3	10			1	2	
Surface level 4	1		2	5		7	7		1	2	2	
Floor 1 floor fill		1		1		4	3					
Floor 1:												
Burial 1 layer 3							1					
Burial 2 layer 2												
Burial 2 layer 3							2					
Other Pit 1			1	2			1					
Other Pit 3												
Other Pit 7			1									
Other Pit 8			2									
Floor 2 rodent hole												
Floor fill												
Construction 6			5	7		3	6					
Construction 7			10	9		6	4	1				
Construction 8			6	3		4	3					
SE foundations						1						1
NE foundations												
Total by vessel	1	1	35	48	1	29	38	1	1	3	4	1
Grand total	2		84			68			1	3	4	1
% in room	0.4		15.9			12.9			0.2	0.6	0.8	0.2

Table C.4 (continued)

Room 8 East 1/2	San Juan Redware Bowl	Forestdale Smudged Bowl	Unidentified Redware Bowl	Plain Gray Jar	Wide Neck-banded Jar	Narrow Neck-banded Jar	Early Pueblo II Neck-corrugated Jar
Floor 1 general fill:							
Surface level 1		1		11	2	1	
Surface level 2			2	5		3	
Surface level 3				16		3	
Surface level 4				4		2	
Floor 1 floor fill				3		3	
Floor 1:							
Burial 1 layer 3	1						
Burial 2 layer 2							
Burial 2 layer 3				1			
Other Pit 1							
Other Pit 3				2			
Other Pit 7							
Other Pit 8				3			
Floor 2 rodent hole						1	
Floor fill							
Construction 6				4		1	
Construction 7				2		1	
Construction 8				8			
SE foundations				2			
NE foundations				1			
Total by vessel	1	1	2	62	2	15	
Grand total	1	1	2	62	2	15	
% in room	0.2	0.2	0.4	11.8	0.4	2.8	

Table C.4 (concluded)

Room 8 East 1/2	Unidentified Corrugated Jar	Pueblo III Corrugated Rims Jar	Fugitive Red Jar	Subtotals	%
Floor 1 general fill:					
Surface level 1	8			35	6.6
Surface level 2	33			65	12.3
Surface level 3	29		1	78	14.8
Surface level 4	53	1		116	22.0
Floor 1 floor fill	34			66	12.5
Floor 1:					
Burial 1 layer 3	3			6	1.1
Burial 2 layer 2	1			1	0.2
Burial 2 layer 3				6	1.1
Other Pit 1	1			7	1.3
Other Pit 3	1	1		5	0.9
Other Pit 7	1			2	0.4
Other Pit 8	1			6	1.1
Floor 2 rodent hole				1	0.2
Floor fill	1			1	0.2
Construction 6	19			47	8.9
Construction 7	6			43	8.2
Construction 8	8		1	37	7.0
SE foundations				4	0.8
NE foundations				1	0.2
Total by vessel	199	2	2	527[a]	99.8
Grand total	199	2	2		
% in room	37.8	0.4	0.4		100.2

[a]Breakdown:

Bowls	127	(24.1%)
Jars	388	(73.6%)
Others	12	(02.3%)
	527	(100.0%)

Table C.5. 29SJ 633 ceramic inventory

	N	% of Ware	%N
Utility Ware			
Plain gray	962	19.3	11.9
Lino Gray	5	0.1	0.1
Lino Fugitive	8	0.2	0.1
Wide Neckbanded	56	1.1	0.7
Narrow Neckbanded	229	4.6	2.9
Neck Corrugated	27	0.5	0.3
PII Corrugated	40	0.8	0.5
PII-III Corrugated	9	0.2	0.1
PIII Corrugated	16	0.3	0.2
Indented corrugated	3621	72.7	45.1
Brownware	10	0.2	0.1
	4983	100.0	62.1
Mineral Paint Types			
BMIII-PI M/w	24	1.6	0.3
Early Red Mesa B/w	17	1.1	0.2
Red Mesa B/w	200	13.2	2.5
Escavada B/w	27	1.8	0.3
Puerco B/w	41	2.7	0.5
Gallup B/w	247	16.4	3.1
Chaco B/w	22	1.4	0.3
Reserve B/w	4	0.3	-
Socorro B/w	7	0.5	0.1
Brimhall B/w	1	0.1	-
Cortez B/w	5	0.3	0.1
Mancos B/w	21	1.4	0.3
PII-III M/w	893	59.2	11.1
	1509	100.0	18.8
Carbon Paint Types			
Lino B/g	2	0.5	-
Kana'a B/w	5	1.1	0.1
Black Mesa B/w	1	0.2	-
Tunicha B/w	1	0.2	-
Newcomb B/w	1	0.2	-
Burnham B/w	1	0.2	-
Toadlena B/w	5	1.1	0.1
Chuska B/w	3	0.7	-
Nava B/w	2	0.4	-
Crumbled House B/w	8	1.8	0.1
Chaco-McElmo B/w	9	2.0	0.1
Wetherill B/w	7	1.6	0.1
McElmo B/w	110	24.5	1.4
Mesa Verde B/w	136	30.3	1.7
Tusayan C/w	6	1.3	0.1
Chuskan C/w	20	4.5	0.3
San Juan C/w	132	29.4	1.6
	449	100.0	5.6

	N	% of Ware	%N
Whiteware	886	100.0	11.0
Redware, Polychromes, and Smudged			
Bluff B/r	3	1.5	-
Sanostee R/o	2	1.0	-
Deadmans B/r	1	0.5	-
Puerco B/r	15	7.4	0.2
Wingate B/r	12	6.0	0.2
St. Johns B/r	4	2.0	-
Wingate Poly	4	2.0	-
St. Johns Poly	14	7.0	0.2
San Juan redware	15	7.4	0.2
Tusayan B/r	2	1.0	-
White Mountain redware	76	37.6	1.0
unknown redware	35	17.3	0.4
Forestdale Smudged	11	5.4	0.1
Showlow Smudged	3	1.5	-
Reserve Indent Corr Smud.	1	0.5	-
unknown smudged red	4	2.0	-
	202	100.1	2.5
Historic Polychrome	1	100.0	-
GRAND TOTALS	8,030		100.0%

Table C.6. Refitted or matched sherds at 29SJ 633

Crumbled House B/w mug
5 FS 368 Room 8, E half Ly 1 Lv 4
1 FS 378 Room 8, Ly 5 Fl fill

McElmo B/w bowl
1 FS 150 Room 7, NE quad Ly 2
1 FS 840 Room 7, NE quad Lys 5-6

Mesa Verde B/w bowl
1 FS 31 Room 7, Ly 2 Lv 4
1 FS 340 Room 8, E half Lv 1

Mesa Verde B/w bowl
1 FS 840 Room 7, NE Quad Lys 5-6
2 FS 642 Room 7, SW Quad Ly 6 Lv 7
10 FS 746 Room 7, Rock Concent. #1
1 FS 641 Room 7, SW Quad Ly 6 Lv 7

PIII Indented Corrugated jar
1 FS 642 Room 7, SW Quad Ly 6 Lv 7
1 FS 641 Room 7, SW Quad Ly 6 Lv 7
1 FS 202 Room 7, SE Quad Ly 5-6
1 FS 368 Room 7, E half Ly 1 Lv 4

Wingate B/r bowl
1 FS 604 Room 7, Ly 3 Lv 5
1 FS 855 Room 7, subfloor 2 Lv 9
1 FS 907 Room 7, Floor 1, R.H. 1

PIII Indented Corrugated jar
1 FS 31 Room 7, Ly 2 Lv 4
1 FS 840 Room 7, E half Lv 1

St. Johns Polychrome bowl
1 FS 174 Room 7, Ly 4
1 FS 368 Room 8, Ly1 Lv 4
1 FS 39 Room 7, Ly 3, Lv 5

PII-III Indented Corrugated jar
1 FS 247 Room 7, NE Quad Ly 3
5 FS 39 Room 7, Ly3, Lv 5
2 FS 150 Room 7, NE Quad Ly 2 Lv 4
2 FS 160 Room 7, NE Quad Ly 3 Lv 5

Gallup B/w jar
3 FS 105 Room 7, NW Quad Ly 2 Lv 2
1 FS 100 Room 7, NW Quad Ly 1 Lv 1

McElmo B/w jar
1 FS 87 Room 7, SW Quad Ly 3 Lv 5
1 FS 123 Room 7, NW Quad Ly 2 Lv 4

McElmo B/w bowl
1 FS 278 Room 7, NE Quad Ly 6 Lv 8
2 FS 731 Room 7, Rock Concent. #2

Mesa Verde B/w bowl
9 FS 16 Room 7, SE Quad Ly 1 Lv 1
2 FS 9 Room 7, SE Quad Ly 2 Lv 2

Mesa Verde B/w bowl
1 FS 123 Room 7, NW Quad Ly 2 Lv 4
1 FS 75 Room 7, SW Quad Ly 2 Lv 4
1 FS 702 Room 7, Bin 1 fill
2 FS 307 Test Trench 1, 4-6 m

Chaco-McElmo B/w ?????
1 FS 39 Room 7, SE Quad Ly 2 Lv 4
1 FS 604 Room 7, NW Quad Ly 3 Lv 5

Mesa Verde B/w bowl
3 FS 1129 T.T. 3, Ly 1 Lvs 1-2
3 FS 311 Test Trench 1, 6-10 m
1 FS 327 Test Trench 1, 12-14 m

Mesa Verde B/w bowl
1 FS 323 Test Trench 1, 12-14 m
1 FS 311 Test Trench 1, 6-10 m

White Mountain Redware bowl
1 FS 604 Room 7, NW Quad Ly 3 Lv 5
1 FS 885 Room 7, SE Quad Ly 8
1 FS 907 Room 7, Floor R.H. #1

Mesa Verde Whiteware bowl
16 FS 16 Room 7, Ly 2 Lv 2
7 FS 31 Room 7, Ly 2 Lv 4
1 FS 48 Room 7, Ly 1 Lv 4
2 FS 142 Room 7, Ly 2 Lv 4

Mesa Verde B/w bowl
12 FS 16 Room 7, Ly 2 Lv 2
1 FS 135 Room 7, Ly 2 Lv 2

Table C.7. Refired samples from 29SJ 633

Provenience	Rough Sort Type	Form	Paste Color	Temper	Refired Color	Color (& Group)	FS & Sample #
Room 7 Ly 2 Lv 2	Mesa Verde B/w	Bowl	Chuska gray < shd	Med. trachyte + ss	5YR7/6	Yellow-red (4)	16-1
Room 7 Ly 2 Lv 3	Exotic M/w	Bowl	No type > sherd	Fine unknown ign	7.5YR7.5/6	Yellow-red (4)	24-1
Room 7 Ly 2 Lv 4	Mesa Verde B/w	Bowl	No type > sherd	Med. sandstone	7.5YR8/4	Buff (2)	31-7
**Room 7 Ly 2 Lv 4	McElmo B/w	Bowl	No type < sherd	Coarse San Juan + ss	5YR7/7	Yellow-red (5)	31-10
Room 7 Ly 2 Lv 4	McElmo B/w	Bowl	Tan > sherd	Fine sandstone	7.5YR7.5/6	Buff/Yellow-red (4)	31-11
Room 7 Ly 3 Lv 5	Chaco-McElmo B/w	Bowl	Gray > sherd	Med. sandstone	10YR8/4	Buff (1)	39-4
Room 7 Ly 2 Lv 2	McElmo B/w	Bowl	No type > sherd	Coarse trachyte + ss	7.5YR8/4	Buff (2)	55-1
Room 7 Ly 2 Lv 5	McElmo B/w	Bowl	Gray > blk. sherd	Med. sandstone	7.5YR8/4	Buff (2)	66-1
Room 7 Ly 3 Lv 5	McElmo B/w	Jar	No type > sherd	Med. San Juan ign	5YR7/8	Yellow-red (5)	87-5
Room 7 Ly 2 Lv 4	McElmo B/w	Bowl	No type > sherd	Coarse sandstone	7.5YR7/6	Yellow-red (4)	75-3
Room 7 Ly 2 Lv 4	Mesa Verde B/w	Bowl	No type no sherd	Med. San Juan + ss	7.5YR8/4	Buff (2)	75-4
Room 7 Ly 2 Lv 4	Mesa Verde B/w*	Ladle	No type > sherd	Med. trachyte + ss	5YR7/6	Yellow-red (5)	75-6
Room 7 Ly 2 Lv 4	PII-III M/w	Ladle	Gray > blk.sherd	Coarse sandstone	7.5YR7.5/5	Buff/Yellow-red (4)	75-7
Room 7 Ly 2 Lv 3	Mesa Verde B/w	Bowl	Gray > sherd	Fine unknown ign + ss	7.5YR6/6	Yellow-red (5)	112-1
Room 7 Ly 2 Lv 4	McElmo B/w	Bowl	Black all sherd	Coarse sandstone	7.5YR8/4	Buff (2)	123-5
Room 7 Ly 2 Lv 4	McElmo B/w	Bowl	Chuska gray	Med. trachyte + ss	7.5YR8/4	Buff (2)	123-8
Room 7 Ly 3 Lv 5	Mesa Verde B/w	Bowl	No type no sherd	Med. San Juan + ss	7.5YR7/6	Yellow-red (4)	160-3
Room 7 Ly 4	Mesa Verde B/w	Bowl	Tan no sherd	Med. San Juan + ss	7.5YR7/6	Yellow-red (4)	174-3
Room 7 Ly 4	McElmo B/w	Bowl	No type > sherd	Med. sandstone	10YR8/3	Buff (1)	174-4
Room 7 Lv 6	McElmo B/w	Bowl	Black > sherd	Med. trachyte + ss	7.5YR7/4	Buff (2)	202-8
Room 7 Ly 6 Lv 8	McElmo B/w	Bowl	No type < sherd	Med. San Juan ign	7.5YR8/4	Buff (2)	278-4
Room 7 Ly 6 Lv 8	Mesa Verde B/w	Bowl	No type all sherd	Fine sandstone	10YR8/3	Buff (1)	278-5
Room 7 Ly 6 Lv 8	Mesa Verde B/w	Bowl	No type no sherd	Med. San Juan + ss	7.5YR8/4	Buff (2)	278-7
Room 7 Burial 3	M.V. Whiteware	Ladle	Gray > sherd	Coarse sandstone	7.5YR7/8	Yellow-red (4)	291-1
Room 7 Ly 3 Lv 5	PII-III culinary	Jar	Tan no sherd	Coarse trachyte	2.5YR5/8	Red (6)	604-1
Room 7 Ly 3 Lv 5	Mesa Verde B/w	Bowl	No type < sherd	Fine iron oxide ss	10YR8/4	Buff (1)	604-5
Room 7 Ly 3 Lv 5	McElmo B/w	Bowl	Gray > blk-wh.	Med. sandstone	7.5YR7/6	Yellow-red (4)	604-6
**Room 7 Ly 3 Lv 5	McElmo B/w	Bowl	No type no sherd	Coarse sandstone	5YR6/2	Yellow-red (5)	604-7
Room 7 Ly 3 Lv 5	McElmo B/w	Bowl	No type > sherd	Med. trachyte + ss	7.5YR8/4	Buff (2)	604-8
FS # wrong, Rm 7?	Mesa Verde B/w	Bowl	Unknown	San Juan ign	7.5YR7.5/6	Yellow-red (4)	625-1
Room 7 Ly 6 Lv 3	McElmo B/w	Bowl	No type no sherd	Fine sandstone	7.5YR7/6	Yellow-red (4)	641-1
Room 7 Ly 6 Lv 7	McElmo B/w	Bowl	No type no sherd	Fine sandstone	7.5YR8/4	Buff (2)	641-7
Room 7 Ly 6 Lv 7	McElmo B/w	Ladle	Black > sherd	Coarse sandstone	7.5YR7/6	Yellow-red (4)	642-3
Room 7 Floor 1	PIII culinary	Jar	Gray > sherd	Med. sandstone	7.5YR8/6	Yellow-red (4)	656-1

*Crumbled House B/w; **cross-listed as "Mesa Verde B/w" by Toll et al. (1980), but coded as "42" or "McElmo B/w" in this analysis.

Table C.7 (concluded)

Provenience	Rough Sort Type	Form	Paste Color	Temper	Refired Color	Color (& Group)	FS & Sample #
**Room 7 Rock Pile 1	McElmo B/w	Bowl	Gray > sherd	Med. sandstone	7.5YR8/6	Yellow-red (4)	746-1
Room 7 Ly 3	McElmo B/w	Bowl	Tan > sherd	Coarse trachyte + ss	5YR7/8	Yellow-red (5)	770-1
Room 7 Ly 4	Mesa Verde B/w	Bowl	No type no sherd	Coarse San Juan ign	7.5YR7/6	Yellow-red (4)	783-1
Room 7 Ly 5	Mesa Verde B/w	Bowl	Gray < blk. sherd	Med. San Juan + ss	7.5YR7/8	Yellow-red (4)	788-1
Room 7 Ly 5	MV whiteware	Bowl	Tan all sherd	Fine San Juan + ss	5YR7/6	Yellow-red (5)	796-3
Room 7 Ly 6 Fl fill	PII-III culinary	Jar	Tan > sherd	Coarse sandstone	7.5YR8/6	Yellow-red (4)	840-1
Room 7 Ly 6 Fl fill	McElmo B/w	Jar	Gray > blk. sherd	Coarse sandstone	7.5YR7/6	Yellow-red (4)	840-6
Room 7 Ly 6 Fl fill	McElmo B/w	Bowl	Gray > sherd	Coarse unknown ign	7.5YR7/6	Yellow-red (4)	840-9
Room 7 Ly 6 Fl fill	McElmo B/w	Bowl	Gray all blk-wh	Coarse sandstone	7.5YR7/6	Yellow-red (4)	840-10
Room 7 Ly 6 Fl fill	McElmo B/w	Bowl	No type > sherd	Med. sandstone	10YR8/4	Buff (1)	840-11
Room 7 Floor	McElmo B/w	Bowl	Gray all sherd	Coarse sandstone	7.5YR8/6	Yellow-red (4)	872-1
Room 8 Ly 1 Lv 4	Mesa Verde B/w*	Mug	Chuska gray	Coarse trachyte	5YR6/8	Yellow-red (5)	368-1
Room 8 Ly 1 Lv 4	Mesa Verde B/w	Bowl	Gray all sherd	Med. sandstone	7.5YR7/6	Yellow-red (4)	368-2
Room 8 Ly 1 Lv 4	Mesa Verde B/w	Bowl	Gray > blk. sherd	Med. sandstone	7.5YR7.5/6	Yellow-red (4)	368-3
Room 8 Ly 1 Lv 4	whiteware	Bowl	Tan > sherd	Med. trachyte	5YR6/8	Yellow-red (5)	368-4
Room 8 Ly 1 Lv 4	PIII culinary	Jar	No type no sherd	Coarse San Juan ign	2.5YR6/8	Red (6)	368-12
Room 8 Other Pit 3	PII-III culinary	Jar	Tan > sherd	Coarse sandstone + SJ	7.5YR7/8	Yellow-red (4)	422-1
Room 8 Burial 1	PII-III culinary	Jar	Tan > sherd	Med. sandstone	7.5YR8/4	Buff (2)	432-1
Room 8 Burial 1	MV whiteware	Ladle	Gray > sherd	Med. trachyte + ss	5YR7/6	Yellow-red (5)	436-1
Room 8 Burial 2	Mesa Verde B/w	Ladle	No type > sherd	Med. unknown ign	7.5YR8/4	Buff (2)	488-1
Room 8 Burial 2	Mesa Verde B/w	Bowl	No type > sherd	Med. sandstone	7.5YR8/4	Buff (2)	472-1
Test Trench 1 fill	Chuska B/w	Bowl	Chuska gray	Med. trachyte	2.5YR?	Red (6)	300-14
Test Trench 1 fill	Chaco-McElmo B/w	Bowl	No type no sherd	Fine sandstone	7.5YR8/4+	Buff (2)	311-9
Test Trench 1 fill	Mesa Verde B/w	Bowl	No type no sherd	Coarse San Juan ign	5YR6/8	Yellow-red (5)	317-4
Test Trench 1 fill	Toadlena B/w	Bowl	No type < sherd	Coarse trachyte + ss	2.5YR?	Red (6)	330-3
Test Trench 1 fill	Chaco-McElmo B/w	Bowl	Unknown	Fine sandstone	7.5YR7/6+	Yellow-red (4)	na
Indicated in Toll et al. (1980), data lost							
	Mesa Verde B/w	Bowl	Unknown	Trachyte	2.5YR?	Red (6)	na
	Mesa Verde B/w	Bowl	Unknown	Unknown ign + ss	2.5YR?	Red (6)	na
	Mesa Verde B/w	Bowl	Unknown	San Juan ign	2.5YR?	Red (6)	na
	Mesa Verde B/w	Bowl	Unknown	San Juan ign	2.5YR?	Red (6)	na
	Mesa Verde B/w	Bowl	Unknown	San Juan ign	2.5YR?	Red (6)	na
	Mesa Verde B/w	Bowl	Unknown	San Juan ign + ss	7.5YR8/4?	Buff (2)	na
	Mesa Verde B/w	Bowl	Unknown	Sandstone	7.5YR7/2-4	Buff (2)	na

*Crumbled House B/w; **cross-listed as "Mesa Verde B/w" by Toll et al. (1980), but coded as "42" or "McElmo B/w" in this analysis.

Appendix D

FAUNAL REMAINS: NOTES ON FEATURES AND MISCELLANEOUS PROVENIENCES

William B. Gillespie

Although Table 10.3 breaks down the faunal remains recovered from most individual layers from the excavated rooms at 29SJ 633, individual features and any divisions of those features have in most cases been lumped. For those interested in finer breakdowns of faunal remains in features and other special proveniences, the following listing and discussion will be of use.

Room 7, Layer 4, Rock Concentration 1 (FS 755)

Material: Taxon	Elements	MNI	Number Charred
Sylvilagus	22	4	0
Lepus	2	1	0
Cynomys	3	1	0
Thomomys	2	1	0
Neotoma sp.	2	1	0
Buteo sp.	1	1	0
Meleagris	30	2	1
Unidentified small mammal	2	-	0
Unidentified medium mammal	2	-	0
Total	66	11	1

Remarks: This assemblage was not conspicuously different from the rest of Room 7 fill. However, turkeys were more numerous than cottontails in terms of number of specimens, and jackrabbits were sparse. Most of the turkey bones were evidently from a single large (male) bird.

Room 7, Layer 4, Rock Concentration 2 (FS 733)

Material: Taxon	Elements	MNI	Number Charred
Sylvilagus	52	5	0
Lepus	73	4	0
Cynomys	5	2	0
Neotoma	6	2	0
Meleagris	75	3	2
Unidentified small rodent	3	-	0
Unidentified small mammal	30	-	0
Unidentifed medium mammal	2	-	0
Unidentified vertebrate	5	-	0
Total	251	16	2

Remarks: Turkeys were again common and Lepus was far more abundant here than in Rock Concentration 1. Lepus remains were also noteworthy for an abnormally high incidence of hind feet. Eighteen of the elements were metatarsals; twenty were phalanges; four were astragali; six were calcanea; and six were tarsals. Hind limbs were also over-represented in the Sylvilagus collection though not to the same extent. This is an interesting occurrence, possibly the by-product of a butchering or consumption event (or evidence of craft specialization in villages of lucky rabbits' feet to be marketed in the Toltec empire).

Room 7, Bin 1

This large feature contained an assemblage of bones, the lower part of which appeared to be a separate deposit from the rest of the room fill. In tabulating these remains in Table 10.3, we put Layers 1 and 2 of the south half with the room fill and summed all other provenience units for a Bin 1 total.

Room 7, Bin 1 (continued)

	E/MNI							
Material: Taxon	Layer 1 FS 673	Layer 2 FS 677	Mixed Layers FS 703	Layer 4 FS 687	Layer 5 FS 694	Fl. fill Floor 1 FS 718	Floor 2 FS 992	Total
Sylvilagus	4/1	5/1	45/3	3/1	14/2			71/4
Lepus			9/2		7/2			16/2
Cynomys		1/1	3/2	1/1	7/2			12/2
Peromyscus			2/1					2/1
Neotoma			1/1					1/1
Odocoileus			1/1					1/1
Meleagris	3/1	19/1	35/1	4/1	25/1	1/1		87/4
Unidentified small rodent			5					5
Unidentified small mammal	2		16	2	11			31
Unidentified artiodactyl			1					1
Unidentified large mammal			5					5
Unidentified vertebrate					8		1	9
Total	9/2	25/3	123/11	10/3	72/9	1/1	1	241/15

Remarks: Noteworthy here were the turkey remains; included were parts of three adults and a juvenile less than 1 week old. Layer 5 was the most interesting as it included the juvenile partial skeleton and parts of a wing of an adult female, which appeared to show butchering (snap fractures on humerus and radius). This occurrence was reminiscent of OP 14 at 29SJ 629, a large bell-shaped plaza pit where juvenile birds were found with an isolated articulated adult wing. It is possible that the bin served as a pen for young birds. Other material in the lower part of the bin looked like trash with definitely butchered jackrabbit remains and the only identified deer bone from the excavations as well as other unidentified large mammal remains.

Room 7, Floor 1 Features

Material: Taxon	OP 1 Fill FS 930	OP 2 Fill FS 936	OP 3 Fill FS 989	OP 6 Fill FS 955	PH 2 Fill FS 899
	E/MNI (1 MNI if not noted)				
Sylvilagus				2/2	1
Cynomys	1			1	
Peromyscus	1		2	2	
Meleagris		1		2	
Unid. rodent			1		
Unid. sm. mammal	5	2			

Remarks: That Floor 1 features were generally lacking in cultural debris is attested to by the fact that Peromyscus was the most abundant genus. The few other elements were probably from the lowest part of the room fill.

Room 7, "Rodent Disturbances" (RH = Rodent Hole)

Material: Taxon	RH 1 FS 910	RH 2 FS 914	Disturbed Area Between RH 1 and 2 FS 919
Sylvilagus	6	5/5	6
Lepus	1	1	
Cynomys	1		1
Dipodomys ordii			2
Neotoma	1		
Meleagris	2		2
Unid. small mammal	5	4	
Unid. medium-large mammal	1		

Remarks: The few remains here were similar to those found in the features except, of course, that there were more small intrusive rodents in the features. It looks as though both Peromyscus and Dipodomys may have had the run of the house after the room was abandoned.

Room 7, Floor 1 Burial Pit 3 (FS 282)

Material: Taxon	Elements	MNI	Number Charred
Sylvilagus	13	2	3
Lepus	5	1	
Cynomys	4	3	
Thomomys	1	1	
Perognathus	1	1	
Meleagris	23	2	
Buteo sp.	2	1	

Remarks: Although the Buteo elements could be associated with the burial, most of the faunal contents of this pit appeared to be trash, not directly related to the function of the pit.

Room 7, Floor 2, Features, Rodent Area 2

Material: Taxon	FP 1 Fill FS 981	FP 1 Plaster FS 987	OP 1 Fill FS 969	Rodent Area 2 FS 978	OP 2 Fill FS 1158
Sylvilagus	1	1	2		
Cynomys			1		
Dipodomys ordii			1		
D. spectabilis			4		
Peromyscus				22	6
Onychomys			1		
Ovis canadensis			1		
Meleagris			1		
Unid. small rodent			4		3
Unid. small mammal	1		5		1
Unid. medium-large mammal			3		
Total	2/1	1/1	23/7	22/1	10/1

Remarks: Rodent disturbance appears to have been extensive, not only in "Rodent Area 2" but in the two "Other Pits." OP 1 also included cultural debris including the only bighorn bone from the site and three unidentified, medium-large mammal bones. Firepit 1 contained nothing of note. None of the specimens from any of the features was charred.

Room 8, Floor 1 Features (C = charred)

Material: Taxon	OP 3 (Burial 1) Layer 2 FS 427	OP 3 (Burial 1) Layer 3 FS 446	Burial 2 Layer 2 FS 467	Burial 2 Layer 3 FS 474	OP 4 Fill FS 457	OP 5 Fill FS 462	OP 8 Fill FS 486
Sylvilagus		2(2C)	2(2C)	2(1C)	1	2	4
Cynomys		1(1C)					1
Peromyscus	2						
Dipodomys ordii							1
Meleagris			1(1C)	2(2C)			
Pipilo						1	
Unidentified small mammal	2(1C)	4(2C)		10(8C)		3	11
Unidentified med.-lg. mammal			1				1
Total	4/1	7/2	4/2	14/2	1/1	6/2	18/3

Remarks: Of note here was the prevalence of charred remains in the two burial pits where more than two-thirds of the specimens were burned. Both turkeys and small mammals were charred in the Burial 2 pit, and only small mammals with Burial 1. Peromyscus and Dipodomys suggested some rodent disturbance. Significance of a single Pipilo (towhee) bone in OP 5 is undetermined. Akins (1985:330) indicates that this uncommon migrant is the only representative of this species and one of three species of Fringilladae found to date in Chaco Canyon. She adds that birds are not a primary food item but are of ceremonial importance to the Pueblo Indians.

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